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Phase II Investigation Report for Pueblo Canyon Aggregate Area



Prepared by the Environmental Programs Directorate

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Responsible project manager:

Printed Name	Signature	Title	Organization	Date
Becky Coel-Roback		Project Manager	Environmental Programs	9/28/10

Responsible LANS representative:

Printed Name	Signature	Title	Organization	Date
Michael J. Graham		Associate Director	Environmental Programs	28 Sept 10

Responsible DOE representative:

Printed Name	Signature	Title	Organization	Date
George J. Rael	for GJR	Manager	DOE-LASO	9/30/2010

EXECUTIVE SUMMARY

This report presents the Phase II investigation and remediation activities at six sites: Solid Waste Management Unit (SWMU) 00-018(a), Areas of Concern (AOCs) 00-030(eS), 00-030(f) and 00-030(h), SWMU 31-001, and SWMU 45-004 in Consolidated Unit 45-001-00. Investigation and remediation activities were conducted from February to June 2010. In addition, historical data from previous investigations completed between 1996 and 2007 are incorporated into this investigation report.

The Pueblo Canyon Aggregate Area is located in the Los Alamos townsite and within the Pueblo Canyon watershed. The Pueblo Canyon Aggregate Area sites discussed in this report are located on former Los Alamos National Laboratory (the Laboratory) property that is now part of the Los Alamos townsite, including property located within Pueblo Canyon. The sites include decommissioned wastewater treatment plants and decommissioned septic systems. Transfer of the property on which these sites are located occurred historically, either to Los Alamos County or to private landholders.

The principle activities of the Phase II investigation included drilling 14 boreholes for a total of 229 linear feet; collecting surface and shallow subsurface samples from 18 locations; excavating 306 yd^3 of contaminated environmental media at AOC 00-030(h); and collecting six confirmatory samples following the soil-tuff removal at AOC 00-030(h). For the 2010 field activities, a total of 64 surface and subsurface samples were collected for off-site laboratory analysis. Sampling locations and strategies were based on specific data requirements identified following the Phase I investigation.

Based on the analytical results from the Phase I and Phase II investigations, the nature and extent of all contaminants of potential concern are defined at the six sites.

The human health risk-screening assessment results indicated no potential unacceptable risks from COPCs for the recreational and residential scenarios at the six sites. The total excess cancer risks were equivalent to or below the New Mexico Environment Department (NMED) target risk level of 1×10^{-5}, the hazard indexes (HIs) were below the NMED target HI of 1.0, and the total radiological doses were below the U.S. Department of Energy target dose limit of 15 mrem/yr.

The ecological risk-screening assessment results indicated no potential unacceptable risks to any receptor at the six sites.

The Laboratory recommends corrective actions complete without controls for SWMU 00-018(a), AOCs 00-030(eS), 00-030(f) and 00-030(h), SWMU 31-001, and Consolidated Unit 45-001-00 and will request certificates of completion for these sites under separate cover.

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1.0 INTRODUCTION

The 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 (Figure 1.0-1). 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. The eastern portion of the plateau stands 300 ft to 1000 ft above the Rio Grande.

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

This investigation report presents the results of the Phase II characterization and remediation activities conducted in accordance with the Phase II investigation work plan for the Pueblo Canyon Aggregate Area (LANL 2008, 104580), approval with modifications (NMED 2008, 103002), and the approved Work Plan for Installation of Stormwater Controls at Area of Concern 00-030(f) (LANL 2009, 105088). This investigation report presents a comprehensive assessment of current site conditions based on the results of the Phase II and previous investigations.

This investigation report describes the characterization and corrective action activities conducted from February to June 2010 at Pueblo Canyon Aggregate Area within Los Alamos townsite and the Pueblo Canyon watershed. Based on the results of Phase I characterization sampling, two SWMUs, three AOCs, and one consolidated unit in the Pueblo Canyon Aggregate Area were recommended for additional characterization or remediation. The New Mexico Environment Department (NMED) regulates cleanup of hazardous wastes and hazardous constituents, pursuant to the New Mexico Hazardous Waste Act. 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.

Corrective actions at the Laboratory are subject to the Compliance Order on Consent (the Consent Order). The Consent Order was issued pursuant to the New Mexico Hazardous Waste Act, New Mexico Statutes Annotated (NMSA) 1978 §74-4-10, and the New Mexico Solid Waste Act, NMSA 1978, Section 74-9-36(D).

This Phase II investigation report includes SWMU 00-018(a), AOCs 00-030(eS), 00-030(f), and 00-030(h), SWMU 31-001, and Consolidated Unit 45-001-00 (Figure 1.0-1). The Pueblo Canyon Aggregate Area Phase II investigation was conducted in accordance with the approved Phase II investigation work plan (LANL 2008, 104580) and was performed to satisfy any general requirements contained in Section IV.B.1 of the Consent Order.

1.1 General Site Information

The Pueblo Canyon Aggregate Area consists of sites located within the Pueblo Canyon watershed or sites that discharged directly to the Pueblo Canyon watershed from the mesa top (Figure 1.0-1). These

sites are located on former Laboratory property that is now part of the Los Alamos townsite or in Pueblo Canyon. Transfer of the property on which these sites are located occurred historically either to Los Alamos County or to private landholders.

As a result of previous investigations at Pueblo Canyon Aggregate Area and the subsequent notice of disapproval (NOD) (NMED 2008, 102049) and approval with modifications (NMED 2008, 103002), the 2010 Phase II field activities included additional work at 6 of the 45 sites at Pueblo Canyon Aggregate Area, including

- SWMU 00-018(a), the former Pueblo Canyon Wastewater Treatment Plant (WWTP);
- AOC 00-030(eS), a former septic tank;
- AOC 00-030(f), a former septic tank;
- AOC 00-030(h), a former septic tank;
- SWMU 31-001, a former septic system; and
- Consolidated Unit 45-001-00, former TA-45 WWTP.

SWMU 00-018(a) is the decommissioned Pueblo Canyon WWTP, which was transferred to Los Alamos County in the early 1960s, decommissioned in 1991–1992, and demolished in 2008. The site of the former WWTP is currently accessible to the public for recreational activities such as hiking, mountain biking, and horseback riding.

AOC 00-030(eS) is a former septic tank located on private property south of Canyon Road at the Chapel Apartments. The tank was likely removed when the Chapel Apartments were built in 1947 (LANL 1996, 056432, pp. 28, 32), and the site is currently a paved parking lot.

AOC 00-030(f) is a former septic tank located on private property near the United Church school building south of Canyon Road and the associated drainline and outfall, located next to the former WWTP (Consolidated Unit 45-001-00).

AOC 00-030(h) is a former septic tank located on private property north of Canyon Road, beneath the asphalt-paved west parking lot at the Immaculate Heart of Mary Catholic Church (3600 Canyon Road) (LANL 1996, 053799, p. 1). The outlet discharged north into Acid Canyon. The area of soil removal at the head of Acid Canyon between Canyon Road and Trinity Drive is located on Los Alamos School District property and on Immaculate Heart of Mary Catholic Church property.

SWMU 31-001 is a former septic tank located on a small bench above the rim of Pueblo Canyon, north of building 31-7 (LANL 1992, 007668, p. 3-48). Technical area (TA-31) was located in what is now the eastern residential area of Los Alamos, immediately west of the Los Alamos County Airport (LANL 1995, 058085, p. 1; LANL 1996, 054320, p. 32).

Consolidated Unit 45-001-00 consists of five SWMUs and one AOC. Of the six sites, the sanitary sewer outfall (SWMU 45-004) is the only site included in this Phase II work and consists of an outfall associated with the sewer system constructed in 1947 to serve the Los Alamos townsite (LANL 1995, 048856, p. 68).

1.2 Purpose of Investigation

The objectives of the Phase II Investigation are to complete the characterization of nature and extent of contamination at five sites and to complete the soil removal at one site within the Pueblo Canyon Aggregate Area. The following data needs were identified to satisfy these objectives:

- finalize determination of the vertical extent of specified inorganic chemicals of potential concern (COPCs) at three sites: AOC 00-030(eS), SWMU 31-001, and SWMU 45-004 in Consolidated Unit 45-001-01;
- perform sampling at AOC 00-030(f) based on new information regarding outfall location;
- perform additional sampling at SWMU 00-018(a) to confirm no changes to site conditions resulted from 2008 demolition activities;
- remediate contamination to meet residential risk levels so land use is unrestricted at AOC 00-030(h); and

Specific details of the data requirements identified for this investigation are provided in section 2.

1.3 Document Organization

This investigation report is organized in nine sections, including this introduction, with multiple supporting appendixes. Section 2 presents an overview of surface and subsurface conditions. Section 3 discusses the scope of investigation activities, and section 4 presents the regulatory criteria. Section 5 presents a discussion of statistical data analysis and the inorganic chemical background comparisons for soil and tuff. Section 6 provides an overview of the site characteristics, operational history, results of previous investigations, results of field investigation, the analytical data, and the nature and spatial distribution of contamination. Section 7 presents the conclusions based on applicable historical data as well as the Phase II investigation data and summarizes the risk-screening assessments performed. Section 8 discusses recommendations for additional actions, if warranted, based on applicable data and the risk-screening assessments. Section 9 includes a list of references cited in this report and the map data sources.

Appendixes A through G present field documentation and associated information, the analytical data (on DVD), a quality assurance/quality control (QA/QC) review of analytical data, and supplemental reports. Appendix H presents box plots and results of statistical tests used to identify COPCs. Appendix I discusses the risk-screening assessments and interpretation of the risk results.

2.0 PUEBLO CANYON AGGREGATE AREA SITE CONDITIONS

2.1 Surface Conditions

The elevations of sites within the Pueblo Canyon Aggregate Area range from approximately 6520 to 7300 ft above mean sea level (amsl). Canyon bottoms range in elevation from approximately 6400 ft amsl at the bottom of Pueblo Canyon to about 7200 ft amsl at the head of Acid Canyon.

The surface conditions of the sites within the Pueblo Canyon Aggregate Area vary. The sites are generally vegetated, but some are located partially or fully under pavement and/or have an outfall leading to the hillslope colluvium. Surface slopes vary from gradients of less than 5% to nearly vertical relief. Most of the sites within the Pueblo Canyon Aggregate Area are underlain by the Tshirege Member of the

Quaternary Bandelier Tuff, which is geomorphologically expressed as a series of benches and steep slopes that grade into Acid and Pueblo Canyons.

2.1.1 Soil

For most of the sites in the Pueblo Canyon Aggregate Area, the natural or undisturbed surface soil cover is limited because of activities such as building and road construction. Thus, the surface material is typically fill, which may be crushed tuff, disturbed soil, or other kinds of imported material (i.e., base course). Where undisturbed, soil on the mesa surface is generally thin. Soil is generally sandy to silty in composition near the surface and more clay-rich at depth. A discussion of soil in the Los Alamos area can be found in the installation work plan (LANL 1998, 062060, p. 2–21) and in Nyhan et al. (1978, 005702, pp. 24–25). Surface material at the SWMUs and AOCs in the Pueblo Canyon Aggregate Area also includes sediment and alluvial deposits within or near stream channels.

2.1.2 Surface Water Conditions

Mesa tops of the Pajarito Plateau are generally dry, both on the surface and within the bedrock forming the mesa. Canyons range from wet to relatively dry; the wettest portions of Pueblo Canyon contain persistent alluvial groundwater saturation with persistent, but discontinuous, surface water. The Pueblo Canyon Aggregate Area includes Acid Canyon, which drains into Pueblo Canyon, and subsequently Pueblo Canyon drains into Los Alamos Canyon.

The surface water and alluvial groundwater hydrology of the Pueblo Canyon watershed is related to several primary factors, including the location and discharge volume of natural and anthropogenic water sources, seasonal events (e.g., snowmelt runoff and stormwater runoff), and general regional climatic conditions (LANL 2004, 087390, p. 7-19). Surface water flow in Acid Canyon and upper Pueblo Canyon, upstream from the Bayo Canyon WWTP [AOC 00-018(b)], is generally ephemeral and occurs primarily as short-duration stormwater runoff (LANL 2004, 087390, p. 7-21). Stormwater runoff into the head of Acid Canyon includes residential and business areas on and west of Trinity Drive and the nearby parking lots and surface areas at the Los Alamos High School and the Immaculate Heart of Mary Catholic Church, thus influencing site contamination at SWMU-00-030(h). Locally persistent surface water flow has been observed in bedrock pools or where alluvial groundwater discharges. Intermittent flow also occurs during snowmelt runoff or alluvial groundwater discharges (LANL 2004, 087390, p. 7-21).

One of the sites in the Pueblo Canyon Aggregate Area is Consolidated Unit 45-001-00, which includes the ephemeral stream channel and associated inactive channel and floodplain areas in Acid Canyon reach ACS (the South Fork of Acid Canyon). None of the other SWMUs or AOCs are directly associated with stream channels. Generally, surface water flow is associated with stormwater and snowmelt runoff from surrounding land forms. No stream flow was observed during the 2010 investigation.

2.1.3 Land Use

Pueblo Canyon is currently open to the public for recreational activities. A well maintained hiking/biking trail system (Pueblo Bridges Loop Trail) exists across the eastern part of SWMU 00-018(a), which has pedestrian access via a closed road (off of Olive Street). The location of SWMU 31-001 crosses the Los Alamos Mesa Trail along the south side of Pueblo Canyon. Sampling locations at Consolidated Unit 45-001-00 (SWMU 45-004) are within an east-west oriented drainage that empties into Acid Canyon and can be accessed via the Ranch School Trail system, north of the Larry R. Walkup Aquatic Center. The remaining sites are located along Canyon Road or on private property within the Los Alamos townsite. The excavation at AOC 00-030(h) occurred in the densely vegetated and steep-sided head of

Acid Canyon, located on Los Alamos Public School and Immaculate Heart of Mary Catholic Church property.

2.2 Subsurface Conditions

2.2.1 Stratigraphic Units of the Bandelier Tuff

The generalized stratigraphy underlying the sites in the Pueblo Canyon Aggregate Area is shown in Figure 2.2-1. The Quaternary Bandelier Tuff is subdivided into two members: the 1.61 Ma Otowi (Qbo), and the 1.22 Ma Tshirege (Qbt) (Broxton et al. 1995, 050121, pp. 33–63). The Tshirege Member of the Bandelier Tuff is a compound cooling unit divided into four distinct cooling units: unit 4, unit 3, unit 2, and units 1v and 1g (Broxton et al. 1995, 050121, pp. 33–63).The Otowi Member of the Bandelier Tuff is a relatively homogenous unit made up of a succession of ash-flow tuff. The base of the Otowi Member includes the Guaje Pumice Bed, a stratified pumice deposit (Broxton and Reneau 1995, 049726, p. 10).

The 1.22 Ma Tshirege Member of the Quaternary Bandelier Tuff (Qbt) is exposed within the Pueblo Canyon Aggregate Area and is overlain by a thin layer of colluvium, alluvium, fill, and/or soil. The bedrock directly underlying most of the SWMUs and AOCs is either cooling unit 3 (Qbt 3), a cliff-forming, partly to nonwelded tuff, or cooling unit 2 (Qbt 2), a distinct, bench-forming, partly- to densely-welded tuff.

At SWMU 00-018(a), the upper 5 to 30 ft of media has been reworked, displaced, filled, and mixed with construction debris and other fill material. In addition, a large area in the central portion of the site has been used by Los Alamos County to land-apply sludge resulting from WWTP operations.

2.2.2 Groundwater Conditions

The regional aquifer, in the central and western portions of the Pajarito Plateau flows eastward towards the Rio Grande within the Puye Formation of the Santa Fe Group. The depth of the regional aquifer decreases from about 1200 ft below ground surface (bgs) along the western margin of the Pajarito Plateau to about 600 ft bgs along the eastern margin. The regional aquifer is encountered in deep wells in Pueblo Canyon at approximately 6070 ft amsl (TW-4), 5870 ft amsl (R-2), 5880 ft amsl (TW-2), and 5830 ft amsl (R-4), resulting in an approximate depth to regional groundwater for the SWMUs and AOCs in the Pueblo Canyon Aggregate Area of greater than 1000 ft bgs. The groundwater in the regional aquifer is separated from alluvial and perched groundwater by 350 to 620 ft of tuff and volcanic sediments (Purtymun 1995, 045344, p. 29).

The Laboratory's evaluation of the nature of regional groundwater in Pueblo Canyon and the possible impacts of SWMUs and AOCs is ongoing via intermediate and regional groundwater monitoring (e.g., LANL 2003, 082612).

3.0 SCOPE OF ACTIVITIES

This section presents an overview of preliminary activities and field activities performed during the implementation of the Pueblo Canyon Aggregate Area Phase II investigation per the approved investigation work plan (LANL 2008, 104580) and approval with modifications letter (NMED 2008, 103002). The field-investigation results and observations are presented in detail in section 6.0 and in the appendixes. The scope of activities for the Pueblo Canyon Aggregate Area Phase II investigation included site access and premobilization activities; geodetic surveys, radiological screening; surface and shallow-subsurface sampling; borehole drilling, sampling, and abandonment; environmental media and debris removal; health and safety monitoring; and waste-management activities.

3.1 Site Access and Public Access Controls

The area around the WWTP complex, SWMU 00-018(a), is traversed by a frequently used trail system that is accessed either from the now closed Olive Street or from the Pueblo Canyon Bridges trail system. Vehicular traffic access to the drill site was limited by a locked gate at the intersection of Orange and Olive Streets, in the Pajarito Environmental Education Center parking lot. “Caution Do Not Enter” signage was placed at the western edge of the access to the WWTP off Olive Street. Because of the timing of the Phase II investigation (late February 2010), snow present on the ground limited pedestrian traffic along this trail system. No observed impact to recreational users or the trail system occurred during the 2010 investigation.

The drill site at SWMU 31-001 was located approximately 50 ft south of the Los Alamos Mesa Trial, which is accessed at the end of Nambe Place, west of the Los Alamos County Airport. The Los Alamos Mesa Trail is a popular trail for activities such as exercising pets, hiking, and running. Because of the amount of snow and ice on the trail during the one day of field work, there was no pedestrian traffic on the trail.

The area of soil removal at the head of Acid Canyon between Canyon Road and Trinity Drive, AOC 00-030(h), is located on Los Alamos Public Schools and Immaculate Heart of Mary Catholic Church property. Background checks for all uncleared field personnel were completed, and an access agreement with Los Alamos Public Schools was completed in May 2010 to allow work to progress. Rope, caution tape barriers, and warning signage were placed around the parking lot where the heavy equipment was used or stored to prevent access by students and other pedestrians near the church and school.

Work at AOCs 03-030(eS) and 00-030(f) and Consolidated Unit 45-001-00 did not require special site access or public access control precautions. Activities at these sites were conducted on property owned by Los Alamos County under the standing access agreement between the Laboratory and Los Alamos County.

3.2 Field Activities

The following sections describe the field activities, including surface surveys, field screening, surface and shallow-subsurface sampling, borehole drilling, sampling and abandonment, and excavation, conducted during the Phase II investigation. Details regarding the field methods and procedures used to perform these field activities are presented in Appendix B.

3.2.1 Vegetation Clearing at Investigation sites

Vegetation clearing was only needed at AOC 00-030(h) within the head of Acid Canyon. Various native shrubs and brushes and small trees were removed or cut during remediation/excavation activities. Vegetation clearing was not allowed on the mesa-top portion of the site, per the access agreement with the property owner (Immaculate Heart of Mary Catholic Church).

3.2.2 Geodetic Surveys

Geodetic surveys were conducted over most of the Pueblo Canyon Aggregate Area investigation, including SWMU 00-018(a), AOCs 00-030(eS), 00-030(f), and 00-030(h), SWMU 31-001, and Consolidated Unit 45-001-00 (SWMU 45-004), to coordinate sampling and borehole locations. The geodetic surveys are described in Appendix B.

3.2.3 Field Screening

Core samples and excavated material were screened for gross-alpha and -beta radiation. Screening was performed using an Eberline E600 with either an 380AB or SHP360 probe (or equivalent) and an ESP-1 rate meter with a 210 probe (or equivalent) in accordance with SOP 10.07, Field Monitoring for Surface and Volume Radioactivity Levels. The probe was held less than 1 in. away from the material, and measurements were made by collecting a 1-min reading to determine gross-alpha and -beta radiation levels. Field personnel collected and recorded background measurements for gross-alpha and gross-beta radiation, and the samples were screened for radioactivity by a radiation control technician (RCT) before they were shipped the Laboratory's Sample Management Office (SMO) to ensure compliance with U.S. Department of Transportation requirements.

Immediately after sample retrieval organic vapor monitoring of surface and subsurface samples was performed using a MiniRae 2000, Model PGM-7600 photoionization detector (PID) with an 11.7-electron volt (eV) bulb. In addition, headspace vapor screening for volatile organic compounds (VOCs) was performed on recovered surface and subsurface media in accordance with Standard Operating Procedure (SOP) 06.33, Headspace Vapor Screening with a Photoionization Detector. Samples were placed in a glass container and covered with aluminum foil. The container was sealed, gently shaken, and allowed to equilibrate for 5 min. The sample was screened by inserting the PID probe into the container and measuring and recording any detected vapors. The workers' breathing zone was also monitored using the MiniRae 2000.

Field-screening results were recorded on the borehole logs and/or corresponding sample collection logs, in the site-safety officer field notebook, and in the RCT field notebook (Appendix C). Field-screening results, along with the physical characteristics of the core (e.g., contacts, elevated moisture, or staining), were considered when sampling intervals were selected. Field-screening results are presented in Table 3.2-1.

3.2.4 Surface and Shallow-Subsurface Soil Investigation

In February, March, and June 2010, 31 surface and shallow subsurface samples were collected from 18 locations at AOCs 00-030(eS), 00-030(f), and 00-030(h) and Consolidated Unit 45-001-00 (SWMU 45-004) in accordance with the approved Phase II investigation work plan for the Pueblo Canyon Aggregate Area (LANL 2008, 104580), and the approved work plan for installation of stormwater controls at AOC 00-030(f) (LANL 2009, 105088).

Surface samples were collected from 0–1 ft using the spade-and-scoop method in accordance with SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. The samples were collected using stainless-steel scoops and disaggregated in a stainless-steel bowl before they were transferred to the appropriate sample containers. All sampling equipment was decontaminated between each sampling event in accordance with SOP-5061, Field Decontamination of Equipment.

Shallow-subsurface samples were collected using the hand-auger method in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. The material was placed in stainless-steel bowls and handled in the same manner as surface soil samples.

All surface and shallow-subsurface samples were placed in appropriate sample containers and submitted for laboratory analysis of target analyte list (TAL) metals at AOC 00-030(eS) and Consolidated Unit 45-001-00 (SWMU 45-004); TAL metals, anions, cyanide, perchlorate, VOCs, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), americium-241, and analysis by gamma spectroscopy at AOC 00-030(f); and TAL metals, SVOCs, and pesticides at AOC 00-030(h).

Standard QA/QC samples (field duplicates and rinsate samples) were also collected in accordance with SOP-01.05, Field Quality Control Samples, at a 10% frequency or at a minimum of one field duplicate and rinsate per SWMU, AOC, and consolidated unit.

All sample-collection activities were coordinated with the SMO and conducted in accordance with SOP-5056, Sample Containers and Preservation; SOP-5057, Handling, Packaging, and Transporting Field Samples; and SOP-5058, Sample Control and Field Documentation. After they were collected, the samples remained in the controlled custody of the field team at all times until delivered to the SMO. Sample custody was then relinquished to the SMO for delivery to a preapproved off-site analytical laboratory.

3.2.5 Subsurface Investigation

The subsurface investigation included drilling 14 vertical boreholes, collecting 28 samples at SWMU 00-018(a), AOC 00-030(h), and SWMU 31-001, and excavating 306 yd^3 of soil and environmental media from the head of Acid Canyon and adjacent slope and mesa top at AOC 00-030(h). The subsurface investigation was conducted in accordance with the approved investigation work plan for the Pueblo Canyon Aggregate Area (LANL 2008, 104580).

The Phase II investigation boreholes were drilled using a Central Mine Equipment 55 hollow-stem auger (HSA) drill rig with 4.25-in.-inside diameter (I.D.) and nominal 8.25-in.-outside diameter (O.D.) augers. A hex-rod core retrieval system and 4-in.-O.D. stainless-steel, split-core barrels were used for sampling. A nominal 9-in.-diameter auger drill bit was used for all borings. During HSA drilling, continuous core was recovered using stainless-steel core barrels through the center of the 4.25-in. drill string. SOP-6.26, Core Barrel Sampling for Subsurface Earth Materials, describes the procedure followed to collect subsurface samples.

Core from all boreholes was collected at 5-ft intervals. At the surface, cuttings and core were screened for organic vapors and radioactivity. All core material was visually inspected, and a lithologic log was generated by a qualified geologist in accordance with SOP-12.01, Field Logging, Handling and Documentation of Borehole Materials. The geologist noted variations and interpreted geologic contacts in the retrieved core and produced a written description in the field. Color of soil and core was determined using the Geological Society of America Munsell soil-color chart. In addition, the geologist noted the results of field screening for organic vapors and radiation, percent core recovery, relative moisture content, and odors, staining, fractures, water-bearing zones, and other features that could guide sample collection or the interpretation of results.

3.2.5.1 Borehole Drilling and Subsurface Sampling

For the 2010 Pueblo Canyon Aggregate Area Phase II investigation, 14 vertical boreholes were drilled and samples collected to comply with the requirements outlined in the approved Pueblo Canyon Aggregate Area Phase II investigation work plan (LANL 2008, 104580; NMED 2008, 103002); the NOD to the Pueblo Canyon Aggregate Area investigation report (NMED 2008, 102049); and the approval with modifications letter (NMED 2008, 103002).

Samples were collected at target intervals based on criteria established in the approved work plan (LANL 2008, 1045580; NMED 2008, 103002). All sampled core material was placed in the appropriate sample containers, labeled, documented, and preserved (as appropriate) for transport to the SMO. Samples were submitted for laboratory analysis of pH, nitrate, cyanide, perchlorate, TAL metals, VOCs, SVOCs,

pesticides, and PCBs, and analysis by gamma spectroscopy at SWMU 00-018(a), TAL metals at SWMU 31-001, and SVOCs at AOC 00-030(h).

Field duplicates and rinsate blanks were submitted for the same suites of analyses as the investigation samples, at a frequency of 10% or at least one field duplicate and rinsate per SWMU or AOC, in accordance with SOP-01.05, Field Quality Control Samples. The drilling equipment was field screened for alpha and beta radiation by a qualified RCT and decontaminated using dry methods, following SOP-1.08, Field Decontamination of Drilling and Sampling Equipment, after each borehole was drilled or as necessary based on field-screening results.

3.2.5.2 Borehole Abandonment

Boreholes were abandoned in accordance with SOP-05.03, Monitoring Well and Borehole Abandonment. All boreholes were abandoned within 24 h of completion with bentonite grout to within 1 ft of the surface. After 24 to 48 h, the backfilled level was checked for settling, and additional grout was added as necessary. The remainder of each boring was filled with Portland type I/II cement to surface grade.

3.2.5.3 Soil Excavation and Removal

During the Pueblo Canyon Aggregate Area Phase II investigation, approximately 306 yd^3 of sediment, soil, and rock was excavated at AOC 00-030(h) to comply with the requirements outlined in the approved Pueblo Canyon Aggregate Area Phase II investigation work plan (LANL 2008, 104580); the NOD to the Pueblo Canyon Aggregate Area investigation report (NMED 2008, 102049); and the approval with modifications letter (NMED 2008, 103002).

The soil excavation and removal activities were conducted in accordance with the approved work plan. The excavated environmental and contact waste was containerized in nineteen 20-yd^3 rolloff bins at the point of generation and moved to TA-50 to remove the waste storage area from public access. The bins were filled to approximately 85% capacity (~17 yd^3) before being sealed and marked in accordance with the approved waste characterization strategy form (WCSF).

3.2.5.4 Excavation Backfilling

The excavation at AOC-00-030(h) was backfilled with clean fill material delivered from off-site. The clean fill material was moisture-conditioned before it was placed in the area of excavation. The clean fill was placed into the open excavations in 10-in. lifts and compacted in place with heavy equipment. This step was repeated until the excavations were completely backfilled to the existing grade.

3.3 Health and Safety Measures

All Phase II 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 the use of level-D personal protective equipment (PPE), and field monitoring for organic vapors and dust particulate matter using portable air monitoring systems.

The investigated Pueblo Canyon Aggregate Area sites are located on Los Alamos County and private property. Some sites [i.e., the old WWTP at SWMU 00-018(a)] are accessible to the public via a trail system. Before field activities began warnings of the potential hazards associated with drilling and sampling in the investigation area were posted and site access limited to authorized personnel only.

3.4 Waste Management

All investigation-derived waste (IDW) generated during the Pueblo Canyon Aggregate Area Phase II investigation was managed in accordance with the IDW management plan in the approved work plan (LANL 2008, 104580), the approved WCSF (Attachment D-1 in Appendix D), and SOP-5238, Characterization and Management of Environmental Program Waste. These documents incorporate the requirements of all applicable U. S. Environmental Protection Agency (EPA) and NMED regulations.

The waste streams associated with the investigation included drill cuttings, excavated environmental media and debris, and contact IDW. Drill cuttings and discarded core from boreholes were collected and containerized in 55-gal. steel drums, placed on pallets, and locked pending characterization. This waste stream was characterized in accordance with the approved WCSF (Appendix D). The drill cutting and discarded core waste stream was classified as nonhazardous waste pending analysis.

Contact IDW included PPE (gloves, ear plugs, Tyvek coveralls, and plastic booties); plastic bags and sheeting; disposable sampling supplies; decontamination towels; and other solid waste that came into contact with possibly contaminated environmental media and debris. Contact waste was stored in 30- and 5-gal. poly drums, placed on pallets in a fenced area, and locked pending characterization. Additional contact IDW included flexible plastic hose and vacuum pipe used during soil removal (vacuuming method) activities. This waste was stored off-site in a locked 20-yd^3 rolloff bin pending characterization. As described in the WCSF, the contact IDW was characterized using acceptable knowledge of the waste generating process and the levels of contamination encountered.

Excavated IWD included sediment, soil, debris, and rocky material, with minor vegetation, and was containerized at the point of generation, then transferred into 20-yd^3 rolloff bins stored in a controlled area where public access was restricted. All rolloff bins were lined with PacTec polyethylene liners before the waste was emplaced.

3.5 Deviations

Deviations from the scope of activities, as defined in the approved work plan (LANL 2008, 104580) and the approved work plan to install of stormwater controls at AOC 00-030(f) (LANL 2009, 105088), occurred during the implementation of the Pueblo Canyon Aggregate Area Phase II investigation.

3.5.1 SWMU 00-018(a)

Borehole PU-611424, located next to the primary settling tank at SWMU 00-018(a), was relocated approximately 5 ft west of the proposed location when the drill rig met refusal at two other locations because of the presence of construction debris and the reinforced concrete floor of the primary settling tank, which was left in place by Los Alamos County demolition crews. Samples were collected at the soil-tuff interface (11.5–12.5 ft bgs) and from the underlying tuff (14–15 ft bgs) according to the approved investigation work plan.

Borehole PU-611425, located next to the final settling tank at SWMU 00-018(a), was relocated approximately 10 ft north and 5 ft west of the proposed location when the drill rig met refusal at three other locations because of the presence of rebar, fencing material, and construction debris. Samples were collected at the soil-tuff interface (15.5–16.5 ft bgs) and from the underlying tuff (19–20 ft bgs) according to the approved investigation work plan.

Borehole PU-611428, located next to the trickling filter tank at SWMU 00-018(a), was relocated approximately 20 ft north of the proposed location when the drill rig met refusal at three other locations

because of the presence of reinforced concrete. Samples were collected at the soil-tuff interface (1.5–2.5 ft bgs) and from the underlying tuff (13–15 ft bgs) according to the approved investigation work plan.

3.5.2 AOC 00-030(f)

The three proposed outfall sampling locations (PU-611434, PU-611435, and PU-611435) at AOC 00-030(f) were relocated 2–3 ft because the proposed locations (within consolidated tuff and on a steep cliff) were not accessible or it was not possible to collect the selected media. The three relocated sampling locations meet the intent of the work plan. The locations were selected because they were downgradient of the former outfall, they best captured possible discharge patterns from the outfall, and they were within soil/colluvium, thus allowing samples to be collected at the soil-tuff interface.

Americium-241 was not analyzed for in samples from the shallowest depths at locations PU-611433, PU-611434, PU-611435, and PU-611436 or from any depth at location PU-611432 at AOC 00-030(f) because of an omission in the sample collection logs. However, americium-241 was collected from the deepest and farthest downgradient samples at AOC 00-030(f). In addition, gamma spectroscopy data, collected from all Phase II samples from the site (with the exception of one sample collected to determine the vertical extent of chromium), is an alternate method by which americium-241 is measured. Therefore, by using the available americium-241 data and the gamma spectroscopy results, the extent of americium-241 could be defined.

3.5.3 AOC 00-030(h)

Two additional sediment samples were collected at locations PU-611540 and PU-611893 at AOC 00-030(h) to better define the area requiring excavation within Acid Canyon.

For remediation activities at AOC 00-030(h), a small portion (~12 ft × 12 ft) of the proposed soil removal area could not be excavated to the proposed depth. The property owners (Immaculate Heart of Mary Catholic Church) would not allow excavation in the area of a clump of large pine trees that were in the middle of the area proposed for remediation (Appendix E, p. E-6, includes a photograph of the clump of trees). The property owners were concerned that deeper removal would compromise the shallow root system of the trees and kill them (or would require complete removal of the trees). Therefore, only the top 6 in. of soil and forest litter were removed near the trees (Lucero 2010, 110541). The final excavation depth away from the trees varied from 2–4 ft of the proposed estimate. This deviation was communicated to NMED during a site visit on June 1, 2010.

3.5.4 Consolidated Unit 45-001-00

Location PU-611431 at Consolidated Unit 45-001-00 (SWMU 45-004) was relocated down drainage approximately 100 ft east (upstream) from historical location 45-01068 because the proposed location was inaccessible and consisted mainly of boulders, making sample collection impractical. Samples were collected from 0–1.0 ft, 4.0–5.0 ft, and 6.0–7.0 ft, according to the approved investigation work plan.

4.0 REGULATORY CRITERIA

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

The objective of the current investigation is to finalize the determination of nature and extent of contamination at SWMUs 00-018(a) and 31-001, AOCs 00-030(eS) and 00-030(f), and Consolidated Unit 45-001-00, to reduce risk resulting from past Laboratory operations at AOC 00-030(h), and to support the risk-screening evaluations. For each SWMU, AOC, and consolidated unit, the regulatory criteria and the data collected during the investigation are used to identify COPCs and their distribution in the environment (section 6.0) and the resulting potential human and ecological risks (section 7.0 and Appendix I).

All analytical results obtained from samples collected during the Phase II investigation as well as relevant historical investigations were reviewed for quality (Appendix F), and all data validated to current standards for data usability were regarded as "qualified data." Only qualified data were included in the final data set used to characterize the nature and extent and evaluate potential risk associated with the site investigation.

4.1 Current and 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 prevalent land use for the remaining sites within the Pueblo Canyon Aggregate Area is currently recreational and is expected to remain so for the reasonably foreseeable future. The residential scenario is also evaluated per the Consent Order for comparison purposes and because the land is no longer under Laboratory control.

4.2 Human Health Screening Levels

Once nature and extent are defined for the Pueblo Canyon Aggregate Area sites, human health risk-screening assessments will be conducted for the solid media. The human health screening assessments were performed using NMED soil screening levels (SSLs) (NMED 2009, 108070; LANL 2010, 108613) for the recreational and residential scenarios. Radionuclides were assessed using the Laboratory's screening action levels (SALs) (LANL 2009, 107655). When an NMED SSL was not available for a COPC, EPA regional screening levels (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) were used (adjusted to a risk level of 10^{-5} for carcinogens) or SSLs were calculated if sufficient toxicity information was available. A surrogate SSL was used for some COPCs based on structural similarity or breakdown products. Applicable SSLs for inorganic and organic chemicals and SALs for radionuclides are presented in the data summary tables for each site.

4.3 Ecological Screening Levels

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

4.4 Cleanup Goals

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 non-carcinogens. The screening levels described in section 4.2 are based on these cleanup levels and a dose of 15 mrem/yr for radionuclides. As specified in Section VIII.B.1 of the

Consent Order, the screening levels are to be used as cleanup levels unless determined to be impracticable or unless SSLs do not exist for current and reasonably foreseeable future land use.

The cleanup goals at AOC 00-030(h) were to reduce risk resulting from past Laboratory operations. In addition to constituents detected in the area of the AOC 00-030(h) septic outfall (primarily arsenic and iron), polycyclic aromatic hydrocarbons (PAHs) present in surface soil above the outfall, likely the result of parking lot runoff, were also driving risk at the site. Residential screening levels were the target cleanup goals for this site, and all Laboratory-related contamination met these cleanup goals following remediation at the site. However, it was not possible to remove PAHs to residential screening levels in a limited area at AOC 00-030(h) because of property-owner restrictions.

5.0 DATA REVIEW

The purpose of the data review is to identify COPCs for each SWMU, AOC, or consolidated unit in the Pueblo Canyon Aggregate Area where the nature and extent of contamination have been defined.

Extent is determined by spatial analysis of detections above background values (BVs) for inorganic chemicals, detections above BVs or fallout values (FVs) for radionuclides, and by detection status for organic chemicals. For inorganic chemicals and radionuclides, detections above BVs and/or FVs may occur that are not substantially different from the appropriate background data set; therefore, statistical comparisons are performed, as described in section 5.2, to determine if concentrations are comparable with background and to aid in defining extent. Inorganic chemicals and radionuclides whose concentrations across a site are below BVs/FVs or are not significantly different from background are considered to have extent defined. In addition, low detected concentrations of certain naturally occurring inorganic chemicals (e.g., nitrate) that do not have established BVs most likely reflect naturally occurring concentrations.

Organic chemical results estimated at or near the estimated quantitation limit (EQL) for the analytical method (i.e., data qualified with a “J”) and present infrequently in site samples with no discernible spatial pattern are considered present at trace concentrations and not representative of a release from the site. Extent is defined for these organic chemicals.

Evaluations of the nature and extent of contamination for all inorganic chemicals, organic chemicals, and radionuclides are presented in section 6.

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, COPCs are not identified for that site and further investigation is recommended.

5.1 Inorganic Chemical and Radionuclide Background Comparisons

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

Background data are generally available for inorganic chemicals in soil, sediment, and tuff (LANL 1998, 059730). However, some analytes (e.g., nitrate, perchlorate, and hexavalent chromium) have no BVs. A BV may be either a calculated value from the background data set (upper tolerance limit [UTL] or the 95% upper confidence bound on the 95th quantile) or a detection limit (DL). When a BV is based on a DL, there is no corresponding background data set.

For inorganic chemicals, data are evaluated by sample media to facilitate the comparison with media-specific background data. To identify inorganic COPCs, the first step is to compare the sampling results with BVs. If the sampling results are above the BV and sufficient data 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 sample quantities are not sufficient or the percentage of nondetects is high, the sampling results are compared with the BVs and the maximum background concentration in the appropriate media. If any sampling result is above the BV and the maximum background concentration, the inorganic chemical is identified as a COPC. The same evaluation is performed using DLs when an inorganic chemical is not detected but has a DL above the BV. If no BV is available, detected inorganic chemicals are identified as COPCs.

Radionuclides are identified as COPCs based on comparisons to BVs for naturally occurring radionuclides or to FVs for fallout radionuclides. Isotopic thorium, uranium-234, uranium-235/236, and uranium-238 are naturally occurring radionuclides. Americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and tritium are fallout radionuclides.

As with inorganic chemicals, naturally occurring radionuclides are compared with media-specific BVs. Radionuclides detected at concentrations above their respective BVs are identified as COPCs. These radionuclides have no background data sets; therefore, statistical comparisons cannot be performed. If the radionuclide is detected above its BV, it is retained as a COPC.

The FVs for the fallout radionuclides apply to the top 0.0–1.0 ft of soil, fill, and sediment. Below 1 ft or in tuff, fallout radionuclide COPCs are determined based on detect status. For samples from 1.0 ft bgs or less, if the concentration of a fallout radionuclide is greater than the FV, comparisons of the top 0.0–1.0 ft sample data are made with the fallout data set, if available. The radionuclide is eliminated as a COPC if concentrations are similar to fallout, based on statistical comparisons or, if statistics cannot be performed, comparisons to the maximum fallout concentration.

The FV for tritium in surface soil (LANL 1998, 059730) is in units of pCi/mL. Valid comparisons to this FV require using sample percent moisture to convert sample tritium data from pCi/g (as provided by analytical laboratories) to the corresponding values in units of pCi/mL. The Laboratory has adopted the conservative approach of identifying tritium in soil samples from 0–1 ft bgs as a COPC based on detection status rather than converting the reporting units for tritium.

Sample media encountered during Phase II investigations include soil (all soil horizons and A horizon, designated by the media code ALLH or Soil, and AH, respectively); fill material (media code FILL); Quaternary alluvium (media code Qal, compared with soil BVs); alluvial sediment (media code SED), Upper Bandelier Tuff (media codes Qbt 2 and Qbt 3); and other (land-applied sludge material). Because no separate BVs are available for fill or sludge material, fill and sludge samples are evaluated by comparison with soil BVs (LANL 1998, 059730). In this report, the discussion of site contamination in soil includes fill and land-applied sludge samples (as applicable) and soil samples together in sample counts and in comparisons with background. Fill and land-applied sludge samples are not discussed separately from soil in relation to BV and nature and extent evaluation. The units of the upper Bandelier Tuff (Qbt 2 and Qbt 3) are likewise evaluated together with respect to background (LANL 1998, 059730).

5.2 Statistical Methods Overview

A variety of statistical methods may be applied to each of the inorganic and radionuclide chemical data sets. The use of any of these methods depends on how appropriate the method is for the available data. A data set must contain 10 or more samples for valid statistical comparisons. Data sets with fewer than 10 qualified data points are excluded from statistical comparisons for background value analysis (see SOP-5245, Background Value Comparisons—Inorganic Chemicals, and SOP-5246, Background Value Comparisons—Radionuclides).

5.2.1 Distributional Comparisons

Comparisons between data sets such as site-specific data and Laboratory background data are performed using a variety of statistical methods. For background comparisons, these methods begin with a simple comparison of site-specific data with an UTL estimated from the background data (UTL [95, 95] or the 95% upper confidence bound on the 95th quantile). The UTLs are used to represent the upper end of concentration distribution and are also referred to as BVs. The UTL comparisons are followed, when appropriate, by statistical tests that evaluate potential differences between data set distributions. These tests are used for testing hypotheses about data from two potentially different distributions (e.g., a test of the hypothesis that site concentrations are elevated above background levels). A p-value is calculated to determine if there is not a statistically significant difference between two data sets. If the p-value is greater than 0.05, there is a statistical difference between data sets; if the p-value is less than 0.05, there is a statistical difference. Nonparametric tests most commonly performed include the Gehan test (modification of the Wilcoxon Rank Sum test), and the quantile test (Gehan 1965, 055611; Gilbert and Simpson 1990, 055612). The Gehan test is recommended when nondetects are relatively frequent (greater than 10% and less than 50%) and evaluates data sets with nondetects reported at multiple DLs in a statistically robust manner (Gehan 1965, 055611; Millard and Deverel 1988, 054953). The Gehan test is not recommended if either of the two data sets has more than 50% nondetects. If there are no nondetected concentrations in the data, the Gehan test is equivalent to the Wilcoxon Rank Sum test. The Gehan test is the preferred test because of its applicability to a majority of environmental data sets, and its recognition and recommendation in EPA sponsored workshops and publications.

The quantile test is better suited to assessing shifts of a subset of the data. The quantile test determines whether more of the observations in the top 20% (chosen percentile) of the combined data set come from the site data set than would be expected by chance, given the relative sizes of the site and background data sets. If the relative proportion of the two populations being tested is different in the top 20% of the data than in the remainder of the data, the distributions may be partially shifted because of a subset of site data. This test is capable of detecting a statistical difference when only a small number of concentrations are elevated (Gilbert and Simpson 1992, 054952). The quantile test is the most useful distribution shift test where samples from a release represent a small fraction of the overall data collected. For example, to detect contamination from historical spills at unknown locations, a work plan may call for collecting samples from a grid. Most sample results show no contamination, but those in or near spill locations show elevated concentrations. The quantile test is applied at a prespecified quantile or threshold, usually the 80th percentile. The test cannot be performed if more than 80% (or, in general, more than the chosen percentile) of the combined data are nondetected values. It can be used when the frequency of nondetects is approximately the same as the quantile being tested. For example, in a case with 75% nondetects in the combined background and site data set, application of a quantile test comparing 80th percentiles is appropriate. The threshold percentage can be adjusted to accommodate the detection rate of an analyte, or to look for differences further into the distribution tails. The quantile test is more powerful than the Gehan test for detecting differences when only a small percentage of the site concentrations are elevated.

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

5.2.2 Graphical Presentation

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

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, 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 potential as outliers. The concentrations are plotted as points overlying the box plot. When a data set contains both detected concentrations and nondetected concentrations reported as DLs, the detected concentrations are represented as Xs, and the nondetected concentrations are represented as Os.

6.0 SITE CONTAMINATION

This section presents site descriptions and operational histories and a summary of previous investigations for SWMUs 00-018(a) and 31-001, AOCs 00-030(eS), 00-030(h), and 00-030(f), and Consolidated Unit 45-001-00. Also presented in subsequent sections are COPC determination, a discussion of nature and extent of contamination, and summaries of human health and ecological risk-screening assessments.

6.1 SWMU 00-018(a) Sludge Bed WWTP, Pueblo Canyon

6.1.1 Site Description and Operational History

SWMU 00-018(a) is the decommissioned Pueblo Canyon WWTP, located in Pueblo Canyon (Figure 6.1-1) on Los Alamos County property (LANL 1997, 056614, p. 28). The plant, which was built between 1946 and 1948, began operating in 1951, primarily receiving waste from residential and

business properties, including the Los Alamos Medical Center (LANL 1997, 056614, p. 28). This WWTP may have received laboratory-scale (e.g., less than 10 L/mo) waste from the TA-43 Health Research Laboratory, the only suspected Laboratory contributor to the waste stream at the plant, from 1953 to 1981 (Emelity 1981, 008081; LANL 1997, 056614, p. 29). From 1982 to 1991, the plant received only sanitary waste from Los Alamos businesses and residences (LANL 1992, 007667, p. 5-61; LANL 1997, 056614, p. 29). Originally, the Zia Company operated the plant for the Atomic Energy Commission (LANL 1997, 056614, p. 28). In the early 1960s, Los Alamos County assumed control of the plant (LANL 1997, 056614, p. 28). Los Alamos County decommissioned the Pueblo Canyon WWTP during 1991 and 1992 (LANL 1997, 056614, p. 29). After decommissioning, sludge was transferred from the plant's digester to the sludge beds that were sampled during the 1996 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) (LANL 1997, 056614, p. 29).

Sometime during the operational history of the Pueblo Canyon WWTP, dried sludge from the older sludge beds was land-applied in an area to the east/southeast of the sludge drying beds. Samples of this sludge fill material were collected down to, but excluding, the underlying tuff during the 1996 RFI. When the Pueblo Canyon WWTP was decommissioned in 1991 and 1992, sludge remaining in the digestion tank was transferred to the eastern sludge drying bed (LANL 1997, 056614, p. 29). During RFI activities in 1996, Los Alamos County personnel removed the sludge material in the eastern sludge bed down to the level of the filter material (LANL 1997, 056614, p. 29); the sludge was taken to the Los Alamos County landfill where it was mixed with wood chips and used as mulch. Samples were collected from the sand filter material and underlying tuff in the eastern sludge beds, which were the oldest beds at the site and the only ones potentially impacted by historical Laboratory operations.

Final D&D of the WWTP occurred during the summer of 2008. In June 2008, the remaining WWTP structures were removed to 3 ft bgs by Los Alamos County. Portions of structures deeper than 3 ft bgs were left in place. As part of the County's site restoration and grading plan, soil and concrete and asphalt pieces were imported as fill for areas of the site where existing material was not sufficient.

During D&D of the WWTP, Los Alamos County collected a sample of liquid and residual sludge from the sludge digestion tank. The sample was analyzed for arsenic (55.6 mg/kg), cadmium (less than 0.25 mg/kg), chromium (106 mg/kg), copper (689 mg/kg), lead (147 mg/kg), mercury (19.6 mg/kg), molybdenum (22.6 mg/kg), nickel (28.8 mg/kg), selenium (59.0 mg/kg), and zinc (587 mg/kg). The sample was also analyzed for PCBs, but none were detected above the DL (0.05 mg/kg). The laboratory report for this sample is presented in Appendix G. Before demolition of the sludge digestion tank, the contents were drained to the site via a trench leading to the western sludge bed.

Potential contamination at SWMU 00-018(a) resulting from historical Laboratory operations would have originated from the oldest sludge drying beds at the site as water-soluble components infiltrated the underlying filter media or when dried sludge for fill material was used at the site. By the end of 1981, any Health Research Laboratory waste being received the Pueblo WWTP was routed to the TA-03 WWTP (Emelity 1981, 008081). Sludge generated between 1983 and 1991 were subject to permit restrictions and analysis and are not expected to have contributed to contamination at SWMU 00-018(a) (LANL 1992, 007667, p. 5-65). The typical depth of the sludge was 6–12 in., although it was observed to be as deep as 2 ft in some areas (LANL 1997, 056614, p. 31). No accidental spills or releases have been documented at SWMU 00-018(a) (LANL 1992, 007667, p. 5-54).

6.1.2 Summary of Previous Investigations

This section discusses the RFI and Phase I investigation sampling and other activities conducted at SWMU 00-018(a) in 1996 and 2006–2007, respectively. Although sanitary effluent and sludge samples

were collected at SWMU 00-018(a) in 1972 and 1991 to address the requirements for the National Pollutant Discharge Elimination System (NPDES) Permit (permit number NM0020125) (LANL 1997, 056614, p. 29), the data from these samples cannot be validated to current standards and are not included in this report. Details regarding pre-RFI activities are provided in the Pueblo Canyon Aggregate Area approved investigation work plan (LANL 2005, 090579, Appendix B; NMED 2005, 091388).

6.1.2.1 1996 RFI

The 1996 RFI focused on the sludge beds and the sludge fill area to the east-southeast of the oldest sludge beds because these areas may have been contaminated by Laboratory wastes. A total of 26 surface and subsurface samples from the oldest sludge beds and sludge fill area were collected during the RFI and were submitted to an off-site laboratory for analysis of one or more of the following: TAL metals, gamma-emitting radionuclides, tritium, isotopic uranium, strontium-90, PCBs, pesticides, SVOCs, and VOCs (LANL 2005, 090579, p. 5).

Sludge Beds

Metals detected above BVs in one or more samples include cadmium, copper, lead, mercury, silver, thallium, and zinc. No radionuclides were detected in any of the four samples from the sand filter material. Four organic chemicals, Aroclor-1254; 4-chloroaniline; chrysene; and 4,4'-DDE (4,4'-dichlorodiphenyldichloroethylene), were detected in one sample from the sand filter material. Three samples from two locations were also collected from the tuff below the sand filter material in the older sludge drying beds. In the underlying tuff, copper and mercury were detected above BVs. Tritium was detected in the deepest tuff sample (5.5–6.5 ft bgs) at location 00-04971. No organic chemicals were detected in any of the samples from the tuff below the sand filter material. Within the sludge beds, concentrations decreased with depth. However, extent was not defined at other locations within the SWMU and beyond the SWMU boundaries.

Sludge Fill Area

In the sludge fill area, several inorganic chemicals, including barium, cadmium, chromium, copper, lead, mercury, selenium, silver, thorium, and zinc, were detected above BVs. No radionuclides were detected above their respective BVs or FVs for samples collected at depths less than 6 in., and no radionuclides were detected where FVs did not apply. A number of organic chemicals were detected in samples, including Aroclor-1254; Aroclor-1260; benzo(a)pyrene; benzo(b)fluoranthene; bis(2-ethylhexyl) phthalate; alpha-chlordane; gamma-chlordane; 4-chloroaniline; chrysene; 4,4'-DDE; dieldrin; endosulfan sulfate; endrin aldehyde; fluoranthene; indeno(1,2,3-cd)pyrene; and pyrene.

6.1.2.2 2006–2007 Phase I Investigation

Six vertical boreholes were drilled at historical locations 00-04971, 00-04972, 00-04976, 00-04977, 00-04979, and 00-04980. The boreholes were drilled between 9.5 and 44 ft bgs. The borehole locations are shown in Figure 6.1-1. In addition, 46 sediment, soil/fill and tuff samples were collected from 13 locations and were submitted to an off-site laboratory for analysis of one or more of the following: anions, cyanide, TAL metals, nitrate, perchlorate, pesticides, PCBs, SVOCs, VOCs, and tritium and by gamma spectroscopy. The COPCs identified at SWMU 00-018(a) include 15 inorganic chemicals, 2 radionuclides, and 39 organic chemicals (LANL 2008, 103243.34).

The lateral and vertical extent for inorganic, radionuclide, and organic COPCs were defined for SWMU 00-018(a), including the extent of contaminant migration downslope towards Pueblo Canyon, as a

result of the Phase I investigation. However, NMED's NOD indicated no site data had been collected during or after demolition and therefore the current site conditions and potential risks had not been thoroughly characterized and documented (LANL 2008, 104580, p. 9; LANL 2008, 103243.4; NMED 2008, 103002, pp. 2–3).

6.1.3 Site Contamination

6.1.3.1 Soil, Rock, and Sediment Sampling

Further characterization was required to assess potential contamination at SWMU 00-018(a), as discussed above. As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional sampling was conducted based on the field-screening results.
- Twenty-two samples were collected from 11 new borehole locations to confirm the results of the previous investigation. Samples were collected at two depths: one from the soil-tuff interface and one from the underlying tuff. Undisturbed soil was not encountered at any of the new borehole locations, and therefore, samples were collected from only two sampling depths, per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002). All samples were analyzed at an off-site fixed laboratory for TAL metals, SVOCs, VOCs, pesticides, nitrate, pH, cyanide, PCBs, perchlorate, and gamma-emitting radionuclides.
- Four QC samples (two field duplicates and two rinsates) were collected from two locations at SWMU 00-018(a).
- Table 6.1-1 presents the samples collected and analyses requested for SWMU 00-018(a). The, Phase I and Phase II sampling locations at SWMU 00-018(a) are shown in Figure 6.1-1.

6.1.3.2 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at SWMU 00-018(a), detected headspace concentrations ranged from 0.0 ppm to 0.4 ppm. No radiological-screening results exceeded the background at the site. The field-screening results are presented in Table 3.2-1.

6.1.3.3 Soil and Rock Sampling and Analytical Results

Samples collected at SWMU 00-018(a) during the Phase II investigation consist of 22 tuff samples collected from 11 new borehole locations. Samples were analyzed for TAL metals, SVOCs, VOCs, pesticides, nitrate, pH, cyanide, PCBs, perchlorate, and gamma-emitting radionuclides Per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002), these samples were collected to define lateral and vertical extent of inorganic chemicals, radionuclide, and organic chemicals beneath the former WWTP structures.

Other historical samples collected at SWMU 00-018(a) during the 1996 RFI and 2006–2007 Phase I investigation included 10 sediment, 18 tuff, 9 soil, 18 fill, and 14 sludge samples collected from 18 locations. Soil, fill, and sludge were evaluated together, and not all samples were analyzed by all methods (Table 6.1-1).

Inorganic Chemicals

Table 6.1-2 presents the inorganic chemicals above BVs, detected inorganic chemicals with no BVs, and inorganic chemicals not detected but with analytical DLs above BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Inorganic COPCs are identified below.

The following inorganic chemicals were detected above BVs, were detected but had no BVs, or had analytical DLs above BVs during the RFI, Phase I, and Phase II investigations: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, nitrate, perchlorate, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in two of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 8050 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-1 and Figure H-1). Aluminum is not identified as a COPC in tuff.

Antimony was not detected above BV (0.83 mg/kg) in soil at SWMU 00-018(a) but had DLs (5.8 to 6.2 mg/kg) above BV in 8 of 24 soil samples. The maximum DL was interpreted as substantially greater than the maximum background concentration of 1.0 mg/kg. Antimony is identified as a COPC in soil.

Antimony was not detected in tuff at SWMU 00-018(a) but had DLs (0.942 to 11 mg/kg) above BV (0.5 mg/kg) in 25 of 39 tuff samples. The maximum DL was greater than the maximum background concentration of 0.4 mg/kg. Antimony is identified as a COPC in tuff.

Arsenic was detected above BV (3.98 mg/kg) in 1 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 4.34 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-2 and Figure H-1). Arsenic is not identified as a COPC in sediment.

Barium was detected above BV (295 mg/kg) in 1 of 29 soil samples at SWMU 00-018(a), with a maximum concentration of 394 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-3 and Figure H-2). Barium is not identified as a COPC in soil.

Barium was detected above BV (46 mg/kg) in 13 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 142 mg/kg. The maximum concentration was interpreted as substantially above background. Barium is identified as a COPC in tuff.

Cadmium was detected above BV (0.4 mg/kg) in 8 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 2.5 mg/kg. Additionally, six DLs were above BV, with a maximum DL of 0.575 mg/kg. Because more than 50% of the site or background data set were nondetects, the Gehan test could not be performed. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-3 and Figure H-2). However, the maximum detection (2.5 mg/kg) was less than the maximum background concentration of 2.6 mg/kg. Cadmium is not identified as a COPC in soil.

Cadmium was not detected above BV (0.4 mg/kg) in sediment at SWMU 00-018(a) but had DLs (0.517 to 0.752 mg/kg) above BV in 8 of 10 sediment samples. Because more than 50% of the site or background data sets were nondetects, the Gehan test could not be performed. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-2 and Figure H-3). Cadmium is identified as a COPC in sediment.

Calcium was detected above BV (2200 mg/kg) in 4 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 56,800 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-1 and Figure H-3). Calcium is not identified as a COPC in tuff.

Chromium was detected above BV (19.3 mg/kg) in 2 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 25.6 mg/kg. The results of the Gehan test indicate that site concentrations are not different from background; however, the results of the quantile test indicate that site concentrations may be different from background (Table H-3 and Figure H-4). Chromium is identified as a COPC in soil.

Chromium was detected above BV (7.14 mg/kg) in 5 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 22.4 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-1 and Figure H-4). Chromium is not identified as a COPC in tuff.

Chromium was detected above BV (10.5 mg/kg) in 2 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 19.1 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-2 and Figure H-5). Chromium is not identified as a COPC in sediment.

Cobalt was detected above BV (3.14 mg/kg) in 2 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 3.89 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-1 and Figure H-5). Cobalt is not identified as a COPC in tuff.

Copper was detected above BV (14.7 mg/kg) in 13 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 145 mg/kg. The maximum concentration was interpreted as substantially above background. Copper is identified as a COPC in soil.

Copper was detected above BV (4.66 mg/kg) in 10 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 39.2 mg/kg. Additionally, four DLs were above BV, with a maximum DL of 11.2 mg/kg. The maximum concentration was interpreted as substantially above background. Copper is identified as a COPC in tuff.

Copper was detected above BV (11.2 mg/kg) in 3 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 19.5 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different than background (Table H-2 and Figure H-6). Copper is identified as a COPC in sediment.

Cyanide was detected above BV (0.5 mg/kg) in 1 of 21 soil samples at SWMU 00-018(a), with a maximum concentration of 0.955 mg/kg. There is no background data set for cyanide in soil. Cyanide is identified as a COPC in soil.

Lead was detected above BV (22.3 mg/kg) in 6 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 251 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in 2 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 58.2 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-1 and Figure H-6). Lead is not identified as a COPC in tuff.

Lead was detected above BV (19.7 mg/kg) in 6 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 72.2 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in sediment.

Magnesium was detected above BV (1690 mg/kg) in 1 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 1800 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-1 and Figure H-7). Magnesium is not identified as a COPC in tuff.

Magnesium was detected above BV (2370 mg/kg) in 1 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 2990 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-2 and Figure H-7). Magnesium is not identified as a COPC in sediment.

Manganese was detected above BV (671 mg/kg) in 2 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 1300 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-3 and Figure H-8). Manganese is not identified as a COPC in soil.

Manganese was detected above BV (482 mg/kg) in 4 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 1660 mg/kg. The maximum concentration was interpreted as substantially above background. Manganese is identified as a COPC in tuff.

Manganese was detected above BV (543 mg/kg) in 1 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 799 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-2 and Figure H-8). Manganese is not identified as a COPC in sediment.

Mercury was detected above BV (0.1 mg/kg) in 19 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 2.6 mg/kg. The maximum concentration was interpreted as substantially above background. Mercury is identified as a COPC in soil.

Mercury was detected above BV (0.1 mg/kg) in 2 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 0.2 mg/kg. Additionally, two DLs were above BV, with a maximum DL of 0.11 mg/kg. There is no background data set for mercury in tuff. Mercury is identified as a COPC in tuff.

Mercury was detected above BV (0.1 mg/kg) in 3 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 0.821 mg/kg. The maximum concentration was interpreted as substantially above background. Mercury is identified as a COPC in sediment.

Nickel was detected above BV (6.58 mg/kg) in 2 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 9.34 mg/kg. Because more than 50% of the site or background data sets were nondetects, the Gehan test could not be performed. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-1 and Figure H-9). Nickel is identified as a COPC in tuff.

Nitrate was detected in 21 soil samples at SWMU 00-018(a), with a maximum concentration of 67.5 mg/kg. Because there is no BV for nitrate in soil, nitrate is identified as a COPC.

Nitrate was detected in 31 tuff samples at SWMU 00-018(a), with a maximum concentration of 62.2 mg/kg. Because there is no BV for nitrate in tuff, nitrate is identified as a COPC.

Nitrate was detected in 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 2.51 mg/kg. Because there is no BV for nitrate in sediment, nitrate is identified as a COPC.

Perchlorate was detected in eight soil samples at SWMU 00-018(a), with a maximum concentration of 0.00115 mg/kg. Because there is no BV for perchlorate in soil, perchlorate is identified as a COPC.

Perchlorate was detected in five tuff samples at SWMU 00-018(a), with a maximum concentration of 0.00155 mg/kg. Because there is no BV for perchlorate in tuff, perchlorate is identified as a COPC.

Selenium was detected above BV (1.52 mg/kg) in 7 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 10.8 mg/kg. Additionally, seven DLs were above BV, with a maximum DL of 1.76 mg/kg. The maximum concentration was interpreted as substantially above background. Selenium is identified as a COPC in soil.

Selenium was detected above BV (0.3 mg/kg) in 6 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 10.8 mg/kg. Additionally, seven DLs were above BV, with a maximum DL of 1.61 mg/kg. The maximum concentration was interpreted as substantially above background. Selenium is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in 8 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 10.6 mg/kg. Additionally, two DLs were above BV, with a maximum DL of 1.61 mg/kg. The maximum concentration was interpreted as substantially above background. Selenium is identified as a COPC in sediment.

Silver was detected above BV (1 mg/kg) in 11 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 9.59 mg/kg. Additionally, six DLs were above BV, with a maximum DL of 1.5 mg/kg. Silver is identified as a COPC in soil.

Silver was not detected above BV (1 mg/kg) in tuff at SWMU 00-018(a) but had DLs (2.2 to 2.3 mg/kg) above BV in 3 of 40 tuff samples. Because more than 50% of the site or background data sets were nondetects, the Gehan test could not be performed. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-1 and Figure H-9). The maximum DL (2.3 mg/kg) was greater than the maximum background concentration (1.9 mg/kg). Silver is identified as a COPC in tuff.

Thallium was detected above BV (0.73 mg/kg) in 3 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 1.1 mg/kg. Additionally, six DLs were above BV, with a maximum DL of 0.79 mg/kg. The results of the Gehan and slippage tests indicate that site concentrations are not different from background (Table H-3 and Figure H-10). Thallium is not identified as a COPC in soil.

Vanadium was detected above BV (17 mg/kg) in 3 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 23.2 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-1 and Figure H-10). Vanadium is not identified as a COPC in tuff.

Vanadium was detected above BV (19.7 mg/kg) in 1 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 24.3 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-2 and Figure H-11). Vanadium is not identified as a COPC in sediment.

Zinc was detected above BV (48.8 mg/kg) in 18 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 324 mg/kg. The maximum concentration was interpreted as substantially above background. Zinc is identified as a COPC in soil.

Zinc was detected above BV (63.5 mg/kg) in 3 of 40 tuff samples at SWMU 00-018(a), with a maximum concentration of 104 mg/kg. The results of the slippage and quartile tests indicate that site concentrations are not different from background (Table H-1 and Figure H-11). Zinc is not identified as a COPC in tuff.

Zinc was detected above BV (60.2 mg/kg) in 4 of 10 sediment samples at SWMU 00-018(a), with a maximum concentration of 116 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different than background Table H-2 and Figure H-12). Zinc is identified as a COPC in sediment.

In summary, the inorganic chemicals identified as COPCs in soil at SWMU 00-018(a) are antimony, chromium, copper, cyanide, lead, mercury, nitrate, perchlorate, selenium, silver, and zinc. The inorganic chemicals identified as COPCs in tuff at SWMU 00-018(a) are antimony, barium, copper, manganese, mercury, nickel, nitrate, perchlorate, selenium, and silver. The inorganic chemicals identified as COPCs in sediment at SWMU 00-018(a) are cadmium, copper, lead, mercury, nitrate, selenium, and zinc.

The new statistical methods for analyzing inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used on data sets for COPC identification for previous investigations but were applied to all data for this report, resulting in modification to the cumulative COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemicals being eliminated as COPCs, when compared with the 2008 investigation report COPC list (LANL 2008, 103243.34, p. 203): manganese and thallium in soil; chromium, lead, and zinc in tuff; and arsenic, chromium, magnesium, manganese, and vanadium in sediment. Further, the following inorganic chemicals were identified as COPCs and added to the COPC list (LANL 2008, 103243.34, p. 203): antimony and chromium in soil; antimony and copper in tuff. These COPCs are discussed below.

Organic Chemicals

Table 6.1-3 presents the detected organic chemicals. Plate 2 shows the spatial distribution of organic chemicals. Organic chemicals detected in tuff, soil, and/or sediment at SWMU 00-018(a) include 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; benzoic acid; bis(2-ethylhexyl)phthalate; 2-butanone; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; 4-chloroaniline; chloroform; chrysene; 4,4'-DDD (4,4'-dichlorodiphenyldichloroethane); 4,4'-DDE (4,4'-dichlorodiphenyldichloroethylene); 4,4'-DDT (4,4'-dichlorodiphenyltrichloroethane); dibenz(a,h)anthracene; 1,4-dichlorobenzene; 1,1-dichloroethene; dieldrin; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; fluoranthene; fluorine; heptachlor epoxide; indeno(1,2,3-cd)pyrene; 4-isopropyltoluene; methylene chloride; naphthalene; phenanthrene; pyrene; styrene; tetrachloroethene; toluene; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene+1,4-xylene.

Radionuclides

Table 6.1-4 presents the radionuclides detected. Plate 3 shows the spatial distribution of radionuclides detected.

Cesium-137 was detected in soil at depths where FVs do not apply. Cesium-137 was identified as a COPC in soil.

Tritium was detected in one of one soil samples at SWMU 00-018(a), with a maximum detected concentration of 4.52 pCi/g. The detection occurred below the depth at which FVs apply; therefore, tritium is identified as a COPC in soil.

Tritium was detected in one of three tuff samples at SWMU 00-018(a), with a maximum concentration of 0.36 pCi/g. FVs do not apply to tuff; therefore, tritium is identified as a COPC.

6.1.3.4 Nature and Extent of Soil and Rock Contamination at SWMU 00-018(a)

The nature and extent of COPCs were defined for SWMU 00-018(a), including the extent of contaminant migration downgradient towards Pueblo Canyon, as a result of the Phase I investigation, (LANL 2008, 103243.34, p. 41). In 2008, the WWTP structures at SWMU 00-018(a) (sludge beds, sludge digestion tank, trickling filter tank, and primary and secondary settling tanks) were demolished and the debris removed or buried on-site. Per NMED, additional characterization of the soil-tuff interface and the underlying tuff beneath these former structures was to be conducted as part of the Phase II investigation (NMED 2008, 102049; NMED 2008, 103002). Because additional samples were collected beneath the former decommissioned structures at SWMU 00-018(a) and additional COPCs were identified, the nature and extent of contamination were evaluated using all site data and are discussed in the following sections.

Inorganic Chemicals

Antimony was not detected above BV in tuff or soil at SWMU 00-018(a) but had DLs (0.92 to 11 mg/kg) above BV. Because antimony was not detected at SWMU 00-018(a), the lateral and vertical extent of antimony are defined.

Barium was detected above BV (46 mg/kg) in 13 of 40 tuff samples at SWMU 00-018(a) at SWMU 00-018(a). The maximum concentration of 142 mg/kg was detected at location PU-611427 in a sample collected from 14.5–15.5 ft bgs. Barium was not detected above BVs in soil and tuff at downgradient locations 00-25529, 00-25530, and 00-25531, at the top of and within Pueblo Canyon. Barium was not detected above BV or was detected at lower concentrations in samples at the deepest depths at all locations. The lateral and vertical extent of barium are defined.

Cadmium was not detected above BV in sediment at SWMU 00-018(a) but had DLs (0.517 to 0.752 mg/kg) above BV (0.4 mg/kg). Because cadmium was not detected at SWMU 00-018(a), the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV (19.3 mg/kg) in 2 of 32 soil samples at SWMU 00-018(a), with a maximum concentration of 25.6 mg/kg at locations 00-04980 (0–1 ft bgs) and 00-25529 (4.5–5 ft bgs). These detections do not exceed the maximum background of chromium in soil (36.5 mg/kg). The lateral and vertical extent of chromium are defined.

Copper was detected above BV in multiple soil, sediment, and tuff samples at SWMU 00-018(a). The maximum detected concentration of 145 mg/kg was detected in a sludge fill sample from location 00-04980 (0–1 ft bgs). Copper concentrations decrease with depth at 00-04980, and copper was not detected above BV in the deepest samples from this location. Location 00-04980 is in the central part of the site, and copper concentrations decrease laterally in all directions from this location. The lateral and vertical extent of copper are defined.

Total cyanide was detected above BV (0.5 mg/kg) in 1 of 21 soil samples at SWMU 00-018(a). The maximum concentration of 0.955 mg/kg was detected at location 00-25531 in a sample collected from

0–0.5 ft bgs. Cyanide, which is naturally occurring, was detected in only one shallow soil sample from the site, was not detected in deeper samples at the same location, and does not appear to the be the result of a release from the Pueblo WWTP. The lateral and vertical extent of cyanide are defined.

Lead was detected above BV in six soil and six sediment samples at SWMU 00-018(a). The maximum concentration of 251 mg/kg occurred at location 00-25524 in a sample collected from 0–0.5 ft bgs. Lead decreased with depth at location 00-25524 and decreased laterally to below maximum background in all directions from this location. The lateral and vertical extent of lead are defined.

Manganese was detected above BV (482 mg/kg) in 4 of 40 tuff samples at SWMU 00-018(a). The maximum concentration of 1660 mg/kg was detected at location PU-611427 in a sample collected from 14.5–15.5 ft bgs. Manganese was not detected at the deepest sample at location PU-611427 and concentrations decreased with depth at all other locations. Concentrations decreased at downgradient locations to the east and north toward Pueblo Canyon. The lateral and vertical extent of manganese are defined.

Mercury was detected above BV in multiple soil, sediment, and tuff samples at SWMU 00-018(a). The maximum detected concentration of 2.6 mg/kg was detected in a sludge fill sample from location 00-04980 (0–1 ft bgs). Mercury concentrations decreased with depth at 00-04980, and mercury was not detected above BV in the deepest samples from this location. Location 00-04980 is in the central part of the site, and mercury concentrations decreased laterally in all directions from this location. The lateral and vertical extent of mercury are defined.

Nickel was detected above BV (6.58 mg/kg) in 2 of 40 tuff samples at SWMU 00-018(a). The maximum concentration of 9.34 mg/kg was detected at location PU-611421 in a sample collected from 5.0–6.0 ft bgs. Nickel was not detected above BV in the deepest sample at location PU-611421, and concentrations decreased at downgradient locations to the east and north toward Pueblo Canyon. The lateral and vertical extent of nickel are defined.

Nitrate was detected in the majority of soil, sediment, and tuff samples at SWMU 00-018(a). The maximum concentration of 67.5 mg/kg was detected at location 00-25531 in a sample collected from 0–0.5 ft bgs. Although nitrates would be expected to be present at elevated levels within a WWTP, concentrations in samples collected around the perimeter of SWMU 00-018(a) generally fell below 10 mg/kg and reflect naturally occurring levels. Nitrate was not detected at elevated levels at the two samples collected on the bench downgradient of location 00-25531 (locations 00-25527 and 00-25530) The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in eight soil and five tuff samples at SWMU 00-018(a). The maximum concentration of 0.00155 mg/kg was detected at location PU-611428 in a sample collected from 1.5–2.5 ft bgs. Concentrations decreased with depth at this location and laterally in all directions. Further, all detections of perchlorate at SWMU 00-018(a) were at or below the EQL. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above BV or had DLs above BV in multiple soil, sediment, and tuff samples at SWMU 00-018(a). The maximum detected concentration of 10.8 mg/kg was detected in a soil sample from location 00-25528 (0–0.5 ft bgs). Selenium was not detected in the 22 samples collected at SWMU 00-018(a) during the Phase II investigation; therefore, the conclusions presented in the approved Phase I investigation report are valid, and the lateral and vertical extent of selenium are defined.

Silver was detected in 11 of 32 soil samples at SWMU 00-018(a); silver was not detected above BV (1 mg/kg) in tuff at SWMU 00-018(a) but had DLs (2.2 to 2.3 mg/kg) above BV in 3 of 40 tuff samples.

The maximum concentration of 9.59 mg/kg was detected at location 00-25529 in a sample collected from 0–0.5 ft bgs. Silver decreased with depth at this location and decreases laterally in all directions. The lateral and vertical extent of silver are defined.

Zinc was detected above BV (48.8 mg/kg) in 18 of 32 soil samples and 4 of 10 sediment samples at SWMU 00-018(a). The maximum concentration of 324 mg/kg was detected at location 00-04980 in a sludge fill sample collected from 0–1 ft bgs. Zinc concentrations decreased with depth at 00-04980, and zinc was not detected above BV in the deepest samples from this location. Location 00-04980 is in the central part of the site, and zinc concentrations decrease laterally in all directions from this location. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Based on the approved 2008 investigation report for Pueblo Canyon Aggregate Area (LANL 2008, 103243.34, p. 41), the nature and extent of all organic chemicals are defined; however, because tuff samples were collected beneath the former decommissioned structures at SWMU 00-018(a), this section discusses the nature and extent of organic COPCs. Organic chemicals detected are acenaphthene; acetone; anthracene; Aroclor-1242; Aroclor-1254; Aroclor-1260; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(k)fluoranthene; benzoic acid; bis(2-ethylhexyl)phthalate; 2-butanone; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; 4-chloroaniline; chloroform; chrysene; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dibenz(a,h)anthracene; 1,4-dichlorobenzene; 1,1-dichloroethene; dieldrin; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; fluoranthene; fluorene; heptachlor epoxide; indeno(1,2,3-cd)pyrene; 4-isopropyltoluene; methylene chloride; naphthalene; phenanthrene; pyrene; styrene; tetrachloroethene; toluene; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene+1,4-xylene. These organic chemicals are retained as COPCs and are evaluated for extent below.

The Phase II tuff samples collected at SWMU 00-018(a) did not significantly change the lateral extent of organic COPCs. However, the vertical extent of organic COPCs is better defined because only two organic COPCs were detected in the deepest samples from Phase II boreholes, which represent the deepest depths sampled at SWMU 00-018(a), with the exception of location 00-04980, which was sampled to a depth of 42.5 ft bgs in 2006. The only organic COPCs detected in the deepest samples from the site, including location 00-04980, are Aroclor-1254 at location PU-611429 at 13–14 ft bgs (0.0056 mg/kg) and fluoranthene at location PU-611425 at 19–20 ft bgs (0.0113 mg/kg). Aroclor-1254 decreases from the shallower sample at location PU-611429 and is not detected in the deepest samples from surrounding boreholes (locations PU-611426, PU-611427, and PU-611428). Fluoranthene is below the EQL at location PU-611425. Vertical extent is defined for all organic COPCs.

Approximately one-third of the organic COPCs for SWMU 00-018(a) are PAHs, which is consistent with the historical and recent use of asphalt as fill material at the site. Acenaphthene; anthracene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(k)fluoranthene; chrysene; dibenz(a,h)anthracene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; naphthalene; phenanthrene; and pyrene were detected in samples throughout the site. With the exception of fluoranthene and pyrene, PAHs were detected in less than 10 samples throughout the site and the distribution is not indicative of a release. Fluoranthene and pyrene have a very similar distribution at SWMU 00-018(a), and the maximum detection of both occurs at location PU-611420 at 28–29 ft bgs. Both decreased to below the DL in the deepest sample from this location and decreased laterally away from this location. With the exception of fluoranthene below the EQL at 19–20 ft bgs at location PU-611425, neither analytes were detected in the deepest sample at any location. The lateral and 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; naphthalene; phenanthrene; and pyrene are defined.

Aroclor-1242; benzoic acid; bis(2-ethylhexyl)phthalate; 2-butanone; butylbenzylphthalate; 4-chloroaniline; chloroform; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; 1,4-dichlorobenzene; 1,1-dichloroethene; dieldrin; di(n)octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; heptachlor epoxide; 4-isopropyltoluene; styrene; tetrachloroethene; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene+1,4-xylene were detected in fewer than 10 out of 58 site samples from SWMU 00-018(a). They were generally detected at levels at or below the EQLs and were not detected in the deepest samples from the site. The distribution of these organic chemicals is not indicative of a release from SWMU 00-018(a). The lateral and vertical extent of Aroclor-1242; benzoic acid; bis(2-ethylhexyl)phthalate; 2-butanone; butylbenzylphthalate; 4-chloroaniline; chloroform; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; 1,4-dichlorobenzene; 1,1-dichloroethene; dieldrin; di(n)octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; heptachlor epoxide; 4-isopropyltoluene; styrene; tetrachloroethene; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene+1,4-xylene are defined.

Acetone, methylene chloride, and toluene were detected in more than 10 but fewer than 20 site samples at concentrations generally at or below EQLs. Acetone, methylene chloride, and toluene were not detected in any of the deepest samples from the site and were not detected or were detected below EQLs in samples downgradient and receiving draining from the site (locations 00-25525, 00-25526, and 00-25527). In addition, the distribution of these organic COPCs is not indicative of a release from the site. The lateral and vertical extent of acetone, methylene chloride, and toluene are defined.

Aroclor-1254 and Aroclor-1260 were detected in several samples from SWMU 00-018(a), with the highest concentrations detected in sludge, fill, and soil samples and lower concentrations in tuff samples. Aroclor-1254 and Aroclor-1260 were not detected in the deepest samples from the site, with the exception of location PU-611429. At this location, Aroclor-1254 decreased with depth, and it was not detected in the deepest samples from surrounding boreholes (locations PU-611426, PU-611427, and PU-611428). Aroclor-1154 and Aroclor-1260 were generally not detected or were detected below the EQLs in samples downgradient and receiving draining from the site (locations 00-25525, 00-25526, and 00-25527). The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Alpha- and gamma-chlordane were detected at or below EQLs in several samples from SWMU 00-018(a) and may be the result of pesticide application at the site. Alpha- and gamma-chlordane were not detected in any samples collected during the Phase II investigation and, therefore, were not detected in deeper samples from the site. The maximum concentrations of both alpha- and gamma-chlordane occurred in a shallow fill sample at location 00-025523 in the eastern sludge bed in the central portion of the site. The lateral and vertical extent of alpha- and gamma chlordane are defined.

Radionuclides

Based on the approved 2008 investigation report for Pueblo Canyon Aggregate Area (LANL 2008, 103243.34, p. 41), the nature and extent of all radionuclides are defined; however, because soil-tuff samples were collected beneath the former decommissioned structures at SWMU 00-018(a), they will be evaluated further for nature and extent.

Radionuclides were not detected in Phase II investigation samples collected beneath the former structures at SWMU 00-018(a). Therefore, the radionuclide COPCs (cesium-137 and tritium) do not change, and the conclusions presented in the approved Phase I investigation report are valid. The lateral and vertical extent of cesium-137 and tritium are defined.

6.1.4 Summary of Human Health Risk-Screening at SWMU 00-018 (a)

The human health risk-screening assessment for SWMU 00-018(a) is discussed in Appendix I, sections I-4.2.1 and I-4.4.

The results of the risk-/dose screening assessments for the recreational scenario are presented in Tables I-4.2-1 to I-4.2-3. The total excess cancer risk for the recreational scenario is 1×10^{-6}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total radiological dose for the recreational scenario is 0.01 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-/dose-screening assessments for the residential scenario are presented in Tables I-4.2-4, I-4.2-5, and I-4.2-6. The total excess cancer risk is 4×10^{-6}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the residential scenario is 0.4 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the recreational and residential scenarios.

6.1.5 Summary of Ecological Risk-Screening at SWMU 00-018 (a)

The ecological risk-screening assessment is discussed in Appendix I, sections I-5.3.1 and I-5.5. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

6.2 AOC 00-030(eS), Septic System

6.2.1 Site Description and Operational History

AOC 00-030(eS) consists of a septic tank, originally referred to as structure 4A (LANL 1996, 056432, p. 1), formerly located on private property south of Canyon Road (Figure 6.2-1) at the Chapel Apartments. The tank was installed between 1943 and 1947 (LANL 1996, 056432, pp. 4–5). It was reported that structure 4A served residences and may have been connected to TA-01 (LANL 1992, 007667, p. 5-94; LANL 1996, 056432, p. 1). However, the mean elevation of the former TA-01 area is 7263 ft amsl, while the ground surface at AOC 00-030(eS) is approximately 7279 ft amsl. Assuming that the septic tank inlet was buried at approximately 5 ft bgs (elevation of 7274 ft amsl), it is not likely that the septic tank received waste from a gravity-feed system originating in TA-01. The tank ceased operating when the central WWTP became operational in 1947 (LANL 1996, 056432, p. 1). Available evidence indicates that the tank was removed when the Chapel Apartments were built in 1949 (LANL 1996, 056432, pp. 28, 32). The site is currently a paved parking lot. The vitrified clay pipe (VCP) downgradient of the tank and the steel outlet pipe located in Pueblo Canyon were still in place as of the Phase II investigation.

6.2.2 Summary of Previous Investigations

This section presents the RFI and Phase I investigation sampling and other activities conducted at AOC 00-030(eS) in 1994 and 2006–2007, respectively.

6.2.2.1 1994 RFI

The septic tank is believed to have been removed during construction of the Chapel Apartments in 1949 (LANL 1996, 056432, p. 30–32). No samples were collected from the area of the former tank location. During the RFI, four surface samples were collected in the vicinity of the outfall and submitted to off-site laboratories for analysis of TAL metals. Two samples were also analyzed for uranium, isotopic plutonium, gamma-emitting radionuclides, PCBs, pesticides, SVOCs, and VOCs, and one sample was analyzed for cyanide.

Metals were detected above BVs in the four surface soil samples from the outfall area. Radionuclides were not detected above BVs/FVs in these four samples. Organic chemicals were detected in a surface sample collected from one upgradient outfall location.

6.2.2.2 2006–2007 Phase I Investigation

One borehole (location 00-25484) was drilled to 13 ft bgs at the suspected location of the former septic tank (Figure 6.2-1). A backhoe was used to excavate an exploratory trench in the area where the elbow of the VCP was expected to be found. The elbow (location 00-25485) was encountered intact approximately 40 linear feet southeast of the expected location, and samples were collected with a hand auger. A second exploratory trench was excavated to expose the concrete key where the VCP discharge transitions to a steel outfall pipe so samples could be collected with a hand auger (location 00-25486). Therefore, although no engineering drawing has been found to verify and correct the structure locations, they have been positively identified in the field, and samples were collected at the correct locations.

A total of 17 soil, fill, and tuff samples were collected from six locations and submitted to an off-site laboratory for analysis of the following analytical suites: anions, cyanide, TAL metals, nitrate, perchlorate, pesticides, PCBs, SVOCs, VOCs, and gamma-emitting radionuclides. The COPCs identified at AOC 00-030(eS) included 13 inorganic chemicals, 2 radionuclides, and 32 organic chemicals (LANL 2008, 103243.34).

The lateral and vertical extent of inorganic COPCs (excluding lead and zinc) and all radionuclide and organic COPCs were defined for AOC 00-030(eS) during the Phase I investigation. Vertical extent was not defined for lead and zinc at one location along the outfall pipeline leading into Pueblo Canyon (LANL 2008, 104580; LANL 2008, 103243.34; NMED 2008, 103002).

6.2.3 Site Contamination

6.2.3.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess extent at AOC 00-030(eS). As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional sampling was conducted based on the field-screening results.
- Two shallow-subsurface samples were collected from one historical location to confirm the results of the previous investigation. Samples were collected from 6–7 ft bgs and 9–10 ft bgs. All samples were analyzed at an off-site fixed laboratory for TAL metals.
- Two QC samples (one field duplicates and one rinsate) were collected from one location at AOC 00-030 (eS).

Table 6.2-1 presents the samples collected and analyses requested for AOC 00-030(eS). The Phase I and Phase II sampling locations at AOC 00-030(eS) are shown in Figure 6.2-1.

6.2.3.2 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at AOC 00-030(eS), the detected headspace concentrations ranged from 0.3 ppm to 0.6 ppm. No radiological screening results exceeded the background at the site. The field-screening results are presented in Table 3.2-1.

6.2.3.3 Soil and Rock Sampling and Analytical Results

The Phase II investigation consisted of two tuff samples collected from one location and analyzed for TAL metals to define vertical extent of lead and zinc at location 00-25486, per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

Other historical samples collected at AOC 00-030(eS) include 13 soil samples and 4 tuff samples collected from six locations.

Inorganic Chemicals

Table 6.2-2 presents the inorganic chemicals above BVs, detected inorganic chemicals with no BVs, and inorganic chemicals not detected but with analytical DLs above BVs. Figure 6.2-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs.

The following inorganic chemicals were detected above BVs, were detected but had no BVs, or had analytical DLs above BVs: aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, copper, cyanide, iron, lead, magnesium, mercury, nickel, nitrate, perchlorate, selenium, silver, sodium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in one of six tuff samples at AOC 00-030(eS), with a maximum concentration of 7940 mg/kg. Sample results did not exceed the maximum background concentration of aluminum in tuff (8370 mg/kg). Aluminum is not identified as a COPC in tuff.

Antimony was not detected above BV in tuff at AOC 00-030(eS) but had DLs (0.997 and 1.1 mg/kg) above BV (0.5 mg/kg) in both tuff samples. The maximum DL was greater than the maximum background concentration (0.4 mg/kg). Antimony is identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in one of six tuff sample at AOC 00-030(eS), with a maximum concentration of 3.24 mg/kg. Sample results did not exceed the maximum background concentration of arsenic in tuff (5.0 mg/kg). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in one of six tuff samples at AOC 00-030(eS), with a maximum concentration of 86.8 mg/kg. The concentration exceeded the maximum background concentration of barium in tuff of 51.6 mg/kg (Figure H-13). Barium is identified as a COPC in tuff.

Cadmium was detected above BV (0.4 mg/kg) in 3 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 1.24 mg/kg. Additionally, two DLs were above BV, with a maximum DL of 0.56 mg/kg. The maximum concentration (1.24 mg/kg) was less than the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.

Calcium was detected above BV (6120 mg/kg) in 2 of 13 soil samples in soil at AOC 00-030(eS), with a maximum concentration of 6710 mg/kg. The results of the Gehan and quantile tests indicate site

concentrations of calcium are not different from background (Table H-4 and Figure H-13). Calcium is not identified as a COPC in soil.

Calcium was detected above BV (2200 mg/kg) in one of six tuff samples at AOC 00-030(eS), with a maximum concentration of 10500 mg/kg. The sampling result exceeded the maximum background concentration of calcium in tuff (2230 mg/kg). Calcium is identified as a COPC in tuff.

Chromium was detected above BV (7.14 mg/kg) in five of six tuff samples at AOC 00-030(eS), with a maximum concentration of 22.6 mg/kg. Sampling results exceeded the maximum background concentration of chromium in tuff (13 mg/kg) and is interpreted as substantially above background. Chromium is identified as a COPC in tuff.

Copper was detected above BV (14.7 mg/kg) in 3 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 123 mg/kg. The maximum concentration was interpreted as substantially above background. Copper is identified as a COPC in soil.

Copper was detected above BV (4.66 mg/kg) in one of two tuff samples at AOC 00-030(eS) at a concentration of 5.9 mg/kg. The sampling result does not exceed the maximum background concentration of copper in tuff (6.2 mg/kg). Copper is not identified as a COPC in tuff.

Cyanide was detected above BV (0.5 mg/kg) in 1 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 0.566 mg/kg. Cyanide is identified as a COPC in soil.

Iron was detected above BV (21,500mg/kg) in 2 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 68,100 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-4 and Figure H-14). Iron is not identified as a COPC in soil.

Lead was detected above BV (22.3 mg/kg) in 7 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 325 mg/kg. The maximum concentration was interpreted as above background. Lead is identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in two of six tuff samples at AOC 00-030(eS), with a maximum concentration of 41.5 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in one of six tuff samples at AOC 00-030(eS) at a concentration of 1940 mg/kg. The sampling result did not exceed the maximum background concentration of 2820 mg/kg of magnesium in tuff (Figure H-14). Magnesium is not identified as a COPC in tuff.

Mercury was detected above BV (0.1 mg/kg) in 1 of soil 13 samples at AOC 00-030(eS) at a concentration of 0.337 mg/kg. The maximum concentration was interpreted as above background. Mercury is identified as a COPC in soil.

Nickel was detected above BV (15.4 mg/kg) in 1 of 13 soil samples at AOC 00-030(eS) at a concentration of 83.6 mg/kg. The results of the Gehan and quantile tests indicate site concentrations of nickel are not different from background (Table H-4 and Figure H-15). Nickel is not identified as a COPC in soil.

Nitrate was detected in 7 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 2.05 mg/kg. Because no BV for nitrate in soil is available, nitrate is identified as a COPC.

Perchlorate was detected in 7 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 0.00261 mg/kg. Because no BV for perchlorate in soil is available, perchlorate is identified as a COPC.

Perchlorate was detected in three of four tuff samples at AOC 00-030(eS), with a maximum concentration of 0.0016 mg/kg. Because no BV for perchlorate in tuff is available, perchlorate is identified as a COPC.

Selenium was not detected above BV in soil at AOC 00-030(eS) but had DLs (1.58 to 8.62 mg/kg) above BV (1.52 mg/kg) in 13 of 13 soil samples. The maximum DL (8.62 mg/kg) was greater than the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.

Selenium was not detected above BV in tuff at AOC 00-030(eS) but had DLs (1.04 to 1.71 mg/kg) above BV (0.3 mg/kg) in all six samples. The maximum DL was greater than the maximum background concentration (0.105 mg/kg). Selenium is identified as a COPC in tuff.

Silver was detected above BV (1.0 mg/kg) in 2 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 1.51 mg/kg. Silver is identified as a COPC in soil.

Sodium was detected above BV (915 mg/kg) in 1 of 13 soil samples at AOC 00-030(eS), with a maximum concentration of 1180 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-4 and Figure H-15). Sodium is not identified as a COPC in soil.

Zinc was detected above BV (48.8 mg/kg) in seven soil samples at AOC 00-030(eS), with a maximum concentration of 463 mg/kg. The maximum concentration was interpreted as substantially above background. Zinc is identified as a COPC in soil.

In summary, the inorganic chemicals identified as COPCs in soil at AOC 00-030(eS) are copper, cyanide, lead, mercury, nitrate, perchlorate, selenium, silver, and zinc. The inorganic chemicals identified as COPCs in tuff at AOC 00-030(eS) are antimony, barium, calcium, chromium, lead, perchlorate, and selenium.

The new statistical methods for inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used to identify COPCs for previous investigations but were applied to all data for this report, resulting in modification to the COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemicals being eliminated as COPCs, when compared with the original COPC list (LANL 2008, 103243.34, p. 239): iron and nickel in soil. Further, the following inorganic chemicals were identified as COPCs and added to the list of COPCs in the 2008 investigation report (LANL 2008, 103243.34, p. 239): antimony and calcium in tuff.

Based on the approved 2008 investigation report (LANL 2008, 103243.34, p. 45), lead and zinc were not defined at one location. Additionally, antimony and calcium were identified as COPCs during the 2010 investigation and added to the list of COPCs in the 2008 investigation report, as discussed above. Lastly, chromium, although extent was defined per the Phase I investigation report, was detected in the samples collected during the Phase II investigation. Therefore, antimony, calcium, chromium, lead, and zinc are evaluated for extent in section 6.2.3.4.

Organic Chemicals

Table 6.2-3 presents the organic chemicals detected at AOC 00-030(eS). Figure 6.2-3 shows the spatial distribution of organic chemicals detected at AOC 00-030(eS). Per the approved Phase II work plan, samples collected at AOC 00-030(eS) were not analyzed for organic chemicals and no new data are

available to evaluate. Because organic COPCs are evaluated based on detection status, the organic COPCs do not change from the approved Phase I investigation report (LANL 2008, 103243.34, pp. 239–240).

Radionuclides

Table 6.2-4 presents the radionuclides detected at AOC 00-030(eS). Figure 6.2-4 shows the spatial distribution of radionuclides detected at AOC 00-030(eS). Per the approved Phase II work plan, radionuclides were not analyzed for during the Phase II investigation at AOC 00-030(eS). Therefore, the radionuclide COPCs (cesium-137 and uranium-235) do not change from the approved Phase I investigation report (LANL 2008, 103243.34, pp. 239–240).

6.2.3.4 Nature and Extent of Soil and Rock Contamination at AOC 00-030(eS)

The nature and extent of contamination at AOC 00-030(eS) were defined per the 2008 Pueblo Canyon investigation report (LANL 2008, 103243.34, p. 45), with the exception of the vertical extent of lead and zinc at the outfall pipeline. Additionally, two inorganic chemicals (antimony and calcium) were identified as COPCs, and added to the list of COPCs. Lastly, although extent was defined for chromium per the Phase I investigation report, it was detected in the samples collected during the Phase II investigation. Antimony, calcium, chromium, lead, and zinc are evaluated below for extent.

Inorganic Chemicals

The objective of the Phase II investigation at AOC 00-030(eS) was to define vertical extent of lead and zinc at outfall pipeline location 00-25486.

Antimony was not detected above BV in tuff at AOC 00-030(eS) but had DLs (0.98 to 1.1 mg/kg) above BV (0.50 mg/kg) in the two samples collected at location 00-25486 during the Phase II investigation. Because antimony was not detected at AOC 00-030(eS), the lateral and vertical extent of antimony are defined.

Calcium was detected above BV (2200 mg/kg) in three tuff samples at AOC 00-030(eS) during the Phase I investigation and was not detected during the Phase II investigation. The maximum concentration of 10,500 mg/kg was detected at location 00-25485 in a sample collected from 1.0–1.5 ft bgs. Calcium was not detected above BV at a deeper depth at the same location and was detected at a lower concentration at the downgradient outfall pipe location 00-25486. Calcium was not detected above BV in the two samples collected at the outfall pipe location 00-25486 during the Phase II investigation. The lateral and vertical extent of calcium are defined.

Although lead and zinc were the only COPCs requiring further sampling to define extent at AOC 00-030(eS), chromium was detected above BVs in the two deeper samples collected during Phase II at location 00-25486. Chromium had not been detected in the shallower Phase I samples from this location where the highest concentrations of other COPCs had been detected, nor was it detected at the outfall. Based on distribution, chromium does not appear to be the result of a release from AOC 00-030(eS) and is more likely to be from the stainless-steel hand auger used during sampling in tuff at depth in a location that was not accessible by a drill rig. The lateral and vertical extent of chromium are defined.

Lead was detected above BV (22.3 mg/kg) for soil in two samples at the outfall pipe location 00-25486 at AOC 00-030(eS) during the Phase I investigation. The maximum concentration of 325 mg/kg was

detected in a sample collected from a depth of 1.5–2.0 ft bgs. Lead was not detected in the two deeper samples collected at this outfall pipe location during the Phase II investigation. The vertical extent of lead is defined.

Zinc was detected above BV (48.8 mg/kg) in two soil samples at the outfall pipe location 00-25486 at AOC 00-030(eS) during the Phase I investigation. The maximum concentration of 463 mg/kg was detected in a sample collected from 1.5–2 ft bgs. Zinc was not detected in the two deeper samples collected at this outfall pipe location during the Phase II investigation. The vertical extent of zinc is defined.

Organic Chemicals

Per the approved Phase II work plan, samples collected at AOC 00-030(eS) were not analyzed for organic chemicals, and no new data are available to evaluate. Therefore, the conclusions in the approved Phase I investigation report (LANL 2008, 103243.34, pp. 239–240) regarding the nature and extent of organic chemicals at AOC 00-030(eS) are valid, and the lateral and vertical extent of all organic COPCs have been defined (LANL 2008, 103243.34, p. 45).

Radionuclides

Per the approved Phase II investigation work plan, radionuclides were not analyzed during the Phase II investigation at AOC 00-030(eS) and no new radionuclide COPCs have been identified. Therefore, the conclusion in the Phase I investigation report that the nature and extent of cesium-137 and uranium-235 are defined at AOC 00-030(eS) is valid.

6.2.4 Summary of Human Health Risk-Screening at AOC 00-030(eS), Septic System

The human health risk-screening assessment for AOC 00-030(eS) is discussed in Appendix I, sections I-4.2.2 and I-4.4.

The results of the risk-/dose-screening assessments for the recreational scenario are presented in Tables I-4.2-7 and I-4.2-8. The total excess cancer risk is approximately 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.07, which is below the NMED target HI of 1.0 (NMED 2009, 108070). No radionuclide COPCs were identified for the recreational scenario.

The results of the risk-/dose-screening assessments for the residential scenario are provided in Tables I-4.2-9, I-4.2-10, and I-4.2-11. The total excess cancer risk is 5×10^{-6}, which is below the NMED target risk level 1×10^{-5} (NMED 2009, 108070). The HI is 0.5, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total radiological dose is 0.4 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the recreational and residential scenarios.

6.2.5 Summary of Ecological Risk-Screening at AOC 00-030(eS)

The ecological risk-screening assessment is discussed in Appendix I, sections I-5.3.2and I-5.5. No potential ecological risk was found for any receptor following evaluations, based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

6.3 AOC 00-030(f), Septic System

6.3.1 Site Description and Operational History

AOC 00-030(f) is a septic system (also referred to as structure 5 in historical reports) consisting of two septic tanks located on private property south of Canyon Road and north of Rose Street (Figure 6.3-1), near the United Church school building (LANL 1992, 007667, p. 5–94). A 1943 engineering drawing labels the tanks "Septic Tank No. 2" (LANL 1996, 056432, pp. 43–44). The tanks connected with sewer lines in the "Apartment Area" and handled sanitary waste from a school, a post exchange, and some of the original Ranch School buildings; it did not receive waste from TA-01 operations (LANL 1996, 056432, p. 5). The tank ceased operating when the Central WWTP became operational in 1947 (LANL 1992, 007667, p. 5-94; LANL 1996, 056432, p. 1). Currently, the tanks are still partially in place and are located beneath existing sidewalks and a retaining wall in a heavily developed area.

6.3.2 Summary of Previous Investigations

This section presents the RFI and Phase I investigation sampling and other activities conducted at AOC 00-030(f) in 1994 and 2006–2007.

6.3.2.1 1994 RFI

The RFI report does not discuss the outfall or the attempts made to locate it, although the RFI work plan indicates the outfall drained to Acid Canyon reach ACS (LANL 1992, 007667).

During the RFI, seven subsurface samples were collected in and around the septic tank system from five locations and submitted to off-site analytical laboratories. These seven samples were analyzed for uranium, isotopic plutonium, PCBs, and pesticides. Five samples were analyzed by gamma spectroscopy; two samples were analyzed for TAL metals, americium-241, SVOCs, and VOCs; and one sample was analyzed for isotopic uranium.

The analyses of the two soil samples collected outside the tank boundaries were performed by an off-site analytical laboratory. Mercury was the only metal detected in either of the two samples collected from outside the estimated tank boundaries. Only one radionuclide, americium-241, was detected. Organic chemicals detected include 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; and endosulfan II. No other organic chemicals were detected in these two samples.

6.3.2.2 2006–2007 Phase I Investigation

The west and east septic tanks were excavated and confirmation samples were collected following excavation. The top and outlet side of the west tank were exposed, and the tank appeared to be partially removed. The tank floor and approximately 3 ft of the walls remained. The center of the tank contained fill material. Because of the tank's condition, the soil beneath the concrete floor was exposed to allow for sampling. The backhoe was used to collect one sample at location 00-25508 near the northeast corner of the tank. An exploratory trench to the drainline depth was excavated to locate the joint of the west and east tank drainline connection. A backhoe was used to collect samples at locations 00-25507 and 00-25509. Sampling locations are shown in Figure 6.3-1. The west and east septic tanks were not removed because they were located beneath the existing sidewalk and retaining wall. The drainline was not removed because it could not be located. Fifteen soil and tuff samples were collected from five locations and submitted to an off-site laboratory for analysis of the following analytes: anions, cyanide, TAL metals, nitrate, perchlorate, pesticides, PCBs, SVOCs, VOCs, americium-241, and gamma-emitting

radionuclides. The COPCs identified at AOC 00-030(f) included 6 inorganic chemicals, 2 radionuclides, and 22 organic chemicals (LANL 2008, 103243.34).

The lateral and vertical extent of all inorganic, radionuclide, and organic COPCs were defined for AOC 00-030(f) during the Phase I investigation (LANL 2008, 103243.34). However, in January 2009, the exact location of the former outlet line and outfall at AOC 00-030(f) was determined from a newly discovered historical drawing. Based on the new information on the outfall location, additional sampling was proposed to define the nature and extent of contamination at the outfall (LANL 2009, 105088).

6.3.3 Site Contamination

6.3.3.1 Soil, Rock, and Sediment Sampling

Because historical engineering drawings showing the location of the former outlet line and outfall were found, further characterization was required to assess potential contamination at AOC 00-030(f). As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional samples were collected based on field-screening results.
- Eleven shallow-subsurface samples were collected from five locations to define the nature and extent of potential contamination from the newly identified outlet line and outfall location. All samples were analyzed for TAL metals, SVOCs, VOCs, pesticides, nitrate, pH, cyanide, PCBs, perchlorate, and gamma-emitting radionuclide at an off-site fixed laboratory.
- Four QC samples (two field duplicates and two rinsate) were collected from one location at AOC 00-030(f).

Table 6.3-1 presents the samples collected and analyses requested for AOC 00-030(f). The Phase I and Phase II sampling locations at AOC 00-030(f) are shown in Figure 6.3-1.

6.3.3.2 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at AOC 00-030(f), detected headspace concentrations ranged from 0.2 ppm to 24.1 ppm. No radiological-screening results exceeded twice the minimum detectable activity at the site. Field-screening results are presented in Table 3.2-1.

6.3.3.3 Soil and Rock Sampling and Analytical Results

The Phase II investigation consisted of 11 tuff samples collected from five new locations and analyzed for TAL metals, SVOCs, VOCs, pesticides, nitrate, pH, cyanide, PCBs, perchlorate, and gamma-emitting radionuclides. Per the approved investigation work plan (LANL 2009, 105088), these samples were collected to define vertical and lateral extent of contamination at AOC 00-030(f).

Historical data collected at AOC 00-030(f) consisted of 12 soil samples collected from four locations.

Inorganic Chemicals

Table 6.3-2 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.

The following inorganic chemicals were detected at concentrations above BVs, were detected but do not have BVs, or had analytical DLs above BV during the RFI, Phase I, and Phase II investigations at AOC 00-030(f): antimony, chromium, cyanide, lead, manganese, mercury, nitrate, perchlorate, and selenium.

Antimony was not detected above BV in tuff at AOC 00-030(f) but had DLs (0.996 to 1.07 mg/kg) above BV (0.5 mg/kg) in 6 of 11 tuff samples. Antimony is identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in 1 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 2.8 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-5 and Figure H-16). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in 1 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 54 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-5 and Figure H-16). Barium is not identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in 2 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 1.3 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different than background (Table H-5 and Figure H-17). Beryllium is identified as a COPC in tuff.

Cadmium was detected above BV (0.4 mg/kg) in 2 of 12 soil samples at AOC 00-030(f), with a maximum concentration of 0.527 mg/kg. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-6 and Figure H-17). The maximum detected concentration (0.527 mg/kg) was less than the maximum background concentration of 2.6 mg/kg (Figure H-17). Cadmium is not identified as a COPC in soil.

Chromium was detected above BV (7.14 mg/kg) in 2 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 62.6 mg/kg. The maximum concentration was interpreted as substantially above background. Chromium is identified as a COPC in tuff.

Copper was detected above BV (14.7 mg/kg) in 1 of 12 soil samples at AOC 00-030(f), with a maximum concentration of 21.2 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-6 and Figure H-18). Copper is not identified as a COPC in soil.

Copper was not detected above BV (4.66 mg/kg) in tuff at AOC 00-030(f) but had DLs (5.44 to 5.69 mg/kg) above BV in 2 of 11 tuff samples. Because more than 50% of the site or background data set were nondetects, the Gehan test could not be performed. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-5 and Figure H-18). The maximum detection (5.69 mg/kg) was less than the maximum background concentration of 6.2 mg/kg (Figure H-18). Copper is not identified as a COPC in tuff.

Cyanide was not detected above BV in tuff at AOC 00-030(f) but had DLs (0.52 to 0.53 mg/kg) above BV (0.5 mg/kg) in 4 of 10 tuff samples. Cyanide is identified as a COPC in tuff.

Lead was detected above BV (22.3 mg/kg) in 2 of 12 soil samples at AOC 00-030(f), with a maximum concentration of 45.1 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-6 and Figure H-19). Lead is not identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in six of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 19.1 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different than background (Table H-5 and Figure H-19). Lead is identified as a COPC in tuff.

Manganese was detected above BV (482 mg/kg) in 5 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 1160 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-5 and Figure H-20). Manganese is identified as a COPC in tuff.

Mercury was detected above BV (0.1 mg/kg) in 1 of 12 soil samples at AOC 00-030(f), with a maximum concentration of 0.318 mg/kg. The maximum concentration was interpreted as substantially above background. Mercury is identified as a COPC in soil.

Nitrate was detected in eight soil samples at AOC 00-030(f), with a maximum concentration of 10.4 mg/kg. Because no BV for nitrate in soil is available, nitrate is identified as a COPC.

Nitrate was detected in nine tuff samples at AOC 00-030(f), with a maximum concentration of 3.63 mg/kg. Because no BV for nitrate in tuff is available, nitrate is identified as a COPC.

Perchlorate was detected in four tuff samples at AOC 00-030(f), with a maximum concentration of 0.00209 mg/kg. Because no BV for perchlorate in tuff is available, perchlorate is identified as a COPC.

Selenium was not detected above BV in soil at AOC 00-030(f) but had DLs (1.58 to 1.79 mg/kg) above BV (1.52 mg/kg) in all 12 soil samples. The maximum DL was greater than the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.

Selenium was not detected above BV in tuff at AOC 00-030(f) but had DLs (0.52 to 1.09 mg/kg) above BV (0.3 mg/kg) in 9 of 11 tuff samples. Selenium is identified as a COPC in tuff.

Zinc was detected above BV (48.8 mg/kg) in 1 of 12 soil samples at AOC 00-030(f), with a maximum concentration of 71.1 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-6 and Figure H-20). Zinc is not identified as a COPC in soil.

Zinc was detected above BV (63.5 mg/kg) in 1 of 11 tuff samples at AOC 00-030(f), with a maximum concentration of 68.7 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-5 and Figure H-21). Zinc is not identified as a COPC in tuff.

In summary, the inorganic chemicals identified as COPCs in soil at AOC 00-030(f) are mercury, nitrate, and selenium. The inorganic chemicals identified as COPCs in tuff at AOC 00-030(f) are antimony, beryllium, chromium, cyanide, lead, manganese, nitrate, perchlorate, and selenium.

The new statistical methods for inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used to identify COPCs for previous investigations but were applied to all data for this report, resulting in modification to the COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemicals being eliminated as COPCs, when compared with the original list of COPCs (LANL 2008, 103243.34, p. 246): copper and lead in soil. Further, the following inorganic chemicals were identified as COPCs and added to the list of COPCs presented in the 2008 investigation report (LANL 2008, 103243.34, p. 246): antimony, beryllium, cyanide, lead, manganese, nitrate, and perchlorate in tuff.

Based on the approved work plan (LANL 2009, 105088), the recently located outlet line and outfall at AOC 00-030(f) required further evaluation to determine nature and extent. Antimony, beryllium, chromium, cyanide, lead, manganese, mercury, nitrate, perchlorate, and selenium are retained as COPCs and are evaluated for extent in section 6.3.3.4.

Organic Chemicals

Table 6.3-3 presents the analytical results for organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. Organic COPCs are identified below.

Organic chemicals detected in soil at AOC 00-030(f) include acenaphthene; acetone; anthracene; Aroclor-1260; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; carbon disulfide; alpha-chlordane; gamma-chlordane; chrysene; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; 2-methylnaphthalene; naphthalene; phenanthrene; pyrene; and toluene.

Organic chemicals detected in tuff at AOC 00-030(f) include acenaphthene; 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; alpha-BHC (alpha–benzene hexachloride); chrysene; 4,4'-DDT; dibenz(a,h)anthracene; fluoranthene; fluorene; heptachlor epoxide; indeno(1,2,3-cd)pyrene; 4-isopropyltoluene; 4,4-methoxychlor; methylene chloride; 2-methylnaphthalene; naphthalene; phenanthrene; pyrene; toluene; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene.

Carbon disulfide; alpha-chlordane; gamma-chlordane; 4,4'-DDD; and 4,4'-DDE were not detected in Phase II samples but were identified as COPCs in soil during Phase I investigation and are retained as COPCs.

Based on the approved work plan (LANL 2009, 105088), the recently located outlet line and outfall AOC 00-030(f) required further evaluation for nature and extent. Acenaphthene; 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; alpha-BHC; carbon disulfide; alpha-chlordane; gamma-chlordane; chrysene; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dibenz(a,h)anthracene; fluoranthene; fluorene; heptachlor epoxide; indeno(1,2,3-cd)pyrene; 4-isopropyltoluene; 4,4'-methoxychlor; methylene chloride; 2-methylnaphthalene; naphthalene; phenanthrene; pyrene, toluene; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene are COPCs and are evaluated for extent in section 6.3.3.4.

Radionuclides

Table 6.3-4 presents the analytical results for radionuclides. Plate 6 shows the spatial distribution of detected radionuclides. The radionuclide COPCs are identified below.

Americium-241 was detected in 1 of 12 soil samples at 0.0483 pCi/g at a depth where FVs do not apply. Americium-241 is identified as a COPC in soil.

Americium-241 was detected in 1 of 10 tuff samples at 0.701 pCi/g. FVs do not apply to tuff samples; therefore, americium-241 is identified as a COPC in tuff.

Cesium-137 was detected in 1 of 12 soil samples at 0.31 pCi/g at a depth where FVs do not apply. Cesium-137 is identified as a COPC in soil.

Cesium-137 was detected in 1 of 10 tuff samples at 0.252 pCi/g. FVs do not apply to tuff samples; therefore, cesium-137 is identified as a COPC in tuff.

Based on the approved work plan (LANL 2009, 105088), the recently located outlet line and outfall at AOC 00-030(f) required further evaluation for nature and extent. Cesium-137 and americium-241 are retained as a COPC and evaluated for extent in section 6.3.3.4.

6.3.3.4 Nature and Extent of Soil and Rock Contamination at AOC 00-030(f)

The nature and extent of contamination at AOC 00-030(f) were defined following the Phase I investigation (LANL 2008, 103243.34, p. 46). In January 2009, the exact location of the outlet line and outfall was identified, and per the approved work plan (LANL 2009, 105088), five additional sampling locations were proposed to reevaluate nature and extent at the outfall.

The nature and extent of inorganic chemicals, organic chemicals, and radionuclides at AOC 00-030(f) are defined, as discussed below.

Inorganic Chemicals

The objective of the Phase II investigation at AOC 00-030(f) was to evaluate the newly located outfall location to further define nature and extent. Antimony, beryllium, chromium, cyanide, lead, manganese, mercury, nitrate, perchlorate, and selenium are retained as COPCs and are evaluated below for extent.

Antimony was not detected in tuff at all outfall locations at AOC 00-030(f) but had DLs (0.996 to 1.07 mg/kg) above BV (0.50 mg/kg) in six tuff samples. Because antimony was not detected at AOC 00-030(f), the lateral and vertical extent of antimony are defined.

Beryllium was detected above BV (1.21 mg/kg) in 2 of 11 tuff samples at AOC 00-030(f). The maximum concentration of 1.3 mg/kg occurred in tuff samples from two separate locations (PU-611434 at 2.5–3.5 ft bgs and PU-611435 at 2.3–3.3 ft bgs). Beryllium was not detected in any other sample from the site, including the outfall. Further, both beryllium detections are less than the maximum background for tuff (1.8 mg/kg). The lateral and vertical extent of beryllium are defined.

Chromium was detected above BV (7.14 mg/kg) in two samples at one outlet line location at AOC 00-030(f). The maximum concentration of 62.6 mg/kg was detected at location PU-611432 in a sample collected from a depth of 4.2–5.2 ft bgs. Chromium was not detected at the deepest depth at this location and was not detected at downgradient locations. The lateral and vertical extent of chromium are defined.

Cyanide was not detected in tuff at all outfall locations at AOC 00-030(f) but had DLs (0.52 to 0.53 mg/kg) above BV (0.5 mg/kg) in four tuff samples. Because cyanide was not detected at AOC 00-030(f), the lateral and vertical extent of cyanide are defined.

Lead was detected above BV (11.2 mg/kg) in tuff samples at multiple outfall locations at AOC 00-030(f). The maximum concentration of 19.1 mg/kg was detected at location PU-611435 in a sample collected from a depth of 0.8–1.3 ft bgs. Lead was not detected above BV or was detected at lower concentrations at the deepest depths at all locations. Concentrations decreased to downgradient location PU-611436. The lateral and vertical extent of lead are defined.

Manganese was detected above BV (482 mg/kg) in tuff samples at multiple outfall locations at AOC 00-030(f). The maximum concentration of 1160 mg/kg was detected at location PU-611435 in a sample collected from a depth of 2.3–3.3 ft bgs. Manganese was not detected above BV or was detected at lower concentrations at the deepest depths at all locations. Concentrations decreased to downgradient location PU-611436. The lateral and vertical extent of manganese are defined.

Mercury was detected above BV (0.1 mg/kg) in 1 of 12 soil samples collected in 2006. Mercury was also detected in a sample at location 45-25461, which was collected in 2006 to characterize SWMU 45-002 (the vehicle-decontamination facility) and coincidentally falls at the outfall for AOC 00-030(f) [the exact

location of the outlet line and outfall for AOC 00-030(f) was not known in 2006]. Mercury decreases with depth at both locations and is not detected in any samples downgradient of the outfall. The lateral and vertical extent of mercury are defined.

Nitrate was detected at multiple outfall locations at AOC 00-030(f). The maximum concentration of 3.63 mg/kg was detected at location PU-611434 in a sample collected from a depth of 0–1.5 ft bgs. Concentrations are low and reflect naturally occurring levels of nitrate. Therefore, the lateral and vertical extent of nitrate are defined.

Perchlorate was detected at low concentrations in four tuff samples at multiple outfall locations at AOC 00-030(f). The maximum concentration of 0.00209 mg/kg was detected at location PU-611435 in a sample collected from a depth of 0.8–1.3 ft bgs. Perchlorate was not detected at the deepest depths at all locations. Concentrations decreased to downgradient location PU-611436. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected in soil at all outfall locations at AOC-030(f) but had DLs (1.58 to 1.79 mg/kg) above BV (1.52 mg/kg) in 12 soil samples. Selenium was not detected in tuff at all outfall locations at AOC 00-030(f) but had DLs (0.52 to 1.09 mg/kg) above BV (0.3 mg/kg) in nine samples. The lateral and vertical extent of selenium are defined.

Organic Chemicals

Organic COPCs at AOC 00-030(f) include acenaphthene; 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; alpha-BHC; carbon disulfide; alpha-chlordane; gamma-chlordane; chrysene; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dibenz(a,h)anthracene; fluoranthene; fluorene; heptachlor epoxide; indeno(1,2,3-cd)pyrene; 4 isopropyltoluene; 4,4'-methoxychlor; methylene chloride; 2-methylnaphthalene; naphthalene; phenanthrene; pyrene; toluene; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene.

Aroclor-1254 was detected in one tuff sample at one outfall location at AOC 00-030(f) during the investigations. It was detected at the top depth of 1.2–2.2 ft bgs at location PU-611432 and was not detected at the deepest depth at this location. Aroclor-1254 was not detected at downgradient locations. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in soil samples at location 00-25510 and in tuff samples from two outfall locations at AOC 00-030(f) during the investigations. The concentration decreased with depth and downgradient from the maximum detected concentration of 0.0296 mg/kg in the surface sample at location 00-25510. At location 00-25510, the concentration of Aroclor-1260 decreased to 0.0016 mg/kg in the bottom depth of 1.5–2.0 ft bgs. In the downgradient sampling locations, the concentration decreased to 0.096 mg/kg at the top depth of 1.2–2.2 ft bgs at location PU-611432 and decreased in concentration to 0.0076 mg/kg in the bottom depth sample of 2.0–3.0 ft bgs at location PU-611433. Aroclor-1260 was not detected at adjacent and downgradient locations, which were sampled to a deeper depth of 3.5 ft bgs. The lateral and vertical extent of Aroclor-1260 are defined.

The PAH compounds 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 were detected at low and mostly estimated concentrations at AOC 00-030(f). The spatial distribution of results does not indicate that the outfall is the source of the PAHs. The PAH compounds detected in the samples are probably from runoff from Canyon Road and the Los Alamos County lay-

down yard located upgradient of the site. The lay-down yard is used to stage asphalt, and portions of the site are or have been paved. No evidence was found of a release of these PAH chemicals from the outfall. The lateral and 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 are defined.

The historically used pesticide 4,4'-DDT and its metabolites (4,4'-DDE and 4,4'-DDT) were detected primarily in the area of the septic tank at AOC 00-030(f). The maximum concentrations of 4,4'-DDT and 4,4'-DDD (0.539 and 0.041 mg/kg, respectively) were detected at location 00-25508 at a depth of 7.0–7.5 ft bgs. The maximum concentration of 4,4'-DDE (0.111 mg/kg) was detected at location 00-25509 at a depth of 5–5.5 ft bgs. The concentrations of these organic chemicals decrease with depth consistently in the area of the septic tank and decreased with distance downgradient from the tank. At the outfall area, 4,4'-DDT was detected in one sample at a concentration below the EQL (PU-611435, 0.0014 mg/kg). Neither 4,4'-DDD or 4,4'-DDE were detected at the outfall. The lateral and vertical extent of 4,4'-DDD; 4,4'-DDE; and 4,4'-DDT are defined.

Alpha-BHC; carbon disulfide; heptachlor epoxide; 4-isopropyltoluene; and 4,4'-methoxychlor were each detected in one sample from the site at a concentrations at or below EQLs. A release of these organic COPCs is not indicated because they were detected in only one sample at low concentrations. The lateral and vertical extent of alpha-BHC; carbon disulfide; heptachlor epoxide; 4-isopropyltoluene; and 4,4'-methoxychlor are defined.

Acetone; benzoic acid; alpha- and gamma-chlordane; methylene chloride; toluene; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene were detected in six or fewer samples at SWMU-00-030(f), and all results were below EQLs. The distribution of these organic COPCs is not indicative of a release from the site. The lateral and vertical extent of acetone; benzoic acid; alpha-BHC; heptachlor epoxide; 4-isopropyltoluene; methylene chloride; toluene; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Radionuclide COPCs at AOC 00-030(f) include americium-241 and cesium-137.

Americium-241 was detected at two locations (PU-611432 and 00-25510) at a maximum concentration of 0.701 pCi/g. At both locations, a deeper sample was collected and americium-241 was not detected in the deeper sample. Americium-241 was not detected in any of the downgradient samples from the outfall area. The lateral and vertical extent of americium-241 are defined.

Cesium-137 was detected at two locations (PU-611434 and 00-25510) at a maximum concentration of 0.0.31 pCi/g. At both locations, a deeper sample was collected and cesium-137 was not detected in the deeper sample. It was detected at a concentration of 0.265 pCi/g at location PU-611434 at the top depth of 0–1.5 ft bgs but was not detected at nearby locations PU-611436 and PU-611435. In addition, concentrations of cesium-137 decreased from upgradient location 00-25510 to downgradient outfall location PU-611434. The lateral and vertical extent of cesium-137 are defined.

6.3.4 Summary of Human Health Risk-Screening at AOC 00-030(f)

The human health risk-screening assessment for AOC 00-030(f) is discussed in Appendix I, sections I-4.2.3 and I-4.4.

The results of the risk-/dose-screening assessments for the recreational scenario are presented in Tables I-4.2-12, I-4.2-13, and I-4.2-14. The total excess cancer risk is 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.08, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.02 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-/dose-screening assessments for the residential scenario are presented in Tables I-4.2-15, I-4.2-16, and I-4.2-17. The total excess cancer risk is 5×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (.NMED 2009, 108070) The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2006, 108070). The total radiological dose is 0.8 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

Based on the screening-assessment results, no potential unacceptable risks or doses exist from COPCs for the recreational and residential scenarios.

6.3.5 Summary of Ecological Risk-Screening at AOC 00-030(f)

The ecological risk-screening assessment is presented in Appendix I, sections I-5.3.3 and I-5.5. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

6.4 AOC 00-030(h), Septic System

6.4.1 Site Description and Operational History

AOC 00-030(h) is a septic tank (structure 7) located on private property north of Canyon Road (Figure 6.4-1) beneath the asphalt-paved west parking lot of the Immaculate Heart of Mary Catholic Church (3600 Canyon Road) (LANL 1996, 053799, p. 1). Constructed of reinforced concrete, the septic tank system was 30 ft long × 20 ft wide × 12 ft deep (LANL 1996, 053799, p. 7). It consisted of two chambers, a concrete baffle between the chambers, and a 6-ft × 2-ft splash box at the inlet line (LANL 1996, 053799, p. 7). The septic tank probably served the areas between Canyon Road and Trinity Drive (LANL 1996, 053799, p. 1; LANL 1996, 062416, p. 1). Buildings within this area were associated with the special engineering detachment, which included the Fort Leonard Wood housing units, dormitories, military barracks, west mess hall, supply room, gymnasium, post office, and recreational buildings (LANL 1996, 053799, p. 1). Trenches excavated across the path of the outfall in 2006 confirmed that the outlet line drained north toward Acid Canyon. The tank was used from 1945 to 1947, when the Central WWTP became operational (LANL 1996, 053799, p. 1).

6.4.2 Historical Investigations

This section presents the voluntary corrective action (VCA) activities and Phase I investigation sampling and other activities conducted at AOC 00-030(h) in 1996 and 2006–2007, respectively.

6.4.2.1 1996 VCA

The septic tank was removed in 1996 during VCA activities (LANL 1996, 062416, pp. 13–14). The outlet pipe and outfall for the tank were not located during the VCA (LANL 1996, 062416, p. 10). Eighteen surface and subsurface samples in and around the septic tank system and suspected outfall location were collected and submitted to off-site analytical laboratories. These samples were analyzed for TAL

metals, including uranium; gamma-emitting radionuclides; isotopic plutonium; PCBs; pesticides; SVOCs; and VOCs.

Arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, and zinc were detected above BVs. Only mercury and zinc were detected above BVs in both samples. Plutonium-239 was detected above the FV in eight samples from four locations collected from outside the septic tank. Cesium-137 and plutonium-239 were detected in the outfall samples; however, only plutonium-239 was above the FV. Pesticides detected were 4,4'-DDT and its metabolites (4,4'-DDD and 4,4'-DDE) and alpha- and gamma-chlordane. Detected VOCs were acetone; dichloroethene; ethylbenzene; methylene chloride; trichloroethylene (TCE); toluene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and total xylene.

6.4.2.2 2006–2007 Phase I Investigation

One vertical borehole (location 00-04816) was advanced to 24 ft, and samples were collected beneath the former septic tank to define the vertical extent of contamination. The borehole location is shown in Figure 6.4-1. In addition, 22 soil and tuff samples were collected from eight locations at AOC 00-030(h) and submitted to an off-site laboratory for analysis of the following analytes: anions, cyanide, TAL metals, nitrate, perchlorate, pesticides, PCBs, SVOCs, VOCs, gamma-emitting radionuclides, and isotopic plutonium. The COPCs identified at AOC 00-030(h) included 17 inorganic chemicals, 44 organic chemicals, and 3 radionuclides (LANL 2008, 103243.34).

The lateral and vertical extent of all inorganic, radionuclide, and organic COPCs were defined for AOC 00-030(h) during the Phase I investigation (LANL 2008, 103243.34; p 47). However, the Laboratory recommended, and NMED approved, limited removal action at AOC 00-030(h) because of the excess cancer risk under the residential scenario due to PAHs and other contributors (LANL 2008, 103243.34; LANL 2008, 103243.4; pp. 7–8; NMED 2008, 103002).

6.4.3 Site Contamination

6.4.3.1 Soil Removal

For the Phase II investigation, approximately 306 yd^3 of material, including soil, rock, and vegetation, was excavated at AOC 00-030(h) (Figure 6.4-1). The waste was containerized into 18 rolloff bins at the point of generation and moved off-site so waste storage was removed from public access. The bins were filled to approximately 85% (17 yd^3) before they were sealed and marked in accordance with the WCSF. An additional rolloff bin was loaded with contact waste, including PPE and soil-contaminated flexible hose and pipe, generated during the entire excavation process.

The contaminated soil at AOC 00-030(h) was excavated and removed using two concurrent processes. The first method resulted in the removal of approximately 51 yd^3 of canyon-bottom sediment, soil, and debris from the east-west oriented Acid Canyon drainage using a GapVax (vacuum suction) truck. This material was removed by initially breaking up a 0.5-ft "cap" of compacted sediment with a pneumatic and electric jack hammer, followed by vacuuming of the loose material into the storage tank of the GapVax truck. The removal of the canyon-bottom sediment proceeded downgradient (from west to east) and was repeated until the desired excavation depth of approximately 1.5 ft was reached.

The second method resulted in removing approximately 255 yd^3 of soil, vegetation, and slope mantling material from the north-south oriented slope into Acid Canyon and in a flat wooded area just north of the parking lot of the Catholic church (on Los Alamos High School and church property). This material was removed using two excavators and a front-end loader. The north-south trending slope was excavated to a

depth of 1.5 ft, and the flat wooded area (southernmost part of the proposed excavation) was excavated to variable depths ranging from 2 to 4 ft.

For remediation activities at AOC 00-030(h) a small portion (~12 ft ×12 ft) of the proposed soil removal area could not be excavated to the proposed depth. The property owners (Immaculate Heart of Mary Catholic Church) would not allow excavation in the area of a clump of large pine trees that were in the middle of the area proposed for remediation (Appendix E, p. E-6, includes a photograph that shows the clump of trees). The property owners were concerned that deeper removal would compromise the shallow root system of the trees and kill them (or require the complete removal of the trees). Therefore, only the top 6 in. of soil and forest litter were removed around the trees (Lucero 2010, 110541), which act as a sediment trap for runoff from the church parking lot. The final excavation depth away from the trees varied from 2–4 ft from that proposed in the work plan.

Near-surface samples were collected within the clump of trees (location PU-612252) to characterize the material being left in place. However, these near-surface sample results are not representative of potential contamination from Laboratory operations because the samples were collected from a location that was stratigraphically higher than that of the former drainline, a gravity-driven buried line that day-lighted into Acid Canyon downslope (north) of the canyon edge. Based on the Phase I sampling results, the outfall is thought to be located near sampling location 00-04811, where the highest concentrations of many contaminants, including plutonium-239, was detected. As presented in the Phase II investigation work plan, PAHs in the surface at this site are more likely the result of runoff from the paved church parking lot. The results from location PU-612252 were retained to evaluate nature and extent but were excluded from the risk assessment because they are not representative of historical Laboratory operations.

Most of the excavated areas had adequate sample coverage to “preconfirm” removal activities. That is, existing data showed decreasing trends to below cleanup levels so that the depth of excavation was established before the cleanup. Because the overlying soils that contained higher concentrations of site COPCs have been removed, decreasing trends must be verified using excavated data (Appendix G). For example, most of the maximum detections of metals and radionuclides at AOC 00-030(h) occurred at location 00-04811 at a depth of 0.42–0.83 bgs. Following excavation to a depth of 1.5 ft bgs, the remaining sampling interval at that location (1.5–2 ft bgs) has only one detection of plutonium-239 at 0.458 pCi/g. No inorganic COPCs were detected above BVs in this sample. Other remaining Phase I sampling locations show levels of benzo(a)pyrene below the cleanup level (0.621 mg/kg) following removal of overlying material with exceedances of the cleanup level. Six additional confirmation samples were collected at SWMU 00-030(h) where existing data could not be used. At these six locations (PU-612249 though PU-612254), very few inorganic COPCs were detected following removal. Organic COPCs (primarily PAHs and pesticides) were detected but were generally at or below residential cleanup levels. One notable exception is location PU-611252, where benzo(a)pyrene was detected at 8.5 mg/kg at a depth of 0.5–1 ft bgs. This sample was collected from a sediment trap in an area of trees that could not be remediated because of restrictions stipulated by the property owner (see above). The extent of the elevated benzo(a)pyrene is very limited; in the deeper sample at this location (1.5–2 ft bgs), benzo(a)pyrene was detected below the EQL, at 0.3 mg/kg.

The excavated areas were restored by backfilling or recontouring following removal actions at AOC 00-030(h). The flat wooded area was backfilled with approximately 240 yd^3 of clean fill material delivered from off-site. The clean fill material was moisture-conditioned during and immediately following placement into the area of excavation.

Upon completion of the soil removal at AOC-00-030(h), erosion-control devices were emplaced to maintain slope stability during stormwater run-off events. Two reinforced retaining barriers (check dams)

were constructed on the north-facing slope using tuff boulders, tree logs, and clean fill. Additionally, straw mats and wattles were installed on all disturbed surfaces, and a Laboratory-approved seed mix was applied to the area.

6.4.3.2 Soil, Rock and Sediment Sampling

Based on previous investigation results, soil removal was required to reduce potential risk at AOC 00-030(h). As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional sampling occurred based on field-screening results.
- Two surface samples were collected from two new locations to refine the extent of contamination before removal action was taken. All samples were analyzed at an off-site fixed laboratory for TAL metals, SVOCs, and pesticides.
- Four shallow-subsurface borehole samples were collected from two new locations to refine the extent of contamination before removal action. All samples were analyzed at an off-site fixed laboratory for SVOCs.
- Eight confirmation samples were collected from seven locations (one historical and six new) following soil excavation and removal activities. All samples were analyzed at an off-site fixed laboratory for TAL metals, SVOCs, and pesticides.
- Four QC samples (two field duplicates and two rinsate) were collected from two locations at AOC 00-030 (h).

Table 6.4-1 presents the samples collected and analyses requested for AOC 00-030(h). The VCA, Phase I, and Phase II sampling locations at AOC 00-030(h) are shown in Figure 6.4-1.

6.4.3.3 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at AOC 00-030(h), detected headspace concentrations ranged from 0.0 ppm to 6.2 ppm. No radiological-screening results exceeded the background at the site. Field-screening results are presented in Table 3.2-1.

6.4.3.4 Soil and Rock Sampling and Analytical Results

The Phase II investigation consisted of two sediment, seven soil, and five tuff samples collected from 1 historical and 10 new locations. Four tuff samples were analyzed for SVOCs to narrow the area requiring removal and determine the source of benzo(a)pyrene. The remaining samples were analyzed for TAL metals, SVOCs, and pesticides. Per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002), these samples were collected at AOC 00-030(h) following soil-removal activities targeting PAHs and other contributors to excess cancer risk.

Historical data collected at AOC 00-030(h) consisted of 22 soil samples and 6 tuff samples collected from 18 locations.

Inorganic Chemicals

Table 6.4-2 presents the inorganic chemicals detected above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at AOC 00-030(h), and the inorganic COPCs are identified below.

The following inorganic chemicals were detected above BVs, were detected but have no BVs, or were not detected but had analytical DLs above BVs, during the Phase I and Phase II investigations: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, nitrate, perchlorate, potassium, selenium, thallium, uranium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 21,400 mg/kg. The concentration did not exceed the maximum background concentration of aluminum in tuff of 8370 mg/kg (Figure H-22). Aluminum is identified as a COPC in tuff.

Antimony was not detected above BV in sediment at AOC 00-030(h) but had DLs (1.08 to 1.13 mg/kg) above BV (0.83 mg/kg) in both sediment samples. No background data set for antimony in sediment is available. Antimony is identified as a COPC in sediment.

Arsenic was detected above BV (2.79 mg/kg) in three of seven tuff samples at AOC 00-030(h), with a maximum concentration of 3.78 mg/kg. The concentration did not exceed the maximum background concentration of 5 mg/kg (Figure H-22). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (295 mg/kg) in 1 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 442 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not statistically different from background (Table H-7, Figure H-23). Barium is not identified as a COPC in soil.

Barium was detected above BV (46 mg/kg) in two of seven tuff samples at AOC 00-030(h), with a maximum concentration of 88.3 mg/kg. The concentration exceeded the maximum background concentration of barium in tuff of 51.6 mg/kg (Figure H-23). Barium is identified as a COPC in tuff.

Beryllium was detected above BV (1.83 mg/kg) in 1 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 3 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-7 and Figure H-24). Beryllium is not identified as a COPC in soil.

Beryllium was detected above BV (1.21 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 1.57 mg/kg. The concentration did not exceed the maximum background concentration of 1.8 mg/kg (Figure H-24). Beryllium is not identified as a COPC in tuff.

Cadmium was not detected above BV (0.4 mg/kg) in soil at AOC 00-030(h) but had DLs (0.44 to 0.634 mg/kg) above BV in 8 of 29 soil samples. Because the combined site and background data sets had greater than 80% nondetects, statistics were not performed. The maximum DL was less than the maximum background concentration (2.6 mg/kg); therefore; cadmium is not identified as a COPC in soil.

Calcium was detected above BV (6120 mg/kg) in 5 of 17 soil samples at AOC 00-030(h), with a maximum concentration of 10,700 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-7 and Figure H-25). Calcium is not identified as a COPC in soil.

Calcium was detected above BV (4420 mg/kg) in one of two sediment samples at AOC 00-030(h) at a concentration of 5180 mg/kg (Figure H-25). Calcium is identified as a COPC in sediment.

Chromium was detected above BV (7.14 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 8.14 mg/kg. The concentration was below the maximum background concentration of 13 mg/kg (Figure H-26). Chromium is not identified as a COPC in tuff.

Cobalt was detected above BV (8.64 mg/kg) in 3 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 37.7 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-7 and Figure H-26). Cobalt is not identified as a COPC in soil.

Copper was detected above BV (14.7 mg/kg) in 1 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 17.9 mg/kg. The results of the Gehan and slippage tests indicate that site concentrations are not different from background (Table H-7 and Figure H-27). Copper is not identified as a COPC in soil.

Copper was detected above BV (4.66 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 8.33 mg/kg. The concentration exceeded the maximum background concentration of copper in tuff of 6.2 mg/kg (Figure H-27). Copper is identified as a COPC in tuff.

Copper was detected above BV (11.2 mg/kg) in one of two sediment samples at AOC 00-030(h), with a maximum concentration of 59.9 mg/kg. The maximum concentration was interpreted as substantially above background. Copper is identified as a COPC in sediment.

Iron was detected above BV (14,500 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 51,900 mg/kg. The maximum concentration was interpreted as substantially above background. Iron is identified as a COPC in tuff.

Lead was detected above BV (22.3 mg/kg) in 10 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 36 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-7 and Figure H-28). Lead is identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in three of seven tuff samples at AOC 00-030(h), with a maximum concentration of 94 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 2210 mg/kg. The concentration did not exceed the maximum background concentration of 2820 mg/kg (Figure H-28). Magnesium is not identified as a COPC in tuff.

Manganese was detected above BV (671 mg/kg) in 3 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 1540 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-7and Figure H-29). Manganese is not identified as a COPC in soil.

Mercury was detected above BV (0.1 mg/kg) in 7 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 1.3 mg/kg. Because more than 50% of the site or background data set were nondetects, the Gehan test could not be performed. The results of the quantile and slippage tests indicate the site concentrations may be different from background (Table H-7 and Figure H-29). Mercury is identified as a COPC in soil.

Nickel was detected above BV (6.58 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 6.6 mg/kg. The concentration did not exceed the maximum background concentration of 7 mg/kg (Figure H-30). Nickel is not identified as a COPC in tuff.

Nitrate was detected in two soil samples at AOC 00-030(h), with a maximum concentration of 1.4 mg/kg. Because no BV for nitrate in soil is available, nitrate is identified as a COPC.

Nitrate was detected in two tuff samples at AOC 00-030(h), with a maximum concentration of 10.3 mg/kg. Because no BV for nitrate in tuff is available, nitrate is identified as a COPC.

Perchlorate was detected in one tuff samples at AOC 00-030(h), with a maximum concentration of 0.000768(J) mg/kg. Because no BV for perchlorate in tuff is available, perchlorate is identified as a COPC.

Potassium was detected above BV (3500 mg/kg) in one of seven tuff samples at AOC 00-030(h), with a maximum concentration of 9010 mg/kg. The concentration exceeded the maximum background concentration of 4720 mg/kg (Figure H-30). Potassium is identified as a COPC in tuff.

Selenium was not detected in soil at AOC 00-030(h) but had DLs (1.61 to 1.9 mg/kg) above BV (1.52 mg/kg) in 8 of 29 soil samples. The maximum DL was greater than the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.

Selenium was not detected above BV in tuff at AOC 00-030(h) but had DLs (0.53 to 1.81 mg/kg) above BV (0.3 mg/kg) in all seven tuff samples. Selenium is identified as a COPC in tuff.

Selenium was not detected above BV in sediment at AOC 00-030(h), but had DLs (1.04 to 1.08 mg/kg) above BV (0.3 mg/kg) in both sediment samples. Selenium is identified as a COPC in sediment.

Thallium was detected above BV (0.73 mg/kg) in two of 29 soil samples at AOC 00-030(h), with a maximum concentration of 2.3 mg/kg. Additionally, eight DLs were above BV, with a maximum DL of 1.3 mg/kg. The maximum concentration was interpreted as substantially above background. Thallium is identified as a COPC in soil.

Uranium was detected above BV (1.82 mg/kg) in 12 of 16 soil samples at AOC 00-030(h), with a maximum concentration of 3.5 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-7 and Figure H-31). Uranium is identified as a COPC in soil.

Zinc was detected above BV (48.8 mg/kg) in 13 of 29 soil samples at AOC 00-030(h), with a maximum concentration of 130 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-7 and Figure H-31). Therefore, zinc is identified as a COPC in soil.

Zinc was detected above BV (60.2 mg/kg) in both sediment samples at AOC 00-030(h), with a maximum concentration of 249 mg/kg. The maximum concentration was above background. Zinc is identified as a COPC in sediment.

In summary, the inorganic chemicals identified as COPCs in soil at AOC 00-030(h) are lead, mercury, nitrate, thallium, selenium, uranium, and zinc. The inorganic chemicals identified as COPCs in sediment at AOC 00-030(h) are antimony, calcium, copper, selenium, and zinc. The inorganic chemicals identified as COPCs in tuff at AOC 00-030(h) are aluminum, barium, copper, iron, lead, nitrate, perchlorate, potassium, and selenium.

The new statistical methods for inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used to identify COPCs for previous investigations but were applied to all data for this report, resulting in modification to the COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemicals being eliminated as COPCs, when compared with the original list of COPCs (LANL 2008, 103243.34, p. 268): antimony, arsenic, barium, chromium, cobalt, copper, iron, manganese, nickel, perchlorate and thallium in soil; chromium in tuff. Further, the following inorganic chemicals were identified as COPCs and added to the list of COPCs in the 2008 investigation report (LANL 2008, 103243.34, p. 268): uranium in soil; antimony, copper, calcium, selenium, and zinc in sediment; and potassium in tuff. Of these, only calcium, potassium, and uranium are new COPCs at the site (i.e., they were not identified as COPCs in any media as a result the Phase I investigation). Therefore, the lateral and vertical extent of all inorganic COPCs are defined, as presented in the Phase I investigation report (LANL 2008, 103243.34, p. 47), with the exception of calcium, potassium, and uranium. The extent of calcium, potassium, and uranium is discussed in section 6.4.3.5.

Organic Chemicals

Table 6.4-3 presents the organic chemicals detected at AOC 00-030(h). Plate 8 shows the spatial distribution of organic chemicals detected at AOC 00-030(h).

The lateral and vertical extent of all organic COPCs are defined, as presented in the Phase I investigation report (LANL 2008, 103243.34, p. 47). However; per the approved Phase II work plan, additional samples were collected at four new locations to determine if additional removal was needed and verify the source of benzo(a)pyrene. Benzo(a)pyrene is evaluated for extent in section 6.4.3.4.

Radionuclides

Table 6.4-4 presents the radionuclides detected at AOC 00-030(h). Plate 9 shows the spatial distribution of radionuclides detected at AOC 00-030(h).

Radionuclides were not analyzed for during the Phase II investigation at AOC 00-030(h); therefore, the radionuclide COPCs remain the same as those presented in the Phase I report (cesium-137, plutonium-238, and plutonium-239) (LANL 2008, 103243.34, pp. 268–269).

6.4.3.5 Nature and Extent of Soil and Rock Contamination at AOC 00-030(h)

The nature and extent of contamination at AOC 00-030(h) were defined per the investigation report (LANL 2008, 102408, p. 47). However, additional preexcavation sampling was conducted at four locations (PU-611430, PU-611656, PU-611540, and PU-611893) to better define the extent of the removal area. In addition, confirmation samples were collected at the base of the excavation, except where deeper samples remained, following the Phase II site remediation activities.

Inorganic Chemicals

Based on the approved Pueblo Canyon investigation report (LANL 2008, 103243.34, p. 47), nature and extent have been defined for inorganic chemicals at AOC 00-030(h). However, calcium, potassium, and uranium, are newly identified site COPCs, and the lateral and vertical extent of these inorganic chemicals are discussed below.

Calcium was detected above BV in one sediment sample within the drainage at AOC 00-030(h). It was not detected above maximum background in samples of any other media from the site. Calcium was not detected in either depth of the farthest downgradient sampling location (00-25458). The lateral and vertical extent of calcium are defined.

Potassium was detected above BV in one sample at location 00-04816 at a concentration of 9010 mg/kg, and the concentration decreased with depth to below the BV in the deeper sample. The lateral and vertical extent of potassium are defined.

Uranium was detected above BV at eight locations, with a maximum detected concentration of 3.5 mg/kg. All detected uranium concentrations were less than the maximum soil background concentration. Uranium was not detected in downgradient locations. The lateral and vertical extent of uranium are defined.

Organic Chemicals

The nature and extent of the organic chemicals identified as COPCs following the Phase I investigation (LANL 2008, 103243.34, pp. 268–269) were defined per the approved investigation report (LANL 2008, 103243.34, p. 47).

One objective of the Phase II investigation at AOC 00-030(h) was to better define the extent of the proposed soil removal area by sampling for COPCs, specifically benzo(a)pyrene, between existing locations to minimize the volume of soil removal. Samples were collected at locations PU-611540 and PU-611893 in the drainage between existing locations 00-25457 and 00-25458 (section 3.5.3) and at locations PU-611430 and PU-611656 along the outlet line between the septic tank (to the south) and historical location 00-25454 (to the north). The latter two locations were also sampled to determine if the septic tank and line were potential sources of benzo(a)pyrene at AOC 00-030(h). No organic COPCs were detected above cleanup levels in these samples; therefore, additional removal was not needed, and the conclusions regarding the extent of organic COPCs presented in the Phase I investigation report are valid. In addition, based on all sampling results, it does not appear that the septic tank is a significant source of benzo(a)pyrene at AOC 00-030(h).

Radionuclides

The nature and extent of the radionuclides identified as COPCs following the Phase I investigation (LANL 2008, 103243.34, p. 268–269) were defined as presented in the Phase I investigation report (LANL 2008, 103243.34, p. 47). Radionuclides were not analyzed during the Phase II investigation at AOC 00-030(h); therefore, there are no new radionuclide data and the conclusions presented in the Phase I investigation report regarding the lateral and vertical extent of cesium-137, plutonium-238, and plutonium-239 are valid.

6.4.4 Summary of Human Health Risk-Screening at AOC 00-030(h)

The human health risk-screening assessment for AOC 00-030(h) is discussed in Appendix I, sections I-4.2.4 and I-4.4. Location PU-612252 was excluded from the risk-assessment evaluation, as discussed above (section 6.4.3.1).

The results of the risk-/dose-screening assessments for the recreational scenario are presented in Tables I-4.2-18, I-4.2-19, and I-4.2-20. The total excess cancer risk is 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.04, which is less than the NMED target HI

of 1.0 (NMED 2009, 108070). The total dose is 0.005 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-/dose-screening assessments for the residential scenario are presented in Tables I-4.2-21, I-4.2-22, and I-4.2-23. The total excess cancer risk is 1×10^{-5}, which is equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total radiological dose is 0.8 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the recreational and residential scenarios.

6.4.5 Summary of Ecological Risk-Screening at AOC 00-030(h)

The ecological risk-screening assessment is presented in Appendix I, sections I-5.3.4 and I-5.5. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

6.5 SWMU 31-001, Septic System

6.5.1 Site Description and Operational History

SWMU 31-001 is a former septic system located at TA-31 (Figure 6.5-1). This system consisted of a septic tank, two sanitary sewer manholes, associated waste lines, and an outfall (LANL 1992, 007668, p. 3-46). TA-31 served as the receiving area for all truck shipments to the Laboratory from 1945 to 1954 (LANL 1995, 058085, p. 1; LANL 1996, 054320, p. 32), and SWMU 31-001 served former building 31-7. The septic tank (structure 00-7), constructed of reinforced concrete, measured 4 ft × 3 ft and was several feet in height (LANL 1992, 007668, p. 3-48). This septic tank was located aboveground on a small bench above the rim of Pueblo Canyon, north of building 31-7 (LANL 1992, 007668, p. 3-48). TA-31 was located in what is now the eastern residential area of Los Alamos, immediately west of the Los Alamos County Airport (LANL 1995, 058085, p. 1; LANL 1996, 054320, p. 32) (Figure 6.5-1). The septic tank was constructed in 1949, operated until 1954, and was removed in 1988 (LANL 1992, 007668, p. 3-47). The waste line was not encountered when the septic tank was removed in 1988 (LANL 1995, 058085, p. 4).

6.5.2 Historical Investigations

This section presents the RFI sampling and other activities conducted in 1993, the VCA activities performed in 1995, and the Phase I investigation activities conducted in 2006–2007 at SWMU 31-001.

6.5.2.1 1993 RFI

For the RFI, three samples were collected from the septic tank area (based on survey information from the 1988 removal). During this investigation, the outfall pipe was located (LANL 1995, 058085, p. 23). Five samples were collected from the top 6 in. of soil in the outfall area.

In an effort to locate the inlet pipe, two trenches were dug during the RFI. One trench was excavated approximately 60 ft upslope of the septic tank in a southeast to northwest direction. The trench was 31 ft long × 4 ft deep (LANL 1995, 058085, p. 5). Three samples were collected from this trench. The second trench was excavated approximately 110 ft upslope of the former septic tank location in a southeast to northwest direction. This trench was approximately 25 ft long and had a maximum depth of 8.5 ft bgs

(LANL 1995, 058085, pp. 5, 23). Three samples were also collected from this trench. All samples were field screened for radioactivity and submitted for off-site laboratory analysis of TAL metals, VOCs, and SVOCs. Cadmium, calcium, lead, mercury, and zinc were detected above BVs. The DLs for antimony and thallium were above the BVs. Benzo(b)fluoranthene, fluoranthene, and pyrene were also detected.

6.5.2.2 1995 Voluntary Corrective Action

A VCA was conducted for SWMU 31-001 in 1995 and included excavation of soil from approximately 2 ft above the outfall to 4 ft below the outfall (LANL 1996, 054320, p. 33). Soil was excavated to the underlying tuff, with the depth of the excavation ranging from 1–2 ft and the width ranging from 0.5–6 ft (LANL 1996, 054320, p. 33). Two confirmatory samples were collected from the excavation and analyzed for radionuclides, TAL metals, and PCBs (LANL 1996, 054320, p. 33, Figure 1). Strontium was the only metal detected in the two confirmation samples. Analytical DLs for antimony, cadmium, silver, and thallium were above the BVs in both samples. No PCBs were detected in either sample (LANL 1996, 054320, pp. 50–52).

6.5.2.2 2006–2007 Phase I Investigation

Two vertical boreholes (locations 31-01006 and 31-01008) were drilled to 13 and 15 ft bgs, respectively, beneath the former drainline and sampled at SWMU 31-001. The borehole locations are shown in Figure 6.5-1. In total, 18 soil and tuff samples were collected from six locations at SWMU 31-001 and were submitted to an off-site laboratory for analysis of one or more of the following analytes: anions, cyanide, metals, nitrate, perchlorate, pesticides, PCBs, SVOCs, VOCs, and gamma-emitting radionuclides. The COPCs identified at SWMU 31-001 includes 10 inorganic chemicals, 1 radionuclide, and 16 organic chemicals (LANL 2008, 103243.34).

The lateral and vertical extent of most inorganic COPCs and all radionuclide and organic COPCs were defined at SWMU 31-001 during the Phase I investigation (LANL 2008, 103243.34). Vertical extent was not defined for lead in one location along the former inlet line to the tank (LANL 2008, 104580, pp. 10–11; LANL 2008, 103243.4; p. 8; NMED 2008, 103002).

6.5.3 Site Contamination

6.5.3.1 Soil, Rock and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 31-001. As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional samples were collected based on field-screening results.
- Two samples were collected from historical borehole location 31-01008 to define the vertical extent of lead. All samples were analyzed at an off-site fixed laboratory for TAL metals.
- Two QC samples (one field duplicates and one rinsate) were collected from one location at SWMU 31-001.

Table 6.5-1 presents the samples collected and analyses requested for SWMU 31-001. The Phase I and Phase II sampling locations at SWMU 31-001 are shown in Figure 6.5-1.

6.5.3.2 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at SWMU 31-001, the detected headspace concentrations ranged from 0.0 ppm to 2.2 ppm. No radiological-screening results exceeded the background activity at the site. Field-screening results are presented in Table 3.2-1.

6.5.3.3 Soil and Rock Sampling and Analytical Results

The Phase II investigation consisted of two tuff samples collected from one historical borehole location and analyzed for TAL metals to define vertical extent of lead at location 31-01008, per the approved investigation work plan (LANL 2008, 104580, pp. 10–11; NMED 2008, 103002).

Other historical data collected at SWMU 31-001 during the Phase I investigation consisted of 6 soil samples and 12 tuff samples collected from six locations.

Inorganic Chemicals

Table 6.5-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.5-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 31-001; inorganic COPCs are identified below.

The following inorganic chemicals were detected above BVs, or had analytical DLs above BVs: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, magnesium, manganese, nickel, nitrate, perchlorate, selenium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in 2 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 12,300 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-8 and Figure H-32). Aluminum is not identified as a COPC in tuff.

Antimony was not detected above BV in tuff at SWMU 31-001 but had DLs (0.987 to 0.989 mg/kg) above BV (0.5 mg/kg) in two of eight tuff samples. Antimony is identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in 7 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 5.04 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-8 and Figure H-32). Arsenic is identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in 5 of 12 tuff samples at SWMU 31-001, with a maximum concentration of 88.2 mg/kg. The results of the Gehan test indicate that site concentrations are not different from background; however, the results of the quantile and slippage tests indicate that site concentrations may be different from background (Table H-8 and Figure H-33). Barium is identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 1.41 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-8 and Figure H-33). Beryllium is not identified as a COPC in tuff.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 31-001 but had DLs (0.529 to 0.739 mg/kg) above BV in five of six soil samples. The DLs did not exceed the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.

Calcium was detected above BV (6120 mg/kg) in three of six soil samples at SWMU 31-001, with a maximum concentration of 107,000 mg/kg. Calcium is identified as a COPC in soil.

Calcium was detected above BV (2200 mg/kg) in 4 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 6260 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-8 and Figure H-34). Calcium is not identified as a COPC in tuff.

Chromium was detected above BV (7.14 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 10.8 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-8 and Figure H-34). Chromium is identified as a COPC in tuff.

Cobalt was detected above BV (3.14 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 5.18 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-8 and Figure H-35). Cobalt is not identified as a COPC in tuff.

Copper was detected above BV (14.7 mg/kg) in one of six soil samples at SWMU 31-001, with a maximum concentration of 41 mg/kg. Copper was above the maximum background concentration in soil of 16 mg/kg (Figure H-35). Copper is identified as a COPC in soil.

Copper was detected above BV (4.66 mg/kg) in 6 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 6.37 mg/kg. The results of the Gehan test indicate that site concentrations may be different from background (Table H-8 and Figure H-36). Copper is identified as a COPC in tuff.

Lead was detected above BV (22.3 mg/kg) in one of six soil samples at SWMU 31-001, with a maximum concentration of 22.6 mg/kg. The concentration did not exceed the maximum background concentration of 28 mg/kg (Figure H-36). Lead is not identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in 6 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 46.7 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in tuff.

Magnesium was detected above BV (4610 mg/kg) in one of five soil samples at SWMU 31-001, with a maximum concentration of 4750 mg/kg. The concentration did not exceed the maximum background concentration of 10000 mg/kg (Figure H-37). Magnesium is not identified as a COPC in soil.

Manganese was detected above BV (482 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 541 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-8 and Figure H-37). Manganese is not identified as a COPC in tuff.

Nickel was detected above BV (6.58 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 6.75 mg/kg. The results of both the quantile test and the slippage test indicate that site concentrations are not different from background (Table H-8 and Figure H-38). Nickel is not identified as a COPC in tuff.

Nitrate was detected in four soil samples at SWMU 31-001, with a maximum concentration of 1.75 mg/kg. Because no BV for nitrate in soil is available, nitrate is identified as a COPC.

Nitrate was detected in six tuff samples at SWMU 31-001, with a maximum concentration of 1.51 mg/kg. Because no BV for nitrate in tuff is available, nitrate is identified as a COPC.

Perchlorate was detected in four soil samples at SWMU 31-001, with a maximum concentration of 0.00165 mg/kg. Because no BV for perchlorate in soil is available, perchlorate is identified as a COPC.

Perchlorate was detected in nine tuff samples at SWMU 31-001, with a maximum concentration of 0.00756 mg/kg. Because no BV for perchlorate in tuff is available, perchlorate is identified as a COPC.

Selenium was not detected above BV in soil at SWMU 31-001 but had DLs (1.59 to 11.1 mg/kg) above BV (1.52 mg/kg) in all six soil samples. The maximum DL was greater than the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.

Selenium was detected above BV (0.3 mg/kg) in 1 of 14 tuff samples at SWMU 31-001, with a maximum concentration of 1.31 mg/kg. Additionally, 13 DLs were above BV, with a maximum DL of 7.95 mg/kg. The maximum concentration was interpreted as substantially above background. Selenium is identified as a COPC in tuff.

Zinc was detected above BV (48.8 mg/kg) in one of six soil samples at SWMU 31-001, with a maximum concentration of 99.5 mg/kg. The concentration exceeded the maximum background concentration of zinc in soil of 75.5 mg/kg (Figure H-38). Zinc is identified as a COPC in soil.

In summary, the inorganic chemicals identified as COPCs in soil at SWMU 31-001 are calcium, copper, nitrate, perchlorate, selenium and zinc. The inorganic chemicals identified as COPCs in tuff at SWMU 31-001 are antimony, arsenic, barium, chromium, copper, lead, nitrate, perchlorate, and selenium.

The new statistical methods for inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used to identify COPCs for previous investigations but were applied to all data for this report, resulting in modification to the COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemicals being eliminated as COPCs, when compared with the original list of COPCs (LANL 2008, 103243.34, p. 334): aluminum and cobalt in tuff. Further, the following inorganic chemicals were identified as COPCs and added to the list of COPCs identified in the 2008 investigation report (LANL 2008, 103243.34, p. 334): calcium in soil and antimony and chromium in tuff.

Based on the approved investigation report (LANL 2008, 103243.34, p. 53), lead is retained as a COPC at SWMU 31-001 because extent was not defined at one location. Additionally, antimony, chromium, and calcium were identified as COPCs during the 2010 investigation and added to the list of COPCs in the 2008 investigation report, as discussed above. Antimony, calcium, chromium, and lead are evaluated for extent in section 6.5.3.4.

Organic Chemicals

Table 6.5-3 presents the organic chemicals detected at SWMU 31-001. Figure 6.5-3 shows the spatial distribution of organic chemicals detected at SWMU 31-001. Organic chemicals were not analyzed for during the Phase II investigation at SWMU 31-001; therefore, the organic COPCs remain the same as presented in the Phase I investigation report (LANL 2008, 103243.34, p. 334).

Radionuclides

Table 6.5-4 presents the radionuclides detected or detected above BVs/FVs at SWMU 31-001. Figure 6.5-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs at SWMU 31-001. Radionuclides were not analyzed for during the Phase II investigation at SWMU 31-001;

therefore, cesium-137 remains the only radionuclide COPC at SWMU 31-001(LANL 2008, 103243.34, p. 334).

6.5.3.4 Nature and Extent of Soil and Rock Contamination at SWMU 31-001

The nature and extent of contamination at SWMU 31-001 were defined per the investigation report (LANL 2008, 103243.34, p. 53), with the exception of the vertical extent of lead at location 31-01008, as discussed below. In addition, antimony, calcium, and chromium were identified as inorganic COPCs and added to the list of COPCs identified in the 2008 investigation report (LANL 2008, 103243.34, p. 334). Antimony, calcium, chromium, and lead are evaluated below for extent.

Inorganic Chemicals

The objective of the Phase II investigation at SWMU 31-001 was to define vertical extent of lead at location 31-01008 (LANL 2008, 103243.34, p. 53).

Antimony was not detected in tuff above BV at SWMU 31-001 but had DLs (0.987 and 0.989 mg/kg) above the BV (0.50 mg/kg) in the two deepest samples at location 31-01008. Because antimony was not detected at SWMU 31-001, the lateral and vertical extent of antimony are defined.

Calcium was detected above BV (6120 mg/kg) in three of six soil samples at SWMU 31-001. The maximum concentration of 107,000 mg/kg was detected at location 31-25521 in a sample collected from 0–0.5 ft bgs, but concentrations of calcium decreased with depth, and this pattern is repeated at all other locations. Calcium is also an essential nutrient. The lateral and vertical extent of calcium are defined.

Chromium was detected above BV in 1 of 14 tuff samples at SWMU 31-001 at a concentration of 10.8 mg/kg, which is below the maximum background (13 mg/kg). The lateral and vertical extent of chromium are defined.

The extent of lead was defined following the Phase I investigation, with the exception of vertical extent at location 31-01008. Lead was detected above BV (11.2 mg/kg) in four tuff samples at location 31-01008 at SWMU 31-001. The maximum concentration of 46.7 mg/kg was detected in a sample collected from 13.5–14 ft bgs during the Phase I investigation. Lead concentration decreased to 13.2 mg/kg in a sample collected from 19–20 ft bgs during the Phase II investigation. The lateral and vertical extent of lead are defined.

Organic Chemicals

The nature and extent of the organic COPCs following the Phase I investigation (LANL 2008, 103243.34, p. 334) were defined per the Phase I investigation report (LANL 2008, 103243.34, p. 53).Organic chemicals were not analyzed for during the Phase II investigation at SWMU 31-001. Therefore, there are no new organic data, and the conclusions presented in the Phase I investigation report regarding the lateral and vertical extent of organic COPCs are valid.

Radionuclides

The nature and extent of the radionuclides COPCs following the Phase I investigation (LANL 2008, 103243.34, p. 334) were defined per the investigation report (LANL 2008, 103243.34, p. 53). Radionuclides were not analyzed during the Phase II investigation at SWMU 31-001. Therefore, there are

no new radionuclide data and the conclusions presented in the Phase I investigation report regarding the lateral and vertical extent of cesium-137 are valid.

6.5.4 Summary of Human Health Risk-Screening at SWMU 31-001

The human health risk-screening assessment for SWMU 31-001 is discussed in Appendix I, sections I-4.2.5 and I-4.4.

The results of the risk-/dose-screening assessments for the recreational scenario are presented in Tables I-4.2-24 and I-4.2-25. The total excess cancer risk is 3×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.05, which is below the NMED target HI of 1.0 (NMED 2009, 108070). No radionuclide COPCs were identified for the recreational scenario.

The results of the risk-/dose-screening assessments for the residential scenario are presented in Tables I-4.2-26, I-4.2-27, and I-4.2-28. The total excess cancer risk is 1×10^{-5}, which is equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.08, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total radiological dose is 2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

Based on the screening-assessment results, no potential unacceptable risks or doses exist from COPCs for the recreational and residential scenarios.

6.5.5 Summary of Ecological Risk-Screening at SWMU 31-001

The ecological risk-screening assessment is presented in Appendix I, sections I-5.3.5 and I-5.5. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

6.6 Consolidated Unit 45-001-00, WWTP, TA-45

6.6.1 Site Description and Operational History

This consolidated unit, which consists of SWMUs 01-002(b)-00, 45-001, 45-002, 45-003, and 45-004 and AOC C-45-001, is located next to Acid Canyon (Figure 6.3-1). The SWMUs and AOC were associated with historical wastewater treatment and disposal activities at TA-45, which was used as an industrial waste discharge area and later served as the Laboratory's first radioactive liquid waste treatment facility (LANL 1992, 007668, p. 3-69).The D&D of TA-45 included excavating and removing industrial waste and contaminated soil and tuff as well as removing all buildings and structures in the area, with the exception of the sewage lift station. The site was released without restriction to Los Alamos County (LANL 1992, 007668, p. 3-71).

Phase II investigation sampling at Consolidated Unit 45-001-00 targeted one site, SWMU 45-004, which consists of a sanitary sewer outfall associated with the sanitary sewer system constructed in 1947 to serve the Los Alamos townsite (LANL 1995, 048856, p. 68). This sewer system included a sanitary sewer lift station (structure 45-3) and sanitary sewer manholes (structures 45-5 and 45-6).

6.6.2 Historical Investigations

This section presents the RFI sampling and other activities conducted at Consolidated Unit 45-001-00 in 1995 and the Phase I investigation sampling performed in 2006–2007.

6.6.2.1 1995 RFI

Eighty-eight surface and subsurface samples from the SWMUs/AOC within Consolidated Unit 45-001-00 were collected and submitted to off-site analytical laboratories. These samples were analyzed for one or more of the following: TAL metals, phosphorus, americium-241, gamma-emitting radionuclides, tritium, isotopic plutonium, isotopic uranium, strontium-90, SVOCs, and VOCs. Eight samples from SWMU 45-002 were also analyzed for high explosives by an off-site analytical laboratory (LANL 1995, 048856).

SWMU 45-004, Sanitary Sewer Outfall

Four samples were collected from four locations at 0.5–1.5 ft bgs from the outfall area. Lead, mercury, silver, and zinc were detected above the BVs; strontium and total phosphorus were detected in the samples closest to the outfall. Detection limits were above the BVs for cadmium, selenium, and silver in most samples. Tritium was detected above the FV at the two locations closest to the outfall. PAHs and acetone were detected at one location.

6.6.2.2 2006–2007 Phase I Investigation

Forty-two soil, fill, and tuff samples were collected from eight locations and submitted to an off-site laboratory for analysis of the following analytical suites: anions, cyanide, TAL metals, nitrate, perchlorate, pesticides, PAHs, PCBs, SVOCs, VOCs, gamma-emitting radionuclides, and tritium. The COPCs identified at Consolidated Unit 45-001-00 included 9 inorganic chemicals, 26 organic chemicals, and 2 radionuclides (LANL 2008, 102408).

The lateral and vertical extent of most inorganic and all radionuclide and organic COPCs were defined for Consolidated Unit 45-001-00 during the Phase I investigation (LANL 2008, 102408). Extent was not defined for silver and mercury within the footprint of SWMU 45-004 (LANL 2008, 104580, p. 8; LANL 2008, 103243.34, p. 8; NMED 2008, 103002).

6.6.3 Site Contamination

6.6.3.1 Soil, Rock and Sediment Sampling

Based on previous investigation results, further characterization was required to define lateral and vertical extent of silver and mercury at SWMU 45-004. As a result, the following activities were completed as part of the Phase II investigation per the approved investigation work plan (LANL 2008, 104580; NMED 2008, 103002).

- All investigation samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radiation. No additional samples were collected based on field-screening results.
- Eight shallow to shallow-subsurface samples were collected from three (one historical and two new) locations to confirm the results of the previous investigation. All samples were analyzed at an off-site fixed laboratory for TAL metals.
- Two QC samples (one field duplicates and one rinsate) were collected from three locations at SWMU 45-004.

Table 6.6-1 presents the samples collected and analyses requested for Consolidated Unit 45-001-00.The Phase I and Phase II sampling locations at Consolidated Unit 45-001-00 are shown in Figure 6.3-1.

6.6.3.2 Soil, Rock, and Sediment Sample Field-Screening Results

During field screening for organic vapors at SWMU 45-004 detected headspace concentrations ranged from 0.0 ppm to 8.1 ppm. No radiological-screening results exceeded the background at the site. Field-screening results are presented in Table 3.2-1.

6.6.3.3 Soil and Rock Sampling and Analytical Results

The Phase II investigation at Consolidated Unit 45-001-00, which was limited to SWMU 45-004, consisted of one sediment, two soil/alluvium, and five tuff samples collected from three (one historical and two new) locations and analyzed for TAL metals. Per NMED, locations upgradient and downgradient of the footprint of SWMU 45-004 were selected to further define the lateral and vertical extent of contamination at SWMU 45-004 (NMED 2008, 103002, p.8). Other historical data collected at Consolidated Unit 45-001-00, including SWMU 45-004, during the Phase I investigation consisted of 32 soil/fill samples and 10 tuff samples collected from 15 locations.

Inorganic Chemicals

Table 6.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs at Consolidated Unit 45-001-00. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The following inorganic chemicals were above BVs or had DLs above BVs during the Phase I and Phase II investigations: antimony, barium, beryllium, cadmium, calcium, chromium, copper, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, and zinc.

Antimony was not detected above BV in soil at Consolidated Unit 45-001-00 but had DLs (1.24 to 1.36 mg/kg) above BV (0.83 mg/kg) in 2 of 28 soil samples. The maximum DL was greater than the maximum background concentration (1 mg/kg). Antimony is identified as a COPC in soil.

Antimony was not detected above BV in tuff at Consolidated Unit 45-001-00 but had DLs (1.18 to 1.41 mg/kg) above BV (0.5 mg/kg) in 5 of 15 tuff samples. The maximum DL was greater than the maximum background concentration (0.4 mg/kg). Antimony is identified as a COPC in tuff.

Antimony was not detected above BV in sediment at Consolidated Unit 45-001-00 but had a DL (1.02 mg/kg) above BV (0.83 mg/kg) in the only sediment sample collected. Antimony is identified as a COPC in sediment.

Barium was detected above BV (46 mg/kg) in 2 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 134 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-9 and Figure H-39). Barium is not identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in 1 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 1.23 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-9 and Figure H-39). Beryllium is not identified as a COPC in tuff.

Cadmium was not detected above BV (0.4 mg/kg) in soil at Consolidated Unit 45-001-00 but had DLs (0.501 to 0.678 mg/kg) above BV in 6 of 28 soil samples. The maximum DL (0.359 mg/kg) was less than the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.

Cadmium was not detected above BV in sediment at Consolidated Unit 45-001-00 but had DLs (0.512 mg/kg) above BV (0.4 mg/kg) in the only sediment sample collected. Cadmium is identified as a COPC in sediment.

Calcium was detected above BV (6120 mg/kg) in 1 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 6210 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-10 and Figure H-40). Calcium is not identified as a COPC in soil.

Chromium was detected above BV (7.14 mg/kg) in 3 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 38.6 mg/kg. The maximum concentration was interpreted as substantially above background. Chromium is identified as a COPC in tuff.

Copper was detected above BV (14.7 mg/kg) in 2 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 22.1 mg/kg. The results of the slippage test indicate that site concentrations may be different from background. Because more than 80% of the combined site and background data sets are nondetects, the quantile test could not be performed (Table H-10 and Figure H-40). Therefore, copper is identified as a COPC in soil.

Copper was not detected above BV (4.66 mg/kg) in tuff at Consolidated Unit 45-001-00 but had DLs (6.37 to 17.4 mg/kg) above BV in 2 of 15 tuff samples. Copper is identified as a COPC in tuff.

Lead was detected above BV (22.3 mg/kg) in 4 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 38.9 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not statistically different from background (Table H-10 and Figure H-41). Lead is not identified as a COPC in soil.

Lead was detected above BV (11.2 mg/kg) in 3 of 15 tuff samples at Consolidated Unit 45-001-00 with a maximum concentration of 33.6 mg/kg. The maximum concentration was interpreted as substantially above background. Lead is identified as a COPC in tuff.

Manganese was detected above BV (482 mg/kg) in 2 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 685 mg/kg. The results of the quantile and slippage tests indicate that site concentrations are not different from background (Table H-9 and Figure H-41). Manganese is not identified as a COPC in tuff.

Mercury was detected above BV (0.1 mg/kg) in 5 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 1.57 mg/kg. The maximum concentration was interpreted as substantially above background. Mercury is identified as a COPC in soil.

Mercury was detected above BV (0.1 mg/kg) in 3 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 0.468 mg/kg. Mercury is identified as a COPC in tuff.

Nickel was detected above BV (15.4 mg/kg) in 1 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 17 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations are not different from background (Table H-10 and Figure H-42). Nickel is not identified as a COPC in soil.

Nitrate was detected in 21 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 4.94 mg/kg. Because no BV for nitrate in soil is available, nitrate is identified as a COPC.

Nitrate was detected in six tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 6.16 mg/kg. Because no BV for nitrate in tuff is available, nitrate is identified as a COPC.

Perchlorate was detected in 17 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 0.00948 mg/kg. Because no BV for perchlorate in soil is available, perchlorate is identified as a COPC.

Perchlorate was detected in four tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 0.00612 mg/kg. Because no BV for perchlorate in tuff is available, perchlorate is identified as a COPC.

Selenium was not detected above BV (1.52 mg/kg) in soil at Consolidated Unit 45-001-00 but had DLs (1.56 to 1.96 mg/kg) above BV in 23 of 28 soil samples. The maximum DL (1.96 mg/kg) was greater than the maximum background concentration (1.7 mg/kg). Selenium is identified as a COPC in soil.

Selenium was detected above BV (0.3 mg/kg) in 1 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 0.684 mg/kg. Additionally, 14 DLs were above BV, with a maximum DL of 1.66 mg/kg. Selenium is identified as a COPC in tuff.

Selenium was not detected above BV in sediment at Consolidated Unit 45-001-00 but had DLs (1.16 mg/kg) above BV (0.3 mg/kg) in the only sediment sample collected. Selenium is identified as a COPC in sediment.

Silver was detected above BV (1 mg/kg) in 5 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 10 mg/kg. Silver is identified as a COPC in soil.

Silver was detected above BV (1 mg/kg) in 2 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 9.55 mg/kg. The maximum concentration was interpreted as substantially above background. Silver is identified as a COPC in tuff.

Zinc was detected above BV (48.8 mg/kg) in 5 of 28 soil samples at Consolidated Unit 45-001-00, with a maximum concentration of 88.3 mg/kg. The results of the Gehan and quantile tests indicate that site concentrations may be different from background (Table H-10 and Figure H-42). Zinc is identified as a COPC in soil.

Zinc was detected above BV (63.5 mg/kg) in 2 of 15 tuff samples at Consolidated Unit 45-001-00, with a maximum concentration of 81.4 mg/kg. The results of the Gehan and slippage tests indicate that site concentrations may be different from background (Table H-9 and Figure H-43). Zinc is identified as a COPC in tuff.

In summary, the inorganic chemicals identified as COPCs in soil at Consolidated Unit 45-001-00 are antimony, copper, mercury, nitrate, perchlorate, selenium, silver, and zinc. The inorganic chemicals identified as COPCs in sediment at Consolidated Unit 45-001-00 are antimony, cadmium, and selenium. The inorganic chemicals identified as COPCs in tuff at Consolidated Unit 45-001-00 are antimony, chromium, copper, lead, mercury, nitrate, perchlorate, selenium, silver, and zinc.

The new statistical methods for inorganic chemicals, adopted in October 2009 and described in section 5.2, were not used to identify COPCs for previous investigations but were applied to all data for this report, resulting in modification to the COPCs identified for the Pueblo Canyon Aggregate Area. The statistical evaluation of the entire data set resulted in the following inorganic chemical being eliminated as a COPC, when compared with the original list of COPCs (LANL 2008, 102408, p. 346): lead in soil. Further, the following inorganic chemicals were identified as COPCs and were added to the list of COPCs

in the 2008 investigation report (LANL 2008, 102408, p. 346): antimony in soil; antimony, cadmium, and selenium in sediment; antimony, copper, mercury, silver, and zinc in tuff. Of these, only antimony and cadmium are new COPCs at the site (i.e., they were not identified as COPCs in any media as a result the Phase I investigation). Therefore, the lateral and vertical extent of all inorganic COPCs are defined, as presented in the Phase I investigation report (LANL 2008, 102408, p. 47), with the exception of antimony, cadmium, mercury, and silver. The extent of antimony, cadmium, mercury, and silver is discussed in section 6.6.3.4.

Based on the approved 2008 investigation report for Pueblo Canyon Aggregate Area (LANL 2008, 102408, pp. 53–54), mercury and silver at Consolidated Unit 45-001-00 required further evaluation because extent was not defined for these two chemicals at SWMU 45-004. Additionally, antimony and cadmium were identified as COPCs during the 2010 investigation and were added to the list of COPCs in the 2008 investigation report, as discussed above. Antimony, cadmium, mercury, and silver are evaluated for extent in section 6.6.3.4.

Organic Chemicals

Table 6.6-3 presents the organic chemicals detected at Consolidated Unit 45-001-00. Plate 5 shows the spatial distribution of organic chemicals detected at Consolidated Unit 45-001-00. Organic chemicals were not analyzed for during the Phase II investigation at Consolidated Unit 45-001-00; therefore, the organic COPCs remain the same as presented in the Phase I report (LANL 2008, 102408, p. 346).

Radionuclides

Table 6.6-4 presents the radionuclides detected at Consolidated Unit 45-001-00. Plate 6 shows the spatial distribution of radionuclides detected at Consolidated Unit 45-001-00. Radionuclides were not analyzed for during the Phase II investigation at Consolidated Unit 45-001-00; therefore, the radionuclide COPCs remain the same as those presented in the Phase I report (cesium-137 and tritium) (LANL 2008, 102408, p. 346).

6.6.3.4 Nature and Extent of Soil and Rock Contamination at Consolidated Unit 45-001-00

The nature and extent of contamination at Consolidated Unit 45-001-00 were defined per the 2008 investigation report for Pueblo Canyon Aggregate Area (LANL 2008, 102408, pp. 53–54), with the exception of the lateral and vertical extent of mercury and silver at SWMU 45-004. In addition, two inorganic chemicals (antimony and cadmium) were identified as COPCs and added to the list of COPCs in the 2008 investigation report (LANL 2008, 102408, p. 346) following the 2010 investigation. Antimony, cadmium, mercury, and silver are evaluated below for extent at SWMU 45-004.

Inorganic Chemicals

Antimony was not detected above BV in tuff at SWMU 45-004 but had DLs (1.02 to 1.41 mg/kg) above BV (0.50 mg/kg) in all the 2010 investigation samples. Because antimony was not detected at SWMU 45-004, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV in sediment at SWMU 45-004 but had DLs (0.512 mg/kg) above BV (0.4 mg/kg) in the only sediment sample collected. Because cadmium was not detected at SWMU 45-004, the lateral and vertical extent of cadmium are defined.

Mercury was detected above BV (0.1 mg/kg) in five soil samples and three tuff samples within the footprint of SWMU 45-004. The maximum concentration of 1.57 mg/kg was reported at location 45-01068 in a sample collected from a depth of 1.0–1.5 ft bgs. Mercury was not detected in the deeper sample at this location and also decreased with depth at downgradient location PU-611753. The vertical extent of mercury is defined.

Silver was detected above BV (1.0 mg/kg) in five soil samples and two tuff samples within the footprint of SWMU 45-004. The maximum concentration of 10 mg/kg was reported at location 45-01068 in a sample collected from a depth of 1.5–2.0 ft bgs. Silver was not detected in the deeper sample at this location and also decreased with depth at downgradient location PU-611753. The vertical extent of silver is defined.

The distribution of mercury and silver within Consolidated Unit 45-001-00 are very similar. Mercury and silver are detected most frequently and at highest concentrations at SWMU 45-004, which appears to be the source of these inorganic COPCs at Consolidated Unit 45-001-00. The only other detections of mercury and silver in TA-45 samples are from locations 45-25461 and 45-25464, respectively, that were sampled in 2006 to characterize SWMU 45-002 (the vehicle-decontamination facility) and coincidentally fall on the outlet line and outfall for AOC 00-030(f) [the exact location of the outlet line and outfall for AOC 00-030(f) was not known in 2006]. Based on information presented in the Los Alamos and Pueblo Canyons Investigation Report (LANL 2004, 087390, pp. 58–59), silver and mercury are both elevated above background in reach ACS (the south fork of Acid Canyon), which receives drainage from Consolidated Unit 45-001-00. However, concentrations of both mercury and silver drop sharply with distance downgradient in this reach. The lateral extent of mercury and silver are defined.

Following the Phase I investigation, the extent of all inorganic COPCs at Consolidated Unit 45-001-00 was defined, with the exception of mercury and silver at SWMU 45-004. Based on the results of the Phase II investigation, the lateral and vertical extent of mercury and silver at SWMU 45-004 are defined. Therefore, the lateral and vertical extent of all inorganic COPCs are defined for Consolidated Unit 45-001-00.

Organic Chemicals

The nature and extent of the organic COPCs following the Phase I investigation (LANL 2008, 102408, p. 346) were defined per the investigation report (LANL 2008, 102408, pp. 53–54). Organic chemicals were not analyzed during the Phase II investigation at SWMU 45-004. Therefore, there are no new organic chemical data, and the conclusions presented in the Phase I investigation report regarding the lateral and vertical extent of organic COPCs at Consolidated Unit 45-001-00 are valid.

Radionuclides

The nature and extent of the radionuclide COPCs following the Phase I investigation (LANL 2008, 102408, p. 346) were defined per the investigation report (LANL 2008, 102408, pp. 53–54). Radionuclides were not analyzed during the Phase II investigation at SWMU 45-004. Therefore, there are no new radionuclide data, and the conclusions presented in the Phase I investigation report regarding the lateral and vertical extent of cesium-137 and tritium at Consolidated Unit 45-001-00 are valid.

6.6.4 Summary of Human Health Risk-Screening at Consolidated Unit 45-001-00

The human health risk-screening assessment for Consolidated Unit 45-001-00 is discussed in Appendix I, sections I-4.2.6 and I-4.4.

The results of the risk-/dose-screening assessments for the recreational scenario are presented in Tables I-4.2-29, I-4.2-30 and I-4.2-31. The total excess cancer risk is 5×10^{-7}, 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 2006, 108070). The total dose is 4×10^{-7} mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-/dose-screening assessments for the residential scenario are presented in Tables I-4.2-32, I-4.2-33, and I-4.2-34. The total excess cancer risk is 4×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.8, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total radiological dose is 0.5 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the recreational and residential scenarios.

6.6.5 Summary of Ecological Risk-Screening at Consolidated Unit 45-001-00

The ecological risk-screening assessment is presented in Appendix I, sections I-5.3.6 and I-5.5. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

7.0 CONCLUSIONS

7.1 Summary of Nature and Extent of Contamination

The nature and extent of contamination have been defined for the following six sites investigated during the 2010 Pueblo Canyon Aggregate Area Phase II investigation:

- SWMU 00-018(a), sludge bed WWTP
- AOC 00-030(eS), septic system
- AOC 00-030(f), septic system
- AOC 00-030(h), septic system
- SWMU 31-001, septic system
- SWMU 45-004, sanitary sewer outfall

Because SWMU 45-004 was the only remaining site requiring definition of nature and extent of COPCs within Consolidated Unit 45-001-00, the nature and extent of COPCs in the consolidated unit are defined.

7.2 Summary of Risk-Screening Assessments

Human health risk-screening and ecological risk-screening assessments were evaluated for all six sites as part of the 2010 Phase II investigation.

7.2.1 Human Health Risk-Screening Assessment

The human health risk-screening assessments are presented in Appendix I, section I-4.

The risk-screening assessment results indicated no potential unacceptable risks from COPCs exist for the recreational and residential scenarios at the six sites. For these sites the total excess cancer risks were equivalent to, or below the NMED target risk level of 1×10^{-5}, the HIs were below the NMED target HI of 1.0, and the total radiological doses were below the DOE target dose limit of 15 mrem/yr.

7.2.2 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, comparison with background concentrations, and previous canyon studies for any of the sites evaluated in the 2010 Phase II investigation.

8.0 RECOMMENDATIONS

The determination of site status is based on the results of the risk-screening assessments and the evaluation of nature and extent. Depending upon the decision scenario used, the sites are recommended as corrective actions complete either with or without controls or for additional action. The residential scenario is the only scenario under which corrective action complete without controls is applicable; that is, no additional corrective actions or conditions are necessary. The other decision scenario (recreational) results in corrective action complete with controls. The current and reasonably foreseeable future land use for the Pueblo Canyon Aggregate Area is recreational. All six sites, for which the nature and extent of contamination are defined, do not pose a potential unacceptable risk or dose under the recreational and residential scenarios. No further investigation or remediation activities are warranted.

The Laboratory recommends corrective actions complete without controls for the following six sites within the Pueblo Canyon Aggregate Area:

- SWMU 00-018(a), sludge bed WWTP
- AOC 00-030(eS), septic system
- AOC 00-030(f), septic system
- AOC 00-030(h), septic system
- SWMU 31-001, septic system
- Consolidated Unit 45-001-00, WWTP, TA-45

9.0 REFERENCES AND MAP DATA SOURCES

9.1 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.

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9.2 Map Data Sources

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

Legend Item/Type	Data Source
LANL Technical Areas	Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.
Paved roads	Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Paved parking	Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Dirt roads	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Drainages	WQH Drainage Arcs; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
LANL structures	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Los Alamos County structures	Structures; County of Los Alamos, Information Services; as published 29 October 2007.
Former Los Alamos County structures at SWMU 00-018(a)	Digitized August 2010 from Field Plan map of former sewage plant; Source: Pueblo Canyon Aggregate Area Phase II Investigation Work Plan: p16, p22, CA Ancell.
Former Los Alamos County sludge pile location at SWMU 00-018(a)	Digitized August 2010 from Field Plan map of former sewage plant Source: Pueblo Canyon Aggregate Area Phase II Investigation Work Plan p16, p22, CA Ancell.
Former drainline at AOC 00-030(f)	GIS feature data file CC10004_FMRMT00_SS; Los Alamos National Laboratory, ER Group, July 2010
Former drainline at SWMU 00-030(eS)	Digitized August 2010 from Field Plan map of SWMU 00-030(eS); Source: Pueblo Canyon Aggregate Area Phase II Investigation Work Plan p16, p23, CA Ancell.
Los Alamos County Property boundaries	Los Alamos County Land Parcels; County of Los Alamos, Information Services, as published 04 March 2009.
LANL PRS boundaries	Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 13 March 2009.
LANL SWMU 00-030(eS) boundary	Digitized August 2020 from Field Plan map of SWMU 00-030(eS); Source: Pueblo Canyon Aggregate Area Phase II Investigation Work Plan p16, p23, CA Ancell.
2010 (new) LANL sampling locations	Located/surveyed by TPMC using Topcon GRS-1 hand-held GPS receiver, Spring 2010

Legend Item/Type	Data Source
LANL historical sampling locations	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 21 January 2010.
Pueblo Canyon Aggregate Area boundary	Aggregate Areas; Los Alamos National Laboratory, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 22 September 2005.
Contours	Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
Contours for SWMU 00-030(h) vicinity	Generated from LIDAR data tile 20100122; Los Alamos National Laboratory, GIS Lab, January 2010

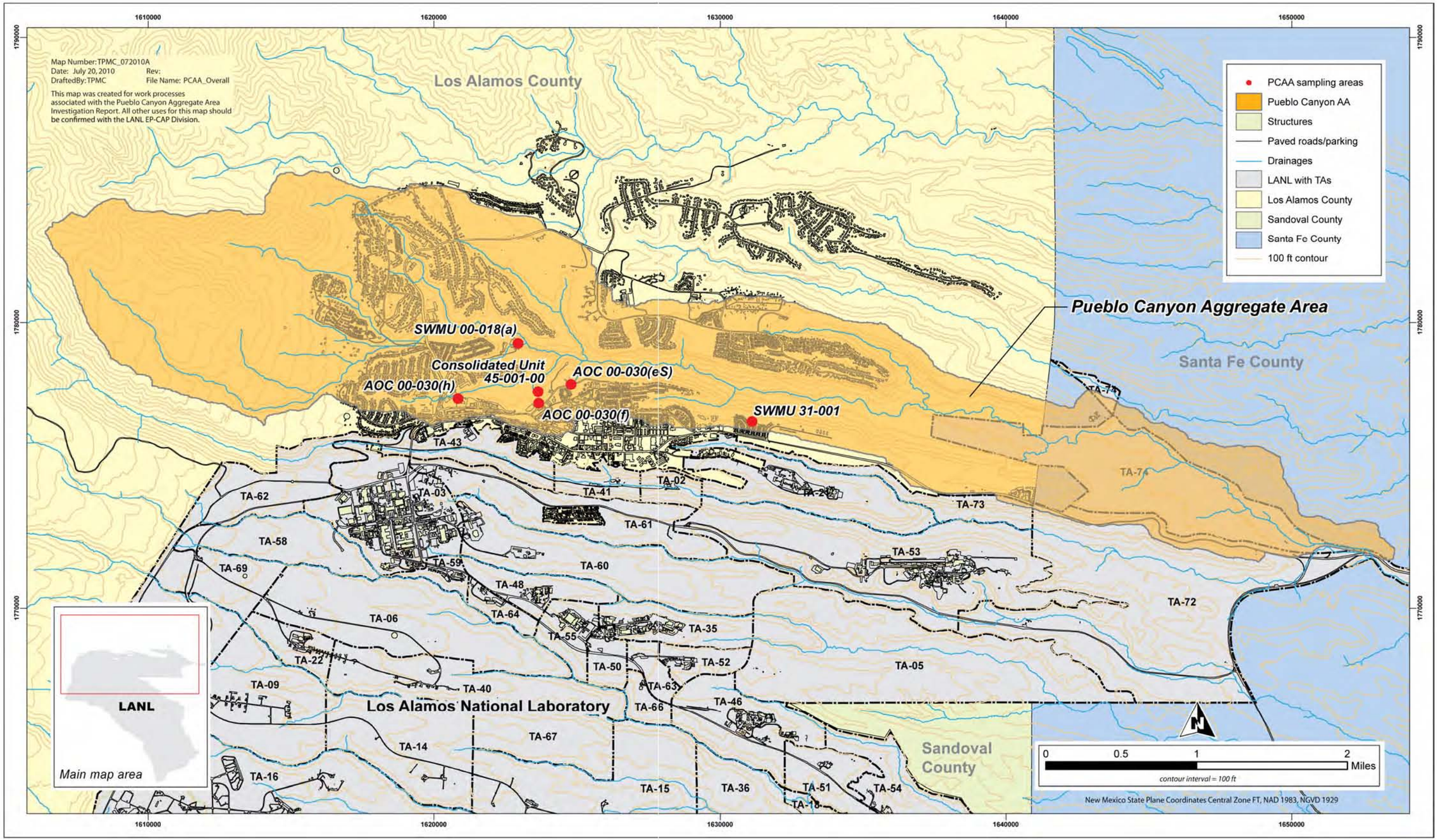


Figure 1.0-1 Locations of Pueblo Canyon Aggregate Area SWMUs, AOCs, and consolidated unit included in the Phase II investigation report

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)	

Figure 2.2-1 Generalized stratigraphy of bedrock geologic units of the Pajarito Plateau

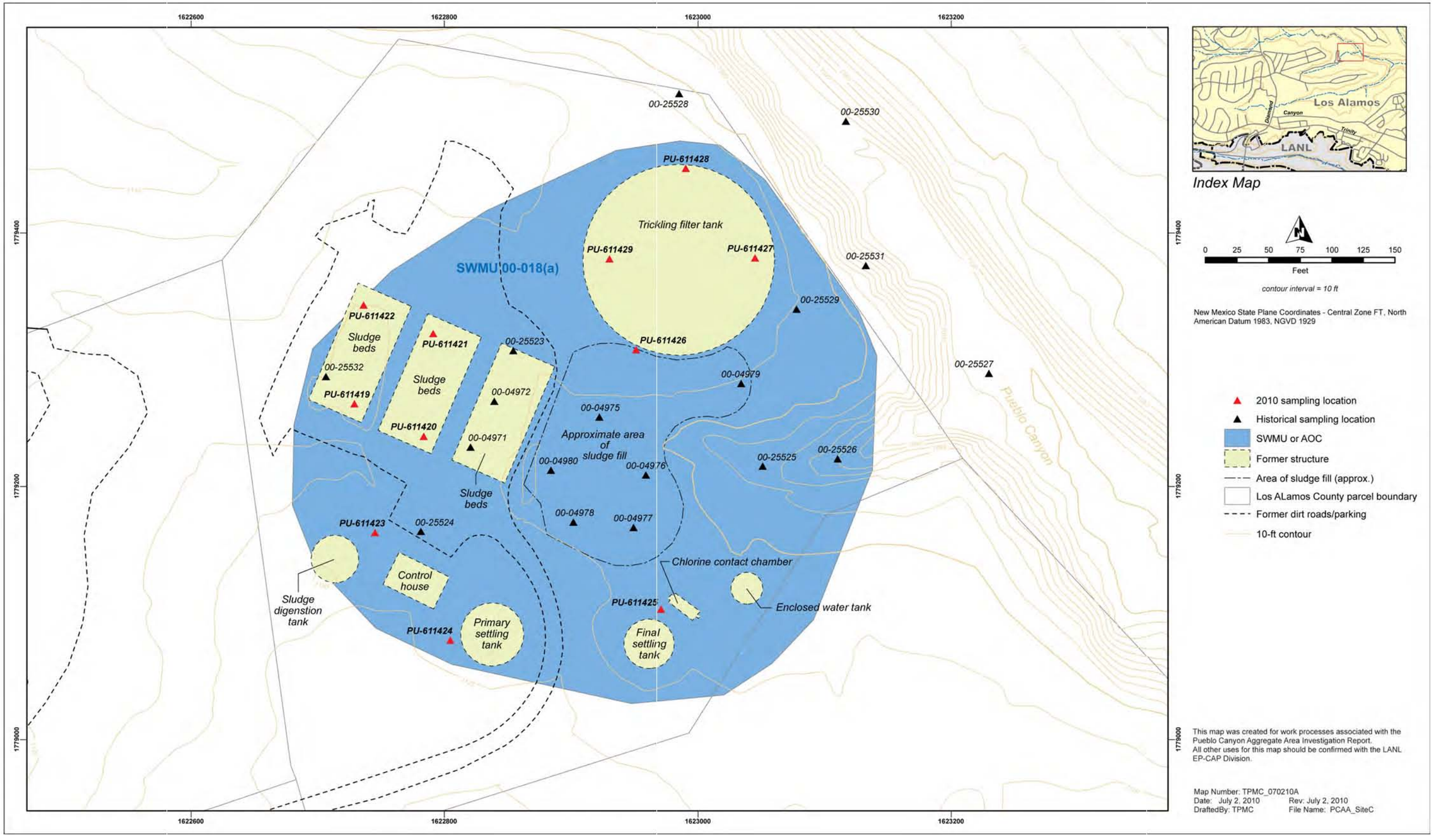


Figure 6.1-1 Locations of surface and subsurface samples collected at SWMU 00-018(a)



Figure 6.2-1 Locations of surface and subsurface samples collected at AOC 00-030(eS)

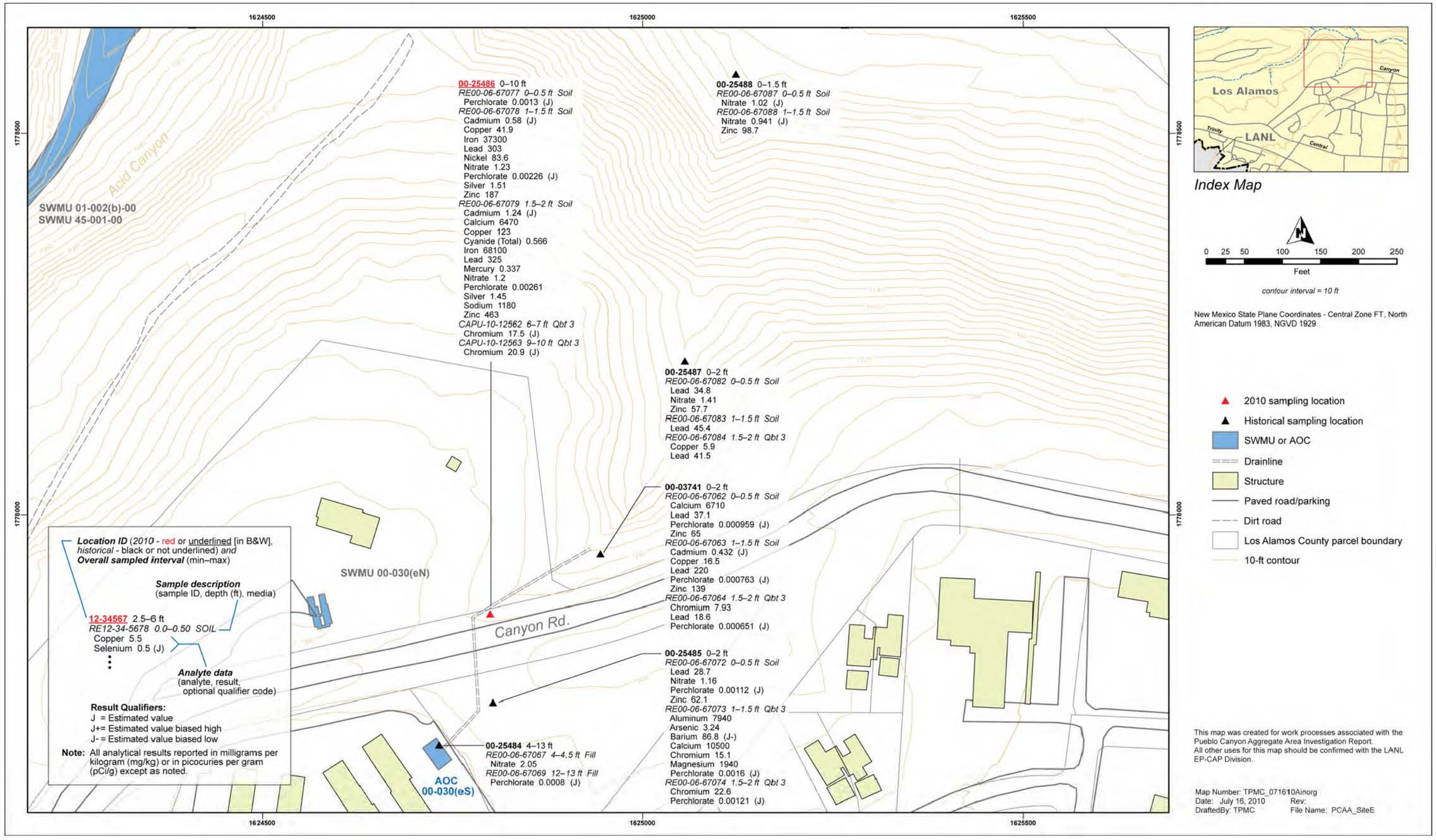


Figure 6.2-2 Inorganic chemicals detected or detected above BVs in samples at AOC 00-030(eS)

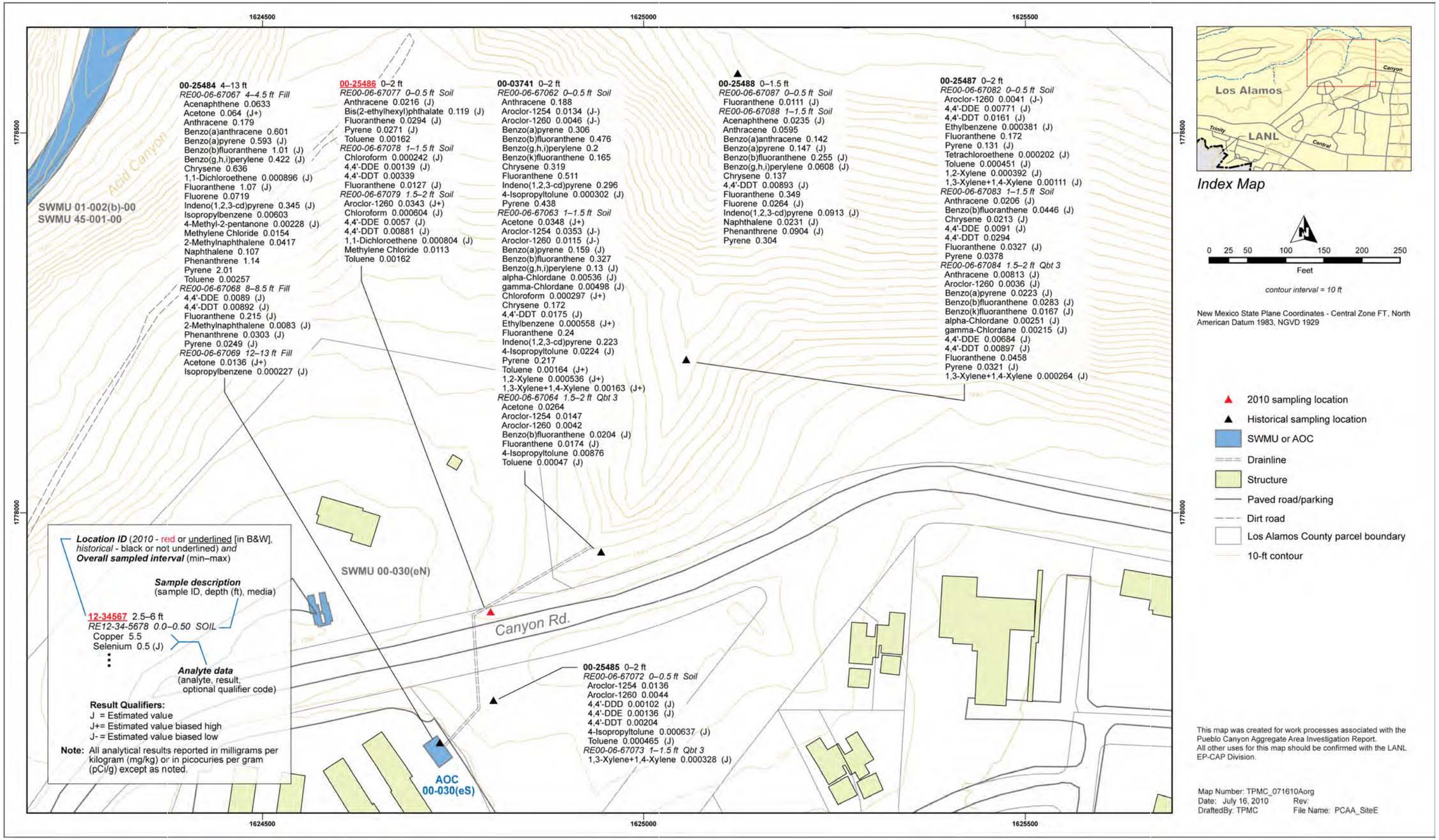


Figure 6.2-3 Organic chemicals detected in samples at AOC 00-030(eS)

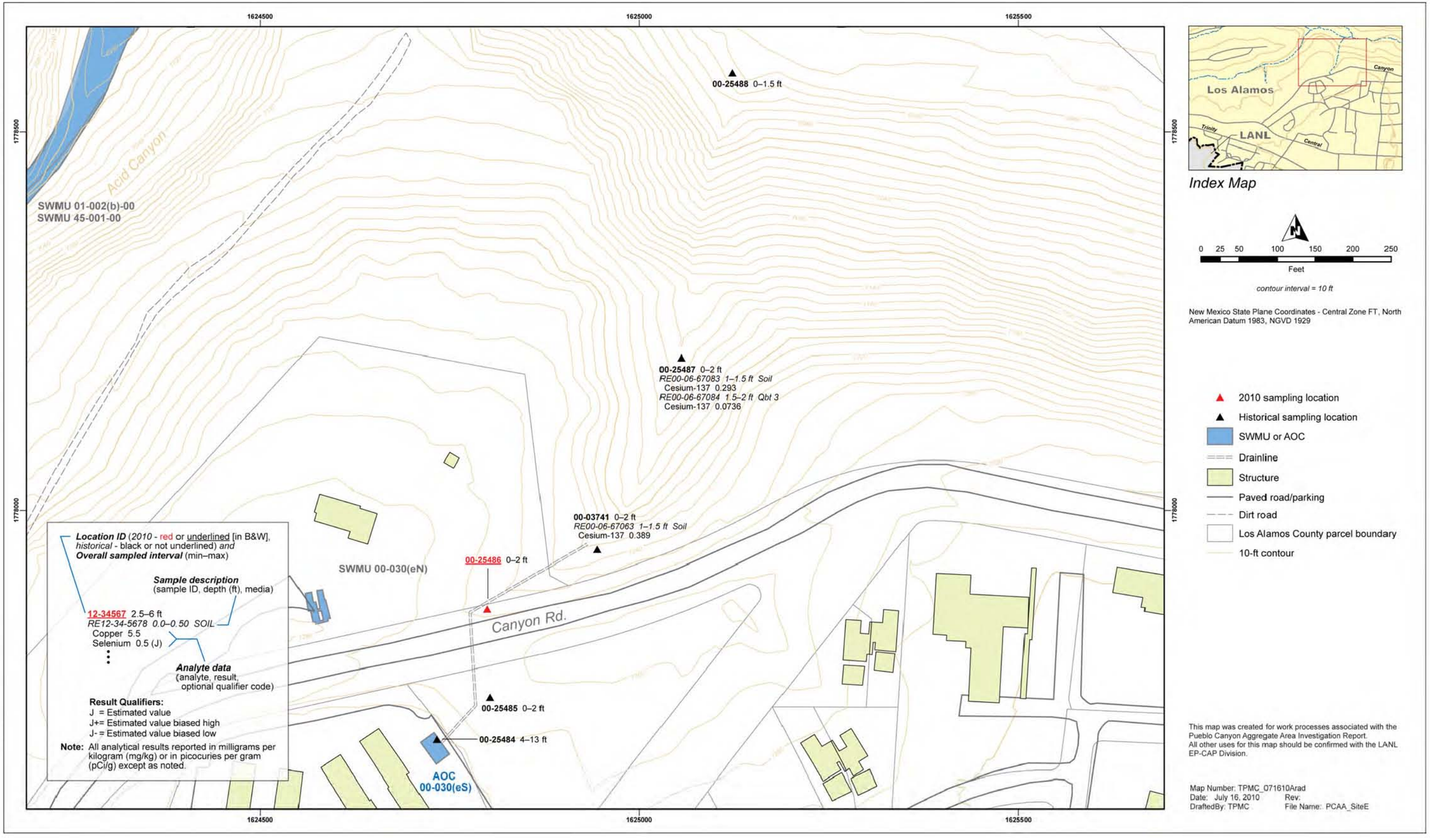


Figure 6.2-4 Radionuclides detected or detected above BVs/FVs in samples at AOC 00-030(eS)

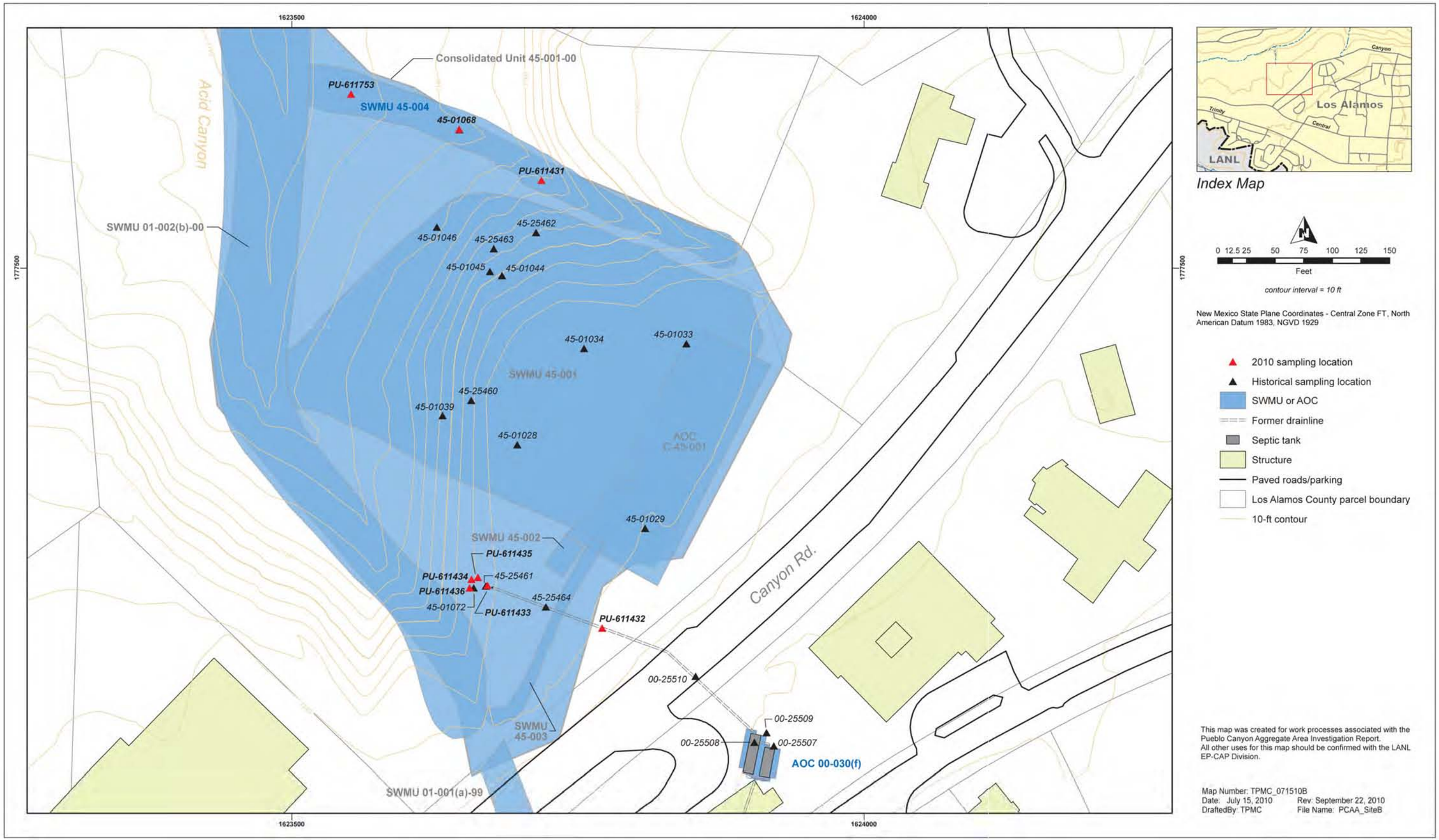


Figure 6.3-1 Locations of surface and subsurface samples collected at AOC 00-030(f) and SWMU 45-004

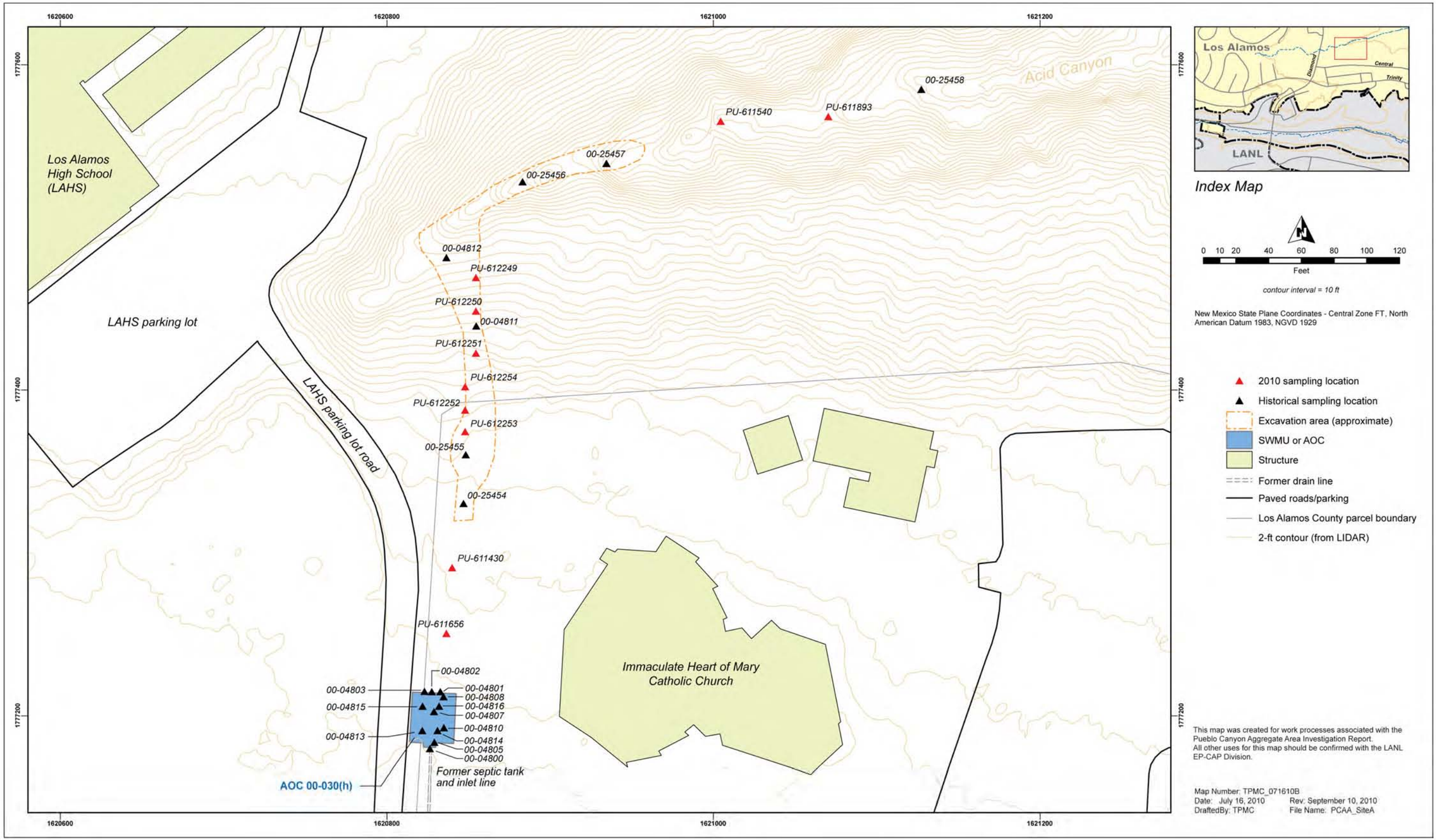


Figure 6.4-1 Locations of surface and subsurface samples collected at AOC 00-030(h)

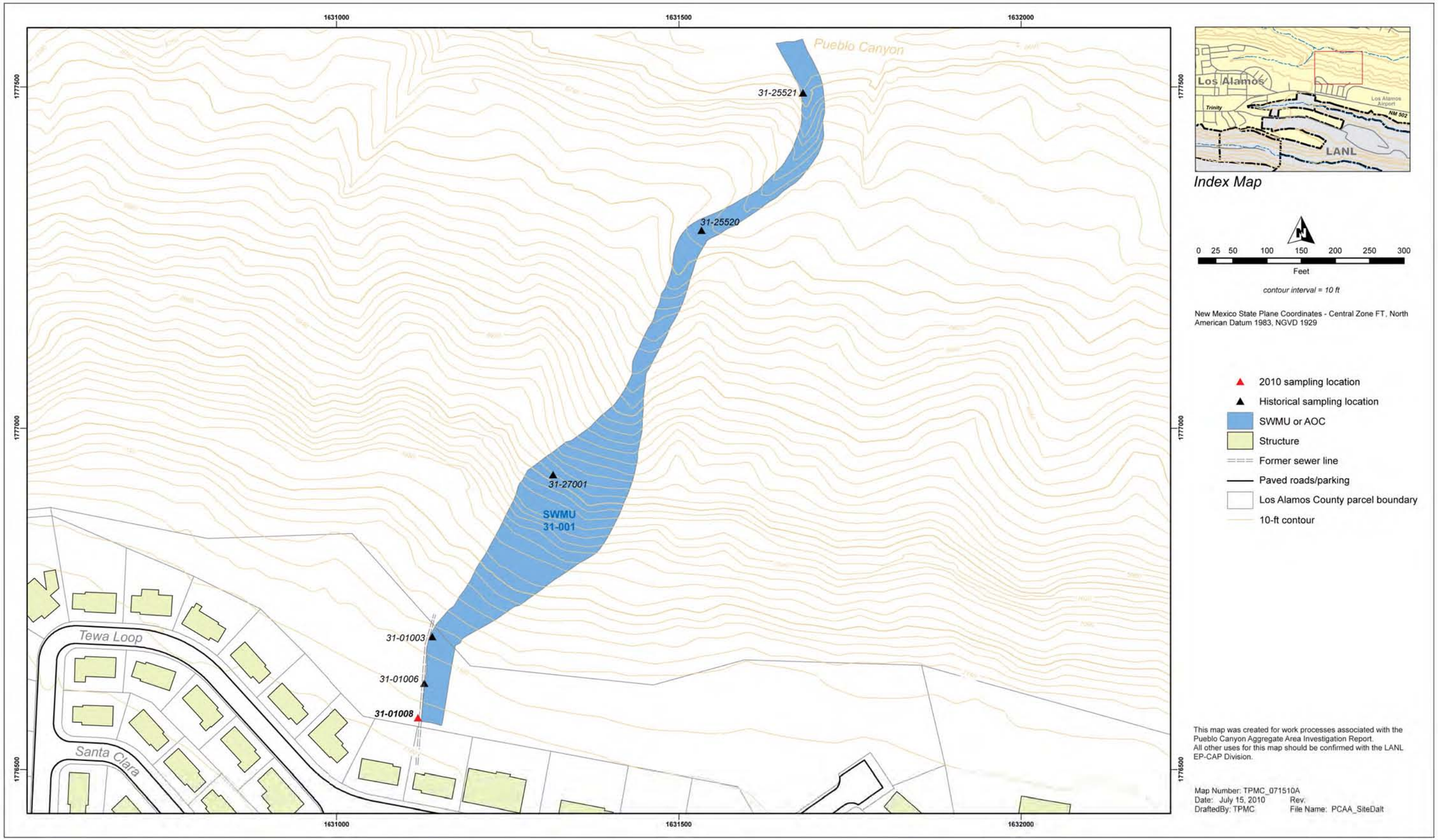


Figure 6.5-1 Locations of surface and subsurface samples collected at SWMU 31-001

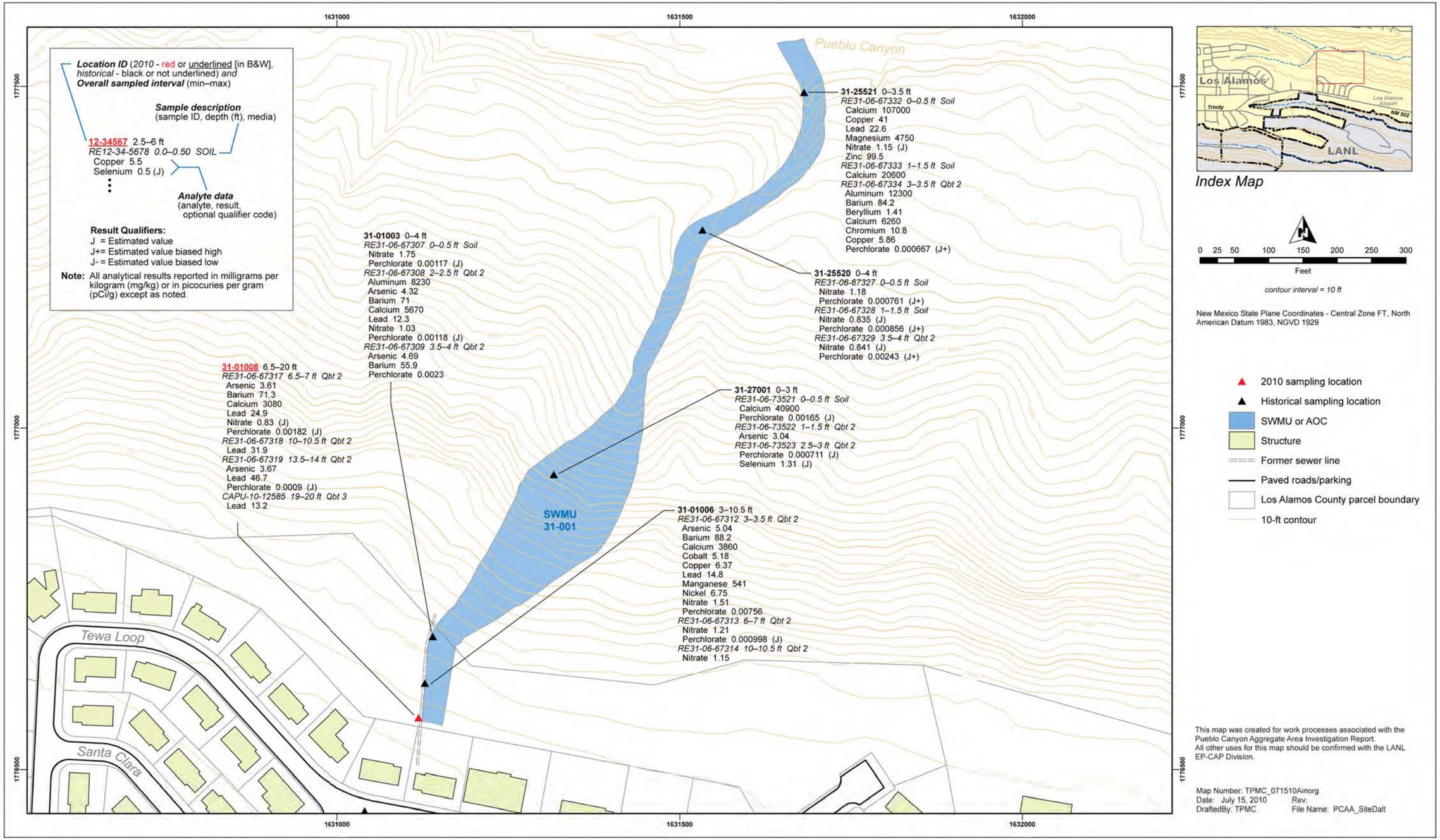


Figure 6.5-2 Inorganic chemicals detected or detected above BVs in samples at SWMU 31-001

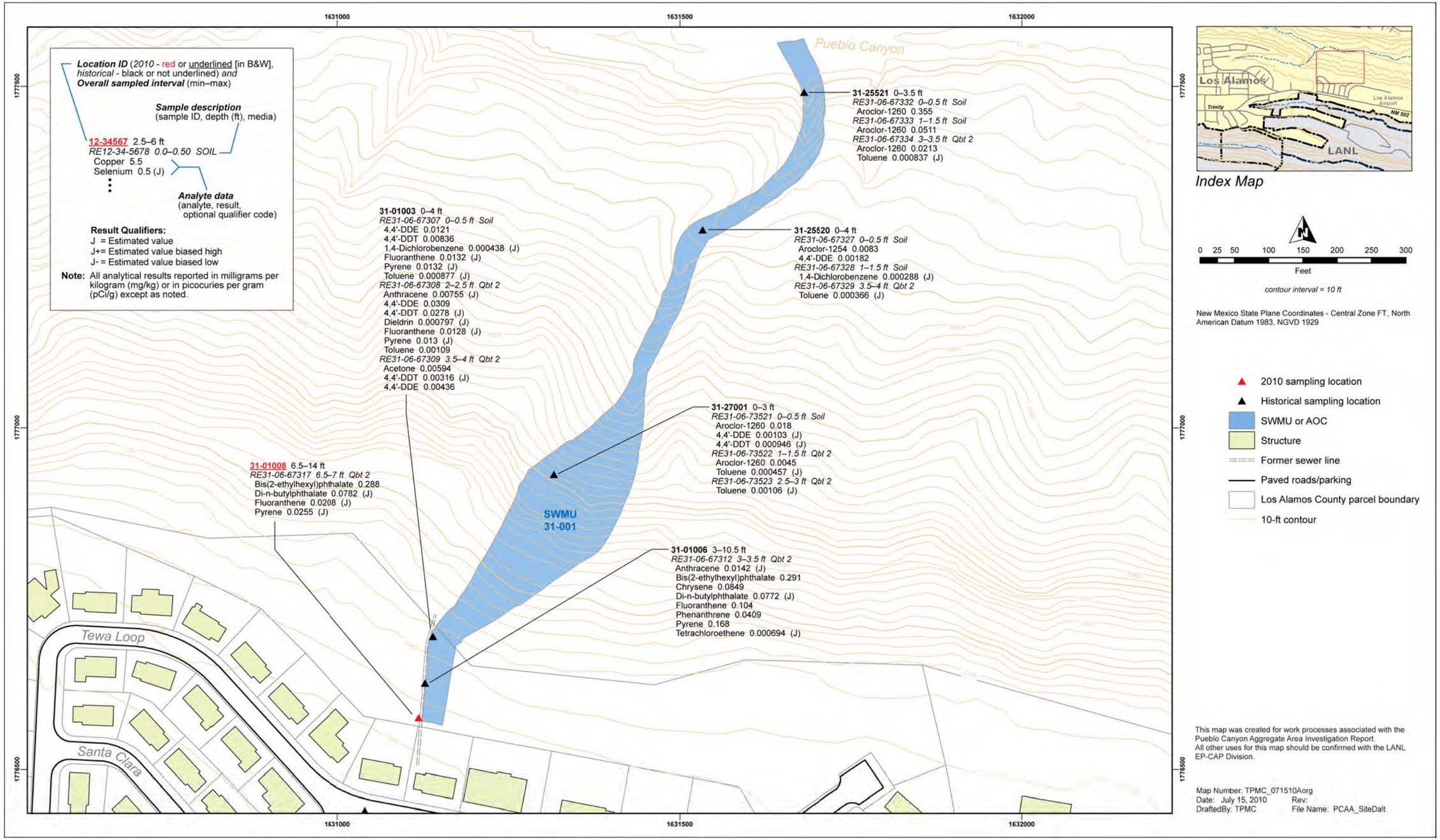


Figure 6.5-3 Organic chemicals detected in samples at SWMU 31-001

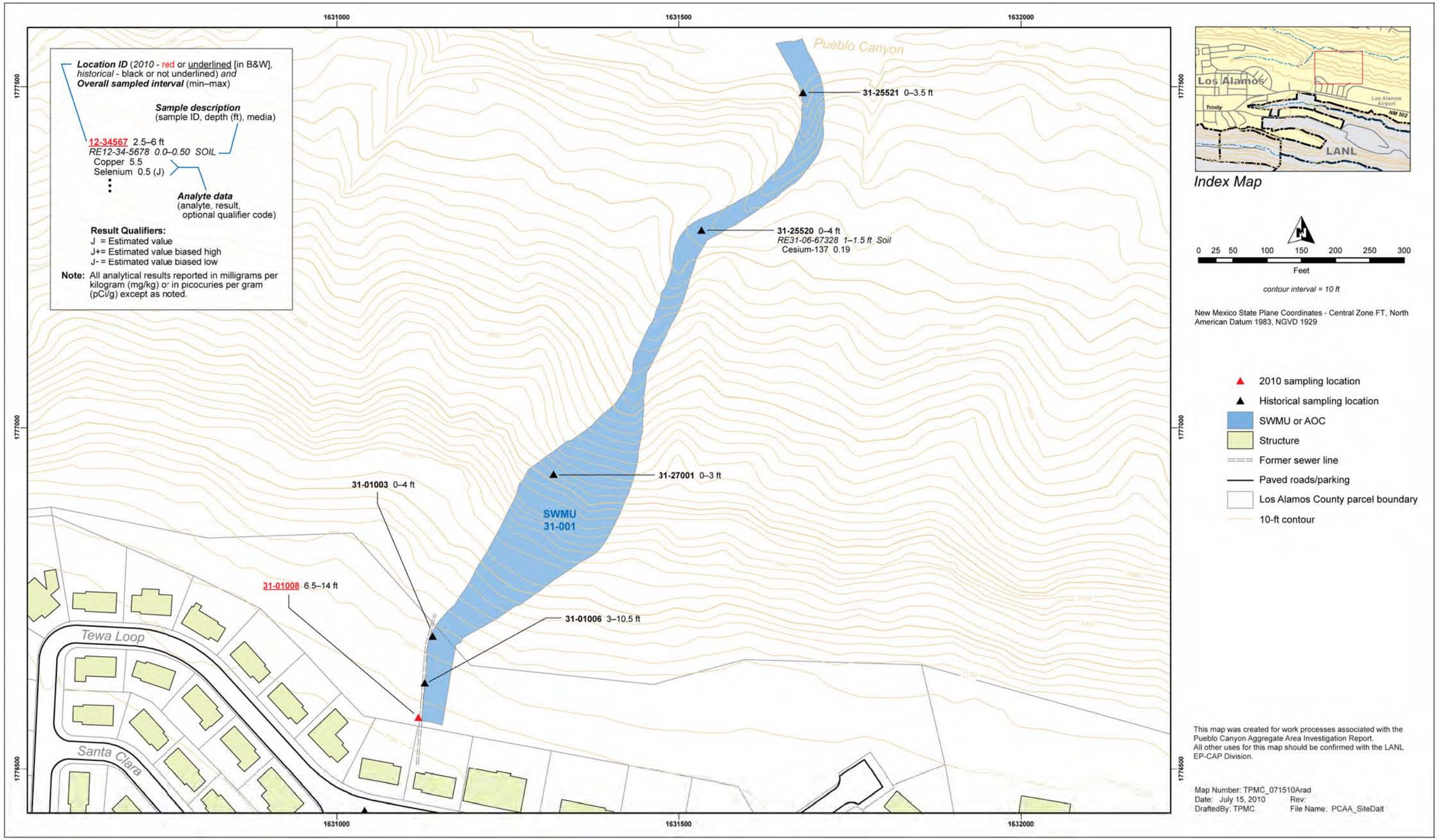


Figure 6.5-4 Radionuclides detected or detected above BVs/FVs in samples at SWMU 31-001

Table 3.2-1
Summary of Solid Media Field-Screening Results

Site	Location ID	Sample ID	Depth (ft bgs)		Collection Date	PID (ppm)		Daily MDA[a] (dpm[b])		α (dpm)	β/γ (dpm)
			Top	Bottom		Ambient	Sample	α	β/γ		
SWMU 00-018(a)											
00-018(a)	PU-611419	CAPU-10-12520	5	6	2/17/2010	0.0	0.2	11	698	<MDA	<MDA
00-018(a)	PU-611419	CAPU-10-12521	14	15	2/17/2010	0.0	0.0	11	698	<MDA	<MDA
00-018(a)	PU-611420	CAPU-10-12522	28	29	2/17/2010	0.0	0.2	11	698	<MDA	<MDA
00-018(a)	PU-611420	CAPU-10-12523	31	32	2/17/2010	0.0	0.0	11	698	<MDA	<MDA
00-018(a)	PU-611421	CAPU-10-12524	5	6	2/18/2010	0.0	0.3	11	698	<MDA	<MDA
00-018(a)	PU-611421	CAPU-10-12525	8	9	2/18/2010	0.0	0.2	11	698	<MDA	<MDA
00-018(a)	PU-611422	CAPU-10-12526	6	7	2/18/2010	0.0	0.4	11	698	<MDA	<MDA
00-018(a)	PU-611422	CAPU-10-12527	11	12	2/18/2010	0.0	0.3	11	698	<MDA	<MDA
00-018(a)	PU-611422	CAPU-10-12549	11	12	2/18/2010	0.0	0.3	11	698	<MDA	<MDA
00-018(a)	PU-611423	CAPU-10-12529	6	7	2/18/2010	0.0	0.0	11	698	<MDA	<MDA
00-018(a)	PU-611423	CAPU-10-12530	11	12	2/18/2010	0.0	0.0	11	698	<MDA	<MDA
00-018(a)	PU-611424	CAPU-10-12532	11.5	12.5	2/19/2010	0.0	0.0	60	1588	<MDA	<MDA
00-018(a)	PU-611424	CAPU-10-12533	14	15	2/19/2010	0.0	0.0	60	1588	<MDA	<MDA
00-018(a)	PU-611425	CAPU-10-12535	15.5	16.5	2/19/2010	0.0	0.2	60	1588	<MDA	<MDA
00-018(a)	PU-611425	CAPU-10-12536	19	20	2/19/2010	0.0	0.0	60	1588	<MDA	<MDA
00-018(a)	PU-611426	CAPU-10-12538	2.5	3.5	2/19/2010	0.0	0.1	60	1588	<MDA	<MDA
00-018(a)	PU-611426	CAPU-10-12539	6	8	2/19/2010	0.0	0.2	60	1588	<MDA	<MDA
00-018(a)	PU-611427	CAPU-10-12541	14.5	15.5	2/22/2010	0.0	0.3	26	1122	<MDA	<MDA
00-018(a)	PU-611427	CAPU-10-12542	18	20	2/22/2010	0.0	0.3	26	1122	<MDA	<MDA
00-018(a)	PU-611428	CAPU-10-12544	1.5	2.5	2/22/2010	0.0	0.3	26	1122	<MDA	<MDA
00-018(a)	PU-611428	CAPU-10-12545	13	15	2/22/2010	0.0	0.1	26	1122	<MDA	<MDA
00-018(a)	PU-611429	CAPU-10-12547	7	9	2/23/2010	0.0	0.0	26	1122	<MDA	<MDA

Table 3.2-1 (continued)

Site	Location ID	Sample ID	Depth (ft bgs)		Collection Date	PID (ppm)		Daily MDA[a] (dpm[b])		α (dpm)	β/γ (dpm)
			Top	Bottom		Ambient	Sample	α	β/γ		
SWMU 00-018(a) continued											
00-018(a)	PU-611429	CAPU-10-12548	13	15	2/23/2010	0.0	0.0	26	1122	<MDA	<MDA
00-018(a)	PU-611429	CAPU-10-12550	13	15	2/23/2010	0.0	0.0	26	1122	<MDA	<MDA
AOC 00-030(eS)											
00-030(eS)	00-25486	CAPU-10-12562	6	7	3/1/2010	0.3	0.3	10	1269	<MDA	<MDA
00-030(eS)	00-25486	CAPU-10-12563	9	10	3/1/2010	0.3	0.6	10	1269	<MDA	<MDA
00-030(eS)	00-25486	CAPU-10-12564	9	10	3/1/2010	0.3	0.6	10	1269	<MDA	<MDA
AOC 00-030(f)											
00-030(f)	PU-611432	CAPU-10-12599	1.2	2.2	3/1/2010	0.3	1.5	7	909	<MDA	<MDA
00-030(f)	PU-611432	CAPU-10-12600	4.2	5.2	3/1/2010	0.0	0.3	7	909	<MDA	<MDA
00-030(f)	PU-611432	RE00-10-22626	5.7	6.2	6/29/2010	0.0	13.3	NA[c]	NA	NA	NA
00-030(f)	PU-611433	CAPU-10-12602	0	1.3	3/1/2010	0.0	0.7	7	909	<MDA	<MDA
00-030(f)	PU-611433	RE00-10-22622	2	3	6/28/2010	0.0	0.2	7	968	60	907
00-030(f)	PU-611434	CAPU-10-12604	0	1.5	3/1/2010	0.1	13.4	7	909	<MDA	<MDA
00-030(f)	PU-611434	RE00-10-22623	2.5	3.5	6/28/2010	0.0	5.8	7	968	89	838
00-030(f)	PU-611435	CAPU-10-12606	0.8	1.3	3/1/2010	0.2	19	7	909	<MDA	<MDA
00-030(f)	PU-611435	CAPU-10-12609	0.8	1.3	3/1/2010	0.2	19	7	909	<MDA	<MDA
00-030(f)	PU-611435	RE00-10-22624	2.3	3.3	6/28/2010	0.0	24.1	7	968	40	660
00-030(f)	PU-611436	CAPU-10-12608	0	1.2	3/1/2010	0.2	1.7	7	909	<MDA	<MDA
00-030(f)	PU-611436	RE00-10-22625	1.8	2.8	6/28/2010	1.8	2.8	7	968	65	703
AOC 00-030(h)											
00-030(h)	00-25454	CAPU-10-12571	3.5	4.0	6/08/2010	1.7	3.4	n/a[d]	n/a	<MDA	<MDA
00-030(h)	00-25454	CAPU-10-12578	3.5	4.0	6/08/2010	1.7	3.4	n/a	n/a	<MDA	<MDA
00-030(h)	PU-611430	CAPU-10-12566	6	7	2/25/2010	0.0	0.1	26	1158	<MDA	<MDA
00-030(h)	PU-611430	CAPU-10-12567	8	9	2/25/2010	0.0	0.1	26	1158	<MDA	<MDA

Table 3.2-1 (continued)

Site	Location ID	Sample ID	Depth (ft bgs)		Collection Date	PID (ppm)		Daily MDA[a] (dpm[b])		α (dpm)	β/γ (dpm)
			Top	Bottom		Ambient	Sample	α	β/γ		
AOC 00-030(h) continued											
00-030(h)	PU-611540	CAPU-10-13136	0	0.5	2/26/2010	0.0	0.2	26	1158	<MDA	<MDA
00-030(h)	PU-611656	CAPU-10-12569	4	5	2/25/2010	0.0	0.1	26	1158	<MDA	<MDA
00-030(h)	PU-611656	CAPU-10-13733	4	5	2/25/2010	0.0	0.1	26	1158	<MDA	<MDA
00-030(h)	PU-611656	CAPU-10-13734	6	7	2/25/2010	0.0	0.1	26	1158	<MDA	<MDA
00-030(h)	PU-611893	CAPU-10-13137	0	0.5	2/26/2010	0.0	0.3	26	1158	<MDA	<MDA
00-030(h)	PU-612249	CAPU-10-18364	1.5	2.0	6/04/2010	0.0	3.5	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612250	CAPU-10-18365	1.5	2.0	6/04/2010	0.0	6.2	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612251	CAPU-10-18366	1.5	2.0	6/04/2010	0.0	5.5	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612252	CAPU-10-12577	1.5	2.0	6/08/2010	1.8	2.4	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612252	CAPU-10-18367	0.5	1.0	6/08/2010	2.7	4.6	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612253	CAPU-10-18368	2.0	2.5	6/08/2010	0.0	0.0	n/a	n/a	<MDA	<MDA
00-030(h)	PU-612254	CAPU-10-18369	4.0	4.5	6/08/2010	2.1	2.6	n/a	n/a	<MDA	<MDA
SWMU 31-001											
31-001	31-01008	CAPU-10-12584	16	17	2/23/2010	0.0	2.2	26	1122	<MDA	<MDA
31-001	31-01008	CAPU-10-12585	19	20	2/23/2010	0.0	0.0	26	1122	<MDA	<MDA
31-001	31-01008	CAPU-10-12587	19	20	2/23/2010	0.0	0.0	26	1122	<MDA	<MDA
Consolidated Unit 45-001-00											
45-004	45-01068	CAPU-10-12594	4	5	3/2/2010	0.0	0.1	10	1269	<MDA	<MDA
45-004	45-01068	CAPU-10-12595	7	8	3/2/2010	0.0	0.1	10	1269	<MDA	<MDA
45-004	PU-611431	CAPU-10-12590	0	1	3/3/2010	0.6	8.1	12	827	<MDA	<MDA
45-004	PU-611431	CAPU-10-12591	4	5	3/3/2010	0.7	1.0	12	827	<MDA	<MDA
45-004	PU-611431	CAPU-10-12592	7	8	3/3/2010	0.3	0.8	12	827	<MDA	<MDA
45-004	PU-611753	CAPU-10-12596	1.5	2	3/3/2010	0.0	0.0	12	827	<MDA	<MDA
45-004	PU-611753	CAPU-10-13855	0	1	3/3/2010	0.3	1.4	12	827	<MDA	<MDA

Table 3.2-1 (continued)

Site	Location ID	Sample ID	Depth (ft bgs)		Collection Date	PID (ppm)		Daily MDA[a] (dpm[b])		α (dpm)	β/γ (dpm)
			Top	Bottom		Ambient	Sample	α	β/γ		
Consolidated Unit 45-001-00 (continued)											
45-004	PU-611753	CAPU-10-13856	1	1.5	3/3/2010	0.1	0.7	12	827	<MDA	<MDA
45-004	PU-611753	CAPU-10-13857	1.5	2	3/3/2010	0.0	0.0	12	827	<MDA	<MDA

[a] MDA = Minimum detectable activity

[b] dpm = disintegrations per minute.

[c] NA = Not analyzed.

[d] n/a = Not applicable.

Table 6.1-1
Samples Collected and Analyses Requested for SWMU 00-018(a)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Uranium	TAL Metals	PCBs	Perchlorate	Pesticides/Herbicides	Pesticide/PCBs	Strontium-90	SVOCs	VOCs	Cyanide
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—*	—	—	—	—	2620	—	—	2619	—	—	2619	2619	—
0100-96-0502	00-04971	1.8–2.2	9/11/1996	Fill	—	—	—	—	—	2620	—	—	2619	—	—	2619	2619	—
0100-96-0523	00-04971	5.5–6.5	10/25/1996	Qbt 3	—	2737	2737	2737	—	2736	2735	—	2735	—	—	2735	2735	—
RE00-06-67376	00-04971	8–8.5	7/20/2006	Fill	5599S	—	—	5600S	—	—	—	5599S	—	—	—	—	—	5599S
0100-96-0505	00-04972	0.25–1.2	9/11/1996	Fill	—	—	—	—	—	2620	—	—	2619	—	—	2619	2619	—
0100-96-0593	00-04972	0.25–1.2	9/12/1996	Fill	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
0100-96-0506	00-04972	1.2–1.8	9/11/1996	Fill	—	—	—	—	—	2620	—	—	2619	—	—	2619	2619	—
0100-96-0524	00-04972	6–7	10/25/1996	Qbt 3	—	2737	2737	2737	—	2736	2735	—	2735	—	—	2735	2735	—
0100-96-0525	00-04972	10–11	10/25/1996	Qbt 3	—	2737	2737	2737	—	2736	2735	—	2735	—	—	2735	2735	—
RE00-06-67380	00-04972	12.5–13	7/21/2006	Fill	5599S	—	—	—	—	5599S	—	5599S	—	—	—	—	—	5599S
RE00-06-67381	00-04972	15–16	7/21/2006	Fill	5599S	—	—	—	—	5599S	—	5599S	—	—	—	—	—	5599S
0100-96-0507	00-04975	0–0.5	9/16/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0588	00-04975	0–0.5	9/16/1996	Sludge	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
0100-97-0211	00-04975	0–0.5	5/30/1997	Soil	—	—	—	—	3188R	—	—	—	—	—	3188R	—	—	—
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0589	00-04976	0–0.5	9/16/1996	Sludge	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	5581S	—	—	—	—	5581S	—	5581S	5580S	—	—	—	—	5581S
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	5581S	—	—	—	—	5581S	—	5581S	5580S	—	—	—	—	5581S
RE00-06-67387	00-04976	9–9.5	7/19/2006	Qbt 2	5581S	—	—	—	—	5581S	—	5581S	5580S	—	—	—	—	5581S
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0590	00-04977	0–0.5	9/16/1996	Sludge	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	5590S	—	—	—	—	5590S	5591S	5590S	5591S	—	—	5591S	—	5590S
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	5590S	—	—	—	—	5590S	5591S	5590S	5591S	—	—	5591S	—	5590S
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	5590S	—	—	—	—	5590S	5591S	5590S	5591S	—	—	5591S	—	5590S
0100-96-0510	00-04978	0–1	9/16/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0511	00-04978	1–2	9/16/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0591	00-04978	1–2	9/16/1996	Sludge	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
0100-96-0512	00-04979	0–0.5	9/17/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0592	00-04979	0–0.5	9/17/1996	Sludge	—	2836	2836	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67396	00-04979	1–1.5	7/20/2006	Qbt 2	5590S	—	—	—	—	5590S	—	5590S	—	—	—	—	—	5590S
RE00-06-67397	00-04979	5–5.5	7/20/2006	Qbt 2	5590S	—	—	—	—	5590S	—	5590S	—	—	—	—	—	5590S
RE00-06-67398	00-04979	9–9.5	7/20/2006	Qbt 2	5590S	—	—	—	—	5590S	—	5590S	—	—	—	—	—	5590S
0100-96-0530	00-04980	0–0.5	9/17/1996	Sludge	—	2631	2631	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Uranium	TAL Metals	PCBs	Perchlorate	Pesticides/Herbicides	Pesticide/PCBs	Strontium-90	SVOCs	VOCs	Cyanide
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	—	—	2630	—	—	—	2629	—	2629	2629	—
RE00-06-67401	00-04980	10.6–11.1	7/20/2006	Fill	5590S	—	—	—	—	5590S	—	5590S	—	—	—	5591S	—	5590S
RE00-06-67402	00-04980	11.1–11.6	7/20/2006	Fill	5590S	—	—	—	—	5590S	—	5590S	—	—	—	5591S	—	5590S
RE00-06-67403	00-04980	27.5–28.5	7/20/2006	Fill	5590S	—	—	—	—	5590S	—	5590S	—	—	—	5591S	—	5590S
RE00-06-67404	00-04980	39.5–40.5	7/20/2006	Qbt 2	5590S	—	—	—	—	5590S	—	5590S	—	—	—	5591S	—	5590S
RE00-06-72806	00-04980	42–42.5	7/20/2006	Qbt 2	5586S	—	—	—	—	5586S	—	5586S	—	—	—	5586S	—	5586S
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	5641S	5641S	—	—	—	5641S	5641S	5641S	5641S	—	—	5641S	5641S	5641S
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	5641S	5641S	—	—	—	5641S	5641S	5641S	5641S	—	—	5641S	5641S	5641S
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	5641S	5641S	—	—	—	5641S	5641S	5641S	5641S	—	—	5641S	5641S	5641S
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	5659S	5660S	—	—	—	5659S	5658S	5659S	5658S	—	—	5658S	5658S	5659S
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	5659S	5660S	—	—	—	5659S	5658S	5659S	5658S	—	—	5658S	5658S	5659S
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	5662S	5663S	—	—	—	5662S	5661S	5662S	5661S	—	—	5661S	5661S	5662S
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	5662S	5663S	—	—	—	5662S	5661S	5662S	5661S	—	—	5661S	5661S	5662S
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	5662S	5663S	—	—	—	5662S	5661S	5662S	5661S	—	—	5661S	5661S	5662S
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	5662S	5663S	—	—	—	5662S	5661S	5662S	5661S	—	—	5661S	5661S	5662S
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	5674S	5675S	—	—	—	5674S	5673S	5674S	5673S	—	—	5673S	5673S	5674S
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	5674S	5675S	—	—	—	5674S	5673S	5674S	5673S	—	—	5673S	5673S	5674S
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	5674S	5675S	—	—	—	5674S	5673S	5674S	5673S	—	—	5673S	5673S	5674S
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	5682S	5683S	—	—	—	5682S	5681S	5682S	5681S	—	—	5681S	5681S	5682S
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	5682S	5683S	—	—	—	5682S	5681S	5682S	5681S	—	—	5681S	5681S	5682S
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	5682S	5683S	—	—	—	5682S	5681S	5682S	5681S	—	—	5681S	5681S	5682S
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	5674S	5675S	—	—	—	5674S	5673S	5674S	5673S	—	—	5673S	5673S	5674S
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	5674S	5675S	—	—	—	5674S	5673S	5674S	5673S	—	—	5673S	5673S	5674S
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	5682S	5683S	—	—	—	5682S	5681S	5682S	5681S	—	—	5681S	5681S	5682S
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	5700S	5701S	—	—	—	5700S	5699S	5700S	5699S	—	—	5699S	5699S	5700S
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	5694S	5695S	—	—	—	5694S	5693S	5694S	5693S	—	—	5693S	5693S	5694S

Table 6.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Isotopic Uranium	TAL Metals	PCBs	Perchlorate	Pesticides/Herbicides	Pesticide/PCBs	Strontium-90	SVOCs	VOCs	Cyanide
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	5694S	5695S	—	—	—	5694S	5693S	5694S	5693S	—	—	5693S	5693S	5694S
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	5694S	5695S	—	—	—	5694S	5693S	5694S	5693S	—	—	5693S	5693S	5694S
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	5659S	5660S	—	—	—	5659S	5658S	5659S	5658S	—	—	5658S	5658S	5659S
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	5659S	5660S	—	—	—	5659S	5658S	5659S	5658S	—	—	5658S	5658S	5659S
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12521	PU-611419	14–15	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12523	PU-611420	31–32	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12525	PU-611421	8–9	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12527	PU-611422	11–12	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12529	PU-611423	6–7	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12530	PU-611423	11–12	2/17/2010	Qbt 2	10-1960	10-1960	—	—	—	10-1960	10-1959	10-1960	10-1959	—	—	10-1959	10-1959	10-1960
CAPU-10-12532	PU-611424	11.5–12.5	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12533	PU-611424	14–15	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12538	PU-611426	2.5–3.5	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12539	PU-611426	6–8	2/19/2010	Qbt 2	10-1995	10-1995	—	—	—	10-1995	10-1994	10-1995	10-1994	—	—	10-1994	10-1994	10-1995
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048
CAPU-10-12542	PU-611427	18–20	2/22/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048
CAPU-10-12545	PU-611428	13–15	2/22/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	10-2048	10-2048	—	—	—	10-2048	10-2047	10-2048	10-2047	—	—	10-2047	10-2047	10-2048

*— = No sample collected.

Table 6.1-2
Inorganic Chemicals above BVs at SWMU 00-018(a)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**	**1690**	**482**	**0.1**
Sediment BV[a]					**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**13,800**	**19.7**	**2370**	**543**	**0.1**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**	**4610**	**671**	**0.1**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**9.29E+01**[e]
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**3.10E+02**[f]
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**	**3.17E+04**	**1.58E+04**	**5.54E+05**	**5.60E+02**	**na**	**1.10E+05**	**2.38E+02**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.30E+01**[f]	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**2.30E+01**[f]
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—[h]	—	—	—	—	2.5	—	—	—	73.9	NA[i]	—	31.3	—	—	1.7
0100-96-0502	00-04971	1.8–2.2	9/11/1996	Fill	—	—	—	—	—	—	—	—	—	69.6	NA	—	—	—	—	0.6
0100-96-0523	00-04971	5.5–6.5	10/25/1996	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.11 (U)
RE00-06-67376	00-04971	8–8.5	7/20/2006	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA
0100-96-0505	00-04972	0.25–1.2	9/11/1996	Fill	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.14
0100-96-0506	00-04972	1.2–1.8	9/11/1996	Fill	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.14
0100-96-0524	00-04972	6–7	10/25/1996	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	11	NA	—	—	—	—	0.2
0100-96-0525	00-04972	10–11	10/25/1996	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	5.7	NA	—	—	—	—	0.11 (U)
RE00-06-67380	00-04972	12.5–13	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67381	00-04972	15–16	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.11 (J)
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67387	00-04976	9–9.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	16.3	NA	—	—	—	—	0.49
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	6.27	—	—	—	—	—	—
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0510	00-04978	0–1	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	0.14
0100-96-0512	00-04979	0–0.5	9/17/1996	Sludge	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE00-06-67396	00-04979	1–1.5	7/20/2006	Qbt 2	—	—	—	48 (J+)	—	—	—	—	—	7.9	—	—	—	—	—	—
RE00-06-67397	00-04979	5–5.5	7/20/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67398	00-04979	9–9.5	7/20/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	—	—	394	—	2.5	—	25.6	—	145	NA	—	53.3	—	—	2.6
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	—	—	—	—	—	—	21	NA	—	—	—	—	0.35
RE00-06-67401	00-04980	10.6–11.1	7/20/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67402	00-04980	11.1–11.6	7/20/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67403	00-04980	27.5–28.5	7/20/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**	**1690**	**482**	**0.1**
Sediment BV[a]					**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**13,800**	**19.7**	**2370**	**543**	**0.1**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**	**4610**	**671**	**0.1**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**9.29E+01**[e]
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**3.10E+02**[f]
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**	**3.17E+04**	**1.58E+04**	**5.54E+05**	**5.60E+02**	**na**	**1.10E+05**	**2.38E+02**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.30E+01**[f]	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**2.30E+01**[f]
RE00-06-67404	00-04980	39.5–40.5	7/20/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	811	—
RE00-06-72806	00-04980	42–42.5	7/20/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	—	—	—	—	—	0.464 (J)	—	—	—	29.3	—	—	—	—	—	0.704
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	—	—	—	—	—	—	22.4	—	—	—	—	—	—	—	—
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	—	—	—	—	—	1.31	—	—	—	40.7	—	—	251	—	—	0.623
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	—	—	—	—	—	0.746	—	—	—	41.9	—	—	61	—	—	0.379
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	—	—	—	—	—	0.855	—	—	—	28.2	—	—	57.2 (J+)	—	—	0.382
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	—	—	—	—	—	—	—	—	—	—	—	—	25.7 (J+)	—	—	0.172
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	—	—	—	—	—	—	—	—	—	13	—	—	72.2 (J+)	2990	—	0.821
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	—	—	75	—	—	—	—	—	6.84	—	—	58.2 (J+)	—	—	—
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	—	—	—	—	—	0.517 (U)	—	—	—	—	—	—	29.6	—	—	—
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	—	—	—	—	—	0.547 (U)	—	19.1	—	11.5	—	—	34.3	—	—	0.139
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	—	—	—	82.7	—	—	—	20.6	—	39.2	—	—	31.7	—	—	—
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	—	—	—	—	—	0.537 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	—	—	—	—	—	0.573 (U)	—	14.6	—	—	—	—	21.4	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	—	—	4.34	—	—	0.752 (U)	—	—	—	19.5	—	—	39.3	—	799 (J+)	—
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	—	—	—	—	0.575 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	—	—	—	—	0.499 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	—	—	1300 (J)	—
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	—	—	—	—	—	0.608	—	—	—	28.8	—	—	—	—	—	0.309
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	—	—	—	—	0.527 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	—	—	—	—	0.528 (U)	—	25.6	—	—	—	—	—	—	—	0.25
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	—	—	—	—	0.619 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	—	—	—	—	0.602 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	—	—	—	—	—	0.582 (U)	—	—	—	—	—	—	—	—	—	—
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	—	—	—	—	—	0.745	—	—	—	21.4	0.955 (J-)	—	23.8	—	787	1.14
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.125
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	—	—	—	—	—	—	—	—	4.73	—	—	—	—	—	—

Table 6.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**	**1690**	**482**	**0.1**
Sediment BV[a]					**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**13,800**	**19.7**	**2370**	**543**	**0.1**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**	**4610**	**671**	**0.1**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**9.29E+01**[e]
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**3.10E+02**[f]
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**	**3.17E+04**	**1.58E+04**	**5.54E+05**	**5.60E+02**	**na**	**1.10E+05**	**2.38E+02**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.30E+01**[f]	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**2.30E+01**[f]
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	—	—	—	—	—	—	—	—	—	30.9	—	—	—	—	—	0.367
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	—	—	—	—	—	—	—	—	27.4	—	—	—	—	—	0.131
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	1.02 (U)	—	—	—	—	—	—	—	7.77 (U)	—	—	—	—	—	—
CAPU-10-12521	PU-611419	14–15	2/17/2010	Qbt 2	—	1.04 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	—	1.1 (U)	—	85.2	—	—	—	—	—	—	—	—	—	—	1330	—
CAPU-10-12523	PU-611420	31–32	2/17/2010	Qbt 2	—	1.07 (U)	—	63.5	—	—	—	—	—	—	—	—	—	—	842	—
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	—	4.94 (U)	—	95.8	—	—	56800	11.1	—	11.2 (U)	—	—	—	—	—	—
CAPU-10-12525	PU-611421	8–9	2/17/2010	Qbt 2	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	1.01 (U)	—	—	—	—	—	—	—	7.2 (U)	—	—	—	—	—	0.179
CAPU-10-12527	PU-611422	11–12	2/17/2010	Qbt 2	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12529	PU-611423	6–7	2/17/2010	Qbt 2	—	1.07 (U)	—	83.3	—	—	—	—	—	5.6 (U)	—	—	—	—	—	—
CAPU-10-12530	PU-611423	11–12	2/17/2010	Qbt 2	—	1.05 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12532	PU-611424	11.5–12.5	2/19/2010	Qbt 2	8050	1.03 (UJ)	—	85.1	—	—	—	7.35	3.68	6.27	—	—	—	—	—	—
CAPU-10-12533	PU-611424	14–15	2/19/2010	Qbt 2	—	0.96 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	1.05 (UJ)	—	50.8	—	—	13600	—	—	—	—	—	—	—	—	—
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	1.05 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12538	PU-611426	2.5–3.5	2/19/2010	Qbt 2	7860	1.09 (UJ)	—	116	—	—	3800	8.5	3.89	7.21	—	—	—	1800 (J+)	—	—
CAPU-10-12539	PU-611426	6–8	2/19/2010	Qbt 2	—	1.04 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	1 (U)	—	142	—	—	—	—	—	—	—	—	—	—	1660	—
CAPU-10-12542	PU-611427	18–20	2/22/2010	Qbt 2	—	0.942 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	1.04 (U)	—	68.5	—	—	—	—	—	5.54	—	—	—	—	—	—
CAPU-10-12545	PU-611428	13–15	2/22/2010	Qbt 2	—	0.976 (U)	—	54.1	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	1.02 (U)	—	—	—	—	7140 (J+)	—	—	—	—	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	1.06 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]					**6.58**	**na[c]**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
Sediment BV[a]					**9.38**	**na**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Soil BV[a]					**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[b]					**6.19E+03**	**4.96E+05**	**2.17E+02**	**na**	**1.55E+03**	**1.55E+03**	**na**	**2.04E+01**	**1.55E+03**	**9.29E+04**
Industrial SSL[b]					**2.27E+04**	**1.82E+06**	**7.95E+02**	**na**	**5.68E+03**	**5.68E+03**	**na**	**7.49E+01**	**5.68E+03**	**3.41E+05**
Recreational SSL[g]					**1.58E+04**	**1.26E+06**	**5.55E+02**	**na**	**3.96E+03**	**3.96E+03**	**na**	**5.23E+01**	**3.96E+03**	**2.38E+05**
Residential SSL[b]					**1.56E+03**	**1.25E+05**	**5.48E+01**	**na**	**3.91E+02**	**3.91E+02**	**na**	**5.16E+00**	**3.91E+02**	**2.35E+04**
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—	NA	NA	—	—	2.6	—	—	—	128
0100-96-0502	00-04971	1.8–2.2	9/11/1996	Fill	—	NA	NA	—	—	—	—	0.79 (J)	—	—
0100-96-0523	00-04971	5.5–6.5	10/25/1996	Qbt 3	—	NA	NA	—	—	2.3 (U)	—	NA	—	—
RE00-06-67376	00-04971	8–8.5	7/20/2006	Fill	NA	12.4	—	NA	NA	NA	NA	NA	NA	NA
0100-96-0505	00-04972	0.25–1.2	9/11/1996	Fill	—	NA	NA	—	—	—	—	—	—	—
0100-96-0506	00-04972	1.2–1.8	9/11/1996	Fill	—	NA	NA	—	—	—	—	—	—	—
0100-96-0524	00-04972	6–7	10/25/1996	Qbt 3	—	NA	NA	—	—	2.2 (U)	—	—	—	—
0100-96-0525	00-04972	10–11	10/25/1996	Qbt 3	—	NA	NA	—	—	2.3 (U)	—	—	—	—
RE00-06-67380	00-04972	12.5–13	7/21/2006	Fill	—	4.17	—	—	1.67 (U)	—	—	—	—	—
RE00-06-67381	00-04972	15–16	7/21/2006	Fill	—	6.47	—	—	1.65 (U)	—	—	—	—	50.5
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	NA	NA	—	—	—	—	—	—	51.7
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	—	2.45	—	—	0.782 (J)	—	—	—	—	—
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	—	2.46	—	—	0.718 (J)	—	—	—	—	—
RE00-06-67387	00-04976	9–9.5	7/19/2006	Qbt 2	—	1.96	—	—	1.58 (U)	—	—	—	—	—
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	NA	NA	—	—	3.3	—	—	—	76.7
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	1.97	—	—	1.61 (U)	—	—	—	—	—
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	4.87	—	—	1.57 (U)	—	—	—	—	—
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	—	4.85	—	—	1.6 (U)	—	—	—	—	—
0100-96-0510	00-04978	0–1	9/16/1996	Sludge	—	NA	NA	—	—	—	—	—	—	53.3
0100-96-0512	00-04979	0–0.5	9/17/1996	Sludge	—	NA	NA	—	—	—	—	0.84 (J)	—	—
RE00-06-67396	00-04979	1–1.5	7/20/2006	Qbt 2	—	1.26	—	—	1.52 (U)	—	—	—	—	66.5
RE00-06-67397	00-04979	5–5.5	7/20/2006	Qbt 2	—	—	0.000885 (J)	—	1.5 (U)	—	—	—	—	—
RE00-06-67398	00-04979	9–9.5	7/20/2006	Qbt 2	—	1.12	—	—	1.52 (U)	—	—	—	—	—
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	NA	NA	—	1.8	5.3	—	1.1 (J)	—	324
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	NA	NA	—	—	—	—	—	—	73.8
RE00-06-67401	00-04980	10.6–11.1	7/20/2006	Fill	—	7.59	—	—	1.7 (U)	—	—	—	—	—
RE00-06-67402	00-04980	11.1–11.6	7/20/2006	Fill	—	12.3	—	—	1.73 (U)	—	—	—	—	—
RE00-06-67403	00-04980	27.5–28.5	7/20/2006	Fill	—	8.09	—	—	1.76 (U)	—	—	—	—	—
RE00-06-67404	00-04980	39.5–40.5	7/20/2006	Qbt 2	—	7.24	—	—	0.657 (J)	—	—	—	—	—

Table 6.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]					**6.58**	**na[c]**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
Sediment BV[a]					**9.38**	**na**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Soil BV[a]					**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[b]					**6.19E+03**	**4.96E+05**	**2.17E+02**	**na**	**1.55E+03**	**1.55E+03**	**na**	**2.04E+01**	**1.55E+03**	**9.29E+04**
Industrial SSL[b]					**2.27E+04**	**1.82E+06**	**7.95E+02**	**na**	**5.68E+03**	**5.68E+03**	**na**	**7.49E+01**	**5.68E+03**	**3.41E+05**
Recreational SSL[g]					**1.58E+04**	**1.26E+06**	**5.55E+02**	**na**	**3.96E+03**	**3.96E+03**	**na**	**5.23E+01**	**3.96E+03**	**2.38E+05**
Residential SSL[b]					**1.56E+03**	**1.25E+05**	**5.48E+01**	**na**	**3.91E+02**	**3.91E+02**	**na**	**5.16E+00**	**3.91E+02**	**2.35E+04**
RE00-06-72806	00-04980	42–42.5	7/20/2006	Qbt 2	—	7.64	0.00112 (J)	—	1.54 (U)	—	—	—	—	—
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	—	3.44	—	—	—	1.04	—	—	—	91 (J+)
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	1.17	—	—	—	—	—	—	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	0.95	—	—	1.54 (U)	—	—	—	—	—
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	—	3.29	—	—	—	1.35	—	—	—	174 (J-)
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	—	8.73	0.000865 (J)	—	—	—	—	—	—	150 (J-)
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	—	16.3	0.000952 (J)	—	—	—	—	—	—	116
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	—	2.51	—	—	1.52 (U)	—	—	—	—	—
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	—	0.885 (J)	—	—	0.798 (J)	—	—	—	24.3	116
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	1.21	—	—	0.817 (J)	—	—	—	—	—
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	—	1.83	—	—	10.6 (J)	—	—	—	—	100 (J-)
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	—	1.74	—	—	7.46 (J)	—	—	—	—	76.6 (J-)
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	—	1.12	—	—	8.23 (J)	—	—	—	—	104 (J-)
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	—	1.43	—	—	1.61 (U)	—	—	—	—	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	—	0.837 (J)	—	—	1.49 (J)	—	—	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	—	1.63	—	—	2.08 (J)	—	—	—	—	80.8
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	1.29	0.000717 (J)	—	10.8	—	—	—	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	1.23	—	—	9.82	—	—	—	—	—
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	0.687 (J)	0.000564 (J)	—	10	—	—	—	—	—
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	—	4.54	0.000603 (J)	—	8.97 (J)	9.59	—	—	—	143 (J-)
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	4.17	0.0011 (J)	—	8.84 (J)	1.48	—	—	—	52.5 (J-)
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	3.55	0.00115 (J)	—	1.85	2.96	—	—	—	60.7
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	0.854 (J)	—	—	4.56	—	—	—	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	0.726 (J)	—	—	5.79	—	—	—	—	—
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	—	0.781 (J)	—	—	4.39	—	—	—	—	—
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	—	67.5	0.000827 (J)	—	1.6 (U)	6.84	—	—	—	102
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	59.6	—	—	1.53 (U)	1.62	—	—	—	55.9
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	62.2	—	—	1.52 (U)	—	—	—	—	—
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	—	5.65	—	—	—	1.02	—	—	—	61.7 (J-)
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	1.58	—	—	—	—	—	—	—	58 (J-)

Table 6.1-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]					**6.58**	**na[c]**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**17**	**63.5**
Sediment BV[a]					**9.38**	**na**	**na**	**2690**	**0.3**	**1**	**1470**	**0.73**	**19.7**	**60.2**
Soil BV[a]					**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[b]					**6.19E+03**	**4.96E+05**	**2.17E+02**	**na**	**1.55E+03**	**1.55E+03**	**na**	**2.04E+01**	**1.55E+03**	**9.29E+04**
Industrial SSL[b]					**2.27E+04**	**1.82E+06**	**7.95E+02**	**na**	**5.68E+03**	**5.68E+03**	**na**	**7.49E+01**	**5.68E+03**	**3.41E+05**
Recreational SSL[g]					**1.58E+04**	**1.26E+06**	**5.55E+02**	**na**	**3.96E+03**	**3.96E+03**	**na**	**5.23E+01**	**3.96E+03**	**2.38E+05**
Residential SSL[b]					**1.56E+03**	**1.25E+05**	**5.48E+01**	**na**	**3.91E+02**	**3.91E+02**	**na**	**5.16E+00**	**3.91E+02**	**2.35E+04**
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	8.09	—	—	1.06 (U)	—	—	—	—	—
CAPU-10-12521	PU-611419	14–15	2/17/2010	Qbt 2	—	—	—	—	1.05 (U)	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	—	—	—	—	1.05 (U)	—	—	—	—	—
CAPU-10-12523	PU-611420	31–32	2/17/2010	Qbt 2	—	—	—	—	1.01 (U)	—	—	—	—	—
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	9.34	7.65	—	—	1.04 (U)	—	—	—	23.2	—
CAPU-10-12525	PU-611421	8–9	2/17/2010	Qbt 2	—	2.48	—	—	0.994 (U)	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	11.6	—	—	1.04 (U)	—	—	—	—	—
CAPU-10-12527	PU-611422	11–12	2/17/2010	Qbt 2	—	1.5	—	—	1.06 (U)	—	—	—	—	—
CAPU-10-12529	PU-611423	6–7	2/17/2010	Qbt 2	—	3.54	—	—	1.06 (U)	—	—	—	—	—
CAPU-10-12530	PU-611423	11–12	2/17/2010	Qbt 2	—	1.31	—	—	1.03 (U)	—	—	—	—	—
CAPU-10-12532	PU-611424	11.5–12.5	2/19/2010	Qbt 2	—	1.09	0.000854 (J)	—	1.07 (U)	—	—	—	17.5	—
CAPU-10-12533	PU-611424	14–15	2/19/2010	Qbt 2	—	—	—	—	1.03 (U)	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	1.21	—	—	1.08 (U)	—	—	—	—	64.6
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	1.2	—	—	1.07 (U)	—	—	—	—	—
CAPU-10-12538	PU-611426	2.5–3.5	2/19/2010	Qbt 2	7.33	9.71	—	—	1.1 (U)	—	—	—	18	—
CAPU-10-12539	PU-611426	6–8	2/19/2010	Qbt 2	—	1.43	—	—	1.02 (U)	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	1.65 (J-)	—	—	0.49 (J)	—	—	—	—	—
CAPU-10-12542	PU-611427	18–20	2/22/2010	Qbt 2	—	1.52 (J-)	—	—	0.982 (U)	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	2.65 (J-)	0.00155 (J)	—	1.01 (U)	—	—	—	—	—
CAPU-10-12545	PU-611428	13–15	2/22/2010	Qbt 2	—	—	0.0006 (J)	—	0.984 (U)	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	2.3 (J-)	—	—	1.04 (U)	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	2.01 (J-)	—	—	0.951 (U)	—	—	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs are from LANL (1998, 059730).

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] SSLs from LANL (2010, 108613).

[h] — = Not detected or not above BV.

[i] NA = Not analyzed.

Table 6.1-3
Organic Chemicals Detected at SWMU 00-018(a)

Sample ID	Location ID	Depth (ft)	Collection Date	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	Benzoic Acid	Bis(2-ethylhexyl)phthalate	2-Butanone
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**9.52E+05[c]**	**4.76E+03**	**1.48E+05**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**2.50E+06[d]**	**1.37E+03**	**3.69E+05**
Recreational SSL[e]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.59E+06**	**1.83E+03**	**4.46E+05**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**2.40E+05[d]**	**3.47E+02**	**3.96E+04**
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—[f]	—	—	—	0.066	—	—	—	—	—	—	—	—	—
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	NA[g]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	—	—	—	0.112	0.0891	—	—	—	—	—	—	0.088 (J)	—
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	NA	—	—	0.0041	0.0057	—	—	—	—	—	—	—	NA
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	NA	—	—	—	—	—	—	—	—	—	—	—	NA
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	—	NA	—	—	0.0055	0.0056	—	—	—	—	—	—	—	NA
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	—	—	—	0.194	0.107	—	0.13 (J)	0.23 (J)	—	—	—	0.61	—
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	—	—	—	—	—	0.0364	—	0.0419	0.0926	0.0276 (J)	—	0.45 (J)	—	—
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	—	—	—	—	0.0022 (J)	—	—	0.0131 (J)	—	—	0.459 (J)	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	0.456 (J)	—	—
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	—	—	0.0122 (J)	—	0.188	0.231	—	—	0.24 (J)	—	—	—	0.0752 (J)	—
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	—	—	0.0126 (J)	—	0.0808	0.0975	—	—	—	—	—	—	—	—
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	—	—	0.0114 (J)	—	0.0335 (J)	0.0381	—	—	—	—	—	—	—	—
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	—	—	—	—	—	0.0165 (J)	—	—	—	—	—	—	—	—
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	—	—	0.0106 (J)	—	—	0.033 (J)	—	—	—	—	—	—	—	—
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	—	—	—	—	0.0017 (J)	—	—	—	—	—	—	—	—
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	—	—	—	—	—	0.0291 (J)	—	—	—	—	—	—	0.0945 (J)	—
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	—	—	—	—	0.0333 (J)	0.0267 (J)	—	—	0.0358 (J)	—	—	—	—	—
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	—	0.00265 (J)	—	—	0.00711	0.0069	—	—	—	—	—	—	—	—
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	—	—	—	—	—	0.0295 (J)	—	—	0.0328 (J)	—	0.014 (J)	—	—	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	—	—	0.014 (J)	—	—	—	—	0.0369 (J)	—	—	—	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	—	—	—	—	—	0.0093	—	—	—	—	—	—	0.368 (J)	—
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	0.00522 (J)	—	0.0139	—	—	—	—	—	—	—	—	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	0.154	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	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	Benzoic Acid	Bis(2-ethylhexyl)phthalate	2-Butanone
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**9.52E+05[c]**	**4.76E+03**	**1.48E+05**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**2.50E+06[d]**	**1.37E+03**	**3.69E+05**
Recreational SSL[e]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.59E+06**	**1.83E+03**	**4.46E+05**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**2.40E+05[d]**	**3.47E+02**	**3.96E+04**
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	0.222	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	—	0.0031 (J)	—	—	0.0933	0.0592	—	0.0663	0.1	0.0401	—	—	—	—
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	0.0043 (J)	—	—	0.025	0.0179	—	—	—	—	—	—	—	—
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	0.0437 (J)	—	—	0.0495	0.0353	—	—	—	—	—	—	—	—
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	0.0618	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	0.0528	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	—	0.156	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	—	—	—	—	0.219	0.146	—	—	—	—	—	—	0.0796 (J)	—
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	—	—	—	0.038	0.0269	—	—	—	—	—	—	—	—
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	—	—	—	0.036	0.0253	—	—	—	—	—	—	—	—
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	—	—	—	—	0.0235	0.051	—	—	—	—	—	—	—	—
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	—	—	—	0.0096	0.0206	—	—	—	—	—	—	—	—
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	—	—	—	0.0061	0.0073	—	—	—	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	0.0422	0.0147 (J)	0.0541	—	—	—	0.0977	0.0822	0.134	0.0573	—	—	—	0.0041 (J)
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	—	0.0109 (J)	—	—	0.0069	0.0064	—	—	—	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	—	—	—	0.0108	0.0129	—	—	—	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	0.00245 (J)	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	—	—	0.0584 (J)	0.0405	0.0169	—	—	—	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	—	—	—	0.0026 (J)	—	—	—	—	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	0.00829 (J)	—	0.0316 (J)	0.0153	0.0052	—	—	—	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	—	—	—	0.0056	—	—	—	—	—	—	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Butylbenzylphthalate	alpha-Chlordane	gamma-Chlordane	4-Chloroaniline	Chloroform	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	Dibenz(a,h)anthracene	1,4-Dichlorobenzene	1,1-Dichloroethene	Dieldrin
Construction Worker SSL[a]					**4.76E+04[c]**	**1.35E+02[h]**	**1.35E+02[h]**	**1.08E+03[c]**	**6.71E+02**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**2.13E+01**	**3.78E+03**	**1.83E+03**	**1.03E+01**
Industrial SSL[a]					**9.10E+03[d]**	**7.19E+01[h]**	**7.19E+01[h]**	**8.6E+01[d]**	**3.19E+01**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.34E+00**	**1.80E+02**	**2.22E+03**	**1.20E+00**
Recreational SSL[e]					**1.35E+04**	**1.09E+02[h]**	**1.09E+02[h]**	**1.28E+02[i]**	**2.24E+02**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**3.01E+00**	**1.26E+03**	**1.38E+04**	**1.60E+00**
Residential SSL[a]					**2.60E+03[d]**	**1.62E+01[h]**	**1.62E+01[h]**	**2.4E+01[d]**	**5.72E+00**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.21E-01**	**3.22E+01**	**6.18E+02**	**3.04E-01**
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—	—	—	2	—	0.22	—	0.0075	—	—	—	—	—
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	0.00215	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	NA	—	0.000202 (J)	NA	NA	NA	—	—	—	NA	NA	NA	—
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	NA	0.000459 (J)	0.0005 (J)	NA	NA	NA	—	—	—	NA	NA	NA	—
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	0.00599	0.00354	—	—	—	—	—	—	—	—	—	—
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	0.000743	0.000684	—	NA	—	—	—	—	—	—	NA	0.000578 (J)
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	—	—	—	NA	—	—	—	—	—	—	NA	0.000399
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	0.123 (J)	—	—	—	NA	—	—	—	—	—	—	NA	—
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	0.0132	—	0.38	—	0.13 (J)	—	0.00597	—	—	—	—	0.0118
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	0.077 (J)	—	—	—	—	—	—	—	—	—
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	—	0.02 (J)	0.0148 (J)	—	—	0.0459	0.00922 (J)	—	—	—	—	0.00095 (J)	0.0245 (J)
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	0.000642 (J)	0.000502 (J)	—	—	—	—	—	—	—	—	—	0.000526 (J)
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	—	—	—	—	0.000231 (J)	0.0876 (J)	—	—	—	—	—	0.00139	—
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	—	—	—	—	—	0.0779 (J)	—	—	—	—	—	0.000843 (J)	—
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	—	—	—	—	—	0.026 (J)	—	—	—	—	—	—	—
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	—	—	—	—	—	0.0588	—	—	—	—	—	—	—
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	—	0.00307 (J)	0.00263 (J)	—	—	—	—	—	0.00389 (J)	—	—	—	—
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	—	0.00475 (J)	0.00473 (J)	—	—	—	—	—	—	—	—	0.000292 (J)	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	—	0.00686 (J)	0.00692 (J)	—	—	—	—	—	—	—	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	—	0.0159 (J)	0.0118 (J)	—	—	—	—	—	—	—	—	—	—
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	0.00144 (J)	0.0011 (J)	—	—	—	—	—	—	—	—	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	—	0.00484 (J)	0.00557 (J)	—	—	0.0635	0.00545 (J)	0.00175 (J)	0.00599 (J)	—	—	—	0.00155

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Butylbenzylphthalate	alpha-Chlordane	gamma-Chlordane	4-Chloroaniline	Chloroform	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	Dibenz(a,h)anthracene	1,4-Dichlorobenzene	1,1-Dichloroethene	Dieldrin
Construction Worker SSL[a]					**4.76E+04**[c]	**1.35E+02**[h]	**1.35E+02**[h]	**1.08E+03**[c]	**6.71E+02**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**2.13E+01**	**3.78E+03**	**1.83E+03**	**1.03E+01**
Industrial SSL[a]					**9.10E+03**[d]	**7.19E+01**[h]	**7.19E+01**[h]	**8.6E+01**[d]	**3.19E+01**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.34E+00**	**1.80E+02**	**2.22E+03**	**1.20E+00**
Recreational SSL[e]					**1.35E+04**	**1.09E+02**[h]	**1.09E+02**[h]	**1.28E+02**[i]	**2.24E+02**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**3.01E+00**	**1.26E+03**	**1.38E+04**	**1.60E+00**
Residential SSL[a]					**2.60E+03**[d]	**1.62E+01**[h]	**1.62E+01**[h]	**2.4E+01**[d]	**5.72E+00**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.21E-01**	**3.22E+01**	**6.18E+02**	**3.04E-01**
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	0.00189 (J)	0.0022 (J)	—	—	—	—	0.00104 (J)	0.00417 (J)	—	—	—	0.000644 (J)
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	0.00382 (J)	0.00269 (J)	—	—	—	—	0.00262	0.00354 (J)	—	—	—	0.00126 (J)
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	0.0016	—
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	0.000266 (J)	—	—
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	—	0.000889 (J)	0.00151 (J)	—	—	0.0167 (J)	0.00163 (J)	—	0.00189 (J)	—	—	0.000425 (J)	0.00183 (J)
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	—	—	—	—	—	0.093	—	—	—	0.0176 (J)	—	—	—
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Di-n-octylphthalate	Endosulfan Sulfate	Endrin	Endrin Aldehyde	Ethylbenzene	Fluoranthene	Fluorene	Heptachlor Epoxide	Indeno(1,2,3-cd)pyrene	4-Isopropyltoluene	Methylene Chloride	Naphthalene	Phenanthrene
Construction Worker SSL[a]					**2.38E+04**[j]	**7.15E+01**[k]	**7.15E+01**	**7.15E+01**[k]	**6.63E+03**	**8.91E+03**	**8.91E+03**	**3.10E+00**[c]	**2.13E+02**	**1.03E+04**[l]	**1.06E+04**	**7.02E+02**	**7.15E+03**
Industrial SSL[a]					**6.84E+04**[j]	**2.05E+02**[k]	**2.05E+02**	**2.05E+02**[k]	**3.85E+02**	**2.44E+04**	**2.44E+04**	**1.90E+00**[d]	**2.34E+01**	**1.49E+04**[l]	**1.09E+03**	**2.52E+02**	**2.05E+04**
Recreational SSL[e]					**7.97E+03**	**1.20E+02**[k]	**1.20E+02**	**1.20E+02**[k]	**2.06E+03**	**1.39E+04**	**1.39E+04**	**2.81E+00**	**3.01E+01**	**5.27E+04**[l]	**4.52E+03**	**1.95E+03**	**1.20E+04**
Residential SSL[a]					**6.11E+03**[j]	**1.83E+01**[k]	**1.83E+01**	**1.83E+01**[k]	**6.97E+01**	**2.29E+03**	**2.29E+03**	**5.30E-01**[d]	**6.21E+00**	**3.21E+03**[l]	**1.99E+02**	**4.50E+01**	**1.83E+03**
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	NA	—	—	—	NA	NA	NA	0.000178 (J)	NA	NA	NA	NA	NA
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	NA	—	—	—	NA	NA	NA	—	NA	NA	NA	NA	NA
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	—	—	—	NA	0.207 (J)	—	—	—	NA	NA	—	—
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	—	—	—	NA	—	—	—	—	NA	NA	—	—
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	—	—	—	—	NA	0.209 (J)	—	—	—	NA	NA	—	—
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	—	0.00712	—	0.0078	—	0.094 (J)	—	—	0.098 (J)	—	—	—	—
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	—	—	—	—	0.00106 (J)	0.0575	—	—	—	—	—	—	0.0194 (J)
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	—	—	—	—	0.00021 (J)	0.107	—	—	—	—	0.0044 (J)	—	0.0297 (J)
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	—	—	—	—	—	0.0705	—	—	—	—	0.00321 (J)	—	—
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	—	—	—	—	—	0.0531 (J)	—	—	—	—	—	—	0.0201 (J)
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	—	—	—	—	0.000299 (J)	0.0454 (J)	—	—	—	—	—	—	0.0138 (J)
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	—	—	—	—	—	0.108 (J)	—	—	—	—	—	—	0.049 (J)
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	—	—	—	—	—	0.0236 (J)	—	—	—	—	—	—	—
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	—	—	—	—	—	0.0327 (J)	—	—	—	—	—	—	—
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	—	—	—	—	0.000229 (J)	0.0139 (J)	—	—	—	—	—	—	—
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	—	—	—	—	—	0.0361 (J)	—	—	—	—	0.00273 (J)	—	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	—	—	—	—	—	0.0554	—	—	—	—	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	2.7	—	—	—	—	0.0352 (J)	—	—	—	—	0.00488 (J)	—	—
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	—	—	—	—	0.0127 (J)	—	—	—	—	0.00338 (J)	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	—	—	—	0.000252 (J)	—	—	—	—	—	0.00349 (J)	—	—
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	—	—	—	0.000356 (J)	—	—	—	—	—	0.00389 (J)	—	—
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	—	—	—	—	0.000258 (J)	0.0709	—	0.00171	0.061	0.000729 (J)	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Di-n-octylphthalate	Endosulfan Sulfate	Endrin	Endrin Aldehyde	Ethylbenzene	Fluoranthene	Fluorene	Heptachlor Epoxide	Indeno(1,2,3-cd)pyrene	4-Isopropyltoluene	Methylene Chloride	Naphthalene	Phenanthrene
Construction Worker SSL[a]					**2.38E+04**[j]	**7.15E+01**[k]	**7.15E+01**	**7.15E+01**[k]	**6.63E+03**	**8.91E+03**	**8.91E+03**	**3.10E+00**[c]	**2.13E+02**	**1.03E+04**[l]	**1.06E+04**	**7.02E+02**	**7.15E+03**
Industrial SSL[a]					**6.84E+04**[j]	**2.05E+02**[k]	**2.05E+02**	**2.05E+02**[k]	**3.85E+02**	**2.44E+04**	**2.44E+04**	**1.90E+00**[d]	**2.34E+01**	**1.49E+04**[l]	**1.09E+03**	**2.52E+02**	**2.05E+04**
Recreational SSL[e]					**7.97E+03**	**1.20E+02**[k]	**1.20E+02**	**1.20E+02**[k]	**2.06E+03**	**1.39E+04**	**1.39E+04**	**2.81E+00**	**3.01E+01**	**5.27E+04**[l]	**4.52E+03**	**1.95E+03**	**1.20E+04**
Residential SSL[a]					**6.11E+03**[j]	**1.83E+01**[k]	**1.83E+01**	**1.83E+01**[k]	**6.97E+01**	**2.29E+03**	**2.29E+03**	**5.30E-01**[d]	**6.21E+00**	**3.21E+03**[l]	**1.99E+02**	**4.50E+01**	**1.83E+03**
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	—	—	—	—	—	—	0.000844	—	0.00225	—	—	—
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	—	0.000568 (J)	—	—	—	—	0.00197 (J)	—	0.00874	—	—	—
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	—	—	—	—	—	—	—	—	—	0.00433 (J)	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	—	—	—	—	0.0197 (J)	—	—	—	—	0.00382 (J)	—	0.0137 (J)
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	—	—	—	—	—	0.0247 (J)	—	—	—	—	0.00316 (J)	—	0.0207 (J)
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	—	—	—	—	—	0.0148 (J)	—	—	—	—	—	—	—
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	—	—	—	—	—	0.0107 (J)	—	—	—	—	0.00273 (J)	—	—
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	—	—	—	—	—	0.23	0.032 (J)	—	0.0496	—	—	0.0305 (J)	0.176
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	—	—	—	—	0.0113 (J)	—	—	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Pyrene	Styrene	Tetrachloroethene	Toluene	1,2,4-Trimethylbenzene	1,2-Xylene	1,3-Xylene-1,4-Xylene
Construction Worker SSL[a]					**6.68E+03**	**3.03E+04**	**3.38E+02**	**2.11E+04**	**6.88E+02[c]**	**2.75E+04**	**3.13E+03[m]**
Industrial SSL[a]					**1.83E+04**	**5.12E+04**	**3.64E+01**	**5.79E+04**	**2.60E+02[d]**	**3.15E+04**	**3.61E+03[m]**
Recreational SSL[e]					**1.04E+04**	**1.26E+05**	**9.17E+01**	**6.08E+04**	**6.88E+03**	**2.48E+05**	**2.78E+04[m]**
Residential SSL[a]					**1.72E+03**	**8.97E+03**	**6.99E+00**	**5.57E+03**	**6.20E+01[d]**	**9.55E+03**	**1.09E+03[m]**
0100-96-0501	00-04971	0–1.8	9/11/1996	Fill	—	—	—	—	—	NA	NA
0100-96-0508	00-04976	0–0.5	9/16/1996	Sludge	—	—	—	—	—	NA	NA
RE00-06-67385	00-04976	1–1.5	7/19/2006	Qbt 2	NA	NA	NA	NA	NA	NA	NA
RE00-06-67386	00-04976	4–4.5	7/19/2006	Qbt 2	NA	NA	NA	NA	NA	NA	NA
0100-96-0509	00-04977	0–0.5	9/16/1996	Sludge	—	—	—	—	—	NA	NA
RE00-06-67390	00-04977	1–1.5	7/19/2006	Qbt 2	—	NA	NA	NA	NA	NA	NA
RE00-06-67391	00-04977	4–4.5	7/19/2006	Qbt 2	—	NA	NA	NA	NA	NA	NA
RE00-06-67392	00-04977	9–9.5	7/19/2006	Qbt 2	0.0141 (J)	NA	NA	NA	NA	NA	NA
0100-96-0513	00-04980	0–1	9/17/1996	Sludge	0.13 (J)	—	—	—	—	NA	NA
0100-96-0514	00-04980	1–1.5	9/17/1996	Sludge	—	—	—	—	—	NA	NA
RE00-06-67408	00-25523	0–0.5	7/26/2006	Fill	0.0564	0.000484 (J)	0.000385 (J)	0.0133	—	0.00121	0.00286
RE00-06-67409	00-25523	1–1.5	7/26/2006	Fill	—	—	—	—	—	—	—
RE00-06-67410	00-25523	3–3.5	7/26/2006	Qbt 2	—	—	—	0.000959 (J)	—	—	—
RE00-06-67413	00-25524	0–0.5	7/27/2006	Fill	0.157 (J)	—	—	0.00318	—	0.000208 (J)	0.0006 (J)
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	0.155 (J)	—	—	0.000886 (J)	—	—	0.000327 (J)
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	0.0587	—	—	0.000628 (J)	—	—	—
RE00-06-67418	00-25525	0–0.5	7/31/2006	Sediment	0.0513	—	—	0.000677 (J)	—	0.000419 (J)	0.000911 (J)
RE00-06-67419	00-25525	1–1.5	7/31/2006	Sediment	0.124	—	—	—	—	—	—
RE00-06-67420	00-25525	2–2.5	7/31/2006	Qbt 3	—	—	—	—	0.000245 (J)	0.00022 (J)	0.000504 (J)
RE00-06-67423	00-25526	0–0.5	8/2/2006	Sediment	0.0293 (J)	—	—	—	—	—	—
RE00-06-67424	00-25526	1–1.5	8/2/2006	Sediment	0.0284 (J)	—	—	—	—	—	—
RE00-06-67425	00-25526	4.5–5	8/2/2006	Qbt 3	0.0165 (J)	—	—	0.000537 (J)	—	0.00026 (J)	0.0006 (J)
RE00-06-67428	00-25527	0–0.5	8/3/2006	Sediment	0.037 (J)	—	—	—	—	—	—
RE00-06-67429	00-25527	1–1.5	8/3/2006	Sediment	0.0696	—	—	—	—	—	—
RE00-06-67430	00-25527	3–3.5	8/3/2006	Sediment	—	—	—	—	—	—	—
RE00-06-67433	00-25528	0–0.5	8/8/2006	Soil	—	—	—	—	—	—	—
RE00-06-67434	00-25528	1–1.5	8/8/2006	Soil	—	—	—	0.000656 (J)	—	0.000253 (J)	0.000651 (J)
RE00-06-67435	00-25528	4.5–5	8/8/2006	Soil	—	—	—	0.000804 (J)	—	—	0.000437 (J)
RE00-06-67438	00-25529	0–0.5	8/2/2006	Soil	0.0588	—	—	0.000775 (J)	—	0.000229 (J)	0.000695 (J)
RE00-06-67439	00-25529	1–1.5	8/2/2006	Soil	—	—	—	—	—	—	—

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Pyrene	Styrene	Tetrachloroethene	Toluene	1,2,4-Trimethylbenzene	1,2-Xylene	1,3-Xylene-1,4-Xylene
Construction Worker SSL[a]					**6.68E+03**	**3.03E+04**	**3.38E+02**	**2.11E+04**	**6.88E+02**[c]	**2.75E+04**	**3.13E+03**[m]
Industrial SSL[a]					**1.83E+04**	**5.12E+04**	**3.64E+01**	**5.79E+04**	**2.60E+02**[d]	**3.15E+04**	**3.61E+03**[m]
Recreational SSL[e]					**1.04E+04**	**1.26E+05**	**9.17E+01**	**6.08E+04**	**6.88E+03**	**2.48E+05**	**2.78E+04**[m]
Residential SSL[a]					**1.72E+03**	**8.97E+03**	**6.99E+00**	**5.57E+03**	**6.20E+01**[d]	**9.55E+03**	**1.09E+03**[m]
RE00-06-67440	00-25529	4.5–5	8/3/2006	Soil	—	—	—	—	—	—	—
RE00-06-67443	00-25530	0–0.5	8/7/2006	Sediment	—	—	—	—	—	—	—
RE00-06-67444	00-25530	1–1.5	8/7/2006	Sediment	—	—	—	—	—	—	—
RE00-06-67445	00-25530	3.5–4	8/7/2006	Sediment	0.0197 (J)	—	—	—	—	—	—
RE00-06-67448	00-25531	0–0.5	8/4/2006	Soil	0.0208 (J)	—	—	0.00049 (J)	—	—	—
RE00-06-67449	00-25531	1–1.5	8/4/2006	Soil	—	0.00025 (J)	—	0.00304	—	—	—
RE00-06-67450	00-25531	4.5–5	8/4/2006	Qbt 2	—	—	—	0.00861	—	—	—
RE00-06-67453	00-25532	0–0.5	7/27/2006	Fill	0.0137 (J)	—	—	0.00115	—	—	—
RE00-06-67454	00-25532	4–4.5	7/27/2006	Fill	—	—	—	—	—	—	—
CAPU-10-12520	PU-611419	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12522	PU-611420	28–29	2/17/2010	Qbt 2	0.158	—	—	—	—	—	—
CAPU-10-12524	PU-611421	5–6	2/17/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12526	PU-611422	6–7	2/17/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12535	PU-611425	15.5–16.5	2/19/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12536	PU-611425	19–20	2/19/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12541	PU-611427	14.5–15.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12544	PU-611428	1.5–2.5	2/22/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12547	PU-611429	7–9	2/23/2010	Qbt 2	—	—	—	—	—	—	—
CAPU-10-12548	PU-611429	13–15	2/23/2010	Qbt 2	—	—	—	—	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] SSLs from LANL (2010, 108613).

[f] — = Not detected or not above BV.

[g] NA = Not analyzed.

[h] Chlordane used as surrogate based on structural similarity.

[i] Calculated using toxicity values from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and parameters and equation from LANL (2010, 108613).

[j] Di-n-butylphthalate used as surrogate based on structural similarity.

[k] Endrin used as surrogate based on structural similarity.

[l] Isopropylbenzene used as surrogate based on structural similarity.

[m] Xylenes used as surrogate based on structural similarity.

Table 6.1-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 00-018(a)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Cesium-137	Tritium
Qbt2, 3, 4 BV[a]					**na**[b]	**na**
Soil BV[a]					**1.65**	**na**
Construction Worker SAL[c]					**1.80E+01**	**3.20E+05**
Industrial SAL[c]					**2.30E+01**	**4.40E+05**
Recreational SAL[c]					**2.10E+02**	**5.30E+06**
Residential SAL[c]					**5.60E+00**	**7.50E+02**
0100-96-0523	00-04971	5.5–6.5	10/25/1996	Qbt 3	—[d]	0.36
RE00-06-67376	00-04971	8–8.5	7/20/2006	Fill	NA[e]	4.51937
0100-96-0593	00-04972	0.25–1.2	9/12/1996	Fill	—	NA
0100-96-0524	00-04972	6–7	10/25/1996	Qbt 3	—	—
0100-96-0525	00-04972	10–11	10/25/1996	Qbt 3	—	—
0100-96-0588	00-04975	0–0.5	9/16/1996	Sludge	—	NA
0100-96-0589	00-04976	0–0.5	9/16/1996	Sludge	—	NA
0100-96-0590	00-04977	0–0.5	9/16/1996	Sludge	—	NA
0100-96-0591	00-04978	1–2	9/16/1996	Sludge	—	NA
0100-96-0592	00-04979	0–0.5	9/17/1996	Sludge	0.102	NA
0100-96-0530	00-04980	0–0.5	9/17/1996	Sludge	0.145	NA
RE00-06-67414	00-25524	1–1.5	7/27/2006	Fill	0.117	NA
RE00-06-67415	00-25524	1.5–2	7/31/2006	Fill	0.151	NA

Note: All activities are in pCi/g.

[a] BVs are from LANL (1998, 059730).

[b] na = Not available.

[c] SALs are from LANL (2009, 107655).

[d] — = Analyzed for but not detected or not detected above BVs/FVs.

[e] NA = Not analyzed.

Table 6.2-1
Summary of Samples Collected and Analyses Requested for AOC 00-030(eS)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	TAL Metals	PCBs	Perchlorate	Pesticides/Herbicides	SVOCs	VOCs	Cyanide
RE00–06–67062	00–03741	0.0–0.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67063	00–03741	1.0–1.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67064	00–03741	1.5–2.0	8/14/2006	Qbt 3	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67067	00–25484	4.0–4.5	7/21/2006	Fill	5602S	5603S	5602S	5601S	5602S	5601S	5601S	5601S	5602S
RE00–06–67068	00–25484	8.0–8.5	7/21/2006	Fill	5602S	5603S	5602S	5601S	5602S	5601S	5601S	5601S	5602S
RE00–06–67069	00–25484	12.0–13.0	7/21/2006	Fill	5602S	5603S	5602S	5601S	5602S	5601S	5601S	5601S	5602S
RE00–06–67072	00–25485	0.0–0.5	8/14/2006	Fill	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67073	00–25485	1.0–1.5	8/14/2006	Qbt 3	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67074	00–25485	1.5–2.0	8/14/2006	Qbt 3	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67077	00–25486	0.0–0.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67078	00–25486	1.0–1.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67079	00–25486	1.5–2.0	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
CAPU–10–12562	00–25486	6.0–7.0	3/1/2010	Qbt 3	—*	—	10–2253	—	—	—	—	—	—
CAPU–10–12563	00–25486	9.0–10.0	3/1/2010	Qbt 3	—	—	10–2253	—	—	—	—	—	—
RE00–06–67082	00–25487	0.0–0.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67083	00–25487	1.0–1.5	8/14/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67084	00–25487	1.5–2.0	8/14/2006	Qbt 3	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67087	00–25488	0.0–0.5	8/15/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S
RE00–06–67088	00–25488	1.0–1.5	8/15/2006	Soil	5803S	5804S	5803S	5802S	5803S	5802S	5802S	5802S	5803S

* — = No sample collected.

Table 6.2-2
Inorganic Chemicals above BVs at AOC 00-030(eS)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide (Total)	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**14,500**	**11.2**	**1690**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**21,500**	**22.3**	**4610**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**	**na**
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**1.12E+03**	**na**	**2.92E+03**[d]	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**	**na**
Recreational SSL[e]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**7.84E+02**	**na**	**1.91E+03**[d]	**3.17E+04**	**1.58E+04**	**5.54E+05**	**5.60E+02**	**na**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**7.79E+01**	**na**	**2.19E+02**[d]	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**	**na**
RE00-06-67062	00-03741	0–0.5	8/14/2006	Soil	—[f]	—	—	—	—	6710	—	—	—	—	37.1	—
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	—	—	—	—	0.432 (J)	—	—	16.5	—	—	220	—
RE00-06-67064	00-03741	1.5 –2	8/14/2006	Qbt 3	—	—	—	—	—	—	7.93	—	—	—	18.6	—
RE00-06-67067	00-25484	4–4.5	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67068	00-25484	8–8.5	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67069	00-25484	12–13	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67072	00-25485	0–0.5	8/14/2006	Soil	—	—	—	—	—	—	—	—	—	—	28.7	—
RE00-06-67073	00-25485	1–1.5	8/14/2006	Qbt 3	7940	—	3.24	86.8 (J-)	—	10,500	15.1	—	—	—	—	1940
RE00-06-67074	00-25485	1.5–2	8/14/2006	Qbt 3	—	—	—	—	—	—	22.6	—	—	—	—	—
RE00-06-67077	00-25486	0–0.5	8/14/2006	Soil	—	—	—	—	0.56 (U)	—	—	—	—	—	—	—
RE00-06-67078	00-25486	1–1.5	8/14/2006	Soil	—	—	—	—	0.58 (J)	—	—	41.9	—	37,300	303	—
RE00-06-67079	00-25486	1.5–2	8/14/2006	Soil	—	—	—	—	1.24 (J)	6470	—	123	0.566	68,100	325	—
CAPU-10-12562	00-25486	6–7	3/1/2010	Qbt 3	—	1.1 (UJ)	—	—	—	—	17.5 (J)	—	NA[g]	—	—	—
CAPU-10-12563	00-25486	9–10	3/1/2010	Qbt 3	—	0.977 (UJ)	—	—	—	—	20.9 (J)	—	NA	—	—	—
RE00-06-67082	00-25487	0–0.5	8/14/2006	Soil	—	—	—	—	—	—	—	—	—	—	34.8	—
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	—	—	—	—	—	—	—	—	—	—	45.4	—
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	—	—	—	—	—	—	—	5.9	—	—	41.5	—
RE00-06-67087	00-25488	0–0.5	8/15/2006	Soil	—	—	—	—	0.53 (U)	—	—	—	—	—	—	—
RE00-06-67088	00-25488	1–1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sodium	Zinc
Qbt 2, 3, 4 BV[a]					**0.1**	**6.58**	**na**[c]	**na**	**0.3**	**1**	**2770**	**63.5**
Soil BV[a]					**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**915**	**48.8**
Construction Worker SSL[b]					**9.29E+01**[h]	**6.19E+03**	**4.96E+05**	**2.17E+02**	**1.55E+03**	**1.55E+03**	**na**	**9.29E+04**
Industrial SSL[b]					**3.10E+02**[i]	**2.27E+04**	**1.82E+06**	**7.95E+02**	**5.68E+03**	**5.68E+03**	**na**	**3.41E+05**
Recreational SSL[e]					**2.38E+02**[i]	**1.58E+04**	**1.26E+06**	**5.55E+02**	**3.96E+03**	**3.96E+03**	**na**	**2.38E+05**
Residential SSL[b]					**2.30E+01**[i]	**1.56E+03**	**1.25E+05**	**5.48E+01**	**3.91E+02**	**3.91E+02**	**na**	**2.35E+04**
RE00-06-67062	00-03741	0–0.5	8/14/2006	Soil	—	—	—	0.000959 (J)	1.65 (U)	—	—	65
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	—	—	—	0.000763 (J)	1.79 (U)	—	—	139
RE00-06-67064	00-03741	1.5–2	8/14/2006	Qbt 3	—	—	—	0.000651 (J)	1.71 (U)	—	—	—
RE00-06-67067	00-25484	4–4.5	7/21/2006	Fill	—	—	2.05	—	1.6 (U)	—	—	—
RE00-06-67068	00-25484	8–8.5	7/21/2006	Fill	—	—	—	—	1.59 (U)	—	—	—
RE00-06-67069	00-25484	12–13	7/21/2006	Fill	—	—	—	0.0008 (J)	1.64 (U)	—	—	—
RE00-06-67072	00-25485	0–0.5	8/14/2006	Soil	—	—	1.16	0.00112 (J)	1.58 (U)	—	—	62.1
RE00-06-67073	00-25485	1–1.5	8/14/2006	Qbt 3	—	—	—	0.0016 (J)	1.57 (U)	—	—	—
RE00-06-67074	00-25485	1.5–2	8/14/2006	Qbt 3	—	—	—	0.00121 (J)	1.57 (U)	—	—	—
RE00-06-67077	00-25486	0–0.5	8/14/2006	Soil	—	—	—	0.0013 (J)	1.68 (U)	—	—	—
RE00-06-67078	00-25486	1–1.5	8/14/2006	Soil	—	83.6	1.23	0.00226 (J)	8.62 (U)	1.51	—	187
RE00-06-67079	00-25486	1.5–2	8/14/2006	Soil	0.337	—	1.2	0.00261	8.5 (U)	1.45	1180	463
CAPU-10-12562	00-25486	6–7	3/1/2010	Qbt 3	—	—	NA	NA	1.04 (U)	—	—	—
CAPU-10-12563	00-25486	9–10	3/1/2010	Qbt 3	—	—	NA	NA	1.04 (U)	—	—	—
RE00-06-67082	00-25487	0–0.5	8/14/2006	Soil	—	—	1.41	—	1.59 (U)	—	—	57.7
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	—	—	—	—	1.7 (U)	—	—	—
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	—	—	—	—	1.71 (U)	—	—	—
RE00-06-67087	00-25488	0–0.5	8/15/2006	Soil	—	—	1.02 (J)	—	1.59 (U)	—	—	—
RE00-06-67088	00-25488	1–1.5	8/15/2006	Soil	—	—	0.941 (J)	—	1.61 (U)	—	—	98.7

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs are from LANL (1998, 059730).

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] SSLs from LANL (2010,108613).

[f] — = Not detected or not above BV.

[g] NA = Not analyzed.

[h] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[i] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table 6.2-3
Organic Chemicals Detected at AOC 00-030(eS)

Sample ID	Location ID	Depth (ft)	Collection Date	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	alpha-Chlordane	gamma-Chlordane
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**4.76E+03**	**1.35E+02[c]**	**1.35E+02[c]**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**1.37E+03**	**7.19E+01[c]**	**7.19E+01[c]**
Recreational SSL[d]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.83E+03**	**1.09E+02[c]**	**1.09E+02[c]**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**3.47E+02**	**1.62E+01[c]**	**1.62E+01[c]**
RE00-06-67062	00-03741	0–0.5	8/14/2006	Soil	—[e]	—	0.188	0.0134 (J-)	0.0046 (J-)	—	0.306	0.476	0.2	0.165	—	—	—
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	—	0.0348 (J+)	—	0.0353 (J-)	0.0115 (J-)	—	0.159 (J)	0.327	0.13 (J)	—	—	0.00536 (J)	0.00498 (J)
RE00-06-67064	00-03741	1.5–2	8/14/2006	Qbt 3	—	0.0264	—	0.0147	0.0042	—	—	0.0204 (J)	—	—	—	—	—
RE00-06-67067	00-25484	4–4.5	7/21/2006	Fill	0.0633	0.064 (J+)	0.179	—	—	0.601	0.593 (J)	1.01 (J)	0.422 (J)	—	—	—	—
RE00-06-67068	00-25484	8–8.5	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67069	00-25484	12–13	7/21/2006	Fill	—	0.0136 (J+)	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67072	00-25485	0–0.5	8/14/2006	Soil	—	—	—	0.0136	0.0044	—	—	—	—	—	—	—	—
RE00-06-67073	00-25485	1–1.5	8/14/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67077	00-25486	0–0.5	8/14/2006	Soil	—	—	0.0216 (J)	—	—	—	—	—	—	—	0.119 (J)	—	—
RE00-06-67078	00-25486	1–1.5	8/14/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67079	00-25486	1.5–2	8/14/2006	Soil	—	—	—	—	0.0343 (J+)	—	—	—	—	—	—	—	—
RE00-06-67082	00-25487	0–0.5	8/14/2006	Soil	—	—	—	—	0.0041 (J-)	—	—	—	—	—	—	—	—
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	—	—	0.0206 (J)	—	—	—	—	0.0446 (J)	—	—	—	—	—
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	—	—	0.00813 (J)	—	0.0036 (J)	—	0.0223 (J)	0.0283 (J)	—	0.0167 (J)	—	0.00251 (J)	0.00215 (J)
RE00-06-67087	00-25488	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67088	00-25488	1–1.5	8/15/2006	Soil	0.0235 (J)	—	0.0595	—	—	0.142	0.147 (J)	0.255 (J)	0.0608 (J)	—	—	—	—

Table 6.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Chloroform	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	1,1-Dichloroethene	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	4-Isopropyltoluene	4-Methyl-2-pentanone
Construction Worker SSL[a]					**6.71E+02**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**1.83E+03**	**6.63E+03**	**8.91E+03**	**8.91E+03**	**2.13E+02**	**1.03E+04**	**1.03E+04**[f]	**2.31E+04**
Industrial SSL[a]					**3.19E+01**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.22E+03**	**3.85E+02**	**2.44E+04**	**2.44E+04**	**2.34E+01**	**1.49E+04**	**1.49E+04**[f]	**7.33E+04**
Recreational SSL[d]					**2.24E+02**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**1.38E+04**	**2.06E+03**	**1.39E+04**	**1.39E+04**	**3.01E+01**	**5.27E+04**	**5.27E+04**[f]	**6.23E+04**
Residential SSL[a]					**5.72E+00**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.18E+02**	**6.97E+01**	**2.29E+03**	**2.29E+03**	**6.21E+00**	**3.21E+03**	**3.21E+03**[f]	**5.95E+03**
RE00-06-67062	00-03741	0–0.5	8/14/2006	Soil	—	0.319	—	—	—	—	—	0.511	—	0.296	—	0.000302 (J)	—
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	0.000297 (J+)	0.172	—	—	0.0175 (J)	—	0.000558 (J+)	0.24	—	0.223	—	0.0224 (J)	—
RE00-06-67064	00-03741	1.5–2	8/14/2006	Qbt 3	—	—	—	—	—	—	—	0.0174 (J)	—	—	—	0.00876	—
RE00-06-67067	00-25484	4–4.5	7/21/2006	Fill	—	0.636	—	—	—	0.000896 (J)	—	1.07 (J)	0.0719	0.345 (J)	0.00603	—	0.00228 (J)
RE00-06-67068	00-25484	8–8.5	7/21/2006	Fill	—	—	—	0.0089 (J)	0.00892 (J)	—	—	0.215 (J)	—	—	—	—	—
RE00-06-67069	00-25484	12–13	7/21/2006	Fill	—	—	—	—	—	—	—	—	—	—	0.000227 (J)	—	—
RE00-06-67072	00-25485	0–0.5	8/14/2006	Soil	—	—	0.00102 (J)	0.00136 (J)	0.00204	—	—	—	—	—	—	0.000637 (J)	—
RE00-06-67073	00-25485	1–1.5	8/14/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67077	00-25486	0–0.5	8/14/2006	Soil	—	—	—	—	—	—	—	0.0294 (J)	—	—	—	—	—
RE00-06-67078	00-25486	1–1.5	8/14/2006	Soil	0.000242 (J)	—	—	0.00139 (J)	0.00339	—	—	0.0127 (J)	—	—	—	—	—
RE00-06-67079	00-25486	1.5–2	8/14/2006	Soil	0.000604 (J)	—	—	0.0057 (J)	0.00881 (J)	0.000804 (J)	—	—	—	—	—	—	—
RE00-06-67082	00-25487	0–0.5	8/14/2006	Soil	—	—	—	0.00771 (J)	0.0161 (J)	—	0.000381 (J)	0.172	—	—	—	—	—
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	—	0.0213 (J)	—	0.0091 (J)	0.0294	—	—	0.0327 (J)	—	—	—	—	—
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	—	—	—	0.00684 (J)	0.00897 (J)	—	—	0.0458	—	—	—	—	—
RE00-06-67087	00-25488	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	0.0111 (J)	—	—	—	—	—
RE00-06-67088	00-25488	1–1.5	8/15/2006	Soil	—	0.137	—	—	0.00893 (J)	—	—	0.349	0.0264 (J)	0.0913 (J)	—	—	—

Table 6.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Methylene Chloride	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Tetrachloroethene	Toluene	1,2-Xylene	1,3-Xylene-1,4-Xylene
Construction Worker SSL[a]					**1.06E+04**	**1.24E+03[g]**	**7.02E+02**	**7.15E+03**	**6.68E+03**	**3.38E+02**	**2.11E+04**	**2.75E+04**	**3.13E+03[i]**
Industrial SSL[a]					**1.09E+03**	**4.10E+03[h]**	**2.52E+02**	**2.05E+04**	**1.83E+04**	**3.64E+01**	**5.79E+04**	**3.15E+04**	**3.61E+03[i]**
Recreational SSL[d]					**4.52E+03**	**3.17E+03[h]**	**1.95E+03**	**1.20E+04**	**1.04E+04**	**9.17E+01**	**6.08E+04**	**2.48E+05**	**2.78E+04[i]**
Residential SSL[a]					**1.99E+02**	**3.10E+02[h]**	**4.50E+01**	**1.83E+03**	**1.72E+03**	**6.99E+00**	**5.57E+03**	**9.55E+03**	**1.09E+03[i]**
RE00-06-67062	00-03741	0–0.5	8/14/2006	Soil	—	—	—	—	0.438	—	—	—	—
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	—	—	—	—	0.217	—	0.00164 (J+)	0.000536 (J+)	0.00163 (J+)
RE00-06-67064	00-03741	1.5–2	8/14/2006	Qbt 3	—	—	—	—	—	—	0.00047 (J)	—	—
RE00-06-67067	00-25484	4–4.5	7/21/2006	Fill	0.0154	0.0417	0.107	1.14	2.01	—	0.00257	—	—
RE00-06-67068	00-25484	8–8.5	7/21/2006	Fill	—	0.0083 (J)	—	0.0303 (J)	0.0249 (J)	—	—	—	—
RE00-06-67069	00-25484	12–13	7/21/2006	Fill	—	—	—	—	—	—	—	—	—
RE00-06-67072	00-25485	0–0.5	8/14/2006	Soil	—	—	—	—	—	—	0.000465 (J)	—	—
RE00-06-67073	00-25485	1–1.5	8/14/2006	Qbt 3	—	—	—	—	—	—	—	—	0.000328 (J)
RE00-06-67077	00-25486	0–0.5	8/14/2006	Soil	—	—	—	—	0.0271 (J)	—	0.00162	—	—
RE00-06-67078	00-25486	1–1.5	8/14/2006	Soil	—	—	—	—	—	—	—	—	—
RE00-06-67079	00-25486	1.5–2	8/14/2006	Soil	0.0113	—	—	—	—	—	0.00162	—	—
RE00-06-67082	00-25487	0–0.5	8/14/2006	Soil	—	—	—	—	0.131 (J)	0.000202 (J)	0.000451 (J)	0.000392 (J)	0.00111 (J)
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	—	—	—	—	0.0378	—	—	—	—
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	—	—	—	—	0.0321 (J)	—	—	—	0.000264 (J)
RE00-06-67087	00-25488	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—
RE00-06-67088	00-25488	1–1.5	8/15/2006	Soil	—	—	0.0231 (J)	0.0904 (J)	0.304	—	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] Chlordane SSL used as surrogate based on structural similarity.

[d] SSLs from LANL (2010,108613).

[e] — = Not detected or not above BV.

[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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[i] Xylenes used as a surrogate based on structural similarity.

Table 6.2.4
Radionuclides Detected or Detected above BVs/FVs at AOC 00-030(eS)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Cesium-137
Qbt2, 3, 4 BV[a]					**na[b]**
Soil BV[a]					**1.65**
Construction Worker SAL[c]					**1.8E+01**
Industrial SAL[c]					**2.3E+01**
Recreational SAL[c]					**2.1E+02**
Residential SAL[c]					**5.6E+00**
RE00-06-67063	00-03741	1–1.5	8/14/2006	Soil	0.389
RE00-06-67083	00-25487	1–1.5	8/14/2006	Soil	0.293
RE00-06-67084	00-25487	1.5–2	8/14/2006	Qbt 3	0.0736

Note: All activities are in pCi/g.

[a] BVs are from LANL (1998, 059730).

[b] na = Not available.

[c] SALs are from LANL (2009, 107655).

Table 6.3-1
Samples Collected and Analyses Requested for AOC 00-030(f)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Americium-241	Anions	Gamma Spectroscopy	TAL Metals	PCBs	Perchlorate	Pesticides	SVOCs	VOCs	Cyanide (Total)
RE00-06-67230	00-25507	7–7.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67231	00-25507	10–10.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67232	00-25507	12–12.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67235	00-25508	7–7.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67236	00-25508	10–10.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67237	00-25508	12–12.5	10/12/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67240	00-25509	5–5.5	10/13/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67241	00-25509	6–6.5	10/13/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67242	00-25509	7–7.5	10/13/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67245	00-25510	0–0.5	10/16/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
RE00-06-67247	00-25510	1.5–2	10/16/2006	Soil	6348S	6347S	6348S	6347S	6346S	6347S	6346S	6346S	6346S	6347S
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	—*	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
CAPU-10-12600	PU-611432	4.2–5.2	3/1/2010	Qbt 3	—	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
RE00-10-22626	PU-611432	5.7–6.2	6/29/2010	Qbt 3	—	—	—	10-3504	—	—	—	—	—	—
CAPU-10-12602	PU-611433	0–1.3	3/1/2010	Qbt 3	—	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
RE00-10-22622	PU-611433	2–3	6/28/2010	Qbt 3	10-3503	10-3503	10-3503	10-3503	10-3502	10-3503	10-3502	10-3502	10-3502	10-3503
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	—	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
RE00-10-22623	PU-611434	2.5–3.5	6/28/2010	Qbt 3	10-3503	10-3503	10-3503	10-3503	10-3502	10-3503	10-3502	10-3502	10-3502	10-3503
CAPU-10-12606	PU-611435	0.8–1.3	3/1/2010	Qbt 3	—	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
RE00-10-22624	PU-611435	2.3–3.3	6/28/2010	Qbt 3	10-3503	10-3503	10-3503	10-3503	10-3502	10-3503	10-3502	10-3502	10-3502	10-3503
CAPU-10-12608	PU-611436	0–1.2	3/1/2010	Qbt 3	—	10-2217	10-2217	10-2217	10-2216	10-2217	10-2216	10-2216	10-2216	10-2217
RE00-10-22625	PU-611436	1.8–2.8	6/28/2010	Qbt 3	10-3503	10-3503	10-3503	10-3503	10-3502	10-3503	10-3502	10-3502	10-3502	10-3503

* — = No sample collected.

Table 6.3-2
Inorganic Chemicals above BVs at AOC 00-030(f)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Cyanide (Total)	Lead	Manganese	Mercury	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2, 3, 4 BV[a]					**0.5**	**2.79**	**46**	**1.21**	**1.63**	**7.14**	**4.66**	**0.5**	**11.2**	**482**	**0.1**	**na**[b]	**na**	**0.3**	**63.5**
Soil BV[a]					**0.83**	**8.17**	**295**	**1.83**	**0.4**	**19.3**	**14.7**	**0.5**	**22.3**	**671**	**0.1**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]					**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**4.49E+02**[d]	**1.24E+04**	**6.19E+03**	**8.00E+02**	**4.63E+02**	**9.29E+01**[e]	**4.96E+05**	**2.17E+02**	**1.55E+03**	**9.29E+04**
Industrial SSL[c]					**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**2.92E+03**[d]	**4.54E+04**	**2.27E+04**	**8.00E+02**	**1.45E+05**	**3.10E+02**[f]	**1.82E+06**	**7.95E+02**	**5.68E+03**	**3.41E+05**
Recreational SSL[g]					**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**1.91E+03**[d]	**3.17E+04**	**1.58E+04**	**5.60E+02**	**1.10E+05**	**2.38E+02**[f]	**1.26E+06**	**5.55E+02**	**3.96E+03**	**2.38E+05**
Residential SSL[c]					**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**2.19E+02**[d]	**3.13E+03**	**1.56E+03**	**4.00E+02**	**1.07E+04**	**2.30E+01**[f]	**1.25E+05**	**5.48E+01**	**3.91E+02**	**2.35E+04**
RE00-06-67230	00-25507	7–7.5	10/12/2006	Soil	—[h]	—	—	—	—	—	—	—	—	—	—	2.06	—	1.67 (U)	—
RE00-06-67231	00-25507	10–10.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	1.65 (U)	—
RE00-06-67232	00-25507	12–12.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.27	—	1.79 (U)	—
RE00-06-67235	00-25508	7–7.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	4.92	—	1.68 (U)	—
RE00-06-67236	00-25508	10–10.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	5.8	—	1.66 (U)	—
RE00-06-67237	00-25508	12–12.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	10.4	—	1.63 (U)	—
RE00-06-67240	00-25509	5–5.5	10/13/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	1.71	—	1.63 (U)	—
RE00-06-67241	00-25509	6–6.5	10/13/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	3.24	—	1.6 (U)	—
RE00-06-67242	00-25509	7–7.5	10/13/2006	Soil	—	—	—	—	0.527 (J)	—	—	—	—	—	—	5.97	—	1.58 (U)	—
RE00-06-67245	00-25510	0–0.5	10/16/2006	Soil	—	—	—	—	0.423 (J)	—	21.2	—	45.1	—	0.318	—	—	1.69 (U)	71.1
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	—	—	—	—	—	—	—	—	30.7	—	—	—	—	1.69 (U)	—
RE00-06-67247	00-25510	1.5–2	10/16/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	1.77 (U)	—
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	1.03 (UJ)	—	—	—	—	11.9	—	—	—	—	—	1.15	0.000863 (J)	0.995 (U)	—
CAPU-10-12600	PU-611432	4.2–5.2	3/1/2010	Qbt 3	0.996 (UJ)	—	—	—	—	62.6	—	—	—	—	—	1.44	—	1.03 (U)	—
RE00-10-22626	PU-611432	5.7–6.2	6/29/2010	Qbt 3	—	2.8	—	—	—	—	—	NA[i]	—	—	—	NA	NA	—	—
CAPU-10-12602	PU-611433	0–1.3	3/1/2010	Qbt 3	1.02 (UJ)	—	—	—	—	—	—	—	11.6	—	—	1.21	—	1.02 (U)	—
RE00-10-22622	PU-611433	2–3	6/28/2010	Qbt 3	—	—	—	—	—	—	—	0.52 (U)	—	—	—	0.85	—	0.52 (U)	—
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	1.07 (UJ)	—	—	—	—	—	5.44 (U)	—	13.9	—	—	3.63	0.00209 (J)	1 (U)	—
RE00-10-22623	PU-611434	2.5–3.5	6/28/2010	Qbt 3	—	—	—	1.3	—	—	—	0.53 (U)	12.9	619 (J-)	—	1.2	—	0.53 (U)	68.7
CAPU-10-12606	PU-611435	0.8–1.3	3/1/2010	Qbt 3	1.01 (UJ)	—	54 (J)	—	—	—	5.69 (U)	—	19.1	1160	—	—	0.00209 (J)	0.941 (U)	—
RE00-10-22624	PU-611435	2.3–3.3	6/28/2010	Qbt 3	—	—	—	1.3	—	—	—	0.52 (U)	12.7	651 (J-)	—	0.71	—	0.52 (U)	—
CAPU-10-12608	PU-611436	0–1.2	3/1/2010	Qbt 3	1.01 (UJ)	—	—	—	—	—	—	—	13.4	560	—	2.91	0.00108 (J)	1.09 (U)	—
RE00-10-22625	PU-611436	1.8–2.8	6/28/2010	Qbt 3	—	—	—	—	—	—	—	0.53 (U)	—	510 (J-)	—	1.5	—	—	—

Notes: All concentrations are in 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[g] SSLs from LANL (2010,108613).
[h] — = Not detected or not above BV.
[i] NA = Not analyzed.

Table 6.3-3
Organic Chemicals Detected at AOC 00-030(f)

Sample ID	Location ID	Depth (ft)	Collection Date	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	Benzoic Acid	alpha-BHC	Carbon Disulfide	alpha-Chlordane
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**9.52E+05[c]**	**2.63E+01**	**5.89E+03**	**1.35E+02[d]**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**2.50E+06[e]**	**3.04E+00**	**7.54E+03**	**7.19E+01[d]**
Recreational SSL[f]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.59E+06**	**4.06E+00**	**3.83E+04**	**1.09E+02[d]**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**2.40E+05[e]**	**7.72E-01**	**1.94E+03**	**1.62E+01[d]**
RE00-06-67230	00-25507	7–7.5	10/12/2006	Soil	—[g]	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67231	00-25507	10–10.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67232	00-25507	12–12.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-67235	00-25508	7–7.5	10/12/2006	Soil	—	—	—	—	—	—	—	0.0434	0.0197 (J)	—	—	—	—	—
RE00-06-67236	00-25508	10–10.5	10/12/2006	Soil	—	0.00287 (J)	—	—	—	—	—	0.0152 (J)	—	—	—	—	0.00166 (J)	—
RE00-06-67237	00-25508	12–12.5	10/12/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00106 (J)
RE00-06-67240	00-25509	5–5.5	10/13/2006	Soil	—	—	—	—	—	—	0.0207 (J)	0.0529	0.0246 (J)	—	—	—	—	—
RE00-06-67241	00-25509	6–6.5	10/13/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00319 (J)
RE00-06-67242	00-25509	7–7.5	10/13/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000224 (J)
RE00-06-67245	00-25510	0–0.5	10/16/2006	Soil	0.015 (J)	—	0.0337 (J)	—	0.0296 (J-)	—	0.369	0.738	0.234	—	—	—	—	0.0044 (J)
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	0.0632	—	0.0892	—	0.0072 (J-)	—	0.172	—	0.0876	—	—	—	—	0.00358 (J)
RE00-06-67247	00-25510	1.5–2	10/16/2006	Soil	—	—	—	—	0.0016 (J-)	—	—	—	—	—	—	—	—	0.00047 (J)
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	0.0343 (J)	—	0.0638	0.0135	0.0096	0.149	0.179	0.183	0.129	0.087	—	—	—	—
CAPU-10-12600	PU-611432	4.2–5.2	3/1/2010	Qbt 3	—	—	0.00819 (J)	—	—	—	0.0198 (J)	0.0211 (J)	0.0192 (J)	—	—	—	—	—
RE00-10-22622	PU-611433	2–3	6/28/2010	Qbt 3	—	—	—	—	0.0076 (J)	—	—	—	—	—	0.35 (J)	—	—	—
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	—	—	—	—	—	0.233	0.176	0.314	0.091 (J)	0.101 (J)	—	—	—	—
RE00-10-22623	PU-611434	2.5–3.5	6/28/2010	Qbt 3	—	0.017 (J)	—	—	—	0.1 (J)	0.08 (J)	0.12 (J)	0.041 (J)	0.07 (J)	0.35 (J)	—	—	—
CAPU-10-12606	PU-611435	0.8–1.3	3/1/2010	Qbt 3	—	0.00598 (J)	—	—	—	—	—	0.0519 (J)	—	—	—	—	—	—
RE00-10-22624	PU-611435	2.3–3.3	6/28/2010	Qbt 3	—	0.01 (J)	—	—	—	0.096 (J)	0.081 (J)	0.12 (J)	—	0.082 (J)	—	0.001 (J)	—	—
CAPU-10-12608	PU-611436	0–1.2	3/1/2010	Qbt 3	—	—	0.114 (J)	—	—	0.934	0.657	1.15	0.352	0.377	—	—	—	—

Table 6.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	gamma-Chlordane	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Heptachlor Epoxide	Indeno(1,2,3-cd)pyrene	4-Isopropyltoluene	4,4-Methoxychlor	Methylene Chloride	2-Methylnaphthalene
Construction Worker SSL[a]					**1.35E+02[d]**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**2.13E+01**	**8.91E+03**	**8.91E+03**	**3.10E+00[c]**	**2.13E+02**	**1.03E+04[h]**	**1.19E+03[c]**	**1.06E+04**	**1.24E+03[c]**
Industrial SSL[a]					**7.19E+01[d]**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.34E+00**	**2.44E+04**	**2.44E+04**	**1.90E+00[e]**	**2.34E+01**	**1.49E+04[h]**	**3.10E+03[e]**	**1.09E+03**	**4.10E+03[e]**
Recreational SSL[f]					**1.09E+02[d]**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**3.01E+00**	**1.39E+04**	**1.39E+04**	**2.81E+00**	**3.01E+01**	**5.27E+04[h]**	**1.99E+03**	**4.52E+03**	**3.17E+03**
Residential SSL[a]					**1.62E+01[d]**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.21E-01**	**2.29E+03**	**2.29E+03**	**5.30E-01[e]**	**6.21E+00**	**3.21E+03[h]**	**3.10E+02[e]**	**1.99E+02**	**3.10E+02[e]**
RE00-06-67230	00-25507	7–7.5	10/12/2006	Soil	—	—	0.0013 (J)	0.0233	0.0285	—	—	—	—	—	—	—	—	—
RE00-06-67231	00-25507	10–10.5	10/12/2006	Soil	—	—	0.000787 (J)	0.0085	0.0103	—	—	—	—	—	—	—	—	—
RE00-06-67232	00-25507	12–12.5	10/12/2006	Soil	—	—	—	0.0026	0.00204	—	—	—	—	—	—	—	—	—
RE00-06-67235	00-25508	7–7.5	10/12/2006	Soil	—	0.0245 (J)	0.041	0.0932	0.539	—	0.0224 (J)	—	—	—	—	—	—	—
RE00-06-67236	00-25508	10–10.5	10/12/2006	Soil	—	—	0.0277	0.0871	0.0884	—	—	—	—	—	—	—	—	—
RE00-06-67237	00-25508	12–12.5	10/12/2006	Soil	0.0029 (J)	—	0.00883	0.0853	0.144	—	—	—	—	—	—	—	—	—
RE00-06-67240	00-25509	5–5.5	10/13/2006	Soil	0.00221 (J)	0.0267 (J)	—	0.111	0.0559	—	0.0245 (J)	—	—	0.0684 (J)	—	—	—	—
RE00-06-67241	00-25509	6–6.5	10/13/2006	Soil	0.00329 (J)	—	0.00375 (J)	0.0934	0.0744	—	0.0147 (J)	—	—	—	—	—	—	—
RE00-06-67242	00-25509	7–7.5	10/13/2006	Soil	0.000257 (J)	—	—	0.00345	0.00201	—	—	—	—	—	—	—	—	—
RE00-06-67245	00-25510	0–0.5	10/16/2006	Soil	—	0.285	—	0.00619 (J)	0.0378	—	0.355	0.015 (J)	—	0.255 (J)	—	—	—	—
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	0.00433 (J)	0.169	—	0.0225	0.107	—	0.351	0.054	—	0.119 (J)	—	—	—	0.0206 (J)
RE00-06-67247	00-25510	1.5–2	10/16/2006	Soil	0.000407 (J)	—	—	0.00221	0.00712	—	—	—	—	—	—	—	—	—
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	—	0.184	—	—	—	0.0366	0.295	0.0352	—	0.114	—	—	—	0.0598
CAPU-10-12600	PU-611432	4.2–5.2	3/1/2010	Qbt 3	—	0.0339 (J)	—	—	—	—	0.0352	—	—	0.0138 (J)	—	—	—	0.052
RE00-10-22622	PU-611433	2–3	6/28/2010	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	0.0013 (J)	—
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	—	0.34	—	—	—	—	0.48	—	—	0.0821 (J)	—	—	—	—
RE00-10-22623	PU-611434	2.5–3.5	6/28/2010	Qbt 3	—	0.13 (J)	—	—	—	—	0.18 (J)	—	—	0.038 (J)	—	—	—	—
CAPU-10-12606	PU-611435	0.8–1.3	3/1/2010	Qbt 3	—	0.0936 (J)	—	—	—	—	0.0633 (J)	—	—	—	—	—	—	—
RE00-10-22624	PU-611435	2.3–3.3	6/28/2010	Qbt 3	—	0.12 (J)	—	—	0.0014 (J)	—	0.17 (J)	—	0.0016 (J)	—	0.00082 (J)	0.0089	0.00083 (J)	—
CAPU-10-12608	PU-611436	0–1.2	3/1/2010	Qbt 3	—	1.18	—	—	—	0.0549 (J)	1.97	—	—	0.291	—	—	—	—

Table 6.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Naphthalene	Phenanthrene	Pyrene	Toluene	1,2,4-Trimethylbenzene	1,3-Xylene-1,4-Xylene
Construction Worker SSL[a]					**7.02E+02**	**7.15E+03**	**6.68E+03**	**2.11E+04**	**6.88E+02**[c]	**3.13E+03**[i]
Industrial SSL[a]					**2.52E+02**	**2.05E+04**	**1.83E+04**	**5.79E+04**	**2.60E+02**[e]	**3.61E+03**[i]
Recreational SSL[f]					**1.95E+03**	**1.20E+04**	**1.04E+04**	**6.08E+04**	**6.88E+03**	**2.78E+04**[i]
Residential SSL[a]					**4.50E+01**	**1.83E+03**	**1.72E+03**	**5.57E+03**	**6.20E+01**[e]	**1.09E+03**[i]
RE00-06-67230	00-25507	7–7.5	10/12/2006	Soil	—	—	—	0.000347 (J)	—	—
RE00-06-67231	00-25507	10–10.5	10/12/2006	Soil	—	—	—	0.000407 (J)	—	—
RE00-06-67232	00-25507	12–12.5	10/12/2006	Soil	—	—	—	—	—	—
RE00-06-67235	00-25508	7–7.5	10/12/2006	Soil	—	0.0122 (J)	0.0227 (J)	—	—	—
RE00-06-67236	00-25508	10–10.5	10/12/2006	Soil	—	—	—	—	—	—
RE00-06-67237	00-25508	12–12.5	10/12/2006	Soil	—	—	—	—	—	—
RE00-06-67240	00-25509	5–5.5	10/13/2006	Soil	—	—	0.0196 (J)	—	—	—
RE00-06-67241	00-25509	6–6.5	10/13/2006	Soil	—	—	—	—	—	—
RE00-06-67242	00-25509	7–7.5	10/13/2006	Soil	—	—	—	0.000632 (J)	—	—
RE00-06-67245	00-25510	0–0.5	10/16/2006	Soil	—	0.167	0.305	—	—	—
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	0.0539	0.334	0.305	—	—	—
RE00-06-67247	00-25510	1.5–2	10/16/2006	Soil	—	—	—	—	—	—
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	0.101	0.324	0.249	—	—	—
CAPU-10-12600	PU-611432	4.2–5.2	3/1/2010	Qbt 3	0.0794	0.104	0.033 (J)	—	—	—
RE00-10-22622	PU-611433	2–3	6/28/2010	Qbt 3	—	—	—	—	0.00054 (J)	NA[j]
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	—	0.43	0.406	0.000771 (J)	—	0.000364 (J)
RE00-10-22623	PU-611434	2.5–3.5	6/28/2010	Qbt 3	—	0.047 (J)	0.14 (J)	—	0.0017 (J)	NA
CAPU-10-12606	PU-611435	0.8–1.3	3/1/2010	Qbt 3	—	—	0.0587 (J)	0.000357 (J)	—	—
RE00-10-22624	PU-611435	2.3–3.3	6/28/2010	Qbt 3	—	0.042 (J)	0.14 (J)	—	0.0007 (J)	NA
CAPU-10-12608	PU-611436	0–1.2	3/1/2010	Qbt 3	—	0.804	1.83	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSLs from LANL (2010,108613).

[g] — = Not detected or not above BV.

[h] Isopropylbenzene used as a surrogate based on structural similarity.

[i] Xylenes used as a surrogate based on structural similarity.

[j] NA = Not analyzed.

Table 6.3.4
Radionuclides Detected or Detected above BVs/FVs at AOC 00-030(f)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Americium-241[a]	Cesium-137
Qbt2, 3, 4 BV[b]					**na[c]**	**na**
Soil BV[b]					**0.013**	**1.65**
Construction Worker SAL[d]					**3.40E+01**	**1.80E+01**
Industrial SAL[d]					**1.80E+02**	**2.30E+01**
Recreational SAL[d]					**2.80E+02**	**2.10E+02**
Residential SAL[d]					**3.00E+01**	**5.60E+00**
RE00-06-67246	00-25510	1–1.5	10/16/2006	Soil	0.0483	0.31
CAPU-10-12599	PU-611432	1.2–2.2	3/1/2010	Qbt 3	0.701	—[e]
CAPU-10-12604	PU-611434	0–1.5	3/1/2010	Qbt 3	—	0.252

Note: All activities are in pCi/g.

[a] Analysis by gamma spectroscopy. See section 3.5.

[b] BVs are from LANL (1998, 059730).

[c] na = Not available.

[d] SALs are from LANL (2010, 107655).

[e] — = Analyzed for but not detected or not detected above BVs/FVs.

Table 6.4-1
Samples Collected and Analyses Requested for AOC 00-030(h)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Isotopic Uranium	Isotopic Plutonium	TAL Metals	PCBs	Perchlorate	Pesticides	SVOCs	VOCs	Cyanide (Total)
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—[a]	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—

Table 6.4-1 continued

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Isotopic Uranium	Isotopic Plutonium	Metals	PCBs	Perchlorate	Pesticides	SVOCs	VOCs	Cyanide (Total)
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	—	2235	—	2235	2234	2233	—	2233	2233	2233	—
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	2513	2513	—	2512	2510	—	2510	2510	2510	—
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	2513	2513	—	2512	2510	—	2510	2510	2510	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	2513	2513	—	2512	2510	—	2510	2510	2510	—
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	5613S	5614S	5614S	—	5613S	5612S	5613S	5612S	5612S	5612S	5613S
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	2513	2513	—	2512	2510	—	2510	2510	2510	—
RE00-06-66826	00-04816	16–16.5	7/24/2006	Qbt 2	5613S	5614S	5614S	—	5613S	5612S	5613S	5612S	5612S	5612S	5613S
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	5613S	5614S	5614S	—	5613S	5612S	5613S	5612S	5612S	5612S	5613S
CAPU-10-12571	00-25454	3.5–4	6/8/2010	Soil	—	—	—	—	10-3357	—	—	10-3357	10-3357	—	—
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66850	00-25456	1.5–2	8/21/2006	Qbt 3	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	5881S	5882S	5882S	—	5881S	5880S	5881S	5880S	5880S	5880S	5881S
CAPU-10-12566	PU-611430	6–7	2/25/2010	Qbt 3	—	—	—	—	—	—	—	—	10-2180	—	—
CAPU-10-12567	PU-611430	8–9	2/25/2010	Qbt 3	—	—	—	—	—	—	—	—	10-2180	—	—
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	—	—	—	—	10-2180	—	—	10-2180	10-2180	—	—
CAPU-10-13733	PU-611656	4–5	2/25/2010	Qbt 3	—	—	—	—	—	—	—	—	10-2180	—	—
CAPU-10-13734	PU-611656	6–7	2/25/2010	Qbt 3	—	—	—	—	—	—	—	—	10-2180	—	—
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	—	—	—	—	10-2180	—	—	10-2180	10-2180	—	—
CAPU-10-18364	PU-612249	1.5–2	6/4/2010	Soil	—	—	—	—	10-3329	—	—	10-3329	10-3329	—	—
CAPU-10-18365	PU-612250	1.5–2	6/4/2010	Soil	—	—	—	—	10-3329	—	—	10-3329	10-3329	—	—
CAPU-10-18366	PU-612251	1.5–2	6/4/2010	Soil	—	—	—	—	10-3329	—	—	10-3329	10-3329	—	—
CAPU-10-18367	PU-612252[b]	0.5–1	6/8/2010	Soil	—	—	—	—	10-3358	—	—	10-3358	10-3358	—	—
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	—	—	—	10-3357	—	—	10-3357	10-3357	—	—
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	—	—	—	—	10-3358	—	—	10-3358	10-3358	—	—
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	—	—	—	—	10-3358	—	—	10-3358	10-3358	—	—

[a] — = No sample collected.

[b] Location excluded from risk assessment calculations. See sections 6.4.3.1, 6.4.4, and I-4.2.4.

Table 6.4-2
Inorganic Chemicals above BVs at AOC 00-030(h)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14,500**	**11.2**	**1690**	**482**
Sediment BV[a]					**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21,500**	**22.3**	**4610**	**671**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**463**
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**[f]	**3.17E+04**	**5.54E+05**	**5.60E+02**	**na**	**1.1E+05**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.3E+02**[f]	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—[h]	5.4 (U)	—	—	—	—	—	—	10.8	—	—	23.6	—	928
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	5.8 (U)	—	—	—	—	—	—	9.2	—	—	—	—	835
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	5.6 (U)	—	—	—	—	—	—		—	—	—	—	—
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	5.6 (U)	—	—	—	—	6500	—		—	—	—	—	—
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	6.1 (U)	—	—	—	—	—	—		—	—	—	—	—
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	6 (U)	—	—	3	0.53 (U)	8730	—	37.7	—	—	33.4	—	1540
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	6.1 (U)	—	—	—	—	—	—	—	—	—	23.8	—	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	5.9 (U)	—	—	—	—	7210	—	—	—	—	22.9	—	—
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	5.7 (U)	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	5.7 (U)	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	5.9 (U)	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	—	6 (U)	—	—	—	—	—	—	—	17.9	—	25.1	—	—
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	—	—	—	0.605 (U)	—	—	—	—	—	—	—	—
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	—	—	—	—	—	0.587 (U)	—	—	—	—	—	—	—	—
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	10700	—	—	—	—	—	—	—
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	7610	—	—	—	—	29	—	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	26.6	—	—
RE00-06-66826	00-04816	16–16.5	7/24/2006	Qbt 2	21,400 (J+)	—	—	88.3	1.57	—	—	8.14	—	8.33	51,900 (J+)	48.4	2210 (J+)	—
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	28.7	—	—
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	—	—	3.27	—	—	—	—	—	—	—	—	—	—	—
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	—	—	3.78	48.9	—	—	—	—	—	—	—	—	—	—
RE00-06-66850	00-25456	1.5–2	8/21/2006	Qbt 3	—	—	3.34	—	—	—	—	—	—	—	—	94	—	—
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	—	—	—	—	—	0.608 (U)	—	—	—	—	—	22.6	—	—
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	—	—	—	—	—	0.537 (U)	—	—	—	—	—	—	—	—
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	—	—	—	0.552 (U)	—	—	—	—	—	—	—	—
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	—	—	442	—	0.634 (U)	—	—	—	—	—	—	—	—

Table 6.4-2 continued

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14,500**	**11.2**	1690	**482**
Sediment BV[a]					**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21,500**	**22.3**	**4610**	**671**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**463**
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**[f]	**3.17E+04**	**5.54E+05**	**5.60E+02**	**na**	**1.1E+05**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.3E+02**[f]	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	—	1.08 (U)	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	—	1.13 (U)	—	—	—	—	5180 (J)	—	—	59.9	—	—	—	—
CAPU-10-18367	PU-612252[i]	0.5–1	6/8/2010	Soil	—	—	—	—	—	—	—	—	—	—	—	36	—	—
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	—	—	—	—	—	—	—	—	—	—	—	26.7	—	—
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Mercury	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 BV[a]					**0.1**	**6.58**	**na**	**na**	**3500**	**0.3**	**1.1**	**na**	**63.5**
Sediment BV[a]					**0.1**	**9.38**	**na**	**na**	**2690**	**0.3**	**0.73**	**na**	**60.2**
Soil BV[a]					**0.1**	**15.4**	**na**	**na**	**3460**	**1.52**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[b]					**9.29E+01[e]**	**6.19E+03**	**4.96E+05**	**2.17E+02**	**na**	**1.55E+03**	**2.04E+01**	**9.29E+02**	**9.29E+04**
Industrial SSL[b]					**3.10E+02[f]**	**2.27E+04**	**1.82E+06**	**7.95E+02**	**na**	**5.68E+03**	**7.49E+01**	**3.41E+03**	**3.41E+05**
Recreational SSL[g]					**2.38E+02[f]**	**1.58E+04**	**1.26E+06**	**5.55E+02**	**na**	**3.96E+03**	**5.23E+01**	**2.38E+04**	**2.38E+05**
Residential SSL[b]					**2.30E+01[f]**	**1.56E+03**	**1.25E+05**	**5.48E+01**	**na**	**3.91E+02**	**5.16E+00**	**2.35E+02**	**2.35E+04**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—	—	—	—	—	—	0.87 (U)	3.4	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	—	—	—	—	1.7 (U)	—	3.3	52.4
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	—	—	—	—	—	—	3	—
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	—	—	—	—	—	0.97 (U)	3	49.8
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	0.94	—	—	—	—	—	—	3.5	91.6
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	1.3	—	—	—	—	1.9 (U)	—	3.5	130
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	0.25	—	—	—	—	—	1.2 (U)	3.4	71.6
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	0.99	—	—	—	—	—	0.75 (U)	3.3	79.1
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	—	—	—	—	—	0.98 (U)	3.2	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	—	—	—	—	—	1.3 (U)	3.2	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	0.24	—	—	—	—	—	—	3.3	—
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	0.71	—	—	—	—	—	—	3.5	127`
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	—	—	—	1.82 (U)	—	—	—
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	—	—	—	—	—	1.76 (U)	—	—	—
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	NA[i]	NA	—	—	0.8 (U)	—	57.1
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	NA	NA	—	—	2.3 (J)	—	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	0.11 (J)	—	NA	NA	—	—	0.79 (U)	—	—
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	10.3	—	—	1.59 (U)	—	—	—
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	NA	NA	—	—	1.2 (J)	—	49
RE00-06-66826	00-04816	16–16.5	7/24/2006	Qbt 2	—	6.6	—	—	9010 (J+)	1.7 (U)	—	—	—
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	—	1.55 (U)	—	—	—
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	—	—	—	—	—	1.58 (U)	—	—	—
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	—	—	—	0.000768 (J)	—	1.54 (U)	—	—	—
RE00-06-66850	00-25456	1.5–2	8/21/2006	Qbt 3	—	—	1.97	—	—	1.81 (U)	—	—	—
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	—	—	—	—	—	1.82 (U)	—	—	—
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	—	—	1.39	—	—	1.61 (U)	—	—	62.4
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	1.4	—	—	1.66 (U)	—	—	82.9
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	—	—	—	—	1.9 (U)	—	—	59.2
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	—	—	NA	NA	—	1.04 (U)	—	—	249

Table 6.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Mercury	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Thallium	Uranium	Zinc
Qbt 2, 3, 4 BV[a]					**0.1**	**6.58**	**na**	**na**	**3500**	**0.3**	**1.1**	**na**	**63.5**
Sediment BV[a]					**0.1**	**9.38**	**na**	**na**	**2690**	**0.3**	**0.73**	**na**	**60.2**
Soil BV[a]					**0.1**	**15.4**	**na**	**na**	**3460**	**1.52**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[b]					**9.29E+01[e]**	**6.19E+03**	**4.96E+05**	**2.17E+02**	**na**	**1.55E+03**	**2.04E+01**	**9.29E+02**	**9.29E+04**
Industrial SSL[b]					**3.10E+02[f]**	**2.27E+04**	**1.82E+06**	**7.95E+02**	**na**	**5.68E+03**	**7.49E+01**	**3.41E+03**	**3.41E+05**
Recreational SSL[g]					**2.38E+02[f]**	**1.58E+04**	**1.26E+06**	**5.55E+02**	**na**	**3.96E+03**	**5.23E+01**	**2.38E+04**	**2.38E+05**
Residential SSL[b]					**2.30E+01[f]**	**1.56E+03**	**1.25E+05**	**5.48E+01**	**na**	**3.91E+02**	**5.16E+00**	**2.35E+02**	**2.35E+04**
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	—	—	NA	NA	—	1.08 (U)	—	—	145
CAPU-10-18367	PU-61225[j]	0.5–1	6/8/2010	Soil	—	—	NA	NA	—	—	—	—	58.6
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	—	NA	NA	—	—	—	—	—
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	—	—	NA	NA	—	—	—	—	—
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	—	—	NA	NA	—	0.53 (U)	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs are from LANL (1998, 059730).

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na= Not available.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] SSLs from LANL (2010,108613).

[h] — = Not detected or not above BV.

[i] NA = Not analyzed.

[j] Location excluded from risk assessment calculations. See sections 6.4.3.1, 6.4.4, and I-4.2.4.

Table 6.4-3
Organic Chemicals Detected at AOC 00-030(h)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	alpha-Chlordane	gamma-Chlordane
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**4.76E+03**	**4.76E+04[c]**	**1.35E+02[d]**	**1.35E+02[d]**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**1.37E+03**	**9.10E+03[e]**	**7.19E+01[d]**	**7.19E+01[d]**
Recreational SSL[f]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.83E+03**	**1.35E+04**	**1.09E+02[d]**	**1.09E+02[d]**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**3.47E+02**	**2.60E+03[e]**	**1.62E+01[d]**	**1.62E+01[d]**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—[g]	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0438	00-04802	7–8	6/5/1996	Soil	0.063 (J)	—	0.1 (J)	—	0.36 (J)	0.46	0.37 (J)	0.31 (J)	0.38	—	—	—	—
0100-96-0439	00-04803	7–8	6/5/1996	Soil	0.2 (J)	—	—0.32 (J)	—	0.94	1.1	0.89	0.82	0.95	—	—	—	—
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	—	—	—	—	—	—	0.067 (J)	—	—	—	—	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	—	—	—	0.047 (J)	0.059 (J)	0.55 (J)	0.061 (J)	0.058 (J)	—	—	—	—
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	—	—	—	0.14 (J)	0.16 (J)	0.12	0.13 (J)	0.14 (J)	—	—	—	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	0.12 (J)	—	0.19 (J)	—	0.63	0.74	0.61	0.49	0.61	—	—	—	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	—	—	—	—	—	0.062 (J)	0.047 (J)	0.059 (J)	0.05 (J)	—	—	0.0028	—
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	0.0052	—	—	—	0.0228 (J)	0.0415	0.0237 (J)	—	—	—	—	—
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	0.0339 (J)	0.023 (J+)	0.0591	—	—	0.243 (J)	0.387 (J)	0.182 (J)	—	83.7	24.1 (J)	—	—
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	0.042 (J-)	—	—	—	—	—	—	—	—	—	—	—
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	0.058 (J-)	—	—	—	—	—	—	—	—	—	—	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	0.04 (J+)	—	—	—	—	—	—	—	—	—	—	—
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	—	—	0.0354 (J)	0.0292 (J)	0.0396	0.0234 (J)	0.0143 (J)	—	—	—	—
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	0.083	—	—	—	—	—	—	—	—	—	—	—
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12571	00-25454	3.5–4	6/8/2010	Soil	—	NA[h]	0.059 (J)	NA	0.26 (J)	0.31 (J)	0.49	0.19 (J)	0.17 (J)	—	—	—	—
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	0.026 (J)	0.0183	0.0391	—	—	0.265	0.469 (J)	0.226	—	—	—	—	—
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	0.0405	0.0363	0.0724	—	0.406	0.495	0.891	0.334	—	—	—	—	—
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	0.0638 (J+)	0.0649	0.0971 (J+)	0.0065	0.266 (J+)	0.314 (J)	0.491 (J)	0.139 (J)	—	—	—	0.00228 (J)	0.00162 (J)
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	0.122	—	0.229	—	—	0.471 (J)	0.776 (J)	0.218 (J)	—	0.0853 (J)	0.101 (J)	—	—
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	0.0179 (J+)	—	—	0.112 (J)	0.192 (J)	0.0751 (J)	—	0.0806 (J)	—	—	—
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	0.0063	0.033 (J)	—	—	0.106 (J)	0.2 (J)	0.0699 (J)	—	—	—	—	—

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	alpha-Chlordane	gamma-Chlordane
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**6.68E+03[b]**	**2.06E+03**	**4.76E+03**	**4.76E+04[c]**	**1.35E+02[d]**	**1.35E+02[d]**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**1.83E+04[b]**	**2.34E+02**	**1.37E+03**	**9.10E+03[e]**	**7.19E+01[d]**	**7.19E+01[d]**
Recreational SSL[f]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**1.04E+04[b]**	**3.01E+02**	**1.83E+03**	**1.35E+04**	**1.09E+02[d]**	**1.09E+02[d]**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**1.72E+03[b]**	**6.21E+01**	**3.47E+02**	**2.60E+03[e]**	**1.62E+01[d]**	**1.62E+01[d]**
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	0.0885	NA	0.176	NA	0.439	0.436	0.743	0.294	—	0.274 (J)	—	0.00249 (J)	0.00251 (J)
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	—	NA	0.0203 (J)	NA	0.116	0.125	0.243	0.111	—	0.583	—	—	—
CAPU-10-18364	PU-612249	1.5–2	6/4/2010	Soil	—	NA	—	NA	0.09 (J)	0.1 (J)	0.085 (J)	0.07 (J)	0.098 (J)	0.1 (J)	—	—	—
CAPU-10-18365	PU-612250	1.5–2	6/4/2010	Soil	—	NA	—	NA	0.11 (J)	0.12 (J)	0.11 (J)	0.096 (J)	0.12 (J)	—	—	—	—
CAPU-10-18366	PU-612251	1.5–2	6/4/2010	Soil	0.086 (J)	NA	0.14 (J)	NA	0.58	0.64	0.6	0.34 (J)	0.58	0.11 (J)	—	—	—
CAPU-10-18367	PU-612252[i]	0.5–1	6/8/2010	Soil	1.4	NA	2.2	NA	7.5	8.5	14	5.2	5	0.13 (J)	—	—	—
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	NA	0.064 (J)	NA	0.25 (J)	0.3 (J)	0.47	0.21 (J)	0.18 (J)	—	—	—	—
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	0.089 (J)	NA	0.14 (J)	NA	0.53	0.65	1.1	0.37 (J)	0.37 (J)	—	—	—	—
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	0.12 (J)	NA	0.21 (J)	NA	0.78	0.86	1.4	0.46	0.46	0.17 (J)	—	—	—

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Chlorobenzene	Chloroform	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	Dibenz(a,h)anthracene	Dibenzofuran	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	Dieldrin	2,4-Dimethylphenol	Di-n-butylphthalate
Construction Worker SSL[a]					**1.58E+03**	**6.71E+02**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**2.13E+01**	**5.52E+02[c]**	**3.78E+03**	**8.91E+03**	**1.03E+01**	**4.76E+03**	**2.38E+04**
Industrial SSL[a]					**2.14E+03**	**3.19E+01**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.34E+00**	**1.00E+03[e]**	**1.8E+02**	**2.44E+04**	**1.20E+00**	**1.37E+04**	**6.84E+04**
Recreational SSL[f]					**9.17E+03**	**2.24E+02**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**3.01E+00**	**3.99E+02**	**1.26E+03**	**1.39E+04**	**1.60E+00**	**7.97E+03**	**3.99E+04**
Residential SSL[a]					**5.08E+02**	**5.72E+00**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.21E-01**	**7.8E+02[e]**	**3.22E+01**	**2.29E+03**	**3.04E-01**	**1.22E+03**	**6.11E+03**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—	—	—	0.0076	1.1	0.81	—	—	—	—	—	—	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	—	—	—	0.031	0.027	—	—	—	—	—	—	—
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	—	0.45	—	0.077	0.048	0.1 (J)	—	—	0.001 (J+)	—	—	—
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	—	1.1	—	0.018 (J)	0.06	0.24 (J)	0.093 (J)	—	—	—	—	—
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	—	—	0.014	0.015	0.0087	—	—	—	—	—	—	—
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	—	—	0.15	0.062	0.51	—	—	—	—	—	—	—
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	0.005 (J)	—	—	0.012	0.052	0.023	—	—	—	—	—	—	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	—	0.05 (J)	0.054	0.17	0.022	—	—	0.002 (J)	—	—	—	—
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	—	0.16 (J)	0.019	0.11	0.08	0.067 (J)	—	—	—	—	—	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	—	0.78	0.013 (J)	0.048	0.12	0.15 (J)	0.056 (J)	—	—	—	—	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	—	—	0.0023 (J)	0.0051	0.0031 (J)	—	—	—	0.002 (J+)	—	—	—
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	0.001 (J+)	—	0.046 (J)	0.29	0.13	0.2	—	—	—	—	—	—	—
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	0.0323 (J)	—	0.00232	0.00441	—	—	—	—	—	—	—
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	—	—	—	—	—	0.00515 (J)	—	—	—	—	—	—	3.97
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	—	—	0.067	0.074	—	—	—	—	—	—	—
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	—	—	0.022	0.042	—	—	—	—	—	—	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	—	—	—	0.024	0.026	—	—	—	—	—	—	—
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	—	0.00127 (J)	0.033	0.0141	—	—	—	—	—	—	—
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	0.2	—	0.04	0.051	—	—	—	—	—	—	—
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	0.000878 (J)	—	—	—	—	—	—	—	—
CAPU-10-12571	00-25454	3.5–4	6/8/2010	Soil	—	NA	0.39	—	—	—	0.044 (J)	—	—	—	—	—	—
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	—	—	0.272	—	—	0.00193 (J)	—	—	—	—	0.00181 (J)	—	—
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	—	—	0.468	—	—	—	—	—	—	—	—	—	—
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	—	0.000378 (J)	0.345 (J+)	—	—	0.00564 (J)	—	—	—	—	—	—	—
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	—	—	0.46	—	—	—	—	0.0818 (J)	—	—	—	—	—
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	0.1 (J)	—	—	—	—	—	—	—	—	—	—
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	—	0.111	—	—	—	—	—	—	—	—	—	—
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	—	NA	0.484	—	—	—	0.0849	—	—	—	—	—	—
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	—	NA	0.166	—	—	—	0.0351 (J)	—	—	—	—	—	—

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Chlorobenzene	Chloroform	Chrysene	4,4-DDD	4,4-DDE	4,4-DDT	Dibenz(a,h)anthracene	Dibenzofuran	1,4-Dichlorobenzene	cis-1,2-Dichloroethene	Dieldrin	2,4-Dimethylphenol	Di-n-butylphthalate
Construction Worker SSL[a]					**1.58E+03**	**6.71E+02**	**2.06E+04**	**6.95E+02**	**4.90E+02**	**1.42E+02**	**2.13E+01**	**5.52E+02**[c]	**3.78E+03**	**8.91E+03**	**1.03E+01**	**4.76E+03**	**2.38E+04**
Industrial SSL[a]					**2.14E+03**	**3.19E+01**	**2.34E+03**	**7.98E+01**	**5.63E+01**	**7.81E+01**	**2.34E+00**	**1.00E+03**[e]	**1.8E+02**	**2.44E+04**	**1.20E+00**	**1.37E+04**	**6.84E+04**
Recreational SSL[f]					**9.17E+03**	**2.24E+02**	**3.01E+03**	**1.07E+02**	**7.53E+01**	**1.22E+02**	**3.01E+00**	**3.99E+02**	**1.26E+03**	**1.39E+04**	**1.60E+00**	**7.97E+03**	**3.99E+04**
Residential SSL[a]					**5.08E+02**	**5.72E+00**	**6.21E+02**	**2.03E+01**	**1.43E+01**	**1.72E+01**	**6.21E-01**	**7.8E+02**[e]	**3.22E+01**	**2.29E+03**	**3.04E-01**	**1.22E+03**	**6.11E+03**
CAPU-10-18364	PU-612249	1.5–2	6/4/2010	Soil	—	NA	0.14 (J)	—	0.0032	0.0062	—	—	—	—	—	—	—
CAPU-10-18365	PU-612250	1.5–2	6/4/2010	Soil	—	NA	0.17 (J)	—	0.0025	0.0036	—	—	—	—	—	—	—
CAPU-10-18366	PU-612251	1.5–2	6/4/2010	Soil	—	NA	0.88	0.015	0.036	0.39	0.13 (J)	0.037 (J)	—	—	—	—	—
CAPU-10-18367	PU-612252[i]	0.5–1	6/8/2010	Soil	—	NA	11	0.0042 (J)	—	0.083	2	0.59	—	—	0.028 (J)	0.046 (J)	—
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	NA	0.37	0.00027 (J)	0.0026 (J)	0.0055 (J)	0.045 (J)	—	—	—	0.0011 (J)	—	—
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	—	NA	0.82	—	—	—	0.091 (J)	—	—	—	0.0032 (J)	—	—
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	—	NA	1.1	0.00023 (J)	—	0.0024 (J)	0.11 (J)	0.053 (J)	—	—	0.0017 (J)	—	—

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Di-n-octylphthalate	Ethylbenze	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	4-Isopropyltoluene	Methylene Chloride	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
Construction Worker SSL[a]					**2.38E+04[j]**	**6.63E+03**	**8.91E+03**	**8.91E+03**	**2.13E+02**	**1.03E+04[k]**	**1.06E+04**	**1.24E+03[c]**	**7.02E+02**	**7.15E+03**	**6.68E+03**
Industrial SSL[a]					**6.84E+04[j]**	**3.85E+02**	**2.44E+04**	**2.44E+04**	**2.34E+01**	**1.49E+04[k]**	**1.09E+03**	**4.10E+03[e]**	**2.52E+02**	**2.05E+04**	**1.83E+04**
Recreational SSL[f]					**7.97E+03**	**2.06E+03**	**1.39E+04**	**1.39E+04**	**3.01E+01**	**5.27E+04[k]**	**4.52E+03**	**3.17E+03**	**1.95E+03**	**1.20E+04**	**1.04E+04**
Residential SSL[a]					**6.11E+03[j]**	**6.97E+01**	**2.29E+03**	**2.29E+03**	**6.21E+00**	**3.21E+03[k]**	**1.99E+02**	**3.10E+02[e]**	**4.50E+01**	**1.83E+03**	**1.72E+03**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—	—	—	—	—	—	—	—	—	—	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	—	0.052 (J)	—	—	—	—	—	—	—	0.052 (J)
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	—	0.88	0.052 (J)	0.27 (J)	—	—	—	—	0.58	0.79
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	—	2.5	0.18 (J)	0.68	—	—	0.043 (J)	0.11 (J)	1.7	2
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	—	—	—	—	—	—	—	—	—	—
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	—	—	—	—	—	—	—	—	—	—
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	—	—	—	0.059 (J)	—	—	—	—	—	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	—	0.078 (J)	—	0.054 (J)	—	—	—	—	—	0.071 (J)
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	—	0.33 (J)	—	0.1 (J)	—	—	—	—	0.21 (J)	0.27 (J)
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	—	1.5	0.11 (J)	0.43	—	—	—	0.07 (J)	1.1	1.4
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	0.002 (J+)	—	—	—	—	—	—	—	—	—
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	—	—	0.073 (J)	—	0.044 (J)	—	—	—	—	0.047 (J)	0.067 (J)
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	—	0.0418	0.017 (J)	—	—	—	—	—	0.0433
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	—	—	—	0.393	0.16 (J)	0.000914 (J+)	0.00203 (J+)	—	—	0.312	0.498
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	0.007 (J-)	—	—	—	—
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	—	—	—	—	0.0058 (J-)	—	—	—	—
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	—	—	0.23	—	—	—	—	—	—	0.21
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	—	0.0682	0.0273 (J)	—	—	—	—	0.0296 (J)	0.058
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	—	0.4	—	—	—	—	—	—	0.36
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12571	00-25454	3.5–4	6/8/2010	Soil	—	—	—	0.61	0.24 (J)	NA	NA	—	—	0.35 (J)	0.58
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	—	—	—	0.415	0.203	0.0094	—	—	—	0.237	0.516
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	—	—	—	0.779	0.3	—	—	0.0074 (J)	—	0.428	0.897
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	—	—	—	0.51 (J+)	0.132 (J)	0.00548	—	0.0163 (J+)	—	0.517 (J+)	0.696 (J+)
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	—	—	—	0.772	0.232 (J)	—	—	0.0619	0.361 (J)	0.869	1.06
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	—	0.126 (J+)	0.0728 (J)	—	—	—	—	0.0887 (J+)	0.203 (J)
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	—	—	0.15	0.0589 (J)	—	—	—	—	0.131	0.211
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	0.114 (J)	—	—	0.811	0.273	NA	NA	0.033 (J)	0.0884	0.773	1.05
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	0.285 (J)	—	—	0.196	0.0978	NA	NA	—	—	0.107	0.286

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Di-n-octylphthalate	Ethylbenze	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	4-Isopropyltoluene	Methylene Chloride	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
Construction Worker SSL[a]					**2.38E+04[j]**	**6.63E+03**	**8.91E+03**	**8.91E+03**	**2.13E+02**	**1.03E+04[k]**	**1.06E+04**	**1.24E+03[c]**	**7.02E+02**	**7.15E+03**	**6.68E+03**
Industrial SSL[a]					**6.84E+04[j]**	**3.85E+02**	**2.44E+04**	**2.44E+04**	**2.34E+01**	**1.49E+04[k]**	**1.09E+03**	**4.10E+03[e]**	**2.52E+02**	**2.05E+04**	**1.83E+04**
Recreational SSL[f]					**7.97E+03**	**2.06E+03**	**1.39E+04**	**1.39E+04**	**3.01E+01**	**5.27E+04[k]**	**4.52E+03**	**3.17E+03**	**1.95E+03**	**1.20E+04**	**1.04E+04**
Residential SSL[a]					**6.11E+03[j]**	**6.97E+01**	**2.29E+03**	**2.29E+03**	**6.21E+00**	**3.21E+03[k]**	**1.99E+02**	**3.10E+02[e]**	**4.50E+01**	**1.83E+03**	**1.72E+03**
CAPU-10-18364	PU-612249	1.5–2	6/4/2010	Soil	—	—	—	0.2 (J)	0.058 (J)	NA	NA	—	—	0.14 (J)	0.21 (J)
CAPU-10-18365	PU-612250	1.5–2	6/4/2010	Soil	—	—	—	0.24 (J)	0.075 (J)	NA	NA	—	—	0.16 (J)	0.26 (J)
CAPU-10-18366	PU-612251	1.5–2	6/4/2010	Soil	—	—	—	1.2	0.26 (J)	NA	NA	—	0.039 (J)	0.84	1.3
CAPU-10-18367	PU-612252[i]	0.5–1	6/8/2010	Soil	—	—	—	16	5.7	NA	NA	0.29 (J)	0.74	11	15
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	—	—	—	0.59	0.25 (J)	NA	NA	—	—	0.35 (J)	0.56
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	—	—	—	1.3	0.42	NA	NA	—	0.048 (J)	0.8	1.1
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	—	—	—	1.8	0.5	NA	NA	—	0.066 (J)	1.2	1.6

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Toluene	Trichloroethene	Trichlorofluoromethane	1,2,4-Trimethylbenzene	1,3 -Xylene+1,4-Xylene
Construction Worker SSL[a]					**2.11E+04**	**4.6E+03**	**5.82E+03**	**6.88E+02[c]**	**3.13E+03[l]**
Industrial SSL[a]					**5.79E+04**	**2.53E+02**	**6.76E+03**	**2.6E+02**	**3.61E+03[l]**
Recreational SSL[f]					**6.08E+04**	**1.45E+03**	**4.98E+04**	**6.88E+03[e]**	**2.78E+04[l]**
Residential SSL[a]					**5.57E+03**	**4.57E+01**	**2.01E+03**	**6.2E+01[e]**	**1.09E+03[l]**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—	0.002 (J)	—	—	—
0100-96-0437	00-04801	7–8	6/5/1996	Soil	0.001 (J+)	0.004 (J+)	—	—	0.002 (J+)
0100-96-0438	00-04802	7–8	6/5/1996	Soil	0.002 (J+)	0.009 (J+)	—	—	0.003 (J+)
0100-96-0439	00-04803	7–8	6/5/1996	Soil	0.003 (J+)	0.008 (J+)	—	—	0.003 (J+)
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	0.002 (J)	—	—	0.001 (J+)
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	0.003 (J+)	0.006 (J+)	—	—	0.004 (J+)
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	0.003 (J+)	0.002 (J)	—	—
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	—	0.002 (J+)	—	—
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	0.004 (J+)	—	—	—
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	0.007 (J+)	—	—	—
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	0.009 (J+)	0.008 (J+)	—	0.002 (J+)	0.012 (J+)
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	0.003 (J+)	0.005 (J+)	—	—	0.003 (J+)
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	—	—	—
RE00-06-66835	00-04812	1.5–2	8/21/2006	Soil	—	—	—	—	—
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	—	—	NA
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	—	—	NA
0100-96-0425	00-04815	13.5–13.5	8/16/1996	Soil	—	—	—	—	NA
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	—	—	—
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	—	—	NA
RE00-06-66827	00-04816	18–18.5	7/24/2006	Qbt 2	—	—	—	—	—
CAPU-10-12571	00-25454	3.5–4	6/8/2010	Soil	NA	—	—	—	NA
RE00-06-66844	00-25455	2.5–3	8/21/2006	Qbt 3	0.000578 (J)	—	—	—	—
RE00-06-66845	00-25455	3–3.5	8/21/2006	Qbt 3	—	—	—	—	—
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	0.000353 (J)	—	—	—	0.000336 (J)
RE00-06-66858	00-25458	0–0.5	8/21/2006	Soil	—	—	—	—	—
RE00-06-66859	00-25458	1–1.5	8/21/2006	Soil	—	—	—	—	—
RE00-06-66860	00-25458	1.5–2	8/21/2006	Soil	—	—	—	—	—
CAPU-10-13136	PU-611540	0–0.5	2/25/2010	Sediment	NA	—	—	—	NA
CAPU-10-13137	PU-611893	0–0.5	2/25/2010	Sediment	NA	—	—	—	NA

Table 6.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Toluene	Trichloroethene	Trichlorofluoromethane	1,2,4-Trimethylbenzene	1,3 -Xylene+1,4-Xylene
Construction Worker SSL[a]					**2.11E+04**	**4.6E+03**	**5.82E+03**	**6.88E+02[c]**	**3.13E+03[l]**
Industrial SSL[a]					**5.79E+04**	**2.53E+02**	**6.76E+03**	**2.6E+02**	**3.61E+03[l]**
Recreational SSL[f]					**6.08E+04**	**1.45E+03**	**4.98E+04**	**6.88E+03[e]**	**2.78E+04[l]**
Residential SSL[a]					**5.57E+03**	**4.57E+01**	**2.01E+03**	**6.2E+01[e]**	**1.09E+03[l]**
CAPU-10-18364	PU-612249	1.5–2	6/4/2010	Soil	NA	—	—	—	NA
CAPU-10-18365	PU-612250	1.5–2	6/4/2010	Soil	NA	—	—	—	NA
CAPU-10-18366	PU-612251	1.5–2	6/4/2010	Soil	NA	—	—	—	NA
CAPU-10-18367	PU-612252[i]	0.5–1	6/8/2010	Soil	NA	—	—	—	NA
CAPU-10-12577	PU-612252	1.5–2	6/8/2010	Soil	NA	—	—	—	NA
CAPU-10-18368	PU-612253	2–2.5	6/8/2010	Soil	NA	—	—	—	NA
CAPU-10-18369	PU-612254	4–4.5	6/8/2010	Qbt 3	NA	—	—	—	NA

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] SSL from LANL (2010, 108613).

[g] — = Not detected or not above BV.

[h] NA = Not analyzed.

[i] Location excluded from risk assessment calculations. See sections 6.4.3.1, 6.4.4 and I-4.2.4.

[j] Di-n-butylphthalate used as surrogate based on structural similarity

[k] Isopropylbenzene used as a surrogate based on structural similarity.

[l] Xylenes used as a surrogate based on structural similarity.

Table 6.4-4
Radionuclides Detected or Detected above BVs/FVs at AOC 00-030(h)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Cesium-137	Plutonium-238	Plutonium-239/240
Qbt 2, 3, 4 BV[a]					**na[b]**	**na**	**na**
Soil BV[a]					**1.65**	**0.023**	**0.054**
Construction Worker SAL[c]					**1.80E+01**	**4.0E+01**	**3.60E+01**
Industrial SAL[c]					**2.30E+01**	**2.4E+02**	**2.10E+02**
Recreational SAL[c]					**2.10E+02**	**3.3E+02**	**3.00E+02**
Residential SAL[c]					**5.60E+00**	**3.7E+01**	**3.30E+01**
0100-96-0403	00-04800	3–3.5	6/5/1996	Soil	—[d]	—	0.181
0100-96-0437	00-04801	7–8	6/5/1996	Soil	—	—	1.7
0100-96-0438	00-04802	7–8	6/5/1996	Soil	—	—	0.347
0100-96-0439	00-04803	7–8	6/5/1996	Soil	—	0.0204	0.0656
0100-96-0407	00-04805	9.5–10	6/6/1996	Soil	—	0.0202	2.51
0100-96-0408	00-04805	11.5–12	6/6/1996	Soil	—	0.027	1.52
0100-96-0411	00-04807	6.5–7	6/6/1996	Soil	—	—	1.24
0100-96-0412	00-04807	10.5–11	6/6/1996	Soil	—	—	1.45
0100-96-0413	00-04808	6–6.5	6/6/1996	Soil	—	—	0.0788
0100-96-0414	00-04808	9.5–10	6/6/1996	Soil	—	—	0.0946
0100-96-0417	00-04810	6–6.5	6/7/1996	Soil	—	—	0.307
0100-96-0418	00-04810	10–10.5	6/7/1996	Soil	—	—	0.82
RE00-06-66831	00-04811	1.5–2	8/21/2006	Soil	—	—	0.458
0100-96-0421	00-04813	13.5–13.5	8/16/1996	Soil	—	—	0.0691
0100-96-0424	00-04814	13.5–13.5	8/16/1996	Soil	—	—	0.0956
RE00-06-66825	00-04816	9–9.5	7/24/2006	Qbt 2	—	—	0.229
0100-96-0426	00-04816	13.5–13.5	8/16/1996	Soil	—	—	0.265
RE00-06-66826	00-04816	16–16.5	7/24/2006	Qbt 2	—	—	0.0167
RE00-06-66855	00-25457	1.5–2	8/21/2006	Soil	0.187	—	0.0317

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SALs are from LANL (2009, 107655).
[d] — = Analyzed for but not detected or not detected above BVs/FVs.

Table 6.5-1
Samples Collected and Analyses Requested for SWMU 31-001

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	TAL Metals	PCBs	Perchlorate	Pesticides/ Herbicides	SVOCs	VOCs	Cyanide
RE31-06-67307	31-01003	0–0.5	9/12/2006	Soil	6081S	6082S	6081S	—*	6081S	6080S	6080S	6080S	6081S
RE31-06-67308	31-01003	2–2.5	9/12/2006	Qbt 2	6081S	6082S	6081S	—	6081S	6080S	6080S	6080S	6081S
RE31-06-67309	31-01003	3.5–4	9/12/2006	Qbt 2	6081S	6082S	6081S	—	6081S	6080S	6080S	6080S	6081S
RE31-06-67312	31-01006	3–3.5	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
RE31-06-67313	31-01006	6–7	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
RE31-06-67314	31-01006	10–10.5	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
RE31-06-67317	31-01008	6.5–7	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
RE31-06-67318	31-01008	10–10.5	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
RE31-06-67319	31-01008	13.5–14	8/15/2006	Qbt 2	5807S	5808S	5807S	—	5807S	5806S	5806S	5806S	5807S
CAPU-10-12584	31-01008	16–17	2/23/2010	Qbt 3	—	—	10-2049	—	—	—	—	—	—
CAPU-10-12585	31-01008	19–20	2/23/2010	Qbt 3	—	—	10-2049	—	—	—	—	—	—
RE31-06-67327	31-25520	0–0.5	9/11/2006	Soil	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-67329	31-25520	3.5–4	9/11/2006	Qbt 2	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-67332	31-25521	0–0.5	9/11/2006	Soil	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-67333	31-25521	1–1.5	9/11/2006	Soil	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-67334	31-25521	3–3.5	9/11/2006	Qbt 2	6070S	6071S	6070S	6069S	6070S	6069S	6069S	6069S	6070S
RE31-06-73521	31-27001	0–0.5	9/13/2006	Soil	6098S	6099S	6098S	6097S	6098S	6097S	6097S	6097S	6098S
RE31-06-73522	31-27001	1–1.5	9/13/2006	Qbt 2	6098S	6099S	6098S	6097S	6098S	6097S	6097S	6097S	6098S
RE31-06-73523	31-27001	2.5–3	9/13/2006	Qbt 2	6098S	6099S	6098S	6097S	6098S	6097S	6097S	6097S	6098S

* — = No sample collected.

Table 6.5-2
Inorganic Chemicals above BVs at SWMU 31-001

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Magnesium	Manganese
Qbt 2, 3, 4 BV[a]					**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**1690**	**482**
Soil BV[a]					**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**4610**	**671**
Construction Worker SSL[b]					**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**[c]	**4.49E+02**[d]	**3.46E+01**[e]	**1.24E+04**	**8.00E+02**	**na**	**4.63E+02**
Industrial SSL[b]					**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.00E+02**[f]	**4.54E+04**	**8.00E+02**	**na**	**1.45E+05**
Recreational SSL[g]					**7.91E+05**	**3.17E+02**	**2.77E+01**	**1.58E+05**	**1.58E+03**	**7.84E+02**	**na**	**1.91E+03**[d]	**2.38E+02**	**3.17E+04**	**5.60E+02**	**na**	**1.10E+05**
Residential SSL[b]					**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**	**2.19E+02**[d]	**2.30E+01**[f]	**3.13E+03**	**4.00E+02**	**na**	**1.07E+04**
RE31-06-67307	31-01003	0–0.5	9/12/2006	Soil	—[h]	—	—	—	—	0.54 (U)	—	—	—	—	—	—	—
RE31-06-67308	31-01003	2–2.5	9/12/2006	Qbt 2	8230	—	4.32	71	—	—	5670	—	—	—	12.3	—	—
RE31-06-67309	31-01003	3.5–4	9/12/2006	Qbt 2	—	—	4.69	55.9	—	—	—	—	—	—	—	—	—
RE31-06-67312	31-01006	3–3.5	8/15/2006	Qbt 2	—	—	5.04	88.2	—	—	3860	—	5.18	6.37	14.8	—	541
RE31-06-67313	31-01006	6–7	8/15/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
RE31-06-67314	31-01006	10–10.5	8/15/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
RE31-06-67317	31-01008	6.5–7	8/15/2006	Qbt 2	—	—	3.61	71.3	—	—	3080	—	—	—	24.9	—	—
RE31-06-67318	31-01008	10–10.5	8/15/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	31.9	—	—
RE31-06-67319	31-01008	13.5–14	8/15/2006	Qbt 2	—	—	3.67	—	—	—	—	—	—	—	46.7	—	—
CAPU-10-12584	31-01008	16–17	2/23/2010	Qbt 3	—	0.989 (U)	—	—	—	—	—	—	—	—	—	—	—
CAPU-10-12585	31-01008	19–20	2/23/2010	Qbt 3	—	0.987 (U)	—	—	—	—	—	—	—	—	13.2	—	—
RE31-06-67327	31-25520	0–0.5	9/11/2006	Soil	—	—	—	—	—	0.569 (U)	—	—	—	—	—	—	—
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	—	—	—	—	—	0.529 (U)	—	—	—	—	—	—	—
RE31-06-67329	31-25520	3.5–4	9/11/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—
RE31-06-67332	31-25521	0–0.5	9/11/2006	Soil	—	—	—	—	—	0.739 (U)	107,000	—	—	41	22.6	4750	—
RE31-06-67333	31-25521	1–1.5	9/11/2006	Soil	—	—	—	—	—	0.584 (U)	20,600	—	—	—	—	—	—
RE31-06-67334	31-25521	3–3.5	9/11/2006	Qbt 2	12,300	—	—	84.2	1.41	—	6260	10.8	—	5.86	—	—	—
RE31-06-73521	31-27001	0–0.5	9/13/2006	Soil	—	—	—	—	—	—	40,900	—	—	—	—	—	—
RE31-06-73522	31-27001	1–1.5	9/13/2006	Qbt 2	—	—	3.04	—	—	—	—	—	—	—	—	—	—
RE31-06-73523	31-27001	2.5–3	9/13/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2, 3, 4 BV[a]					**6.58**	**na[c]**	**na**	**0.3**	**63.5**
Soil BV[a]					**15.4**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[b]					**6.19E+03**	**4.96E+05**	**2.17E+02**	**1.55E+03**	**9.29E+04**
Industrial SSL[b]					**2.27E+04**	**1.82E+06**	**7.95E+02**	**5.68E+03**	**3.41E+05**
Recreational SSL[g]					**1.58E+04**	**1.26E+06**	**5.55E+02**	**3.96E+03**	**2.38E+05**
Residential SSL[b]					**1.56E+03**	**1.25E+05**	**5.48E+01**	**3.91E+02**	**2.35E+04**
RE31-06-67307	31-01003	0–0.5	9/12/2006	Soil	—	1.75	0.00117 (J)	1.62 (U)	—
RE31-06-67308	31-01003	2–2.5	9/12/2006	Qbt 2	—	1.03	0.00118 (J)	1.54 (U)	—
RE31-06-67309	31-01003	3.5–4	9/12/2006	Qbt 2	—	—	0.0023	1.53 (U)	—
RE31-06-67312	31-01006	3–3.5	8/15/2006	Qbt 2	6.75	1.51	0.00756	7.56 (U)	—
RE31-06-67313	31-01006	6–7	8/15/2006	Qbt 2	—	1.21	0.000998 (J)	1.48 (U)	—
RE31-06-67314	31-01006	10–10.5	8/15/2006	Qbt 2	—	1.15	—	1.49 (U)	—
RE31-06-67317	31-01008	6.5–7	8/15/2006	Qbt 2	—	0.83 (J)	0.00182 (J)	7.95 (U)	—
RE31-06-67318	31-01008	10–10.5	8/15/2006	Qbt 2	—	—	—	1.48 (U)	—
RE31-06-67319	31-01008	13.5–14	8/15/2006	Qbt 2	—	—	0.0009 (J)	1.5 (U)	—
CAPU-10-12584	31-01008	16–17	2/23/2010	Qbt 3	—	NA[i]	NA	1.01 (U)	—
CAPU-10-12585	31-01008	19–20	2/23/2010	Qbt 3	—	NA	NA	0.973 (U)	—
RE31-06-67327	31-25520	0–0.5	9/11/2006	Soil	—	1.18	0.000761 (J+)	1.71 (U)	—
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	—	0.835 (J)	0.000856 (J+)	1.59 (U)	—
RE31-06-67329	31-25520	3.5–4	9/11/2006	Qbt 2	—	0.841 (J)	0.00243 (J+)	1.55 (U)	—
RE31-06-67332	31-25521	0–0.5	9/11/2006	Soil	—	1.15 (J)	—	11.1 (U)	99.5
RE31-06-67333	31-25521	1–1.5	9/11/2006	Soil	—	—	—	1.75 (U)	—
RE31-06-67334	31-25521	3–3.5	9/11/2006	Qbt 2	—	—	0.000667 (J+)	1.74 (U)	—
RE31-06-73521	31-27001	0–0.5	9/13/2006	Soil	—	—	0.00165 (J)	2.27 (U)	—
RE31-06-73522	31-27001	1–1.5	9/13/2006	Qbt 2	—	—	—	1.75 (U)	—
RE31-06-73523	31-27001	2.5–3	9/13/2006	Qbt 2	—	—	0.000711 (J)	1.31 (J)	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs are from LANL (1998, 059730).

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na= Not available.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] SSL from LANL (2010, 108613).

[h] — = Not detected or not above BV.

[i] NA = Not analyzed.

Table 6.5-3
Organic Chemicals Detected at SWMU 31-001

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Acetone	Anthracene	Aroclor-1254	Aroclor-1260	Bis(2-ethylhexyl)phthalate	Chrysene	4,4-DDE	4,4-DDT	1,4-Dichlorobenzene	Dieldrin	Di-n-butylphthalate	Fluoranthene
Construction Worker SSL[a]					**2.63E+05**	**6.68E+04**	**4.36E+00**	**7.58E+00**	**4.76E+03**	**2.06E+04**	**4.90E+02**	**1.42E+02**	**3.78E+03**	**1.03E+01**	**2.38E+04**	**8.91E+03**
Industrial SSL[a]					**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**1.37E+03**	**2.34E+03**	**5.63E+01**	**7.81E+01**	**1.80E+02**	**1.20E+00**	**6.84E+04**	**2.44E+04**
Recreational SSL[b]					**7.02E+05**	**1.04E+05**	**6.65E+00**	**1.05E+01**	**1.83E+03**	**3.01E+03**	**7.53E+01**	**1.22E+02**	**1.26E+03**	**1.60E+00**	**3.99E+04**	**1.39E+04**
Residential SSL[a]					**6.75E+04**	**1.72E+04**	**1.12E+00**	**2.22E+00**	**3.47E+02**	**6.21E+02**	**1.43E+01**	**1.72E+01**	**3.22E+01**	**3.04E-01**	**6.11E+03**	**2.29E+03**
RE31-06-67307	31-01003	0–0.5	9/12/2006	Soil	—[c]	—	NA[d]	NA	—	—	0.0121	0.00836	0.000438 (J)	—	—	0.0132 (J)
RE31-06-67308	31-01003	2–2.5	9/12/2006	Qbt 2	—	0.00755 (J)	NA	NA	—	—	0.0309	0.0278 (J)	—	0.000797 (J)	—	0.0128 (J)
RE31-06-67309	31-01003	3.5–4	9/12/2006	Qbt 2	0.00594	—	NA	NA	—	—	0.00436	0.00316 (J)	—	—	—	—
RE31-06-67312	31-01006	3–3.5	8/15/2006	Qbt 2	—	0.0142 (J)	NA	NA	0.291	0.0849	—	—	—	—	0.0772 (J)	0.104
RE31-06-67317	31-01008	6.5–7	8/15/2006	Qbt 2	—	—	NA	NA	0.288	—	—	—	—	—	0.0782 (J)	0.0208 (J)
RE31-06-67327	31-25520	0–0.5	9/11/2006	Soil	—	—	0.0083	—	—	—	0.00182	—	—	—	—	—
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	—	—	—	—	—	—	—	—	0.000288 (J)	—	—	—
RE31-06-67329	31-25520	3.5–4	9/11/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—
RE31-06-67332	31-25521	0–0.5	9/11/2006	Soil	—	—	—	0.355	—	—	—	—	—	—	—	—
RE31-06-67333	31-25521	1–1.5	9/11/2006	Soil	—	—	—	0.0511	—	—	—	—	—	—	—	—
RE31-06-67334	31-25521	3–3.5	9/11/2006	Qbt 2	—	—	—	0.0213	—	—	—	—	—	—	—	—
RE31-06-73521	31-27001	0–0.5	9/13/2006	Soil	—	—	—	0.018	—	—	0.00103 (J)	0.000946 (J)	—	—	—	—
RE31-06-73522	31-27001	1–1.5	9/13/2006	Qbt 2	—	—	—	0.0045	—	—	—	—	—	—	—	—
RE31-06-73523	31-27001	2.5–3	9/13/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Phenanthrene	Pyrene	Tetrachloroethene	Toluene
Construction Worker SSL[a]					**7.15E+03**	**6.68E+03**	**3.38E+02**	**2.11E+04**
Industrial SSL[a]					**2.05E+04**	**1.83E+04**	**3.64E+01**	**5.79E+04**
Recreational SSL[b]					**1.20E+04**	**1.04E+04**	**9.17E+01**	**6.08E+04**
Residential SSL[a]					**1.83E+03**	**1.72E+03**	**6.99E+00**	**5.57E+03**
RE31-06-67307	31-01003	0–0.5	9/12/2006	Soil	—	0.0132 (J)	—	0.000877 (J)
RE31-06-67308	31-01003	2–2.5	9/12/2006	Qbt 2	—	0.013 (J)	—	0.00109
RE31-06-67309	31-01003	3.5–4	9/12/2006	Qbt 2	—	—	—	—
RE31-06-67312	31-01006	3–3.5	8/15/2006	Qbt 2	0.0409	0.168	0.000694 (J)	—
RE31-06-67317	31-01008	6.5–7	8/15/2006	Qbt 2	—	0.0255 (J)	—	—
RE31-06-67327	31-25520	0–0.5	9/11/2006	Soil	—	—	—	—
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	—	—	—	—
RE31-06-67329	31-25520	3.5–4	9/11/2006	Qbt 2	—	—	—	0.000366 (J)
RE31-06-67332	31-25521	0–0.5	9/11/2006	Soil	—	—	—	—
RE31-06-67333	31-25521	1–1.5	9/11/2006	Soil	—	—	—	—
RE31-06-67334	31-25521	3–3.5	9/11/2006	Qbt 2	—	—	—	0.000837 (J)
RE31-06-73521	31-27001	0–0.5	9/13/2006	Soil	—	—	—	—
RE31-06-73522	31-27001	1–1.5	9/13/2006	Qbt 2	—	—	—	0.000457 (J)
RE31-06-73523	31-27001	2.5–3	9/13/2006	Qbt 2	—	—	—	0.00106 (J)

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] SSL from LANL (2010, 108613).

[c] — = Not detected or not above BV.

[d] NA = Not analyzed.

Table 6.5-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 31-001

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Cesium-137
Soil BV[a]					**1.65**
Construction Worker SAL[b]					**1.80E+01**
Industrial SAL[b]					**2.30E+01**
Recreational SAL[b]					**2.10E+02**
Residential SAL[b]					**5.60E+00**
RE31-06-67328	31-25520	1–1.5	9/11/2006	Soil	0.19

Note: All activities are in pCi/g.

[a] BVs are from LANL 1998, 059730.

[b] SALs are from LANL (2009, 107655).

Table 6.6-1
Samples Collected and Analyses Requested for Consolidated Unit 45-001-00

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Tritium	TAL Metals	PAHs	PCBs	Perchlorate	Pesticides/ Herbicides	SVOCs	VOCs	Cyanide
RE45-06-66874	45-01028	0–0.5	7/25/2006	Fill	5626S	—*	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66875	45-01028	1–1.5	7/25/2006	Fill	5626S	—	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66876	45-01028	21–21.5	7/25/2006	Qbt 2	5626S	—	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66877	45-01028	29–29.5	7/25/2006	Qbt 2	5626S	—	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66878	45-01028	39–39.5	7/25/2006	Qbt 2	5626S	—	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66879	45-01028	49–49.5	7/25/2006	Qbt 2	5626S	—	—	5626S	—	5625S	5626S	5625S	5625S	5625S	5626S
RE45-06-66887	45-01029	0–0.5	8/15/2006	Soil	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-66888	45-01029	1–1.5	8/15/2006	Soil	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-66889	45-01029	1.5–2	8/15/2006	Qbt 3	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-66894	45-01033	0–0.5	8/15/2006	Soil	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-66895	45-01033	1–1.5	8/15/2006	Soil	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-66896	45-01033	1.5–2	8/15/2006	Soil	5811S	—	—	5811S	—	5810S	5811S	5810S	5810S	5810S	5811S
RE45-06-68165	45-01034	1.5–2	8/15/2006	Soil	—	—	—	5811S	—	—	—	—	—	—	—
RE45-06-66882	45-01039	0–0.5	8/17/2006	Soil	5875S	5876S	—	5875S	—	5874S	5875S	5874S	5874S	5874S	5875S
RE45-06-66883	45-01039	1–1.5	8/17/2006	Soil	5875S	5876S	—	5875S	—	5874S	5875S	5874S	5874S	5874S	5875S
RE45-06-66884	45-01039	1.5–2	8/17/2006	Qbt 3	5875S	5876S	—	5875S	—	5874S	5875S	5874S	5874S	5874S	5875S
RE45-06-68167	45-01044	1.5–2	8/15/2006	Soil	—	—	—	5811S	—	—	—	—	—	—	—
RE45-06-68169	45-01045	1.5–2	8/15/2006	Soil	—	—	—	5811S	—	—	—	—	—	—	—
RE45-06-68171	45-01046	1.5–2	8/17/2006	Qbt 3	—	—	—	5875S	—	—	—	—	—	—	—
CAPU-10-12594	45-01068	4–5	3/2/2010	Qal	—	—	—	10-2254	—	—	—	—	—	—	—
RE45-06-66904	45-01068	0–0.5	8/17/2006	Soil	5875S	5876S	5876S	5875S	—	5874S	5875S	5874S	5874S	5874S	5875S
RE45-06-66905	45-01068	1–1.5	8/17/2006	Soil	5875S	5876S	5876S	5875S	—	5874S	5875S	5874S	5874S	5874S	5875S
RE45-06-66906	45-01068	1.5–2	8/17/2006	Soil	5875S	5876S	5876S	5875S	—	5874S	5875S	5874S	5874S	—	5875S
CAPU-10-12595	45-01068	7–8	3/2/2010	Qbt 2	—	—	—	10-2254	—	—	—	—	—	—	—
RE45-06-66899	45-01072	0–0.5	8/17/2006	Soil	5875S	5876S	—	5875S	—	5874S	5875S	—	—	—	5875S
RE45-06-66900	45-01072	1–1.5	8/17/2006	Soil	5875S	5876S	—	5875S	—	5874S	5875S	—	—	—	5875S
RE45-06-66901	45-01072	1.5–2	8/17/2006	Soil	5875S	5876S	—	5875S	—	5874S	5875S	—	—	—	5875S
RE45-06-67345	45-25460	0–0.5	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67346	45-25460	1–1.5	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67347	45-25460	1.5–2	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67350	45-25461	0–0.5	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67351	45-25461	1–1.5	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67352	45-25461	1.5–2	8/17/2006	Soil	5878S	5879S	—	5878S	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67355	45-25462	0–0.5	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S

Table 6.6-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anions	Gamma Spectroscopy	Tritium	TAL Metals	PAHs	PCBs	Perchlorate	Pesticides/ Herbicides	SVOCs	VOCs	Cyanide
RE45-06-67356	45-25462	1–1.5	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67357	45-25462	1.5–2	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67360	45-25463	0–0.5	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67361	45-25463	1–1.5	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67362	45-25463	1.5–2	8/17/2006	Soil	5878S	—	—	—	—	5877S	5878S	5877S	5877S	5877S	5878S
RE45-06-67366	45-25464	0–0.5	7/25/2006	Fill	5628S	5629S	—	5628S	5627S	5627S	5628S	—	—	—	5628S
RE45-06-67367	45-25464	1–1.5	7/25/2006	Fill	5628S	5629S	—	5628S	5627S	5627S	5628S	—	—	—	5628S
RE45-06-67368	45-25464	4–4.5	7/25/2006	Qbt 2	5628S	5629S	—	5628S	5627S	5627S	5628S	—	—	—	5628S
RE45-06-67369	45-25464	7–7.5	7/25/2006	Qbt 2	5628S	5629S	—	5628S	5627S	5627S	5628S	—	—	—	5628S
RE45-06-67370	45-25464	12–13	7/25/2006	Qbt 2	5628S	5629S	—	5628S	5627S	5627S	5628S	—	—	—	5628S
CAPU-10-12590	PU-611431	0–1	3/3/2010	Sediment	—	—	—	10-2297	—	—	—	—	—	—	—
CAPU-10-12591	PU-611431	4–5	3/3/2010	Qbt 3	—	—	—	10-2297	—	—	—	—	—	—	—
CAPU-10-12592	PU-611431	7–8	3/3/2010	Qbt 3	—	—	—	10-2297	—	—	—	—	—	—	—
CAPU-10-13855	PU-611753	0–1	3/3/2010	AH	—	—	—	10-2297	—	—	—	—	—	—	—
CAPU-10-13856	PU-611753	1–1.5	3/3/2010	Qbt 2	—	—	—	10-2297	—	—	—	—	—	—	—
CAPU-10-13857	PU-611753	1.5–2	3/3/2010	Qbt 2	—	—	—	10-2297	—	—	—	—	—	—	—

* — = No sample collected.

Table 6.6-2
Inorganic Chemicals above BVs at Consolidated Unit 45-001-00

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt 2, 3, 4 BV[a]					**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**11.2**	**482**	**0.1**	**6.58**	**na**[b]	**na**	**0.3**	**1**	**63.5**
Sediment BV[a]					**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**11.2**	**19.7**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**60.2**
Soil BV[a]					**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]					**1.2E+02**	**4.4E+03**	**1.4E+02**	**3.1E+02**	**na**	**4.5E+02**[d]	**1.2E+04**	**8.0E+02**	**4.6E+02**	**9.3E+01**[e]	**6.2E+03**	**5.0E+05**	**2.2E+02**	**1.6E+03**	**1.6E+03**	**9.3E+04**
Industrial SSL[c]					**4.5E+02**	**2.2E+05**	**2.3E+03**	**1.1E+03**	**na**	**2.9E+03**[d]	**4.5E+04**	**8.0E+02**	**1.5E+05**	**3.1E+02**[f]	**2.3E+04**	**1.8E+06**	**8.0E+02**	**5.7E+03**	**5.7E+03**	**3.4E+05**
Recreational SSL[g]					**3.2E+02**	**1.6E+05**	**1.6E+03**	**7.8E+02**	**na**	**1.9E+03**[d]	**3.2E+04**	**5.6E+02**	**1.1E+05**	**2.4E+02**	**1.6E+04**	**1.3E+06**	**5.6E+02**	**4.0E+03**	**4.0E+03**	**2.4E+05**
Residential SSL[c]					**3.1E+01**	**1.6E+04**	**1.6E+02**	**7.8E+01**	**na**	**2.2E+02**[d]	**3.1E+03**	**4.0E+02**	**1.1E+04**	**2.3E+01**[f]	**1.6E+03**	**1.3E+05**	**5.5E+01**	**3.9E+02**	**3.9E+02**	**2.4E+04**
RE45-06-66874	45-01028	0-0.5	7/25/2006	Fill	—[h]	—	—	0.541 (U)	—	—	—	—	—	—	—	1.15	—	1.62 (U)	—	—
RE45-06-66875	45-01028	1-1.5	7/25/2006	Fill	—	—	—	0.563 (U)	—	—	—	—	—	—	—	1.07 (J)	—	1.69 (U)	—	—
RE45-06-66876	45-01028	21-21.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	4.47	—	1.56 (U)	—	—
RE45-06-66877	45-01028	29-29.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	2.81	—	1.57 (U)	—	—
RE45-06-66878	45-01028	39-39.5	7/25/2006	Qbt 2	—	—	1.23	—	—	—	—	—	—	—	—	6.16	0.000567 (J)	1.66 (U)	—	—
RE45-06-66879	45-01028	49-49.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	2.64	—	1.52 (U)	—	—
RE45-06-66887	45-01029	0-0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	3.39	0.000722 (J)	1.59 (U)	—	—
RE45-06-66888	45-01029	1-1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.28	0.00059 (J)	1.58 (U)	—	—
RE45-06-66889	45-01029	1.5-2	8/15/2006	Qbt 3	—	—	—	—	—	15.3	—	—	—	—	—	1.11	—	1.63 (U)	—	—
RE45-06-66894	45-01033	0-0.5	8/15/2006	Soil	—	—	—	0.544 (U)	—	—	—	—	—	—	—	—	—	1.63 (U)	—	—
RE45-06-66895	45-01033	1-1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	1.28	—	1.63 (U)	—	—
RE45-06-66896	45-01033	1.5-2	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	0.917 (J)	—	1.61 (U)	—	—
RE45-06-68165	45-01034	1.5-2	8/15/2006	Soil	—	—	—	—	6210	—	—	—	—	—	—	NA[i]	NA	1.69 (U)	—	—
RE45-06-66882	45-01039	0-0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	3.11	0.000895 (J-)	1.64 (U)	—	—
RE45-06-66883	45-01039	1-1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	1.72	0.00154 (J-)	1.61 (U)	—	—
RE45-06-66884	45-01039	1.5-2	8/17/2006	Qbt 3	—	—	—	—	—	—	—	16	—	—	—	1.41	0.00612 (J-)	1.6 (U)	—	—
RE45-06-68167	45-01044	1.5-2	8/15/2006	Soil	—	—	—	—	—	—	—	22.6	—	—	—	NA	NA	1.69 (U)	—	—
RE45-06-68169	45-01045	1.5-2	8/15/2006	Soil	—	—	—	0.501 (U)	—	—	—	—	—	—	—	NA	NA	—	—	—
RE45-06-68171	45-01046	1.5-2	8/17/2006	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	NA	NA	0.684 (J)	—	—
CAPU-10-12594	45-01068	4-5	3/2/2010	Qal	1.36 (UJ)	—	—	0.678 (U)	—	—	—	—	—	—	—	NA	NA	—	—	—
RE45-06-66904	45-01068	0-0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	0.108	—	1.71	—	1.86 (U)	1.45	51.1
RE45-06-66905	45-01068	1-1.5	8/17/2006	Soil	—	—	—	—	—	—	22.1	38.6	—	1.57	—	2.57	—	1.96 (U)	6.76	88.3
RE45-06-66906	45-01068	1.5-2	8/17/2006	Soil	—	—	—	—	—	—	17.6	38.9	—	0.902	—	—	—	1.77 (U)	10	72
CAPU-10-12595	45-01068	7-8	3/2/2010	Qbt 2	1.41 (UJ)	—	—	—	—	38.6 (J)	—	—	685 (J+)	—	—	NA	NA	1.33 (U)	—	79.4 (J+)
RE45-06-66899	45-01072	0-0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	4.94	0.00108 (J-)	1.68 (U)	—	—
RE45-06-66900	45-01072	1-1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	17	3.11	0.00133 (J-)	—	—	—
RE45-06-66901	45-01072	1.5-2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.45	0.00261 (J-)	1.69 (U)	—	—

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt 2, 3, 4 BV[a]					**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**11.2**	**482**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**1**	**63.5**
Sediment BV[a]					**0.83**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**11.2**	**19.7**	**543**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1**	**60.2**
Soil BV[a]					**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]					**1.2E+02**	**4.4E+03**	**1.4E+02**	**3.1E+02**	**na**	**4.5E+02[d]**	**1.2E+04**	**8.0E+02**	**4.6E+02**	**9.3E+01[e]**	**6.2E+03**	**5.0E+05**	**2.2E+02**	**1.6E+03**	**1.6E+03**	**9.3E+04**
Industrial SSL[c]					**4.5E+02**	**2.2E+05**	**2.3E+03**	**1.1E+03**	**na**	**2.9E+03[d]**	**4.5E+04**	**8.0E+02**	**1.5E+05**	**3.1E+02[f]**	**2.3E+04**	**1.8E+06**	**8.0E+02**	**5.7E+03**	**5.7E+03**	**3.4E+05**
Recreational SSL[g]					**3.2E+02**	**1.6E+05**	**1.6E+03**	**7.8E+02**	**na**	**1.9E+03[d]**	**3.2E+04**	**5.6E+02**	**1.1E+05**	**2.4E+02**	**1.6E+04**	**1.3E+06**	**5.6E+02**	**4.0E+03**	**4.0E+03**	**2.4E+05**
Residential SSL[c]					**3.1E+01**	**1.6E+04**	**1.6E+02**	**7.8E+01**	**na**	**2.2E+02[d]**	**3.1E+03**	**4.0E+02**	**1.1E+04**	**2.3E+01[f]**	**1.6E+03**	**1.3E+05**	**5.5E+01**	**3.9E+02**	**3.9E+02**	**2.4E+04**
RE45-06-67345	45-25460	0–0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.04	—	1.61 (U)	—	—
RE45-06-67346	45-25460	1–1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	1.45	—	1.7 (U)	—	—
RE45-06-67347	45-25460	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.56	—	1.65 (U)	—	—
RE45-06-67350	45-25461	0-0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	2.13	0.000695 (J-)	1.66 (U)	—	50.6
RE45-06-67351	45-25461	1-1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	0.151	—	—	0.000839 (J-)	1.58 (U)	—	—
RE45-06-67352	45-25461	1.5-2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.00129 (J-)	1.66 (U)	—	—
RE45-06-67355	45-25462	0-0.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	—	NA	NA	NA
RE45-06-67357	45-25462	1.5-2	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—	0.000679 (J-)	NA	NA	NA
RE45-06-67360	45-25463	0-0.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.71	0.00403 (J-)	NA	NA	NA
RE45-06-67361	45-25463	1-1.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.34	0.0072 (J-)	NA	NA	NA
RE45-06-67362	45-25463	1.5-2	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.23	0.00948 (J-)	NA	NA	NA
RE45-06-67366	45-25464	0-0.5	7/25/2006	Fill	—	—	—	0.521 (U)	—	—	—	—	—	—	—	—	—	1.56 (U)	—	—
RE45-06-67367	45-25464	1-1.5	7/25/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—	0.000722 (J)	—	1.04	—
RE45-06-67368	45-25464	4-4.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	—	1.55 (U)	—	—
RE45-06-67369	45-25464	7-7.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	634	—	—	—	0.000702 (J)	1.55 (U)	—	—
RE45-06-67370	45-25464	12-13	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—	0.000726 (J)	1.54 (U)	—	—
CAPU-10-12590	PU-611431	0-1	3/3/2010	Sediment	1.02 (U)	—	—	0.512 (U)	—	—	—	—	—	—	—	NA	NA	1.16 (U)	—	—
CAPU-10-12591	PU-611431	4-5	3/3/2010	Qbt 3	1.18 (U)	—	—	—	—	—	—	—	—	0.236	—	NA	NA	1.12 (U)	—	—
CAPU-10-12592	PU-611431	7-8	3/3/2010	Qbt 3	1.22 (U)	—	—	—	—	—	—	—	—	—	—	NA	NA	1.17 (U)	—	—
CAPU-10-13855	PU-611753	0-1	3/3/2010	AH	1.24 (U)	—	—	—	—	—	—	25.7	—	1.43	—	NA	NA	—	2.26	62.4
CAPU-10-13856	PU-611753	1-1.5	3/3/2010	Qbt 2	1.28 (U)	134	—	—	—	10.2 (J)	17.4 (U)	33.6	—	0.468	—	NA	NA	1.24 (U)	9.55	81.4
CAPU-10-13857	PU-611753	1.5-2	3/3/2010	Qbt 2	1.2 (U)	53.3	—	—	—	—	6.37 (U)	15.9	—	0.391	—	NA	NA	1.25 (U)	2.33	—

Notes: All concentrations are in 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] SSL from LANL (2010, 108613).

[h] — = Not detected or not above BV.

[i] NA = Not analyzed.

Table 6.6-3
Organic Chemicals Detected at Consolidated Unit 45-001-00

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**2.06E+03**	**9.52E+05[b]**	**4.76E+03**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**2.34E+02**	**2.50E+06[c]**	**1.37E+03**
Recreational SSL[d]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**3.01E+02**	**1.59E+06**	**1.83E+03**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**6.21E+01**	**2.40E+05[c]**	**3.47E+02**
RE45-06-66874	45-01028	0–0.5	7/25/2006	Fill	0.136 (J)	—[e]	0.132 (J)	—	—	—	—	0.132 (J)	0.13 (J)	0.173 (J)	4.88 (J)	—
RE45-06-66875	45-01028	1–1.5	7/25/2006	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66878	45-01028	39–39.5	7/25/2006	Qbt 2	—	0.0064 (J)	—	—	—	—	—	—	—	—	—	—
RE45-06-66879	45-01028	49–49.5	7/25/2006	Qbt 2	0.0125 (J)	—	0.0107 (J)	—	—	—	—	—	0.0113 (J)	0.0107 (J)	0.467 (J)	—
RE45-06-66887	45-01029	0–0.5	8/15/2006	Soil	—	—	—	—	0.0592 (J-)	0.16 (J-)	—	—	—	—	—	—
RE45-06-66888	45-01029	1–1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66889	45-01029	1.5–2	8/15/2006	Qbt 3	—	—	—	—	0.0021 (J)	0.002 (J)	—	—	—	—	—	—
RE45-06-66894	45-01033	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66895	45-01033	1–1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66896	45-01033	1.5–2	8/15/2006	Soil	—	—	—	—	—	0.0044	—	—	—	—	—	—
RE45-06-66882	45-01039	0–0.5	8/17/2006	Soil	—	—	0.00874 (J)	0.0166	0.0226	0.01	—	—	0.0529 (J)	—	—	—
RE45-06-66883	45-01039	1–1.5	8/17/2006	Soil	0.0197 (J)	—	0.0358 (J)	—	0.005	0.0034 (J)	0.123	—	0.22 (J)	—	—	—
RE45-06-66884	45-01039	1.5–2	8/17/2006	Qbt 3	—	—	0.0146 (J)	—	—	0.0034 (J)	0.0632	—	0.11 (J)	—	—	—
RE45-06-66904	45-01068	0–0.5	8/17/2006	Soil	—	—	0.0185 (J)	—	0.0318	0.0116	—	—	—	—	—	0.12 (J)
RE45-06-66905	45-01068	1–1.5	8/17/2006	Soil	0.0446	0.0147 (J)	0.0808	—	0.0113	0.0036 (J)	—	0.17	0.274	—	—	0.0935 (J)
RE45-06-66906	45-01068	1.5–2	8/17/2006	Soil	0.0382 (J)	NA[f]	0.0459	—	0.0363	0.0125	—	—	—	—	0.203 (J)	—
RE45-06-66899	45-01072	0–0.5	8/17/2006	Soil	NA	NA	NA	—	0.0049	0.0043 (J)	NA	NA	NA	NA	NA	NA
RE45-06-66900	45-01072	1–1.5	8/17/2006	Soil	NA	NA	NA	—	0.0075	0.0046 (J)	NA	NA	NA	NA	NA	NA
RE45-06-67345	45-25460	0–0.5	8/17/2006	Soil	—	—	—	—	—	0.0048	—	—	—	—	—	—
RE45-06-67346	45-25460	1–1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-67347	45-25460	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-67350	45-25461	0–0.5	8/17/2006	Soil	—	—	—	—	0.0057	0.0075	—	—	—	—	—	—
RE45-06-67351	45-25461	1–1.5	8/17/2006	Soil	—	—	—	—	—	0.011 (J-)	—	—	—	—	—	—

Table 6.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate
Construction Worker SSL[a]					**1.86E+04**	**2.63E+05**	**6.68E+04**	**7.58E+00**	**4.36E+00**	**7.58E+00**	**2.13E+02**	**2.13E+01**	**2.13E+02**	**2.06E+03**	**9.52E+05**[b]	**4.76E+03**
Industrial SSL[a]					**3.67E+04**	**8.51E+05**	**1.83E+05**	**8.26E+00**	**8.26E+00**	**8.26E+00**	**2.34E+01**	**2.34E+00**	**2.34E+01**	**2.34E+02**	**2.50E+06**[c]	**1.37E+03**
Recreational SSL[d]					**2.08E+04**	**7.02E+05**	**1.04E+05**	**1.05E+01**	**6.65E+00**	**1.05E+01**	**3.01E+01**	**3.01E+00**	**3.01E+01**	**3.01E+02**	**1.59E+06**	**1.83E+03**
Residential SSL[a]					**3.44E+03**	**6.75E+04**	**1.72E+04**	**2.22E+00**	**1.12E+00**	**2.22E+00**	**6.21E+00**	**6.21E-01**	**6.21E+00**	**6.21E+01**	**2.40E+05**[c]	**3.47E+02**
RE45-06-67352	45-25461	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-67357	45-25462	1.5–2	8/17/2006	Soil	—	0.0257	—	—	—	—	—	—	—	—	—	—
RE45-06-67360	45-25463	0–0.5	8/17/2006	Soil	—	—	—	—	0.0053	0.0033 (J)	—	—	—	—	—	—
RE45-06-67361	45-25463	1–1.5	8/17/2006	Soil	—	0.00477 (J)	—	—	0.0096 (J)	0.0028 (J)	—	—	—	—	—	—
RE45-06-67362	45-25463	1.5–2	8/17/2006	Soil	—	—	—	0.0207	0.0098 (J)	—	—	—	—	—	—	—
RE45-06-67367	45-25464	1–1.5	7/25/2006	Fill	—	NA	—	—	—	—	0.0754	0.0516	0.132	—	NA	NA
RE45-06-67368	45-25464	4–4.5	7/25/2006	Qbt 2	—	NA	—	—	—	—	—	—	—	—	NA	NA

Table 6.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Chloroform	Chrysene	4,4-DDE	4,4-DDT	1,1-Dichloroethene	Dieldrin	Diethylphthalate	4,6-Dinitro-2-methylphenol	Ethylbenzene	Fluoranthene	Fluorene	4-Isopropyltoluene
Construction Worker SSL[a]					**6.71E+02**	**2.06E+04**	**4.90E+02**	**1.42E+02**	**1.83E+03**	**1.03E+01**	**1.91E+05**	**2.38E+01**	**6.63E+03**	**8.91E+03**	**8.91E+03**	**1.03E+04[g]**
Industrial SSL[a]					**3.19E+01**	**2.34E+03**	**5.63E+01**	**7.81E+01**	**2.22E+03**	**1.20E+00**	**5.47E+05**	**6.48E+01**	**3.85E+02**	**2.44E+04**	**2.44E+04**	**1.49E+04[g]**
Recreational SSL[d]					**2.24E+02**	**3.01E+03**	**7.53E+01**	**1.22E+02**	**1.38E+04**	**1.60E+00**	**3.19E+05**	**3.99E+01**	**2.06E+03**	**1.39E+04**	**1.39E+04**	**5.27E+04[g]**
Residential SSL[a]					**5.72E+00**	**6.21E+02**	**1.43E+01**	**1.72E+01**	**6.18E+02**	**3.04E-01**	**4.89E+04**	**6.11E+00**	**6.97E+01**	**2.29E+03**	**2.29E+03**	**3.21E+03[g]**
RE45-06-66874	45-01028	0–0.5	7/25/2006	Fill	—	0.173 (J)	—	—	—	—	1.23 (J)	3.79	—	0.144 (J)	—	—
RE45-06-66875	45-01028	1–1.5	7/25/2006	Fill	—	—	—	—	—	—	1.01 (J)	—	—	—	—	—
RE45-06-66878	45-01028	39–39.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66879	45-01028	49–49.5	7/25/2006	Qbt 2	—	0.0112 (J)	—	—	—	—	—	0.352	—	0.0107 (J)	—	—
RE45-06-66887	45-01029	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66888	45-01029	1–1.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	0.034 (J)	—	—
RE45-06-66889	45-01029	1.5–2	8/15/2006	Qbt 3	—	—	—	—	—	—	—	—	—	0.0126 (J)	—	—
RE45-06-66894	45-01033	0–0.5	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	0.0157 (J)	—	—
RE45-06-66895	45-01033	1–1.5	8/15/2006	Soil	—	0.0178 (J)	0.0198 (J)	0.0278 (J)	—	—	—	—	—	0.0298 (J)	—	—
RE45-06-66896	45-01033	1.5–2	8/15/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-66882	45-01039	0–0.5	8/17/2006	Soil	—	0.0406	—	—	—	—	—	—	—	0.0721	—	—
RE45-06-66883	45-01039	1–1.5	8/17/2006	Soil	—	0.125	—	—	—	—	—	—	—	0.197	0.0208 (J)	—
RE45-06-66884	45-01039	1.5–2	8/17/2006	Qbt 3	—	0.0692	—	—	—	—	—	—	—	0.0991	—	0.000419 (J)
RE45-06-66904	45-01068	0–0.5	8/17/2006	Soil	—	—	—	0.00766 (J)	—	—	—	—	—	0.103	0.0152 (J)	—
RE45-06-66905	45-01068	1–1.5	8/17/2006	Soil	—	0.154	—	—	—	—	—	—	—	0.31	0.0603	0.000897 (J)
RE45-06-66906	45-01068	1.5–2	8/17/2006	Soil	NA	0.0985	—	0.00865 (J)	NA	—	—	—	NA	0.194	0.0562	NA
RE45-06-66899	45-01072	0–0.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE45-06-66900	45-01072	1–1.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE45-06-67345	45-25460	0–0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	0.0302 (J)	—	—
RE45-06-67346	45-25460	1–1.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-67347	45-25460	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	0.000221 (J)	0.0282 (J)	—	—
RE45-06-67350	45-25461	0–0.5	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	0.204	—	—
RE45-06-67351	45-25461	1–1.5	8/17/2006	Soil	—	—	—	—	0.00109 (J)	—	—	—	—	—	—	—
RE45-06-67352	45-25461	1.5–2	8/17/2006	Soil	—	—	—	—	—	0.0118 (J)	—	—	—	—	—	—
RE45-06-67357	45-25462	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE45-06-67360	45-25463	0–0.5	8/17/2006	Soil	0.000574 (J)	—	0.000653 (J)	—	—	—	—	—	—	0.0333 (J)	—	—
RE45-06-67361	45-25463	1–1.5	8/17/2006	Soil	0.000446 (J)	—	0.00126 (J)	0.000393 (J)	—	—	—	—	—	0.0219 (J)	—	—
RE45-06-67362	45-25463	1.5–2	8/17/2006	Soil	0.000909 (J)	—	0.000981 (J)	—	—	—	—	—	—	—	—	—
RE45-06-67367	45-25464	1–1.5	7/25/2006	Fill	NA	0.0753	NA	NA	NA	NA	NA	NA	NA	0.115	—	NA
RE45-06-67368	45-25464	4–4.5	7/25/2006	Qbt 2	NA	—	NA	NA	NA	NA	NA	NA	NA	—	—	NA

Table 6.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	4-Methyl-2-pentanone	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Toluene	1,2,4-Trimethylbenzene	1,2-Xylene	1,3-Xylene+1,4-Xylene
Construction Worker SSL[a]					**2.31E+04**	**1.24E+03**[b]	**7.02E+02**	**7.15E+03**	**6.68E+03**	**2.11E+04**	**6.88E+02**[b]	**2.75E+04**	**3.13E+03**[h]
Industrial SSL[a]					**7.33E+04**	**4.10E+03**[c]	**2.52E+02**	**2.05E+04**	**1.83E+04**	**5.79E+04**	**2.60E+02**[c]	**3.15E+04**	**3.61E+03**[h]
Recreational SSL[d]					**6.23E+04**	**3.17E+03**	**1.95E+03**	**1.20E+04**	**1.04E+04**	**6.08E+04**	**6.88E+03**	**2.48E+05**	**2.78E+04**[h]
Residential SSL[a]					**5.95E+03**	**3.10E+02**[c]	**4.50E+01**	**1.83E+03**	**1.72E+03**	**5.57E+03**	**6.20E+01**[c]	**9.55E+03**	**1.09E+03**[h]
RE45-06-66874	45-01028	0–0.5	7/25/2006	Fill	—	0.116 (J)	—	0.149 (J)	0.15 (J)	0.00242	0.000235 (J)	—	—
RE45-06-66875	45-01028	1–1.5	7/25/2006	Fill	—	—	—	—	—	0.00371	—	—	0.000301 (J)
RE45-06-66878	45-01028	39–39.5	7/25/2006	Qbt 2	—	—	—	—	—	—	—	—	—
RE45-06-66879	45-01028	49–49.5	7/25/2006	Qbt 2	0.0018 (J)	0.0121 (J)	—	0.0129 (J)	0.0113 (J)	—	—	—	—
RE45-06-66887	45-01029	0–0.5	8/15/2006	Soil	—	—	—	—	0.0529 (J)	—	—	—	—
RE45-06-66888	45-01029	1–1.5	8/15/2006	Soil	—	—	—	0.0227 (J)	0.0371	—	—	—	—
RE45-06-66889	45-01029	1.5–2	8/15/2006	Qbt 3	—	—	—	—	0.0147 (J)	—	—	—	—
RE45-06-66894	45-01033	0–0.5	8/15/2006	Soil	—	—	—	—	0.0139 (J)	—	—	—	—
RE45-06-66895	45-01033	1–1.5	8/15/2006	Soil	—	—	—	0.0198 (J)	0.0401	—	—	—	—
RE45-06-66896	45-01033	1.5–2	8/15/2006	Soil	—	—	—	—	—	—	—	—	—
RE45-06-66882	45-01039	0–0.5	8/17/2006	Soil	—	—	—	0.0481	0.0846	—	—	—	—
RE45-06-66883	45-01039	1–1.5	8/17/2006	Soil	—	0.00843 (J)	0.0207 (J)	0.176	0.24	—	—	—	—
RE45-06-66884	45-01039	1.5–2	8/17/2006	Qbt 3	—	—	—	0.0695	0.113	—	—	—	—
RE45-06-66904	45-01068	0–0.5	8/17/2006	Soil	—	—	0.0218 (J)	0.0938	0.123	0.00126 (J)	—	—	—
RE45-06-66905	45-01068	1–1.5	8/17/2006	Soil	—	0.0335 (J)	0.0985	0.323	0.295	—	—	—	—
RE45-06-66906	45-01068	1.5–2	8/17/2006	Soil	NA	0.037 (J)	0.123	0.258	0.214	NA	NA	NA	NA
RE45-06-66899	45-01072	0–0.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE45-06-66900	45-01072	1–1.5	8/17/2006	Soil	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE45-06-67345	45-25460	0–0.5	8/17/2006	Soil	—	—	—	0.0181 (J)	0.0303 (J)	—	—	—	—
RE45-06-67346	45-25460	1–1.5	8/17/2006	Soil	—	—	—	—	0.0185 (J)	—	—	—	—
RE45-06-67347	45-25460	1.5–2	8/17/2006	Soil	—	—	—	—	0.0392	0.000532 (J)	—	0.000213 (J)	0.000655 (J)
RE45-06-67350	45-25461	0–0.5	8/17/2006	Soil	—	—	—	0.0311 (J)	0.277 (J)	0.00155	—	—	—
RE45-06-67351	45-25461	1–1.5	8/17/2006	Soil	—	—	—	—	—	0.00155	—	—	—
RE45-06-67352	45-25461	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—
RE45-06-67357	45-25462	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	—
RE45-06-67360	45-25463	0–0.5	8/17/2006	Soil	—	—	—	0.0306 (J)	0.0617 (J)	—	—	—	—
RE45-06-67361	45-25463	1–1.5	8/17/2006	Soil	—	—	—	0.0244 (J)	0.0457 (J)	0.000815 (J)	—	—	—
RE45-06-67362	45-25463	1.5–2	8/17/2006	Soil	—	—	—	—	—	—	—	—	0.000357 (J)

Table 6.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	4-Methyl-2-pentanone	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Toluene	1,2,4-Trimethylbenzene	1,2-Xylene	1,3-Xylene+1,4-Xylene
Construction Worker SSL[a]					**2.31E+04**	**1.24E+03**[b]	**7.02E+02**	**7.15E+03**	**6.68E+03**	**2.11E+04**	**6.88E+02**[b]	**2.75E+04**	**3.13E+03**[h]
Industrial SSL[a]					**7.33E+04**	**4.10E+03**[c]	**2.52E+02**	**2.05E+04**	**1.83E+04**	**5.79E+04**	**2.60E+02**[c]	**3.15E+04**	**3.61E+03**[h]
Recreational SSL[d]					**6.23E+04**	**3.17E+03**	**1.95E+03**	**1.20E+04**	**1.04E+04**	**6.08E+04**	**6.88E+03**	**2.48E+05**	**2.78E+04**[h]
Residential SSL[a]					**5.95E+03**	**3.10E+02**[c]	**4.50E+01**	**1.83E+03**	**1.72E+03**	**5.57E+03**	**6.20E+01**[c]	**9.55E+03**	**1.09E+03**[h]
RE45-06-67367	45-25464	1–1.5	7/25/2006	Fill	NA	NA	—	0.0372	0.106	NA	NA	NA	NA
RE45-06-67368	45-25464	4–4.5	7/25/2006	Qbt 2	NA	NA	—	—	0.0132	NA	NA	NA	NA

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] 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] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSLs from LANL (2010, 108163).

[e] — = Not detected or not above BV.

[f] NA = Not analyzed.

[g] Isopropylbenzene used as a surrogate based on structural similarity.

[h] Xylenes used as a surrogate based on structural similarity.

Table 6.6-4
Radionuclides Detected or Detected above BVs/FVs at Consolidated Unit 45-001-00

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Cesium-137	Tritium
Soil BV[a]					**1.65**	**na**[b]
Construction Worker SAL[c]					**1.80E+01**	**3.20E+05**
Industrial SAL[c]					**2.30E+01**	**4.40E+05**
Recreational SAL[c]					**2.10E+02**	**5.30E+06**
Residential SAL[c]					**5.60E+00**	**7.50E+02**
RE45-06-66904	45-01068	0–0.5	8/17/2006	Soil	—[d]	0.125969
RE45-06-66905	45-01068	1–1.5	8/17/2006	Soil	0.162	—
RE45-06-66906	45-01068	1.5–2	8/17/2006	Soil	0.365	—
RE45-06-66900	45-01072	1–1.5	8/17/2006	Soil	0.157	NA[e]
RE45-06-67352	45-25461	1.5–2	8/17/2006	Soil	0.206	NA

Note: All activities are in pCi/g.

[a] BVs are from LANL (1998, 059730).

[b] na = Not available.

[c] SALs are from LANL (2009, 107655), unless otherwise noted.

[d] — = Analyzed for but not detected.

[e] NA = Not analyzed.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
ALARA	as low as reasonably achievable
amsl	above mean sea level
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
CFR	Code of Federal Regulations
COC	chain of custody
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cpm	counts per minute
CVAA	cold vapor atomic absorption
%D	percent difference
D&D	decontamination and decommissioning
DAF	dilution attenuation factor
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DL	detection limit
DOE	Department of Energy (U.S.)
dpm	disintegrations per minute
EC	effect concentration
EDL	estimated detection limit
Eh	oxidation reduction potential
EP	Environmental Programs Directorate
EPA	Environmental Protection Agency (U.S.)
EPC	exposure point concentration
EQL	estimated quantitation limit
ESL	ecological screening level

eV	electron-volt
FV	fallout value
GC/MS	gas chromatography-mass spectrometry
GIS	geographical information system
GPR	ground-penetrating radar
GPS	global-positioning system
GRO	gasoline range organic
HI	hazard index
HR	home range
HSA	hollow-stem auger
HQ	hazard quotient
ICPMS	inductively coupled plasma mass spectroscopy
ICS	interference check sample
ICV	initial calibration verification
ID	identification
I.D.	inside diameter
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
LAHS	Los Alamos High School
LAL	lower acceptance limit
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LD	lethal dose
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
LLW	low-level waste
MATC	maximum allowable toxic concentration
MDA	minimum detectable activity
MDC	minimum detectable concentration
MDL	method detection limit
MS	matrix spike

NMED	New Mexico Environment Department
NMSA	New Mexico Statues Annotated
NOAEL	no observed adverse effect level
NOD	notice of disapproval
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
O.D.	outside diameter
PAH	polycyclic aromatic hydrocarbon
PAUF	population area use factor
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PQL	practical quantitation limit
PRG	preliminary remediation goal
QA/QC	quality assurance/quality control
%R	percent recovery
%RSD	percent relative standard difference
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RDA	recommended daily allowance
RESRAD	residual radioactive (model)
RfD	reference dose
RL	reporting limit
RFI	RCRA facility investigation
RME	reasonable maximum exposure
RPD	relative percent difference
RPF	Records Processing Facility
RSD	relative standard 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
T&E	threatened and endangered
TA	technical area
TAL	target analyte list
TCE	trichloroethylene
TPU	total propagated uncertainty
TRV	toxicity reference value
UAL	upper acceptance limit
UCL	upper confidence limit
UTL	upper tolerance limit
VCA	voluntary corrective action
VCP	vitrified clay pipe
VOC	volatile organic compound
WCSF	waste characterization strategy form
WWTP	wastewater treatment plant

A-2.0 METRIC CONVERSION TABLE

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

A-3.0 DATA QUALIFIER DEFINITIONS

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

Appendix B

Field Methods

B-1.0 INTRODUCTION

This appendix describes field methods used during Phase II investigations at the Pueblo Canyon Aggregate Area sites, including Solid Waste Management Unit (SWMU) 00-018(a), Areas of Concern (AOCs) 00-030(eS), 00-030(f), and 00-030(h), SWMU 31-001, and Consolidated Unit 45-001-00. Characterization and remediation activities occurred from February 2010 to June 2010. All activities were conducted in accordance with the current versions of applicable Los Alamos National Laboratory (LANL or the Laboratory), Environmental Programs (EP) standard operating procedures (SOPs). All field activities conducted for the Pueblo Canyon Aggregate Area are described in the approved Phase II investigation work plan, (LANL 2008, 104580) and the "Work Plan for Installation of Stormwater Controls at Area of Concern 00-030(f)" (LANL 2009, 105088). These activities included the following:

- Conducting geodetic surveys to locate SWMUs/AOCs, historical sampling locations, and new sampling locations.
- Drilling 14 vertical boreholes to collect subsurface soil and tuff samples.
- Collecting surface and subsurface soil and tuff samples using the hand-auger and spade-and-scoop methods.
- Conducting radiological surveys for gross alpha- and beta-/gamma-emitting radionuclides of borehole core samples, surface and subsurface soil, and tuff samples.
- Excavating and removing soil, sediment, and debris at AOC 00-030(h). Environmental material from the excavated area was loaded into waste bins and waste characterization samples were collected.
- Collecting confirmation soil and tuff samples following excavation activities at AOC 00-030(h).
- Documenting field activities on a daily basis.

The following sections describe specific field methods used in the characterization and remediation activities at the sites associated with the Pueblo Canyon Aggregate Area. Table B-1.0-1 provides a summary of the field methods.

B-2.0 EXPLORATORY DRILLING CHARACTERIZATION

Fourteen vertical boreholes were advanced and sampled using a CME-55 hollow-stem auger (HSA) drill rig equipped with nominal 8.25-in. augers using a stainless-steel, continuous core barrel sampling system. Sampling followed SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials.

B-2.1 Borehole Logging

Lithologic logs were completed for all boreholes during the field investigation. All boreholes were continuously sampled and logged in 5-ft intervals in accordance with SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials. Information recorded in borehole logs included footage and recovery in feet, lithology, sample-collection depth, field-screening results for radioactivity and organic vapors, completion time of core logging, and other relevant observations.

The lithologic description for each core interval included the following:

- color (using a Munsell soil-color chart)
- matrix composition, volume, and size
- degree of compaction or welding of matrix material (as applicable)
- presence and size of crystals (in tuff) or phenocrysts (in basalt)
- presence of clasts (in sedimentary rocks) or pumice fragments (in tuff) with color, size, alteration, and color, size, and nature of phenocrysts
- staining and/or presence of clay-filled fracture zones
- angle, thickness, and density of fractures, if present or preserved
- qualitative description of moisture content
- any other information pertinent to the geology of the core recovered

Completed borehole logs are presented in Appendix C.

B-2.2 Borehole Abandonment

The boreholes drilled during the Phase II field investigation were permanently abandoned in accordance with SOP-5034, Monitor Well and RFI Borehole Abandonment.

All 14 boreholes were less than 40 ft below ground surface (bgs) and were abandoned by placing grout from the bottom up into the borehole. Care was taken to ensure that the grout did not bridge or form gaps or voids within the borehole. A small amount of hydrated Quikrete Concrete mix was used from 2 ft bgs to ground surface, to form a surface seal.

B-3.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used during the 2010 drilling, sampling, and remediation activities conducted at the SWMUs, AOCs, and consolidated unit associated with the Phase II investigation. Field-screening results collected during drilling, sampling, and remediation activities are provided in Table 3.2-1 of the investigation report.

B-3.1 Field Screening for Organic Vapors

Organic vapor screening was conducted using a MiniRAE 2000 portable volatile organic compound (VOC) photoionization detector (PID). Field screening for organic vapors was conducted during drilling, sampling, and remediation activities according to SOP-06.33, Headspace Vapor Screening with a Photo Ionization Detector. The PID was equipped with an 11.7-electronvolt (eV) lamp with sensitivity to 1 ppm. A background check for the PID was obtained by sealing air in a foil-sealed container, allowing the container to equilibrate for 5 min, and then inserting the PID probe through the foil and recording the measurement.

During drilling, screening was performed by removing sampling material from the core-barrel sampler, sealing it in a foil-sealed container, allowing the container to equilibrate for 5 min, and then inserting the PID probe through the foil and recording the measurement. A new foil-sealed container was used for each screening test performed to avoid potential cross contamination. All readings were recorded in parts per million and are provided in Table 3.2-1 of the investigation report.

During collection of subsurface samples using the hand auger or excavation method, screening was performed by the same method described above. All readings were recorded in parts per million and are provided in Table 3.2-1 of the investigation report.

B-3.2 Field Screening for Radioactivity

Field screening for radioactivity was conducted during drilling, sampling, and remediation activities. Each sample was screened for alpha- and beta-/gamma-emitting radioactivity by a radiation control technician (RCT) using an Eberline E-600 radiation meter with an SHP-380AB alpha/beta scintillation detector held within 1 in. of the core barrel. 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 for detecting beta emissions and is thinly coated with zinc sulfide for detecting alpha emissions. The operational range varies from trace emissions to 1,000,000 disintegrations per minute (dpm).

Local background levels for radioactivity were measured in ambient air and were calculated daily using the following procedure. To determine the minimum detectable activity (the instrument's lowest detection limit) in the field with the SHP-380AB attachment, a background reading was obtained. The minimum detectable activity was calculated as follows: minimum detectable activity = 2.71 + 4.65/(Rb × 0.2) 0.2, where Rb is the background rate in counts per minute (cpm). The minimum detectable activity was then converted from cpm to dpm, where efficiency was assumed to be 20% for the SHP-380AB attachment based on the manufacturer's specifications. All field results for radioactivity were recorded in dpm in the sample collection log (SCL)/chain of custody (COC) forms and borehole logs. The screening results are presented in Table 3.2-1 of the investigation report.

B-3.3 PID Calibration

The PID was calibrated in the field, 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 1% of 100 ppm isobutylene, qualifying the instrument for use.

The following calibration information was recorded in the field log book and/or health and safety monitoring field form:

- instrument identification (ID) number
- date and time
- concentration and type of calibration gas used (isobutylene at 100 ppm)

All calibration procedures for the MiniRAE 2000 PID met the manufacturer's specifications for standard reference gas calibration.

B-3.4 Eberline E-600 Instrument Calibration

The Eberline E-600 was calibrated in the field daily by the RCT before local background levels for radioactivity were measured and recorded by the RCT. The instrument was calibrated using plutonium-239 and chloride-36 sources for alpha and beta/gamma emissions, respectively. The following five checks were performed as part of the calibration procedures: date of calibration, signs of physical

damage, battery function, response to a source of radioactivity, and background level. All calibrations performed for the Eberline E-600 met the manufacturer's specifications; the requirements of QP-5.2, Control of Measuring and Test Equipment; and the HSR-1 Eberline E-600 Radiation Detection Instrument Manual HSR1-INS-009 (February 9, 2004).

B-4.0 SURFACE AND SUBSURFACE SAMPLING

This section describes the methods used for collecting samples for laboratory analysis, including soil, fill, sediment, and tuff samples. The samples were collected according to the approved Phase II investigation work plan (LANL 2008, 104580, pp. 8–11, 13), and the "Work Plan for Installation of Stormwater Controls at Area of Concern 00-030(f)" (LANL 2009, 105088, pp. 1–3).

B-4.1 Surface and Shallow Subsurface Soil and Fill Sampling Methods

Surface and shallow subsurface samples were collected from soil and fill using a spade and scoop or hand augers at 18 locations. All sampling was performed in accordance with SOP-0.6.09, Spade and Scoop Method for Collection of Soil Samples, and SOP-0.6.10, Hand Auger and Thin-Wall Tube Sampler, respectively.

B-4.2 Solid Media Sampling Methods

In 2010, tuff samples were collected from 14 boreholes at the SWMUs, AOCs, and consolidated unit associated with the Phase II investigation in accordance with SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials, for fixed-laboratory analysis. Borehole samples were contained in a stainless-steel, split-spoon, core-barrel sampler that retrieved core in 5-ft intervals.

Tuff samples were also collected from hand auger locations at the SWMUs, AOCs, and consolidated unit in accordance with SOP-06.10, Hand Auger and Thin- Wall Tube Sampler, for fixed-laboratory analysis.

The goal of borehole and hand-auger sampling was to finalize the definition of extent of contamination associated with potential releases of hazardous chemicals and/or radionuclides. Target sampling depth intervals were specified in the approved Phase II investigation work plan, (LANL 2008, 104580, pp. 8–11, 13), and the "Work Plan for Installation of Stormwater Controls at Area of Concern 00-030(f)" (LANL 2009, 105088, pp. 1–3).

Borehole core and hand auger samples retrieved from the surface and subsurface were field screened and visually inspected before the specific sample interval was collected. The interval was removed from the core or hand auger barrel, and placed in a decontaminated stainless-steel bowl. The material was crushed with a decontaminated rock hammer and stainless-steel spoon to allow material to fit into sample containers. The samples were placed in sterile sample containers, sealed, and labeled with the location ID, date, time, depth interval, and type of material.

B-4.3 Quality Assurance/Quality Control Samples

Quality assurance/quality control (QA/QC) samples for soil, fill, sediment, and tuff were collected in accordance with SOP-5059, Field Quality Control Samples. Field duplicate samples were collected at a frequency of at least 1 duplicate sample for every 10 samples collected. Field rinsate samples were collected from sampling equipment at a frequency of at least 1 rinsate sample for every 10 samples. Field trip blanks were also collected at a frequency of 1 for every 10 VOC samples, or 1 field trip blank was collected and submitted to the Sample Management Office (SMO) each day that VOC samples were

collected and submitted to the SMO. Data for QA/QC samples for soil and rock are included in Appendix G (provided on DVD).

B-4.4 Sample Documentation and Handling

Field personnel completed SCLs and associated COC forms for each sample. The sample containers were sealed with signed COC seals and placed into coolers to maintain a temperature of approximately 4°C. Samples were packaged with preservatives, as necessary, depending upon the analytical method to be used, packed, handled, and shipped in accordance with SOP-5057, Handling, Packaging, and Transporting Field Samples, and SOP-5056, Sample Containers and Preservation.

B-4.5 Decontamination of Sampling Equipment

The stainless-steel scoop, bowl, split-spoon core barrel, hand auger, and all other nondisposable sampling equipment that made (or could have made) contact with sample material was decontaminated after each sample was collected. Decontamination included wiping the equipment with Fantastik (or equivalent) and paper towels.

Decontamination of all sampling and drilling equipment was conducted before mobilization 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 SOP-5061, Field Decontamination of Equipment. Decontaminated equipment was surveyed by a RCT before being released from the site.

B-5.0 EXCAVATION

The excavation process was executed in an area at AOC 00-030(h) that had been established by the lateral and vertical extent of contamination from historical and 2010 sampling.

The specific sequence of activities associated with the excavation and soil removal were as follows: (1) mobilization, including preparing excavation documents, identifying underground utilities, and conducting excavation readiness assessment; (2) site preparation, including the installation of fencing and stormwater controls and conducting a preexcavation survey; (3) removal of contaminated media, including stockpiling, characterizing, and disposing of waste at the appropriate facility; (4) survey of the limits of excavation and establishing subgrade; (5) confirmation sampling; (6) backfilling, including compacting, and site-restoration activities after demobilization.

B-6.0 GEODETIC SURVEYING

Sample locations were marked in the field using stakes or pin flags. Geodetic surveys of all sampling locations were performed using a GPS Model TSC-1 (or equivalent) referenced from published and monumented external Laboratory survey control points in the vicinity. All sampling locations were surveyed according to SOP-5028, Coordinating and Evaluating Geodetic Surveys.

Wherever possible, each location was sampled precisely at the staked point. The coordinates were uploaded into the geographic information system (GIS) database. If a location was moved from its planned location (e.g., because of refusal or the presence of underground utilities), the offset was noted and the actual sampling location was resurveyed and coordinates uploaded into the database.

B-7.0 WASTE STORAGE AND DISPOSAL

Investigation-derived waste (IDW) generated during the Pueblo Canyon Aggregate Phase II investigation consisted of drill cuttings, soil and tuff from excavations, contact waste, and personal protective equipment (PPE). All IDW generated during the field investigation was managed in accordance with the procedures described in Appendix D as well as SOP-5238, Characterization and Management of Environmental Program Waste, which incorporate 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.

B-8.0 DEVIATIONS FROM APPROVED WORK PLAN

Deviations from the scope of activities, as defined in the approved work plan (LANL 2008, 104580) and the approved work plan to install of stormwater controls at AOC 00-030(f) (LANL 2009, 105088), occurred during the implementation of the Pueblo Canyon Aggregate Area Phase II investigation.

Borehole PU-611424, located next to the primary settling tank at SWMU 00-018(a), was relocated approximately 5 ft west of the proposed location because the drill rig met refusal at two other locations because of the presence of construction debris and the reinforced concrete floor of the primary settling tank, which was left in place by Los Alamos County demolition crews. Samples were collected at the soil-tuff interface (11.5–12.5 ft bgs) and from the underlying tuff (14–15 ft bgs) according to the approved investigation work plan.

Borehole PU-611425, located next to the final settling tank at SWMU 00-018(a), was relocated approximately 10 ft north and 5 ft west of the proposed location because the drill rig met refusal at three other locations because of the presence of rebar, fencing material, and construction debris. Samples were collected at the soil-tuff interface (15.5–16.5 ft bgs) and from the underlying tuff (19–20 ft bgs) according to the approved investigation work plan.

Borehole PU-611428, located next to the trickling filter tank at SWMU 00-018(a), was relocated approximately 20 ft north of the proposed location because the drill rig met refusal at three other locations because of the presence of reinforced concrete. Samples were collected at the soil-tuff interface (1.5–2.5 ft bgs) and from the underlying tuff (13–15 ft bgs) according to the approved investigation work plan.

The three proposed outfall sampling locations (PU-611434, PU-611435, and PU-611435) at AOC 00-030(f) were relocated 2–3 ft because the proposed locations (within consolidated tuff and on a steep cliff) were not accessible or it was not possible to collect the selected media. The three relocated sampling locations meet the intent of the work plan. The locations were selected because they were downgradient of the former outfall, they best captured possible discharge patterns from the outfall, and they were within soil/colluvium, thus allowing samples to be collected at the soil-tuff interface.

Two additional sediment samples were collected at locations PU-611540 and PU-611893 at AOC 00-030(h) to better define the area requiring excavation within Acid Canyon.

Americium-241 was not analyzed for in samples from the shallowest depths at locations PU-611433, PU-611434, PU-611435, and PU-611436 or from any depth at location PU-611432 at AOC 00-030(f) because of an omission in the sample collection logs. However, americium-241 was collected from the deepest and farthest downgradient samples at AOC 00-030(f). In addition, gamma spectroscopy data, collected from all Phase II samples from the site (with the exception of one sample collected to determine the vertical extent of chromium), is an alternate method by which americium-241 is measured. Therefore,

by using the available americium-241 data and the gamma spectroscopy results, the extent of americium-241 could be defined.

For remediation activities at AOC 00-030(h), a small portion (~12 ft × 12 ft) of the proposed soil removal area could not be excavated to the proposed depth. The property owners (Immaculate Heart of Mary Catholic Church) would not allow excavation in the area of a clump of large pine trees that were in the middle of the area proposed for remediation (Appendix E, p. E-6, includes a photograph of the clump of trees). The property owners were concerned that deeper removal would compromise the shallow root system of the trees and kill them (or would require complete removal of the trees). Therefore, only the top 6 in. of soil and forest litter were removed near the trees (Lucero 2010, 110541). The final excavation depth away from the trees varied from 2–4 ft of the proposed estimate. This deviation was communicated to NMED during a site visit on June 1, 2010.

Location PU-611431 at Consolidated Unit 45-001-00 was relocated down drainage approximately 100 ft east (upstream) from historical location 45-01068 because the proposed location was inaccessible and consisted mainly of boulders, making sample collection impractical. Samples were collected from 0–1.0 ft, 4.0–5.0 ft, and 6.0–7.0 ft, according to the approved investigation work plan.

B-9.0 REFERENCES

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

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

LANL (Los Alamos National Laboratory), October 2008. "Pueblo Canyon Aggregate Area Phase II Investigation Work Plan," Los Alamos National Laboratory document LA-UR-08-6722, Los Alamos, New Mexico. (LANL 2008, 104580)

LANL (Los Alamos National Laboratory), February 2009. "Work Plan for Installation of Stormwater Controls at Area of Concern 00-030(f)," Los Alamos National Laboratory document LA-UR-09-0794, Los Alamos, New Mexico. (LANL 2009, 105088)

Table B-1.0-1
Summary of Investigation Methods

Method	Summary
Locating Utilities	Excavation/Soil Disturbance Permits were obtained from the Industrial Hygiene and Safety–Operational Support Division. New Mexico One-Call was notified and underground utilities were located. The excavation and New Mexico One-Call permits were secured before the readiness and planning review and before any field activities at Pueblo Canyon Aggregate Area were undertaken.
Spade-and-Scoop Collection of Soil Samples	This method was used to collect surface and near surface (i.e., 0–1 ft bgs) soil or fill samples. A hole was dug to the desired depth, as prescribed in the work plan, and a discrete grab sample was collected. The sample was crushed with a decontaminated rock hammer and stainless-steel spoon in a decontaminated stainless-steel bowl before it was transferred to the appropriate sample containers.
Split-Spoon Core-Barrel Sampling	The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. The stainless-steel core barrel (3-in. inside-diameter [I.D.] and 5 ft long) is rotated directly into the subsurface media with a hollow-stem auger drilling rig. During the investigation, a continuous length of core was extracted with the core barrel. Once it was extracted, the section of core was screened for organic vapors, and described in a lithologic log. If it was located within a targeted sample interval, a portion of the core was collected for laboratory analysis.
Field Logging, Handling, and Documentation of Borehole Materials	Once they reached the surface, core barrels were immediately opened for field-screening, logging, and sampling. Logging of borehole materials included run number, core recovery in feet, depth interval (in 5-ft increments), field-screening results and lithological and structural description. Once the core material was logged, selected samples were taken from discrete intervals of the core. All borehole material not sampled was then disposed of as waste.
Hand auger and thin-wall tube sampler	This method was used for sampling soil, fill, sediment, and tuff at depths of less than 15 ft bgs. This method involved hand-turning a stainless-steel bucket auger (3 in. I.D.) with an attached thin-wall tube sampler, creating a vertical hole that was advanced to the desired sample depth. When the desired depth was reached, the auger was decontaminated before the hole was advanced through the sample depth. The sampling material was transferred from the bucket auger to a stainless-steel sampling bowl before the various required sample containers were filled.
Excavation Method	Excavations were completed using two methods. The first method used a GapVax (vacuum suction) truck to remove sediment from the canyon bottom by initially breaking up compacted sediment with a pneumatic and electric jack hammer, followed by vacuuming of the loose material into the storage tank of the GapVax truck. Second, a Caterpillar 325D excavator and Caterpillar 320D excavator were used to remove surface soil material from the canyon slope, and flat wooded area. After the specific depth of surface soil had been removed from the flat wooded area, confirmation samples were collected, and any necessary over-excavation work was completed, the open excavations were backfilled by a Caterpillar 325D excavator using clean stockpiled backfill materials. Excavated soil and tuff were placed in 20-yd^3-capacity rolloff bins.
Headspace Vapor Screening	Samples from each 5-ft core interval were field screened for organic vapors by placing a portion of the sample in an amber glass jar. The jar was sealed with foil and allowed to equilibrate for approximately 5 min. The sample was then screened by inserting a PID probe equipped with an 11.7-eV lamp into the container. The results were recorded in units of ppm.
Handling, Packaging, and Shipping of Samples	Samples were sealed and labeled before being packed in ice. Sample and transport containers were examined to ensure they were free of external contamination. Samples were packaged to minimize the possibility of breakage during transport. After environmental samples were collected, packaged, and preserved, they were transported to the SMO.

Table B-1.0-1 (continued)

Method	Summary
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times were based on EPA guidance for environmental sampling, preservation, and QA. Specific requirements for each sample were printed in the SCLs provided by the SMO (size and type of container, preservatives, etc.). All samples were preserved by placing them in insulated containers with ice to maintain a temperature of 4°C.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented on standard forms generated by the SMO. These forms included SCLs, COC forms, and sample container labels. The SCLs were completed at the time samples were collected and were signed by the sampler and a reviewer who verified that the logs were complete and accurate. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around container lids or openings. The COC forms were completed and signed to verify that the samples had not been left unattended.
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 Topcon DMS2 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 are expressed as State Plane Coordinate System, North American Datum 83, New Mexico Central Zone, U.S. survey ft. All elevation data are reported relative to the National Geodetic Vertical Datum of 1983.
Management, Characterization, and Storage of IDW	The IDW was managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and the characterization approach for each waste stream managed. Waste characterization complied with on-site or off-site waste acceptance criteria, as appropriate. All stored IDW was marked with appropriate signs and labels. Drums containing IDW were stored in clamshell containers to prevent the containers from deteriorating and for security reasons. The means to store, control, and transport each potential waste type and classification of the waste was determined before field operations began. A waste storage area was established before waste was generated at each site in Pueblo Canyon Aggregate Area. Each waste container was individually labeled with waste classification, and item ID immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination.
Field Quality Control Samples	Field QC samples were collected as follows: *Field Duplicate*: At a frequency of 10%; and/or once per SWMU and AOC, collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: At a frequency of 10%; and/or once per SWMU and, AOC, collected by rinsing sampling equipment with deionized water collected in a sample container and submitted for laboratory analysis *Trip Blanks*: Required for all field events that include collecting samples for VOC analysis. Trip-blank containers consist of certified clean sand that are opened and kept with the other sample containers during the sampling process and then sent for analysis with the same sample containers.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination was the preferred method to minimize generating liquid waste. Dry decontamination included using a wire and/or stiff bristle brush or other tools to remove soil or other material adhering to the sampling equipment, followed by applying a commercial cleaning agent (i.e., Fantastik) and paper wipes.

Appendix C

Borehole Logs

Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611419	**TA:** SWMU 00-018(a)	**Drill Depth:** 15 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/17/2010	**End Date:** 2/17/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 11 dpm	**β/γ=** 698 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** Dark brown (7.5YR 3/4), 0-1' bgs is organic (root fragments) and clay-rich; 1'-5' is unconsolidated, poorly sorted, rounded to subrounded, silt to gravel (up to 40 mm) sized clasts of various lithologies (eg., granites,	Fill	
1						
2						
3						
4						Contact of fill and Qbt2 is at 5.5' bgs.
5	3/5	PID= 0.2	CAPU-10-12520	dacite, and quartzite).		Sample interval is 5' – 6' bgs.
6		α= <MDA		**Unit 2 of the Tschirege Member of the**	Qbt2	
7		β/γ= <MDA		**Bandelier Tuff:**		
8				AFT: Reddish gray (2.5YR 5/1), moderately to		
9				well welded, crystal-rich, with 10-15%		
10	5/5			quartz, 10-15% sanidine in an ash matrix.		
11				Sugary quartz-filled vugs and minor iron		
12				oxide staining present.		
13						
14		PID= 0.0	CAPU-10-12521	AFT: SAA		Sample interval is 14' – 15' bgs.
15		α= <MDA				
16		β/γ= <MDA				
17						
18						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611420	**TA:** SWMU 00-018(a)	**Drill Depth:** 35 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/17/2010	**End Date:** 2/17/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 11 dpm	**β/γ=** 698 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** Brown (7.5YR 4/4) 0'-2' is unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized clasts of various lithologies (eg., granites, dacite, and quartzite). 2'-5' includes tuff fragments (up to 40mm).		
5	1/5			Fill: Large concrete block		Limited recovery due to concrete debris.
10	5/5			Fill: Brown (7.5YR 4/3), dominantly reworked clay and ash-rich weathered AFT. Devitrified, reddish brown (5YR 4/3), pumice fragments present .	Tf	
15	5/5			Fill: SAA		
20	5/5			Fill: SAA		
25	5/5					
27						Contact of fill and Qbt2 is at 28.5' bgs.
28		PID= 0.2	CAPU-10-12522			Sample interval is 28' – 29' bgs.
29		α= <MDA		**Unit 2 of the Tschirege Member of the**		
30	5/5	β/γ= <MDA		**Bandelier Tuff:**	Qbt_2	
31		PID= 0.0	CAPU-10-12523	AFT: Reddish gray (2.5YR 5/1), moderately to		Sample interval is 31' – 32' bgs.
32		α= <MDA		well welded, crystal-rich, with 10-15%		
33		β/γ= <MDA		quartz, 10-15% sanidine in an ash matrix.		
34				Minor iron oxide staining present.		
38						

Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611421	**TA:** SWMU 00-018(a)	**Drill Depth:** 9 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/18/2010	**End Date:** 2/18/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 11 dpm	**β/γ=** 698 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** Brown (7.5YR 4/4); 0-2' bgs is sand and clay-rich; 2'-5' is unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized clasts of various lithologies (eg., granites, dacite, tuff and quartzite).	Fill	
1						
2						
3						
4						Contact of fill and Qbt2 is at 5.5' bgs.
5	4/5	PID= 0.3	CAPU-10-12524	4'-5' includes concrete fragments (up to 40mm).		Sample interval is 5' – 6' bgs.
6		α= <MDA		**Unit 2 of the Tschirege Member of the**	Qbt2	
7		β/γ= <MDA		**Bandelier Tuff:**		
8		PID= 0.2	CAPU-10-12525	AFT: Reddish gray (2.5YR 5/1), moderately to well welded, crystal-rich, with 10-15% quartz, 10-15% sanidine in an ash matrix. Sugary quartz-filled vugs and minor iron oxide staining present.		Sample interval is 8' – 9' bgs.
9		α= <MDA				
10		β/γ= <MDA				
11						
12						
13						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-61142	**TA:** SWMU 00-018(a)	**Drill Depth:** 13 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/18/2010	**End Date:** 2/18/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 11 dpm	**β/γ=** 698 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** Black (7.5YR 2.5/1); 0-1' bgs is organic (root fragments) and clay-rich; 1'-5' is dark brown (7.5YR 3/4), unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized quartz and sanidine crystals, and clasts of various lithologies (eg., granites, dacite, tuff and quartzite).	Fill	
1						
2						
3						
4						
5	3/5					Contact of fill and Qbt2 is at 6.5' bgs.
6		PID= 0.4	CAPU-10-12526			Sample interval is 6' – 7' bgs.
7		α= <MDA		**Unit 2 of the Tschirege Member of the Bandelier Tuff:** AFT: Reddish gray (2.5YR 5/1), moderately to well welded, crystal-rich, with 10-15% quartz, 10-15% sanidine in an ash matrix. Sugary quartz-filled vugs and minor iron oxide staining present.	?Qbt2	
8		β/γ= <MDA				
9						
10	3/3					
11		PID= 0.3	CAPU-10-12527			Sample interval is 11' – 12' bgs.
12		α= <MDA	CAPU-10-12549			Field duplicate interval is 12' – 13' bgs.
13		β/γ= <MDA				
14						
15						
16						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611423	**TA:** SWMU 00-018(a)	**Drill Depth:** 12 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/18/2010	**End Date:** 2/18/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 11 dpm	**β/γ=** 698 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0 – 1' bgs is wet, silt to sand fill.		
1				1'– 6.5' is strong brown (7.5YR 5/6),		
2				unconsolidated, dominantly reworked clay and		
3				ash-rich weathered AFT. Devitrified, reddish		
4				brown (5YR 4/3), pumice fragments present.	FT	
5	5/5					Sample interval is 6' – 7' bgs.
6		PID= 0.0	CAPU-10-12529	**Unit 2 of the Tschirege Member of the**		Contact of fill and Qbt2 is at 6.5' bgs.
7		α= <MDA		**Bandelier Tuff:**		
8		β/γ= <MDA		AFT: Reddish gray (2.5YR 5/1), moderately to		
9				well welded, crystal-rich, with 10-15%	Qbt2	
10	5/5			quartz, 10-15% sanidine in an ash matrix.		
11		PID= 0.0	CAPU-10-12530	Minor iron oxide staining present.		Sample interval is 11' – 12' bgs.
12		α= <MDA				
13		β/γ= <MDA				
14						
15						
16						
17						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611424	**TA:** SWMU 00-018(a)	**Drill Depth:** 15 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/19/2010	**End Date:** 2/19/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 60 dpm	**β/γ=** 1588 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0 – 1' bgs is black (7.5YR 2.5/1), organic (root fragments) and clay-rich. 1'– 5' is brown (7.5YR 4/4), unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized quartz and sanidine crystals, and clasts of various lithologies (eg., granites, dacite, tuff and quartzite). Fill: 5'-10' is brown (7.5YR 4/3), dominantly reworked clay and ash-rich weathered AFT. Devitrified, reddish brown (5YR 4/3), pumice fragments present.	Fill	
1						
2						
3						
4						
5	5/5					
6						
7						
8						
9						
10	5/5					
11		PID= 0.0	CAPU-10-12532			Sample interval is 11.5' – 12.5' bgs.
12		α= <MDA		**Unit 2 of the Tschirege Member of the**	Qbt2	Contact of fill and Qbt2 is at 12' bgs.
13		β/γ= <MDA		**Bandelier Tuff:**		
14		PID= 0.0	CAPU-10-12533	AFT: Reddish gray (2.5YR 5/1), moderately to		Sample interval is 14' – 15' bgs.
15		α= <MDA		well welded, crystal-rich, with 10-15%		
16		β/γ= <MDA		quartz, 10-15% sanidine in an ash matrix.		
17				Minor iron oxide staining present.		
18						
19						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611425	**TA:** SWMU 00-018(a)	**Drill Depth:** 20 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/19/2010	**End Date:** 2/19/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 60 dpm	**β/γ=** 1588 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** is brown (7.5YR 4/4), unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized quartz and sanidine crystals, and clasts of various lithologies (eg., granites, dacite, tuff and quartzite).		
5	5/5					
10	0/5					No recovery due to unconsolidated material.
15	5/5	PID= 0.2 α= <MDA β/γ= <MDA	CAPU-10-12535	**Unit 2 of the Tschirege Member of the Bandelier Tuff:**		Sample interval is 15.5' – 16.5' bgs. Contact of fill and Qbt2 is at 16' bgs.
19		PID= 0.0 α= <MDA β/γ= <MDA	CAPU-10-12536	AFT: Reddish gray (2.5YR 5/1), moderately to well welded, crystal-rich, with 10-15% quartz, 10-15% sanidine in an ash matrix. Minor iron oxide staining present.		Sample interval is 19' – 20' bgs.

Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611426	**TA:** SWMU 00-018(a)	**Drill Depth:** 8 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/19/2010	**End Date:** 2/19/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 60 dpm	**β/γ=** 1588 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0-1' bgs is asphalt, concrete and	Fill	
1		PID= 0.1	CAPU-10-12538	rebar debris-rich; 1'-2' is strong brown		Sample interval is 2.5' – 3.5' bgs.
2		α= <MDA		(7.5YR 4/6), organic (root fragments) and	Qbt2	Contact of fill and Qbt2 is at 3' bgs.
3		β/γ= <MDA		clay-rich soil (?).		
4				**Unit 2 of the Tschirege Member of the**		
5	3/3			**Bandelier Tuff:**		
6		PID= 0.2	CAPU-10-12539	AFT: Reddish gray (2.5YR 5/1), moderately to		Sample interval is 6' – 8' bgs.
7		α= <MDA		well welded, crystal-rich, with 10-15%		
8		β/γ= <MDA		quartz, 10-15% sanidine in an ash matrix.		
9				Minor iron oxide staining present.		
10						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611427	**TA:** SWMU 00-018(a)	**Drill Depth:** 20 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/22/2010	**End Date:** 2/22/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 26 dpm	**β/γ=** 1122 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	2.5/5			**Fill Material:** 0-3' bgs is asphalt, concrete and rebar debris-rich; 3'-7' is brown (7.5YR 4/4) unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized clasts of various lithologies (eg., granites, dacite, and quartzite).	Fill	
1						
2						
3						
4						
5	2.5/5			Fill: Brown (7.5YR 4/3), dominantly reworked clay and ash-rich weathered AFT. Devitrified, reddish brown (5YR 4/3), pumice fragments present.		
6						
7						
8						
9						
10	3/5					
11						
12						
13						
14						Sample interval is 14.5' – 15.5' bgs.
15	3/5	PID= 0.3	CAPU-10-12541	**Unit 2 of the Tschirege Member of the Bandelier Tuff:**	Qbt2	Contact of fill and Qbt2 is at 15' bgs.
16		α= <MDA				
17		β/γ= <MDA		AFT: Reddish gray (2.5YR 5/1), moderately to		
18			CAPU-10-12542	well welded, crystal-rich, with 10-15%		Sample interval is 18' – 20' bgs.
19		PID= 0.3		quartz, 10-15% sanidine in an ash matrix.		
20		α= <MDA		Minor iron oxide staining present.		
21		β/γ= <MDA				
22						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611428	**TA:** SWMU 00-018(a)	**Drill Depth:** 18 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/22/2010	**End Date:** 2/22/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 26 dpm	**β/γ=** 1122 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** Dark brown (7.5YR 3/4), 0-1' bgs is	Fill	
1				organic (root fragments) and clay-rich; 1'-2' is		Contact of fill and Qbt2 is at 2' bgs.
2		PID= 0.3	CAPU-10-12544	brown (7.5YR 4/4) unconsolidated,	Qbt2	Sample interval is 1.5' – 2.5' bgs.
3		α= <MDA		poorly sorted, rounded to subrounded, silt to		
4		β/γ= <MDA		sand-sized clasts of various lithologies		
5	5/5			(eg., granites, dacite, and quartzite).		
6				**Unit 2 of the Tschirege Member of the**		
7				**Bandelier Tuff:**		
8				AFT: Brown (7.5YR 4/3), clay and ash-rich		
9				weathered and oxidized AFT. Devitrified,		
10	5/5			reddish brown (5YR 4/3), pumice fragments		
11				present .		
12						
13		PID= 0.1	CAPU-10-12545	AFT: Reddish gray (2.5YR 5/1), moderately to		Sample interval is 13' – 15' bgs.
14		α= <MDA		well welded, crystal-rich, with 10-15%		
15		β/γ= <MDA		quartz, 10-15% sanidine in an ash matrix.		
16				Minor iron oxide staining present.		
17						
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Pueblo Canyon Aggregate Area SWMU 00-018(a)			
Borehole ID: PU-611429	**TA:** SWMU 00-018(a)	**Drill Depth:** 15 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/23/2010	**End Date:** 2/23/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 26 dpm	**β/γ=** 1122 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0 – 1' bgs organic-rich (plant and root fragments). 1'– 6' is unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized clasts of various lithologies (eg., granites, dacite, and quartzite). 7' – 8' bgs is dominated by concrete and wood debris.	fill	
1						
2						
3						
4						
5	5/5					
6						
7		PID= 0.0	CAPU-10-12547			Sample interval is 7' – 9' bgs.
8		α= <MDA		**Unit 2 of the Tschirege Member of the**		Contact of fill and Qbt2 is at 8' bgs.
9		β/γ= <MDA		**Bandelier Tuff:**		
10	5/5			AFT: Reddish gray (2.5YR 5/1), moderately to		
11				well welded, crystal-rich, with 10-15%	?Qbt2	
12				quartz, 10-15% sanidine in an ash matrix.		
13		PID= 0.0	CAPU-10-12548	Minor iron oxide staining present.		Sample interval is 13' – 15' bgs.
14		α= <MDA	CAPU-10-12550			Field duplicate is 13' – 15' bgs.
15		β/γ= <MDA				
16						
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Pueblo Canyon Aggregate Area AOC 00-030(eS)			
Borehole ID: 00-25486	**TA:** AOC 00-030(eS)	**Drill Depth:** 10 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/1/2010	**End Date:** 3/1/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.3 ppm	**α=**10 dpm	**β/γ=** 1269 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	10/10			**Fill Material:** 0-0.5': Dark reddish brown (5YR 3/2),		
1				organic-rich (roots, twigs and bark) soil.		
2				0.5' - 3.9':Reddish brown (5YR 4/3), reworked	Fill	Auger cuttings are dry
3				AFT, silt to sand-sized tuff fragments		
4				(up to 20 mm) with quartz and sanidine crystals.		
5				Root fragments and clay-rich layers also present.		Contact of fill and Qbt3 is at 5' bgs.
6		PID= 0.3	CAPU-10-12562	**Unit 3 of the Tschirege Member of the**	Qbt3	Sample interval is 6' – 7' bgs.
7		α= <MDA		**Bandelier Tuff:**		
8		β/γ= <MDA		5'-6': AFT: Brown (7.5YR 4/3), clay and ash-rich		
9		PID= 0.6	CAPU-10-12563	weathered and oxidized, poorly-welded AFT.		Sample interval is 9' – 10' bgs.
10		α= <MDA	CAPU-10-12564	6'-10': AFT: Reddish brown (5YR 5/3), slightly to		Field duplicate interval is 9' – 10' bgs.
11		β/γ= <MDA		moderately well welded, crystal and pumice-rich.		
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Pueblo Canyon Aggregate Area AOC 00-030(f)			
Borehole ID: PU-611432	**TA:** AOC 00-030(f)	**Drill Depth:** 5.2 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/1/2010	**End Date:** 6/28/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket		**Logged By:** S. Muggleton	
Background Values:	**PID=** See below	**α=**7 dpm	**β/γ=** 909 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5.2/5.2	PID Bkgd= 0.3		**Fill Material:** 0-0.2': Dark reddish brown (5YR 3/2),	Fill	Contact of fill and Qbt3 is at 0.2' bgs.
1		PID= 1.5	CAPU-10-12599	organic (roots, twigs and bark) and clay-rich.	QBT3	Sample interval is 1.2' – 2.2' bgs.
2		α= <MDA		**Unit 3 of the Tschirege Member of the**		
3		β/γ= <MDA		**Bandelier Tuff:**		
4		PID Bkgd= 0.0	CAPU-10-12600	AFT: 0.2' to 3.5': Light brown (7.5YR 6/3),		Sample interval is 4.2' – 5.2' bgs.
5		PID= 0.3		slightly to moderately well welded, cyrstal-rich,		
6	0.5/0.5	α= <MDA	RE00-10-22626	pumice and lithics present. Lithics are dacitic in		Sample interval is 5.7' – 6.2' bgs.
7		β/γ= <MDA		composition, subangular and up to 50 mm.		
8		PID Bkgd=0.0		AFT: 3.5' to 5.2': Pale red (10R 6/3),		
9		PID= 13.3		slightly to moderately well welded, cyrstal-rich,		
10		α= <MDA		pumice and lithics present. Lithics are dacitic in		
11		β/γ= <MDA		composition, subangular and up to 20 mm.		
12				AFT: 5.7' to 6.2': Pale red (10R 6/3),		
13				moderately well welded, non-weathered.		
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Pueblo Canyon Aggregate Area AOC 00-030(f)			
Borehole ID: PU-611433	**TA:** AOC 00-030(f)	**Drill Depth:** 1.3 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/1/2010	**End Date:** 6/28/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket			**Logged By:** S. Muggleton
Background Values (3/01/10):	**PID=** 0.7 ppm	**α=**7 dpm	**β/γ=** 909 dpm
Background Values (6/28/10):	**PID=** 0.2 ppm	**α=**60 dpm	**β/γ=** 907 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	1.3/1.3	PID= 0.7		**Fill Material:** 0-0.75': Dark reddish brown (5YR 3/2),	Fill	Contact of fill and Qbt3 is at 0.75' bgs.
1		α= <MDA	CAPU-10-12602	organic (roots, twigs and bark) with colluvial	Qbt 3	Sample interval is 0' – 1.3' bgs.
2	1.0/1.0	β/γ= <MDA		material consisting of poorly sorted, sand to		
3			RE00-10-22622	pebbles of various lithologies (eg., granite,		Sample interval is 2.0' – 3.0' bgs.
4		PID= 0.2		dacite, and quartzite).		
5		α= <MDA		**Unit 3 of the Tschirege Member of the**		
6		β/γ= <MDA		**Bandelier Tuff:**		
7				AFT: Light brown (7.5YR 6/3), slightly to		
8				moderately well welded, crystal-rich, pumice		
9				and lithics present. Lithics are dacitic in		
10				composition, subangular and up to 50 mm.		
11				AFT: Light brown (7.5YR 6/3), poorly to		
12				moderately well welded, non-altered/ weathered.		
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Pueblo Canyon Aggregate Area AOC 00-030(f)			
Borehole ID: PU-611434	**TA:** AOC 00-030(f)	**Drill Depth:** 1.5 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/1/2010	**End Date:** 6/28/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket		**Logged By:** S. Muggleton	
Background Values (3/01/10):	**PID=** 0.1 ppm	**α=7** dpm	**β/γ=** 909 dpm
Background Values (6/28/10):	**PID=** 0.0 ppm	**α=7** dpm	**β/γ=** 968 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	1.5/1.5	PID= 13.4	CAPU-10-12604	**Fill Material:** 0-0.92': Dark reddish brown (5YR 3/2), organic (roots, twigs and bark) with colluvial material consisting of poorly sorted, sand to pebbles of various lithologies (eg., granite, dacite, and quartzite).	FILL	Contact of fill and Qbt3 is at 0.92' bgs.
1		α= <MDA				Sample interval is 0' – 1.5' bgs.
2	1.0/1.0	β/γ= <MDA				
3		PID= 5.8			Qbt 3	Sample interval is 2.5' – 3.5' bgs.
4		α= <MDA				
5		β/γ= <MDA				
6				**Unit 3 of the Tschirege Member of the Bandelier Tuff:**		
7				AFT: Light brown (7.5YR 6/3), slightly to moderately well welded, crystal-rich, pumice and lithics present. Lithics are dacitic in composition, subangular and up to 50 mm. AFT: Light brown (7.5YR 6/3), poorly to moderately well welded, non-weathered.		
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Pueblo Canyon Aggregate Area AOC 00-030(f)			
Borehole ID: PU-611435	**TA:** AOC 00-030(f)	**Drill Depth:** 1.8 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/1/2010	**End Date:** 6/28/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket			**Logged By:** S. Muggleton
Background Values (3/01/10):	**PID=** 0.2 ppm	**α=**7 dpm	**β/γ=** 909 dpm
Background Values (6/28/10):	**PID=** 0.0 ppm	**α=**40 dpm	**β/γ=** 660 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	1.8/1.8	PID= 19		**Fill Material:** 0-1.3': Dark reddish brown (5YR 3/2) organic (roots, twigs and bark) with colluvial material consisting of poorly sorted, sand to pebbles of various lithologies (eg., granite, dacite, and quartzite).	Tf	Contact of fill and Qbt3 is at1.3' bgs.
1		α= <MDA	CAPU-10-12606			Sample interval is 0.8' – 1.8' bgs.
2	1.0/1.0	β/γ= <MDA	CAPU-10-12609		Qbt 3	Field duplicate interval is 0.8'-1.8' bgs.
3		PID= 24.1	RE00-10-22624			Sample interval is 2.3' – 3.3' bgs.
4		α= <MDA				
5		β/γ= <MDA				
6				**Unit 3 of the Tschirege Member of the Bandelier Tuff:** AFT: Light brown (7.5YR 6/3), slightly to moderately well welded, crystal-rich, pumice and lithics present. Lithics are dacitic in composition, subangular and up to 50 mm. AFT: Light brown (7.5YR 6/3), poorly to moderately well welded, non-weathered.		
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Pueblo Canyon Aggregate Area AOC 00-030(f)							
Borehole ID: PU-611436		**TA:** AOC 00-030(f)		**Drill Depth:** 1.2 ft		**Total Pages:** 1 of 1	
Drillers: S. Muggleton and A. Stocker				**Start Date:** 3/1/2010		**End Date:** 6/28/2010	
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket							
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket					**Logged By:** S. Muggleton		
Background Values (3/01/10):		**PID=** 0.2 ppm		**α=**7 dpm	**β/γ=** 909 dpm		
Background Values (6/28/10):		**PID=** 0.0 ppm		**α=**7 dpm	**β/γ=** 968 dpm		

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	1.2/1.2	PID= 1.7		**Fill Material:** 0-0.2': Dark reddish brown (5YR 3/2),	Tf	Contact of fill and Qbt3 is at 0.2' bgs.
1		α= <MDA	CAPU-10-12608	organic (roots, twigs and bark) with colluvial		Sample interval is 0' – 1.2' bgs.
2	1.0/1.0	β/γ= <MDA		material consisting of poorly sorted, sand to	Qbt3	Sample interval is 1.8' – 2.8' bgs.
3		PID= 0.7	RE00-10-22625	pebbles of various lithologies (eg., granite,		
4		α= <MDA		dacite, and quartzite).		
5		β/γ= <MDA		**Unit 3 of the Tschirege Member of the**		
6				**Bandelier Tuff:**		
7				AFT: Light brown (7.5YR 6/3), slightly to		
8				moderately well welded, crystal-rich, pumice		
9				and lithics present. Lithics are dacitic in		
10				composition, subangular and up to 50 mm.		
11				AFT: Light brown (7.5YR 6/3), poorlyly to		
12				moderately well welded, non-altered.		
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Pueblo Canyon Aggregate Area AOC 00-030(h)			
Borehole ID: PU-611430	**TA:** AOC 00-030(h)	**Drill Depth:** 10 ft	**Total Pages:** 1 of 1
Drillers: D. Toney and R. Husted		**Start Date:** 2/25/2010	**End Date:** 2/25/2010
Drilling Equipment/Method: CME 55 Track Rig			
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=** 26 dpm	**β/γ=** 1158 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0-1': Unconsolidated, poorly sorted, rounded to subrounded, clasts (up to 40 mm) of granite and quartzite in a sandy matrix.	fill	
1						
2						Contact of fill and Qbt3t is at 3' bgs.
3				1'-2': Dark brown (7.5YR 3/2), clay-rich layer.		
4				2'-3': Reworked AFT, weathered and oxidized,		
5	5/5	PID= 0.1		reddish brown (2.5YR 4/3).		
6		α= <MDA	CAPU-10-12566	**Unit 3t of the Tschirege Member of the**	Qbt3t	Sample interval is 6' – 7' bgs.
7		β/γ= <MDA		**Bandelier Tuff:**		
8		PID= 0.1	CAPU-10-12567	AFT: Brown (7.5YR 4/3), clay and ash-rich		Sample interval is 8' – 9' bgs.
9		α= <MDA		weathered and oxidized AFT.		
10		β/γ= <MDA		AFT: Pale red (2.5YR 6/2), well to very well		
11				welded, crystal-rich. 25-30% quartz (up to 5mm)		
12				and sanadine crystals, 5% altered pyroxene		
13				crystals in an ash matrix.		
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Pueblo Canyon Aggregate Area AOC 00-030(h)							
Borehole ID: PU-611656		**TA:** AOC 00-030(h)		**Drill Depth:** 9 ft		**Total Pages:** 1 of 1	
Drillers: D. Toney and R. Husted				**Start Date:** 2/25/2010		**End Date:** 2/25/2010	
Drilling Equipment/Method: CME 55 Track Rig							
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler					**Logged By:** S. Muggleton		
Background Values:		**PID=** 0.0 ppm		**α=** 26 dpm	**β/γ=** 1158 dpm		

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** 0-1': Unconsolidated, poorly sorted,	Fill	
1				rounded to subrounded, clasts (up to 40 mm)		
2				of granite and quartzite in a sandy matrix.		Contact of fill and Qbt3t is at 3' bgs.
3		PID= 0.1		1'-2': Dark brown (7.5YR 3/2), clay-rich layer.	Qbt3t	
4		α= <MDA	CAPU-10-13733	2'-3': Reworked AFT, weathered and oxidized,		Sample interval is 4' – 5' bgs.
5	4/4	β/γ= <MDA	CAPU-10-12569	reddish brown (2.5YR 4/3).		Field duplicate interval is 4' – 5' bgs.
6		PID= 0.1	CAPU-10-13734	**Unit 3t of the Tschirege Member of the**		Sample interval is 6' – 7' bgs.
7		α= <MDA		**Bandelier Tuff:**		
8		β/γ= <MDA		AFT: Brown (7.5YR 4/3), clay and ash-rich		
9				weathered and oxidized AFT.		
10				AFT: Pale red (2.5YR 6/2), well to very well		
11				welded, crystal-rich. 25-30% quartz (up to 5mm)		
12				and sanadine crystals, 5% altered pyroxene		
13				crystals in an ash matrix.		
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Pueblo Canyon Aggregate Area SWMU 31-001							
Borehole ID: 31-01008		**TA:** SWMU 31-001		**Drill Depth:** 23 ft		**Total Pages:** 1 of 1	
Drillers: D. Toney and R. Husted				**Start Date:** 2/23/2010		**End Date:** 2/23/2010	
Drilling Equipment/Method: CME 55 Track Rig							
Sampling Equipment: 3" ID 5' Length Split Core-Barrel Sampler					**Logged By:** S. Muggleton		
Background Values:		**PID=** 0.0 ppm		**α=** 26 dpm	**β/γ=** 1122 dpm		

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	5/5			**Fill Material:** is strong brown (7.5YR 5/6), unconsolidated, poorly sorted, rounded to subrounded, silt to sand-sized quartz and sanidine crystals, and clasts (up to 40 mm) of various lithologies (eg., chert, limestone and quartzite).	Qbt2	
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8						Contact of fill and Qbt2 is at 9' bgs.
9				**Unit 3 of the Tschirege Member of the Bandelier Tuff:**	Qbt 3	
10	5/5			AFT: Brown (7.5YR 4/3), clay and ash-rich weathered and oxidized AFT.		
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13				AFT: Reddish gray (10R 6/1), slightly to moderately well-welded, crystal and pumice-rich.		
14						
15	5/5	PID= 2.2	CAPU-10-12584	Pumice fragments are up 1 to 2 cm in diameter and devitrified. Minor iron oxide staining present.		Sample interval is 16' – 17' bgs.
16		α= <MDA				
17		β/γ= <MDA				
18						
19		PID= 0.0	CAPU-10-12585			Sample interval is 19' – 20' bgs.
20		α= <MDA	CAPU-10-12587			Field duplicate is 19' – 20' bgs.
21		β/γ= <MDA				
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Pueblo Canyon Aggregate Area Unconsolidated Unit 45-001-00			
Borehole ID: 45-01068	**TA:** CU 45-001-00	**Drill Depth:** 8 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A. Stocker		**Start Date:** 3/2/2010	**End Date:** 3/2/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket		**Logged By:** S. Muggleton	
Background Values:	**PID=** 0.0 ppm	**α=**10 dpm	**β/γ=** 1269 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	8/8			**Qal:** Fine to coarse sand-sized clasts of quartz and		
1				sanidine crystals with pebble to cobble-sized		
2				AFT fragments, dacite and granite clasts.		
3						
4		PID= 0.1	CAPU-10-12594			Sample interval is 4' – 5' bgs.
5		α= <MDA				
6		β/γ= <MDA		**Unit 2 of the Tschirege Member of the**	? Qbt2 Q	Contact of Qal and Qbt2 is at 6' bgs.
7		PID= 0.1	CAPU-10-12595	**Bandelier Tuff:**		Sample interval is 7' – 8' bgs.
8		α= <MDA		AFT: Reddish gray (2.5YR 6/1), moderately		
9		β/γ= <MDA		well welded,crystal-rich, with 10-15%		
10				quartz, 10-15% sanidine in an ash matrix.		
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Pueblo Canyon Aggregate Area Unconsolidated Unit 45-001-00			
Borehole ID: PU-611431	**TA:** CU 45-001-00	**Drill Depth:** 8 ft	**Total Pages:** 1 of 1
Drillers: S. Muggleton and A.Stocker		**Start Date:** 3/3/2010	**End Date:** 3/3/2010
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket			
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket		**Logged By:** S. Muggleton	
Background Values:	**PID=** See below	**α=**12 dpm	**β/γ=** 827 dpm

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	8/8	PID Bkgd= 0.6	CAPU-10-12590	**SED:** Fine to coarse sand-sized clasts of quartz and		Sample interval is 0' – 1' bgs.
1		PID= 8.1		sanidine crystals with tuff fragments and minor		
2		α= <MDA		clay.		Contact of SED and Qbt3 is at 3.5' bgs.
3		β/γ= <MDA		**Unit 3 of the Tschirege Member of the**		Note: Sample is wet
4		PID Bkgd= 0.7	CAPU-10-12591	**Bandelier Tuff:**		Sample interval is 4' – 5' bgs.
5		PID= 1.0		AFT: Light gray (5YR 7/1), nonwelded, crystal-rich,		
6		α= <MDA		with 10-15% quartz, 10-15% sanidine and pumice		
7		β/γ= <MDA	CAPU-10-12592	fragments up to 5mm.		Sample interval is 7' – 8' bgs.
8		PID Bkgd= 0.3				
9		PID= 0.8				
10		α= <MDA				
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Pueblo Canyon Aggregate Area Unconsolidated Unit 45-001-00							
Borehole ID: PU-611753		**TA:** CU 45-001-00		**Drill Depth:** 2 ft		**Total Pages:** 1 of 1	
Drillers: S. Muggleton and A. Stocker				**Start Date:** 3/3/2010		**End Date:** 3/3/2010	
Drilling Equipment/Method: 3-in. ID, stainless-steel hand auger bucket							
Sampling Equipment: 3-in. ID, stainless-steel hand auger bucket					**Logged By:** S. Muggleton		
Background Values:		**PID=** See below		**α=**12 dpm	**β/γ=** 827 dpm		

DEPTH (ft bgs)	RECOVERY (ft/ft)	FIELD SCREENING RESULTS: PID (ppm)/gross-alpha, -beta, -gamma (dpm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0	2/2	PID Bkgd= 0.3	CAPU-10-13855	**Soil:** A horizon (AH), dark brown (7.5YR 3/2), organic	T	Sample interval is 0' – 1' bgs.
1		PID= 1.4		rich with silt to sand sized crystals of quartz,	Qbt2	Contact of AH and Qbt2 is at 1.2' bgs.
2		α= <MDA		sanidine and pale red tuff fragments.		Sample interval is 1' – 1.5' bgs.
3		β/γ= <MDA		**Unit 2 of the Tschirege Member of the**		Sample interval is 1.5' – 2' bgs.
4		PID Bkgd= 0.1	CAPU-10-13856	**Bandelier Tuff:**		Field duplicate interval is 1.5' – 2' bgs.
5		PID= 0.7		AFT: Reddish gray (2.5YR 6/1), moderately to		
6		α= <MDA		well welded,crystal-rich, with 10-15% quartz,		
7		β/γ= <MDA	CAPU-10-13857	10-15% sanidine in an ash matrix.		
8		PID Bkgd= 0.0	CAPU-10-12596			
9		PID= 0.0				
10		α= <MDA				
11		β/γ= <MDA				
12						
13						
14						
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Appendix D

Investigation-Derived Waste Management

D-1.0 INTRODUCTION

The investigation-derived waste (IDW) streams generated during the Phase II investigation activities associated with the Pueblo Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory) are identified in Table D-1.0-1 and are described briefly below. The table presents the waste types, waste volumes, characterization methods, methods of on-site management, and the path for disposing of each of the waste streams that are discussed below. All IDW generated during the field investigation was managed in accordance with the procedures described in Appendix B as well as Standard Operating Procedure (SOP) 5238, Characterization and Management of Environmental Program Waste, which incorporate the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department regulations, and U.S. Department of Energy orders.

D-2.0 IDW

D-2.1 Drill Cuttings

This waste stream consists of soil and tuff cuttings generated from the drilling of boreholes. The drill cuttings were classified as nonhazardous, industrial, and low-level waste (LLW), pending analysis. The waste was managed in accordance with the project waste characterization strategy form ([WCSF] Attachment D-1 on CD included with this document) and stored in locked 55-gal. drums that were secured at the point of generation and staged at Technical Area 50 (TA-50). Final characterization of the drill cuttings was based on the analytical data generated during the 2010 investigation drilling activities (see Table D-1.0-1). Solid Waste Management Area (SWMU) 00-018(a) drill cuttings were characterized as nonhazardous waste and met residential SSLs and were land applied at SWMU 00-018(a) in July 2010, in compliance with the criteria in QP-011, Land Application of Drill Cuttings. Drill cuttings from Area of Concern (AOC) 00-030(h) and SWMU 31-001 have also met the land application criteria and will be land applied on site.

D-2.2 Excavated Environmental Media and Debris

This waste stream consisted of 306 yd^3 of overburden soil and debris generated during the excavation activities at AOC 00-030(h). The waste was containerized into rolloff bins at the point of generation and moved to TA-50, away from public access. Final characterization of the excavated soil and debris overburden was based on the analytical data generated during the Phase II investigation drilling activities (Table D-1.0-1). The environmental media was placed into 20-yd^3 rolloff bins. A solid superabsorbent polymer (Waste Lock 770) was added to two bins to solidify aqueous waste components. The excavated media has been designated as LLW and will be disposed of at TA-54.

D-2.3 Contact Waste

This waste stream includes personal protective equipment (PPE), contaminated sampling supplies, and dry decontamination waste that may have come in contact with contaminated environmental media and cannot be decontaminated. This includes plastic sheeting (e.g., tarps and liners); gloves, coveralls (e.g., Tyvek); booties; paper towels; plastic and glass sample bottles; and disposable sampling supplies. In addition, this waste stream also includes aluminum Victaulic pipe and flexible plastic hose and fittings used during vacuuming of solid material that was likely permeated with contaminated soil and debris and that cannot be decontaminated. This waste was stored in locked 5- and 30-gal. polyethylene buckets or

20-yd^3 rolloff bins at the point of generation. Approximately 17 yd^3 of contact waste was generated during the Phase II investigation activities.

Contamination of contact wastes generated during field activities was conservatively assumed to be identical to those found in the associated environmental media. Therefore, contact IDW was characterized using acceptable knowledge (AK) based on the direct sampling and analyses of the media with which it came into contact.

D-2.4 Decontamination Fluids

No decontamination fluids were generated during the Phase II investigation activities.

D-2.5 Municipal Solid Waste

Municipal waste generated during the Phase II investigation activities included paper, cardboard, plastic, and food and beverage containers that did not come in contact with any other waste streams. Municipal solid waste was stored in plastic trash bags and disposed of at the Los Alamos County transfer station or other authorized facility. Less than 1 yd^3 of municipal waste was generated (not included in Table D-1.0-1).

D-2.6 Petroleum Contaminated Soil

No petroleum-contaminated soil was generated during the Phase II investigation activities.

D-2.7 Returned or Excess Samples

No returned or excess samples were generated during the Phase II investigation activities.

Table D-1.0-1
Summary of IDW Generation and Management

Waste Stream	Waste Type	Volume	Characterization Method	On-Site Management	Disposition
SWMU 00-018(a)					
Drill Cuttings	Nonhazardous	0.68 yd^3	Direct sampling of drill cuttings	55-gal. drums stored in locked portable drum-storage container	Land application at SWMU 00-018(a)
Contact Waste	Nonhazardous	0.005 yd^3	AK—analytical results from drill cuttings	30-gal. polyethylene bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico
AOC 00-030(eS)					
Contact Waste	Nonhazardous	0.005 yd^3	AK—analytical results from characterization samples	5-gal. poly bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico
AOC 00-030(h)					
Excavated Environmental Media	Nonhazardous LLW	306 yd^3	Direct sampling of excavated environmental media	20-yd^3 rolloff bins	Disposal at TA-54
Contact Waste	Nonhazardous	17 yd^3	AK—analytical results from excavated material	20-yd^3 roll-off bins	Disposal at Waste Management of New Mexico
Drill Cuttings	Nonhazardous	0.074 yd^3	Direct sampling of drill cuttings	55-gal. drums stored in locked portable drum-storage container	Land application at AOC 00-030(h)
Contact Waste	Nonhazardous	0.015 yd^3	AK—analytical results from drill cuttings	5-gal. poly bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico
Consolidated Unit 45-001-00					
Contact Waste	Nonhazardous	0.005 yd^3	AK—analytical results from characterization samples	5-gal. poly bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico
SWMU 31-001					
Drill cuttings	Nonhazardous	0.074 yd^3	Direct sampling of drill cuttings	55-gal. drums stored in locked portable drum-storage container	Land application at SWMU 31-001
Contact Waste	Nonhazardous	0.015 yd^3	AK—analytical results from drill cuttings	30-gal. poly bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico
AOC 00-030(f)					
Contact Waste	Nonhazardous	0.005 yd^3	AK—analytical results from characterization samples	5-gal. poly bucket stored in locked portable drum-storage container	Disposal at Waste Management of New Mexico

Attachment D-1

Waste Characterization Strategy Form
(on CD included with this document)

Appendix E

Photographs of Field Activities



Photo 1 **Preexcavation, view downstream (to the east) in Acid Canyon**



Photo 2 **Preexcavation, view near former outfall area, down slope (to the north) toward Acid Canyon**



Photo 3 Preexcavation, view upstream (to the west) within Acid Canyon



Photo 4 Preexcavation, view downstream (to the east) within Acid Canyon



Photo 5 **Preexcavation, view downstream (to the east) to near terminus of proposed excavation within Acid Canyon**



Photo 6 **Preexcavation, view downslope (to the north) of the former outfall location, former outfall daylighted north of upturned root**



Photo 7 **During excavation, view upstream (to the west) crew removing sediment and debris from Acid Canyon**



Photo 8 **During excavation, view of the Gap Vax vacuum truck at the top of the slope near Los Alamos High School parking lot**



Photo 9 Los Alamos County installation of culvert extension at head of Acid Canyon



Photo 10 During excavation, view to east, soil and rock removal near former outfall location



Photo 11 **Postexcavation, view to the south up slope from Acid Canyon drainage**



Photo 12 **Postexcavation, view to the north from edge of church parking lot. Note clump of trees in middle background. These trees could not be removed (see investigation report) and are a sediment trap from church parking lot runoff, and are also the location for the shallow confirmation sample CAPU-10-18367.**



Photo 13 Postexcavation, looking south at the top of the slope, note edge of church parking lot



Photo 14 Site restoration, view to south downslope into Acid Canyon, note end of new culvert (installed by Los Alamos County) in upper left



Photo 15 Site restoration, view to east at top of the slope, church parking lot just out of view to right

Appendix F

Analytical Program

F-1.0 INTRODUCTION

This appendix discusses the analytical methods and data quality assessment for samples collected during investigations at the Pueblo Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). This appendix also summarizes the effects of data-quality issues on the acceptability of the analytical data.

Quality assurance (QA), quality control (QC), and data validation procedures were implemented in accordance with the Quality Assurance Project Plan Requirements for Sampling and Analysis (LANL 1996, 054609), and the Laboratory's statements of work (SOWs) for analytical laboratories (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). The results of the QA/QC procedures were used to estimate the accuracy, bias, and precision of the analytical measurements. Samples for QC include method blanks, matrix spikes (MSs), laboratory control samples (LCSs), internal standards (ISs), initial calibration verifications (ICVs) and continuing calibration verifications (CCVs), surrogates, and tracers.

The type and frequency of laboratory QC analyses are described in the SOWs for analytical 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) EP-ERSS-SOP-5056, Sample Containers and Preservation.

The following SOPs, available at http://www.lanl.gov/environment/all/qa/adep.shtml, were used for data validation:

- SOP-5161, Routine Validation of Volatile Organic Data
- SOP-5162, Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data
- SOP-5163, Routine Validation of Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) 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

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.

F-2.0 ANALYTICAL DATA ORGANIZATION

Historical and 2010 data evaluated in this report were collected from Solid Waste Management Units (SWMUs) 00-018(a) and 31-001; Areas of Concern (AOCs) 00-030(eS), 00-030(f), and 00-030(h); and Consolidated Unit 45-001-00 during Resource Conservation and Recovery Act facility investigations, other corrective actions, and other investigations. For purposes of analytical data presentation and review, the analytical data are included in Appendix G (provided on CD) as six separate databases corresponding to the six areas investigated.

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

The analytical methods used for inorganic chemical analyses are summarized in Table F-3.0-1.

SWMU 00-018(a)

At SWMU 00-018(a), a total of 83 samples (25 soil/fill, 40 tuff, 10 sediment, and 8 sludge), plus 7 field duplicates, were collected during historical and 2010 investigations. A total of 82 samples were analyzed for target analyte list (TAL) metals; 68 samples were analyzed for nitrate, perchlorate, and cyanide.

SWMU 31-001

At SWMU 31-001, a total of 20 samples (6 soil and 14 tuff), plus 3 field duplicates, were collected during historical and 2010 investigations. All 20 samples were analyzed for TAL metals; 18 samples were analyzed for nitrate, perchlorate, and cyanide.

AOC 00-030(eS)

At AOC 00-030(eS), a total of 19 samples (13 soil/fill and 6 tuff), plus 4 field duplicates, were collected during historical and 2010 investigations. All 19 samples were analyzed for TAL metals; 17 samples were analyzed for nitrate, perchlorate, and cyanide.

AOC 00-030(f)

At AOC 00-030(f), a total of 23 samples (12 soil/fill and 11 tuff), plus 2 field duplicates, were collected during historical and 2010 investigations. All 23 samples were analyzed for TAL metals. A total of 22 samples were analyzed for nitrate and cyanide; 21 samples were analyzed for perchlorate.

AOC 00-030(h)

At AOC 00-030(h), a total of 38 samples (29 soil/fill, 7 tuff, and 2 sediment), plus 1 field duplicate were collected during historical and 2010 investigations. All 38 samples were analyzed for TAL metals; 12 samples were analyzed for nitrate, perchlorate, and cyanide.

Consolidated Unit 45-001-00

At Consolidated Unit 45-001-00, a total of 50 samples (33 soil/fill, 1 sediment, and 16 tuff), plus 4 field duplicates, were collected during historical and 2010 investigations. A total of 44 samples were analyzed for TAL metals; 38 samples were analyzed for nitrate, perchlorate, and cyanide.

Tables in the investigation report summarize the samples collected and analyses requested for the sites within the Pueblo Canyon Aggregate Area investigated during the Phase II campaign. All analyses obtained by the investigations are presented in Appendix G (on CD).

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 investigations. These QA/QC sample types are defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and are described briefly below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals, 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).

MSs 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% (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 [ICPMS]) 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 Chain of Custody

Sample collection logs (SCLs)/chain of custody (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 SCLs/COC forms in the field (Appendix G).

F-3.2.3 Sample Dilutions

Some samples were diluted for inorganic chemical analyses. No qualifiers were applied to any inorganic chemical sample results because of dilutions.

F-3.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.5 Holding Times

F-3.2.5.1 SWMUs 00-018(a) and 31-001 and AOCs 00-030(eS), 00-030(f), and 00-030(h)

Holding time criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.5.2 Consolidated Unit 45-001-00

Six perchlorate results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

A total of 15 perchlorate results were qualified as estimated (J) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-3.2.6 ICV and CCV Verifications

F-3.2.6.1 SWMUs 00-018(a) and 31-001, AOCs 00-030(eS) and 00-030(f), and Consolidated Unit 45-001-00

ICV and CCV criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.6.2 AOC 00-030(h)

One TAL metals result was qualified as estimated not detected (UJ) because the ICV and/or CCV was not analyzed at the appropriate method frequency.

Four TAL metals results were qualified as estimated (J) because the ICV and/or CCV was not analyzed at the appropriate method frequency.

F-3.2.7 ICS and/or Serial Dilutions

F-3.2.7.1 SWMU 31-001, AOC 00-030(h), and Consolidated Unit 45-001-00

ICS and/or serial dilution criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.7.2 SWMU 00-018(a)

One TAL metals result was qualified as estimated (J) because the serial dilution sample RPD was greater than 10% and the sample result was greater than 50 times the MDL (100 times for ICPMS).

F-3.2.7.3 AOC 00-030(eS)

Three TAL metals results were qualified as estimated (J) because the serial dilution sample RPD was greater than 10% and the sample result was greater than 50 times the MDL (100 times for ICPMS).

F-3.2.7.4 AOC 00-030(f)

A total of 12 perchlorate results were qualified as estimated not detected (UJ) because the associated ICS was recovered below the lower warning limit but above the lower acceptable limit (LAL).

F-3.2.8 Laboratory Duplicate Samples

F-3.2.8.1 SWMU 00-018(a)

Three TAL metals results were 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 31 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.

A total of 13 TAL metals results were qualified as estimated (J) because either the sample or duplicate sample results or both were greater than or equal to 5 times the RL and the difference between the samples was greater than 2 times the RL for soil samples.

F-3.2.8.2 SWMU 31-001

Eight TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 2 times the RL and the duplicate RPD was greater than 35% for soil samples.

One TAL metals result was qualified as estimated (J) because either the sample or duplicate sample results or both were greater than or equal to 5 times the RL and the difference between the samples was greater than two times the RL for soil samples.

F-3.2.8.3 AOC 00-030(eS)

A total of 34 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.

F-3.2.8.4 AOC 00-030(f)

A total of 18 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.

F-3.2.8.5 AOC 00-030(h)

A total of 12 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.

F-3.2.8.6 Consolidated Unit 45-001-00

A total of 32 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.

F-3.2.9 Blanks

F-3.2.9.1 SWMU 00-018(a)

One TAL metals result was qualified as not detected (U) because the sample result was less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 19 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

Six TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.2 SWMU 31-001

Four TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

F-3.2.9.3 AOC 00-030(eS)

Two TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

F-3.2.9.4 AOC 00-030(f)

Eight TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank.

A total of 10 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

Four TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

Six TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.5 AOC 00-030(h)

A total of 47 TAL metal results were qualified as not detected (U because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank.

Two TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

Two TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

F-3.2.9.6 Consolidated Unit 45-001-00

A total of 13 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

A total of 10 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.10 MS Samples

F-3.2.10.1 SWMU 00-018(a)

A total of 22 TAL metals results, 13 cyanide results, and 1 nitrate result were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 32 TAL metals results and 5 nitrate results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 100 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.

A total of 38 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >150%) was observed for these analytes in the associated spike sample.

F-3.2.10.2 SWMU 31-001

Nine TAL metals and one cyanide result were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

Two TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 23 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-3.2.10.3 AOC 00-030(eS)

Five TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 16 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 17 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 150%) was observed for these analytes in the associated spike sample.

A total of 10 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-3.2.10.4 AOC 00-030(f)

Two 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.

Eight TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 17 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 22 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.

A total of 12 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >150%) was observed for these analytes in the associated spike sample.

F-3.2.10.5 AOC 00-030(h)

Nine TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 16 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 29 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.

Nine TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >150%) was observed for these analytes in the associated spike sample.

F-3.2.10.6 Consolidated Unit 45-001-00

A total of 36 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 63 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 12 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

F-3.2.11 LCS Recoveries

F-3.2.11.1 SWMU 00-018(a)

Six TAL metals results and three cyanide results were qualified as estimated not detected (UJ) because the associated LCS %Rs were less than the LAL but greater than 10%.

A total of 43 TAL metals results and one cyanide result were qualified as estimated and biased high (J+) because the associated LCSs were recovered above the upper warning limit.

F-3.2.11.2 SWMU 31-001

Four TAL metals results were qualified as estimated and biased high (J+) because the associated LCSs were recovered above the upper warning limit.

F-3.2.11.3 AOC 00-030(eS)

Six TAL metals results were qualified as estimated and biased high (J+) because the associated LCSs were recovered above the upper warning limit.

F-3.2.11.4 AOC 00-030(f)

Six TAL metals results were qualified as estimated not detected (UJ) because the associated LCS %Rs were less than the LAL but greater than 10%.

A total of 12 TAL metals results were qualified as estimated and biased high (J+) because the associated LCSs were recovered above the upper warning limit.

F-3.2.11.5 AOC 00-030(h)

Six TAL metals results were qualified as estimated and biased high (J+) because the associated LCSs were recovered above the upper warning limit.

F-3.2.11.6 Consolidated Unit 45-001-00

Two TAL metals results were qualified as estimated not detected (UJ) because the associated LCS %Rs were less than the LAL but greater than 10%.

A total of 11 TAL metals results were qualified as estimated and biased high (J+) because the associated LCS %Rs were greater than 125%.

F-3.2.12 Detection Limits

F-3.2.12.1 SWMU 00-018(a)

A total of 156 TAL metals results, 6 nitrate results, and 10 perchlorate results were qualified as estimated (J) because the sample results were reported as detected between the estimated detection limit (EDL) and the MDL.

A total of 52 TAL metals results, 3 perchlorate results, and 1 cyanide result were qualified as estimated (J) because the sample results were reported as detected between the practical quantitation limit (PQL) and the MDL.

F-3.2.12.2 SWMU 31-001

A total of 39 TAL metals results, 4 nitrate results, 6 perchlorate results, and 2 cyanide results were qualified as estimated (J) because the sample results were reported as detected between the EDL and the MDL.

F-3.2.12.3 AOC 00-030(eS)

A total of 44 TAL metals results, 2 nitrate results, 9 perchlorate results, and 2 cyanide results were qualified as estimated (J) because the sample results were reported as detected between the EDL and the MDL.

Two TAL metals results were qualified as estimated (J) because the sample results were reported as detected between the PQL and the MDL.

F-3.2.12.4 AOC 00-030(f)

A total of 33 TAL metals results and 6 cyanide results were qualified as estimated (J) because the sample results were reported as detected between the EDL and the MDL.

A total of 18 TAL metals results and 4 perchlorate results were qualified as estimated (J) because the sample results were reported as detected between the PQL and the MDL.

F-3.2.12.5 AOC 00-030(h)

A total of 86 TAL metals results, 1 perchlorate result, and 1 cyanide result were qualified as estimated (J) because the sample results were reported as detected between the EDL and the MDL.

A total of 20 TAL metals results were qualified as estimated (J) because the sample results were reported as detected between the PQL and the MDL.

F-3.2.12.6 Consolidated Unit 45-001-00

A total of 108 TAL metals results, 2 nitrate results, 6 perchlorate results, and 1 cyanide result were qualified as estimated (J) because the sample results were reported as detected between the EDL and the MDL.

Nine TAL metals results were qualified as estimated (J) because the sample results were reported as detected between the PQL and the MDL.

F-3.2.13 Rejected Results

F-3.2.13.1 Consolidated Unit 45-001-00

Sample results for inorganic chemical analysis were not qualified as rejected (R).

F-3.2.13.2 SWMU 00-018(a)

A total of 15 TAL metals results (6 antimony, 3 barium, 3 magnesium, and 3 potassium) was qualified as rejected (R) because recoveries of less than 30% were observed in the associated MS analyses.

F-3.2.13.3 SWMU 31-001

A total of 15 TAL metals results (9 antimony and 6 barium) was qualified as rejected (R) because recoveries of less than 30% were observed in the associated MS analyses.

F-3.2.13.4 AOC 00-030(eS)

A total of 14 antimony results was qualified as rejected (R) because recoveries of less than 30% were observed in the associated MS analyses.

F-3.2.13.5 AOC 00-030(f)

One perchlorate result was qualified as rejected (R) because the ion-abundance criteria did not meet specifications.

Five selenium results were qualified as rejected (R) because the project chemist identified quality deficiencies in the reported data that require further qualification.

F-3.2.13.6 AOC 00-030(h)

Eight selenium results were qualified as rejected (R) because the project chemist identified quality deficiencies in the reported data that require further qualification.

A total of 12 antimony results was qualified as rejected (R) because recoveries of less than 30% were observed in the associated MS analyses.

The rejected data were not used to characterize the nature and extent of contamination or assess potential risk. However, sufficient data of good quality are available to characterize the sites. 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

The analytical methods used for organic chemical analyses are summarized in Table F-3.0-1.

SWMU 00-018(a)

At SWMU 00-018(a), a total of 77 samples (22 soil/fill, 37 tuff, 10 sediment, and 8 sludge), plus 5 field duplicates, was collected during historical and 2010 investigations. A total of 74 samples was analyzed for semivolatile organic compounds (SVOCs), 66 samples were analyzed for volatile organic compounds (VOCs), 57 samples were analyzed for polychlorinated biphenyls (PCBs), 64 samples were analyzed for pesticides, and 8 samples were analyzed for pesticides and PCBs.

SWMU 31-001

At SWMU 31-001, a total of 18 samples (6 soil and 12 tuff), plus 2 field duplicates, was collected during historical and 2010 investigations. All 18 samples were analyzed for VOCs, SVOCs, and pesticides; 9 samples were analyzed for PCBs.

AOC 00-030(eS)

At AOC 00-030(eS), a total of 17 samples (13 soil/fill and 4 tuff), plus 2 field duplicates, was collected during historical investigations. All 17 samples were analyzed for VOCs, SVOCs, pesticides, and PCBs.

AOC 00-030(f)

At AOC 00-030(f), a total of 22 samples (12 soil/fill and 10 tuff), plus 1 field duplicate, was collected during historical and 2010 investigations. All 22 samples were analyzed for VOCs, SVOCs, pesticides, and PCBs.

AOC 00-030(h)

At AOC 00-030(h), a total of 42 samples (29 soil/fill, 11 tuff, and 2 sediment), plus 2 field duplicates, was collected during historical and 2010 investigations. All 42 samples were analyzed for SVOCs, 38 samples were analyzed for pesticides, and 28 samples were analyzed for PCBs and VOCs.

Consolidated Unit 45-001-00

At Consolidated Unit 45-001-00, a total of 38 samples (29 soil/fill and 9 tuff), plus 3 field duplicates, was collected during historical investigations. All 38 samples were analyzed for PCBs, 30 samples were analyzed for SVOCs and pesticides, 29 samples were analyzed for VOCs, and 5 samples were analyzed for PAHs.

All organic chemical results are included in Appendix G (provided on CD).

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. These QA/QC sample types are defined in the analytical services SOWs (LANL 1995, 049738, LANL 2000, 071233, LANL 2008, 109962) and are described briefly below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical procedure and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the accuracy of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration ensures that the initial calibration is still holding and correct as the instrument is used to process samples. The continuing calibration also serves to determine that analyte identification criteria such as retention times and spectral matching are being met.

The LCS is a sample of a known matrix that has been spiked with compounds that are representative of the target analytes; it serves as a monitor of overall performance. 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 be 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).

MSs are used to measure the ability to recover prescribed analytes from a native sample matrix; they 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 LAL and the 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 is not normally found in environmental samples. Surrogates are added to every blank, sample, and spike to evaluate the efficiency with which analytes are recovered during extraction and analysis. The recovery percentage of the surrogates must be within specified ranges or the sample may be rejected or assigned a qualifier.

An IS is a chemical compound added to every blank, sample, and standard extract at a known concentration. ISs 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.

At SWMU 00-018(a), four SVOC results and one VOC result were qualified as not detected (U) because the associated mass spectra did not meet method specifications.

At AOC 00-003(eS), three SVOC results and four VOC results were qualified as not detected (U) because the associated mass spectra did not meet method specifications.

At AOC 00-030(f), three SVOC results were qualified as not detected (U) because the associated mass spectra did not meet method specifications.

At AOC 00-030(h), two SVOC results and one VOC result were qualified as not detected (U) because the associated mass spectra did not meet method specifications.

At Consolidated Unit 45-001-00, three SVOC results and 27 PAH results were qualified as not detected (U) because the associated mass spectra did not meet method specifications.

F-4.2.1 Maintenance of COC

SCLs/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 SCLs in the field (Appendix G).

F-4.2.3 Sample Dilutions

F-4.2.3.1 SWMUs 31-001 and 00-018(a), AOCs 00-030(eS) and 00-030(f), and Consolidated Unit 45-001-00

Some samples were diluted for organic chemical analyses. No qualifiers were applied to any organic chemical sample results because of dilutions.

F-4.2.3.2 AOC 00-030(h)

A total of 121 SVOC results and 525 VOC results was qualified as estimated not detected (UJ) because of duplicates, dilutions, or reanalysis.

A total of 14 SVOC results and 24 VOC results was qualified as estimated (J) because of duplicates, dilutions, or reanalysis.

F-4.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for organic chemicals.

F-4.2.5 Holding Times

F-4.2.5.1 SWMUs 00-018(a) and 31-001 and AOCs 00-030(eS) and 00-030(h)

Holding-time criteria were met for all samples analyzed for organic chemicals.

F-4.2.5.2 AOC 00-030(f)

A total of 18 pesticide results was qualified as estimated not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

Three PCB results were qualified as estimated and biased low (J-) because the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

F-4.2.5.3 Consolidated Unit 45-001-00

Five PCB results were qualified as estimated not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

Two PCB results were qualified as estimated and biased low (J-) because the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

F-4.2.6 ICV and CCV Verifications

F-4.2.6.1 SWMU 00-018(a)

A total of 103 pesticide results, 196 SVOC results, and 169 VOC results was qualified as estimated not detected (UJ) because the associated percent relative standard difference (%RSD)/%difference (D) exceeded the criteria in the initial and/or continuing calibration standards.

A total of 104 SVOC results and 36 VOC results was qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 38 pesticide results, 2 SVOC results, and 15 VOC results was qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial and/or continuing calibration standards.

Four VOC results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

F-4.2.6.2 SWMU 31-001

A total of 35 pesticide results, 71 SVOC results, and 64 VOC results was qualified as estimated not detected (UJ) because the associated %RSD/%D exceeded the criteria in the initial and/or continuing calibration standards.

Four pesticide results were qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial and/or continuing calibration standards.

F-4.2.6.3 AOC 00-003(eS)

A total of 104 SVOC results and 28 VOC results was qualified as estimated not detected (UJ) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

Three SVOC results were qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

F-4.2.6.4 AOC 00-030(f)

A total of 43 pesticide results, 28 SVOC results, and 23 VOC results was qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 33 SVOC results and 24 VOC results was qualified as estimated not detected (UJ) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

Three SVOC results were qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

One pesticide result and one VOC result were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

F-4.2.6.5 AOC 00-030(h)

A total of 34 pesticide results, 85 SVOC results, and 12 VOC results was qualified as estimated not detected (UJ) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

Two pesticide results and 50 SVOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

Three pesticide results and five SVOC results were qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

One pesticide result was qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

F-4.2.6.6 Consolidated Unit 45-001-00

A total of 42 pesticide results, 159 SVOC results, and 58 VOC results was qualified as estimated not detected (UJ) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

Two PCB results, three pesticide results, and three SVOC results were qualified as estimated (J) because the associated %RSD/%D exceeded the criteria in the initial or continuing calibration standards.

Two PCB results were qualified as estimated (J) because the associated continuing calibration standard was not analyzed within 72 h of the initial analysis or the pattern in the sample does not adequately match the pattern for the analyte in the standard.

F-4.2.7 Surrogate Recoveries

F-4.2.7.1 SWMUs 00-018(a) and 31-001 and AOC 00-030(f)

Surrogate recovery criteria were met for all samples analyzed for organic chemicals.

F-4.2.7.2 AOC 00-003(eS)

A total of 23 PCB results was qualified as estimated not detected (UJ) because the surrogate recoveries were less than the LAL but greater than or equal to 10%.

Five PCB results were qualified as estimated and biased low (J-) because the surrogate recoveries were less than the LAL but greater than or equal to 10%.

One PCB result and six VOC results were qualified as estimated and biased high (J+) because the associated surrogates were recovered above the UAL.

F-4.2.7.3 AOC 00-030(h)

A total of 116 VOC results was qualified as estimated not detected (UJ) because two or more surrogate recoveries in the same fraction were recovered below the LAL but were greater than or equal to 10%.

Four VOC results were qualified as estimated and biased low (J-) because two or more surrogate recoveries in the same fraction were recovered below the LAL but were greater than or equal to 10%.

A total of 12 SVOC results and 11 VOC results was qualified as estimated and biased high (J+) because two or more surrogate recoveries in the same fraction were recovered above the UAL.

F-4.2.7.4 Consolidated Unit 45-001-00

One PCB result was qualified as estimated and biased low (J-) because the surrogate recovery was less than the LAL but greater than or equal to 10%.

F-4.2.8 IS Responses

F-4.2.8.1 SWMU 31-001 and AOC 00-030(f)

IS response criteria were met for all samples analyzed for organic chemicals.

F-4.2.8.2 SWMU 00-018(a)

A total of 65 SVOC results and 87 VOC results was qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

Six SVOC results were qualified as estimated (J) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

Eight SVOC results were qualified as estimated (J) because the associated IS area counts were greater than 200% when compared to the area counts in the applicable continuing calibration standard.

F-4.2.8.3 AOC 00-003(eS)

A total of 22 SVOC results and 16 VOC results was qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

A total of 12 SVOC results and one VOC result was qualified as estimated (J) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

F-4.2.8.4 AOC 00-030(h)

A total of 12 SVOC results and 512 VOC results was qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

A total of 22 SVOC results and one VOC result was qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

A total of 19 VOC results was qualified as estimated (J) because the associated IS area counts were less than 50% or greater than 200% when compared with the area counts in the applicable continuing calibration standard.

F-4.2.8.5 Consolidated Unit 45-001-00

A total of 51 SVOC results and 117 VOC results was qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

Three SVOC results and three VOC results were qualified as estimated (J) because the associated IS area counts were less than 50% but greater than 10% when compared with the area counts in the applicable continuing calibration standard.

F-4.2.9 Method Blanks

F-4.2.9.1 SWMU 00-018(a)

Two PCB results, one SVOC result, and three VOC results were qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

Two PCB results were qualified as estimated (J) because the sample results were greater than 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.2 SWMU 31-001

One VOC result and three SVOC results were qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.3 AOC 00-030(f)

Two pesticide results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analyte in the method blank.

F-4.2.9.4 AOC 00-030(h)

A total of 18 VOC results was qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.5 Consolidated Unit 45-001-00

Four SVOC results were qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

Two SVOC results were qualified as estimated (J) because the sample results were greater than 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.10 MS Samples

Matrix spike criteria were met for all samples analyzed for organic chemicals.

F-4.2.11 Laboratory Duplicate Samples

Laboratory duplicates collected for organic chemical analyses indicated acceptable precision for all samples.

F-4.2.12 Laboratory Control Sample Recoveries

F-4.2.12.1 AOC 00-030(f)

LCS criteria were met for all samples analyzed for organic chemicals.

F-4.2.12.2 SWMU 00-018(a)

Four SVOC results and six VOC results were qualified as estimated not detected (UJ) because the LCS %Rs were less than LAL but greater than 10%.

F-4.2.12.3 SWMU 31-001

Six VOC results were qualified as estimated not detected (UJ) because the LCS %Rs were less than LAL but greater than 10%.

F-4.2.12.4 AOC 00-003(eS)

Six VOC results were qualified as estimated not detected (UJ) because the LCS %Rs were less than the LAL but greater than 10%.

Two VOC results were qualified as estimated and biased high (J+) because the LCS %Rs were greater than the UAL.

F-4.2.12.5 AOC 00-030(h)

Six VOC results were qualified as estimated not detected (UJ) because the LCS %Rs were less than the LAL but greater than 10%.

F-4.2.12.6 Consolidated Unit 45-001-00

Six SVOC results and six VOC results were qualified as estimated not detected (UJ) because the LCS %Rs were less than the LAL but greater than 10%.

F-4.2.13 Quantitation and MDLs

F-4.2.13.1 SWMU 00-018(a)

A total of 10 PCB results, 6 pesticide results, 52 SVOC results, and 43 VOC results was qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.2 SWMU 31-001

One pesticide result, 10 SVOC results, and 8 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.3 AOC 00-003(eS)

One PCB result, 18 pesticide results, 22 SVOC results, and 17 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.4 AOC 00-030(f)

One PCB result, 18 pesticide results, 53 SVOC results, and 16 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.5 AOC 00-030(h)

A total of 16 pesticide results, 89 SVOC results, and 4 VOC results was qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.6 Consolidated Unit 45-001-00

Seven PCB results, 6 pesticide results, 57 SVOC results, and 16 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.14 Rejected Data

F-4.2.14.1 SWMU 31-001, AOCs 00-030(eS) and 00-030(f), and Consolidated Unit 45-001-00

Sample results for organic chemical analysis were not qualified as rejected (R).

F-4.2.14.2 SWMU 00-018(a)

A total of 15 SVOC results (1 benzoic acid; 1 chloro-3-methylphenol[4-]; 1 chlorophenol[2-]; 1 dichlorophenol[2,4-]; 1 dimethylphenol[2,4-]; 1 dinitro-2-methylphenol[4,6-]; 1 dinitrophenol[2,4-]; 1 methylphenol[2-]; 1 methylphenol[4-]; 1 nitrophenol[2-]; 1 nitrophenol[4-]; 1 pentachlorophenol; 1 phenol; 1 trichlorophenol[2,4,5-]; and 1 trichlorophenol[2,4,6-]) was qualified as rejected (R) because the associated surrogate percent recoveries were less than 10%.

F-4.2.13.3 AOC 00-030(h)

One DDT[4,4'-] result and 11 SVOC results (1 benzo[a]anthracene; 1 benzo[a]pyrene; 1 benzo[b]fluoranthene; 1 benzo[g,h,i]perylene; 1 bis[2-ethylhexyl]phthalate; 1 butylbenzylphthalate; 1 chrysene; 1 fluoranthene; 1 indeno[1,2,3-cd]pyrene; 1 phenanthrene; and 1 pyrene) 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 RL.

The rejected data were not used to characterize the nature and extent of contamination or assess potential risk. However, sufficient data of good quality are available to characterize the sites. 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

The analytical methods used for radionuclide analyses are summarized in Table F-3.0-1.

SWMU 00-018(a)

At SWMU 00-018(a), a total of 63 samples (18 soil/fill, 29 tuff, 10 sediment, and 6 sludge), plus 4 field duplicates, were collected during historical and 2010 investigations. A total of 61 samples were analyzed for gamma-emitting radionuclides, 10 samples were analyzed for alpha-/beta-emitting radionuclides, 4 samples were analyzed for tritium, and 1 sample was analyzed for isotopic uranium and strontium-90.

SWMU 31-001

At SWMU 31-001, a total of 18 samples (6 soil and 12 tuff), plus 2 field duplicates, were collected during historical and 2010 investigations. All 18 samples were analyzed for gamma-emitting radionuclides.

AOC 00-030(eS)

At AOC 00-030(eS), a total of 17 samples (13 soil/fill and 4 tuff), plus 2 field duplicates, were collected during historical investigations. All 17 samples were analyzed for gamma-emitting radionuclides.

AOC 00-030(f)

At AOC 00-030(f), a total of 22 samples (12 soil/fill and 10 tuff), plus 1 field duplicate, were collected during historical and 2010 investigations. All 22 samples were analyzed for gamma-emitting radionuclides; 16 samples were analyzed for americium-241.

AOC 00-030(h)

At AOC 00-030(h), a total of 28 samples (22 soil/fill and 6 tuff) were collected during historical and 2010 investigations. All 28 samples were analyzed for gamma-emitting radionuclides and isotopic plutonium.

Consolidated Unit 45-001-00

At Consolidated Unit 45-001-00, a total of 20 samples (16 soil/fill and 4 tuff), plus 2 field duplicates, were collected during historical investigations. All 20 samples were analyzed for gamma-emitting radionuclides; 3 samples were analyzed for tritium.

F-5.1 Radionuclide QA/QC Samples

All procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to the minimum detectable concentration (MDC). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to 3 times the total propagated uncertainty (TPU). This data qualification is related to detection status only and not to data-quality issues.

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. These QA/QC sample types are defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233, LANL 2008, 109962) and are described below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For radionuclides in soil/tuff, LCS %R should fall between the control limits of 80%–120%.

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during analysis. All radionuclide results should be below the MDC.

MSs assess the accuracy of radionuclide analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125%.

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. 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 and ±20% for water (LANL 1995, 049738; LANL 2000, 071233), LANL 2008, 109962.

F-5.2 Data-Quality Results for Radionuclides

F-5.2.1 Chain of Custody

SCLs/COC forms were maintained properly for all samples.

F-5.2.2 Sample Documentation

All samples were properly documented on the SCLs/COC in the field.

F-5.2.3 Sample Dilutions

Some samples were diluted for radionuclide analyses. No qualifiers were applied to any radionuclide sample results because of dilutions.

F-5.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for radionuclides.

F-5.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for radionuclides.

F-5.2.6 Method Blanks

Results for samples analyzed for radionuclides were not qualified because of blank contamination.

F-5.2.7 MS Samples

MS criteria were met for all samples analyzed for radionuclides.

F-5.2.8 Tracer Recoveries

Tracer-recovery criteria were met for all samples analyzed for radionuclides.

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

F-5.2.11.1 SWMU 00-018(a)

A total of 16 cesium-134 results was qualified as rejected (R) because the MDC and/or TPU documentation was missing.

A total of 17 cesium-134 results was qualified as R because spectral interferences prevented positive identification of the analytes.

F-5.2.11.2 SWMU 31-001

A total of 11 cesium-134 results was qualified as R because the MDC and/or TPU documentation was missing.

F-5.2.11.3 AOC 00-030(eS)

A total of 11 cesium-134 results was qualified as R because spectral interferences prevented positive identification.

F-5.2.11.4 AOC 00-030(f)

Five cesium-134 results were qualified as R because spectral interferences prevented positive identification of the analytes.

Seven cesium-134 results were qualified as R because the MDC and/or TPU documentation was missing.

F-5.2.11.5 AOC 00-030(h)

Six cesium-134 results were qualified as R because the MDC and/or TPU documentation was missing.

F-5.2.11.6 Consolidated Unit 45-001-00

A total of 10 cesium-134 results and 1 cobalt-60 result was qualified as rejected (R) because spectral interferences prevented positive identification.

The rejected data were not used to characterize the nature and extent of contamination or assess potential risk. However, sufficient data of good quality are available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information 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-3.0-1
Inorganic Chemical, Organic Chemical, and
Radionuclide Analytical Methods for Samples Collected from the Pueblo Canyon Aggregate Area

Analytical Method	Analytical Description	Analytical Suite
EPA 300.0	Ion chromatography	Anions (nitrate)
EPA 905.0	Gas flow proportional counting	Strontium-90
EPA 906.0	Distillation and liquid scintillation	Tritium
EPA SW-846: 6010/6010B	Inductively coupled plasma emission spectroscopy—atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846:6020	ICPMS	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 (GC)	PCBs
EPA SW-846: 8260 and 8260B	GC-mass spectrometry (GC/MS)	VOCs
EPA SW-846: 8270 and 8270C	GC/MS	SVOCs
EPA SW-846:8310	High performance liquid chromatography	Polycyclic aromatic hydrocarbons
Generic: gamma spectroscopy	Gamma spectroscopy	Americium-241, cesium-134, cesium-137, cobalt-60, europium-152, ruthenium-106, sodium-22, uranium-235
Generic: KPA	Kinetic phosphorescence	Uranium
HASL Method 300	Chemical separation alpha spectrometry	Isotopic uranium, isotopic plutonium, americium-241

Appendix G

Analytical Suites and Results and Analytical Reports
(on DVD included with this document)

Appendix H

Box Plots and Statistical Results

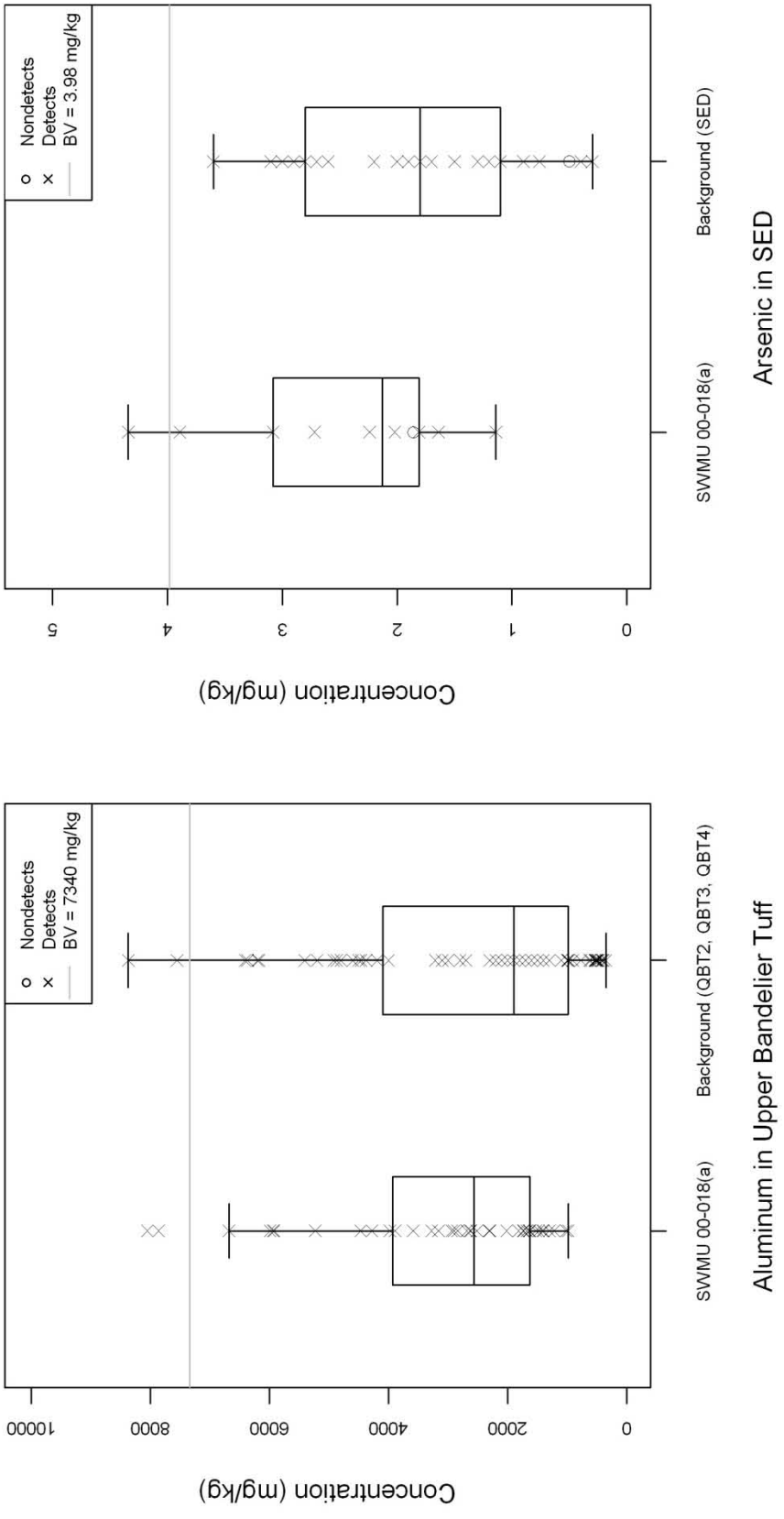
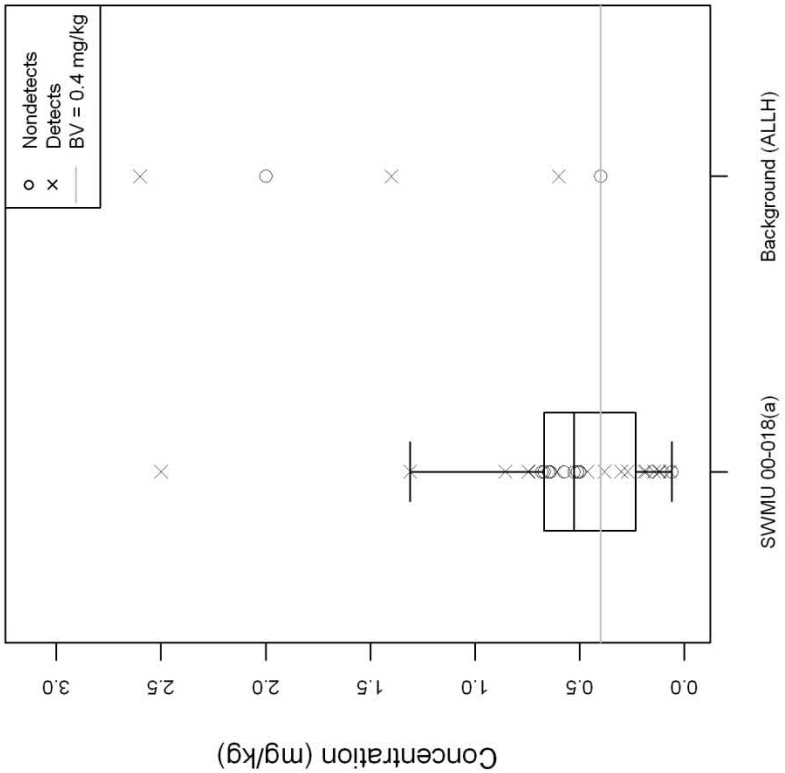


Figure H-1 Box plots for aluminum in tuff and arsenic in sediment at AOC 00-018(a)



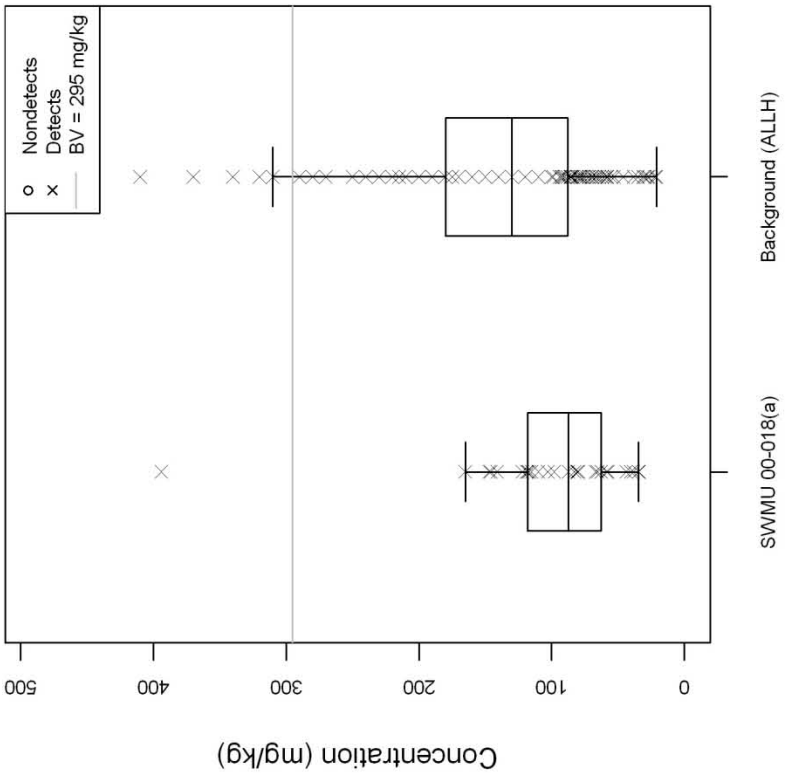
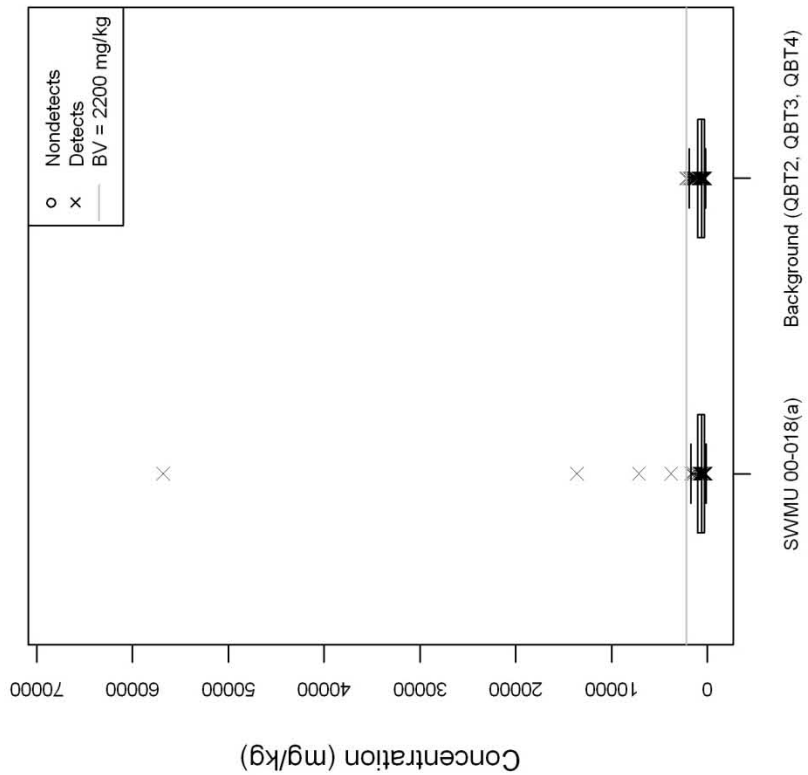


Figure H-2 Box plots for barium and cadmium in soil at SWMU 00-018(a)



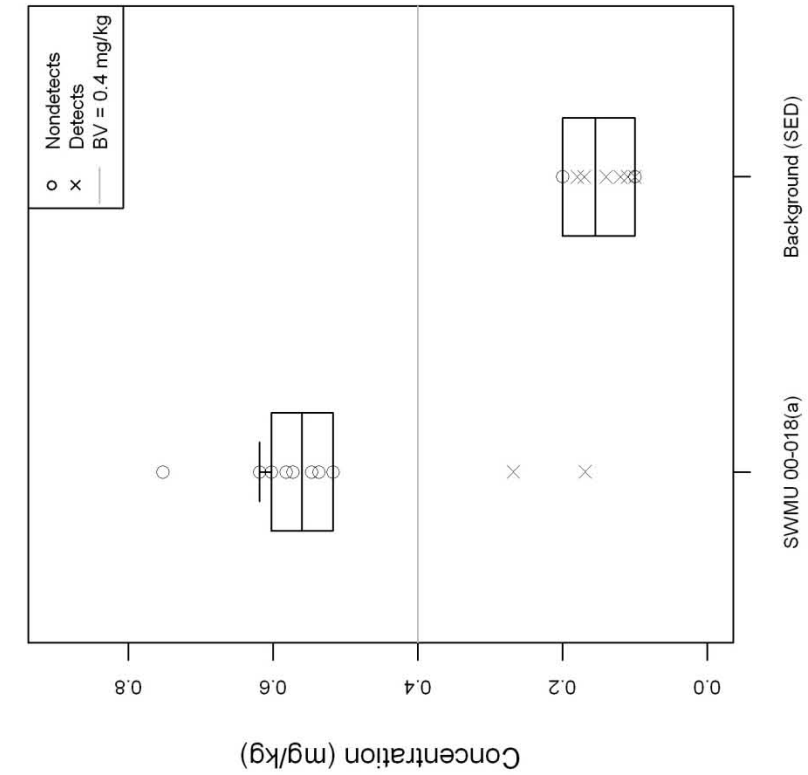
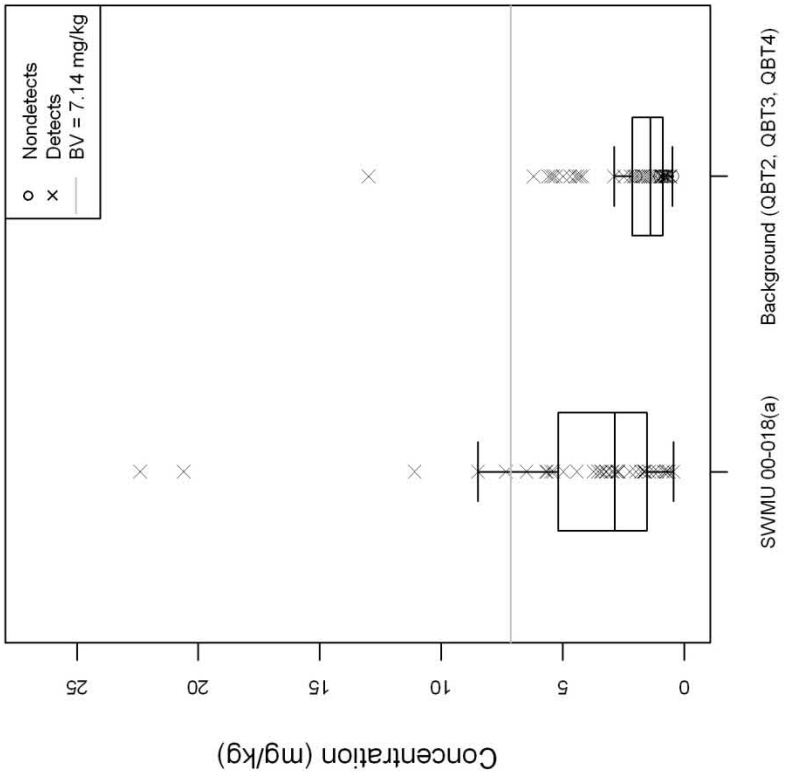


Figure H-3 Box plots for cadmium in sediment and calcium in tuff at SWMU 00-018(a)



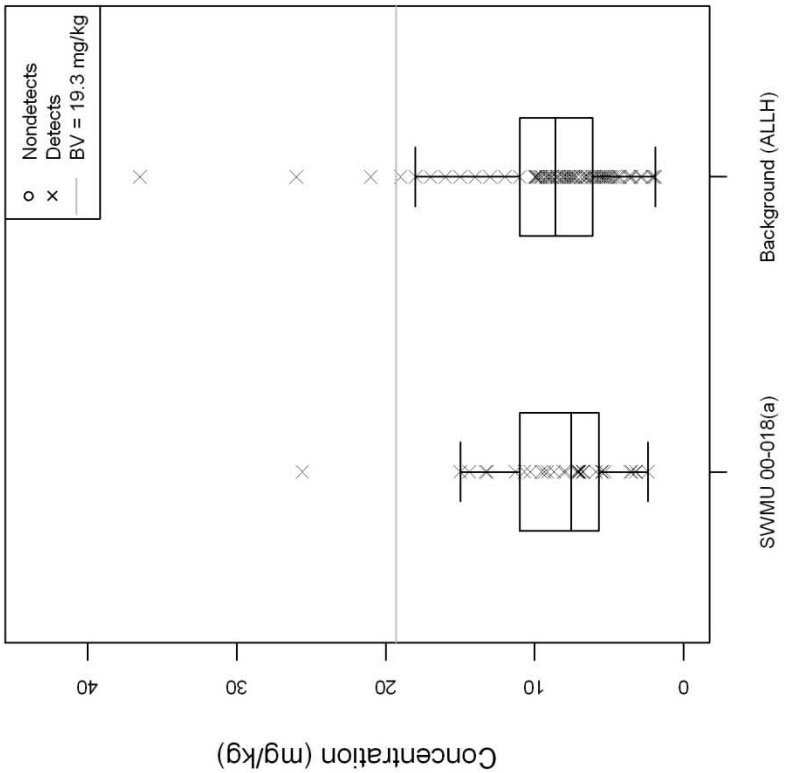
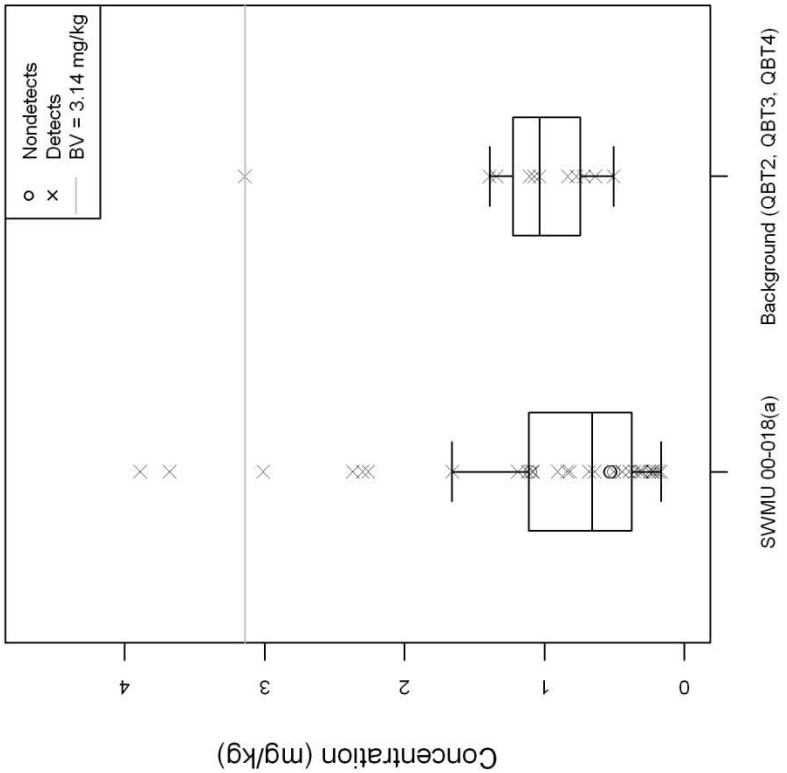


Figure H-4 Box plots for chromium in soil and tuff at SWMU 00-018(a)



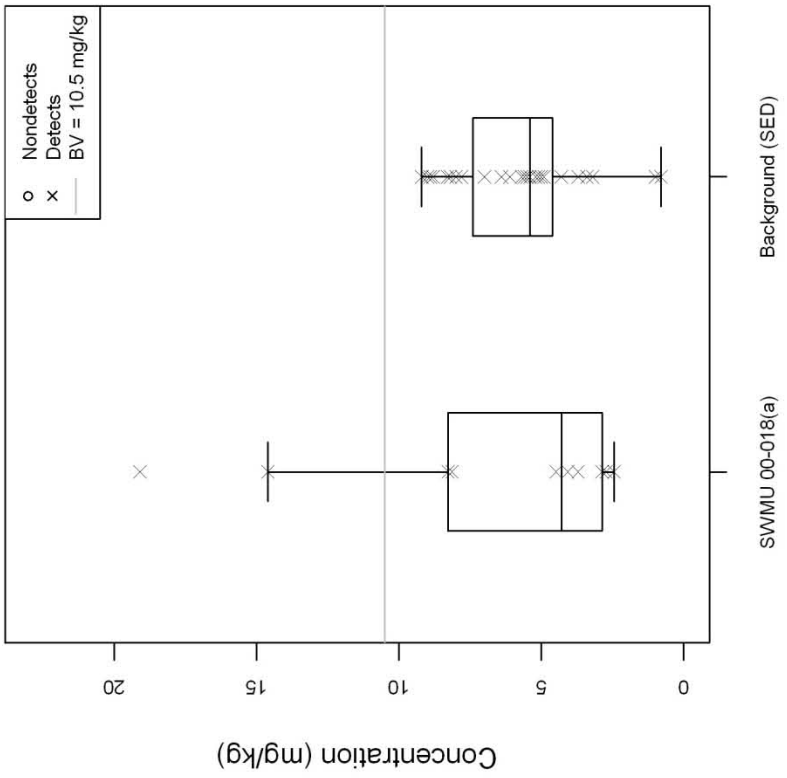
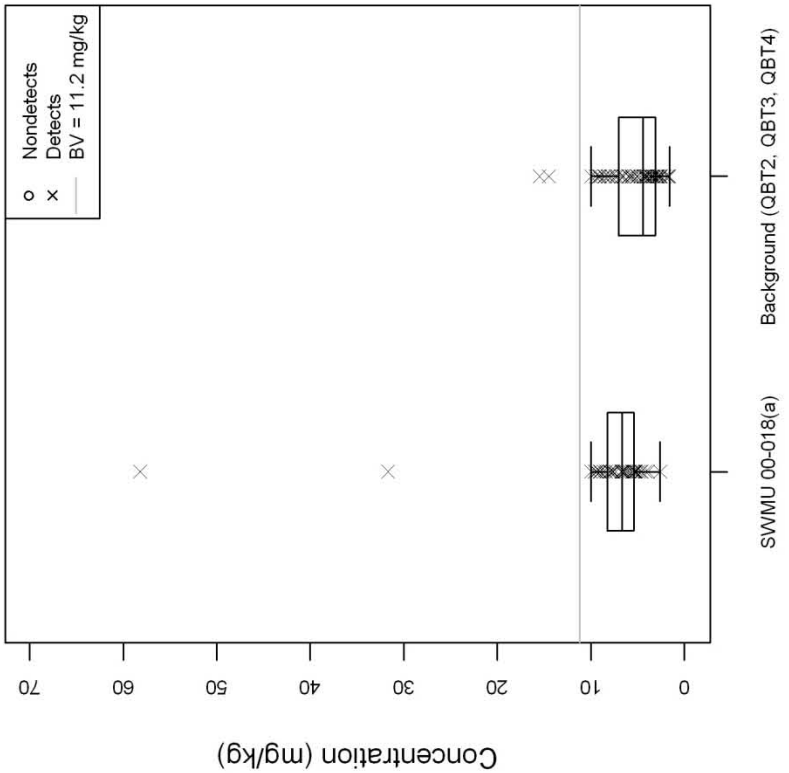


Figure H-5 Box plots for chromium in sediment and cobalt in tuff at SWMU 00-018(a)



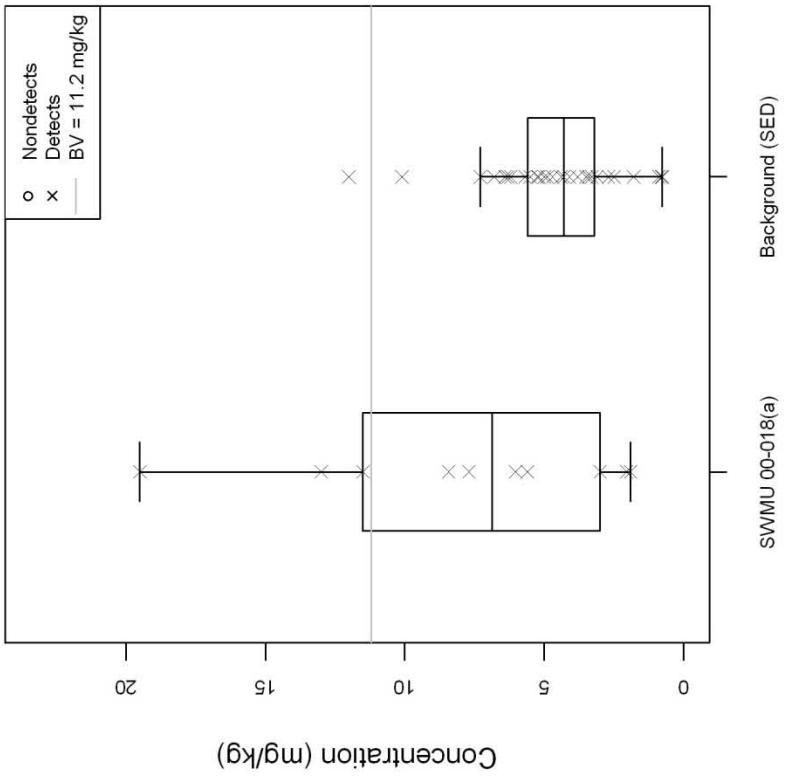
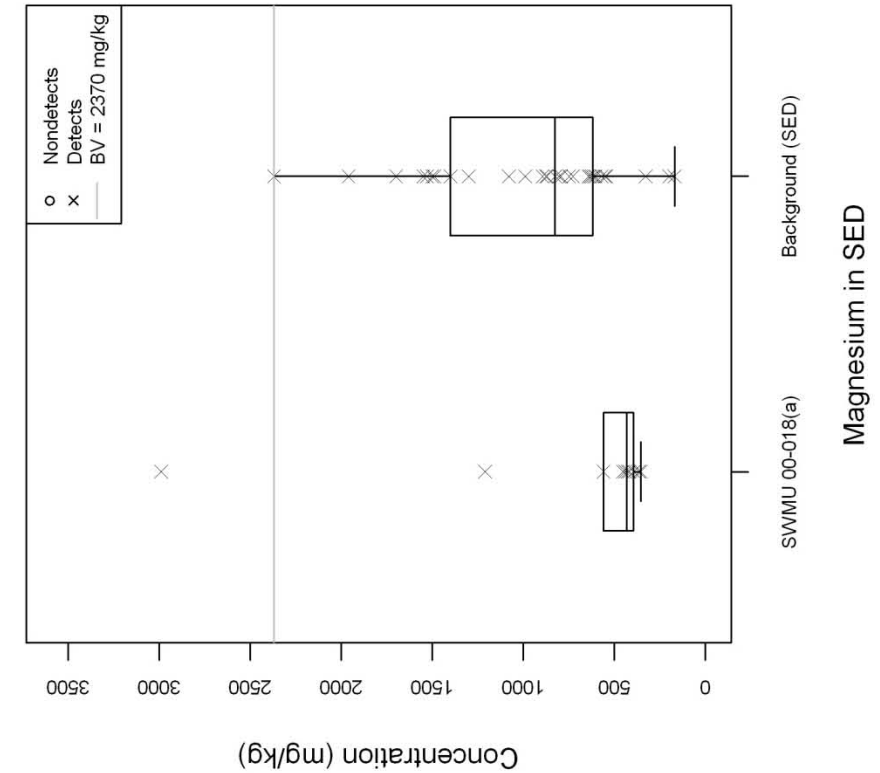


Figure H-6 Box plots for copper in sediment and lead in tuff at SWMU 00-018(a)



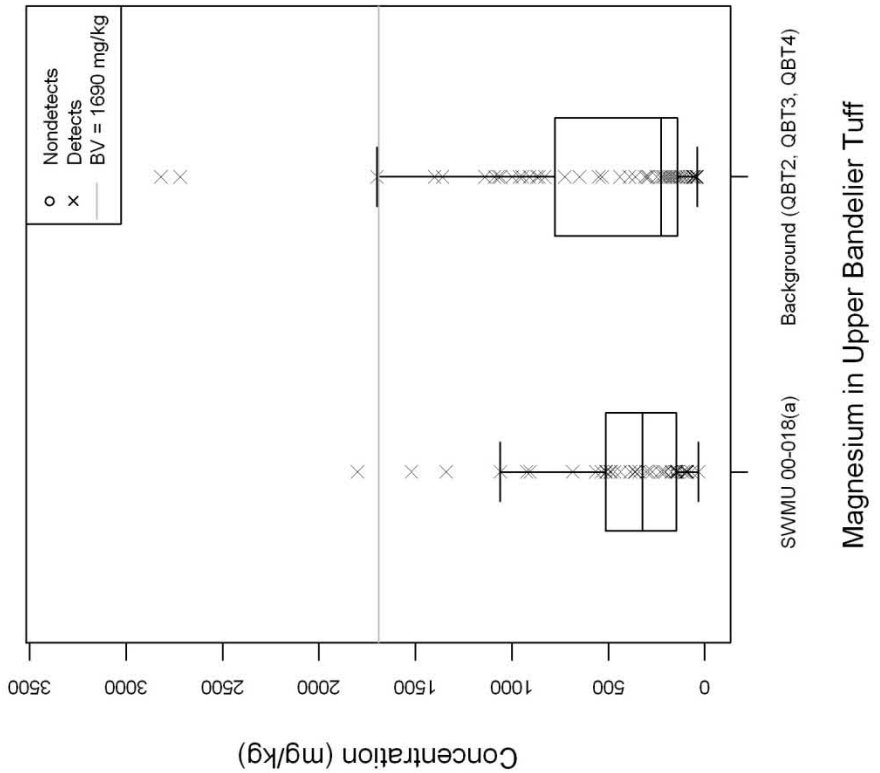
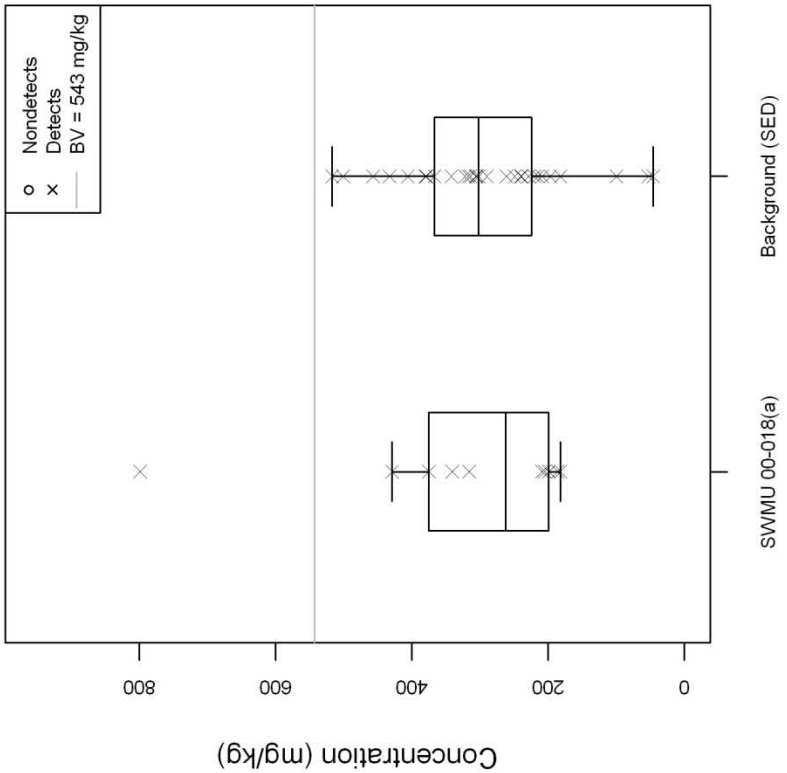


Figure H-7 Box plots for magnesium in tuff and sediment at SWMU 00-018(a)



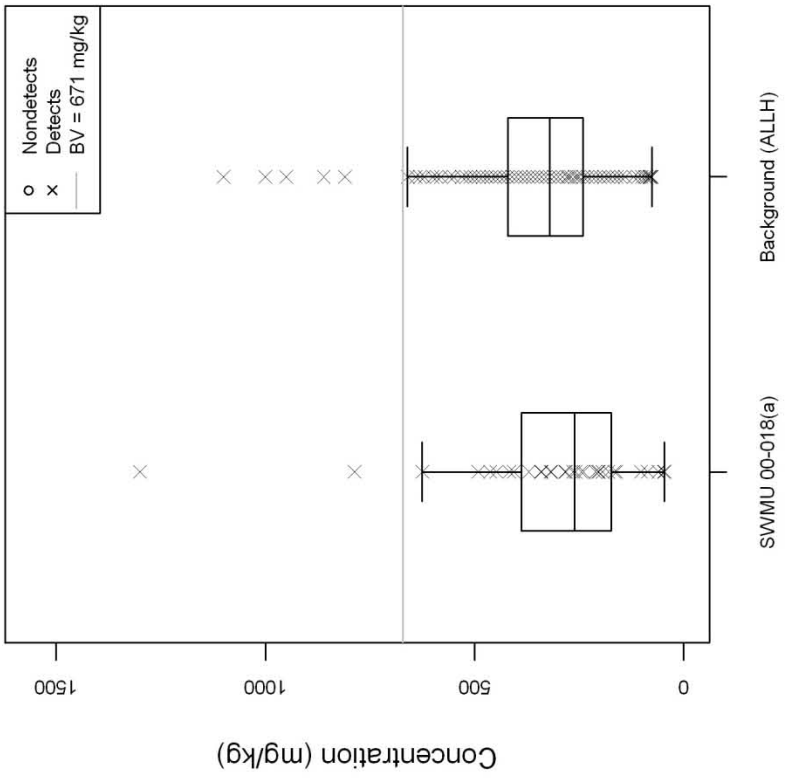
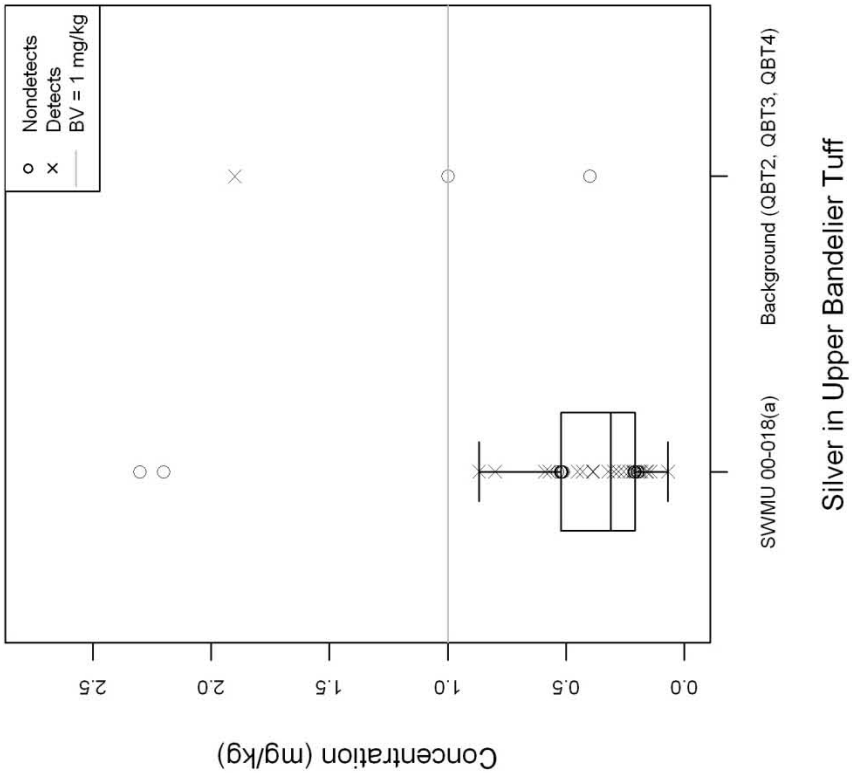


Figure H-8 Box plots for manganese in soil and sediment at SWMU 00-018(a)



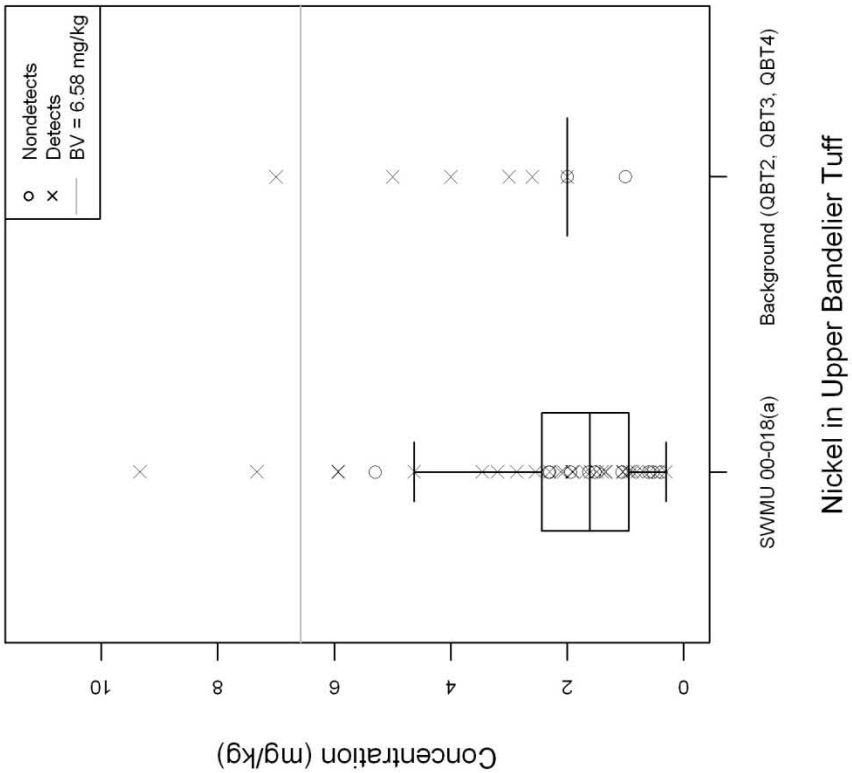
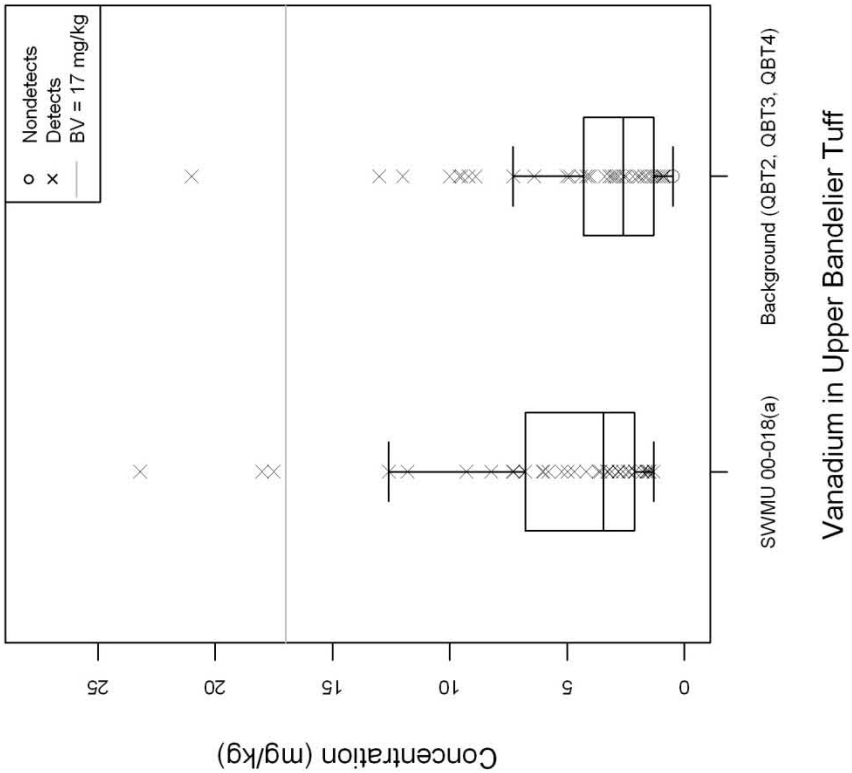


Figure H-9 Box plots for nickel and silver in tuff at SWMU 00-018(a)



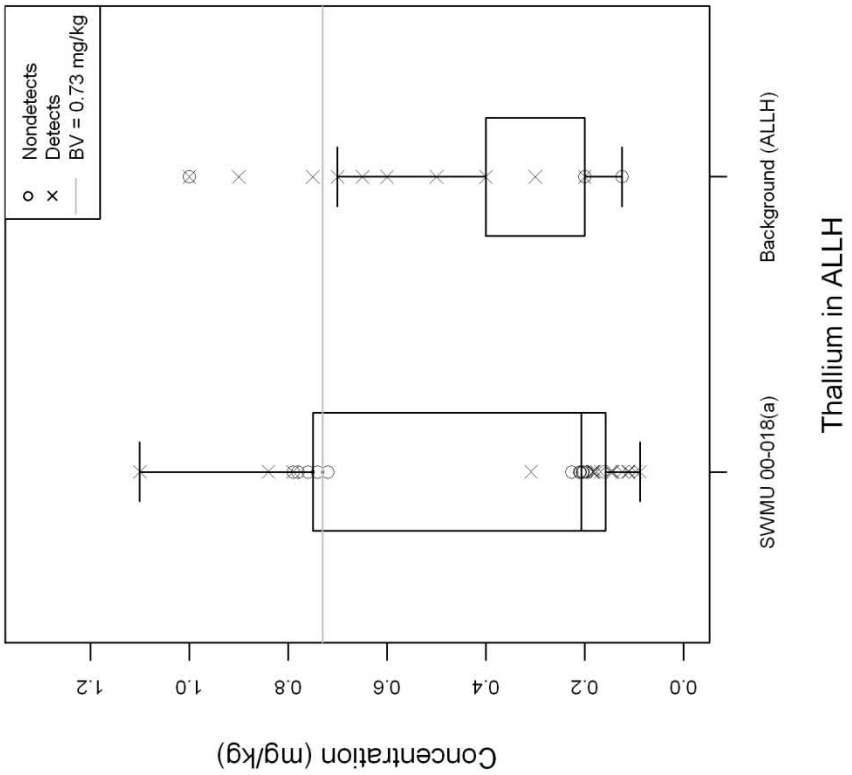
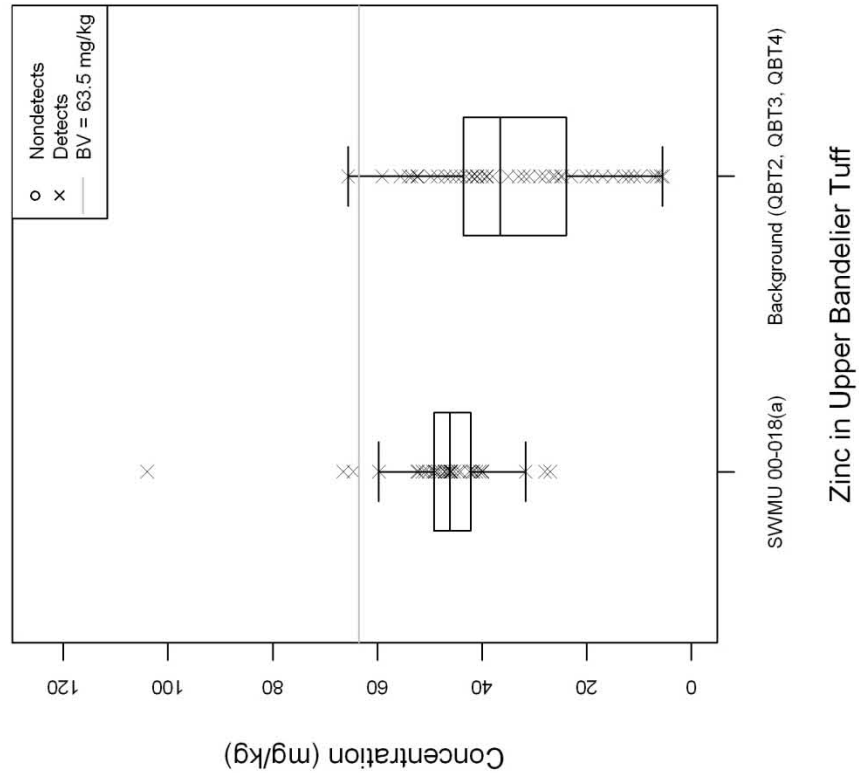


Figure H-10 Box plots for thallium in soil and vanadium in tuff at SWMU 00-018(a)



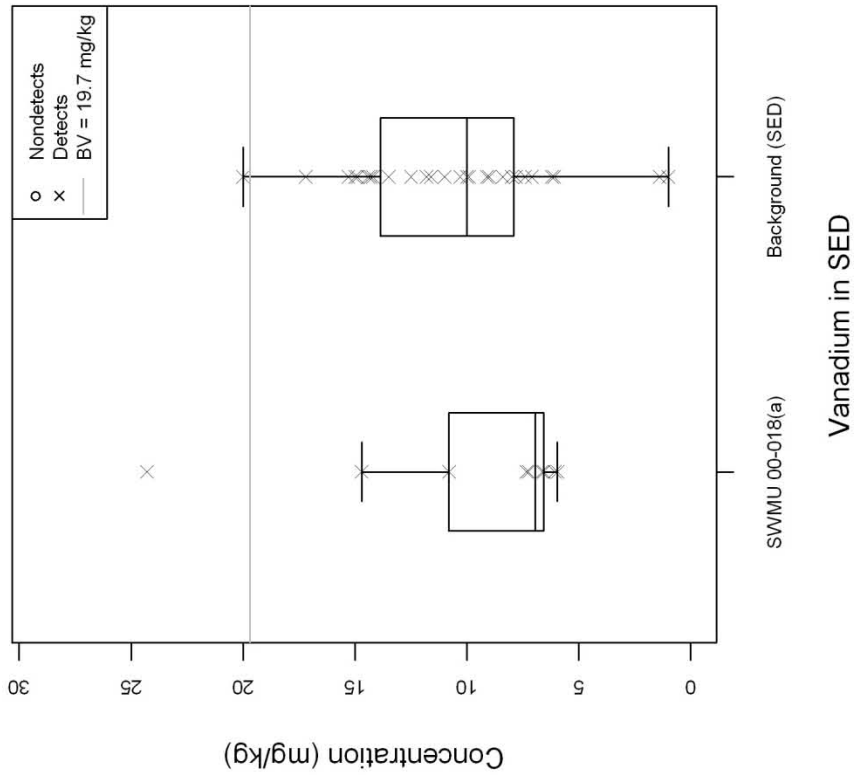


Figure H-11 Box plots for vanadium in sediment and zinc in tuff at SWMU 00-018(a)

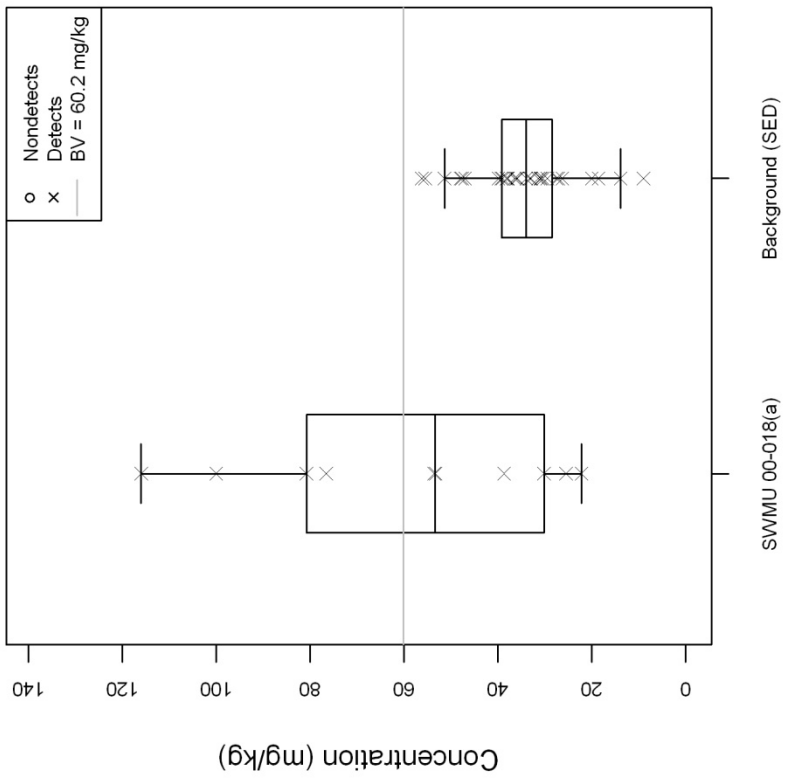
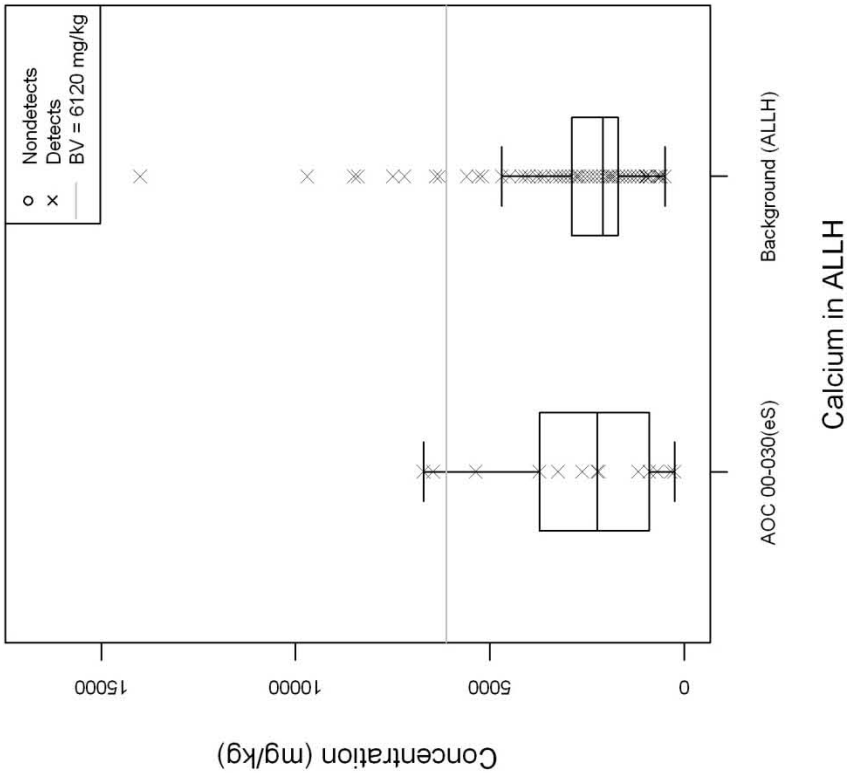


Figure H-12 Box plot for zinc in sediment at SWMU 00-018(a)



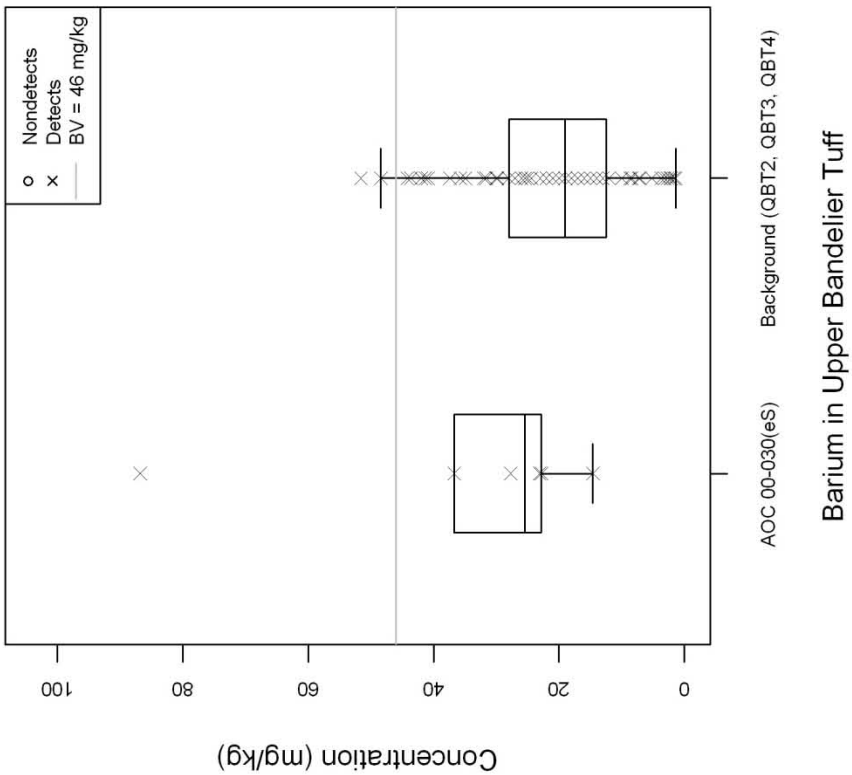
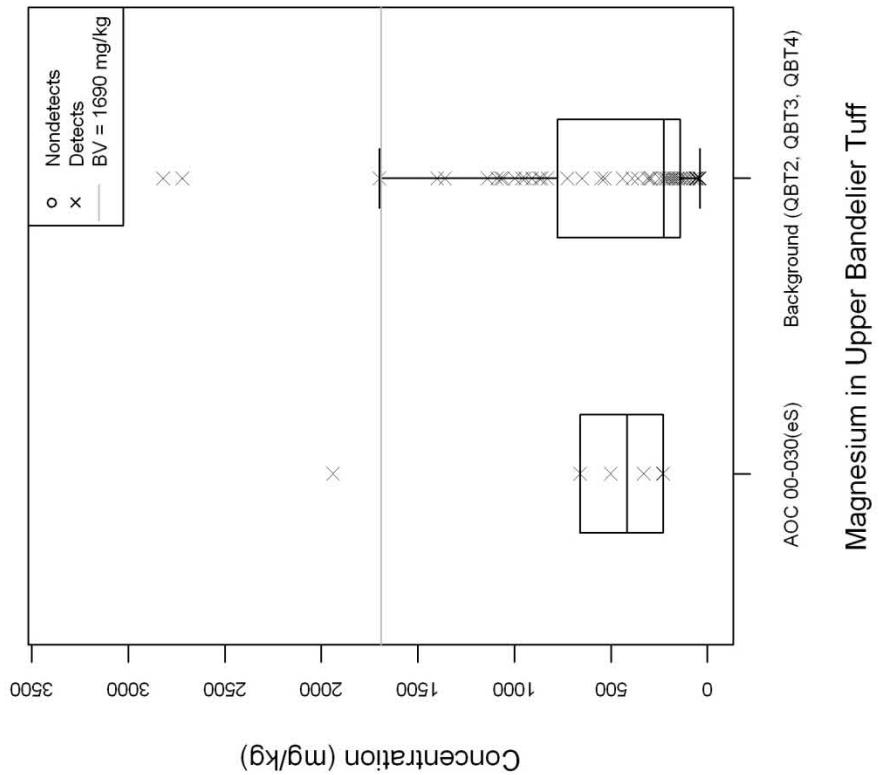


Figure H-13 Box plots for barium in tuff and calcium in soil at AOC 00-030(eS)



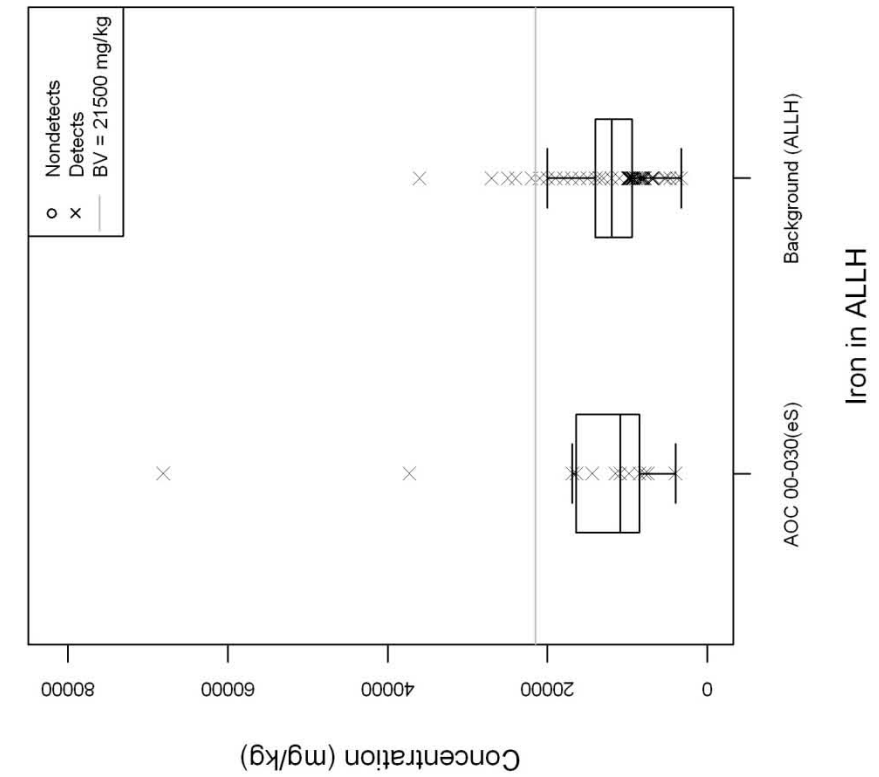
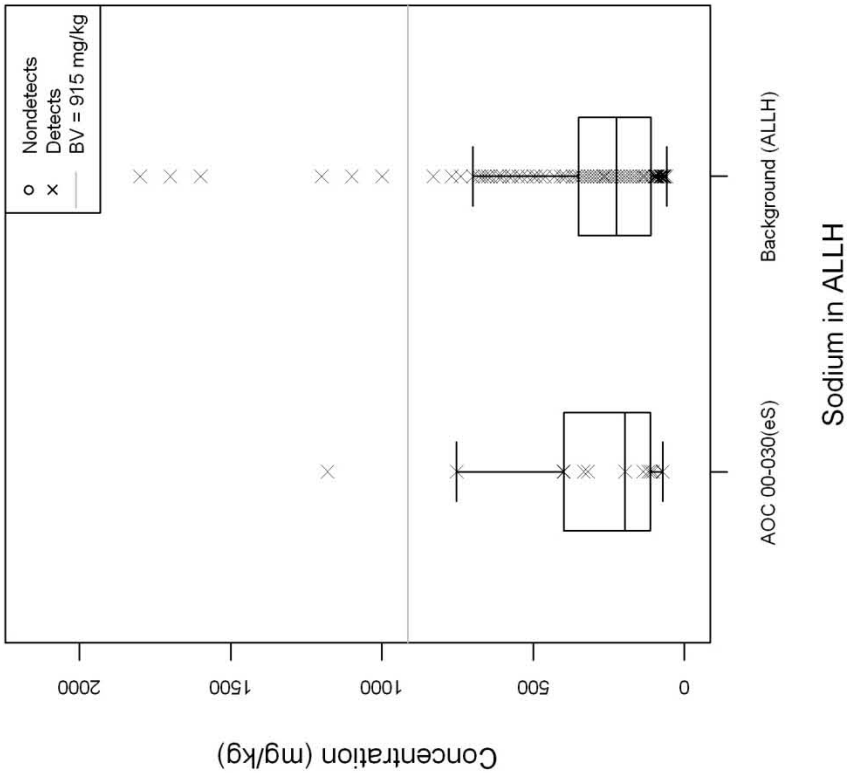


Figure H-14 Box plots for iron in soil and magnesium in tuff at AOC 00-030(eS)



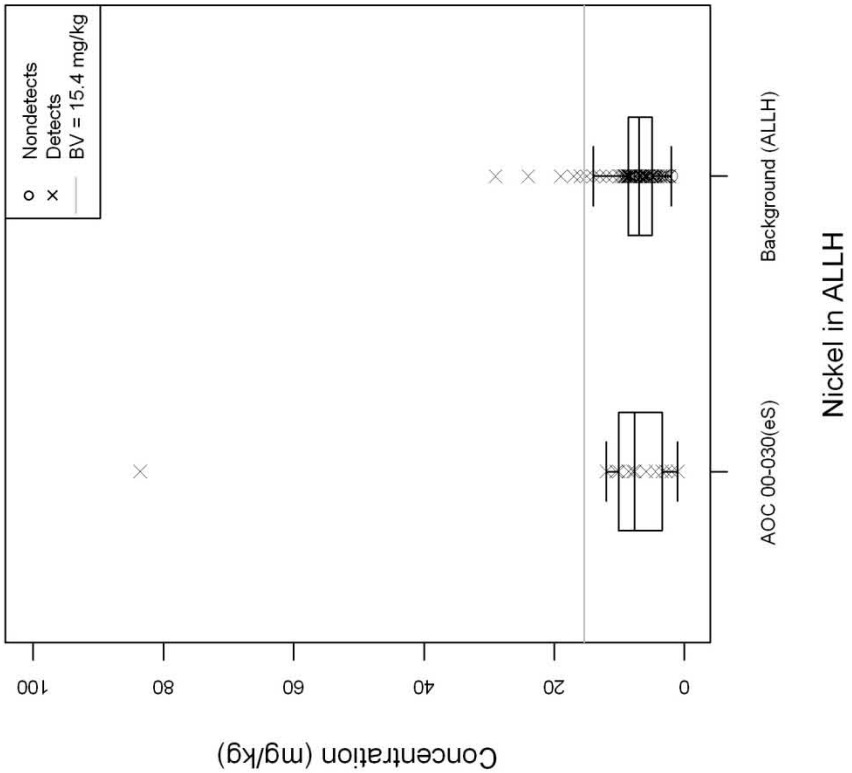
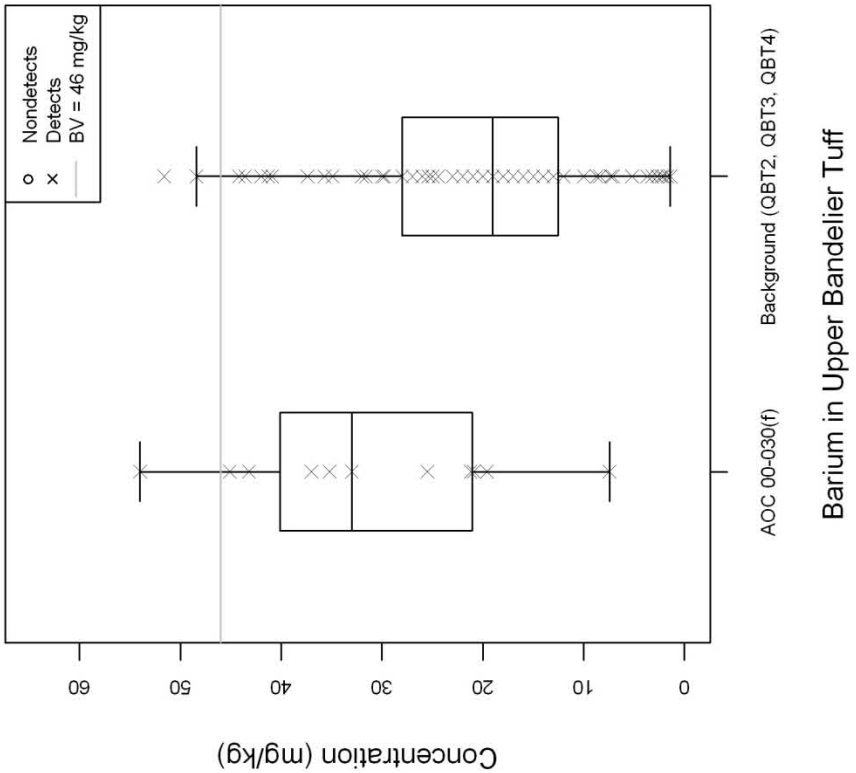


Figure H-15 Box plots for nickel and sodium in soil at AOC 00-030(eS)



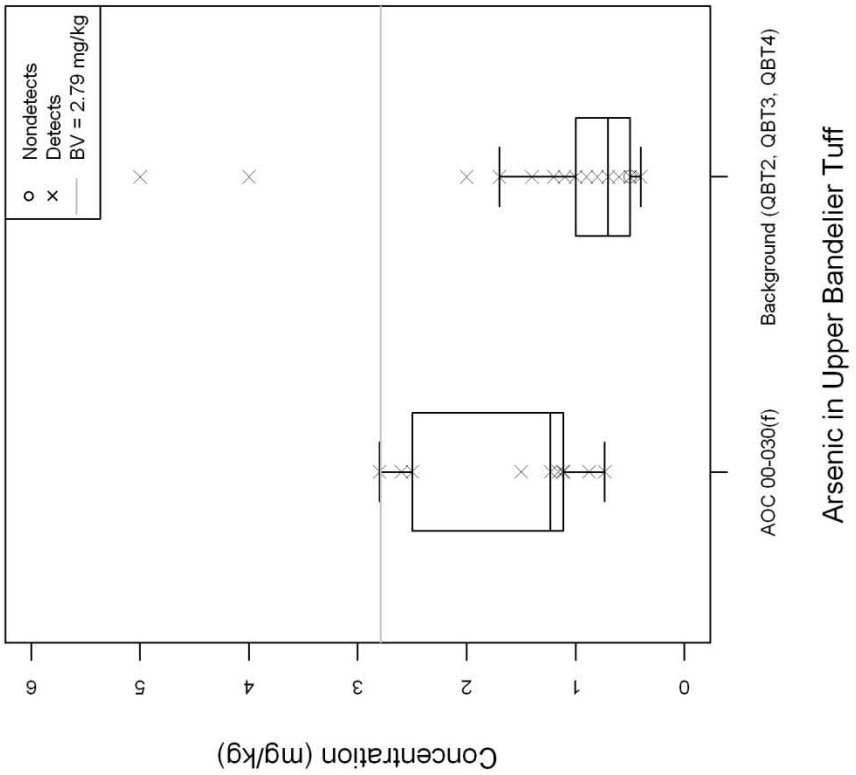
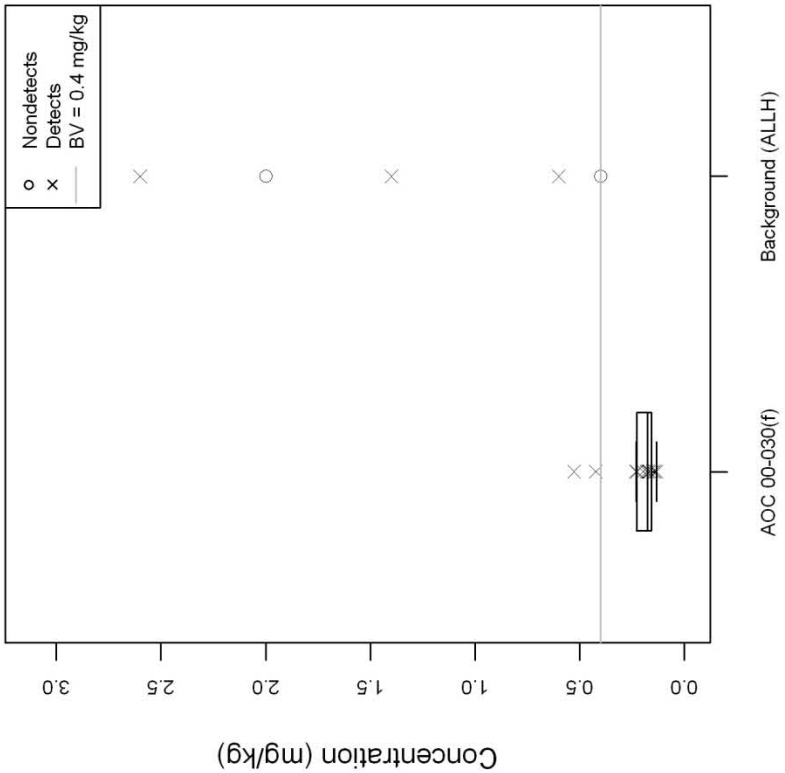


Figure H-16 Box plots for arsenic and barium in tuff at AOC 00-030(f)



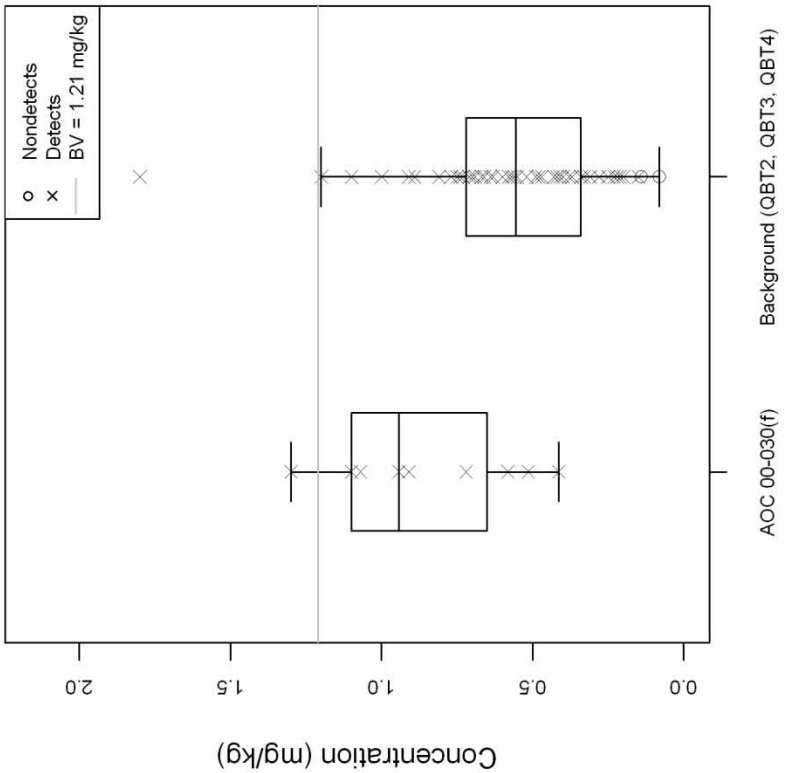
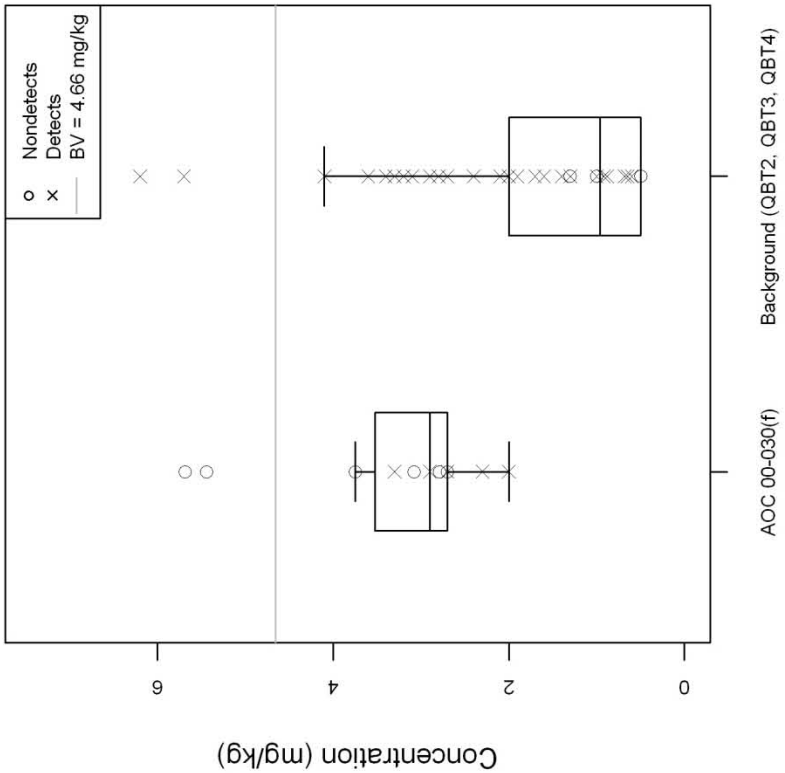


Figure H-17 Box plots for beryllium in tuff and cadmium in soil at AOC 00-030(f)



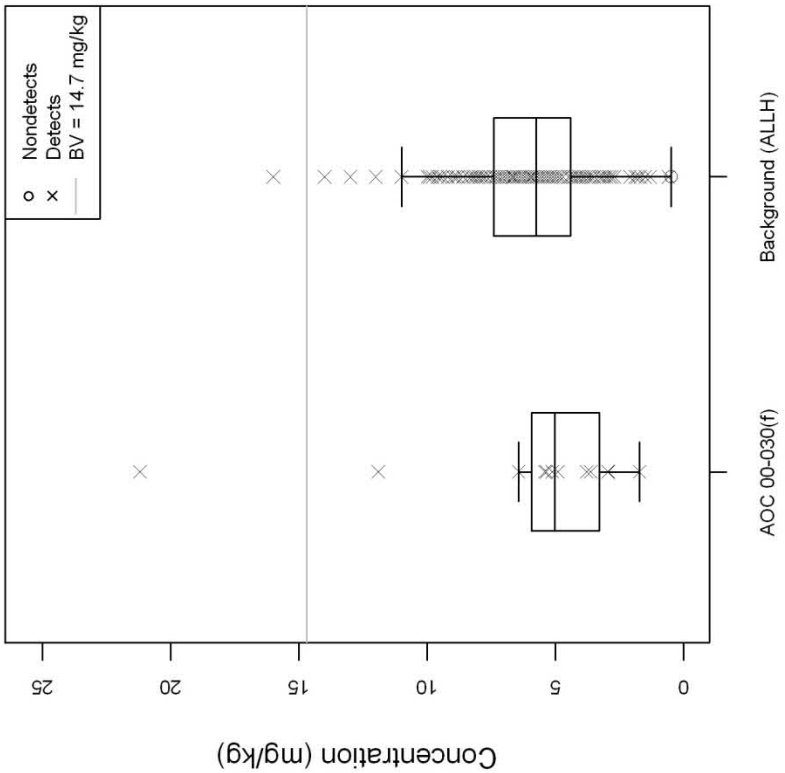
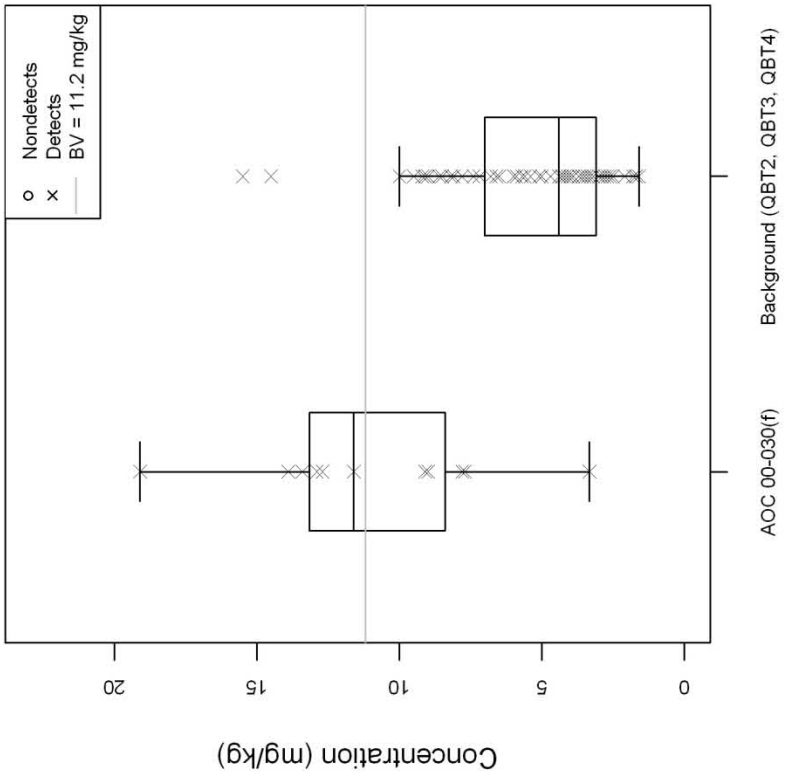


Figure H-18 Box plots for copper in soil and tuff at AOC 00-030(f)



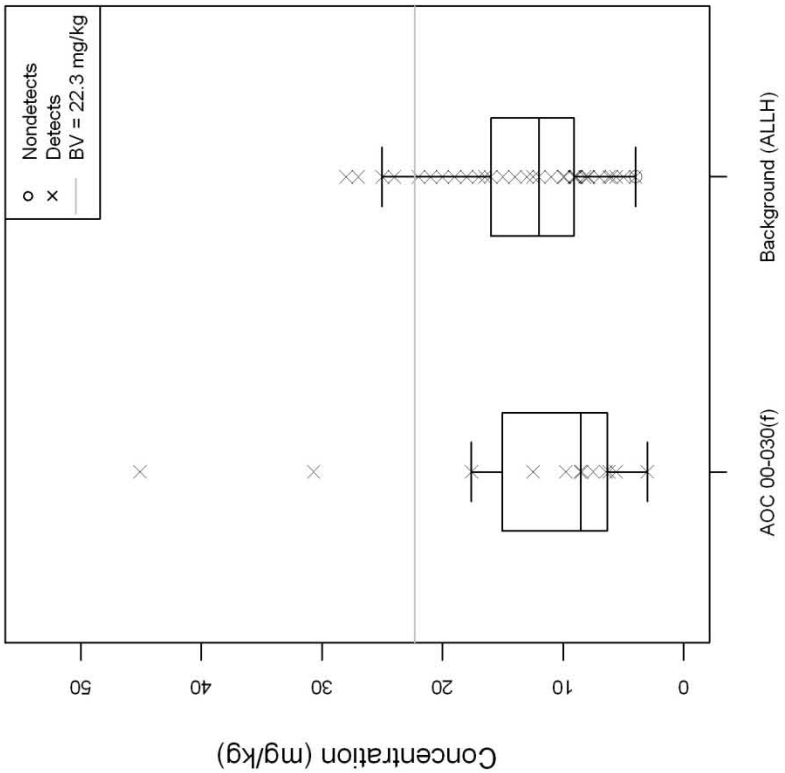
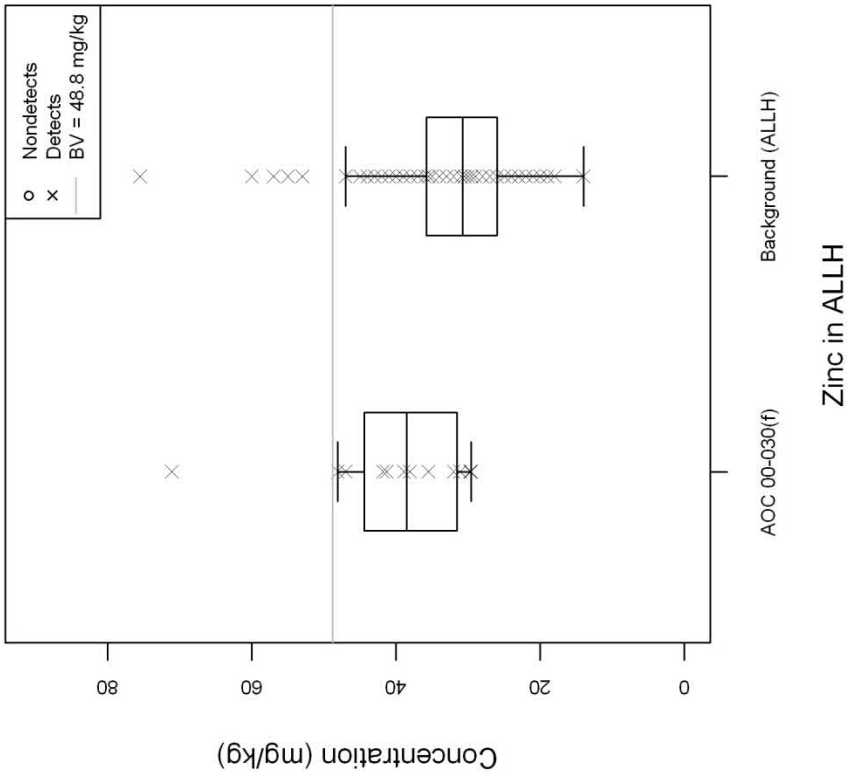


Figure H-19 Box plots for lead in soil and tuff at AOC 00-030(f)



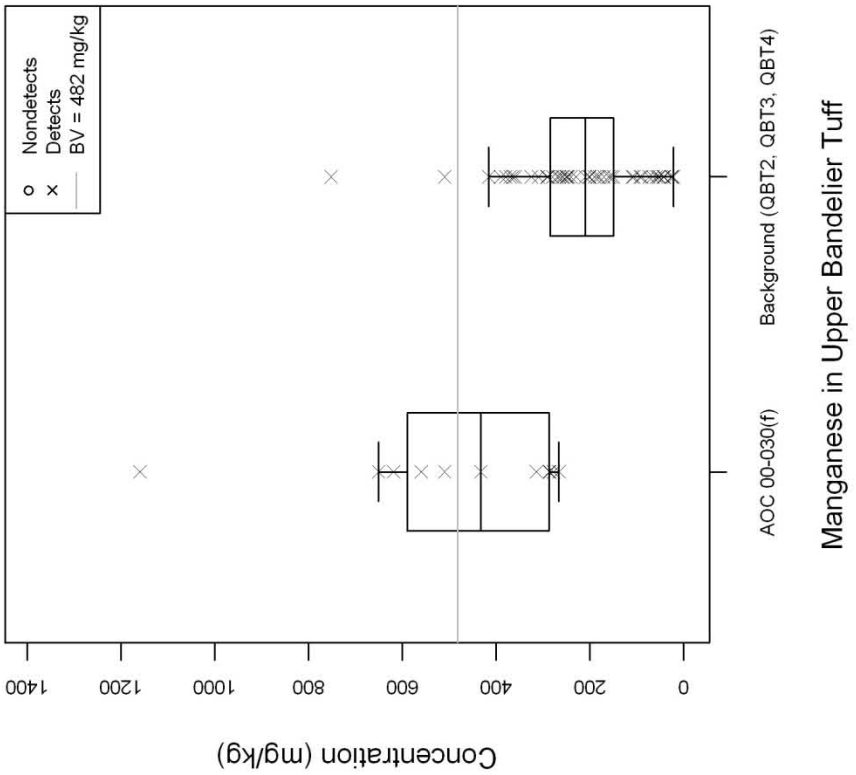


Figure H-20 Box plots for manganese in tuff and zinc in soil at AOC 00-030(f)

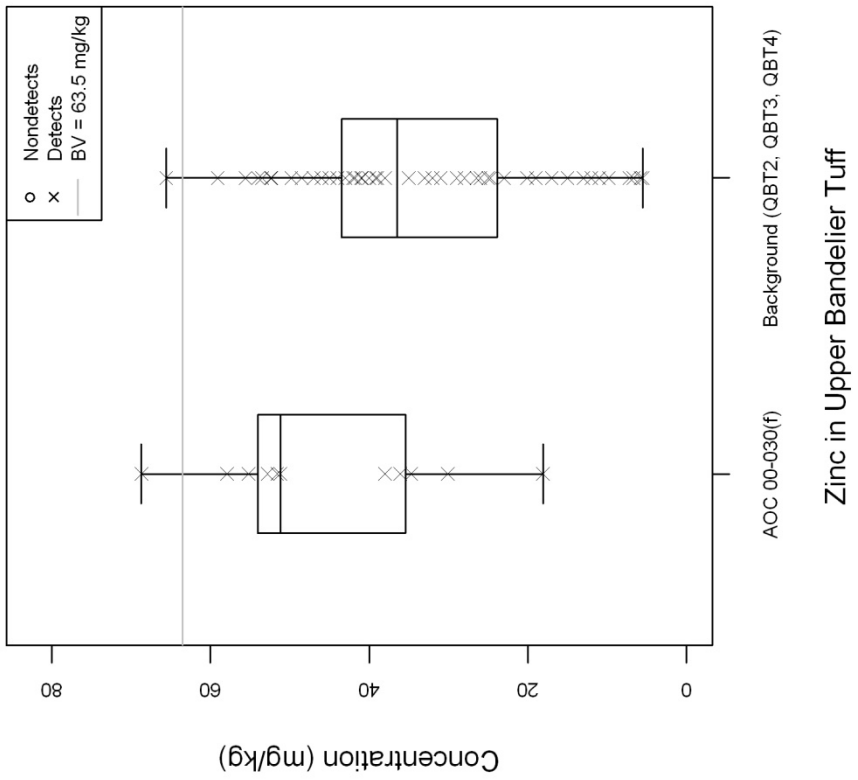
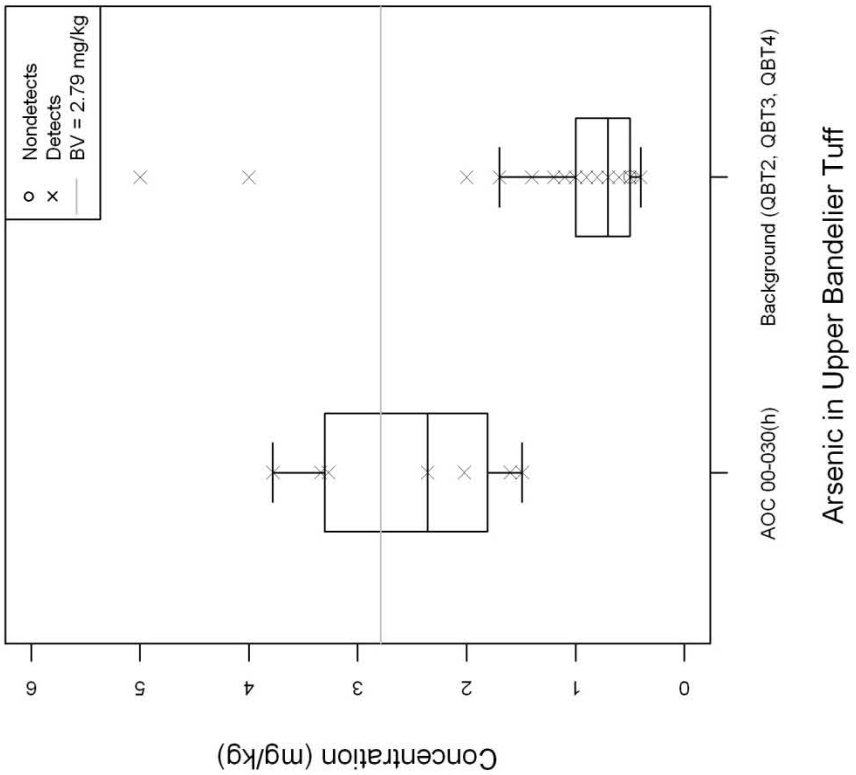


Figure H-21 Box plot for zinc in tuff at AOC 00-030(f)



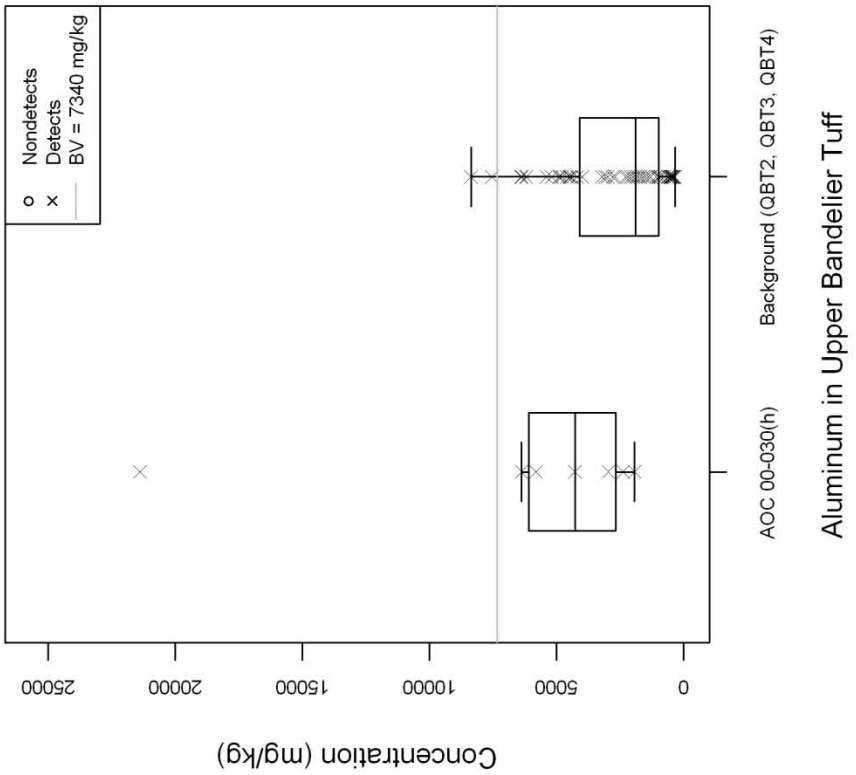
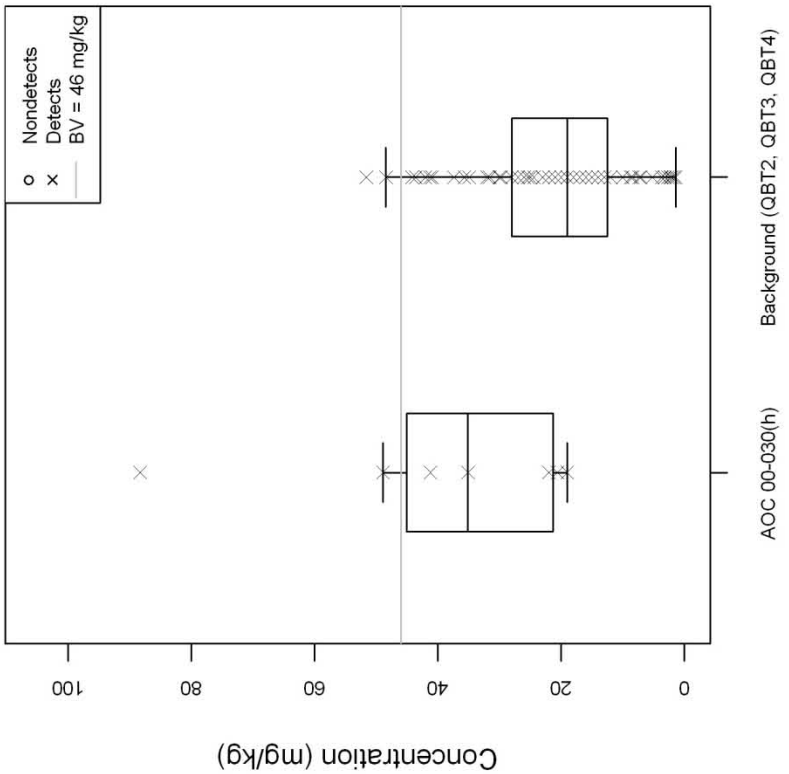


Figure H-22 Box plots for aluminum and arsenic in tuff at AOC 00-030(h)



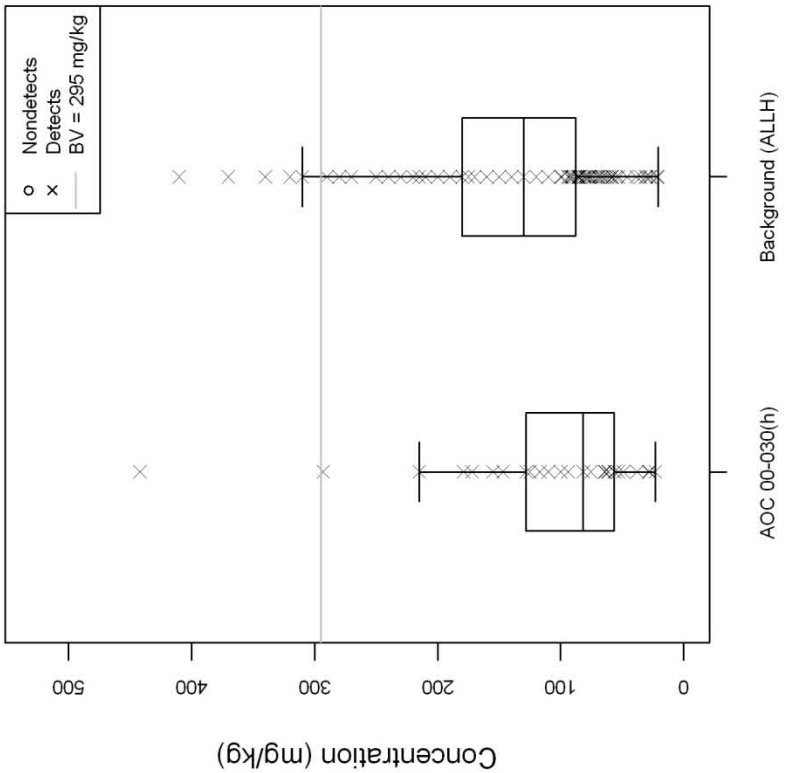
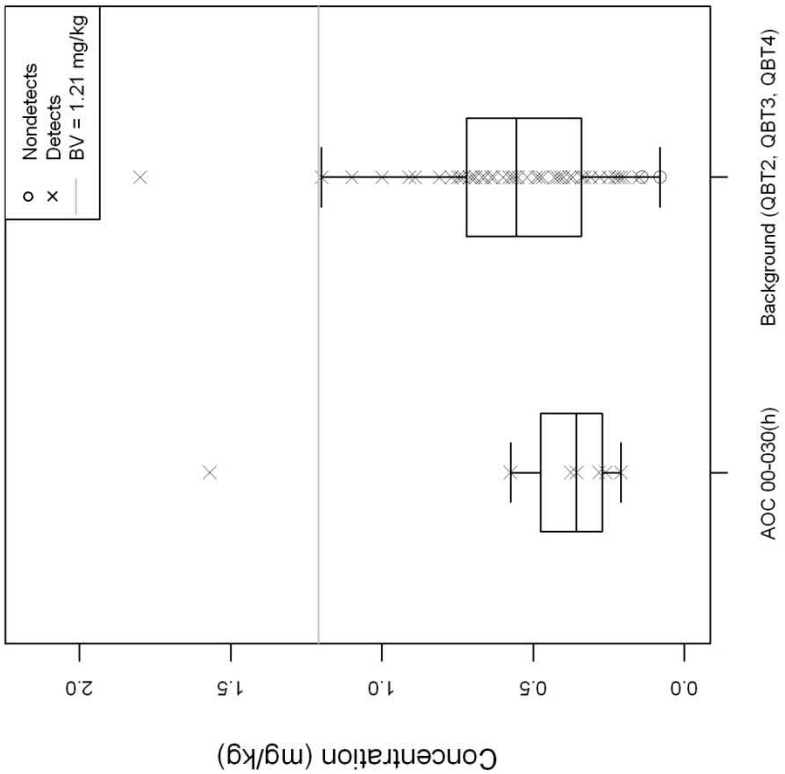


Figure H-23 Box plots for barium in soil and tuff at AOC 00-030(h)



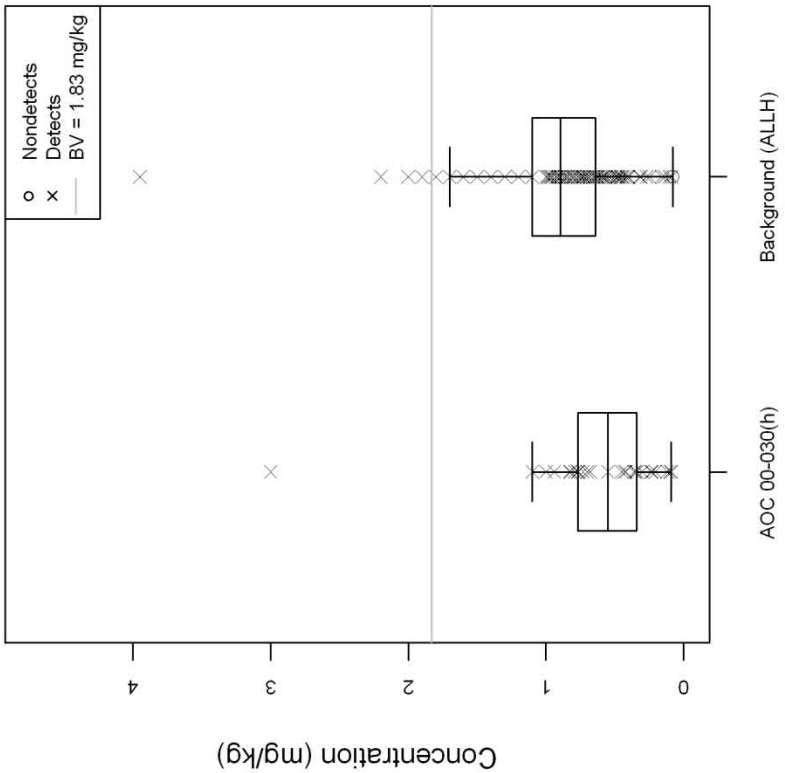


Figure H-24 Box plots for beryllium in soil and tuff at AOC 00-030(h)

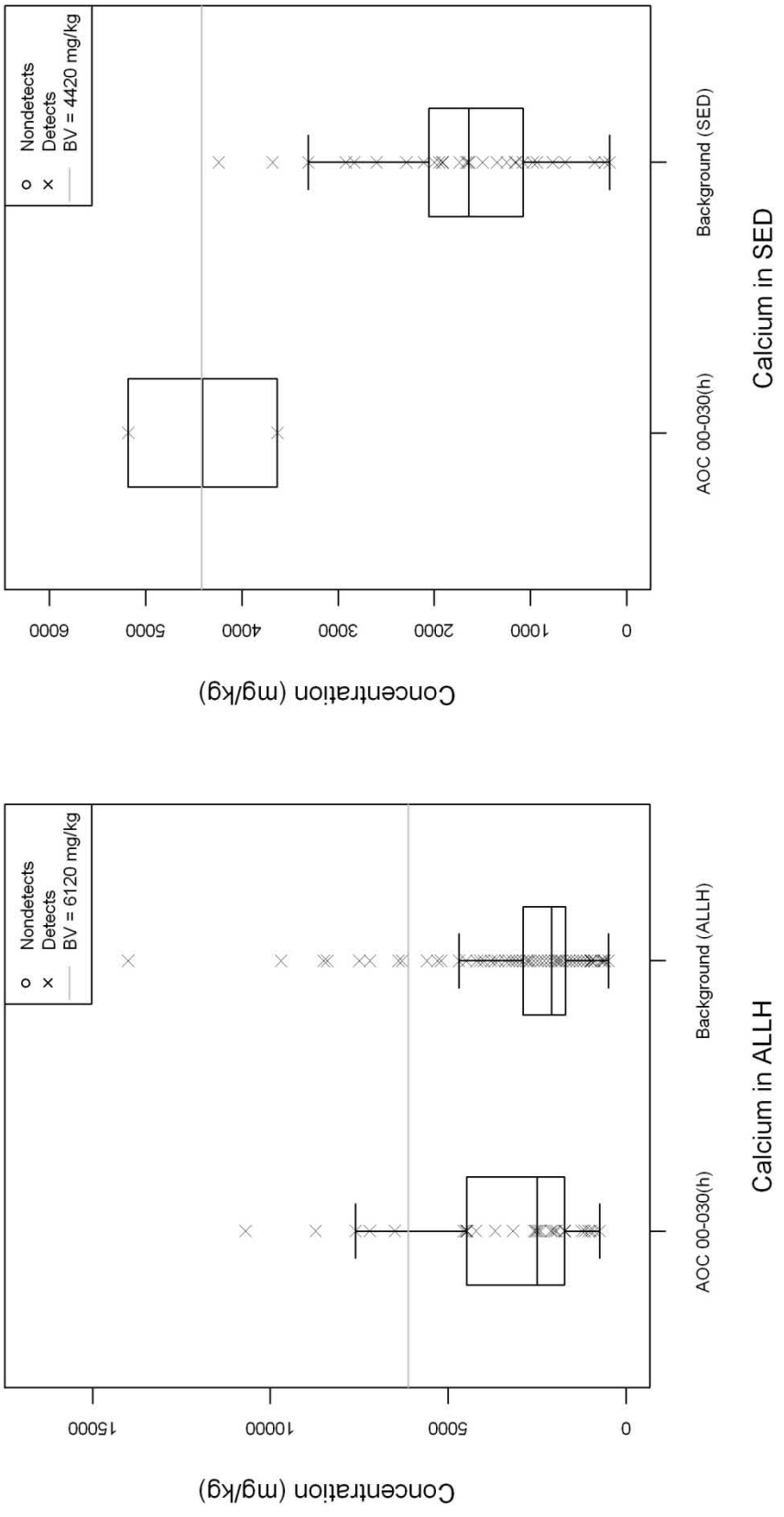
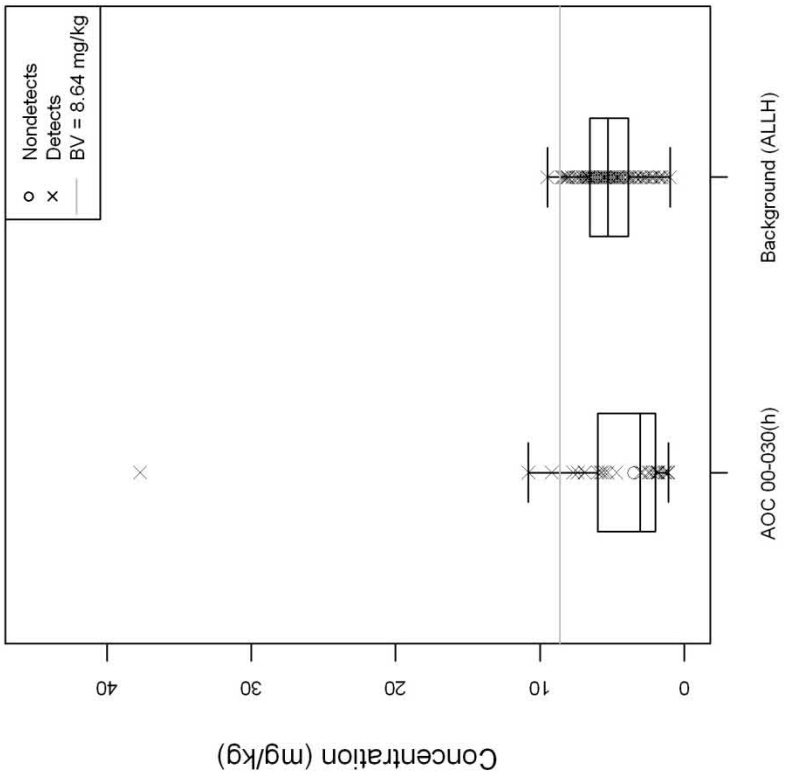


Figure H-25 Box plots for calcium in soil and sediment at AOC 00-030(h)



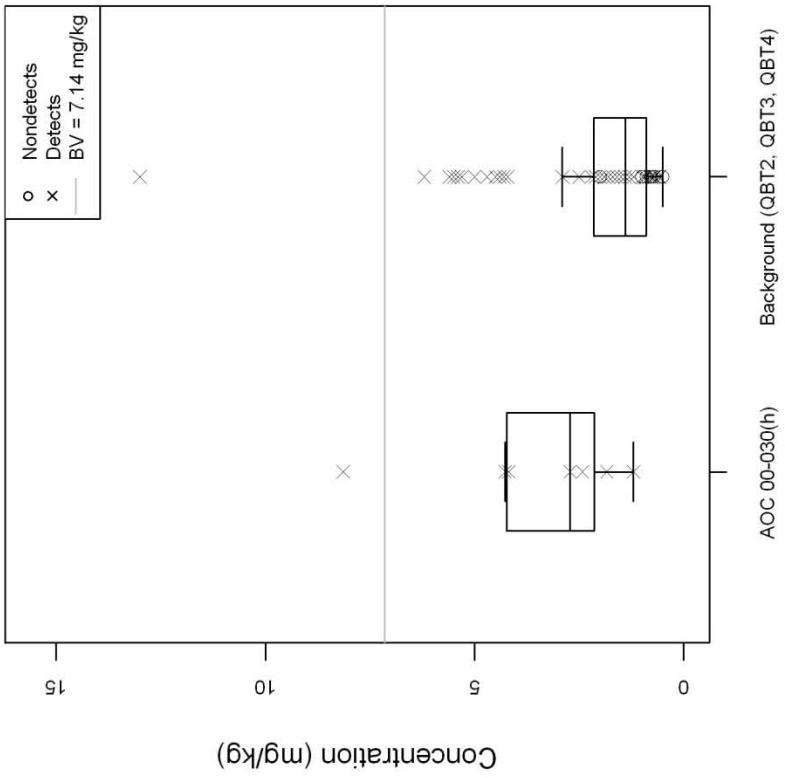
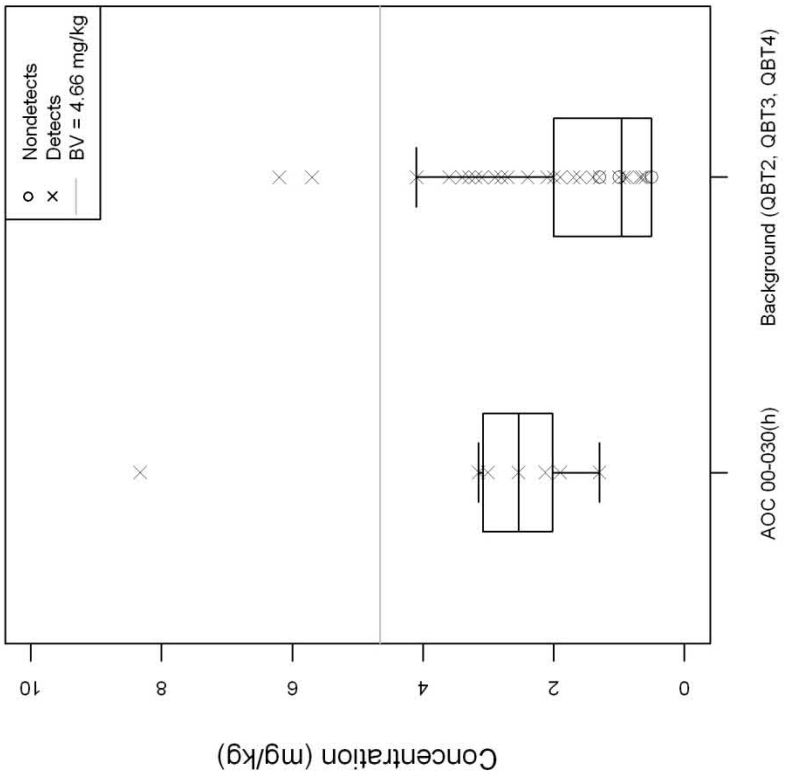


Figure H-26 Box plots for chromium in tuff and cobalt in soil at AOC 00-030(h)



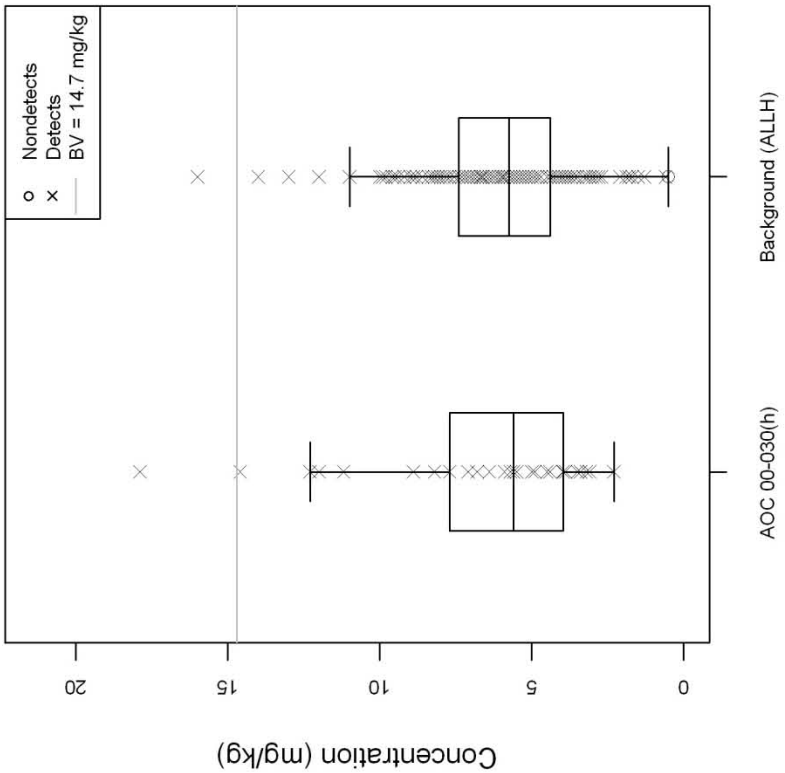
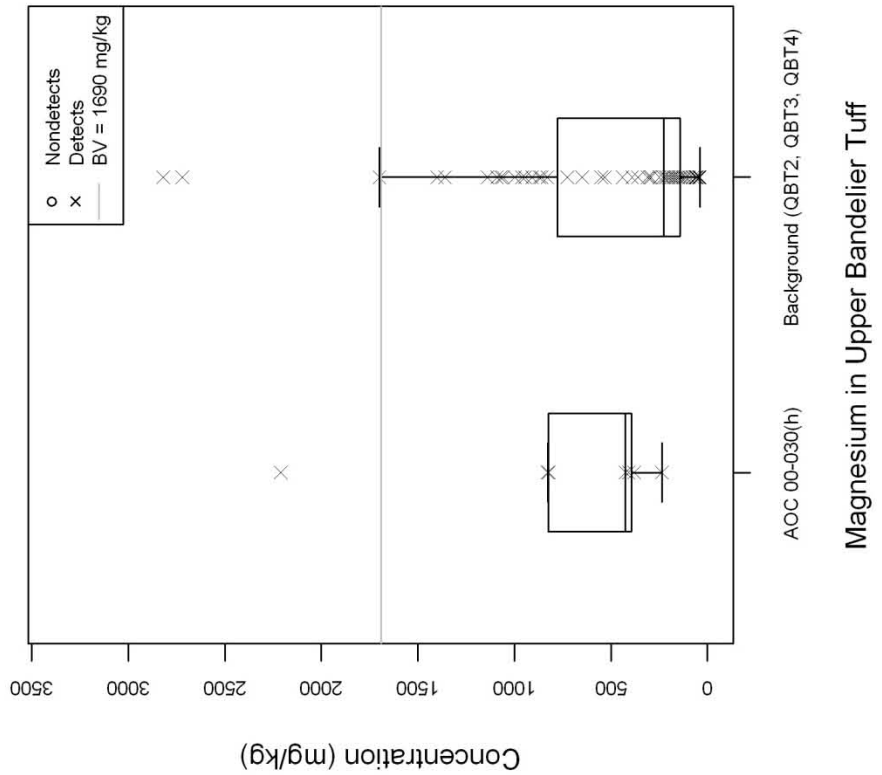


Figure H-27 Box plots for copper in soil and tuff at AOC 00-030(h)



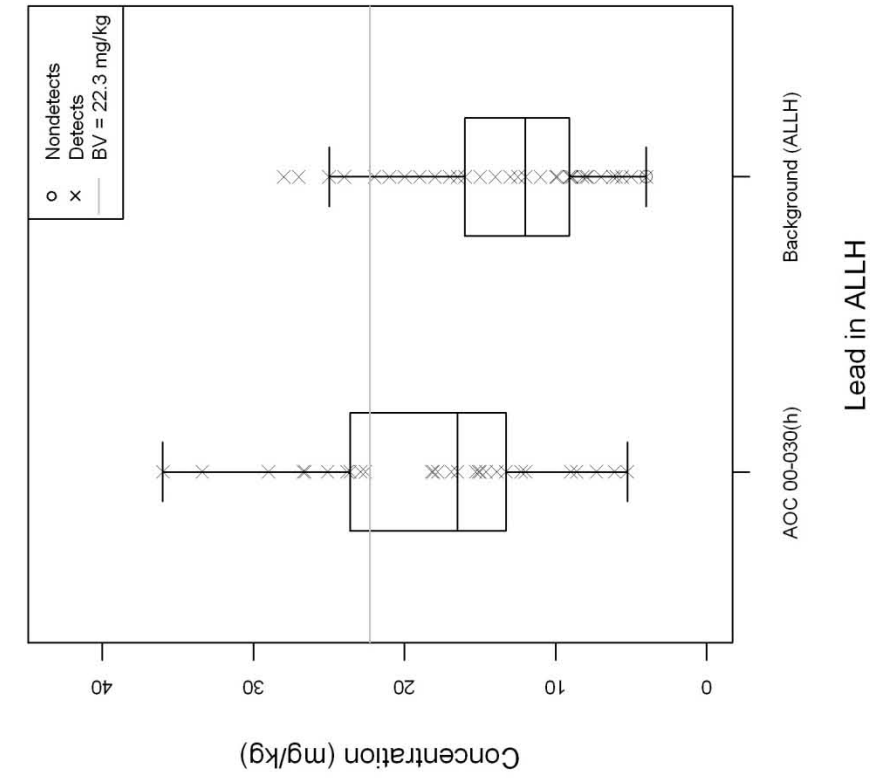
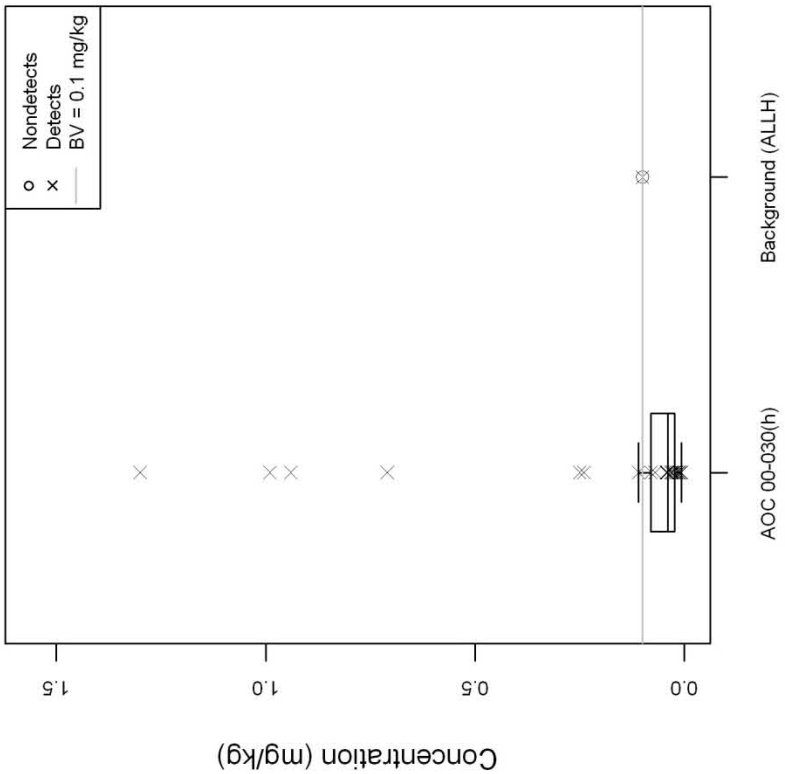


Figure H-28 Box plots for lead in soil and magnesium in tuff at AOC 00-030(h)



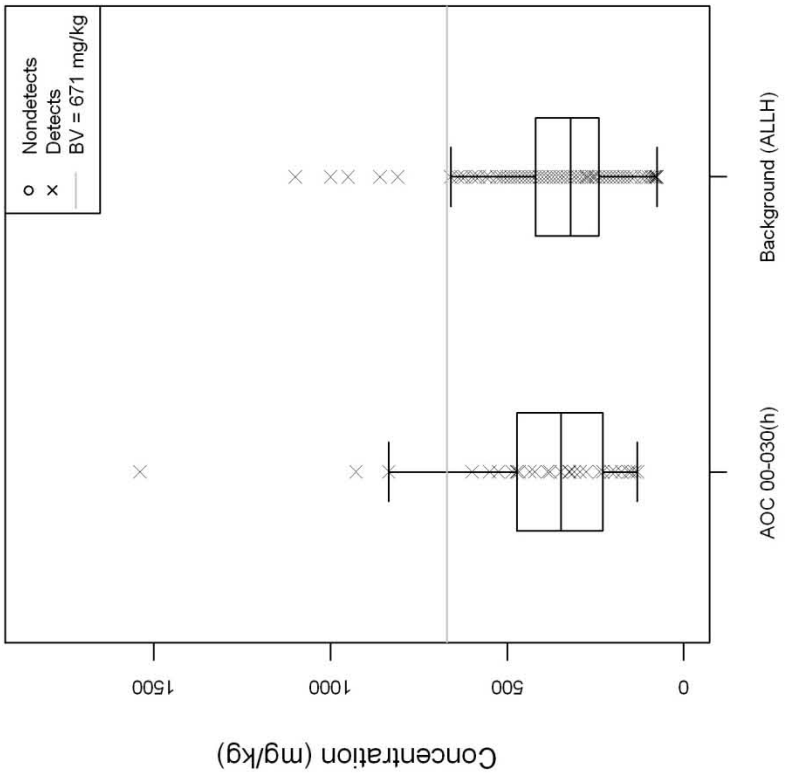
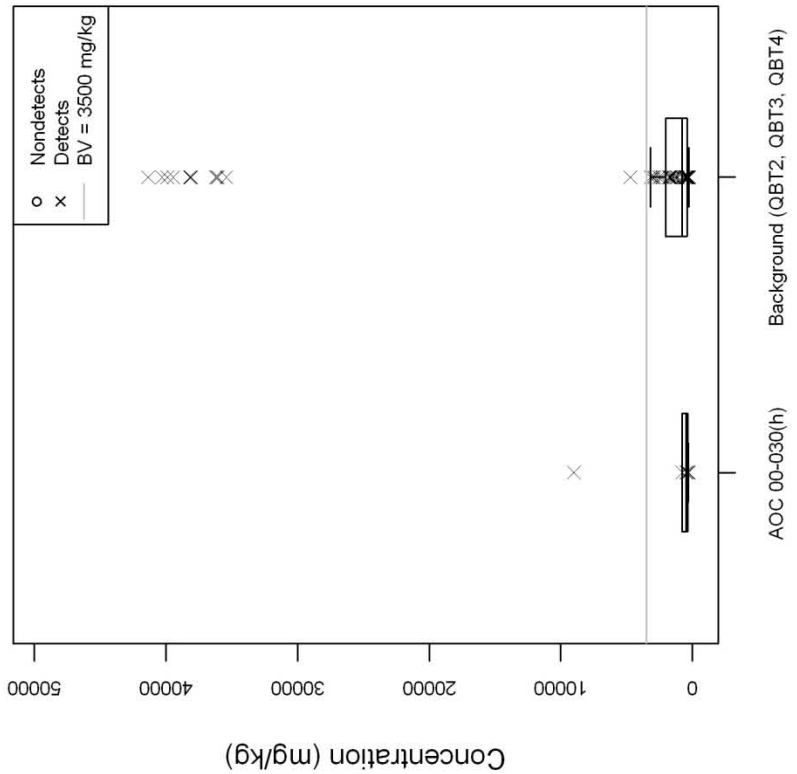


Figure H-29 Box plots for manganese and mercury in soil at AOC 00-030(h)



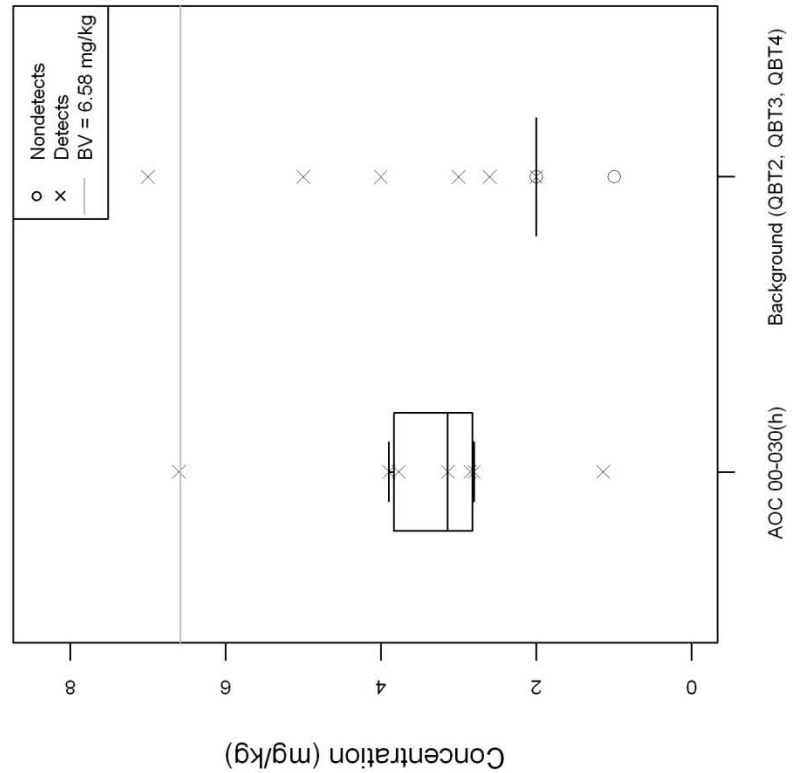
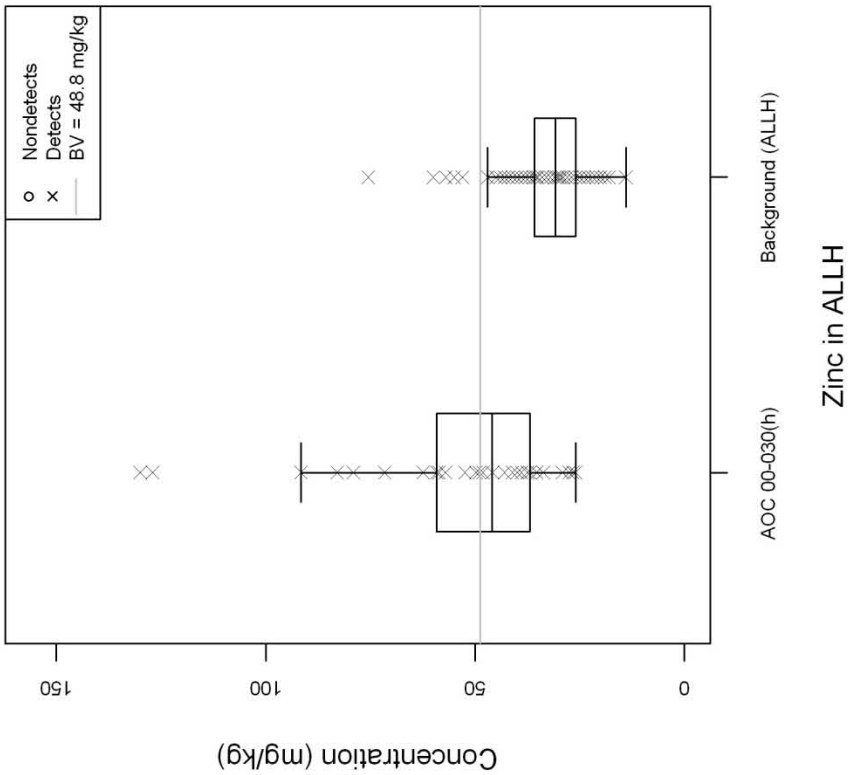


Figure H-30 Box plots for nickel and potassium in tuff at AOC 00-030(h)



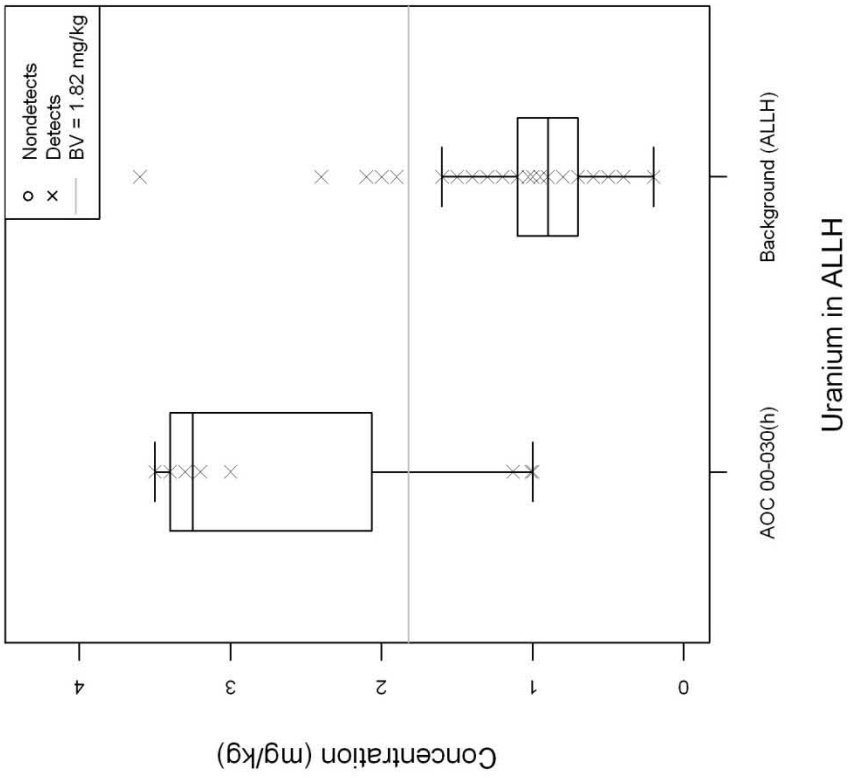
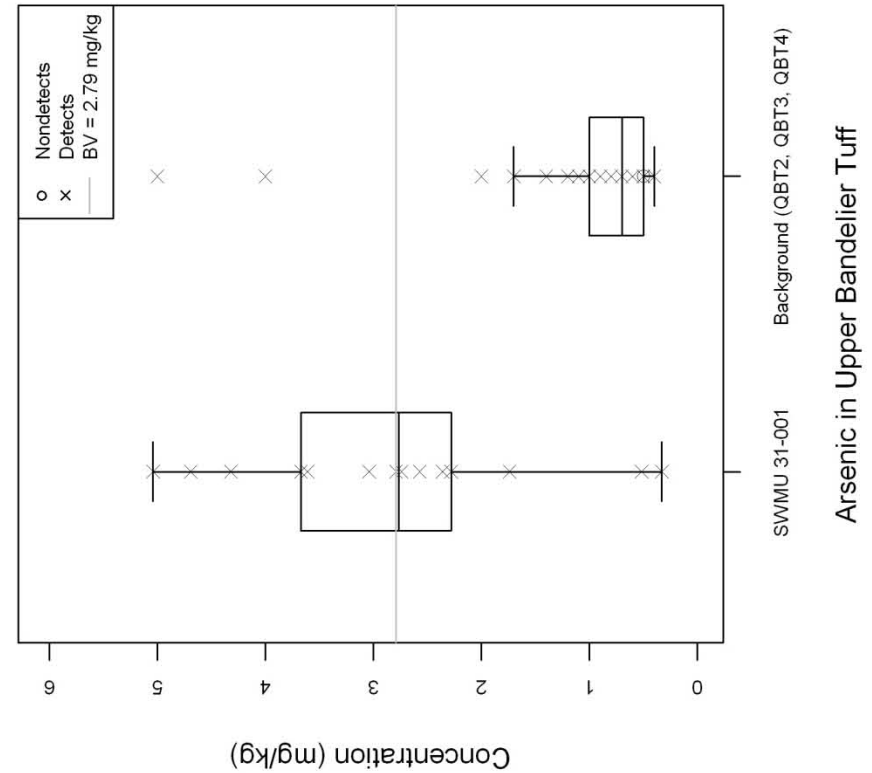


Figure H-31 Box plots for uranium and zinc in soil at AOC 00-030(h)



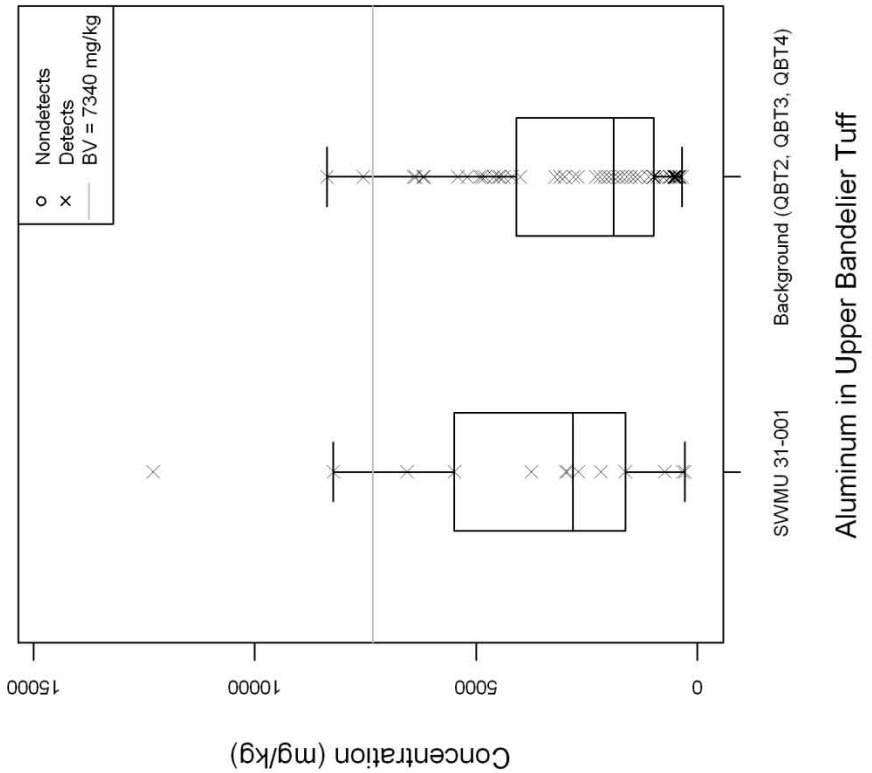
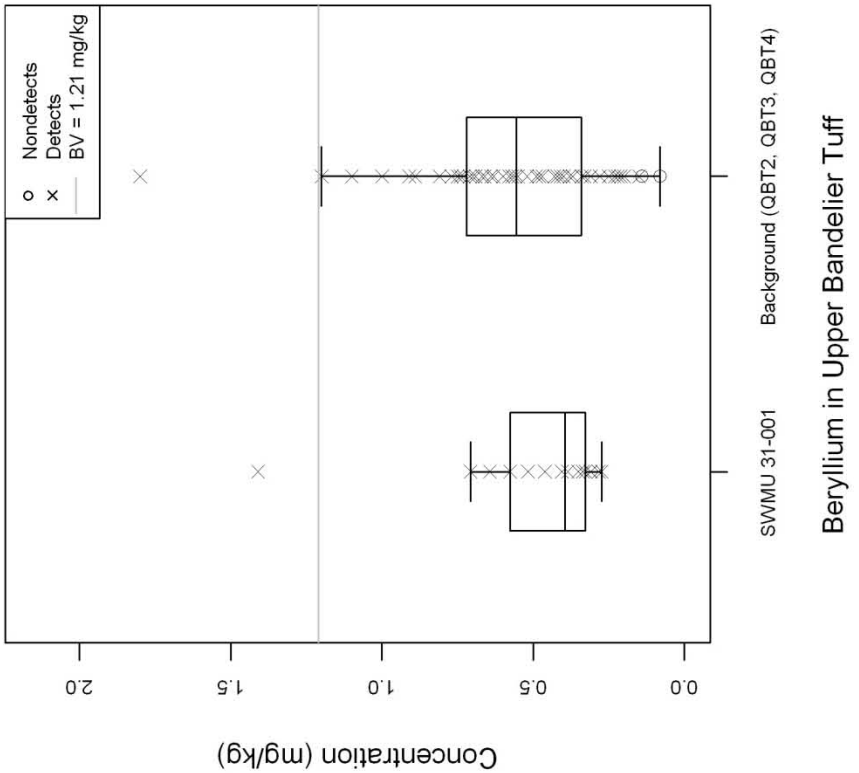


Figure H-32 Box plots for aluminum and arsenic in tuff at SWMU 31-001



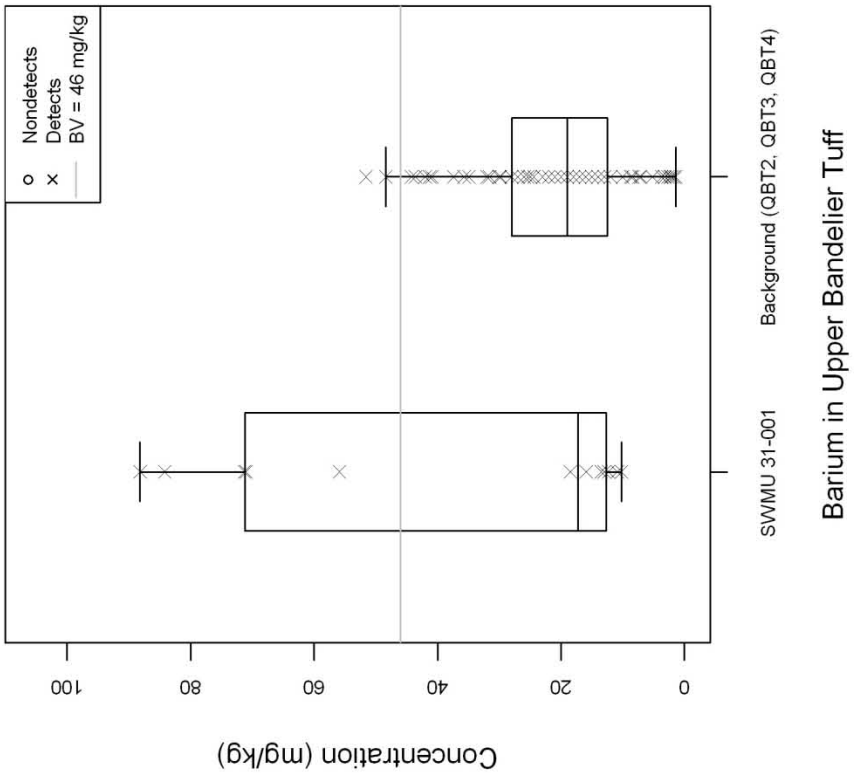
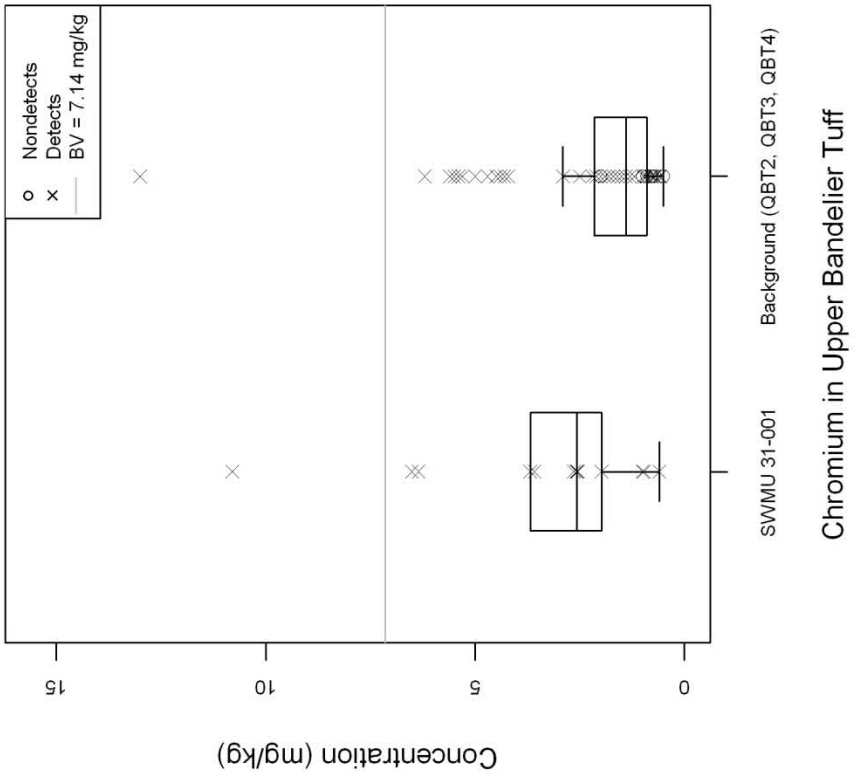


Figure H-33 Box plots for barium and beryllium in tuff at SWMU 31-001



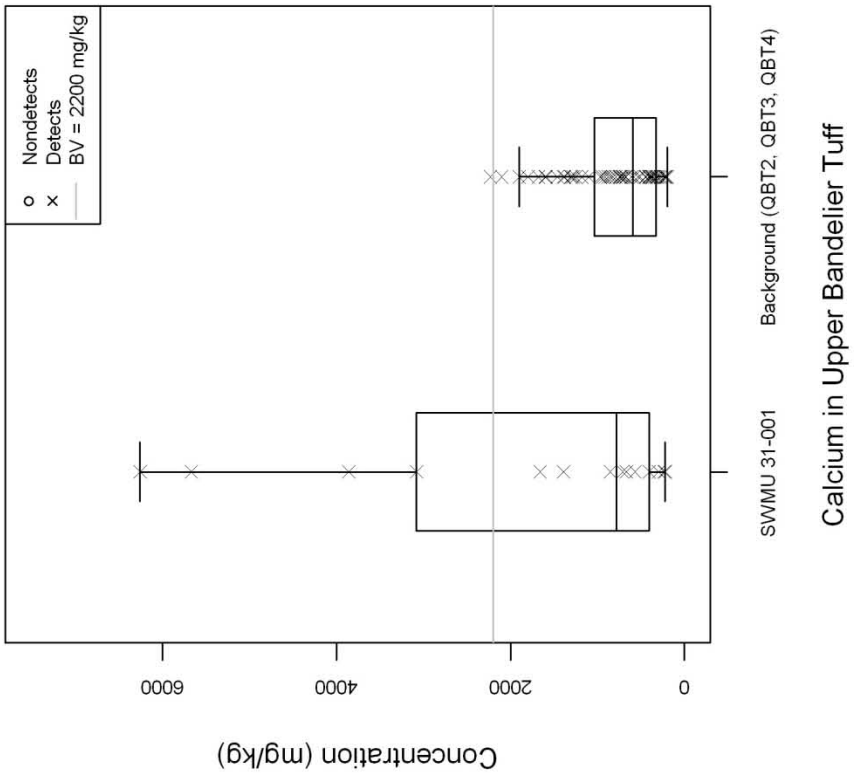
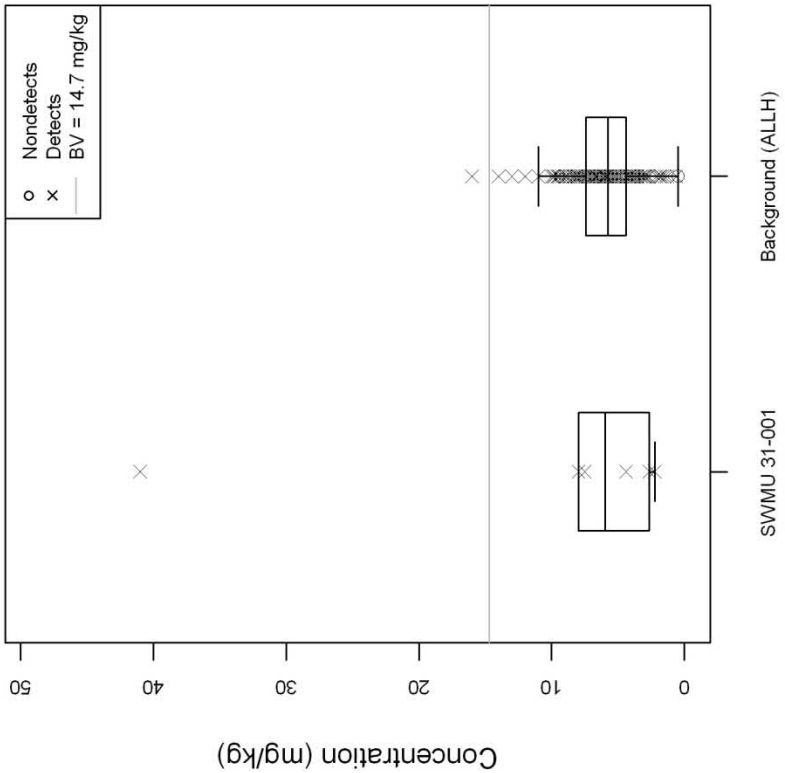


Figure H-34 Box plots for calcium and chromium in tuff at SWMU 31-001



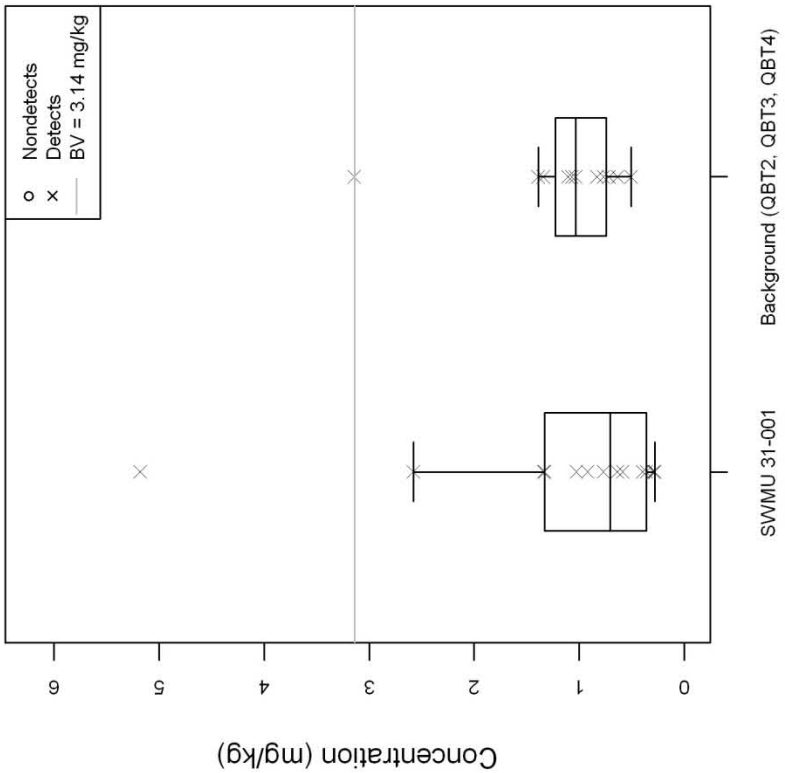
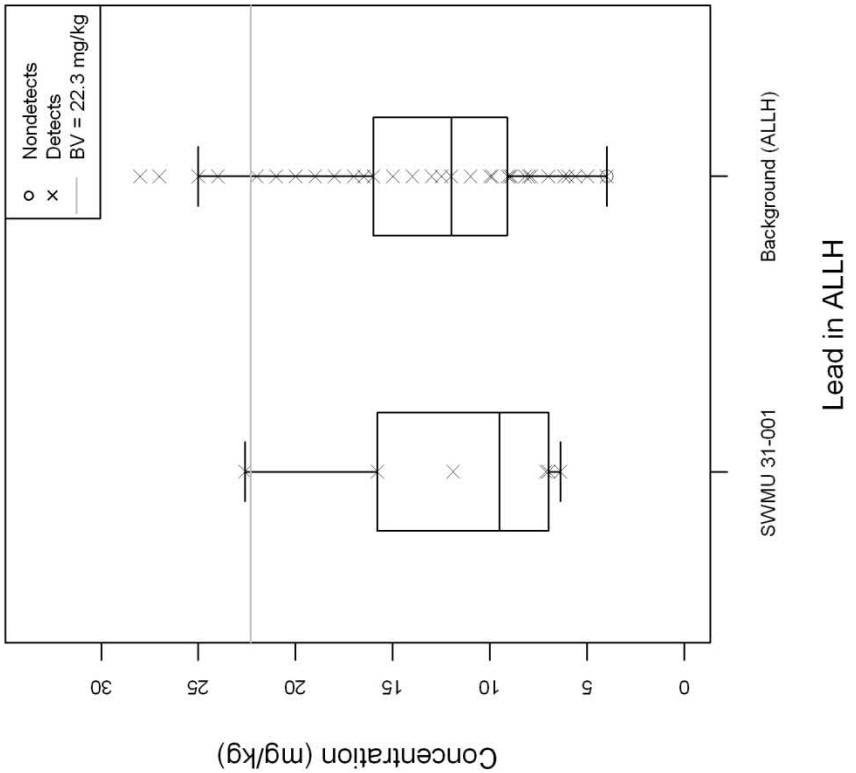


Figure H-35 Box plots for cobalt in tuff and copper in soil at SWMU 31-001



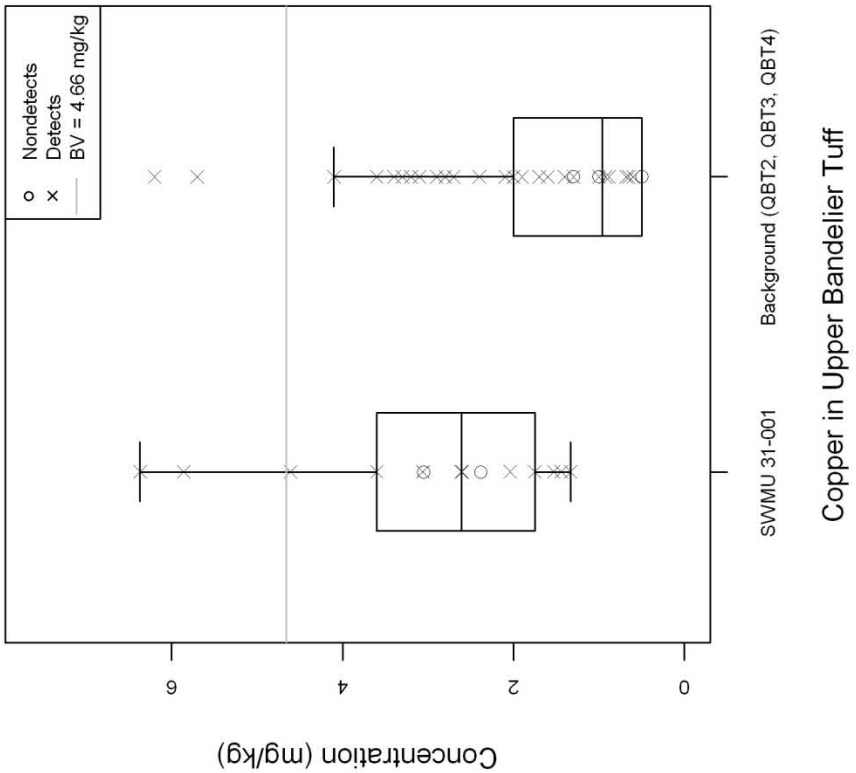
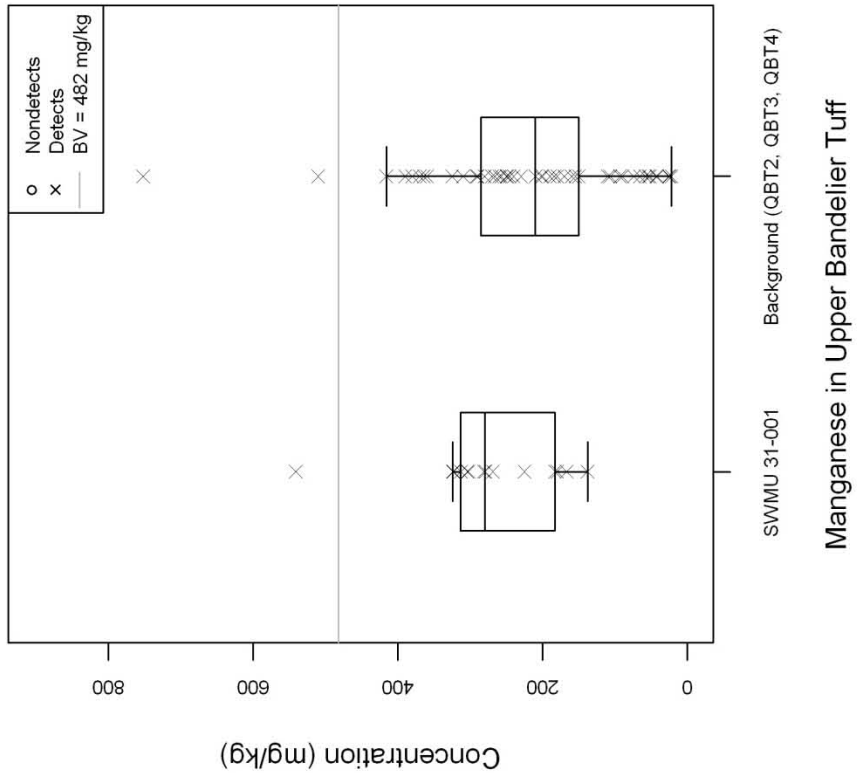


Figure H-36 Box plots for copper in tuff and lead in soil at SWMU 31-001



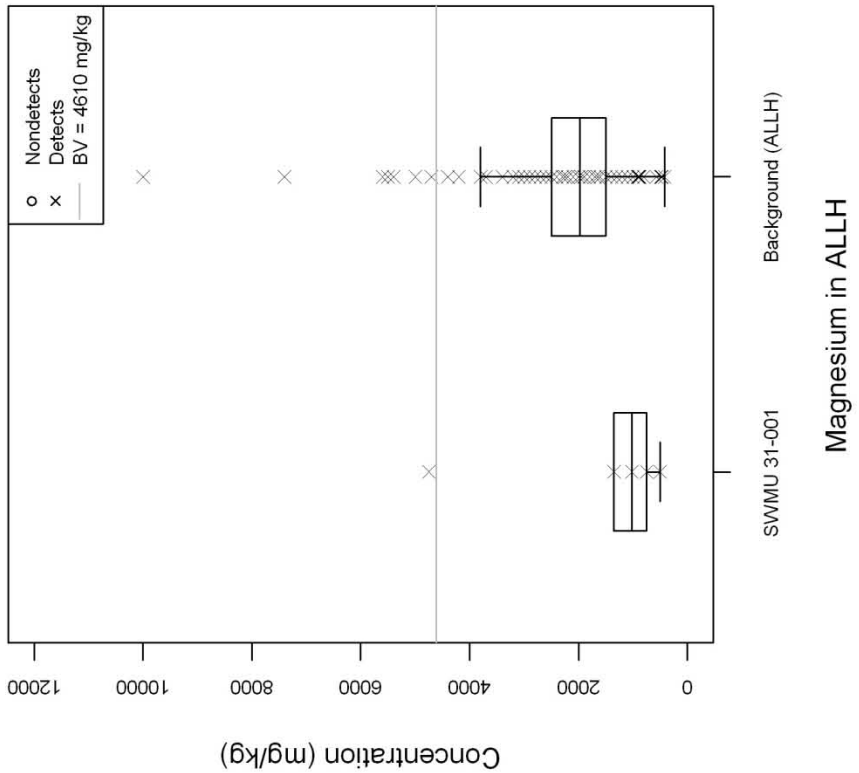
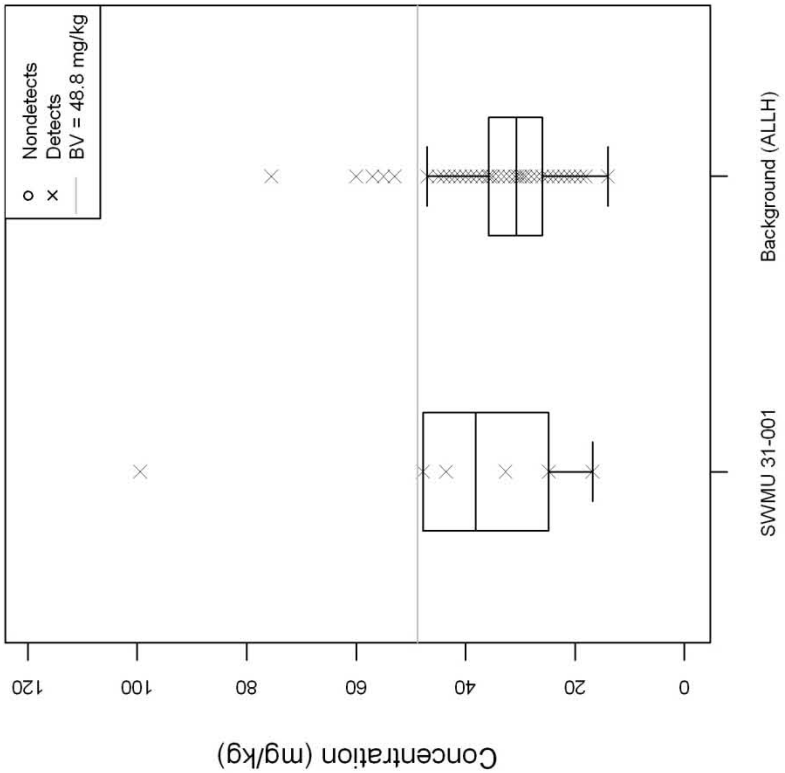


Figure H-37 Box plots for magnesium in soil and manganese in tuff at SWMU 31-001



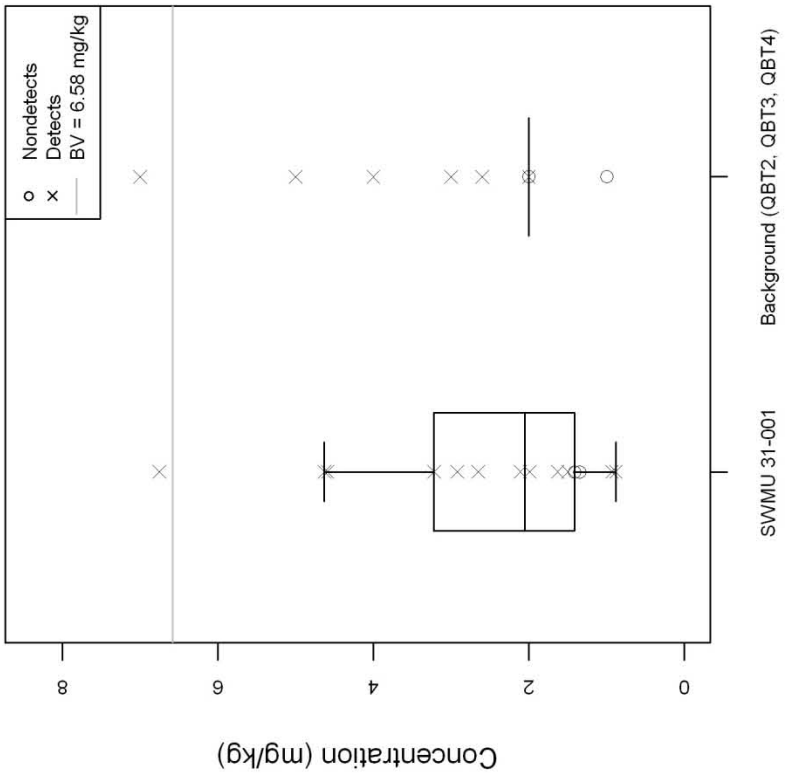
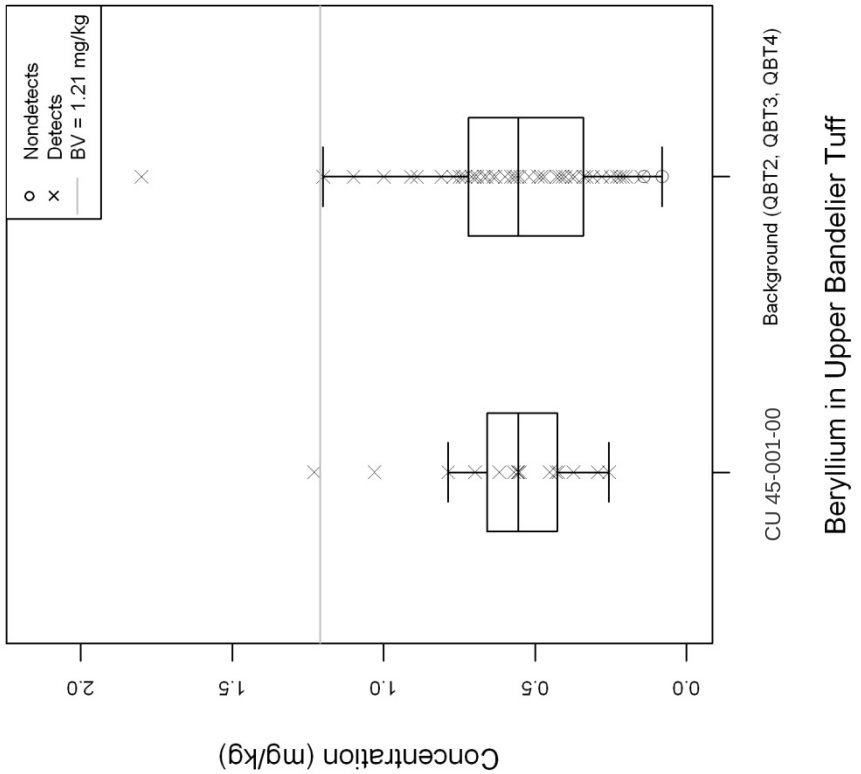


Figure H-38 Box plots for nickel in tuff and zinc in soil at SWMU 31-001



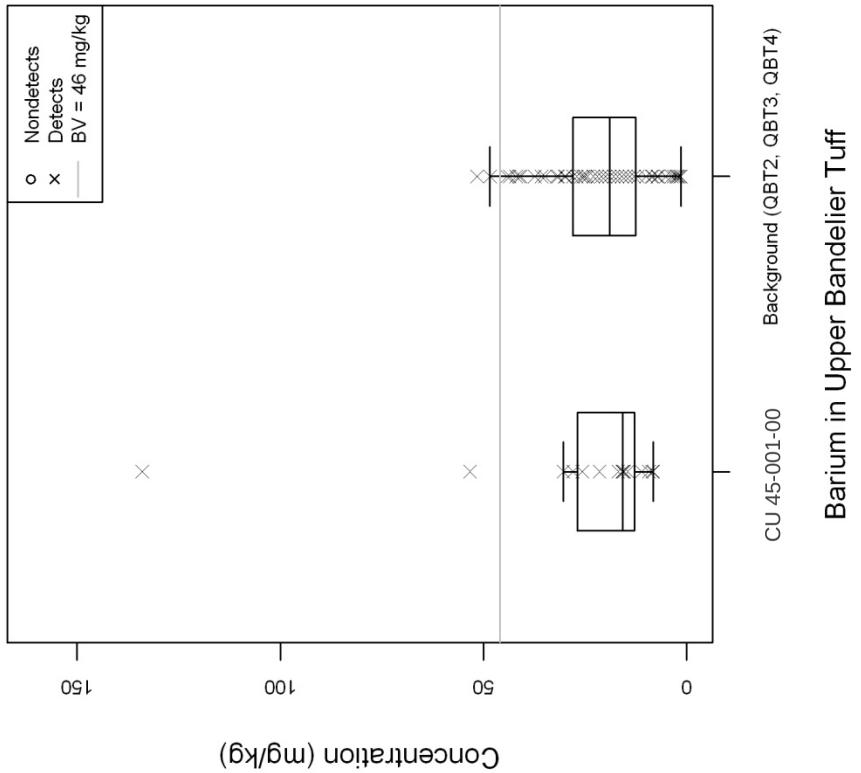
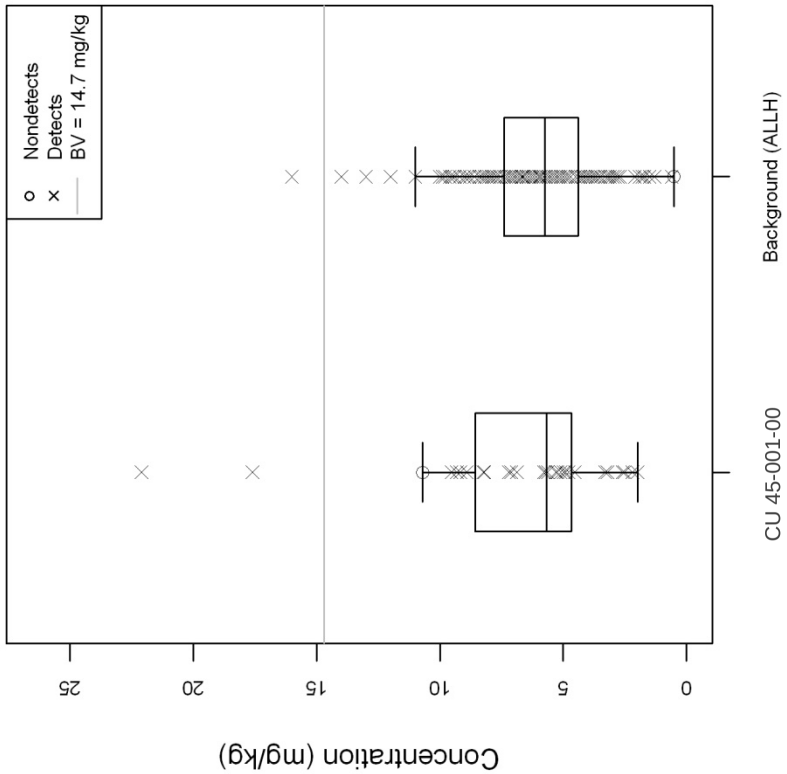


Figure H-39 Box plots for barium and beryllium in tuff at Consolidated Unit 45-001-00



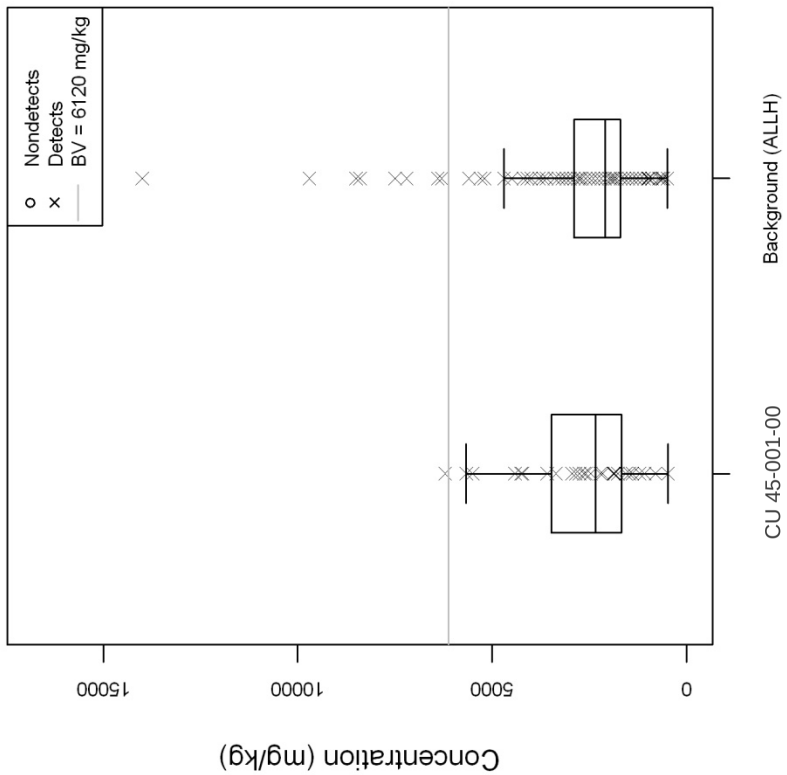
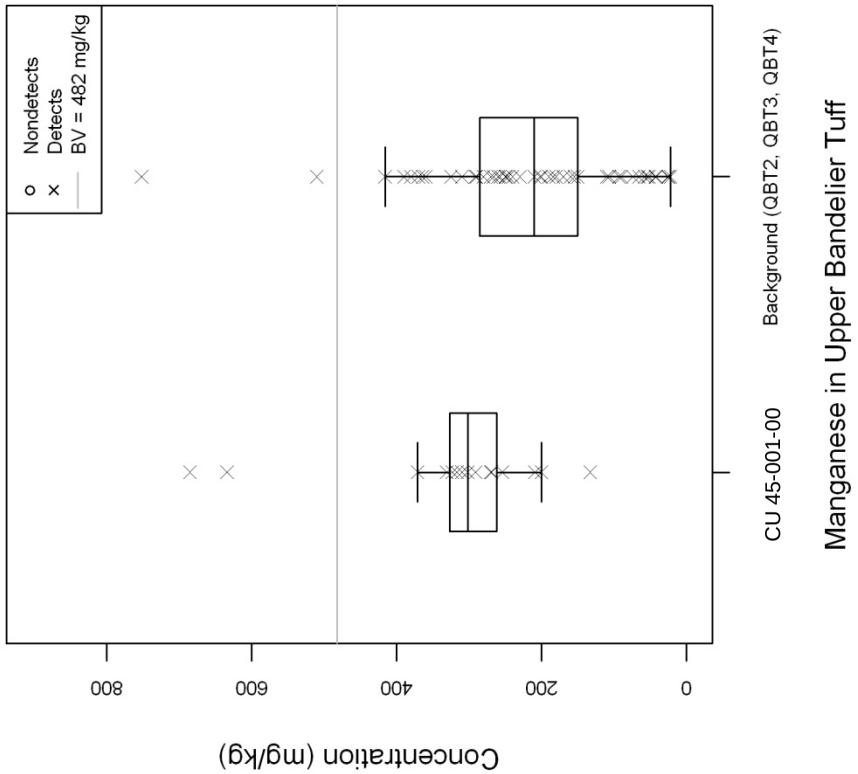


Figure H-40 Box plots for calcium and copper in soil at Consolidated Unit 45-001-00



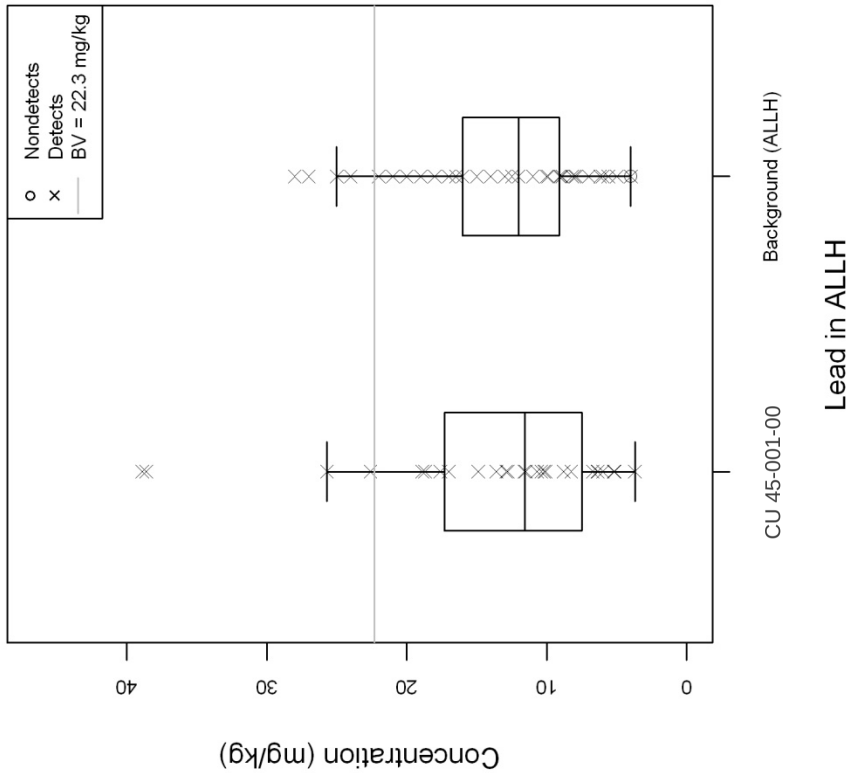
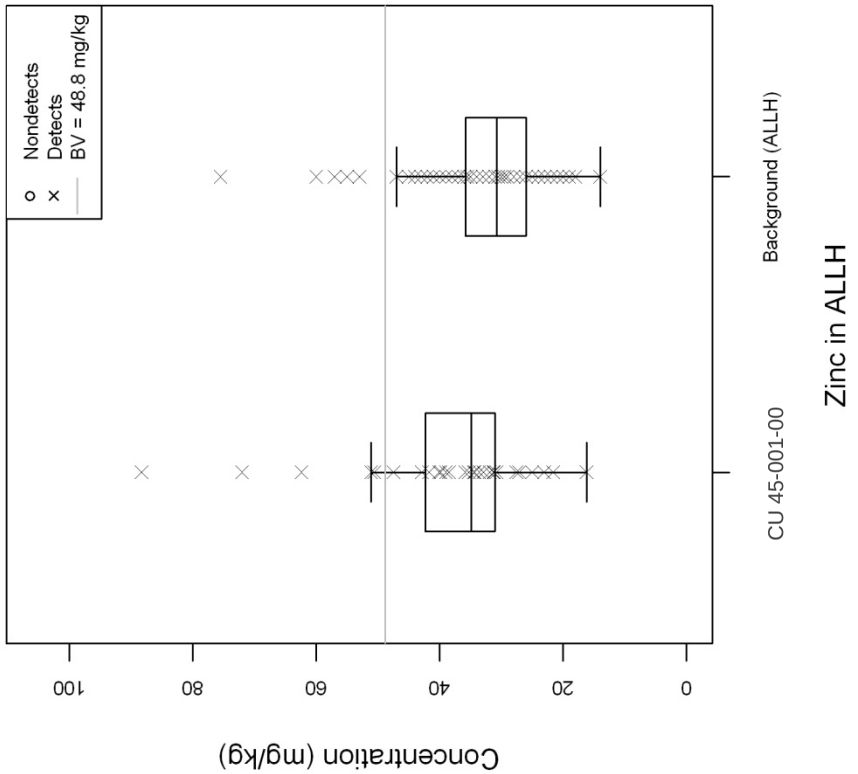


Figure H-41 Box plots for lead in soil and manganese in tuff at Consolidated Unit 45-001-00



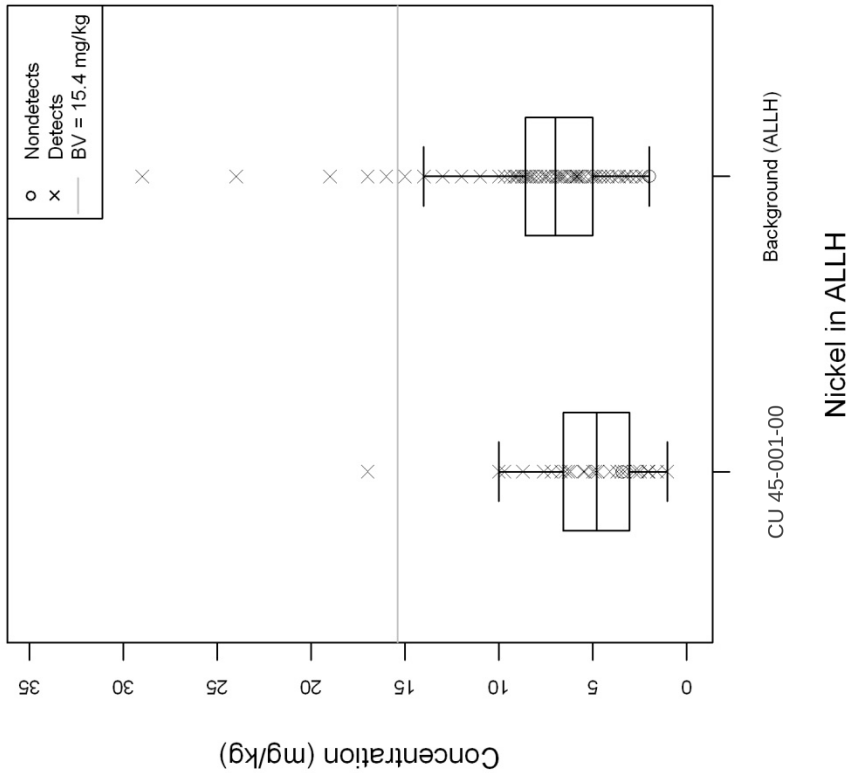


Figure H-42 Box plots for nickel and zinc in soil at Consolidated Unit 45-001-00

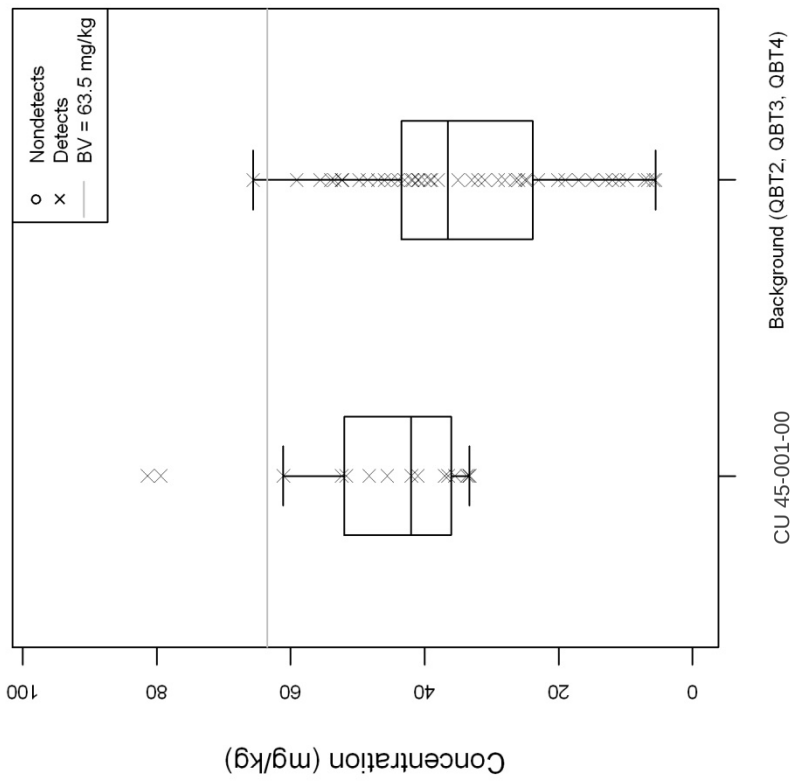


Figure H-43 Box plot for zinc in tuff Consolidated Unit 45-001-00

Table H-1
Results of Statistical Tests for Inorganic Chemicals in Tuff at AOC 00-018(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Aluminum	0.03185	0.51649	n/a	No
Calcium	0.60022	0.29696	n/a[a]	No
Chromium	0.00011	0.05468	0.14563	No
Cobalt	0.96217	0.77325	n/a	No
Lead	0.00018	0.15076	0.14849	No
Magnesium	0.36528	0.86761	n/a	No
Nickel	—[b]	—	n/a	Yes
Silver	—	—	n/a	Yes
Vanadium	0.01029	0.7103	0.38462	No
Zinc	—	0.14278	0.14563	No

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

Table H-2
Results of Statistical Tests for Inorganic Chemicals in Sediment at AOC 00-018(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Arsenic	0.09376	0.46397	n/a[a]	No
Cadmium	—[b]	—	n/a	Yes
Chromium	0.66463	0.1825	n/a	No
Copper	0.04175	0.04459	n/a	Yes
Magnesium	0.9903	0.96044	n/a	No
Manganese	0.6193	0.46397	n/a	No
Vanadium	0.94283	0.78061	n/a	No
Zinc	0.01949	0.00639	n/a	Yes

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

Table H-3
Results of Statistical Tests for Inorganic Chemicals in Soil at AOC 00-018(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Barium	0.99971	0.91077	n/a[a]	No
Cadmium	—[b]	—	n/a	No[c]
Chromium	0.58177	0.03397	n/a	Yes
Manganese	0.96374	0.42432	n/a	No
Thallium	0.99978	—	0.1561	No

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets

[c] Cadmium is not retained as a COPC because statistical tests could not be performed and maximum detected concentration is less than maximum background concentration.

Table H-4
Results of Statistical Tests for Inorganic Chemicals in Soil at AOC 00-030(eS)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Calcium	0.53726	0.13361	n/a*	No
Iron	0.52441	0.3894	n/a	No
Nickel	0.46821	0.3894	n/a	No
Sodium	0.50212	0.3894	n/a	No

*n/a = Not applicable.

Table H-5
Results of Statistical Tests for Inorganic Chemicals in Tuff at AOC 00-030(f)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Arsenic	0.00022	0.06832	1	No
Barium	0.00766	0.07143	0.14865	No
Beryllium	0.00089	0.00143	n/a[a]	Yes
Copper	—[b]	—	n/a	No[c]
Lead	6.00E-05	0.00011	n/a	Yes
Manganese	3.00E-05	0.00143	n/a	Yes
Zinc	0.01936	0.06832	0.14667	No

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

[c] Copper is not retained as a COPC because statistical tests could not be performed and maximum detected concentration is less than maximum background concentration.

Table H-6
Results of Statistical Tests for Inorganic Chemicals in Soil at AOC 00-030(f)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Cadmium	—[a]	—	n/a[b]	No[c]
Copper	0.90927	0.30124	n/a	No
Lead	0.9298	0.30359	n/a	No
Zinc	0.00139	0.07323	1	No

[a] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets

[b] n/a = Not applicable.

[c] Cadmium is not retained as a COPC because statistical tests could not be performed and maximum detected concentration is less than maximum background concentration.

Table H-7
Results of Statistical Tests for Inorganic Chemicals in Soil at AOC 00-030(h)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Barium	0.99999	0.84678	n/a[a]	No
Beryllium	0.99998	0.90957	n/a	No
Calcium	0.78411	0.52749	n/a	No
Cobalt	0.98277	0.37453	n/a	No
Copper	0.54689	0.04482	0.14286	No
Lead	0.03926	0.01664	n/a	Yes
Manganese	0.17696	0.15032	n/a	No
Mercury	—[b]	0.00434	0.00161	Yes
Selenium	—	—	n/a	Yes
Uranium	0	0	n/a	Yes
Zinc	6.00E-05	0.00107	n/a	Yes

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

Table H-8
Results of Statistical Tests for Inorganic Chemicals in Tuff at SWMU 31-001

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Aluminum	0.15772	0.58306	n/a[a]	No
Arsenic	1.00E-05	0	n/a	Yes
Barium	0.17179	0.0194	5.00E-05	Yes
Beryllium	0.8467	0.93316	n/a	No
Calcium	0.08473	0.12634	n/a	No
Chromium	0.00358	0.00684	n/a	Yes
Cobalt	0.90556	0.90435	n/a	No
Copper	0.00135	—[b]	n/a	Yes
Manganese	0.05108	0.12634	n/a	No
Nickel	n/a	0.13382	1	No

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of non-detections in the site and/or background datasets.

Table H-9
Results of Statistical Tests for
Inorganic Chemicals in Tuff at Consolidated Unit 45-001-00

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Barium	0.57296	0.63553	n/a*	No
Beryllium	0.36313	0.83139	n/a	No
Manganese	0.00321	0.05248	1	No
Zinc	0.00547	0.05248	0.03408	Yes

*n/a = Not applicable.

Table H-10
Results of Statistical Tests for
Inorganic Chemicals in Soil at Consolidated Unit 45-001-00

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Calcium	0.35387	0.34827	n/a[a]	No
Copper	0.47205	—[b]	0.01862	Yes
Lead	0.65727	0.13781	n/a	No
Nickel	0.99783	0.90236	n/a	No
Zinc	0.00321	0.00904	n/a	Yes

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of non-detections in the site and/or background datasets.

Appendix I

Risk Assessments

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I-1.0 INTRODUCTION

This appendix presents the results of the human health and ecological risk screening assessments conducted in support of the Phase II investigation at sites within the Pueblo Canyon Aggregate Area. Sites are situated on private property or Los Alamos County property proximal to Los Alamos National Laboratory (LANL or the Laboratory) and include Solid Waste Management Units (SWMUs) 31-001 and 00-018(a); Areas Of Concern (AOCs) 00-030(eS), 00-030(f), and 00-030(h); and Consolidated Unit 45-001-00. The six sites investigated as part of the Pueblo Canyon Aggregate Area are of three types: former sewage treatment plant, septic tanks, and other belowground structures and former radioactive liquid wastewater treatment plant. Descriptions of the consolidated unit, SWMUs, and AOCs investigated are included in section 6 of the report and are summarized here.

I-2.0 BACKGROUND

I-2.1 Site Descriptions

SWMU 00-018(a), Decommissioned Pueblo Canyon Waste Water Treatment Plant

SWMU 00-018(a) is the decommissioned Pueblo Canyon WWTP, located in Pueblo Canyon (Figure 6.1-1) on Los Alamos County property (LANL 1997, 056614, p. 28). The plant, which was built between 1946 and 1948, began operating in 1951, primarily receiving waste from residential and business properties, including the Los Alamos Medical Center (LANL 1997, 056614, p. 28). This WWTP may have received laboratory-scale (e.g., less than 10 L/mo) waste from the TA-43 Health Research Laboratory, the only suspected Laboratory contributor to the waste stream at the plant, from 1953 to 1981 (Emelity 1981, 008081; LANL 1997, 056614, p. 29). Los Alamos County decommissioned the Pueblo Canyon WWTP during 1991 and 1992 (LANL 1997, 056614, p. 29). The buildings were demolished by Los Alamos County in June 2008.

AOC 00-030(eS), Septic Tank

AOC 00-030(eS) consists of a septic tank, originally referred to as structure 4A (LANL 1996, 056432, p. 1), formerly located on private property south of Canyon Road (Figure 6.2-1) at the Chapel Apartments. The tank was installed between 1943 and 1947 (LANL 1996, 056432, pp. 4–5). It was reported that structure 4A served residences and may have been connected to TA-01 (LANL 1992, 007667, p. 5-94; LANL 1996, 056432, p. 1). However, the mean elevation of the former TA-01 area is 7263 ft amsl, while the ground surface at AOC 00-030(eS) is approximately 7279 ft amsl. Assuming that the septic tank inlet was buried at approximately 5 ft below ground surface ([bgs] elevation of 7274 ft amsl), it is not likely that the septic tank received waste from a gravity-feed system originating in TA-01. The tank ceased operating when the central WWTP became operational in 1947 (LANL 1996, 056432, p. 1). Available evidence indicates that the tank was removed when the Chapel Apartments were built in 1949 (LANL 1996, 056432, pp. 28, 32). The site is currently a paved parking lot. The vitrified clay pipe downgradient of the tank and the steel outlet pipe located in Pueblo Canyon were still in place as of the Phase II investigation.

AOC 00-030(f), Septic Tank

AOC 00-030(f) is a septic system (also referred to as structure 5 in historical reports) consisting of two septic tanks located on private property south of Canyon Road and north of Rose Street (Figure 6.3-1), near the United Church school building (LANL 1992, 007667, p. 5–94). A 1943 engineering drawing

labels the tanks “Septic Tank No. 2” (LANL 1996, 056432, pp. 43–44). The tanks connected with sewer lines in the “Apartment Area” and handled sanitary waste from a school, a post exchange, and some of the original Ranch School buildings; it did not receive waste from TA-01 operations (LANL 1996, 056432, p. 5). The tank ceased operating when the Central WWTP became operational in 1947 (LANL 1992, 007667, p. 5-94; LANL 1996, 056432, p. 1). Currently, the tanks are still partially in place and are located beneath existing sidewalks and a retaining wall in a heavily developed area.

AOC 00-030(h), Septic Tank

AOC 00-030(h) is a septic tank (structure 7) located on private property north of Canyon Road (Figure 6.4-1) beneath the asphalt-paved west parking lot of the Immaculate Heart of Mary Church (3600 Canyon Road) (LANL 1996, 053799, p. 1). Constructed of reinforced concrete, the septic tank system was 30 ft long × 20 ft wide × 12 ft deep (LANL 1996, 053799, p. 7). It consisted of two chambers, a concrete baffle between the chambers, and a 6-ft × 2-ft splash box at the inlet line (LANL 1996, 053799, p. 7). The septic tank probably served the areas between Canyon Road and Trinity Drive (LANL 1996, 053799, p. 1; LANL 1996, 062416, p. 1). Buildings within this area were associated with the special engineering detachment, which included the Fort Leonard Wood housing units, dormitories, military barracks, west mess hall, supply room, gymnasium, post office, and recreational buildings (LANL 1996, 053799, p. 1). Trenches excavated across the path of the outfall in 2006 confirmed that the outlet line drained north toward Acid Canyon. The tank was used from 1945 to 1947, when the Central WWTP became operational (LANL 1996, 053799, p. 1).

SWMU 31-001, Septic System

SWMU 31-001 is a former septic system located at TA-31 (Figure 6.5-1). This system consisted of a septic tank, two sanitary sewer manholes, associated waste lines, and an outfall (LANL 1992, 007668, p. 3-46). TA-31 served as the receiving area for all truck shipments to the Laboratory from 1945 to 1954 (LANL 1995, 058085, p. 1; LANL 1996, 054320, p. 32), and SWMU 31-001 served former building 31-7. The septic tank (structure 00-7), constructed of reinforced concrete, measured 4 ft × 3 ft and was several feet in height (LANL 1992, 007668, p. 3-48). This septic tank was located aboveground on a small bench above the rim of Pueblo Canyon, north of building 31-7 (LANL 1992, 007668, p. 3-48). TA-31 was located in what is now the eastern residential area of Los Alamos, immediately west of the Los Alamos County Airport (LANL 1995, 058085, p. 1; LANL 1996, 054320, p. 32) (Figure 6.5-1). The septic tank was constructed in 1949, operated until 1954, and was removed in 1988 (LANL 1992, 007668, p. 3-47). The waste line was not encountered when the septic tank was removed in 1988 (LANL 1995, 058085, p. 4).

Consolidated Unit 45-001-00, Former Radioactive Liquid Waste Treatment Plant and Associated Outfalls

This consolidated unit, which consists of SWMUs 01-002(b)-00, 45-001, 45-002, 45-003, and 45-004 and AOC C-45-001, is located next to Acid Canyon (Figure 6.3-1). The SWMUs and AOC were associated with historical wastewater treatment and disposal activities at TA-45, which was used as an industrial waste discharge area and later served as the Laboratory’s first radioactive liquid waste treatment facility (LANL 1992, 007668, p. 3-69).The D&D of TA-45 included excavating and removing industrial waste and contaminated soil and tuff as well as removing all buildings and structures in the area, with the exception of the sewage lift station. The site was released without restriction to Los Alamos County (LANL 1992, 007668, p. 3-71).

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 Pueblo Canyon 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 present in Appendix G (on CD).

Tables I-2.2-1 to I-2.2-18 summarize the COPCs evaluated for potential risk for each site investigated as part of the Phase II activities in the Pueblo Canyon Aggregate Area. Section 5 in the report summarizes the COPC selection process. Inorganic chemicals and radionuclides above background values (BVs) or fallout values (FVs) and detected organic chemicals or radionuclides detected in tuff are retained as COPCs. The risk 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 scenario, 0–5 ft bgs for ecological risk, and 0–1 ft bgs for the recreational 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. The results of the risk assessments for each scenario include a list of COPCs not detected within the depth interval associated with a given scenario.

I-3.0 CONCEPTUAL SITE MODEL

The six sites investigated as part of the Phase II activities are of three types. The first type is the wastewater treatment plant site, SWMU 00-018(a). This site encompasses a large area and contains a broad suite of COPCs from waste streams. SWMU 00-018(a) has surface and subsurface COPCs associated with old, inactive sludge beds and with the reuse of some sludge as fill on the site. COPCs may be found in surface material and may also have migrated into the subsurface.

The second type of site is subsurface structures (septic tanks). Although different COPCs may be found at each site, depending on the materials discharged in them, the sites have relatively similar pathways for releases and exposures. The COPCs occur in the subsurface surrounding the structures, particularly at the junctions between tanks and piping or connections in the associated piping structures. The septic tanks had outfall pipes; effluent at these outfalls could contribute to COPCs on the surface and in the subsurface. Some of the structures associated with the septic tanks have been excavated; others were left in place.

The third type of site is Consolidated Unit 45-001-00, which includes a former radioactive liquid wastewater treatment plant, a vehicle-decontamination facility, some sanitary sewer lines and manholes, and a parking area that was the site of an accidental spill. The area encompassed by Consolidated Unit 45-001-00 was the subject of a large scale cleanup that included removal of all buildings and structures, along with contaminated soil and tuff. Soil and sediment removal occurred in a large area downstream of the outfall in Acid Canyon as part of an interim action (LANL 2002, 073660). This consolidated unit may have COPCs in the surface and subsurface.

I-3.1 Receptors and Exposure Pathways

The primary exposure pathway for human receptors is surface soil and subsurface soil/tuff that may be brought to the surface through intrusive activities. Migration of contamination to groundwater through the vadose zone is unlikely given the depth to groundwater (greater than 1000 ft bgs) at the site. 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. The exposure pathways are the same as those for surface soil. Sources, exposure pathways, and receptors are shown in the conceptual site model (Figure I-3.1-1).

The sites within the Pueblo Canyon Aggregate Area are primarily in residential areas or on the slopes or bottoms of canyons. The sites provide potential habitat for ecological receptors and 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 particulates, 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 section 6 of 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 Pueblo Canyon Aggregate Area where sampling has shown that contamination is vertically bounded near the surface and the distance from the surface to the water table is large. For these reasons, screening of contaminant concentrations in soil against the DAF SSLs was not performed.

The 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 Pueblo Canyon 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 Pueblo Canyon 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 in the Pueblo Canyon Aggregate Area 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 Pueblo Canyon 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 Pueblo Canyon

Aggregate Area sites. Based on this criterion, aluminum, antimony, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, thallium and zinc have a low potential to mobilize and migrate through soil and the vadose zone. The K_d values for arsenic, copper, cyanide, iron, 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/toxpro2.html.

- Arsenic may undergo a variety of reactions including oxidation-reduction reactions, ligand exchange, precipitation, and biotransformation. Arsenic forms insoluble complexes with iron, aluminum, and magnesium oxides commonly found in soil, and in this form, arsenic is relatively immobile. However, under low pH and reducing conditions, arsenic can become soluble and may potentially leach into groundwater or result in runoff of arsenic into surface waters. Arsenic is expected to have low mobility under the environmental conditions (average pH = 7.2) present in the Pueblo Canyon Aggregate Area.
- 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 in the Pueblo Canyon Aggregate Area, 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.
- Iron is naturally occurring in soil and tuff and may be relatively mobile under reducing conditions. Iron is sensitive to soil pH conditions and occurs in two oxidation states: iron(III), the insoluble oxidized form, and iron(II), the reduced soluble form. Most iron in well drained neutral to alkaline soil is present as precipitates of iron(III) hydroxides and oxides. With time, these precipitates are mineralized and form various iron-bearing minerals, such as lepidcrocite, hematite, and goethite. Iron is not expected to be mobile in the neutral soil (average pH = 7.2) in the Pueblo Canyon Aggregate Area. The extent of iron 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 Pueblo Canyon Aggregate Area sites has low moisture content, which would inhibit 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 soil pH at the sites within the Pueblo Canyon Aggregate Area 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 Pueblo Canyon 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 Pueblo Canyon 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; 2-butanone; 4-chloroaniline; chloroform; 1,1-dichloroethene; cis-1,2-dichloroethene; 4-methyl-2-pentanone; methylene chloride; trichloroethene; and trichlorofluoromethane 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-1254; Aroclor-1260; alpha–benzene hexachloride (BHC); benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; benzo[g,h,i]perylene; benzo[k]fluoranthene; bis[2-ethylhexyl]phthalate; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; chrysene; dibenz[a,h]anthracene; dibenzofuran; 4,4'-dichlorodiphenyldichloroethane (DDD); 4,4'-dichlorophenyltrichloroethylene (DDE); 4,4'-dichlorodiphenyltrichloroethane (DDT); dieldrin; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; fluoranthene; fluorene; heptachlor epoxide; 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; butanone[2-]; chloroform; 1,4-dichlorobenzene; 1,1-dichloroethene; ethylbenzene; isopropylbenzene; 4-isopropyltoluene; 4-methyl-2-pentanone; methylene chloride; styrene; tetrachloroethene; toluene; trichloroethene; trichlorofluoromethane; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene have vapor pressures greater than 0.01 mm Hg.

Chemicals with vapor pressures less than 0.000001 mm Hg are less likely to volatilize and, therefore, tend to remain immobile. 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; butylbenzylphthalate; alpha-chlordane, gamma-chlordane, chrysene, dibenz[a,h]anthracene, 4,4'-DDD,

4,4'-DDE; 4,4'-DDT; dieldrin; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; fluoranthene; indeno[1,2,3-cd]pyrene; and pyrene have vapor pressures less than 0.000001 mm Hg.

The K_{ow} is an indicator of a chemical's potential to bioaccumulate or bioconcentrate in the fatty tissues of living organisms. The unitless K_{ow} value is an indicator of water solubility, mobility, sorption, and bioaccumulation. The higher the K_{ow} 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 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; alpha-BHC; bis[2-ethylhexyl]phthalate; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; chrysene; dibenz[a,h]anthracene; dibenzofuran; 1,4-dichlorobenzene; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; di-n-butylphthalate; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; fluoranthene; fluorene; heptachlor epoxide; indeno[1,2,3-cd]pyrene; isopropylbenzene; 4-isopropyltoluene; 2-methylnaphthalene; 4,4'-methoxychlor; naphthalene; phenanthrene; pyrene; tetrachloroethene; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3- xylene + 1,4-xylene. 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; 2-butanone; 4-chloroaniline; chloroform; 1.1-dichloroethene; 4-methyl-2-pentanone; methylene chloride; trichloroethene; 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). 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, alpha-BHC; bis[2-ethylhexyl]phthalate; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; chrysene; dibenz[a,h]anthracene; dibenzofuran; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; dieldrin; di-n-butylphthalate; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; ethylbenzene; fluoranthene; fluorene; heptachlor epoxide; indeno[1,2,3-cd]pyrene; isopropylbenzene; 2-methylnaphthalene; 4,4'-methoxychlor; naphthalene; phenanthrene; pyrene; styrene; and 1,2,4-trimethylbenzene 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; 2-butanone; 4-chloroaniline; chloroform; 1,4-dichlorobenzene; 1,1-dichloroethene; dichloroethene[cis-1,2-]; 4-methyl-2-pentanone; methylene chloride; tetrachloroethene; toluene; trichloroethene; trichlorofluoromethane; 1,2-xylene; and 1,3- xylene + 1,4-xylene.

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; alpha-BHC; bis[2-ethylhexyl]phthalate; butylbenzylphthalate; alpha-chlordane; gamma-chlordane; chrysene; dibenz[a,h]anthrachene; dibenzofuran; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; di-n-octylphthalate; endosulfan sulfate; endrin; endrin aldehyde; fluoranthene; fluorene; heptachlor epoxide; 4,4-methoxychlor; phenanthrene; and pyrene are the least mobile and the most likely to bioaccumulate. The more soluble and volatile COPCs acetone; benzoic acid; 2-butanone; chloroform; 1,4-dichlorobenzene; 1,1-dichloroethene; cis-1,2-dichloroethene; 4-methyl-2-pentanone; methylene chloride; tetrachloroethene; toluene; trichloroethene; trichlorofluoromethane; 1,2-xylene; and 1,3-xylene + 1,4-xylene 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 gives physical and chemical properties of the radionuclide COPCs identified at the Pueblo Canyon Aggregate Area sites. Based on K_d values, americium-241, cesium-137, plutonium-238, and plutonium-239 have a very low potential to migrate towards groundwater at the sites within the Pueblo Canyon Aggregate Area. The K_d value for tritium is less than 40 and indicates a potential to migrate towards groundwater.

Tritium's initial behavior in the environment is determined by the source. If it is released as a gas or vapor to the atmosphere, substantial dispersion can be expected, and the rapidity of deposition is dependent on climatic factors. If tritium is released in liquid form, it is diluted in surface water and is subject to physical dispersion, percolation, and evaporation (Whicker and Schultz 1982, 058209, p. 147). Tritium concentrations in the subsurface at the area of elevated radioactivity are low (<1 pCi/g), indicating that the area of elevated radioactivity is not a significant source of tritium, although this radionuclide is relatively mobile. Because tritium migrates in association with moisture, the low moisture content of the subsurface limits the potential for tritium to migrate to groundwater.

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 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 software (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 UCL for the recommended calculation method was used as the EPC. 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. Environmental data may have a normal, lognormal, or gamma distribution but are often nonparametric (no definable shape to the distribution). 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-2.2-18. 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 each site within the Pueblo Canyon Aggregate Area samples as part of the Phase II investigation. All sites were screened for the residential scenario using data from 0–10 ft bgs. All sites were also screened for the recreational scenario based on the potential use and receptors for the site identified in section I-3.1. Recreational risk-screening assessments used data from 0–1 ft bgs.

I-4.1 SSLs

Human health risk screening assessments were conducted using the residential 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 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}. SSLs for the recreational scenario were obtained from Laboratory guidance (LANL 2010, 108613). Radionuclide screening action levels (SALs) are used for comparison with radionuclide COPC concentrations 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 recreational and residential SSLs and SALs are presented in Tables I-4.1-1 to I-4.1-3. 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).

I-4.2 Results of the Human Health Risk-Screening Evaluations

The EPC of each COPC in soil was compared with the SSLs for the appropriate scenario(s). 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}. A hazard quotient (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. The radionuclide EPCs were divided by the SAL and multiplied by 15 mrem/yr. The sum of the doses was compared with 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-4.2-39.

I-4.2.1 SWMU 00-018(a)

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-1, I-4.2-2, and I-4.2-3. The total excess cancer risk for the recreational scenario is 1×10^{-6}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the recreational scenario is 0.01 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results risk-screening assessment for the residential scenario are presented in Tables I-4.2-4, I-4.2-5, and I-4.2-6. The total excess cancer risk is 4×10^{-6}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the residential scenario is 0.4 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.2 AOC 00-030(eS)

Calcium was retained as a COPC because it was detected above background in tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's Risk Assessment Guidance for Superfund (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the recommended daily allowance (RDA) for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur for the maximum concentration found at AOC 00-030(eS) (10,500 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 1.5 mg calcium per day. At the intake level of 1.5 mg/d, the adult's ingestion

of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at AOC 00-030(eS) at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 3.5 mg/d. At the intake level of 3.5 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 10,500 mg/kg, and calcium is eliminated as a COPC.

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-7 and I-4.2-8. The total excess cancer risk is approximately 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.07, which is below the NMED target HI of 1.0 (NMED 2009, 108070). No radionuclide COPCs were identified for the recreational scenario.

The results of the risk-screening assessment for the residential scenario are provided in Tables I-4.2-9, I-4.2-10, and I-4.2-11. The total excess cancer risk is 5×10^{-6}, which is below the NMED target risk level 1×10^{-5} (NMED 2009, 108070). The HI is 0.5, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.4 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.3 AOC 00-030(f)

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-12, I-4.2-13, and I-4.2-14. The total excess cancer risk is 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.08, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.02 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-15, I-4.2-16, and I-4.2-17. The total excess cancer risk is 5×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.8 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.4 AOC 00-030(h)

Location PU-612252 is a surface location upgradient of the former outfall, which was not included in the Pueblo Canyon Aggregate Area investigation work plan but was sampled because of a deviation to the proposed excavation and at the direction of NMED (section 3.5). The sample from this location is not representative of any Laboratory operations and was influenced by years of stormwater runoff from the Immaculate Heart of Mary Catholic Church asphalt parking lot (section 6.4.3). Therefore, the results from this location were excluded from the risk-screening assessments conducted for this AOC.

Calcium was retained as a COPC because it was detected above background in sediment; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's Risk Assessment Guidance for Superfund (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the RDA for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the maximum concentration at AOC 00-030(h) (6500 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.9 mg calcium per day. At the intake level of 0.9 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at AOC 00-030(h) at the

EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 2.2 mg/d. At the intake level of 2.2 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 6500 mg/kg, and calcium is eliminated as a COPC.

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-18, I-4.2-19, and I-4.2-20. The total excess cancer risk is 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.04, which is less than the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.005 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessment for the residential scenario are presented in Tables I-4.2-21, I-4.2-22, and I-4.2-23. The total excess cancer risk is 1×10^{-5}, which is equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.8 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.5 SWMU 31-001

Calcium was retained as a COPC because it was detected above background in soil and tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's Risk Assessment Guidance for Superfund (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the RDA for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the maximum concentration found at SWMU 31-001 (107,000 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 15.3 mg calcium per day. At the intake level of 15.3 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at SWMU 31-001 at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 35.7 mg/d. At the intake level of 35.7 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 107,000 mg/kg, and calcium is eliminated as a COPC.

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-24 and I-4.2-25. The total excess cancer risk is 3×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.05, which is below the NMED target HI of 1.0 (NMED 2009, 108070). No radionuclide COPCs were identified for the recreational scenario.

The results of the risk-screening assessment for the residential scenario are presented in Tables I-4.2-26, I-4.2-27, and I-4.2-28. The total excess cancer risk is 1×10^{-5}, which is equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.08, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.6 Consolidated Unit 45-001-00

The results of the risk-screening assessment for the recreational scenario are presented in Tables I-4.2-29, I-4.2-30, and I-4.2-31. The total excess cancer risk is 5×10^{-7}, 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 0.0000004 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessment for the residential scenario are presented in Tables I-4.2-32, I-4.2-33, and I-4.2-34. The total excess cancer risk is 4×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.8, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.5 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.3 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-4.3.1 Data Evaluation and COPC Identification Process

A primary uncertainty associated with the COPC identification process is the possibility that a chemical may be inappropriately identified as a COPC when it is actually not a COPC or that a chemical may not be identified as a COPC when it actually should be identified as a COPC. 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. No established BVs for organic chemicals are available; 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-4.3.2 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 recreational scenario assumes that the receptor is exposed for 1 h for 200 events per yr. This scenario may not reflect actual time spent on the site and may overestimate the potential risk/dose. The residential scenario is based on exposure of 24 h/d, 350 d/yr and 30 yr and may overestimate the potential risk/dose but is protective.

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 (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.

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-4.3.3 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-4.3.3.1 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-4.3.3.2 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-4.3.3.3 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-4.3.3.4 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-4.3.3.5 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, alpha-chlordane, and gamma- chlordane, endosulfan sulfate, endrin aldehyde, and 4-isopropyltoluene 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.

I-4.3.4 Additive Approach

For noncarcinogens, the effects of exposure to multiple chemicals are generally unknown, and possible interactions could be synergistic or antagonistic, resulting in either an overestimation or underestimation of the potential risk. Additionally, RfDs used in the risk calculations typically are not based on the same endpoints with respect to severity, effects, or target organs. Therefore, the potential for noncarcinogenic effects may be overestimated for individual COPCs that act by different mechanisms and on different target organs but are addressed additively.

I-4.4 Interpretation

SWMU 00-018(a)

The total excess cancer risks for the recreational and residential scenarios are 1×10^{-6} and 4×10^{-6}, respectively. These risks are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.2 for both scenarios, which are below the NMED target HI of 1.0 (NMED 2009, 108070). The total doses for the recreational and residential scenarios are 0.01 and 0.4 mrem/yr, respectively, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of 8×10^{-6}, based on a comparison with EPA's residential preliminary remediation goals (PRGs) for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls). The total dose for the recreational scenario is equivalent to a total risk of 5×10^{-8}, based on conversion from dose using RESRAD Version 6.5.

Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the recreational and residential scenarios.

AOC 00-030(eS)

The total excess cancer risks for the recreational and residential scenarios are 1×10^{-6} and 5×10^{-6}, respectively, and are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.07, and approximately 0.5, respectively, which are below the NMED target HI (NMED 2009, 108070). The total dose for the residential scenario is 0.4 mrem/yr and below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of

3×10^{-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 residential and recreational scenarios.

AOC 00-030(f)

The total excess cancer risks for the recreational and residential scenarios are 3×10^{-6} and 5×10^{-6}, respectively, which are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.08 and 0.2, respectively, and are below the NMED target HI of 1.0 (NMED 2009, 108070). The total doses are 0.02 mrem/yr and 0.8 mrem/yr, respectively, and are below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of 5×10^{-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). The total dose for the recreational scenario is equivalent to a total risk of 8×10^{-8}, based on conversion from dose using RESRAD Version 6.5.

Based on the screening-assessment results, no potential unacceptable risks or doses from COPCs exist for the residential and recreational scenarios.

AOC 00-030(h)

The total excess cancer risks for the recreational and residential scenarios are 3×10^{-6} and 1×10^{-5}, respectively, which are below or equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). In addition, a portion of the site is below an asphalt parking lot so no complete pathways for exposure exist. The HIs are 0.04 and 0.2, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070). The total doses are 0.005 mrem/yr and 0.8 mrem/yr, respectively, and are below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of 3×10^{-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). The total dose for the recreational scenario is equivalent to a total risk of 2×10^{-8}, based on conversion from dose using RESRAD Version 6.5.

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

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The total excess cancer risks for the recreational and residential scenarios are 3×10^{-7} and 1×10^{-5}, respectively, and are below or equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.05 and 0.08, which are below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the residential scenario is 2 mrem/yr and below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of 1×10^{-5}, 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 dose from COPCs exist for the residential and recreational scenarios.

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The total excess cancer risks for the recreational and residential scenarios are 5×10^{-7} and 4×10^{-6}, respectively, and are below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HIs are 0.1 and 0.8, respectively, and are below the NMED target HI of 1.0 (NMED 2009, 108070). The total doses are 0.0000004 and 0.5 mrem/yr, respectively, and are below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario is equivalent to a total risk of 7×10^{-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). The total dose for the recreational scenario is equivalent to a total risk of 3×10^{-11}, based on conversion from dose using RESRAD Version 6.5.

Based on the screening assessment results, no potential unacceptable risks or dose from COPCs exist for the residential and recreational scenarios.

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 six sites 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. Some the sites are in undeveloped areas, some are in residential areas, and some are in developed areas with pavement overlying the site. For the sites that are undeveloped or developed as residential areas, the area typically provides some potential habitat for ecological receptors. However, because of the presence of residences and other townsite facilities, the quality of the habitat varies. At AOCs 00-030(eS), 00-030(f), and 00-030(h), the septic tank footprints are under asphalt parking lots, and that portion of the sites is inaccessible to ecological receptors.

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 exist at any of the six sites within the aggregate area. 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 to be 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 2.4 (LANL 2009, 107524).

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 are 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 (determined from samples collected between 0 and 5 ft bgs) 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, I-2.2-11, I-2.2-14, and I-2.2-17, and the calculations are summarized in section I-3.4. Input and output data files for ProUCL calculations are provided on CD as Attachment I-1. The ESLs were obtained from the ECORISK Database, Version 2.4 (LANL 2009, 107524) and are presented in Table I-5.3-1 for all COPCs and receptors evaluated.

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 to the ESLs. The EPCs consist of UCLs or maximum detected concentrations. 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 evaluated further in the uncertainty section.

Calcium; 4,6-dinitro-2-methylphenol; endosulfate sulfate; endrin aldehyde; ethylbenzene; heptachlor epoxide; isopropylbenzene; 4-isopropyltoluene; nitrate; perchlorate; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene do not have ESLs for any receptors. As a result, these COPCs are retained as COPECs and are discussed in the uncertainty section.

I-5.3.1 SWMU 00-018(a)

The results of the minimum ESL comparisons are presented in Table I-5.3-2. Antimony, barium, cadmium, chromium, copper, cyanide (total), lead, manganese, mercury, nickel, selenium, silver, zinc, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzoic acid, bis[2-ethylhexyl]phthalate, 4-chloroaniline, 4,4'-DDD, di-n-octylphthalate, dieldrin, and endrin 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 00-018(a). All the receptors, except for the red fox, have HIs greater than 1.0 and are discussed further in the uncertainty analysis.

Endosulfan sulfate; endrin aldehyde; ethylbenzene; heptachlor epoxide; 4-isopropyltoluene; nitrate; perchlorate; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty analysis.

I-5.3.2 AOC 00-030(eS)

The results of the minimum ESL comparisons are presented in Table I-5.3-4. Barium, chromium, copper, cyanide (total), lead, mercury, selenium, silver, zinc, Aroclor-1254, 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 AOC 00-030(eS). The HI analysis indicates that all receptors, except the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed further in the uncertainty section.

Calcium; ethylbenzene; isopropylbenzene; 4-isopropyltoluene; nitrate; perchlorate; 1,2-xylene; and 1,3-xylene + 1,4-xylene do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty section.

I-5.3.3 AOC 00-030(f)

The results of the minimum ESL comparisons are presented in Table I-5.3-6. Antimony, beryllium, chromium, cyanide(total), lead, manganese, mercury, selenium, Aroclor-1254, benzoic acid, and 4,4'-DDT have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-7 presents the HQs and HIs for each receptor or COPEC at AOC 00-030(f). The HI analysis indicates that all receptors, except the kestrel (top carnivore) and the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed further in the uncertainty section.

Heptachlor epoxide; 4-isopropyltoluene; nitrate; perchlorate; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty section.

I-5.3.4 AOC 00-030(h)

The results of the minimum ESL comparisons are presented in Table I-5.3-8. Antimony; barium; copper; lead; selenium; thallium; zinc; bis[2-ethylhexyl]phthalate; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; di-n-butylphthalate; and dieldrin 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 AOC 00-030(h). The HI analysis indicates that all receptors have HIs greater than 1.0. The COPECs and receptors are discussed further in the uncertainty section.

Calcium; 4-isopropyltoluene; nitrate, perchlorate; and 1,3-xylene + 1,4-xylene do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty section.

I-5.3.5 SWMU 31-001

The results of the minimum ESL comparisons are presented in Table I-5.3-10. Aroclor-1260, arsenic, barium, bis[2-ethylhexyl]phthalate, chromium, copper, 4,4'-DDT, di-n-butylphthalate, lead, selenium, and zinc have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-11 presents the HQs and HIs for each receptor/COPEC at SWMU 31-001. The HI analysis indicates that all receptors, except for the cottontail and red fox, have HIs greater than 1.0. The COPECs and receptors are discussed further in the uncertainty section.

Calcium, nitrate, and perchlorate do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty section.

I-5.3.6 Consolidated Unit 45-001-00

The results of the minimum ESL comparisons are presented in Table I-5.3-12. Antimony, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc, acenaphthene, Aroclor-1242, Aroclor-1254, benzoic acid, bis[2-ethylhexyl]phthalate, 4,4'-DDT, and dieldrin have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-13 presents the HQs and HIs for each receptor/COPEC at Consolidated Unit 45-001-00. The HI analysis indicates that all receptors, except the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed further in the uncertainty section.

Dinitro-2-methylphenol[4,6-]; ethylbenzene; 4-isopropyltoluene; nitrate; perchlorate; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene do not have ESLs and are retained as COPECs. They are discussed further in the uncertainty section.

I-5.4 Uncertainty Analysis

The uncertainty analysis describes the key sources of uncertainty related to the screening evaluations. This analysis can result in either adding or removing chemicals from the list of COPECs. 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, organic, and radionuclide 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 calculations of HQs 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 Pueblo Canyon 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 95% UCLs for some inorganic chemicals were similar to the ranges of background concentrations indicating no potential risk from exposure across the site. This relationship is presented in Tables I-5.4-1 to I-5.4-6. The 95% 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 ranges of background concentrations, the receptor is exposed to an average concentration that is comparable to naturally occurring levels across the site. For example, if the chromium EPC is 15 mg/kg and the ranges of background concentrations are 1.9 mg/kg to 36.5 mg/kg for soil and 0.25 mg/kg to 13 mg/kg for Qbt 2, 3, 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(s) of background concentrations are contributing risk overestimates the potential risk and does not reflect actual exposure and risk.

SWMU 00-018(a)

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(s) of background concentrations for soil and/or tuff, indicating that exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-1). Antimony, barium, cadmium, chromium, manganese, nickel, and zinc are eliminated as COPECs because their EPCs are similar to the range(s) of background concentrations. Copper, cyanide, lead, mercury, selenium, and silver are retained as COPECs.

AOC 00-030(eS)

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(s) of background concentrations for soil and tuff, indicating that exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-2). Barium, calcium, chromium, cyanide,

and silver are eliminated as COPECs because their EPCs are similar to the range(s) of background. Copper, lead, mercury, selenium, and zinc are retained as COPECs.

AOC 00-030(f)

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(s) of background concentrations for soil and tuff, indicating that exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-3). Antimony, beryllium, chromium, cyanide, lead, manganese, mercury, and selenium are eliminated as COPECs because their EPCs are similar to the range(s) of background. In the case of antimony and selenium, no detected concentrations were above background.

AOC 00-030(h)

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(s) background concentrations for soil and tuff, indicating that exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-4). Antimony, barium, calcium, lead, thallium, and selenium are eliminated as COPECs because their EPCs are similar to the range(s) of background. In the case of antimony, no detected concentrations were above background. Copper and zinc are retained as COPECs.

SWMU 31-001

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(s) of background concentrations for soil and tuff, indicating that exposure to these inorganic chemicals across the site is similar to the range(s) of background (Table I-5.4-5). Arsenic, barium, chromium, copper, lead, selenium, and zinc are eliminated as COPECs because their EPCs are similar to background. Calcium is retained as a COPEC.

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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(s) of background concentrations for soil and tuff, indicating that exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-6). Antimony, cadmium, chromium, copper, lead, selenium, and zinc are eliminated as COPECs because their EPCs are similar to the range(s) of background. In the case of antimony, no detected concentrations were above background. Mercury and silver are retained as COPECs.

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 0.18 hectares (ha) to 2.8 ha, and the HR for the Mexican spotted owl is 366 ha (Table I-5.4-7). 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 0.0000009 to approximately 0.9. Therefore, no potential for adverse impacts to the Mexican spotted owl exist.

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 HR 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 (Table I-5.4-7). 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 HQs and HIs for each site are presented in Tables I-5.4-8 to I-5.4-13.

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 to 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) are presented in Table I-5.4-14 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 (Tables I-5.4-15 to I-5.4-24), if the wildlife receptor HIs exceeded 1.0 using the LOAEL-based ESLs.

I-5.4.8 Site Discussions

SWMU 00-018(a)

The adjusted HIs for SWMU 00-018(a) are less than 1.0 for the kestrel (intermediate and top carnivore), cottontail, and fox. The adjusted HIs for the other receptors ranged from 3 to 14. The HIs for the robin (herbivore, insectivore, omnivore) are primarily from cyanide, lead, mercury, and selenium as well as bis[2-ethylhexyl]phthalate for the insectivore and omnivore. The deer mouse and shrew HIs are primarily

from selenium and di-n-octylphthalate. The primary COPECs for the earthworm are copper, mercury, selenium, and 4-chloroaniline, and for the plant are copper, lead, selenium, and 4-chloroaniline.

The LOAEL analysis results in HIs equivalent to 1 for the earthworm and 2 for the plant (Table I-5.4-15). 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 did not indicate adverse effects of any kind, and there appears to be functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals at the site. Therefore, the HIs are not consistent with field observations and do not indicate potential risk to these receptors.

The adjusted LOAEL HIs for the robin (herbivore and omnivore) and the montane shrew are less than or equivalent to 1, while the HIs for the robin (insectivore) and the deer mouse are 2 and 4, respectively (Table I-5.4-16). The adjusted LOAEL HIs are from selenium for both receptors as well as mercury for the robin (insectivore). The ESLs for selenium and mercury (both the NOAEL-based and LOAEL-based) overestimate the potential risk to the receptors; selenium ESLs are 0.75 mg/kg and 1.5 mg/kg for the robin (insectivore) and 0.83 mg/kg and 1.2 mg/kg for the deer mouse and the mercury ESLs are 0.013 mg/kg and 0.13 mg/kg for the robin (insectivore). The ESLs are less than or equivalent to the soil BVs (selenium BV is 1.52 mg/kg with a maximum background concentration of 1.7 mg/kg and mercury BV is 0.1 mg/kg), making it very unlikely that the ESLs reflect an effect level. The receptors are adapted to the naturally occurring selenium and mercury levels in the soil and would not be adversely impacted when exposed to these concentrations. In addition, the selenium concentrations are confined to the eastern portion of the site so the exposure area is much smaller. Given the conservatism associated with the exposure, no potential risk to the robin and deer mouse exists.

In addition, field and laboratory studies conducted as part of the canyon investigations have included detected COPEC concentrations comparable to those detected at sites within the Pueblo Canyon Aggregate Area (LANL 2004, 087390; LANL 2006, 094161; LANL 2007, 098279; LANL 2008, 104909; LANL 2009, 106939; LANL 2009, 107453). Mercury has a range of concentrations in canyon reaches of 0.12 mg/kg to 5.57 mg/kg, and selenium has a range of concentrations in canyon reaches of 0.628 mg/kg to 5.07 mg/kg compared with EPCs of 0.567 mg/kg and 4.65 mg/kg, respectively. The studies have found no effects from exposure to COPECs in the canyon reaches, further supporting the conclusion that no potential ecological risk exists at SWMU 00-018(a).

AOC 00-030(eS)

The adjusted HIs for AOC 00-030(eS) are less than or equivalent to 1.0 for the kestrel (intermediate and top carnivore), desert cottontail, robin (herbivore), shrew, and red fox. The adjusted HIs for the other receptors ranged from 2 to 21. The HI for the robin (insectivore) is from lead, mercury, selenium, and bis[2-ethylhexyl]phthalate, while the robin (omnivore) HI is from lead, mercury and selenium. The deer mouse HI is from lead, selenium, and zinc. The earthworm HI is primarily from copper, mercury, selenium, and zinc, and copper, lead, selenium, and zinc are the primary COPECs for the plant HI. The EPC for selenium is based on a detection limit because no concentrations were detected. As a result, the potential risk to receptors is substantially overestimated by this comparison.

The LOAEL analysis results in HIs less than 1 for the earthworm and 3 for the plant (Table I-5.4-17). The plant HI is from selenium and is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the plant. Selenium was not detected in any sample and had much lower detection limits than the one evaluated. In addition, field observations made during the site visit found no indication of adverse effects on the plant community (Attachment I-2). Field

observations did not indicate adverse effects of any kind, and there appears to be functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals. Therefore, the HI is not consistent with field observations and does not indicate potential risk to the plant.

The adjusted LOAEL HI is less than 1 for the robin and is 3 for the deer mouse (Table I-5.4-18). The adjusted LOAEL HI for the deer mouse is from selenium and is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the deer mouse. Selenium was not detected in any sample and had much lower detection limits than the one evaluated. Therefore, the HI does not indicate potential risk to the deer mouse.

AOC 00-030(f)

The adjusted HIs for AOC 00-030(f) are less than 1 for all receptors.

AOC 00-030(h)

The adjusted HIs for AOC 00-030(h) are less than or equivalent to 1 for the kestrel (intermediate and top carnivore), robin (herbivore), cottontail, earthworm, plant, and red fox. The adjusted HIs for the other receptors ranged from 2 to 44. The HIs for the robin (insectivore and omnivore) are primarily from bis[2-ethylhexyl]phthalate and di-n-butylphthalate. The deer mouse and shrew HIs are from bis[2-ethylhexyl]phthalate and DDT. The EPCs for bis[2-ethylhexyl]phthalate and di-n-butylphthalate are from one elevated concentration and substantially overestimate the potential risk. Di-n-butyl phthalate was detected in only one sample. Bis[2-ethylhexyl]phthalate has a maximum detected concentration more than 2 orders of magnitude higher than the other detected concentrations. The bis[2-ethylhexyl]phthalate EPC without the maximum detected concentration is 0.21 mg/kg, which results in adjusted HIs of 0.3 and 0.2 for robin (insectivore and omnivore) and 0.03 for the deer mouse. Both the maximum bis[2-ethylhexyl]phthalate and di-n-butylphthalate concentrations are at the same location and are well bounded: location PU-612249 is within 20 ft of location 00-04812 and had a detected concentration of bis[2-ethylhexyl]phthalate of 0.1 mg/kg and did not detect di-n-butylphthalate.

The adjusted LOAEL HIs for the robin (insectivore and omnivore) are 4 and 2, respectively, and are less than 1 for the deer mouse and shrew (Tables I-5.4-19 and I-5.4-20). As stated above, the adjusted LOAEL HIs for the robin are from bis[2-ethylhexyl]phthalate and di-n-butylphthalate. The potential risk is substantially overestimated by the maximum detected concentrations at one location. This condition is highly unlikely to adversely impact the population and substantially overestimates the potential risk. Therefore, the HIs do not indicate potential risk to these receptors.

SWMU 31-001

The adjusted HIs for SWMU 31-001 are less than 1 for all receptors, except for the robin (insectivore). The HI for the robin (insectivore) is from bis[2-ethylhexyl]phthalate and di-n-butylphthalate. The EPC for bis[2-ethylhexyl]phthalate is the maximum and the only detected concentration.

The adjusted LOAEL HI for the robin (insectivore) is less than 1 (Tables I-5.4-21 and I-5.4-22). Therefore, the HI does not indicate potential risk to the robin (insectivore).

Consolidated Unit 45-001-00

The adjusted HIs for Consolidated Unit 45-001-00 are less than or equivalent to 1 for the kestrel (intermediate and top carnivore), robin (herbivore), cottontail, plant, montane shrew, and red fox. The

adjusted HIs for the robin (insectivore and omnivore), earthworm, and deer mouse ranged from 4 to 16. The adjusted HIs for the robin (insectivore and omnivore) are primarily from mercury and bis[2-ethylhexyl]phthalate. The adjusted HI for the deer mouse is from benzoic acid and dieldrin, and the adjusted HI for the earthworm is from mercury.

The LOAEL analysis results in HIs equivalent to 1 for the deer mouse and 2 for the earthworm (Table I-5.4-23). In addition, field observations made during the site visit and field activities found no indication of adverse impacts 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 did not indicate adverse effects of any kind, and there appears to be 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 risks to the earthworm and deer mouse.

The adjusted LOAEL HIs for the robin (insectivore and omnivore) are less than 1 (Table I-5.4-24). Therefore, the HIs do not indicate potential risks to these receptors.

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 to 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, U.S. Department of Agriculture Integrated Pesticide Management Database, American Bird Conservancy Pesticide Toxicity Database, and Oak Ridge National Laboratory Risk Assessment Information System. Toxicity data was obtained for several COPECs and receptors as a result of this online database search and interim ESLs were calculated. The ESLs are called interim because the information and calculations are still undergoing review, and 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 with 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 that 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 00-018(a)

No ESLs are available for endosulfan sulfate; endrin aldehyde; ethylbenzene; heptachlor epoxide; 4-isopropyltoluene; nitrate; perchlorate; 1,2,4-trimethylbenzene; 1,2-xylene; and 1,3-xylene + 1,4-xylene.

Endosulfan sulfate was detected in one sample at a maximum detected concentration of 0.00712 mg/kg. The minimum ESL for endosulfan (0.64 mg/kg for the deer mouse) was used to screen endosulfan sulfate and resulted in a maximum HQ of 0.01. Because the HQ is less than 0.3, endosulfan sulfate is not retained as a COPEC.

Endrin aldehyde was detected in one sample at a maximum detected concentration of 0.0078 mg/kg. The minimum ESL for endrin (0.0014 mg/kg for the robin insectivore) was used to screen endrin aldehyde and resulted in a maximum HQ of 6. After applying the PAUF, the HQ is 0.9. Because the adjusted HQ is less than 0.3, endrin aldehyde is not retained as a COPEC.

Ethylbenzene was detected in seven samples at a maximum detected concentration of 0.00106 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 0.00004. Because the HQ is less than 0.3, ethylbenzene is not retained as a COPEC.

Heptachlor epoxide was detected in four samples at a maximum detected concentration of 0.002 mg/kg. The minimum ESL for heptachlor (0.059 mg/kg for the montane shrew) was used to screen heptachlor epoxide and resulted in a maximum HQ of 0.03. Because the HQ is less than 0.3, heptachlor epoxide is not retained as a COPEC.

Isopropyltoluene[4-] was detected in three samples at a maximum detected concentration of 0.00874 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.004. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Nitrate was detected in 36 of 36 samples, with a maximum concentration of 67.5 mg/kg. The NMED residential SSL for nitrate is 100,000 mg/kg, indicating that potential toxicity is very low. Because of the potential low toxicity, nitrate is not retained as a COPEC.

Perchlorate was detected in nine samples with an EPC of 0.0011 mg/kg. Comparison of this EPC with the NMED residential SSL of 54.5 mg/kg indicates that the potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Trimethylbenzene[1,2,4-] was detected in one sample at a maximum detected concentration of 0.000245 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen

1,2,4-trimethylbenzene and resulted in a maximum HQ of 0.00001. Because the HQ is less than 0.3, 1,2,4-trimethylbenzene is not retained as a COPEC.

Xylene[1,2-] was detected in seven samples at a maximum detected concentration of 0.00121 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,2-xylene and resulted in a maximum HQ of 0.0009. Because the HQ is less than 0.3, 1,2-xylene is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in nine samples at a maximum detected concentration of 0.00286 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,3-xylene + 1,4-xylene and resulted in a maximum HQ of 0.002. Because the HQ is less than 0.3, 1,3-xylene + 1,4-xylene is not retained as a COPEC.

I-5.4.9.2 AOC 00-030(eS)

No ESLs are available for calcium, ethylbenzene, isopropylbenzene, 4-isopropyltoluene, nitrate, perchlorate, 1,2-xylene, and 1,3-xylene + 1,4-xylene.

Calcium was detected above BV in three samples in 0-5 ft with an EPC of 5049 mg/kg. As presented in Table I-5.4-2, the calcium EPC is similar to the range of background concentrations. Because of the similarity to background and the infrequent detection above background, calcium is not retained as a COPEC.

Ethylbenzene was detected in two samples at a maximum detected concentration of 0.000588 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 0.00002. Because the HQ is less than 0.3, ethylbenzene is not retained as a COPEC.

Isopropylbenzene was detected in one sample at a maximum detected concentration of 0.00603 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen isopropylbenzene and resulted in a maximum HQ of 0.0003. Because the HQ is less than 0.3, isopropylbenzene is not retained as a COPEC.

Isopropyltoluene[4-] was detected in four samples at a maximum detected concentration of 0.0224 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.001. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Nitrate was detected in seven samples with a maximum concentration of 2.05 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 nine samples with a maximum detected concentration of 0.00261 mg/kg. Comparison of the maximum detected concentration with the NMED residential SSL of 54.5 mg/kg indicates that 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 two samples at a maximum detected concentration of 0.000536 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,2-xylene and resulted in a maximum HQ of 0.0004. Because the HQ is less than 0.3, 1,2-xylene is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in four samples at a maximum detected concentration of 0.00163 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,3-xylene + 1,4-xylene and resulted in a maximum HQ of 0.001. Because the HQ is less than 0.3, 1,3-xylene + 1,4-xylene is not retained as a COPEC.

I-5.4.9.3 AOC 00-030(f)

No ESLs are available for heptachlor epoxide, 4-isopropyltoluene, nitrate, perchlorate, 1,2,4-trimethylbenzene, and 1,3-xylene + 1,4-xylene.

Heptachlor epoxide was detected in one sample at a maximum detected concentration of 0.0016 mg/kg. The minimum ESL for heptachlor (0.059 mg/kg for the montane shrew) was used to screen heptachlor epoxide and resulted in a maximum HQ of 0.03. Because the HQ is less than 0.3, heptachlor epoxide is not retained as a COPEC.

Isopropyltoluene[4-] was detected in one sample at a maximum detected concentration of 0.00082 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.00004. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Nitrate was detected in nine of 13 samples with a maximum concentration of 3.63 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 four samples with an upper confidence limit estimate of 0.00194 mg/kg. Comparison of the EPC with the NMED residential SSL of 54.5 mg/kg indicates that potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Trimethylbenzene[1,2,4-] was detected in one sample at a maximum detected concentration of 0.000245 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen 1,2,4-trimethylbenzene and resulted in a maximum HQ of 0.00001. Because the HQ is less than 0.3, 1,2,4-trimethylbenzene is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in four samples at a maximum detected concentration of 0.00163 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,3-xylene + 1,4-xylene and resulted in a maximum HQ of 0.001. Because the HQ is less than 0.3, 1,3-xylene + 1,4-xylene is not retained as a COPEC.

I-5.4.9.4 AOC 00-030(h)

No ESLs are available for calcium, 4-isopropyltoluene, nitrate, perchlorate, and 1,3-xylene + 1,4-xylene.

Calcium was detected above BV in one sample in 0-5 ft with an EPC of 2397mg/kg. As presented in Table I-5.4-4, the calcium EPC is similar to the ranges of background concentrations. Because of the similarity to background and the infrequent detection above background, calcium is not retained as a COPEC.

Isopropyltoluene[4-] was detected in three samples at a maximum detected concentration of 0.0094 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen

4-isopropyltoluene and resulted in a maximum HQ of 0.0004. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Nitrate was detected in 3 samples with a maximum concentration of 1.97 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 one sample with a maximum detected concentration of 0.000768 mg/kg. Comparison of the maximum detected concentration with the NMED residential SSL of 54.5 mg/kg indicates that potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in one sample at a maximum detected concentration of 0.000336 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,3-xylene + 1,4-xylene and resulted in a maximum HQ of 0.0002. Because the HQ is less than 0.3, 1,3-xylene + 1,4-xylene is not retained as a COPEC.

I-5.4.9.5 SWMU 31-001

No ESLs are available for calcium, nitrate, and perchlorate.

Calcium was detected above BV in six samples in 0-5 ft with an EPC of 51094 mg/kg. Calcium is an essential nutrient to all animals and plants and has very low toxicity. The calcium in the soil is bound by other inorganic chemicals and is generally unavailable biologically. Therefore, the elevated calcium detected at this SWMU does not present a potential risk. In addition, the elevated calcium concentrations are at two locations approximately 650 ft apart. Because of the very low toxicity and the infrequent detection above background, calcium is not retained as COPEC.

Nitrate was detected in 7 samples with a maximum concentration of 1.75 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 10 samples with an upper confidence limit estimate on the mean of 0.00269 mg/kg. Comparison of the maximum detected concentration with the NMED residential SSL of 54.5 mg/kg indicates that potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

I-5.4.9.6 Consolidated Unit 45-001-00

No ESLs are available for 4,6-dinitro-2-methylphenol, ethylbenzene, 4-isopropyltoluene, nitrate, perchlorate, 1,2,4-trimethylbenzene, 1,2-xylene, and 1,3-xylene + 1,4-xylene.

Dinitro-2-methylphenol[4,6-] was detected in two samples with a maximum detected concentration of 3.79 mg/kg. The NMED residential SSL is 6.11 mg/kg, indicating that potential toxicity is moderate. Because of the potential moderate toxicity and the infrequent detection, 4,6-dinitro-2-methylphenol is not retained as a COPEC.

Ethylbenzene was detected in one sample at a maximum detected concentration of 0.000221 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 0.000009. Because the HQ is less than 0.3, ethylbenzene is not retained as a COPEC.

Isopropyltoluene[4-] was detected in two samples at a maximum detected concentration of 0.000897 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen 4-isopropyltoluene and resulted in a maximum HQ of 0.00004. Because the HQ is less than 0.3, 4-isopropyltoluene is not retained as a COPEC.

Nitrate was detected in 23 samples with a maximum concentration of 4.94 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 probably reflect natural levels. Because of the potential low toxicity and naturally occurring concentrations, nitrate is not retained as a COPEC.

Perchlorate was detected in 18 samples with a maximum detected concentration of 0.0095 mg/kg. Comparison of the maximum detected concentration to the NMED residential SSL of 54.5 mg/kg indicates that potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Trimethylbenzene[1,2,4-] was detected in one sample at a maximum detected concentration of 0.000235 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen 1,2,4-trimethylbenzene and resulted in a maximum HQ of 0.00001. Because the HQ is less than 0.3, 1,2,4-trimethylbenzene is not retained as a COPEC.

Xylene[1,2-] was detected in one sample at a maximum detected concentration of 0.000213 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,2-xylene and resulted in a maximum HQ of 0.0002. Because the HQ is less than 0.3, 1,2-xylene is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in two samples at a maximum detected concentration of 0.000655 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen 1,3-xylene + 1,4-xylene and resulted in a maximum HQ of 0.0005. Because the HQ is less than 0.3, 1,3-xylene + 1,4-xylene is not retained as a COPEC.

I-5.5 Receptor Lines of Evidence

Based on the ecological risk screening assessments, several COPECs (including COPECs without ESLs) were identified at the Pueblo Canyon Aggregate Area sites (Tables I-5.3-2 to I-5.3-29). 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), LOAEL analyses, and previous canyon investigations.

I-5.5.1 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 HIs for the kestrel (top carnivore) were less than or equivalent to 1 at AOC 00-030(f).
- 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 or equivalent to 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 home range. The adjusted HIs are less than 1.0 for all sites (section I-5.4.5).

These lines of evidence support the conclusion that no potential ecological risk to the kestrel (top carnivore) or the Mexican spotted owl exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.2 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.
- 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 Pueblo Canyon Aggregate Area sites.

I-5.5.3 Robin (All Feeding Guilds)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the robin, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- 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 at AOC 00-030(eS) (herbivore); AOC 00-030(f) (herbivore, insectivore, omnivore); AOC 00-030(h) (herbivore); SWMU 31-001 (herbivore and omnivore); and Consolidated Unit 45-001-00 (herbivore).
- A LOAEL analysis was conducted for SWMUs 00-018(a) and 31-001, AOCs 00-030(eS) and 00-030(h), and Consolidated Unit 45-001-00. The analyses and adjustments with the PAUFs resulted in HIs less than 1, except at SWMU 00-018(a) for the robin (insectivore) and AOC 00-030(h) for the robin (insectivore and omnivore). The HIs at SWMU 00-018(a) (from mercury and selenium) and AOC 00-030(h) [from bis(2-ethylhexyl)phthalate and di-n-butylphthalate] are overestimated. The ESLs for mercury and selenium (both the NOAEL-based and LOAEL-based) are less than or equivalent to the soil BVs (0.1 for mercury and 1.52 mg/kg for selenium with a maximum background concentration of 1.7 mg/kg) making it very unlikely that the LOAEL-based ESLs reflect effect levels. The receptors are adapted to the naturally occurring mercury and selenium in the soil and would not be adversely impacted when exposed to these concentrations. The HIs at AOC 00-030(h) are also substantially overestimated by the maximum detected concentrations of bis[2-ethylhexyl]phthalate and di-n-butylphthalate at one location, which is highly unlikely to adversely impact the population. The adjusted HIs without the maximum detected bis[2-ethylhexyl]phthalate concentration were less than 1.

- Field studies and laboratory analyses on birds in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453) included reaches with comparable COPEC concentrations (mercury and selenium) and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the robin (all feeding guilds) exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.4 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 greater than 1.0 at all sites, except for AOC 00-030(f) and SWMU 31-001.
- A LOAEL analysis was conducted for SWMU 00-018(a), AOCs 00-030(eS) and 00-030(h), and Consolidated Unit 45-001-00. The analyses and adjustments with the PAUFs resulted in HIs less than 1, except at SWMU 00-018(a) and AOC 00-030(eS) for the deer mouse. The adjusted LOAEL HIs for the deer mouse are primarily from selenium. The ESLs for selenium (both the NOAEL-based and LOAEL-based) are less than or equivalent to the soil BV for selenium (1.52 mg/kg), with a maximum background concentration of 1.7 mg/kg), making it very unlikely that the LOAEL-based ESLs reflect an effect level. The receptor is adapted to the naturally occurring selenium in the soil and would not be adversely impacted when exposed to these concentrations. At AOC 00-030(eS), the potential risk is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the deer mouse. Selenium was not detected in any sample and had much lower detection limits than the one evaluated.
- Field studies and laboratory analyses on small mammals in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Sandia Canyon (LANL 2009, 107453) included reaches with comparable COPEC concentrations (selenium) and found no effects from exposure.
- These lines of evidence support the conclusion that no potential ecological risk to the deer mouse exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.5 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 above 1 at all sites, except for SWMU 31-001.

- 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 for the cottontail for all sites.

These lines of evidence support the conclusion that no potential ecological risk to the cottontail exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.6 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 for the shrew at all sites, except SWMU 00-018(a) and AOC 00-030(h).
- A LOAEL analysis was conducted for SWMU 00-018(a) and AOC 00-030(h). The adjusted LOAEL HIs were less than 1.

These lines of evidence support the conclusion that no potential ecological risk to the montane shrew exists at the Pueblo Canyon Aggregate Area sites.

I-5.6.7 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 for all sites, except AOC 00-030(h).
- 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 for all sites.

These lines of evidence support the conclusion that no potential ecological risk to the red fox exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.8 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 or equivalent to 1 for AOCs 00-030(f) and 00-030(h), and SWMU 31-001.
- A LOAEL analysis was conducted for SWMU 00-018(a), AOC 00-030(eS), and Consolidated Unit 45-001-00. The adjusted LOAEL HI was less than or equivalent to 1 at SWMU 00-018(a) and AOC 00-030(eS). The HI was 2 at Consolidated Unit 45-001-00.

- 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 did not indicate adverse effects of any kind, and there appears to be functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals.
- Laboratory studies on earthworms in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939), and Sandia Canyon (LANL 2009, 107453) included reaches with comparable COPEC concentrations (mercury) and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the earthworm exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.9 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 or equivalent to 1 for AOC 00-030(f), AOC 00-030(h), SWMU 31-001, and Consolidated Unit 45-001-00.
- A LOAEL analysis was conducted for SWMU 00-018(a) and AOC 00-030(eS). The LOAEL HIs were 2 and 3 at SWMU 00-018(a) and AOC 00-030(eS), respectively. The LOAEL HIs are primarily from selenium. The ESLs for selenium (both the NOAEL-based and LOAEL-based) are less than or equivalent to the soil BV for selenium (1.52 mg/kg with a maximum background concentration of 1.7 mg/kg), making it very unlikely that the LOAEL-based ESLs reflect an effect level. The receptors are adapted to the naturally occurring selenium in the soil and would not be adversely impacted when exposed to these concentrations. At AOC 00-030(eS), the potential risk is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the plant. Selenium 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 was found based on field observations during site visits; the plant community is typical of the surrounding area and appears healthy. Field observations did not indicate adverse effects of any kind, and there appears to be functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals.
- Laboratory studies on plants in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939), and Sandia Canyon (LANL 2009, 107453) included reaches with comparable COPEC concentrations (selenium) and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the plant exists at the Pueblo Canyon Aggregate Area sites.

I-5.5.10 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 Pueblo Canyon Aggregate Area sites.

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 recreational and residential scenarios for any of the sites in the Pueblo Canyon Aggregate Area.

The total excess cancer risks were less than or equivalent to the NMED target risk level of 1×10^{-5} (NMED 2009, 108070) for the recreational and residential scenarios at all sites where evaluated.

The HIs for the recreational and residential scenarios were less than the NMED target HI of 1.0 (NMED 2009, 108070) for all sites evaluated.

The doses for the recreational and residential scenarios are less than the DOE target dose of 15 mrem/yr at all sites evaluated. The total equivalent risks ranged from 3×10^{-11} to 8×10^{-8} for the recreational scenario and 3×10^{-6} to 1×10^{-5} for the residential scenario.

The Laboratory's as low as reasonably achievable (ALARA) program description states that quantitative ALARA evaluations are not necessary for Laboratory activities that have a potential for annual public exposure less than a 3-mrem total effective dose equivalent individual dose ("Los Alamos National Laboratory Environmental ALARA Program," PD410, p. 7, effective November 8, 2008). The calculated radiation dose(s) for the residential scenario ranged from 0.4 mrem/yr to 2 mrem/yr. Therefore, radiation exposures to the public at the sites evaluated within the Pueblo Canyon Aggregate Area are ALARA.

I-6.2 Ecology

No potential ecological risks were found for any receptor based on minimum ESL comparisons, HI analyses, comparison with background concentrations, potential effects to populations (individuals for T&E species), previous canyon studies, 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 exists in the Pueblo Canyon Aggregate Area.

I-7.0 REFERENCES

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

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Primary Source	Primary Release Mechanism	Affected Media	Secondary Release Mechanism	Impacted Media	Exposure Pathways	Residential	Recreational	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**
			Seeps	Water	None	**O**	**O**	**O**
	Volatilization	Soil and Tuff	Volatilization	Air	Inhalation	**X**	**X**	**O**
	Resuspension	Airborne Particulates		Air	Inhalation	**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**
			Erosion	Sediment	Ingestion Dermal External Irradiation	**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**	**O** **O** **O**	**X** **X** **X**
		Subsurface Soil (Below 10 ft or 5 ft)	Soil and Tuff		None	**O**	**O**	**O**

X = Evaluated in risk screen; major 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 00-018(a) for the Recreational Scenerio

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	15	1	0.124 (J-)	6.2 (U)	Nonparametric	0.124	Maxiumum detected concentration
Cadmium	18	8	0.06 (U)	2.5	Gamma	0.972	95% KM (t)
Chromium	18	18	2.45	25.6	Gamma	11.61	95% Approximate Gamma
Copper	18	18	3	145	Lognormal	61.08	95% Chebyshev (Mean, Sd)
Cyanide (total)	10	1	0.258 (UJ)	0.955 (J-)	n/a*	0.955	Maxiumum detected concentration
Lead	18	18	3.2	251	Nonparametric	89.96	95% Chebyshev (Mean, Sd)
Mercury	18	18	0.0046 (J)	2.6	Gamma	0.898	95% Approximate Gamma
Nitrate	10	10	0.854 (J)	67.5	Nonparametric	37.53	95% Chebyshev (Mean, Sd)
Perchlorate	10	3	0.000603 (J)	0.00254 (U)	n/a	0.000827	Maxiumum detected concentration
Selenium	18	8	0.38 (U)	10.8	Gamma	4.257	95% KM (t)
Silver	18	12	0.105 (J)	9.59	Gamma	3.089	95% KM (BCA)
Zinc	18	18	18.8	324	Gamma	119.2	95% Approximate Gamma
Organic Chemicals (mg/kg)							
Acetone	18	3	0.0031 (J)	0.0618	n/a	0.0618	Maxiumum detected concentration
Anthracene	18	1	0.0122 (J)	0.38 (U)	n/a	0.0122	Maxiumum detected concentration
Aroclor-1242	18	1	0.0035 (U)	0.0759 (U)	n/a	0.0139	Maxiumum detected concentration
Aroclor-1254	18	7	0.00612 (U)	0.219	Normal	0.0939	95% KM (t)
Aroclor-1260	18	10	0.00612 (U)	0.231	Normal	0.0777	95% KM (t)
Benzo(a)pyrene	18	3	0.0343 (U)	0.38 (U)	n/a	0.13	Maxiumum detected concentration
Benzo(b)fluoranthene	18	5	0.0328 (J)	0.38 (U)	Normal	0.115	95% KM (t)
Benzo(g,h,i)perylene	18	2	0.0276 (J)	0.38 (U)	n/a	0.0401	Maxiumum detected concentration
Benzo(k)fluoranthene	18	1	0.014 (J)	0.38 (U)	n/a	0.014	Maxiumum detected concentration
Benzoic acid	18	1	0.45 (J)	1.8 (U)	n/a	0.45	Maxiumum detected concentration
Bis(2-ethylhexyl)phthalate	18	5	0.0752 (J)	1.2 (U)	Nonparametric	0.174	95% KM (t)

Table I-2.2-1 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chlordane[alpha-]	18	8	0.000696 (U)	0.02 (J)	Normal	0.00616	95% KM (t)
Chlordane[gamma-]	18	6	0.000696 (U)	0.0148 (J)	Normal	0.00424	95% KM (t)
Chloroaniline[4-]	18	2	0.343 (U)	2	n/a	2	Maximum detected concentration
Chloroform	18	1	0.000231 (J)	0.006 (U)	n/a	0.000231	Maximum detected concentration
Chrysene	18	7	0.0167 (J)	0.38 (U)	Normal	0.0879	95% KM (t)
DDD[4,4'-]	18	3	0.00139 (U)	0.0303 (UJ)	n/a	0.00922	Maximum detected concentration
DDE[4,4'-]	18	3	0.00139 (U)	0.0303 (U)	n/a	0.0075	Maximum detected concentration
DDT[4,4'-]	18	2	0.00139 (UJ)	0.0303 (UJ)	n/a	0.00599	Maximum detected concentration
Dichloroethene[1,1-]	18	5	0.000292 (J)	0.006 (U)	Normal	0.00112	95% KM (t)
Dieldrin	18	4	0.00139 (U)	0.0303 (UJ)	n/a	0.0245	Maximum detected concentration
Endosulfan sulfate	18	1	0.00139 (U)	0.0303 (UJ)	n/a	0.00712	Maximum detected concentration
Endrin aldehyde	18	1	0.00035 (U)	0.0303 (UJ)	n/a	0.0078	Maximum detected concentration
Ethylbenzene	18	4	0.00021 (J)	0.006 (U)	n/a	0.00106	Maximum detected concentration
Fluoranthene	18	10	0.0107 (J)	0.38 (U)	Normal	0.0635	95% KM (t)
Heptachlor epoxide	18	1	0.000696 (U)	0.0152 (UJ)	n/a	0.00171	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	18	2	0.0343 (U)	0.38 (U)	n/a	0.098	Maximum detected concentration
Isopropyltoluene[4-]	18	1	0.000729 (J)	0.006 (U)	n/a	0.000729	Maximum detected concentration
Methylene chloride	18	5	0.00273 (J)	0.00725 (UJ)	Normal	0.00415	95% KM (t)
Phenanthrene	18	3	0.0138 (J)	0.38 (U)	n/a	0.0297	Maximum detected concentration
Pyrene	18	9	0.0137 (J)	0.38 (U)	Normal	0.0808	95% KM (t)
Styrene	18	1	0.000484 (J)	0.006 (U)	n/a	0.000484	Maximum detected concentration
Tetrachloroethene	18	1	0.000385 (J)	0.006 (U)	n/a	0.000385	Maximum detected concentration

Table I-2.2-1 continued

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Toluene	18	6	0.00049 (J)	0.0133	Gamma	0.00304	95% KM (t)
Xylene[1,2-]	10	4	0.000208 (J)	0.00169 (U)	n/a	0.00121	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	10	4	0.0006 (J)	0.00337 (U)	n/a	0.00286	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	15	8	0.037 (U)	0.446	Gamma	0.172	95% KM (t)

*n/a = Not applicable.

Table I-2.2-2
EPCs for SWMU 00-018(a) for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	41	2	0.124 (J-)	1.09(UJ)	n/a*	0.178	Maximum detected concentration
Barium	42	42	19.3	394	Gamma	99.98	95% Approximate Gamma
Cadmium	48	20	0.06 (U)	2.5	Gamma	0.523	95% KM (t)
Chromium	48	48	1.8	25.6	Gamma	10.24	95% Approximate Gamma
Copper	48	48	1.91	145	Nonparametric	33.3	95% Chebyshev (Mean, Sd)
Cyanide (total)	36	3	0.244 (U)	0.955 (J-)	n/a	0.955	Maximum detected concentration
Lead	48	48	3.2	251	Nonparametric	47.56	95% Chebyshev (Mean, Sd)
Manganese	48	48	45.9	1300 (J)	Gamma	382.3	95% Approximate Gamma
Mercury	48	47	0.0036 (J)	2.6	Lognormal	0.567	95% KM (Chebyshev)
Nickel	48	46	1.04	13.9	Gamma	4.649	95% KM (BCA)
Nitrate	36	36	0.687 (J)	67.5	Nonparametric	20.44	95% Chebyshev
Perchlorate	36	9	0.000564 (J)	0.00316 (U)	Normal	0.0011	95% KM (t)
Selenium	48	27	0.38 (U)	10.8	Nonparametric	4.65	95% KM (Chebyshev)
Silver	48	36	0.059 (J)	9.59	Gamma	2.19	95% KM (Chebyshev)
Zinc	48	48	18.8	324	Lognormal	80.08	95% H-UCL
Organic Chemicals (mg/kg)							
Acetone	43	10	0.00265 (J)	0.222	Gamma	0.0315	95% KM (t)
Anthracene	45	5	0.0106 (J)	0.38 (U)	Normal	0.0131	95% KM (t)
Aroclor-1242	45	1	0.00336 (U)	0.078 (U)	n/a	0.0139	Maximum detected concentration
Aroclor-1254	45	18	0.0026 (J)	0.219	Gamma	0.0446	95% KM (t)
Aroclor-1260	45	24	0.0017 (J)	0.231	Gamma	0.0418	95% KM (BCA)
Benzo(a)pyrene	45	4	0.0333 (U)	0.38 (U)	n/a	0.13	Maximum detected concentration
Benzo(b)fluoranthene	45	7	0.0131 (J)	0.38 (U)	Normal	0.0572	95% KM (t)
Benzo(g,h,i)perylene	45	2	0.0276 (J)	0.38 (U)	n/a	0.0401	Maximum detected concentration
Benzo(k)fluoranthene	45	1	0.014 (J)	0.38 (U)	n/a	0.014	Maximum detected concentration

Table I-2.2-2 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Benzoic acid	45	3	0.439 (U)	1.8 (U)	n/a	0.459	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	45	6	0.0752 (J)	1.2 (U)	Nonparametric	0.129	95% KM (t)
Chlordane[alpha-]	47	16	0.000459 (J)	0.02 (J)	Gamma	0.00366	95% KM (t)
Chlordane[gamma-]	47	15	0.000202 (J)	0.0155 (U)	Gamma	0.00274	95% KM (t)
Chloroaniline[4-]	45	3	0.077 (J)	2	n/a	2	Maximum detected concentration
Chloroform	43	1	0.000231 (J)	0.006 (U)	n/a	0.000231	Maximum detected concentration
Chrysene	45	9	0.0167 (J)	0.38 (U)	Normal	0.0487	95% KM (t)
DDD[4,4'-]	47	3	0.00135 (U)	0.0342 (UJ)	n/a	0.0092	Maximum detected concentration
DDE[4,4'-]	47	5	0.00104 (J)	0.0342 (U)	Normal	0.00217	95% KM (t)
DDT[4,4'-]	47	5	0.00135 (UJ)	0.0342 (UJ)	Normal	0.00261	95% KM (t)
Di-n-octylphthalate	45	1	0.17 (U)	2.7	n/a	2.7	Maximum detected concentration
Dichlorobenzene[1,4-]	88	1	0.000266 (J)	0.854 (U)	n/a	0.000266	Maximum detected concentration
Dichloroethene[1,1-]	43	6	0.000292 (J)	0.006 (U)	Normal	0.000939	95% KM (t)
Dieldrin	47	9	0.000399	0.0342 (UJ)	Lognormal	0.00336	95% KM (BCA)
Endosulfan sulfate	47	1	0.00135 (U)	0.0342 (UJ)	n/a	0.00712	Maximum detected concentration
Endrin aldehyde	47	1	0.00033 (U)	0.0342 (UJ)	n/a	0.0078	Maximum detected concentration
Endrin	47	1	0.000568 (J)	0.0342 (U)	n/a	0.000568	Maximum detected concentration
Ethylbenzene	43	7	0.00021 (J)	0.006 (U)	Nonparametric	0.000428	95% KM (t)
Fluoranthene	45	20	0.0107 (J)	0.38 (U)	Gamma	0.0513	95% KM (t)
Heptachlor epoxide	47	4	0.000178 (J)	0.0171 (UJ)	n/a	0.002	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	45	2	0.0333 (U)	0.38 (U)	n/a	0.098	Maximum detected concentration
Isopropyltoluene[4-]	43	3	0.000729 (J)	0.00874	n/a	0.00874	Maximum detected concentration
Methylene chloride	43	11	0.00273 (J)	0.0168 (U)	Normal	0.00399	95% KM (t)
Phenanthrene	45	7	0.0137 (J)	0.38 (U)	Gamma	0.0247	95% KM (t)
Pyrene	45	16	0.0137 (J)	0.38 (U)	Gamma	0.054	95% KM (t)
Styrene	43	2	0.00025 (J)	0.006 (U)	n/a	0.000484	Maximum detected concentration

Table I-2.2-2 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Tetrachloroethene	43	1	0.000385 (J)	0.006 (U)	n/a	0.000385	Maximum detected concentration
Toluene	43	14	0.00049 (J)	0.0133	Nonparametric	0.00204	95% KM (BCA)
Trimethylbenzene[1,2,4-]	43	1	0.000245 (J)	0.006 (U)	n/a	0.000245	Maximum detected concentration
Xylene[1,2-]	31	7	0.000208 (J)	0.00336 (U)	Nonparametric	0.000391	95% KM (t)
Xylene[1,3-]+Xylene[1,4-]	31	9	0.000327 (J)	0.00672 (U)	Lognormal	0.000862	95% KM (t)
Radionuclide (pCi/g)							
Cesium-137	37	10	0.056 (U)	0.446	Gamma	0.01	95% KM (t) UCL

*n/a = Not applicable.

Table I-2.2-3
EPCs for SWMU 00-018(a) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	54	2	0.124 (J-)	11 (UJ)	n/a*	0.178	Maximum detected concentration
Barium	55	55	3.84 (J+)	394	Gamma	86.28	95% Approximate Gamma
Cadmium	61	24	0.06 (U)	2.5	Gamma	0.458	95% KM (t)
Chromium	61	61	1.1	25.6	Gamma	8.908	95% Approximate Gamma
Copper	61	56	1.1	145	Nonparametric	27.36	95% KM (Chebyshev)
Cyanide (total)	48	3	0.239 (U)	0.955 (J-)	n/a	0.955	Maximum detected concentration
Lead	61	61	2.6	251	Nonparametric	39.2	95% Chebyshev (Mean, Sd)
Manganese	61	61	45.9	1300 (J)	Gamma	348.3	95% Approximate Gamma
Mercury	61	53	0.0036 (J)	2.6	Lognormal	0.462	95% KM (Chebyshev)
Nickel	61	54	0.6(U)	13.9	Gamma	4.233	95% KM (BCA)
Nitrate	48	47	0.687 (J)	67.5	Nonparametric	16.63	95% KM (Chebyshev)
Perchlorate	48	10	0.000564 (J)	0.00316 (U)	Normal	0.00108	95% KM (t)
Selenium	61	27	0.22 (U)	10.8	Nonparametric	2.835	95% KM (BCA)
Silver	61	39	0.059 (J)	9.59	Lognormal	1.786	95% KM (Chebyshev)
Zinc	61	61	18.8	324	Nonparametric	89.85	95% Chebyshev
Organic Chemicals (mg/kg)							
Acetone	52	12	0.00265 (J)	0.222	Gamma	0.027	95% KM (t)
Anthracene	55	5	0.0106 (J)	0.38 (U)	Normal	0.0131	95% KM (t)
Aroclor-1242	55	2	0.00336 (U)	0.078 (U)	n/a	0.0316	Maximum detected concentration
Aroclor-1254	55	23	0.0026 (J)	0.219	Gamma	0.0377	95% KM (t)
Aroclor-1260	55	29	0.0017 (J)	0.231	Gamma	0.0351	95% KM (BCA)
Benzo(a)pyrene	55	4	0.0333 (U)	0.38 (U)	n/a	0.13	Maximum detected concentration

Table I-2.2-3 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Benzo(b)fluoranthene	55	7	0.0131 (J)	0.38 (U)	Normal	0.0526	95% KM (t)
Benzo(g,h,i)perylene	55	2	0.0276 (J)	0.38 (U)	n/a	0.0401	Maximum detected concentration
Benzo(k)fluoranthene	55	1	0.014 (J)	0.38 (U)	n/a	0.014	Maximum detected concentration
Benzoic acid	54	3	0.439 (U)	1.9 (U)	n/a	0.459	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	55	6	0.0752 (J)	1.2 (U)	Nonparametric	0.122	95% KM (t)
Butylbenzylphthalate	55	1	0.123 (J)	0.854 (U)	n/a	0.123	Maximum detected concentration
Chlordane[alpha-]	58	16	0.000459 (J)	0.02 (J)	Gamma	0.00318	95% KM (t)
Chlordane[gamma-]	58	15	0.000202 (J)	0.0155 (U)	Gamma	0.0024	95% KM (t)
Chloroaniline[4-]	55	3	0.077 (J)	2	n/a	2	Maximum detected concentration
Chloroform	52	1	0.000231 (J)	0.006 (U)	n/a	0.000231	Maximum detected concentration
Chrysene	55	9	0.0167 (J)	0.38 (U)	Normal	0.0442	95% KM (t)
DDD[4,4'-]	58	3	0.00135 (U)	0.0342 (UJ)	n/a	0.00922	Maximum detected concentration
DDE[4,4'-]	58	5	0.00104 (J)	0.0342 (U)	Normal	0.00203	95% KM (t)
DDT[4,4'-]	58	5	0.00135 (UJ)	0.0342 (UJ)	Normal	0.00253	95% KM (t)
Di-n-octylphthalate	55	1	0.17 (U)	2.7	n/a	2.7	Maximum detected concentration
Dichlorobenzene[1,4-]	107	1	0.000266 (J)	0.854 (U)	n/a	0.000266	Maximum detected concentration
Dichloroethene[1,1-]	52	6	0.000292 (J)	0.006 (U)	Normal	0.000924	95% KM (t)
Dieldrin	58	9	0.000399	0.0342 (UJ)	Lognormal	0.00279	95% KM (BCA)
Endosulfan sulfate	58	1	0.00135 (U)	0.0342 (UJ)	n/a	0.00712	Maximum detected concentration
Endrin aldehyde	58	1	0.00033 (U)	0.0342 (UJ)	n/a	0.0078	Maximum detected concentration
Endrin	58	1	0.000568 (J)	0.0342 (U)	n/a	0.000568	Maximum detected concentration
Ethylbenzene	52	7	0.00021 (J)	0.006 (U)	Nonparametric	0.000428	95% KM (t)
Fluoranthene	55	21	0.0107 (J)	0.38 (U)	Gamma	0.0519	95% KM (t)
Heptachlor epoxide	58	4	0.000178 (J)	0.0171 (UJ)	n/a	0.00197	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	55	2	0.0333 (U)	0.38 (U)	n/a	0.098	Maximum detected concentration

Table I-2.2-3 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Isopropyltoluene[4-]	52	3	0.000729 (J)	0.00874	n/a	0.00874	Maximum detected concentration
Methylene chloride	52	11	0.00273 (J)	0.0168 (U)	Normal	0.00399	95% KM (t)
Phenanthrene	55	7	0.0137 (J)	0.38 (U)	Gamma	0.0244	95% KM (t)
Pyrene	55	17	0.0137 (J)	0.38 (U)	Gamma	0.0474	95% KM (t)
Styrene	52	2	0.00025 (J)	0.006 (U)	n/a	0.000484	Maximum detected concentration
Tetrachloroethene	52	1	0.000385 (J)	0.006 (U)	n/a	0.000385	Maximum detected concentration
Toluene	52	14	0.00049 (J)	0.0133	Nonparametric	0.0018	95% KM (BCA)
Trimethylbenzene[1,2,4-]	52	1	0.000245 (J)	0.006 (U)	n/a	0.000245	Maximum detected concentration
Xylene[1,2-]	38	7	0.000208 (J)	0.00336 (U)	Nonparametric	0.00037	95% KM (t)
Xylene[1,3-]+Xylene[1,4-]	38	9	0.000327 (J)	0.00672 (U)	Lognormal	0.000817	95% KM (t)
Radionuclides (pCi/g)							
Cesium-137	46	10	0.056 (U)	0.446	Gamma	0.1	95% KM (t)
Tritium	3	2	0.061 (U)	4.51937	n/a	4.52	Maximum detected concentration

*n/a = Not applicable.

Table I-2.2-4
EPCs for AOC 00-030(eS) for the Recreational Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Calcium	5	5	256	6710	Normal	5104	95% Student's-t
Lead	5	5	6.48	37.1	Normal	36.97	95% Student's-t
Nitrate	5	3	1.02 (J)	1.41	n/a*	1.41	Maximum detected concentration
Perchlorate	5	3	0.000959 (J)	0.00222 (U)	n/a	0.0013	Maximum detected concentration
Selenium	5	0	1.58(U)	1.68(U)	n/a	1.68(U)	Maximum detection limit
Zinc	5	5	23.3	65	Normal	66.36	95% Student's-t
Organic Chemicals (mg/kg)							
Anthracene	5	2	0.0216 (J)	0.188	n/a	0.188	Maximum detected concentration
Aroclor-1254	5	2	0.00366 (U)	0.0136	n/a	0.0136	Maximum detected concentration
Aroclor-1260	5	3	0.00366 (U)	0.0046 (J-)	n/a	0.0046 (J-)	Maximum detected concentration
Benzo(a)pyrene	5	1	0.0366 (UJ)	0.306	n/a	0.306	Maximum detected concentration
Benzo(b)fluoranthene	5	1	0.0366 (UJ)	0.476	n/a	0.476	Maximum detected concentration
Benzo(g,h,i)perylene	5	1	0.0366 (UJ)	0.2	n/a	0.2	Maximum detected concentration
Benzo(k)fluoranthene	5	1	0.0366 (UJ)	0.165	n/a	0.165	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	5	1	0.119 (J)	0.762 (U)	n/a	0.119	Maximum detected concentration
Chrysene	5	1	0.0366 (U)	0.319	n/a	0.319	Maximum detected concentration
DDD[4,4'-]	5	1	0.00102 (J)	0.076 (U)	n/a	0.00102	Maximum detected concentration
DDE[4,4'-]	5	2	0.00136 (J)	0.076 (U)	n/a	0.00771	Maximum detected concentration
DDT[4,4'-]	5	2	0.00204	0.076 (U)	n/a	0.0161	Maximum detected concentration
Ethylbenzene	5	1	0.000381 (J)	0.00112 (U)	n/a	0.000381	Maximum detected concentration
Fluoranthene	5	4	0.0111 (J)	0.511	n/a	0.511	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	5	1	0.0366 (UJ)	0.296	n/a	0.296	Maximum detected concentration
Isopropyltoluene[4-]	5	2	0.000302 (J)	0.00112 (U)	n/a	0.000637	Maximum detected concentration
Pyrene	5	3	0.0271 (J)	0.438	n/a	0.438	Maximum detected concentration
Tetrachloroethene	5	1	0.000202 (J)	0.00112 (U)	n/a	0.000202	Maximum detected concentration

Table I-2.2-4 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Toluene	5	3	0.000451 (J)	0.00162	n/a	0.00162	Maximum detected concentration
Xylene[1,2-]	5	1	0.000392 (J)	0.00112 (U)	n/a	0.000392	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	5	1	0.00111 (J)	0.00224 (U)	n/a	0.00111	Maximum detected concentration

*n/a = Not applicable.

Table I-2.2-5
EPCs for AOC 00-030(eS) for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Barium	15	15	6.77 (J-)	291 (J-)	gamma	115.2	95% Approximate Gamma
Calcium	15	15	256	10500	gamma	5049	95% Approximate Gamma
Chromium	15	15	1.26	22.6	Normal	12.42	95% Student's-t
Copper	15	15	1.08	123	Lognormal	51.07	95% Chebyshev (Mean, Sd)
Cyanide (Total)	15	3	0.116 (J)	0.566	n/a	0.566	Maximum detected concentration
Lead	15	15	2.58	325	Lognormal	198.8	95% Chebyshev (Mean, Sd)
Mercury	15	15	0.006 (J)	0.337	Nonparametric	0.138	95% Chebyshev (Mean, Sd)
Nitrate	15	7	0.941 (J)	2.05	Normal	1.261	95% KM (t)
Perchlorate	15	9	0.000651 (J)	0.00261	Normal	0.00158	95% KM (t)
Selenium	15	0	1.57 (U)	8.62 (U)	n/a	8.62(U)	Maximum detection limit
Silver	15	14	0.0536 (J)	1.51	Nonparametric	0.839	95% KM (Chebyshev)
Zinc	15	15	23.3	463	Nonparametric	219	95% Chebyshev (Mean, Sd)
Organic Chemicals (mg/kg)							
Acenaphthene	15	2	0.0235 (J)	0.381 (U)	n/a	0.0633	Maximum detected concentration
Acetone	15	3	0.00468 (U)	0.064 (J+)	n/a	0.064	Maximum detected concentration
Anthracene	15	6	0.00813 (J)	0.381 (U)	Gamma	0.0748	95% KM (t)
Aroclor-1254	15	4	0.00353 (U)	0.0378 (U)	n/a	0.0353	Maximum detected concentration
Aroclor-1260	15	7	0.00353 (U)	0.0378 (U)	Nonparametric	0.0111	95% KM (t)
Benzo(a)anthracene	15	2	0.0236 (U)	0.601	n/a	0.601	Maximum detected concentration
Benzo(a)pyrene	15	5	0.0223 (J)	0.593 (J)	Normal	0.18	95% KM (t)
Benzo(b)fluoranthene	15	7	0.0204 (J)	1.01 (J)	Normal	0.291	95% KM (t)
Benzo(g,h,i)perylene	15	4	0.0353 (U)	0.422 (J)	n/a	0.422	Maximum detected concentration
Benzo(k)fluoranthene	15	2	0.0167 (J)	0.381 (U)	n/a	0.165	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	15	1	0.119 (J)	1.91 (U)	Nonparametric	0.119	Maximum detected concentration
Chlordane[alpha-]	15	2	0.000706 (U)	0.038 (U)	n/a	0.00536	Maximum detected concentration

Table I-2.2-5 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chlordane[gamma-]	15	2	0.000706 (U)	0.038 (U)	n/a	0.00498	Maximum detected concentration
Chloroform	15	3	0.000242 (J)	0.00123 (U)	n/a	0.000604	Maximum detected concentration
Chrysene	15	5	0.0213 (J)	0.636	Normal	0.189	95% KM (t)
DDD[4,4'-]	15	1	0.00102 (J)	0.076 (U)	Nonparametric	0.00102	Maximum detected concentration
DDE[4,4'-]	15	6	0.00136 (J)	0.076 (U)	Normal	0.00648	95% KM (t)
DDT[4,4'-]	15	8	0.00141 (U)	0.076 (U)	Normal	0.0127	95% KM (t)
Dichloroethene[1,1-]	15	2	0.000804 (J)	0.00123 (U)	n/a	0.000896	Maximum detected concentration
Ethylbenzene	15	2	0.000381 (J)	0.00123 (U)	n/a	0.000558	Maximum detected concentration
Fluoranthene	15	11	0.0111 (J)	1.07 (J)	Gamma	0.508	95% KM (Chebyshev)
Fluorene	15	2	0.0264 (J)	0.381 (U)	n/a	0.0719	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	15	4	0.0353 (U)	0.381 (U)	n/a	0.345	Maximum detected concentration
Isopropylbenzene	15	1	0.000937 (U)	0.00603	Nonparametric	0.00603	Maximum detected concentration
Isopropyltoluene[4-]	15	4	0.000302 (J)	0.0224 (J)	n/a	0.0224	Maximum detected concentration
Methyl-2-pentanone[4-]	15	1	0.00228 (J)	0.00616 (U)	Nonparametric	0.00228	Maximum detected concentration
Methylene chloride	15	2	0.00468 (U)	0.0154	n/a	0.0154	Maximum detected concentration
Methylnaphthalene[2-]	15	1	0.0353 (U)	0.381 (U)	Nonparametric	0.0417	Maximum detected concentration
Naphthalene	15	2	0.0231 (J)	0.381 (U)	n/a	0.107	Maximum detected concentration
Phenanthrene	15	2	0.0353 (UJ)	1.14	n/a	1.14	Maximum detected concentration
Pyrene	15	8	0.0271 (J)	2.01	Gamma	0.491	95% KM (BCA)
Tetrachloroethene	15	1	0.000202 (J)	0.00123 (U)	Nonparametric	0.000202	Maximum detected concentration
Toluene	15	7	0.000451 (J)	0.00257	Normal	0.0012	95% KM (t)
Xylene[1,2-]	15	2	0.000392 (J)	0.00123 (U)	n/a	0.000536	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	15	4	0.000264 (J)	0.00246 (U)	n/a	0.00163	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	15	5	0.316 (U)	0.389	Normal	0.169	95% KM (t)

* n/a = Not applicable.

Table I-2.2-6
EPCs for AOC 00-030(eS) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	4	0	0.415 (UJ)	1.1 (UJ)	n/a*	1.1(UJ)	Maximum detection limit
Barium	18	18	6.77 (J-)	291 (J-)	Gamma	117.8	95% Approximate Gamma
Calcium	18	18	256	10500	Gamma	4263	95% Approximate Gamma
Chromium	18	18	1.26	22.6	Normal	13.5	95% Student's-t
Copper	18	16	1.08	123	Lognormal	43.54	95% KM (Chebyshev)
Cyanide (Total)	16	3	0.116 (J)	0.566	n/a	0.566	Maximum detected concentration
Lead	18	18	2.58	325	Lognormal	169.8	95% Chebyshev (Mean, Sd)
Mercury	18	16	0.006 (J)	0.337	Nonparametric	0.118	95% KM (Chebyshev)
Nitrate	16	7	0.941 (J)	2.05	Normal	1.243	95% KM (t)
Perchlorate	16	9	0.000651 (J)	0.00261	Normal	0.00155	95% KM (t)
Selenium	18	0	1.04 (U)	8.62 (U)	n/a*	8.62(U)	Maximum detection limit
Silver	18	15	0.0536 (J)	1.51	Nonparametric	0.722	97.5% KM (Chebyshev)
Zinc	18	18	23.3	463	Nonparametric	191.1	95% Chebyshev (Mean, Sd)
Organic Chemicals (mg/kg)							
Acenaphthene	16	2	0.0235 (J)	0.381 (U)	n/a	0.0633	Maximum detected concentration
Acetone	16	3	0.00468 (U)	0.064 (J+)	n/a	0.064	Maximum detected concentration
Anthracene	16	6	0.00813 (J)	0.381 (U)	Gamma	0.071	95% KM (t)
Aroclor-1254	16	4	0.00353 (U)	0.0378 (U)	n/a	0.0353	Maximum detected concentration
Aroclor-1260	16	7	0.00353 (U)	0.0378 (U)	Nonparametric	0.0106	95% KM (t)
Benzo(a)anthracene	16	2	0.0236 (U)	0.601	n/a	0.601	Maximum detected concentration
Benzo(a)pyrene	16	5	0.0223 (J)	0.593 (J)	Normal	0.17	95% KM (t)
Benzo(b)fluoranthene	16	7	0.0204 (J)	1.01 (J)	Normal	0.275	95% KM (t)
Benzo(g,h,i)perylene	16	4	0.0353 (U)	0.422 (J)	n/a	0.422	Maximum detected concentration
Benzo(k)fluoranthene	16	2	0.0167 (J)	0.381 (U)	n/a	0.165	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	16	1	0.119 (J)	1.91 (U)	n/a	0.119	Maximum detected concentration

Table I-2.2-6 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chlordane[alpha-]	16	2	0.000706 (U)	0.038 (U)	n/a	0.00536	Maximum detected concentration
Chlordane[gamma-]	16	2	0.000706 (U)	0.038 (U)	n/a	0.00498	Maximum detected concentration
Chloroform	16	3	0.000242 (J)	0.00123 (U)	n/a	0.000604	Maximum detected concentration
Chrysene	16	5	0.0213 (J)	0.636	Normal	0.178	95% KM (t)
DDD[4,4'-]	16	1	0.00102 (J)	0.076 (U)	n/a	0.00102	Maximum detected concentration
DDE[4,4'-]	16	7	0.00136 (J)	0.076 (U)	Normal	0.00692	95% KM (t)
DDT[4,4'-]	16	9	0.00141 (U)	0.076 (U)	Normal	0.0125	95% KM (t)
Dichloroethene[1,1-]	16	2	0.000804 (J)	0.00123 (U)	n/a	0.000896	Maximum detected concentration
Ethylbenzene	16	2	0.000381 (J)	0.00123 (U)	n/a	0.000558	Maximum detected concentration
Fluoranthene	16	12	0.0111 (J)	1.07 (J)	Gamma	0.489	95% KM (Chebyshev)
Fluorene	16	2	0.0264 (J)	0.381 (U)	n/a	0.0719	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	16	4	0.0353 (U)	0.381 (U)	n/a	0.345	Maximum detected concentration
Isopropylbenzene	16	1	0.000937 (U)	0.00603	n/a	0.00603	Maximum detected concentration
Isopropyltoluene[4-]	16	4	0.000302 (J)	0.0224 (J)	n/a	0.0224	Maximum detected concentration
Methyl-2-pentanone[4-]	16	1	0.00228 (J)	0.00616 (U)	n/a	0.00228	Maximum detected concentration
Methylene chloride	16	2	0.00468 (U)	0.0154	n/a	0.0154	Maximum detected concentration
Methylnaphthalene[2-]	16	2	0.0083 (J)	0.381 (U)	n/a	0.0417	Maximum detected concentration
Naphthalene	16	2	0.0231 (J)	0.381 (U)	n/a	0.107	Maximum detected concentration
Phenanthrene	16	3	0.0303 (J)	1.14	n/a	1.14	Maximum detected concentration
Pyrene	16	9	0.0249 (J)	2.01	Gamma	0.458	95% KM (BCA)
Tetrachloroethene	16	1	0.000202 (J)	0.00123 (U)	n/a	0.0002	Maximum detected concentration
Toluene	16	7	0.000451 (J)	0.00257	Normal	0.00112	95% KM (t)
Xylene[1,2-]	16	2	0.000392 (J)	0.00123 (U)	n/a	0.000536	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	16	4	0.000264 (J)	0.00246 (U)	n/a	0.00163	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	16	5	0.316 (U)	0.389	Normal	0.163	95% KM (t)

* n/a = Not applicable.

Table I-2.2-7
EPCs for AOC 00-030(f) for the Recreational Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	5	0	0.127 (U)	1.07 (UJ)	n/a*	1.07(U)	Maximum detection limit
Lead	5	5	11.6	45.1	Gamma	41.05	95% Approximate Gamma
Manganese	5	5	242 (J+)	1160	Normal	889.6	95% Student's-t
Mercury	5	4	0.00504 (J)	0.318	n/a	0.318	Maximum detected concentration
Nitrate	5	3	1.08 (U)	3.63	n/a	3.63	Maximum detected concentration
Perchlorate	5	3	0.00108 (J)	0.0023 (UJ)	n/a	0.00209	Maximum detected concentration
Selenium	5	0	0.941(U)	1.69(U)	n/a	1.69(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	5	1	0.015 (J)	0.145 (U)	n/a	0.015	Maximum detected concentration
Acetone	5	1	0.00535 (UJ)	0.00598 (J)	n/a	0.00598	Maximum detected concentration
Anthracene	5	2	0.0337 (J)	0.145 (U)	n/a	0.114	Maximum detected concentration
Aroclor-1260	5	1	0.00361 (U)	0.0362 (U)	n/a	0.0296	Maximum detected concentration
Benzo(a)anthracene	5	2	0.144 (U)	0.934	n/a	0.934	Maximum detected concentration
Benzo(a)pyrene	5	3	0.144 (U)	0.657	n/a	0.657	Maximum detected concentration
Benzo(b)fluoranthene	5	4	0.0519 (J)	1.15	n/a	1.15	Maximum detected concentration
Benzo(g,h,i)perylene	5	3	0.091 (J)	0.352	n/a	0.352	Maximum detected concentration
Benzo(k)fluoranthene	5	2	0.0389 (U)	0.377	n/a	0.377	Maximum detected concentration
Chlordane[alpha-]	5	1	0.0044 (J)	0.00726 (U)	n/a	0.0044	Maximum detected concentration
Chrysene	5	4	0.0936 (J)	1.18	n/a	1.18	Maximum detected concentration
DDE[4,4'-]	5	1	0.00619 (J)	0.0145 (U)	n/a	0.00619	Maximum detected concentration
DDT[4,4'-]	5	1	0.0143 (U)	0.0378	n/a	0.0378	Maximum detected concentration
Dibenz(a,h)anthracene	5	1	0.0389 (U)	0.145 (U)	n/a	0.0549	Maximum detected concentration
Fluoranthene	5	4	0.0633 (J)	1.97	n/a	1.97	Maximum detected concentration

Table I-2.2-7 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Fluorene	5	1	0.015 (J)	0.145 (U)	n/a	0.015	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	5	3	0.0821 (J)	0.291	n/a	0.291	Maximum detected concentration
Phenanthrene	5	3	0.144 (U)	0.804	n/a	0.804	Maximum detected concentration
Pyrene	5	4	0.0587 (J)	1.83	n/a	1.83	Maximum detected concentration
Toluene	5	2	0.000357 (J)	0.00117 (U)	n/a	0.000771	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	5	1	0.000364 (J)	0.00233 (U)	n/a	0.000364	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	4	2	0.0397 (U)	0.252	n/a	0.252	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-8
Ecological COPC Statistics for AOC 00-030(f)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	13	0	0.127 (U)	1.07 (UJ)	n/a*	1.07(UJ)	Maximum detection limit
Beryllium	13	13	0.411	1.3	Normal	0.975	95% Student's-t
Chromium	13	13	1.7	62.6	Lognormal	18.61	95% H-UCL
Cyanide (total)	13	3	0.126 (J)	0.53 (U)	Normal	0.221	95% KM (t)
Lead	13	13	3.33	45.1	Gamma	22.2	95% Approximate Gamma
Manganese	13	13	212 (J+)	1160	Gamma	587.6	95% Approximate Gamma
Mercury	13	7	0.00504 (J)	0.318	Gamma	0.0887	95% KM (BCA)
Nitrate	13	9	0.71	3.63	Gamma	1.842	95% KM (Percentile Bootstrap)
Perchlorate	12	4	0.000863 (J)	0.0053 (U)	n/a	0.00209	Maximum detected concentration
Selenium	12	0	0.52 (U)	1.77 (U)	n/a	1.77(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	13	3	0.015 (J)	0.35 (U)	n/a	0.0632	Maximum detected concentration
Acetone	13	3	0.00519 (UJ)	0.021 (U)	n/a	0.017	Maximum detected concentration
Anthracene	13	5	0.00819 (J)	0.35 (U)	Normal	0.0864	95% KM (t)
Aroclor-1254	13	1	0.00346 (U)	0.0389 (UJ)	n/a	0.0135	Maximum detected concentration
Aroclor-1260	13	5	0.0016 (J-)	0.0362 (U)	Normal	0.0133	95% KM (t)
Benzo(a)anthracene	13	5	0.0346 (U)	0.934	Gamma	0.303	95% KM (t)
Benzo(a)pyrene	13	8	0.0198 (J)	0.657	Normal	0.25	95% KM (t)
Benzo(b)fluoranthene	13	8	0.0211 (J)	1.15	Gamma	0.421	95% KM (BCA)
Benzo(g,h,i)perylene	13	7	0.0192 (J)	0.352	Normal	0.16	95% KM (t)
Benzo(k)fluoranthene	13	5	0.0346 (U)	0.377	Nonparametric	0.145	95% KM (t)
Benzoic acid	13	2	0.35 (J)	2.9 (U)	n/a	0.35	Maximum detected concentration
BHC[alpha-]	13	1	0.000798 (U)	0.036 (U)	n/a	0.001	Maximum detected concentration
Chlordane[alpha-]	13	3	0.00047 (J)	0.036 (U)	n/a	0.0044	Maximum detected concentration
Chlordane[gamma-]	13	2	0.000407 (J)	0.036 (U)	n/a	0.00433	Maximum detected concentration

Table I-2.2-8 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chrysene	13	9	0.0339 (J)	1.18	Gamma	0.422	95% KM (BCA)
DDE[4,4'-]	13	3	0.0018 (U)	0.036 (U)	n/a	0.0225	Maximum detected concentration
DDT[4,4'-]	13	4	0.0014 (J)	0.107	n/a	0.107	Maximum detected concentration
Dibenz(a,h)anthracene	13	2	0.0346 (U)	0.35 (U)	n/a	0.0549	Maximum detected concentration
Fluoranthene	13	9	0.0352	1.97	Gamma	0.601	95% KM (BCA)
Fluorene	13	3	0.015 (J)	0.35 (U)	n/a	0.054	Maximum detected concentration
Heptachlor epoxide	13	1	0.000798 (U)	0.036 (UJ)	n/a	0.0016	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	13	7	0.0138 (J)	0.35 (U)	Normal	0.164	95% KM (t)
Isopropyltoluene[4-]	13	1	0.00082 (J)	0.0053 (U)	n/a	0.00082	Maximum detected concentration
Methoxychlor[4,4'-]	13	1	0.0035 (U)	0.0778 (U)	n/a	0.0089	Maximum detected concentration
Methylene chloride	13	2	0.00083 (J)	0.00599 (U)	n/a	0.0013	Maximum detected concentration
Methylnaphthalene[2-]	13	3	0.0206 (J)	0.35 (U)	n/a	0.0598	Maximum detected concentration
Naphthalene	13	3	0.0389 (U)	0.35 (U)	n/a	0.101	Maximum detected concentration
Phenanthrene	13	8	0.0399 (U)	0.804	Normal	0.323	95% KM (t)
Pyrene	13	9	0.033 (J)	1.83	Gamma	0.589	95% KM (BCA)
Toluene	13	2	0.000357 (J)	0.0053 (U)	n/a	0.000771	Maximum detected concentration
Trimethylbenzene[1,2,4-]	13	3	0.00054 (J)	0.0053 (U)	n/a	0.0017	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	9	1	0.000364 (J)	0.00239 (U)	n/a	0.000364	Maximum detected concentration
Radionuclides (pCi/g)							
Americium-241	2	2	0.0483	0.701	n/a	0.701	Maximum detected concentration
Cesium-137	11	3	-0.020 (U)	0.31	n/a	0.31	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-9
EPCs for AOC 00-030(f) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	19	0	0.127 (U)	1.07 (U)	n/a*	1.07(U)	Maximum detection limit
Beryllium	19	19	0.411	1.3	Gamma	0.889	95% Approximate Gamma
Chromium	19	19	1.7	62.6	Nonparametric	22	95% Chebyshev (Mean, Sd)
Cyanide (Total)	18	5	0.0832 (J)	0.53 (U)	Normal	0.185	95% KM (t)
Lead	19	19	3.03	45.1	Gamma	17.55	95% Approximate Gamma
Manganese	19	19	128 (J+)	1160	Lognormal	475.6	95% H-UCL
Mercury	19	12	0.00504 (J)	0.318	Gamma	0.0721	95% KM (BCA)
Nitrate	18	14	0.71	5.97	Gamma	2.601	95% KM (Percentile Bootstrap)
Perchlorate	17	4	0.000863 (J)	0.0053 (U)	n/a	0.00209	Maximum detected concentration
Selenium	17	0	0.52 (U)	1.77 (U)	n/a	1.77(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	18	3	0.015 (J)	0.35 (U)	n/a	0.0632	Maximum detected concentration
Acetone	18	3	0.00519 (UJ)	0.021 (U)	n/a	0.017	Maximum detected concentration
Anthracene	18	5	0.00819 (J)	0.35 (U)	Normal	0.0623	95% KM (t)
Aroclor-1254	18	1	0.00346 (U)	0.0389 (UJ)	n/a	0.0135	Maximum detected concentration
Aroclor-1260	18	5	0.0016 (J-)	0.0366 (U)	Normal	0.00969	95% KM (t)
Benzo(a)anthracene	18	5	0.0244 (U)	0.934	Gamma	0.244	95% KM (t)
Benzo(a)pyrene	18	9	0.0198 (J)	0.657	Gamma	0.184	95% KM (t)
Benzo(b)fluoranthene	18	10	0.0211 (J)	1.15	Gamma	0.331	95% KM (BCA)
Benzo(g,h,i)perylene	18	9	0.0192 (J)	0.352	Gamma	0.116	95% KM (t)
Benzo(k)fluoranthene	18	5	0.0346 (U)	0.377	Nonparametric	0.124	95% KM (t)
Benzoic acid	18	2	0.35 (J)	2.9 (U)	n/a	0.35	Maximum detected concentration
BHC[alpha-]	18	1	0.000734 (U)	0.036 (U)	n/a	0.001	Maximum detected concentration
Chlordane[alpha-]	18	5	0.000224 (J)	0.036 (U)	Normal	0.0028	95% KM (t)

Table I-2.2-9 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chlordane[gamma-]	18	5	0.000257 (J)	0.036 (U)	Normal	0.00255	95% KM (t)
Chrysene	18	11	0.0245 (J)	1.18	Gamma	0.29	95% KM (BCA)
DDD[4,4'-]	18	3	0.0013 (J)	0.041	n/a	0.041	Maximum detected concentration
DDE[4,4'-]	18	8	0.0018 (U)	0.111	Gamma	0.0371	95% KM (t)
DDT[4,4'-]	18	9	0.0014 (J)	0.539	Gamma	0.102	95% KM (t)
Dibenz(a,h)anthracene	18	2	0.0346 (U)	0.35 (U)	n/a	0.0549	Maximum detected concentration
Fluoranthene	18	12	0.0147 (J)	1.97	Gamma	0.442	95% KM (BCA)
Fluorene	18	3	0.015 (J)	0.35 (U)	n/a	0.054	Maximum detected concentration
Heptachlor epoxide	18	1	0.000734 (U)	0.036 (UJ)	n/a	0.0016	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	18	8	0.0138 (J)	0.35 (U)	Normal	0.118	95% KM (t)
Isopropyltoluene[4-]	18	1	0.00082 (J)	0.0053 (U)	n/a	0.00082	Maximum detected concentration
Methoxychlor[4,4'-]	18	1	0.0035 (U)	0.15 (U)	n/a	0.0089	Maximum detected concentration
Methylene chloride	18	2	0.00083 (J)	0.00599 (U)	n/a	0.0013	Maximum detected concentration
Methylnaphthalene[2-]	18	3	0.0206 (J)	0.35 (U)	n/a	0.0598	Maximum detected concentration
Naphthalene	18	3	0.0366 (U)	0.35 (U)	n/a	0.101	Maximum detected concentration
Phenanthrene	18	9	0.0122 (J)	0.804	Normal	0.233	95% KM (t)
Pyrene	18	11	0.0196 (J)	1.83	Gamma	0.393	95% KM (BCA)
Toluene	18	4	0.000347 (J)	0.0053 (U)	n/a	0.000771	Maximum detected concentration
Trimethylbenzene[1,2,4-]	18	3	0.00054 (J)	0.0053 (U)	n/a	0.0017	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	14	1	0.000364 (J)	0.00239 (U)	n/a	0.000364	Maximum detected concentration
Radionuclides (pCi/g)							
Americium-241	2	2	0.0483	0.701	n/a	0.701	Maximum detected concentration
Americium-241	2	2	0.0483	0.701	n/a	0.701	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-10
EPCs for AOC 00-030(h) for the Recreational Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	3	0	0.424 (U)	1.13 (U)	n/a*	1.13(U)	Maximum detection limit
Calcium	3	3	1950 (J+)	5180 (J)	n/a	5180	Maximum detected concentration
Copper	3	3	3.97	59.9	n/a	59.9	Maximum detected concentration
Lead	3	3	16.5	18.5	n/a	18.5	Maximum detected concentration
Nitrate	1	1	1.39	1.39	n/a	1.39	Maximum detected concentration
Selenium	3	0	1.04 (U)	1.61 (U)	n/a	1.61(U)	Maximum detection limit
Zinc	3	3	62.4	249	n/a	249	Maximum detected concentration
Organic Chemicals (mg/kg)							
Acenaphthene	3	2	0.0377 (U)	0.122	n/a	0.122	Maximum detected concentration
Anthracene	3	3	0.0203 (J)	0.229	n/a	0.229	Maximum detected concentration
Benzo(a)anthracene	3	2	0.0366 (U)	0.439	n/a	0.439	Maximum detected concentration
Benzo(a)pyrene	3	3	0.125	0.471	n/a	0.471	Maximum detected concentration
Benzo(b)fluoranthene	3	3	0.243	0.776	n/a	0.776	Maximum detected concentration
Benzo(g,h,i)perylene	3	3	0.111	0.294	n/a	0.294	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	3	3	0.0853 (J)	0.583	n/a	0.583	Maximum detected concentration
Butylbenzylphthalate	3	1	0.101 (J)	0.407 (U)	n/a	0.101	Maximum detected concentration
Chlordane[alpha-]	3	1	0.00249 (J)	0.00754 (U)	n/a	0.00249	Maximum detected concentration
Chlordane[gamma-]	3	1	0.00251 (J)	0.00754 (U)	n/a	0.00251	Maximum detected concentration
Chrysene	3	3	0.166	0.484	n/a	0.484	Maximum detected concentration
Di-n-octylphthalate	3	2	0.114 (J)	0.366 (U)	n/a	0.285	Maximum detected concentration
Dibenz(a,h)anthracene	3	2	0.0351 (J)	0.0849	n/a	0.0849	Maximum detected concentration
Dibenzofuran	3	1	0.0818 (J)	0.407(U)	n/a	0.0818	Maximum detected concentration
Fluoranthene	3	3	0.196	0.811	n/a	0.811	Maximum detected concentration
Fluorene	3	2	0.0377 (U)	0.134	n/a	0.134	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	3	3	0.0978	0.273	n/a	0.273	Maximum detected concentration

Table I-2.2-10 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Methylnaphthalene[2-]	3	2	0.033 (J)	0.0619(J)	n/a	0.0619	Maximum detected concentration
Naphthalene	3	2	0.0377 (U)	0.361	n/a	0.361	Maximum detected concentration
Phenanthrene	3	3	0.107	0.869	n/a	0.869	Maximum detected concentration
Pyrene	3	3	0.286	1.06	n/a	1.06	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	1	1	0.063	0.063	n/a	0.063	Maximum detected concentration

*n/a = Not applicable.

Table I-2.2-11
EPCs for AOC 00-030(h) for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	17	0	0.112 (U)	1.13 (U)	n/a*	1.13(U)	Maximum detection limit
Barium	20	20	19 (J-)	442	Lognormal	111	95% H-UCL
Calcium	20	20	417 (J+)	5180	Gamma	2397	95% Approximate Gamma
Copper	18	18	1.3 (J)	59.9	Nonparametric	21.52	95% Chebyshev (Mean, Sd)
Lead	18	18	3.91	94	Gamma	25.59	95% Approximate Gamma
Nitrate	9	3	1.05 (U)	1.97	n/a	1.97	Maximum detected concentration
Perchlorate	9	1	0.000768 (J)	0.00254 (U)	n/a	0.000768	Maximum detected concentration
Selenium	18	0	0.53 (U)	1.9(U)	n/a	1.9(U)	Maximum detection limit
Thallium	20	4	0.072 (U)	0.87 (U)	n/a	0.365	Maximum detected concentration
Uranium	1	1	3.4	3.4	n/a	3.4	Maximum detected concentration
Zinc	18	18	26	249	Nonparametric	116.6	95% Chebyshev (Mean, Sd)
Organic Chemicals (mg/kg)							
Acenaphthene	19	9	0.026 (J)	0.122	Normal	0.0732	95% KM (t)
Acetone	10	6	0.00509 (U)	0.0649	Normal	0.0294	95% KM (t)
Anthracene	19	12	0.0179 (J+)	0.229	Normal	0.117	95% KM (t)
Aroclor-1260	10	1	0.0036 (U)	0.0425 (U)	n/a	0.0065	Maximum detected concentration
Benzo(a)anthracene	19	10	0.0354 (J)	0.78	Normal	0.319	95% KM (t)
Benzo(a)pyrene	19	16	0.0228 (J)	0.86	Normal	0.386	95% KM (t)
Benzo(b)fluoranthene	19	16	0.0379 (U)	1.4	Normal	0.6	95% KM (t)
Benzo(g,h,i)perylene	19	16	0.0237 (J)	0.46	Normal	0.233	95% KM (t)
Benzo(k)fluoranthene	19	6	0.036 (J)	0.58	Normal	0.222	95% KM (t)
Bis(2-ethylhexyl)phthalate	19	8	0.0806 (J)	83.7	Nonparametric	24.49	95% KM (Chebyshev)
Butylbenzylphthalate	19	2	0.101 (J)	24.1 (J)	n/a	24.1	Maximum detected concentration
Chlordane[alpha-]	18	2	0.000736 (U)	0.02 (U)	n/a	0.00249	Maximum detected concentration
Chlordane[gamma-]	18	2	0.000736 (U)	0.02 (U)	n/a	0.00251	Maximum detected concentration

Table I-2.2-11 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chloroform	10	1	0.000378 (J)	0.00124 (U)	n/a	0.000378	Maximum detected concentration
Chrysene	19	15	0.0323 (J)	1.1	Normal	0.454	95% KM (t)
DDD[4,4'-]	18	3	0.00023 (J)	0.02 (U)	n/a	0.015	Maximum detected concentration
DDE[4,4'-]	18	5	0.0019 (U)	01.1	Gamma	0.18	95% KM (t)
DDT[4,4'-]	18	9	0.0019 (UJ)	0.81	Nonparametric	0.568	95% KM (Chebyshev)
Di-n-butylphthalate	19	1	0.35 (U)	3.97	n/a	3.97	Maximum detected concentration
Di-n-octylphthalate	19	2	0.114 (J)	0.427 (U)	n/a	0.285	Maximum detected concentration
Dibenz(a,h)anthracene	19	6	0.0351 (J)	0.36(U)	Normal	0.0675	95% KM (t)
Dibenzofuran	19	3	0.037 (J)	0.053	n/a	0.0818	Maximum detected concentration
Dieldrin	18	3	0.0016 (U)	0.017(U)	n/a	0.0032	Maximum detected concentration
Fluoranthene	19	16	0.0379 (U)	1.8	Normal	0.711	95% KM (t)
Fluorene	19	10	0.0159 (J)	0.37(U)	Normal	0.0683	95% KM (t)
Indeno(1,2,3-cd)pyrene	19	16	0.017 (J)	0.5	Normal	0.229	95% KM (t)
Isopropyltoluene[4-]	10	3	0.000914 (J+)	0.0094	n/a	0.0094	Maximum detected concentration
Methylene Chloride	10	1	0.00203 (J+)	0.00621 (U)	n/a	0.00203	Maximum detected concentration
Methylnaphthalene[2-]	19	4	0.0074 (J)	0.39 (U)	n/a	0.0619	Maximum detected concentration
Naphthalene	19	5	0.0356 (U)	0.37(U)	Gamma	0.0964	95% KM (t)
Phenanthrene	19	15	0.0379 (U)	1.2	Normal	0.527	95% KM (t)
Pyrene	19	16	0.0356 (U)	1.6	Normal	0.756	95% KM (t)
Toluene	10	2	0.000353 (J)	0.006 (U)	n/a	0.000578	Maximum detected concentration
Trichloroethene	10	1	0.000976 (U)	0.002	n/a	0.002	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	9	1	0.000336 (J)	0.00248 (U)	n/a	0.000336	Maximum detected concentration
Radionuclides (pCi/g)							
Cesium-137	9	2	0.00872 (U)	0.187	n/a	0.187	Maximum detected concentration
Plutonium-239/240	9	2	0.0147 (U)	0.458	n/a	0.458	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-12
EPCs for AOC 00-030(h) for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	18	0	0.112 (U)	1.13 (U)	n/a*	1.13(U)	Maximum detection limit
Barium	29	29	19 (J-)	442	Gamma	119.4	95% Approximate Gamma
Calcium	27	27	417 (J+)	6500	Gamma	2889	95% Approximate Gamma
Copper	27	27	1.3 (J)	59.9	Gamma	10.03	95% Approximate Gamma
Lead	27	27	3.91	94	lognormal	21.58	95% H-UCL
Mercury	29	27	0.0062 (J)	0.94	Nonparametric	0.215	95% KM (Chebyshev)
Nitrate	10	4	1.05 (U)	10.3	n/a	10.3	Maximum detected concentration
Perchlorate	10	1	0.000768 (J)	0.00254 (U)	n/a	0.000768	Maximum detected concentration
Selenium	27	0	0.53	1.9 (U)	n/a	1.9(U)	Maximum detection limit
Thallium	27	5	0.072 (U)	1.3 (U)	Normal	0.181	95% KM (t)
Uranium	9	9	3	3.5	Normal	3.36	95% Student's-t
Zinc	27	27	26	249	Nonparametric	95.53	95% Chebyshev (Mean, Sd)
Organic Chemicals (mg/kg)							
Acenaphthene	31	11	0.026 (J)	0.2	Normal	0.0787	95% KM (t)
Acetone	19	6	0.005 (U)	0.0649	Normal	0.0195	95% KM (t)
Anthracene	31	15	0.0179 (J+)	0.32	Normal	0.12	95% KM (t)
Aroclor-1260	10	1	0.0036 (U)	0.19 (U)	n/a	0.0065	Maximum detected concentration
Benzo(a)anthracene	31	15	0.0354 (J)	0.94	Normal	0.29	95% KM (t)
Benzo(a)pyrene	31	21	0.0228 (J)	1.1	Normal	0.362	95% KM (t)
Benzo(b)fluoranthene	31	21	0.0356 (U)	1.4	Normal	0.47	95% KM (t)
Benzo(g,h,i)perylene	31	22	0.0234 (J)	0.82	Gamma	0.244	95% KM (Percentile Bootstrap)
Benzo(k)fluoranthene	31	11	0.0143 (J)	0.95	Normal	0.217	95% KM (t)
Bis(2-ethylhexyl)phthalate	31	8	0.0806 (J)	83.7	Nonparametric	31.04	95% KM (Chebyshev)
Butylbenzylphthalate	31	2	0.101 (J)	24.1 (J)	n/a	24.1	Maximum detected concentration
Chlordane[alpha-]	27	2	0.000736 (U)	0.02 (U)	n/a	0.00249	Maximum detected concentration

Table I-2.2-12 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chlordane[gamma-]	27	2	0.000736 (U)	0.02 (U)	n/a	0.00251	Maximum detected concentration
Chloroform	19	1	0.000378 (J)	0.006 (U)	n/a	0.000378	Maximum detected concentration
Chrysene	31	18	0.0323 (J)	1.1	Gamma	0.412	95% KM (t)
Dichloroethene[cis-1,2-]	19	2	0.000976(U)	0.006(U)	n/a	0.002	Maximum detected concentration
DDD[4,4'-]	27	9	0.00023 (J)	0.02 (U)	Normal	0.00715	95% KM (t)
DDE[4,4'-]	27	18	0.0019 (U)	1.1	Lognormal	0.238	95% KM (t)
DDT[4,4'-]	27	18	0.0019 (UJ)	0.81	Gamma	0.122	95% KM (Chebyshev)
Di-n-butylphthalate	31	1	0.35 (U)	3.97	n/a	3.97	Maximum detected concentration
Di-n-octylphthalate	31	2	0.114 (J)	0.427 (U)	n/a	0.285	Maximum detected concentration
Dibenz(a,h)anthracene	31	10	0.0351 (J)	0.416(U)	Normal	0.0826	95% KM (t)
Dibenzofuran	31	5	0.037 (J)	0.425 (U)	n/a	0.0814	Maximum detected concentration
Dieldrin	27	3	0.00147 (U)	0.019 (U)	n/a	0.0032	Maximum detected concentration
Ethylbenzene	19	1	0.00976 (U)	0.006 (U)	n/a	0.002	Maximum detected concentration
Fluoranthene	31	22	0.0356 (U)	2.5	Gamma	0.982	95% KM (Chebyshev)
Fluorene	31	12	0.0159 (J)	0.41(U)	Normal	0.0715	95% KM (t)
Indeno(1,2,3-cd)pyrene	31	22	0.017 (J)	0.68	Gamma	0.223	95% KM (Percentile Bootstrap)
Isopropyltoluene[4-]	19	3	0.000914 (J+)	0.0094	n/a	0.0094	Maximum detected concentration
Methylene chloride	19	1	0.00203 (J+)	0.043 (U)	n/a	0.00203	Maximum detected concentration
Methylnaphthalene[2-]	31	5	0.0074 (J)	0.41 (U)	Normal	0.0343	95% KM (t)
Naphthalene	31	7	0.0356 (U)	0.361	Gamma	0.086	95% KM (t)
Phenanthrene	31	20	0.0296 (J)	1.7	Gamma	0.503	95% KM (t)
Pyrene	31	22	0.0356 (U)	2	Normal	0.667	95% KM (t)
Toluene	19	6	0.000353 (J)	0.009	Gamma	0.0021	95% KM (t)
Trichloroethene	19	6	0.000976 (U)	0.009	Normal	0.00454	95% KM (t)
Trichlorofluoromethane	19	1	0.000976 (U)	0.006 (U)	n/a	0.002	Maximum detected concentration

Table I-2.2-12 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Trimethylbenzene[1,2,4-]	19	1	0.000976 (U)	0.006 (U)	n/a	0.002	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	10	1	0.000336 (J)	0.00248 (U)	n/a	0.000336	Maximum detected concentration
Radionuclides (pCi/g)							
Cesium-137	19	2	0.00872 (U)	0.187	n/a	0.187	Maximum detected concentration
Plutonium-238	19	2	-0.0136 (U)	0.204	n/a	0.0204	Maximum detected concentration
Plutonium-239/240	19	12	-0.0147 (U)	2.51	Gamma	0.661	95% KM (Percentile Bootstrap)

* n/a = Not applicable.

Table I-2.2-13
EPCs for SWMU 31-001 for the Recreational Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Calcium	4	4	1130	107000	n/a*	107000	Maximum detected concentration
Copper	4	4	2.66	41	n/a	41	Maximum detected concentration
Lead	4	4	7.13	22.6	n/a	22.6	Maximum detected concentration
Nitrate	4	3	1.15 (J)	1.75	n/a	1.75	Maximum detected concentration
Perchlorate	4	3	0.000761 (J+)	0.00308 (U)	n/a	0.00165	Maximum detected concentration
Selenium	4	0	1.62 (U)	11.1 (U)	n/a	11.1(U)	Maximum detection limit
Zinc	4	4	16.8	99.5	n/a	99.5	Maximum detected concentration
Organic Chemicals (mg/kg)							
Aroclor-1254	3	1	0.0054 (U)	0.0501 (U)	n/a	0.0083	Maximum detected concentration
Aroclor-1260	3	2	0.00383 (U)	0.355	n/a	0.355	Maximum detected concentration
DDE[4,4'-]	4	3	0.00103 (J)	0.0121	n/a	0.0121	Maximum detected concentration
DDT[4,4'-]	4	2	0.000946 (J)	0.00836	n/a	0.00836	Maximum detected concentration
Dichlorobenzene[1,4-]	4	1	0.000438 (J)	0.00162 (U)	n/a	0.000438	Maximum detected concentration
Fluoranthene	4	1	0.0132 (J)	0.054 (U)	n/a	0.0132	Maximum detected concentration
Pyrene	4	1	0.0132 (J)	0.054 (U)	n/a	0.0132	Maximum detected concentration
Toluene	4	1	0.000877 (J)	0.00162 (U)	n/a	0.000877	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-14
EPCs for SWMU 31-001 for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Arsenic	13	13	1.33 (J)	5.04	Normal	3.7	95% Student's-t
Barium	10	10	18.5	159	Normal	87.9	95% Student's-t
Calcium	13	13	669 (J)	107000	Lognormal	51094	95% Chebyshev(Mean, Sd)
Chromium	13	13	2.49	10.8	Gamma	7.62	95% Approximate Gamma
Copper	13	13	1.75	41	Lognormal	11.93	95% H-UCL
Lead	13	0	4.79	22.6	Normal	12.73	95% Student's-t
Nitrate	13	7	0.835 (J)	1.75	Normal	1.2	95% KM (t)
Perchlorate	13	10	0.000667 (J+)	0.00756	Gamma	0.00269	95% KM (BCA)
Selenium	13	1	1.31 (J)	11.1 (U)	n/a*	1.31	Maximum detected concentration
Zinc	13	13	16.8	99.5	Gamma	48.05	95% Approximate Gamma
Organic Chemicals (mg/kg)							
Acetone	13	1	0.00513 (UJ)	0.0081 (U)	n/a	0.00594	Maximum detected concentration
Anthracene	13	2	0.00755 (J)	0.054 (U)	n/a	0.0142	Maximum detected concentration
Aroclor-1254	9	1	0.00349 (U)	0.0501 (U)	n/a	0.0083	Maximum detected concentration
Aroclor-1260	9	5	0.00349 (U)	0.355	Gamma	0.135	95% KM (BCA)
Bis(2-ethylhexyl)phthalate	13	1	0.174 (U)	0.291	n/a	0.291	Maximum detected concentration
Chrysene	13	1	0.0348 (U)	0.0849	n/a	0.0849	Maximum detected concentration
DDE[4,4'-]	13	5	0.00103 (J)	0.0309	Normal	0.00906	95% KM (t)
DDT[4,4'-]	13	4	0.000946 (J)	0.0278 (J)	n/a	0.0278	Maximum detected concentration
Di-n-butylphthalate	13	1	0.0772 (J)	0.54 (U)	n/a	0.0772	Maximum detected concentration
Dichlorobenzene[1,4-]	13	2	0.000288 (J)	0.00162 (U)	n/a	0.000438	Maximum detected concentration
Dieldrin	13	1	0.000797 (J)	0.00688 (U)	n/a	0.000797	Maximum detected concentration
Fluoranthene	13	3	0.0128 (J)	0.104	n/a	0.104	Maximum detected concentration
Phenanthrene	13	1	0.0348 (U)	0.054 (U)	n/a	0.0409	Maximum detected concentration

Table I-2.2-14 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Pyrene	13	3	0.013 (J)	0.168	n/a	0.168	Maximum detected concentration
Tetrachloroethene	13	1	0.000694 (J)	0.00162 (U)	n/a	0.000694	Maximum detected concentration
Toluene	13	6	0.000366 (J)	0.00162 (U)	Normal	0.000883	95% KM (t)
Radionuclide (pCi/g)							
Cesium-137	13	3	0.00302 (U)	0.609	n/a	0.609	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-15
EPCs for SWMU 31-001 for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Arsenic	15	15	1.33 (J)	5.04	Normal	3.606	95% Student's-t
Barium	12	12	12.3	159	Normal	81.15	95% Student's-t
Calcium	15	15	232	107000	Lognormal	32500	95% Chebyshev (MVUE)
Chromium	15	15	0.97	10.8	Gamma	7.057	95% approximate gamma
Copper	15	15	1.33	41	Gamma	10.39	95% Approximate Gamma
Lead	15	15	2.73	24.9	Normal	13.61	95% Student's-t
Nitrate	15	9	0.83 (J)	1.75	Normal	1.175	95% KM (t)
Perchlorate	15	12	0.000667 (J+)	0.00756	Gamma	0.00253	95% KM (BCA)
Selenium	15	1	1.31 (J)	11.1 (U)	n/a*	1.31	Maximum detected concentration
Zinc	15	15	16.8	99.5	Gamma	45.3	95% Approximate Gamma
Organic Chemicals (mg/kg)							
Acetone	15	1	0.00513 (UJ)	0.0081 (U)	n/a	0.00594	Maximum detected concentration
Anthracene	15	2	0.00755 (J)	0.054 (U)	n/a	0.0142	Maximum detected concentration
Aroclor-1254	9	1	0.00349 (U)	0.0501 (U)	n/a	0.0083	Maximum detected concentration
Aroclor-1260	9	5	0.00349 (U)	0.355	Gamma	0.355	95% KM (BCA)
Bis(2-ethylhexyl)phthalate	15	2	0.169 (U)	0.291	n/a	0.291	Maximum detected concentration
Chrysene	15	1	0.0337 (U)	0.0849	n/a	0.0849	Maximum detected concentration
DDE[4,4'-]	15	5	0.00103 (J)	0.0309	Normal	0.0309	95% KM (t)
DDT[4,4'-]	15	4	0.000946 (J)	0.0278 (J)	n/a	0.0278	Maximum detected concentration
Di-n-butylphthalate	15	2	0.0772 (J)	0.54 (U)	n/a	0.0782	Maximum detected concentration
Dichlorobenzene[1,4-]	15	2	0.000288 (J)	0.00162 (U)	n/a	0.000438	Maximum detected concentration
Dieldrin	15	1	0.000797 (J)	0.00688 (U)	n/a	0.000797	Maximum detected concentration
Fluoranthene	15	4	0.0128 (J)	0.104	n/a	0.00594	Maximum detected concentration
Phenanthrene	15	1	0.0337 (U)	0.054 (U)	n/a	0.104	Maximum detected concentration

Table I-2.2-15 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Pyrene	15	4	0.013 (J)	0.168	n/a	0.0409	Maximum detected concentration
Tetrachloroethene	15	1	0.000694 (J)	0.00162 (U)	n/a	0.168	Maximum detected concentration
Toluene	15	6	0.000366 (J)	0.00162 (U)	n/a	0.000694	Maximum detected concentration
Radionuclide (pCi/g)							
Cesium-137	15	3	0.00302 (U)	0.609	n/a	0.609	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-16
EPCs for Consolidated Unit 45-001-00 for the Recreational Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	12	0	0.408 (UJ)	1.36 (UJ)	n/a*	1.36(UJ)	Maximum detection limit
Cadmium	12	7	0.14 (J)	0.678 (U)	Normal	0.211	95% KM (t)
Lead	12	12	3.7	25.7	Normal	14.82	95% Student's t
Mercury	12	9	0.0028 (J)	1.43	Lognormal	1.33	99% KM (Chebyshev)
Nitrate	11	9	1.06 (U)	4.94	Normal	3.261	95% KM (t)
Perchlorate	11	5	0.000695 (J-)	0.00403 (J-)	Nonparametric	0.0017	95% KM (t)
Selenium	12	0	1.16 (U)	1.86 (U)	n/a	1.86(U)	Maximum detection limit
Silver	12	9	0.045 (J)	2.26	Gamma	1.397	95% KM (Chebyshev)
Zinc	12	12	16.2	62.4	Normal	46.65	95% Student's-t
Organic Chemicals (mg/kg)							
Acenaphthene	10	1	0.0177 (U)	0.147 (U)	n/a	0.136	Maximum detected concentration
Anthracene	10	3	0.00874 (J)	0.147 (U)	n/a	0.132	Maximum detected concentration
Aroclor-1242	11	1	0.00376 (U)	0.0759 (U)	n/a	0.0166	Maximum detected concentration
Aroclor-1254	11	6	0.00376 (U)	0.0759 (U)	Normal	0.0265	95% KM (t)
Aroclor-1260	11	7	0.0033 (J)	0.16 (J-)	Nonparametric	0.083	95% KM (Chebyshev)
Benzo(a)pyrene	10	1	0.0372 (U)	0.147 (U)	n/a	0.132	Maximum detected concentration
Benzo(b)fluoranthene	10	2	0.0376 (U)	0.147 (U)	n/a	0.13	Maximum detected concentration
Benzo(k)fluoranthene	10	1	0.0372 (U)	0.173 (J)	n/a	0.173	Maximum detected concentration
Benzoic Acid	9	1	0.744 (U)	4.88 (J)	n/a	4.88	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	9	1	0.12 (J)	1.9 (U)	n/a	0.12	Maximum detected concentration
Chloroform	9	1	0.000574 (J)	0.00119 (U)	n/a	0.0006	Maximum detected concentration
Chrysene	10	2	0.0376 (U)	0.173 (J)	n/a	0.173	Maximum detected concentration
DDE[4,4'-]	9	1	0.000653 (J)	0.0736 (U)	n/a	0.0007	Maximum detected concentration
DDT[4,4'-]	9	1	0.00151 (UJ)	0.0736 (U)	n/a	0.0077	Maximum detected concentration
Diethylphthalate	9	1	0.372 (U)	1.47 (U)	n/a	1.23	Maximum detected concentration

Table I-2.2-16 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Dinitro-2-methylphenol[4,6-]	9	1	0.372 (U)	3.79	n/a	3.79	Maximum detected concentration
Fluoranthene	10	7	0.0157 (J)	0.204	Normal	0.11	95% KM (t)
Fluorene	10	1	0.0152 (J)	0.379 (UJ)	n/a	0.0152	Maximum detected concentration
Methylnaphthalene[2-]	9	1	0.0372 (U)	0.147 (U)	n/a	0.116	Maximum detected concentration
Naphthalene	10	1	0.0177 (U)	0.379 (U)	n/a	0.0218	Maximum detected concentration
Phenanthrene	10	6	0.00746 (U)	0.149 (J)	Normal	0.0738	95% KM (t)
Pyrene	10	8	0.0139 (J)	0.277 (J)	Normal	0.132	95% KM (t)
Toluene	9	3	0.00088 (U)	0.0024	n/a	0.0024	Maximum detected concentration
Trimethylbenzene[1,2,4-]	9	1	0.000235 (J)	0.00132 (U)	n/a	0.0002	Maximum detected concentration
Radionuclide (pCi/g)							
Tritium	1	1	0.126	0.126	n/a	0.126	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-17
EPCs for Consolidated Unit 45-001-00 for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	36	0	0.401 (UJ)	1.36 (UJ)	n/a*	1.36(UJ)	Maximum detection limit
Cadmium	36	26	0.103 (J)	0.678 (U)	Gamma	0.201	95% KM (Percentile Bootstrap)
Chromium	36	36	1.73 (J)	18.4	Gamma	8.125	95% Approximate Gamma
Copper	36	31	1.14	22.1	Gamma	7.112	95% KM (BCA)
Lead	36	36	3.42	38.9	Gamma	16.12	95% Approximate Gamma
Mercury	36	33	0.0028 (J)	1.57	Lognormal	0.782	99% KM (Chebyshev)
Nitrate	32	23	0.917 (J)	4.94	Gamma	2.161	95% KM (Percentile Bootstrap)
Perchlorate	32	18	0.00059 (J)	0.00948 (J-)	Nonparametric	0.00241	95% KM (t)
Selenium	36	2	0.684 (J)	1.96 (U)	n/a	0.691	Maximum detected concentration
Silver	36	29	0.045 (J)	10	Nonparametric	5.181	99% KM (Chebyshev)
Zinc	36	36	16.2	88.3	Gamma	45.84	95% Approximate Gamma
Organic Chemicals (mg/kg)							
Acenaphthene	29	4	0.0174 (U)	0.381 (U)	n/a	0.136	Maximum detected concentration
Acetone	25	3	0.00427 (U)	0.0257	n/a	0.0257	Maximum detected concentration
Anthracene	29	7	0.00807 (U)	0.381 (U)	Normal	0.0329	95% KM (t)
Aroclor-1242	32	2	0.00353 (U)	0.0761 (U)	n/a	0.0207	Maximum detected concentration
Aroclor-1254	32	13	0.0021 (J)	0.0761 (U)	Gamma	0.0141	95% KM (t)
Aroclor-1260	32	16	0.002 (J)	0.16 (J-)	Nonparametric	0.0205	95% KM (BCA)
Benzo(a)anthracene	29	3	0.00461 (U)	0.381 (U)	n/a	0.123	Maximum detected concentration
Benzo(a)pyrene	29	3	0.00312 (U)	0.381 (U)	n/a	0.17	Maximum detected concentration
Benzo(b)fluoranthene	29	6	0.0178 (U)	0.381 (U)	Normal	0.0935	95% KM (t)
Benzo(k)fluoranthene	29	1	0.00239 (U)	0.381 (U)	n/a	0.173	Maximum detected concentration
Benzoic acid	26	2	0.203 (J)	7.61 (U)	n/a	4.88	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	26	2	0.0935 (J)	1.9 (U)	n/a	0.12	Maximum detected concentration
Chloroform	25	3	0.000446 (J)	0.00125 (U)	n/a	0.000909	Maximum detected concentration

Table I-2.2-17 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Chrysene	29	8	0.0141 (U)	0.381 (U)	Normal	0.0554	95% KM (t)
DDE[4,4'-]	26	4	0.000653 (J)	0.0745 (U)	n/a	0.0198	Maximum detected concentration
DDT[4,4'-]	26	4	0.000393 (J)	0.0745 (U)	n/a	0.0278	Maximum detected concentration
Dichloroethene[1,1-]	25	1	0.000854 (U)	0.00132 (U)	n/a	0.00109	Maximum detected concentration
Dieldrin	26	1	0.00149 (U)	0.0758 (U)	n/a	0.0118	Maximum detected concentration
Diethylphthalate	26	2	0.352 (U)	1.47 (U)	n/a	1.23	Maximum detected concentration
Dinitro-2-methylphenol[4,6-]	26	1	0.352 (U)	3.81 (U)	n/a	3.79	Maximum detected concentration
Ethylbenzene	25	1	0.000221 (J)	0.00132 (U)	n/a	0.000221	Maximum detected concentration
Fluoranthene	29	17	0.0124 (U)	0.381 (U)	Gamma	0.0935	95% KM (t)
Fluorene	29	4	0.0152 (J)	0.381 (UJ)	n/a	0.0603	Maximum detected concentration
Isopropyltoluene[4-]	25	2	0.000419 (J)	0.00132 (U)	n/a	0.000897	Maximum detected concentration
Methylnaphthalene[2-]	26	4	0.00843 (J)	0.381 (U)	n/a	0.116	Maximum detected concentration
Naphthalene	29	4	0.0172 (U)	0.381 (U)	n/a	0.123	Maximum detected concentration
Phenanthrene	29	14	0.00404 (U)	0.381 (U)	Gamma	0.0834	95% KM (t)
Pyrene	29	20	0.0132	0.381 (U)	Gamma	0.102	95% KM (Percentile Bootstrap)
Toluene	25	7	0.000532 (J)	0.00371	Normal	0.00126	95% KM (t)
Trimethylbenzene[1,2,4-]	25	1	0.000235 (J)	0.00132 (U)	n/a	0.000235	Maximum detected concentration
Xylene[1,2-]	25	1	0.000213 (J)	0.00132 (U)	n/a	0.000213	Maximum detected concentration
Xylene[1,3-]+xylene[1,4-]	25	2	0.000357(J)	0.00132(U)	n/a	0.000655	Maximum detected concentration
Radionuclides (pCi/g)							
Cesium-137	18	5	0.00536 (U)	0.365	Normal	0.179	95% KM (t) UCL
Tritium	3	1	0.00783 (U)	0.126	n/a	0.126	Maximum detected concentration

* n/a = Not applicable.

Table I-2.2-18
EPCs for Consolidated Unit 45-001-00 for the Residential Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	39	0	0.401 (UJ)	1.41 (UJ)	n/a*	1.41(UJ)	Maximum detection limit
Cadmium	39	27	0.103 (J)	0.707 (U)	Gamma	0.199	95% KM (Percentile Bootstrap)
Chromium	39	39	1.37	38.6 (J)	Gamma	9.074	95% Approximate Gamma
Copper	39	33	1.14	22.1	Gamma	6.774	95% KM (BCA)
Lead	39	39	3.42	38.9	Gamma	15.36	95% Approximate Gamma
Mercury	39	33	0.0028 (J)	1.57	Lognormal	0.404	95% KM (Chebyshev)
Nitrate	33	23	0.917 (J)	4.94	Gamma	2.122	95% KM (Percentile Bootstrap)
Perchlorate	33	19	0.00059 (J)	0.00948 (J-)	Nonparametric	0.0024	95% KM (t)
Selenium	39	2	0.684 (J)	1.96 (U)	n/a	0.691	Maximum detected concentration
Silver	39	30	0.045 (J)	10	Nonparametric	2.69	95% KM (Chebyshev)
Zinc	39	39	16.2	88.3	Gamma	46.44	95% Approximate Gamma
Organic Chemicals (mg/kg)							
Acenaphthene	30	4	0.0174 (U)	0.381 (U)	n/a	0.136	Maximum detected concentration
Acetone	25	3	0.00427 (U)	0.0257	n/a	0.0257	Maximum detected concentration
Anthracene	30	7	0.00807 (U)	0.381 (U)	Normal	0.0318	95% KM (t)
Aroclor-1242	33	2	0.00353 (U)	0.0761 (U)	n/a	0.0207	Maximum detected concentration
Aroclor-1254	33	13	0.0021 (J)	0.0761 (U)	Gamma	0.0137	95% KM (t)
Aroclor-1260	33	16	0.002 (J)	0.16 (J-)	Nonparametric	0.0193	95% KM (BCA)
Benzo(a)anthracene	30	3	0.00178 (U)	0.381 (U)	n/a	0.123	Maximum detected concentration
Benzo(a)pyrene	30	3	0.00178 (U)	0.381 (U)	n/a	0.17	Maximum detected concentration
Benzo(b)fluoranthene	30	6	0.00178 (U)	0.381 (U)	Normal	0.0921	95% KM (t)
Benzo(k)fluoranthene	30	1	0.000892 (U)	0.381 (U)	n/a	0.173	Maximum detected concentration
Benzoic acid	26	2	0.203 (J)	7.61 (U)	n/a	4.88	Maximum detected concentration

Table I-2.2-18 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Organic Chemicals (mg/kg) (continued)							
Bis(2-ethylhexyl)phthalate	26	2	0.0935 (J)	1.9 (U)	n/a	0.12	Maximum detected concentration
Chloroform	25	3	0.000446 (J)	0.00125 (U)	n/a	0.0009	Maximum detected concentration
Chrysene	30	8	0.00178 (U)	0.381 (U)	Normal	0.0541	95% KM (t)
DDE[4,4'-]	26	4	0.000653 (J)	0.0745 (U)	n/a	0.0198	Maximum detected concentration
DDT[4,4'-]	26	4	0.000393 (J)	0.0745 (U)	n/a	0.0278	Maximum detected concentration
Dichloroethene[1,1-]	25	1	0.000854 (U)	0.00132 (U)	n/a	0.0011	Maximum detected concentration
Dieldrin	26	1	0.00149 (U)	0.0758 (U)	n/a	0.0118	Maximum detected concentration
Diethylphthalate	26	2	0.352 (U)	1.47 (U)	n/a	1.23	Maximum detected concentration
Dinitro-2-methylphenol[4,6-]	26	1	0.352 (U)	3.81 (U)	n/a	3.79	Maximum detected concentration
Ethylbenzene	25	1	0.000221 (J)	0.00132 (U)	n/a	0.0002	Maximum detected concentration
Fluoranthene	30	17	0.00178 (U)	0.381 (U)	Gamma	0.0906	95% KM (t)
Fluorene	30	4	0.0152 (J)	0.381 (UJ)	n/a	0.0603	Maximum detected concentration
Isopropyltoluene[4-]	25	2	0.000419 (J)	0.00132 (U)	n/a	0.0009	Maximum detected concentration
Methylnaphthalene[2-]	26	4	0.00843 (J)	0.381 (U)	n/a	0.116	Maximum detected concentration
Naphthalene	30	4	0.0172 (U)	0.381 (U)	n/a	0.123	Maximum detected concentration
Phenanthrene	30	14	0.00404 (U)	0.381 (U)	Gamma	0.081	95% KM (t)
Pyrene	30	20	0.00178 (U)	0.381 (U)	Gamma	0.102	95% KM (Percentile Bootstrap)
Toluene	25	7	0.000532 (J)	0.0037	Normal	0.0013	95% KM (t)
Trimethylbenzene[1,2,4-]	25	1	0.000235 (J)	0.00132 (U)	n/a	0.0002	Maximum detected concentration
Xylene[1,2-]	25	1	0.000213 (J)	0.00132 (U)	n/a	0.0002	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	25	3	0.000301 (J)	0.00264 (U)	n/a	0.0007	Maximum detected concentration
Radionuclides (pCi/g)							
Cesium-137	19	5	0.0157 (U)	0.365	Normal	0.177	95% KM (t)
Tritium	3	1	0.007830 (U)	0.126	n/a	0.126	Maximum detected concentration

* n/a = Not applicable.

Table I-3.2-1
Physical and Chemical Properties of Inorganic COPCs

COPC	Kd[a] (cm^3/g)	Water Solubility[a,b] (g/L)
Aluminum	1500	Insoluble
Antimony	45	Insoluble
Arsenic	29	Insoluble
Barium	41	Insoluble
Beryllium	790	Insoluble
Cadmium	75	Insoluble
Calcium	na[c]	na
Chromium	850[d]	Insoluble
Cobalt	45	Insoluble
Copper	35	Insoluble
Cyanide (total)	9.9	na
Iron	25	Insoluble
Lead	900	Insoluble
Manganese	65	Insoluble
Mercury	52	Insoluble
Nickel	65[e]	Insoluble
Selenium	5	Insoluble
Silver	8.3	Insoluble
Thallium	71[f]	Insoluble
Uranium	450[g]	Insoluble
Zinc	62	Insoluble

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=nrad.

[b] Denotes reference information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] na = Not available.

[d] As chromium salts

[e] As nickel salts.

[f] As thallium salts.

[g] As uranium salts.

Table I-3.2-2
Physical and Chemical Properties of Organic COPCs

COPC	Organic Carbon Coefficient K_{oc}[a] (L/kg)	Log Octanol-Water Partition Coefficient K_{ow}[a]	Water Solubility[a] (mg/L)	Vapor Pressure[a] (mm Hg at 25°C)
Acenaphthene	6.12E+03	3.92E+00[b]	3.6E+00[b]	2.5E-03[b]
Acetone	1.98E+00	-2.40E-01[b]	1.00E+06[b]	2.31E+02[b]
Anthracene	2.04E+04	4.45E+00[b]	4.34E-02[b]	2.67E-06[b]
Aroclor-1242	4.48E+04	6.29E+00	2.77E-01	8.63E-05
Aroclor-1254	5.30E+05[c]	6.79E+00[b]	3.40E-03[b]	6.53E-06[b]
Aroclor-1260	5.30E+05[c]	8.27E+00[b]	2.84E-04[b]	4.05E-05[b]
Benzo(a)anthracene	2.31E+05	5.76E+00[b]	9.40E-03[b]	1.90E-06[b]
Benzo(a)pyrene	7.87E+05	6.13E+00[b]	1.62E-03[b]	5.49E-09[b]
Benzo(b)fluoranthene	8.03E+05	5.78E+00[b]	1.50E-03[b]	5.00E-07[b]
Benzo(g,h,i)perylene	2.68E+06	6.63E+00[b]	2.60E-04[b]	1.00E-10[b]
Benzo(k)fluoranthene	7.87E+05	6.11E+00[b]	8.00E-04[b]	9.65E-10[b]
Benzoic acid	1.45E+01	1.87E+00[b]	3.40E+03[b]	7.00E-04[b]
BHC(alpha-)	3.38E+03	4.14E+00	8.0E+00	3.52E-05
Bis(2-ethylhexyl)phthalate	1.65E+05	7.60E+00[b]	2.70E-01[b]	1.42E-07[b]
Butanone[2-]	3.83E+00	2.90E-01	2.23E+05	9.06E+01
Butylbenzylphthalate	9.36E+03	4.73E+00	2.69E+00	8.25E-06
Chlordane[alpha-]	6.75E+04	6.10 E+00	5.60E-02	9.98E-06
Chlordane[gamma-]	6.75E+04	6.22 E+00	5.60E-02	9.98E-06
Chloroaniline[4-]	7.25E+01	1.83E+00	3.9E+03	2.7E-02
Chloroform	3.5E+01	1.97E+00	7.95E+03	1.97E+02
Chrysene	2.36E+05	5.81E+00[b]	6.30E-03[b]	6.23E-09[b]
Dibenz(a,h)anthracene	2.62E+06	6.54E+00	1.03E-03	1.39E-11
Dibenzofuran	1.13E+04	4.12E+00	3.1E+00	2.48E-03
Dichlorobenzene[1,4-]	4.34E+01	3.44E+00[b]	8.13E+01[b]	1.74E+00[b]
Dichloroethene[1,1-]	3.5E+01	2.13E+00	2.42E+03	6.34E+02
Dichloroethene[cis-1,2-]	3.96E+01	1.86E+00	6.41E+03	2.01E+02
DDD[4,4'-]	1.53E+05	6.02E+00	9.0E-02	1.35E-06
DDE[4,4'-]	1.53E+05	6.51E+00	4.0E-02	6.0E-06
DDT[4,4'-]	2.2E+05	6.91E+00	5.5E-03	1.6E-07
Dieldrin	1.06E+04	5.2E+00	2.5E-01	3.0E-06
Di-n-butylphthalate	1.46E+03	4.50E+00	1.12E+01	2.01E-05
Dinitro-2-methylphenol[4,6-]	7.54E+02	2.13 E+00	1.98E+02	1.20E-04
Di-n-octylphthalate	1.96E+05	8.1E+00	2.0E-02	1.0E-07
Endosulfan sulfate	9.85E+03	3.66 E+00	4.8E-01	2.7E-07
Endrin aldehyde	3.27E+03	4.8 E+00	2.4E-02	2.0E-07
Endrin	9.72E+03	4.99 E+00	7.55E-02	5.51E-06

Table I-3.2-2 (continued)

COPC	Organic Carbon Coefficient K_{oc}[a] (L/kg)	Log Octanol-Water Partition Coefficient K_{ow}[a]	Water Solubility[a] (mg/L)	Vapor Pressure[a] (mm Hg at 25°C)
Ethylbenzene	5.18E+02	3.15E+00	1.69E+02	9.6E+00
Fluoranthene	7.09E+04[c]	5.16E+00[c]	2.60E-01[c]	9.22E-06[c]
Fluorene	1.13E+04	4.18E+00[b]	1.89E+00[b]	8.42E-03[b]
Heptachlor epoxide	5.26E+03	4.98E+00	2.0E-01	1.95E-05
Indeno(1,2,3-cd)pyrene	2.68E+06	6.70E+00[b]	1.90E-04[b]	1.25E-10[b]
Isopropylbenzene	8.17E+02	3.66E+00	6.13E+01	4.5E+00
Isopropyltoluene[4-]	na[d]	4.10E+00[b]	2.34E+01[b]	1.64E+00[b]
Methoxychlor[4,4'-]	2.69E+04	5.08E+00	1.00E-01	4.17E-05
Methyl-2-pentanone[4-]	1.09E+01	1.31E+00[b]	1.90E+04[b]	1.99E+01[b]
Methylene chloride	2.37E+01	1.30E+00[b]	1.30E+04[b]	4.30E+02[b]
Methylnaphthalene[2-]	2.98E+03	3.86E+00	2.46E+01	5.5E-02
Naphthalene	1.84E+03	3.3E+00	3.1E+01	8.5E-02
Phenanthrene	2.08E+04	4.46E+00[b]	1.15E+00[b]	1.12E-04[b]
Pyrene	6.94E+04	4.88E+00[b]	1.35E-01[b]	4.50E-06[b]
Styrene	5.18E+02	2.95E+00	3.1E+02	6.4E+00
Tetrachloroethene	1.07E+02	3.4E+00	2.06E+02	1.85E+01
Toluene	2.68E+02	2.73E+00	5.26E+02	2.84E+01
Trichloroethene	6.07E+01	2.42E+00	1.28E+03	6.9E+01
Trichlorofluoromethane	4.39E+01	2.53E+00	1.1E+03	8.03E+02
Trimethylbenzene[1,2,4-]	7.18E+02	3.63E+00	5.7E+01	2.1E+00
Xylene [1,2-]	4.34E+02	3.2E+00	1.61E+02	8.29E+00
Xylene [1,3-] + Xylene [1,4-]	4.43E+02	3.12E+00	1.06E+02	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)
Americium-241	680	Insoluble
Cesium-137	1000	Insoluble
Plutonium-238	4500	Insoluble
Plutonium-239	4500	Insoluble
Tritium	9.9	Soluble

[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 Recreational and Residential Scenarios

Parameter	Recreational Value	Residential Value
Target HQ	1	1
Target cancer risk	10^{-5}	10^{-5}
Averaging time (carcinogen)	70 yr × 365 d	70 yr × 365 d
Averaging time (noncarcinogen)	ED × 365 d	ED × 365 d
Skin absorption factor	SVOC = 0.1	SVOC = 0.1
	Chemical-specific	Chemical-specific
Adherence factor–child	0.2 mg/cm^2	0.2 mg/cm^2
Body weight–child	31 kg (6–11 yr of age)	15 kg (0–6 yr of age)
Cancer slope factor–oral (chemical-specific)	(mg/kg-d)$^{-1}$	(mg/kg-d)$^{-1}$
Cancer slope factor–inhalation (chemical-specific)	(mg/kg-d)$^{-1}$	(mg/kg-d)$^{-1}$
Exposure frequency	200 events/yr	350 d/yr
Exposure time	0.33 h/d	24 h/d
Exposure duration–child	6 yr	6 yr
Age-adjusted ingestion factor	22.6 mg/kg-d	114 mg-yr/kg-d
Age-adjusted inhalation factor	0.8 m^3-yr/kg-d	11 m^3-yr/kg-d
Inhalation rate–child	1.2 m^3/h	10 m^3/d
Soil ingestion rate–child	71.4 mg/d	200 mg/d
Particulate emission factor	6.61 × 10^9 m^3/kg	6.61 × 10^9 m^3/kg
Reference dose–oral (chemical-specific)	(mg/kg-d)	(mg/kg-d)
Reference dose–inhalation (chemical-specific)	(mg/kg-d)	(mg/kg-d)
Exposed surface area–child	3525 cm^2/d	2800 cm^2/d
Age-adjusted skin contact factor for carcinogens	273.3 mg-yr/kg-d	361 mg-yr/kg-d
Volatilization factor for soil (chemical-specific)	(m^3/kg)	(m^3/kg)
Body weight–adult	70 kg	70 kg
Exposure duration*	30 yr	30 yr
Adherence factor–adult	0.07 mg/cm^2	0.07 mg/cm^2
Soil ingestion rate–adult	25.6 mg/d	100 mg/d
Exposed surface area–adult	5700 cm^2/d	5700 cm^2/d
Inhalation rate–adult	1.6 m^3/h	20 m^3/d

Note: Parameter values from NMED (2009, 108070).

* 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 Used 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
Parameters Used in the SAL Calculations for Radionuclides, Recreational

Parameters	Recreational, Child	Recreational, Adult
Inhalation rate (m^3/yr)	10,526[a]	14,035[b]
Mass loading (g/m^3)	1.5×10^{-7} [c]	1.5×10^{-7} [c]
Outdoor time fraction	0.0228[d]	0.0228[d]
Indoor time fraction	0	0
Soil ingestion (g/yr)	626[e]	225[f]

[a] Calculated as [1.2 m^3/h × 200 h/yr] / [indoor + outdoor time fractions], where 1.2 m^3/h is the child inhalation rate for moderate activity (EPA 1997, 066596, Table 5-23).

[b] Calculated as [1.60 m^3/h × 200 h/yr] / [indoor + outdoor time fractions], where 1.6 m^3/d is the adult inhalation rate for moderate activity (EPA 1997, 066596, Table 5-23).

[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 h/d × 200 d/yr] / 8766 h/yr, where 1 h/d is an estimate of the exposure time for a recreational adult or child (LANL 2007, 094496).

[e] Calculated as [(0.4 g/d × 5.6 h/d) × 200 h/yr] / [indoor + outdoor time fractions], where 5.6 h/d is the time spent out doors for a child (EPA 1997, 066598, Section 15.4.1), and where 0.4 g/d is the upper bound child soil-ingestion rate (EPA 1997, 066598, Table 4-23).

[f] Calculated as [(0.1 g/d × 3.9 h/d) × 200 h/yr] / [indoor + outdoor time fractions], where 3.9 h/d is the time-weighted average for "doers" ages 12–44 (EPA 1997, 066598, Table 15-10), and where 0.1 g/d is the adult soil-ingestion rate (NMED 2009, 108070).

Table I-4.2-1
Recreational Carcinogenic Screening Evaluation for SWMU 00-018(a)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	Cancer Risk
Aroclor-1242	0.0139	10.5	1E-08
Aroclor-1260	0.0777	10.5	7E-08
Benzo(a)pyrene	0.13	3.01	4E-07
Benzo(b)fluoranthene	0.115	30.1	4E-08
Benzo(k)fluoranthene	0.014	301	5E-10
Bis(2-ethylhexyl)phthalate	0.174	1830	1E-09
Chlordane[alpha-]	0.00616	109[b]	6E-10
Chlordane[gamma-]	0.00424	109[b]	4E-10
Chloroaniline[4-]	2	128[c]	2E-07
Chloroform	0.000231	224	1E-11
Chrysene	0.0879	3010	3E-10
DDD[4,4'-]	0.00922	107	9E-10
DDE[4,4'-]	0.0075	75.3	1E-09
DDT[4,4'-]	0.00599	122	5E-10
Dichloroethene[1,1-]	0.00112	2240	5E-12
Dieldrin	0.0245	1.6	2E-07
Ethylbenzene	0.00106	2060	5E-12
Heptachlor epoxide	0.00171	2.81	6E-09
Indeno(1,2,3-cd)pyrene	0.098	30.1	3E-08
Methylene chloride	0.00415	4520	9E-12
Tetrachloroethene	0.000385	91.7	4E-11
		Total Excess Cancer Risk	**1E-06**

[a] SSLs from LANL (2010, 108613).

[b] Chlordane SSL used as surrogate based on structural similarity.

[c] Calculated using toxicity values from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and parameters and equation from LANL (2010, 108613).

Table I-4.2-2
Recreational Noncarcinogenic Screening Evaluation for SWMU 00-018(a)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	HQ
Acetone	0.0618	702000	9E-08
Anthracene	0.0122	104000	1E-07
Antimony	0.124	317	4E-04
Aroclor-1254	0.0939	6.65	1E-02
Benzo(g,h,i)perylene	0.0401	10400[b]	4E-06
Benzoic acid	0.45	1590000	3E-07
Cadmium	0.972	784	1E-03
Chromium	11.61	1910[c]	6E-03
Copper	61.08	31700	2E-03
Cyanide (total)	0.955	15800	6E-05
Endosulfan sulfate	0.00712	120[d]	6E-05
Endrin aldehyde	0.0078	120[d]	7E-05
Fluoranthene	0.0635	13900	5E-06
Isopropyltoluene[4-]	0.000729	52700[e]	1E-08
Lead	89.96	560	2E-01
Mercury	0.898	238	4E-03
Nitrate	37.53	1260000	3E-05
Perchlorate	0.000827	555	1E-06
Phenanthrene	0.0297	12000	2E-06
Pyrene	0.0808	10400	8E-06
Selenium	4.257	3960	1E-03
Silver	3.089	3960	8E-04
Styrene	0.000484	126000	4E-09
Toluene	0.00304	60800	5E-08
Xylene[1,2-]	0.00121	248000	5E-09
Xylene[1,3-]+Xylene[1,4-]	0.00286	27800	1E-07
Zinc	119.2	238000	5E-04
		HI	**0.2**

[a] SSLs from LANL (2010, 108613).

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] Chromium(VI) SSL used.

[d] Endrin SSL used as surrogate based on structural similarity.

[e] Isopropylbenzene SSL used as surrogate based on structural similarity.

Table I-4.2-3
Recreational Radionuclide Screening Evaluation for SWMU 00-018(a)

COPC	EPC (pCi/g)	Recreational SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.172	210	0.01
		Total Dose	**0.01**

*SALs from LANL (2009, 107655).

Table I-4.2-4
Residential Carcinogenic Screening Evaluation for SWMU 00-018(a)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	Cancer Risk
Aroclor-1242	0.0316	2.22	1E-07
Aroclor-1260	0.0351	2.22	2E-07
Benzo(a)pyrene	0.13	0.621	2E-06
Benzo(b)fluoranthene	0.0526	6.21	8E-08
Benzo(k)fluoranthene	0.014	62.1	2E-09
Bis(2-ethylhexyl)phthalate	0.122	347	4E-09
Butylbenzylphthalate	0.123	2600[b]	5E-10
Chlordane[alpha-]	0.00318	16.2[c]	2E-09
Chlordane[gamma-]	0.0024	16.2[c]	1E-09
Chloroaniline[4-]	2	24[b]	8E-07
Chloroform	0.000231	5.72	4E-10
Chrysene	0.0442	621	7E-10
DDD[4,4'-]	0.00922	20.3	5E-09
DDE[4,4'-]	0.00203	14.3	1E-09
DDT[4,4'-]	0.00253	17.2	1E-09
Dichlorobenzene[1,4-]	0.000266	32.2	8E-11
Dieldrin	0.00279	0.34	8E-08
Ethylbenzene	0.000428	69.7	6E-11
Heptachlor epoxide	0.00197	0.53[b]	4E-08
Indeno(1,2,3-cd)pyrene	0.098	6.21	2E-07
Methylene chloride	0.00399	199	2E-10
Tetrachloroethene	0.000385	6.99	6E-10
		Total Excess Cancer Risk	**4E-06**

[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] Chlordane SSL used as surrogate based on structural similarity.

Table I-4.2-5
Residential Noncarcinogenic
Screening Evaluation for SWMU 00-018(a)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acetone	0.027	67500	4E-07
Anthracene	0.0131	17200	8E-07
Antimony	0.178	31.3	6E-03
Aroclor-1254	0.0377	1.12	3E-02
Barium	86.28	15600	6E-03
Benzo(g,h,i)perylene	0.0401	1720[b]	2E-05
Benzoic acid	0.459	245000[c]	2E-06
Cadmium	0.458	77.9	6E-03
Chromium	8.908	219	4E-02
Copper	27.36	3130	9E-03
Cyanide (total)	0.955	1560	6E-04
Dichloroethene[1,1-]	0.000924	618	1E-06
Di-n-octylphthalate	2.7	6110	4E-04
Endosulfan sulfate	0.00712	367	2E-05
Endrin	0.000568	18.3	3E-05
Endrin aldehyde	0.0078	18.3	4E-04
Fluoranthene	0.0519	2290	2E-05
Isopropyltoluene[4-]	0.00874	3210[d]	3E-06
Lead	39.2	400	1E-01
Manganese	348.3	10700	3E-02
Mercury	0.462	23[c]	2E-02
Nickel	4.233	1560	3E-03
Nitrate	16.63	125000	1E-04
Perchlorate	0.00108	54.8	2E-05
Phenanthrene	0.0244	1830	1E-05
Pyrene	0.0474	1720	3E-05
Selenium	2.835	391	7E-03
Silver	1.786	391	5E-03
Styrene	0.000484	8970	5E-08

Table I-4.2-5 (continued)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Toluene	0.0018	5570	3E-07
Trimethylbenzene[1,2,4-]	0.000245	62[c]	4E-06
Xylene[1,2-]	0.00037	9550	4E-08
Xylene[1,3-]+Xylene[1,4-]	0.000817	1090	7E-07
Zinc	89.85	23500	4E-03
		HI	**0.2**

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Isopropylbenzene SSL used as surrogate based on structural similarity.

Table I-4.2-6
Residential Radionuclide Screening Evaluation for SWMU 00-018(a)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.1	5.6	3E-01
Tritium	4.51937	750	9E-02
		Total Dose	**0.4**

* SALs from LANL (2009, 107655).

Table I-4.2-7
Recreational Carcinogenic Screening Evaluation for AOC 00-030(eS)

COPC	EPC (mg/kg)	Recreational SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.0046	10.5	4E-09
Benzo(a)pyrene	0.306	3.01	1E-06
Benzo(b)fluoranthene	0.476	30.1	2E-07
Benzo(k)fluoranthene	0.165	301	5E-09
Bis(2-ethylhexyl)phthalate	0.119	1830	7E-10
Chrysene	0.319	3010	1E-09
DDD[4,4'-]	0.00102	107	1E-10
DDE[4,4'-]	0.00771	75.3	1E-09
DDT[4,4'-]	0.0161	122	1E-09
Ethylbenzene	0.000381	2060	2E-12
Indeno(1,2,3-cd)pyrene	0.296	30.1	1E-07
Tetrachloroethene	0.000202	91.7	2E-11
		Total Excess Cancer Risk	**1E-06**

* SSLs from LANL (2010, 108613).

Table I-4.2-8
Recreational Noncarcinogenic Screening Evaluation for AOC 00-030(eS)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	HQ
Anthracene	0.188	104000	2E-06
Aroclor-1254	0.0136	6.65	2E-03
Benzo(g,h,i)perylene	0.2	10400[b]	2E-05
Fluoranthene	0.511	13900	4E-05
Isopropyltoluene[4-]	0.000637	52700[c]	1E-08
Lead	36.97	560	7E-02
Nitrate	1.41	1260000	1E-06
Perchlorate	0.0013	555	2E-06
Pyrene	0.438	10400	4E-05
Selenium	1.68(U)	3960	4E-04
Toluene	0.00162	60800	2E-08
Xylene[1,2-]	0.000392	248,000	2E-09
Xylene[1,3-]+Xylene[1,4-]	0.00111	27,800	4E-08
Zinc	66.36	238000	3E-04
		HI	**0.07**

[a] SSLs from LANL (2010, 108613).

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] Isopropylbenzene SSL used as surrogate based on structural similarity.

Table I-4.2-9
Residential Carcinogenic Screening Evaluation for AOC 00-030(eS)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	Cancer Risk
Aroclor-1260	0.0106	2.22	5E-08
Benzo(a)anthracene	0.601	6.21	1E-06
Benzo(a)pyrene	0.17	0.621	3E-06
Benzo(b)fluoranthene	0.275	6.21	4E-07
Benzo(k)fluoranthene	0.165	62.1	3E-08
Bis(2-ethylhexyl)phthalate	0.119	347	3E-09
Chlordane[alpha-]	0.00536	16.2[b]	3E-09
Chlordane[gamma-]	0.00498	16.2[b]	3E-09
Chloroform	0.000578	5.72	1E-09
Chrysene	0.178	621	3E-09
DDD[4,4'-]	0.00102	20.3	5E-10
DDE[4,4'-]	0.00692	14.3	5E-09
DDT[4,4'-]	0.0125	17.2	7E-09
Ethylbenzene	0.000558	69.7	8E-11
Indeno(1,2,3-cd)pyrene	0.345	6.21	6E-07
Methylene chloride	0.0154	199	8E-10
Naphthalene	0.107	45	2E-08
Tetrachloroethene	0.0002	6.99	3E-10
Total Excess Cancer Risk			**5E-06**

[a] SSLs from NMED (2009, 108070).

[b] Chlordane SSL used as surrogate based on structural similarity.

Table I-4.2-10
Residential Noncarcinogenic Screening Evaluation for AOC 00-030(eS)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acenaphthene	0.0633	3440	2E-05
Acetone	0.064	67500	9E-07
Anthracene	0.071	17200	4E-06
Antimony	1.1(UJ)	31.3	4E-02
Aroclor-1254	0.0353	1.12	3E-02
Barium	117.8	15600	8E-03
Benzo(g,h,i)perylene	0.422	1720[b]	2E-04
Cadmium	0.413	77.9	5E-03
Chromium	13.5	219[c]	6E-02
Copper	43.54	3130	1E-02
Cyanide (total)	0.566	1560	4E-04
Dichloroethene[1,1-]	0.000896	618	1E-06
Fluoranthene	0.489	2290	2E-04
Fluorene	0.0719	2290	8E-06
Isopropylbenzene	0.00603	3210	2E-06
Isopropyltoluene[4-]	0.0224	3210[d]	7E-06
Lead	169.8	400	4E-01
Mercury	0.118	23[e]	5E-03
Methyl-2-pentanone[4-]	0.00228	5950	4E-07
Methylnaphthalene[2-]	0.0417	310[e]	1E-04
Nitrate	1.243	125000	1E-05
Perchlorate	0.00155	54.8	3E-05
Phenanthrene	1.14	1830	6E-04
Pyrene	0.458	1720	3E-04
Selenium	8.62(U)	391	2E-02
Silver	0.722	391	2E-03
Toluene	0.00112	5570	2E-07
Xylene[1,2-]	0.000536	9550	6E-08
Xylene[1,3-]+Xylene[1,4-]	0.00163	1090	1E-06
Zinc	191.1	23500	8E-03
		HI	**0.5**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] Chromium(VI) SSL used.

[c] Pyrene SSL used as surrogate based on structural similarity.

[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).

Table I-4.2-11
Residential Radionuclide Screening Evaluation for AOC 00-030(eS)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.163	5.6	0.4
		Total Dose	**0.4**

* SALs from LANL (2009, 107655).

Table I-4.2-12
Recreational Carcinogenic Screening Evaluation for AOC 00-030(f)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	Cancer Risk
Aroclor-1260	0.0296	10.5	3E-08
Benzo(a)anthracene	0.934	30.1	3E-07
Benzo(a)pyrene	0.657	3.01	2E-06
Benzo(b)fluoranthene	1.15	30.1	4E-07
Benzo(k)fluoranthene	0.377	301	1E-08
Chlordane[alpha-]	0.0044	109[b]	4E-10
Chrysene	1.18	3010	4E-09
DDE[4,4'-]	0.00619	75.3	8E-10
DDT[4,4'-]	0.0378	122	3E-09
Dibenz(a,h)anthracene	0.0549	3.01	2E-07
Indeno(1,2,3-cd)pyrene	0.291	30.1	1E-07
		Total Excess Cancer Risk	**3E-06**

[a] SSLs from LANL (2010, 108613).

[b] Chlordane SSL used as surrogate based on structural similarity.

Table I-4.2-13
Recreational Noncarcinogenic Screening Evaluation for AOC 00-030(f)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	HQ
Acenaphthene	0.015	20800	7E-07
Acetone	0.00598	702000	9E-09
Anthracene	0.114	104000	1E-06
Antimony	1.07(UJ)	317	3E-03
Benzo(g,h,i)perylene	0.352	10400[b]	3E-05
Fluoranthene	1.97	13900	1E-04
Fluorene	0.015	13900	1E-06
Lead	41.05	560	7E-02
Manganese	889.6	110000	8E-03
Mercury	0.318	238	1E-03
Nitrate	3.63	1260000	3E-06
Perchlorate	0.00209	555	4E-06
Phenanthrene	0.804	12000	7E-05
Pyrene	1.83	10400	2E-04
Selenium	1.69(U)	3960	4E-04
Toluene	0.000771	60800	1E-08
Xylene[1,3-]+Xylene[1,4-]	0.000364	27800	1E-08
		HI	**0.08**

[a] SSLs from LANL (2010, 108613).

[b] Pyrene SSL used as surrogate based on structural similarity.

Table I-4.2-14
Recreational Radionuclide Screening Evaluation for AOC 00-030(f)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.252	210	0.02
		Total Dose	**0.02**

* SALs from LANL (2009, 107655).

Table I-4.2-15
Residential Carcinogenic Screening Evaluation for AOC 00-030(f)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	Cancer Risk
Aroclor-1260	0.00969	2.22	4E-08
Benzo(a)anthracene	0.244	6.21	4E-07
Benzo(a)pyrene	0.184	0.621	3E-06
Benzo(b)fluoranthene	0.331	6.21	5E-07
Benzo(k)fluoranthene	0.124	62.1	2E-08
BHC[alpha-]	0.001	0.772	1E-08
Chlordane[alpha-]	0.0028	16.2[b]	2E-09
Chlordane[gamma-]	0.00255	16.2[b]	2E-09
Chrysene	0.29	621	5E-09
DDD[4,4'-]	0.041	20.3	2E-08
DDE[4,4'-]	0.0371	14.3	3E-08
DDT[4,4'-]	0.102	17.2	6E-08
Dibenz(a,h)anthracene	0.0549	0.621	9E-07
Heptachlor epoxide	0.0016	0.53[c]	3E-08
Indeno(1,2,3-cd)pyrene	0.118	6.21	2E-07
Methylene chloride	0.0013	199	7E-11
Naphthalene	0.101	45	2E-08
		Total Excess Cancer Risk	**5E-06**

[a] SSLs from NMED (2009, 108070).

[b] Chlordane SSL used as surrogate based on structural similarity.

[c] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

Table I-4.2-16
Residential Noncarcinogenic Screening Evaluation for AOC 00-030(f)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acenaphthene	0.0632	3440	2E-05
Acetone	0.017	67500	3E-07
Antimony	1.07(UJ)	31.3	3E-02
Anthracene	0.0623	17200	4E-06
Aroclor-1254	0.0135	1.12	1E-02
Benzo(g,h,i)perylene	0.116	1720[b]	7E-05
Benzoic acid	0.35	245000[c]	1E-06
Beryllium	0.889	156	6E-03
Chromium	22	219[d]	1E-01
Cyanide (total)	0.185	1560	1E-04
Fluoranthene	0.442	2290	2E-04
Fluorene	0.054	2290	2E-05
Isopropyltoluene[4-]	0.00082	3210[e]	3E-07
Lead	17.55	400	4E-02
Manganese	475.6	10700	4E-02
Mercury	0.0721	23[c]	3E-03
Methoxychlor[4,4'-]	0.0089	310[c]	3E-05
Methylnaphthalene[2-]	0.0598	310[c]	2E-04
Nitrate	2.601	125000	2E-05
Perchlorate	0.00209	54.8	4E-05
Phenanthrene	0.233	1830	1E-04
Pyrene	0.393	1720	2E-04
Selenium	1.77(U)	391	5E-03
Toluene	0.000771	5570	1E-07
Trimethylbenzene[1,2,4-]	0.0017	62[c]	3E-05
Xylene[1,3-]+Xylene[1,4-]	0.000364	1090	3E-07
		HI	**0.2**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Chromium(VI) SSL used.

[e] Isopropylbenzene SSL used as surrogate based on structural similarity.

Table I-4.2-17
Residential Radionuclide Screening Evaluation for AOC 00-030(f)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Americium-241	0.0483	30	0.02
Cesium-137	0.31	5.6	0.8
		Total Dose	**0.8**

* SALs from LANL (2009, 107655).

Table I-4.2-18
Recreational Carcinogenic Screening Evaluation for AOC 00-030(h)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	Cancer Risk
Benzo(a)anthracene	0.439	30.1	1E-07
Benzo(a)pyrene	0.471	3.01	2E-06
Benzo(b)fluoranthene	0.776	30.1	3E-07
Bis(2-ethylhexyl)phthalate	0.583	1830	3E-09
Butylbenzylphthalate	0.101	13500	7E-11
Chlordane[alpha-]	0.00249	109[b]	2E-10
Chlordane[gamma-]	0.00251	109[b]	2E-10
Chrysene	0.484	3010	2E-09
Dibenz(a,h)anthracene	0.0849	3.01	3E-07
Indeno(1,2,3-cd)pyrene	0.273	30.1	9E-08
Naphthalene	0.361	1950	2E-09
		Total Excess Cancer Risk	**3E-06**

[a] SSLs from LANL (2010, 108613).

[b] Chlordane SSL used as surrogate based on structural similarity.

Table I-4.2-19
Recreational Noncarcinogenic Screening Evaluation for AOC 00-030(h)

COPC	EPC (mg/kg)	Recreational SSL[a] (mg/kg)	HQ
Acenaphthene	0.122	20800	6E-06
Anthracene	0.229	104000	2E-06
Antimony	1.13(U)	317	4E-03
Benzo(g,h,i)perylene	0.294	10400[b]	3E-05
Copper	59.9	31700	2E-03
Dibenzofuran	0.0818	399	2E-04
Di-n-octylphthalate	0.285	7970	4E-05
Fluoranthene	0.811	13900	6E-05
Fluorene	0.134	13900	1E-05
Lead	18.5	560	3E-02
Methylnaphthalene[2-]	0.0619	3170	2E-05
Nitrate	1.39	1260000	1E-06
Phenanthrene	0.869	12000	7E-05
Pyrene	1.06	10400	1E-04
Selenium	1.61(U)	3960	4E-04
Zinc	249	238000	1E-03
		HI	**0.04**

[a] SSLs from LANL (2010, 108613).

[b] Pyrene SSL used as surrogate based on structural similarity.

Table I-4.2-20
Recreational Radionuclide Screening Evaluation for AOC 00-030(h)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.063	210	0.005
		Total Dose	**0.005**

* SALs from LANL (2009, 107655).

Table I-4.2-21
Residential Carcinogenic Screening Evaluation for AOC 00-030(h)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	Cancer Risk
Aroclor-1260	0.0065	2.22	3E-08
Benzo(a)anthracene	0.29	6.21	5E-07
Benzo(a)pyrene	0.362	0.621	6E-06
Benzo(b)fluoranthene	0.47	6.21	8E-07
Benzo(k)fluoranthene	0.217	62.1	4E-08
Bis(2-ethylhexyl)phthalate	31.04	347	9E-07
Butylbenzylphthalate	24.1	2600[b]	9E-08
Chlordane[alpha-]	0.00249	16.2[c]	2E-09
Chlordane[gamma-]	0.00251	16.2[c]	2E-09
Chloroform	0.000378	5.72	7E-10
Chrysene	0.412	621	7E-09
DDD[4,4'-]	0.00715	20.3	4E-09
DDE[4,4'-]	0.238	14.3	2E-07
DDT[4,4'-]	0.122	17.2	7E-08
Dibenz(a,h)anthracene	0.0826	0.621	1E-06
Dieldrin	0.0032	0.34	9E-08
Ethylbenzene	0.002	69.7	3E-10
Indeno(1,2,3-cd)pyrene	0.221	6.21	4E-07
Methylene chloride	0.00203	199	1E-10
Naphthalene	0.086	45	2E-08
Trichloroethene	0.00454	45.7	1E-09
Total Excess Cancer Risk			**1E-05**

[a] SSLs from NMED (2009, 108070).

[b] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Chlordane SSL used as surrogate based on structural similarity.

Table I-4.2-22
Residential Noncarcinogenic Screening Evaluation for AOC 00-030(h)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acenaphthene	0.0787	3440	2E-05
Acetone	0.0195	67500	3E-07
Anthracene	0.12	17200	7E-06
Antimony	1.13(U)	31.3	4E-02
Barium	119.4	15600	8E-03
Benzo(g,h,i)perylene	0.244	1720[b]	1E-04
Dichloroethene[cis-1,2-]	0.002	782	3E-06
Copper	10.03	3130	3E-03
Dibenzofuran	0.053	78[c]	7E-04
Di-n-butylphthalate	3.97	6110	6E-04
Di-n-octylphthalate	0.285	6110[d]	5E-05
Fluoranthene	0.982	2290	4E-04
Fluorene	0.0715	2290	3E-05
Isopropyltoluene[4-]	0.0094	3210[e]	3E-06
Lead	21.58	400	5E-02
Mercury	0.215	23[c]	9E-03
Methylnaphthalene[2-]	0.0343	310[c]	1E-04
Nitrate	10.3	125000	8E-05
Perchlorate	0.000768	54.8	1E-05
Phenanthrene	0.503	1830	3E-04
Pyrene	0.667	1720	4E-04
Selenium	1.9(U)	391	5E-03
Thallium	0.181	5.16	4E-02
Toluene	0.0021	5570	4E-07
Trichlorofluoromethane	0.002	2010	1E-06
Trimethylbenzene[1,2,4-]	0.002	62[c]	3E-05
Uranium	3.36	235	1E-02
Xylene[1,3-]+Xylene[1,4-]	0.000336	1090	3E-07
Zinc	116.8	23500	5E-03
		HI	**0.2**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] Pyrene SSL used as surrogate based on structural similarity

[c] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSL from EPA (2007, 099314).

[e] Isopropylbenzene SSL used as surrogate based on structural similarity.

Table I-4.2-23
Residential Radionuclide Screening Evaluation for AOC 00-030(h)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.187	5.6	0.5
Plutonium-238	0.0204	37	0.008
Plutonium-239/240	0.661	33	0.3
		Total Dose	**0.8**

* SALs from LANL (2009, 107655).

Table I-4.2-24
Recreational Carcinogenic Screening Evaluation for SWMU 31-001

COPC	EPC (mg/kg)	Recreational SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.355	10.5	3E-07
DDE[4,4'-]	0.0121	75.3	2E-09
DDT[4,4'-]	0.00836	122	7E-10
Dichlorobenzene[1,4-]	0.000438	1260	3E-12
		Total Excess Cancer Risk	**3E-07**

* SSLs from LANL (2010, 108613).

Table I-4.2-25
Recreational Noncarcinogenic Screening Evaluation for SWMU 31-001

COPC	EPC (mg/kg)	Recreational SSL* (mg/kg)	HQ
Aroclor-1254	0.0083	6.65	1E-03
Copper	41	31700	1E-03
Fluoranthene	0.0132	13900	9E-07
Lead	22.6	560	4E-02
Nitrate	1.75	1260000	1E-06
Perchlorate	0.00165	555	3E-06
Pyrene	0.0132	10400	1E-06
Selenium	11.1(U)	3960	3E-03
Toluene	0.000877	60800	1E-08
Zinc	99.5	238000	4E-04
		HI	**0.05**

* SSLs from LANL (2010, 108613).

Table I-4.2-26
Residential Carcinogenic Screening Evaluation for SWMU 31-001

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.355	2.22	2E-06
Arsenic	3.606	3.9	9E-06
Bis(2-ethylhexyl)phthalate	0.291	347	8E-09
Chrysene	0.0849	621	1E-09
DDE[4,4'-]	0.0309	14.3	2E-08
DDT[4,4'-]	0.0278	17.2	2E-08
Dichlorobenzene[1,4-]	0.000438	32.2	1E-10
Dieldrin	0.000797	0.34	2E-08
Tetrachloroethene	0.000694	6.99	1E-09
Total Excess Cancer Risk			**1E-05**

* SSLs from NMED (2009, 108070).

Table I-4.2-27
Residential Noncarcinogenic Screening Evaluation for SWMU 31-001

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	HQ
Acetone	0.00594	67500	9E-08
Anthracene	0.0142	17200	8E-07
Aroclor-1254	0.0083	1.12	7E-03
Barium	81.15	15600	5E-03
Chromium	7.057	219[b]	3E-02
Copper	10.39	3130	3E-03
Di-n-butylphthalate	0.0782	6110	1E-05
Fluoranthene	0.104	2290	5E-05
Lead	13.61	400	3E-02
Nitrate	1.175	125000	9E-06
Perchlorate	0.00253	54.8	5E-05
Phenanthrene	0.0409	1830	2E-05
Pyrene	0.168	1720	1E-04
Selenium	1.31	391	3E-03
Toluene	0.00109	5570	2E-07
Zinc	45.3	23500	2E-03
HI			**0.08**

* SSLs from NMED (2009, 108070).

Table I-4.2-28
Residential Radionuclide Screening Evaluation for SWMU 31-001

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.609	5.6	2
		Total Dose	**2**

*SALs from LANL (2009, 107655).

Table I-4.2-29
Recreational Carcinogenic Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (mg/kg)	Recreational SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0166	10.5	2E-08
Aroclor-1260	0.083	10.5	8E-08
Benzo(a)pyrene	0.132	3.01	4E-07
Benzo(b)fluoranthene	0.13	30.1	4E-08
Benzo(k)fluoranthene	0.173	301	6E-09
Bis(2-ethylhexyl)phthalate	0.12	1830	7E-10
Chloroform	0.0006	224	3E-11
Chrysene	0.173	3010	6E-10
DDE[4,4'-]	0.0007	75.3	9E-11
DDT[4,4'-]	0.0077	122	6E-10
Naphthalene	0.0218	1950	1E-10
		Total Excess Cancer Risk	**5E-07**

* SSLs from LANL (2010, 108613).

Table I-4.2-30
Recreational Noncarcinogenic Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (mg/kg)	Recreational SSL* (mg/kg)	HQ
Acenaphthene	0.136	20800	7E-06
Anthracene	0.132	104000	1E-06
Antimony	1.36(UJ)	317	4E-03
Aroclor-1254	0.0265	6.65	4E-03
Benzoic acid	4.88	1590000	3E-06
Cadmium	0.211	784	3E-04
Diethyl phthalate	1.23	319000	4E-06
Dinitro-2-methylphenol[4,6-]	3.79	39.9	9E-02
Fluoranthene	0.11	13900	8E-06
Fluorene	0.0152	13900	1E-06
Lead	14.82	560	3E-02
Mercury	1.33	238	6E-03
Methylnaphthalene[2-]	0.116	3170	4E-05
Nitrate	3.261	1260000	3E-06
Perchlorate	0.0017	555	3E-06
Phenanthrene	0.0738	12000	6E-06
Pyrene	0.132	10400	1E-05
Selenium	1.86(U)	3960	5E-04
Silver	1.397	3960	4E-04
Toluene	0.0024	60800	4E-08
Trimethylbenzene[1,2,4-]	0.0002	6880	3E-08
Zinc	46.65	238000	2E-04
		HI	**0.1**

* SSLs from LANL (2010, 108613).

Table I-4.2-31
Recreational Radionuclide Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Tritium	0.126	5300000	4E-07
		Total Dose	**0.0000004**

* SALs from LANL (2009, 107655).

Table I-4.2-32
Residential Carcinogenic Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0207	2.22	9E-08
Aroclor-1260	0.0193	2.22	9E-08
Benzo(a)anthracene	0.123	6.21	2E-07
Benzo(a)pyrene	0.17	0.621	3E-06
Benzo(b)fluoranthene	0.0921	6.21	1E-07
Benzo(k)fluoranthene	0.173	62.1	3E-08
Bis(2-ethylhexyl)phthalate	0.12	347	3E-09
Chloroform	0.0009	5.72	2E-09
Chrysene	0.0541	621	9E-10
DDE[4,4'-]	0.0198	14.3	1E-08
DDT[4,4'-]	0.0278	17.2	2E-08
Dieldrin	0.0118	0.34	3E-07
Ethylbenzene	0.0002	69.7	3E-11
Naphthalene	0.123	45	3E-08
Total Excess Cancer Risk			**4E-06**

* SSLs from NMED (2009, 108070).

Table I-4.2-33
Residential Noncarcinogenic Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acenaphthene	0.136	3440	4E-05
Acetone	0.0257	67500	4E-07
Anthracene	0.0318	17200	2E-06
Antimony	1.41(UJ)	31.3	5E-02
Aroclor-1254	0.0137	1.12	1E-02
Benzoic acid	4.88	245000[b]	2E-05
Cadmium	0.199	77.9	3E-03
Chromium	9.074	219	4E-02
Copper	6.774	3130	2E-03
Dichloroethene[1,1-]	0.0011	618	2E-06
Diethylphthalate	1.23	48900	3E-05
Dinitro-2-methylphenol[4,6-]	3.79	6.11	6E-01
Fluoranthene	0.0906	2290	4E-05
Fluorene	0.0603	2290	3E-05
Isopropyltoluene[4-]	0.0009	3210[c]	3E-07
Lead	15.36	400	4E-02
Mercury	0.404	23[b]	2E-02
Methylnaphthalene[2-]	0.116	310[b]	4E-04
Nitrate	2.122	125000	2E-05
Perchlorate	0.0024	54.8	4E-05
Phenanthrene	0.081	1830	4E-05
Pyrene	0.102	1720	6E-05
Selenium	0.691	391	2E-03
Silver	2.69	391	7E-03
Toluene	0.0013	5570	2E-07
Trimethylbenzene[1,2,4-]	0.0002	62[b]	4E-06
Xylene[1,2-]	0.0002	9550	2E-08
Xylene[1,3-]+Xylene[1,4-]	0.0007	1090	6E-07
Zinc	46.44	23500	2E-03
		HI	**0.8**

[a] SSLs from NMED (2009, 108070).

[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.

Table I-4.2-34
Residential Radionuclide Screening
Evaluation for Consolidated Unit 45-001-00

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Cesium-137	0.177	5.6	0.5
Tritium	0.126	750	0.003
		Total Dose	**0.5**

* SALs from LANL (2009, 107655).

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)
Antimony	na*	na	na	na	na	0.48	2.9	78	0.05	0.26	45
Arsenic	160	1100	42	18	26	32	160	6.8	18	15	810
Barium	11,000	37,000	820	1000	930	1800	3300	330	110	1300	41,000
Beryllium	na	na	na	na	na	56	170	40	2.5	18	420
Cadmium	2	580	4.4	0.29	0.54	0.51	9.9	140	32	0.27	510
Chromium (total)	7700	37,000	1900	830	1100	1900	13,000	2.3	2.4	750	30,000
Copper	110	1600	38	15	22	64	270	80	70	38	3800
Cyanide (total)	0.47	0.58	0.1	0.1	0.1	340	740	na	na	310	2200
Lead	120	810	21	14	16	120	370	1700	120	72	3700
Manganese	35,000	90,000	1400	3100	1900	1400	2000	450	220	1500	41,000
Mercury	0.082	0.28	0.07	0.013	0.022	3	22	0.05	34	1.7	46
Nickel	160	2900	160	21	38	20	500	280	38	9.7	1200
Selenium	5.6	97	1	0.75	0.87	0.83	2.1	4.1	0.52	0.66	84
Silver	19	840	11	2.6	4.3	24	150	na	560	14	4100
Thallium	6.6	75	9.2	0.9	1.6	0.068	2.8	na	0.1	0.032	2.8
Uranium	21000	39000	1900	1600	1700	750	2000	na	25	220	4800
Zinc	320	2400	350	48	85	170	1800	120	160	98	6000

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)
Acenaphthene	na*	na	na	na	na	160	490	na	0.25	120	6200
Acetone	1200	30,000	7.5	170	14	1.2	1.4	na	na	15	2900
Americium-241	35,000	62,000	13,000	4000	4000	32,000	32,000	44	21,000	31,000	26,000
Anthracene	na	na	na	na	na	310	1100	na	6.8	210	5800
Aroclor-1242	0.26	1.4	1	0.041	0.079	0.76	30	na	na	0.38	16
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
Benzene	na	na	na	na	na	24	35	na	na	47	7600
Benzo(a)anthracene	na	na	na	na	na	3.4	6.2	na	18	3	32
Benzo(a)pyrene	na	na	na	na	na	85	280	na	na	53	380
Benzo(b)fluoranthene	na	na	na	na	na	52	130	na	18	38	250
Benzo(g,h,i)perylene	na	na	na	na	na	47	540	na	na	24	94
Benzo(k)fluoranthene	na	na	na	na	na	100	350	na	na	62	400
Benzoic acid	na	na	na	na	na	1.3	4.2	na	na	1	350
BHC[alpha-]	na	na	na	na	na	100	750	na	na	58	2400
Bis(2-ethylhexyl)phthalate	0.045	0.033	20	0.02	0.04	1.1	2700	na	na	0.59	1.2
Butylbenzylphthalate	na	na	na	na	na	160	2300	na	na	90	1900
Cesium-137	3700	2900	4200	3800	3700	2400	2300	1700	2300	2400	680
Chlordane[alpha-]	1	1.1	19	0.28	0.55	0.54	57	na	2.2	0.27	1.4
Chlordane[gamma-]	9.2	10	22	2.3	4.2	4.3	69	na	2.2	2.2	12

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)
Chloroaniline[4-]	na	na	na	na	na	na	na	1.8	1	na	na
Chloroform	na	na	na	na	na	8	17	na	na	8.2	2300
Chrysene	na	na	na	na	na	3.1	6.5	na	na	2.4	25
DDD[4,4'-]	0.027	0.036	0.14	0.0063	0.012	8	260	na	na	4.1	28
DDE[4,4'-]	0.34	0.3	5.6	0.11	0.21	7.3	610	na	na	3.7	12
DDT[4,4'-]	1.2	1.2	28	0.36	0.72	0.089	12	na	4.1	0.044	0.19
Dibenzo(a,h)anthracene	na	na	na	na	na	22	95	na	na	12	54
Dibenzofuran	na	na	na	na	na	na	na	na	6.1	na	na
Dichlorobenzene[1,4-]	na	na	na	na	na	1.5	11	1.2	na	0.88	72
Dichloroethene[1,1-]	na	na	na	na	na	14	40	na	na	11	2900
Dieldrin	0.063	0.12	0.35	0.012	0.023	0.0088	0.33	na	10	0.0045	0.058
Diethyl phthalate	na	na	na	na	na	3600	8000	na	100	3600	650000
Di-n-butylphthalate	0.068	0.24	0.39	0.011	0.021	370	16000	na	160	180	5000
Di-n-octylphthalate	na	na	na	na	na	2.2	16000	na	na	1.1	16
Endrin	0.0082	0.02	0.049	0.0014	0.0028	0.046	2	na	0.0034	0.023	0.41
Fluoranthene	na	na	na	na	na	38	260	10	na	22	360
Fluorene	na	na	na	na	na	340	1100	3.7	na	250	9300
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	110	590	na	na	62	270
Methoxychlor[4,4'-]	100	250	110	18	32	9.1	80	na	na	5	87
Methyl-2-pentanone[4-]	na	na	na	na	na	9.8	15	na	na	15	6600

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)
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	100	590	3.4	16	5.7	9.7	12	na	1	27	1200
Phenanthrene	na	na	na	na	na	15	59	5.5	na	10	290
Plutonium-239/240	34,000	160,000	8600	2100	2100	150,000	170,000	47	160,000	110,000	33,000
Pyrene	na	na	na	na	na	32	110	10	na	22	360
Styrene	na	na	na	na	na	na	na	1.2	300	na	na
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
Trichloroethene	na	na	na	na	na	55	170	na	na	42	6400
Tritium	630,000	580,000	300,000	600,000	440,000	330,000	230,000	48,000	36,000	340,000	190,000
Xylene (total)	280	3200	90	41	56	2	7	na	100	1.4	130

Note: Units are mg/kg.

* na = Not available.

Table I-5.3-2
Minimum ESL Comparison for SWMU 00-018(a)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	0.178	0.05	Plant	**3.6**
Barium	99.98	110	Plant	**0.91**
Cadmium	0.523	0.27	Montane shrew	**1.9**
Chromium	10.24	2.3	Earthworm	**4.5**
Copper	33.3	15	American robin (insectivore)	**2.2**
Cyanide (total)	0.955	0.1	American robin (herbivore)	**9.6**
Lead	47.56	14	American robin (insectivore)	**3.4**
Manganese	382.3	220	Plant	**1.7**
Mercury	0.567	0.013	American robin (insectivore)	**44**
Nickel	4.649	9.7	Montane shrew	**0.48**
Selenium	4.65	0.52	Plant	**8.9**
Silver	2.189	2.6	American robin (insectivore)	**0.84**
Zinc	80.08	48	American robin (insectivore)	**1.7**
Organic Chemicals (mg/kg)				
Acetone	0.0315	1.2	Deer mouse	0.026
Anthracene	0.0131	6.8	Plant	0.0019
Aroclor-1242	0.0139	0.041	American robin (insectivore)	**0.34**
Aroclor-1254	0.0446	0.041	American robin (insectivore)	**1.1**
Aroclor-1260	0.0418	0.14	Red fox	**0.3**
Benzo(a)pyrene	0.013	53	Montane shrew	0.0025
Benzo(b)fluoranthene	0.0572	18	Plant	0.0032
Benzo(g,h,i)perylene	0.0401	24	Montane shrew	0.0017
Benzo(k)fluoranthene	0.014	62	Montane shrew	0.00023
Benzoic acid	0.459	1	Montane shrew	**0.46**
Bis(2-ethylhexyl)phthalate	0.129	0.02	American robin (insectivore)	**6.5**
Chlordane[alpha-]	0.00366	0.27	Montane shrew	0.014
Chlordane[gamma-]	0.00274	2.2	Plant	0.0012
Chloroaniline[4-]	2	1	Plant	**2**
Chloroform	0.000231	8	Deer mouse	0.000029
Chrysene	0.0487	2.4	Montane shrew	0.02
DDD[4,4'-]	0.0092	0.0063	American robin (insectivore)	**1.5**
DDE[4,4'-]	0.00217	0.11	American robin (insectivore)	0.02
DDT[4,4'-]	0.00261	0.044	Montane shrew	0.059
Di-n-octylphthalate	2.7	1.1	Montane shrew	**2.5**
Dichlorobenzene[1,4-]	0.000266	0.88	Montane shrew	0.0003

Table I-5.3-2 (continued)

COPC	EPC	ESL	Receptor	HQ
Organic Chemicals (mg/kg) (continued)				
Dichloroethene[1,1-]	0.000939	11	Montane shrew	0.000085
Dieldrin	0.00336	0.0045	Montane shrew	**0.75**
Endrin	0.000568	0.0014	American robin (insectivore)	**0.41**
Fluoranthene	0.0513	10	Earthworm	0.0051
Indeno(1,2,3-cd)pyrene	0.098	62	Montane shrew	0.0016
Methylene chloride	0.00399	2.6	Deer mouse	0.0015
Phenanthrene	0.0247	5.5	Earthworm	0.0045
Pyrene	0.054	10	Earthworm	0.0054
Styrene	0.000484	1.2	Earthworm	0.0004
Tetrachloroethene	0.000385	0.18	Montane shrew	0.0021
Toluene	0.00204	23	Montane shrew	0.000089
Radionuclide (pCi/g)				
Cesium-137	0.11	680	Red fox	0.00016

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-3
HI Analysis for SWMU 00-018(a)

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	0.178	na*	na	na	na	na	**0.37**	0.061	0.0023	**3.6**	**0.68**	0.004
Barium	99.98	0.0091	0.0027	0.12	0.1	0.11	0.056	0.03	0.3	**0.91**	0.077	0.0024
Cadmium	0.523	0.26	0.0009	0.12	**1.8**	**0.97**	**1**	0.053	0.0037	0.016	**1.9**	0.001
Chromium	10.24	0.0013	0.00028	0.0054	0.012	0.0093	0.0054	0.00079	**4.5**	**4.3**	0.014	0.00034
Copper	33.3	**0.3**	0.021	**0.88**	**2.2**	**1.5**	**0.52**	0.12	**0.42**	**0.48**	**0.88**	0.0088
Cyanide (total)	0.955	**2**	**1.6**	**9.6**	**9.6**	**9.6**	0.0028	0.0013	na	na	0.0031	0.00043
Lead	47.56	**0.4**	0.059	**2.3**	**3.4**	**3**	**0.4**	0.13	0.028	**0.4**	**0.66**	0.013
Manganese	382.3	0.011	0.0042	0.27	0.12	0.2	0.27	0.19	**0.85**	**1.7**	**0.25**	0.0093
Mercury	0.567	**6.9**	**2**	**8.1**	**44**	**26**	0.19	0.026	**11**	0.017	**0.33**	0.012
Nickel	4.649	0.029	0.0016	0.029	0.22	0.12	0.23	0.0093	0.017	0.12	**0.48**	0.0039
Selenium	4.65	**0.83**	0.048	**4.7**	**6.2**	**5.3**	**5.6**	**2.2**	**1.1**	**8.9**	**7**	0.055
Silver	2.189	0.12	0.0026	0.2	**0.84**	**0.51**	0.091	0.015	na	0.0039	0.16	0.00053
Zinc	80.08	0.25	0.033	0.23	**1.7**	**0.94**	**0.47**	0.044	**0.67**	**0.5**	**0.82**	0.013
Organic Chemicals												
Aroclor-1242	0.0139	0.053	0.0099	0.014	**0.34**	0.18	0.018	0.00046	na	na	0.037	0.00087
Aroclor-1254	0.0446	0.26	0.2	0.034	**1.1**	**0.56**	0.051	0.00086	na	0.00028	0.1	0.3
Aroclor-1260	0.0418	0.011	0.0091	0.00091	0.048	0.025	0.0021	0.000014	na	na	0.0042	0.3
Benzoic acid	0.458	na	na	na	na	na	**0.35**	0.11	na	na	**0.46**	0.0013

Table I-5.3-3 (continued)

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 (continued)												
Bis(2-ethylhexyl)phthalate	0.129	**2.9**	**3.9**	0.0065	**6.5**	**3.2**	0.12	0.000048	na	na	0.22	0.11
Chloroaniline[4-]	2	na	na	na	na	na	na	na	**1.1**	**2**	na	na
DDD[4,4'-]	0.0092	**0.34**	0.26	0.066	**1.5**	**0.77**	0.0012	0.000035	na	na	0.0022	0.00033
Dieldrin	0.00336	0.053	0.028	0.0096	0.28	0.15	**0.38**	0.01	na	0.00034	**0.75**	0.058
Di-n-octylphthalate	2.7	na	na	na	na	na	**1.2**	0.00017	na	na	**2.5**	0.17
Endrin	0.000568	0.069	0.028	0.012	**0.41**	0.2	0.012	0.00028	na	0.17	0.025	0.0014
HI		**15**	**8**	**26**	**80**	**53**	**11**	**3**	**19**	**21**	**17**	1

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 AOC 00-030(eS)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Barium	115.2	110	Plant	**1**
Chromium	12.42	2.3	Earthworm	**5.4**
Copper	51.07	15	American robin (insectivore)	**3.4**
Cyanide (total)	0.566	0.1	American robin (herbivore)	**5.66**
Lead	198.8	14	American robin (insectivore)	**14**
Mercury	0.138	0.013	American robin (insectivore)	**11**
Selenium	8.62(U)	0.52	Plant	**17**
Silver	0.839	2.6	American robin (insectivore)	**0.32**
Zinc	219	48	American robin (insectivore)	**4.6**
Organic Chemicals (mg/kg)				
Acenaphthene	0.0633	0.25	Plant	0.25
Acetone	0.064	1.2	Deer mouse	0.053
Anthracene	0.0748	6.8	Plant	0.011
Aroclor-1254	0.0353	0.041	American robin (insectivore)	**0.86**
Aroclor-1260	0.0111	0.14	Red fox	0.079
Benzo(a)anthracene	0.601	3	Montane shrew	0.2
Benzo(a)pyrene	0.18	53	Montane shrew	0.0034
Benzo(b)fluoranthene	0.291	18	Plant	0.016
Benzo(g,h,i)perylene	0.422	24	Montane shrew	0.018
Benzo(k)fluoranthene	0.165	62	Montane shrew	0.0027
Bis(2-ethylhexyl)phthalate	0.119	0.02	American robin (insectivore)	**6**
Chlordane[alpha-]	0.00536	0.27	Montane shrew	0.02
Chlordane[gamma-]	0.00498	2.2	Plant	0.0023
Chloroform	0.000604	8	Deer mouse	0.000076
Chrysene	0.189	2.4	Montane shrew	0.079
DDD[4,4'-]	0.00102	0.0063	American robin (insectivore)	0.16
DDE[4,4'-]	0.00648	0.11	American robin (insectivore)	0.059
DDT[4,4'-]	0.0127	0.044	Montane shrew	0.29
Dichloroethene[1,1-]	0.000896	11	Montane shrew	0.000081
Fluoranthene	0.508	10	Earthworm	0.051
Fluorene	0.0719	3.7	Earthworm	0.019
Indeno(1,2,3-cd)pyrene	0.345	62	Montane shrew	0.0056
Methyl-2-pentanone[4-]	0.00228	9.8	Deer mouse	0.00023
Methylene chloride	0.0154	2.6	Deer mouse	0.0059
Methylnaphthalene[2-]	0.0417	2.5	Montane shrew	0.017

Table I-5.3-4 (continued)

COPC	EPC	ESL	Receptor	HQ
Organic Chemicals (mg/kg) (continued)				
Naphthalene	0.107	1	Plant	0.11
Phenanthrene	1.14	5.5	Earthworm	0.21
Pyrene	0.491	10	Earthworm	0.049
Tetrachloroethene	0.000202	0.18	Montane shrew	0.0011
Toluene	0.0012	23	Montane shrew	0.000052

Note: Bolded values indicate HQ greater than 0.3

Table I-5.3-5
HI Analysis for AOC 00-030(eS)

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												
Barium	115.2	0.01	0.0031	0.14	0.12	0.12	0.064	0.035	**0.35**	**1**	0.089	0.0028
Chromium (total)	12.42	0.0016	0.00034	0.0065	0.015	0.011	0.0065	0.00096	**5.4**	**5.2**	0.017	0.00041
Copper	51.07	**0.46**	0.032	**1.3**	**3.4**	**2.3**	**0.8**	0.19	**0.64**	**0.73**	**1.3**	0.013
Cyanide (total)	0.224	**0.48**	**0.39**	**2.2**	**2.2**	**2.2**	0.00066	0.0003	na*	na	0.00072	0.0001
Lead	198.8	**1.7**	0.25	**9.5**	**14**	**12**	**1.7**	**0.54**	0.12	**1.7**	**2.8**	0.054
Mercury	0.138	**1.7**	**0.49**	**2**	**11**	**6.3**	0.046	0.0063	**2.8**	0.0041	0.081	0.003
Selenium	8.62(U)	**1.5**	0.089	**8.6**	**11**	**9.9**	**10**	**4.1**	**2.1**	**17**	**13**	0.1
Silver	0.839	0.044	0.001	0.076	**0.32**	0.2	0.035	0.0056	na	0.0015	0.06	0.0002
Zinc	219	**0.68**	0.091	**0.63**	**4.6**	**2.6**	**1.3**	0.12	**1.8**	**1.4**	**2.2**	0.037
Organic Chemicals												
Aroclor-1254	0.0353	0.21	0.16	0.027	**0.86**	**0.44**	0.04	0.00068	na	0.00022	0.08	0.24
Bis(2-ethylhexyl)phthalate	0.119	**2.6**	**3.6**	0.006	**6**	**3**	0.11	0.000044	na	na	0.2	0.099
HI		**9**	**5**	**24**	**54**	**39**	**14**	**5**	**13**	**27**	**20**	0.5

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 AOC 00-030(f)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	1.07(UJ)	0.05	Plant	**21**
Beryllium	0.975	2.5	Plant	**0.39**
Chromium	18.61	2.3	Earthworm	**8.1**
Cyanide	0.221	0.1	American robin (insectivore)	**2.21**
Lead	22.2	14	American robin (insectivore)	**1.6**
Manganese	587.6	220	Plant	**2.7**
Mercury	0.0887	0.013	American robin (insectivore)	**6.8**
Selenium	1.77(U)	0.52	Plant	**3.4**
Organic Chemicals (mg/kg)				
Acenaphthene	0.0632	0.25	Plant	0.25
Acetone	0.017	1.2	Deer mouse	0.014
Anthracene	0.0864	6.8	Plant	0.013
Aroclor-1254	0.0135	0.041	American robin (insectivore)	**0.33**
Aroclor-1260	0.0133	0.14	Red fox	0.095
Benzo(a)anthracene	0.303	3	Montane shrew	0.1
Benzo(a)pyrene	0.25	53	Montane shrew	0.0047
Benzo(b)fluoranthene	0.421	18	Plant	0.023
Benzo(g,h,i)perylene	0.16	24	Montane shrew	0.0067
Benzo(k)fluoranthene	0.145	62	Montane shrew	0.0023
Benzoic acid	0.35	1	Montane shrew	**0.35**
BHC[alpha-]	0.001	58	Montane shrew	0.000017
Chlordane[alpha-]	0.0044	0.27	Montane shrew	0.016
Chlordane[gamma-]	0.00433	2.2	Plant	0.002
Chrysene	0.422	2.4	Montane shrew	0.18
DDE[4,4'-]	0.0225	0.11	American robin (insectivore)	0.2
DDT[4,4'-]	0.107	0.044	Montane shrew	**2.4**
Dibenz(a,h)anthracene	0.0549	12	Montane shrew	0.0046
Fluoranthene	0.601	10	Earthworm	0.06
Fluorene	0.054	3.7	Earthworm	0.015
Indeno(1,2,3-cd)pyrene	0.164	62	Montane shrew	0.0026
Methoxychlor[4,4'-]	0.0089	5	Montane shrew	0.0018
Methylene chloride	0.0013	2.6	Deer mouse	0.0005
Methylnaphthalene[2-]	0.0598	2.5	Montane shrew	0.024
Naphthalene	0.101	1	Plant	0.1
Phenanthrene	0.323	5.5	Earthworm	0.059

Table I-5.3-6 (continued)

COPC	EPC	ESL	Receptor	HQ
Organic Chemicals (mg/kg) (continued)				
Pyrene	0.589	10	Earthworm	0.059
Toluene	0.000771	23	Montane shrew	0.000034
Radionuclides (pCi/g)				
Americium-241	0.701	44	Earthworm	0.0016
Cesium-137	0.31	680	Red fox	0.00046

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-7
HI Analysis for AOC 00-030(f)

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	1.07(UJ)	na*	na	na	na	na	**2.2**	**0.37**	0.014	**21**	**4.1**	0.024
Beryllium	0.975	na	na	na	na	na	0.017	0.0057	0.024	**0.39**	0.054	0.0023
Chromium	18.61	0.0024	0.0005	0.0098	0.022	0.017	0.0098	0.0014	**8.1**	**7.8**	0.025	0.00062
Cyanide (total)	0.221	**0.47**	**0.38**	**2.2**	**2.2**	**2.2**	0.00065	0.0003	na	na	0.00071	0.0001
Lead	22.2	0.19	0.027	**1.1**	**1.6**	**1.4**	0.19	0.06	0.013	0.19	**0.31**	0.006
Manganese	587.6	0.017	0.0065	**0.42**	0.19	**0.31**	**0.42**	0.29	**1.3**	**2.7**	**0.39**	0.014
Mercury	0.0887	**1.1**	**0.32**	**1.3**	**6.8**	**4**	0.03	0.004	**1.8**	0.0026	0.052	0.0019
Selenium	1.77(U)	**0.32**	0.018	**1.8**	**2.4**	**2**	**2.1**	**0.84**	**0.43**	**3.4**	**2.7**	0.021
Organic Chemicals												
Aroclor-1254	0.0135	0.079	0.061	0.01	**0.33**	0.17	0.015	0.00026	na	0.000084	0.031	0.09
Benzoic acid	0.35	na	na	na	na	na	0.27	0.083	na	na	**0.35**	0.001
DDT[4,4'-]	0.107	0.089	0.089	0.0038	0.3	0.15	**1.2**	0.0089	na	0.026	**2.4**	**0.56**
HI		**2**	0.9	**7**	**14**	**10**	**6**	**2**	**12**	**36**	**10**	0.7

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 AOC 00-030(h)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	1.13(U)	0.05	Plant	**23**
Barium	111	110	Plant	**1**
Copper	21.52	15	American robin (insectivore)	**1.4**
Lead	25.59	14	American robin (insectivore)	**1.8**
Selenium	1.9(U)	0.52	Plant	**3.7**
Thallium	0.365	0.032	Montane shrew	**11.4**
Uranium	3.4	25	Plant	0.14
Zinc	116.6	48	American robin (insectivore)	**2.4**
Organic Chemicals (mg/kg)				
Acenaphthene	0.0732	0.25	Plant	0.29
Acetone	0.0294	1.2	Deer mouse	0.025
Anthracene	0.117	6.8	Plant	0.017
Aroclor-1260	0.0065	0.14	Red fox	0.046
Benzo(a)anthracene	0.319	3	Montane shrew	0.11
Benzo(a)pyrene	0.386	53	Montane shrew	0.0073
Benzo(b)fluoranthene	0.6	18	Plant	0.033
Benzo(g,h,i)perylene	0.233	24	Montane shrew	0.0097
Benzo(k)fluoranthene	0.222	62	Montane shrew	0.0036
Bis(2-ethylhexyl)phthalate	24.49	0.02	American robin (insectivore)	**1200**
Butylbenzylphthalate	24.1	90	Montane shrew	0.27
Chlordane[alpha-]	0.00249	0.27	Montane shrew	0.0092
Chlordane[gamma-]	0.00251	2.2	Plant	0.0011
Chloroform	0.000378	8	Deer mouse	0.000047
Chrysene	0.454	2.4	Montane shrew	0.19
DDD[4,4'-]	0.015	0.0063	American robin (insectivore)	**2.4**
DDE[4,4'-]	0.18	0.11	American robin (insectivore)	**1.6**
DDT[4,4'-]	0.568	0.044	Montane shrew	**13**
Di-n-butylphthalate	3.97	0.011	American robin (insectivore)	**360**
Di-n-octylphthalate	0.285	1.1	Montane shrew	0.26
Dibenz(a,h)anthracene	0.0675	12	Montane shrew	0.0056
Dibenzofuran	0.0818	6.1	Plant	0.013
Dieldrin	0.0032	0.0045	Montane shrew	**0.71**
Fluoranthene	0.711	10	Earthworm	0.071
Fluorene	0.0683	3.7	Earthworm	0.018
Indeno(1,2,3-cd)pyrene	0.229	62	Montane shrew	0.0037
Methylene chloride	0.00203	2.6	Deer mouse	0.00078
Methylnaphthalene[2-]	0.0619	2.5	Montane shrew	0.025

Table I-5.3-8 (continued)

COPC	EPC	ESL	Receptor	HQ
Organic Chemicals (mg/kg) (continued)				
Naphthalene	0.0964	1	Plant	0.096
Phenanthrene	0.527	5.5	Earthworm	0.096
Pyrene	0.756	10	Earthworm	0.076
Toluene	0.000578	23	Montane shrew	0.000025
Trichloroethene	0.002	42	Montane shrew	0.00005
Radionuclides (pCi/g)				
Cesium-137	0.187	680	Red fox	0.00028
Plutonium-239/240	0.458	47	Earthworm	0.0097

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-9
HI Analysis for AOC 00-030(h)

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	1.13(U)	na*	na	na	na	na	**2.4**	**0.39**	0.014	**23**	**4.3**	0.025
Barium	111	0.01	0.003	0.14	0.11	0.12	0.062	0.034	**0.34**	**1**	0.085	0.0027
Copper	21.52	0.2	0.013	**0.57**	**1.4**	**0.98**	**0.34**	0.08	0.27	**0.31**	**0.57**	0.0057
Lead	25.59	0.21	0.032	**1.2**	**1.8**	**1.6**	0.21	0.069	0.015	0.21	**0.36**	0.0069
Selenium	1.9(U)	**0.34**	0.02	**1.9**	**2.5**	**2.2**	**2.3**	**0.9**	**0.46**	**3.7**	**2.9**	0.023
Thallium	0.365	0.055	0.0049	0.04	**0.41**	0.23	**5.4**	0.13	na	**3.65**	**11.4**	0.13
Zinc	116.6	**0.36**	0.049	**0.33**	**2.4**	**1.4**	**0.69**	0.065	**0.97**	**0.73**	**1.2**	0.019
Organic Chemicals												
Bis(2-ethylhexyl)phthalate	24.49	**540**	**740**	**1.2**	**1200**	**610**	**22**	0.0091	na	na	**42**	**20**
DDD[4,4'-]	0.015	0.15	0.11	0.028	**0.63**	**0.33**	0.0005	0.000015	na	na	0.00097	0.00014
DDE[4,4'-]	0.18	**0.53**	**0.6**	0.032	**1.6**	**0.86**	0.025	0.0003	na	na	0.049	0.015
DDT[4,4'-]	568	**0.47**	**0.47**	0.02	**1.6**	**0.79**	**6.4**	0.047	na	0.14	**13**	**3**
Dieldrin	0.0032	0.051	0.027	0.0091	0.27	0.14	**0.36**	0.0097	na	0.00032	**0.71**	0.055
Di-n-butylphthalate	3.97	**58**	**17**	**10**	**360**	**190**	0.011	0.00025	na	0.025	0.022	0.00079
HI		**610**	**760**	**16**	**1600**	**810**	**40**	**2**	**2**	**33**	**76**	**24**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.3-10
Minimum ESL Comparison for SWMU 31-001

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Arsenic	3.7	6.8	Earthworm	**0.54**
Barium	87.9	110	Plant	**0.8**
Chromium	7.52	2.3	Earthworm	**3.3**
Copper	11.93	15	American robin (insectivore)	**0.8**
Lead	12.73	14	American robin (insectivore)	**0.91**
Selenium	1.31	0.52	Plant	**2.5**
Zinc	48.05	48	American robin (insectivore)	**11**
Organic Chemicals (mg/kg)				
Acetone	0.00594	1.2	Deer mouse	0.005
Anthracene	0.0142	6.8	Plant	0.0021
Aroclor-1254	0.0083	0.041	American robin (insectivore)	0.2
Aroclor-1260	0.135	0.14	Red fox	**0.96**
Bis(2-ethylhexyl)phthalate	0.291	0.02	American robin (insectivore)	**15**
Chrysene	0.0849	2.4	Montane shrew	0.035
DDE[4,4'-]	0.00906	0.11	American robin (insectivore)	0.082
DDT[4,4'-]	0.0278	0.044	Montane shrew	**0.63**
Di-n-butylphthalate	0.0772	0.011	American robin (insectivore)	**7**
Dichlorobenzene[1,4-]	0.000438	0.88	Montane shrew	0.0005
Dieldrin	0.000797	0.0045	Montane shrew	0.18
Fluoranthene	0.104	10	Earthworm	0.01
Phenanthrene	0.0409	5.5	Earthworm	0.0074
Pyrene	0.168	10	Earthworm	0.017
Tetrachloroethene	0.000694	0.18	Montane shrew	0.0039
Toluene	0.000883	23	Montane shrew	0.000038
Radionuclides (pCi/g)				
Cesium-137	0.609	680	Red fox	0.0009

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-11
HI Analysis for SWMU 31-001

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												
Arsenic	3.7	0.023	0.0034	0.088	0.21	0.14	0.12	0.023	**0.54**	0.21	0.25	0.0046
Barium	87.9	0.008	0.0024	0.11	0.088	0.095	0.049	0.027	0.27	**0.8**	0.068	0.0021
Chromium	7.52	0.001	0.0002	0.004	0.009	0.007	0.004	0.0006	**3.3**	**3.1**	0.01	0.0003
Copper	11.93	0.11	0.0075	0.31	**0.8**	0.54	0.19	0.044	0.15	0.17	0.31	0.0031
Selenium	1.31	0.23	0.014	**1.3**	**1.7**	**1.5**	**1.6**	**0.62**	**0.32**	**2.5**	**2**	0.016
Lead	12.73	0.11	0.016	**0.61**	**0.91**	**0.8**	0.11	0.034	0.0075	0.11	0.18	0.0034
Zinc	48.05	0.15	0.02	0.14	**1**	**0.57**	0.28	0.027	**0.4**	**0.3**	**0.49**	0.008
Organic Chemicals												
Aroclor-1260	0.135	0.036	0.029	0.0029	0.15	0.079	0.0068	0.000045	na*	na	0.014	**0.96**
Bis(2-ethylhexyl)phthalate	0.291	**6.5**	**8.8**	0.015	**15**	**7.3**	0.26	0.00011	na	na	**0.49**	0.24
DDT[4,4'-]	0.0278	0.023	0.023	0.00099	0.077	0.039	**0.31**	0.0023	na	0.0068	**0.63**	0.15
Di-n-butylphthalate	0.0772	**1.1**	**0.32**	0.2	**7**	**3.7**	0.00021	4.8E-06	na	0.00048	0.00043	0.000015
HI		**8**	**9**	**2**	**26**	**14**	**3**	1	**5**	**7**	**4**	1

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.3-12
Minimum ESL Comparison for Consolidated Unit 45-001-00

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	1.36(UJ)	0.05	Plant	**27**
Cadmium	0.201	0.27	Montane shrew	**0.74**
Chromium	8.125	2.3	Earthworm	**3.5**
Copper	7.112	15	American robin (insectivore)	**0.47**
Lead	16.12	14	American robin (insectivore)	**1.2**
Mercury	0.782	0.013	American robin (insectivore)	**60**
Selenium	0.691	0.52	Plant	**1.3**
Silver	5.181	2.6	American robin (insectivore)	**2**
Zinc	45.84	48	American robin (insectivore)	**0.96**
Organic Chemicals (mg/kg)				
Acenaphthene	0.136	0.25	Plant	**0.54**
Acetone	0.0257	1.2	Deer mouse	0.021
Anthracene	0.0329	6.8	Plant	0.0048
Aroclor-1242	0.0207	0.041	American robin (insectivore)	**0.5**
Aroclor-1254	0.0141	0.041	American robin (insectivore)	**0.34**
Aroclor-1260	0.0205	0.14	Red fox	0.15
Benzo(a)anthracene	0.123	3	Montane shrew	0.041
Benzo(a)pyrene	0.17	53	Montane shrew	0.0032
Benzo(b)fluoranthene	0.0935	18	Plant	0.0052
Benzo(k)fluoranthene	0.173	62	Montane shrew	0.0028
Benzoic acid	4.88	1	Montane shrew	**4.9**
Bis(2-ethylhexyl)phthalate	0.12	0.02	American robin (insectivore)	**6**
Chloroform	0.000909	8	Deer mouse	0.00011
Chrysene	0.0554	2.4	Montane shrew	0.023
DDE[4,4'-]	0.0198	0.11	American robin (insectivore)	0.18
DDT[4,4'-]	0.0278	0.044	Montane shrew	**0.63**
Dichloroethene[1,1-]	0.00109	11	Montane shrew	0.000099
Dieldrin	0.0118	0.0045	Montane shrew	**2.6**
Fluoranthene	0.0935	10	Earthworm	0.0094
Fluorene	0.0603	3.7	Earthworm	0.016
Methylnaphthalene[2-]	0.116	2.5	Montane shrew	0.046
Naphthalene	0.123	1	Plant	0.12
Phenanthrene	0.0834	5.5	Earthworm	0.015
Pyrene	0.102	10	Earthworm	0.01

Table I-5.3-12 (continued)

COPC	EPC	ESL	Receptor	HQ
Organic Chemicals (mg/kg) (continued)				
Toluene	0.00126	23	Montane shrew	0.000055
Radionuclides (pCi/g)				
Cesium-137	0.179	680	Red fox	0.00026
Tritium	0.126	36,000	Plant	0.0000035

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-13
HI Analysis for Consolidated Unit 45-001-00

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	1.36 (UJ)	na*	na	na	na	na	**2.8**	**0.47**	0.017	**27**	**5.2**	0.03
Cadmium	0.201	0.1	0.00035	0.046	**0.69**	**0.37**	**0.39**	0.02	0.0014	0.0063	**0.74**	0.00039
Chromium	8.125	0.0011	0.00022	0.0043	0.0098	0.0074	0.0043	0.00063	**3.5**	**3.4**	0.011	0.00027
Copper	7.112	0.065	0.0044	0.19	**0.47**	**0.32**	0.11	0.026	0.089	0.1	0.19	0.0019
Lead	16.12	0.13	0.02	**0.77**	**1.2**	**1**	0.13	0.044	0.0095	0.13	0.22	0.0044
Mercury	0.782	**9.5**	**2.8**	**11**	**60**	**36**	0.26	0.036	**16**	0.023	**0.46**	0.017
Selenium	0.691	0.12	0.0071	**0.69**	**0.92**	**0.79**	**0.83**	**0.33**	0.17	**1.3**	**1**	0.0082
Silver	5.181	0.27	0.0062	**0.47**	**2**	**1.2**	0.22	0.035	na	0.0093	**0.37**	0.0013
Zinc	45.84	0.14	0.019	0.13	**0.96**	**0.54**	0.27	0.025	**0.38**	0.29	**0.47**	0.0076
Organic Chemicals												
Acenaphthene	0.136	na	na	na	na	na	0.00085	0.00028	na	**0.54**	0.0011	0.000022
Aroclor-1242	0.0207	0.1	0.015	0.021	**0.5**	0.26	0.027	0.00069	na	na	0.054	0.0013
Aroclor-1254	0.0141	0.083	0.064	0.011	**0.34**	0.18	0.016	0.00027	na	0.000088	0.032	0.094
Benzoic acid	4.88	na	na	na	na	na	**3.8**	**1.2**	na	na	**4.9**	0.014
Bis(2-ethylhexyl)phthalate	0.12	**2.7**	**3.6**	0.006	**6**	**3**	0.11	0.000044	na	na	0.2	0.1

Table I-5.3-13 (continued)

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 (continued)												
DDT[4,4'-]	0.0278	0.023	0.023	0.00099	0.077	0.039	**0.31**	0.0023	na	0.0068	**0.63**	0.15
Dieldrin	0.0118	0.19	0.098	0.034	**0.98**	**0.51**	**1.3**	0.036	na	0.0012	**2.6**	0.2
HI		**14**	**7**	**16**	**76**	**46**	**11**	**2**	**20**	**34**	**17**	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 to
Background Concentrations for SWMU 00-018(a)

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)[a]	Tuff Background Concentrations (mg/kg)[a]
Antimony	0.178	0.1–1.0	0.5[b]
Barium	99.98	21–410	1.4–51.6
Cadmium	0.523	0.2–2.6	0.1–1.5
Chromium	10.24	1.9–36.5	0.25–13
Copper	33.3	0.25–16	0.25–6.2
Cyanide	0.955	0.5[b]	0.5[b]
Lead	47.56	2–28	1.6–15.5
Manganese	382.3	76–1100	22–752
Mercury	0.567	0.05–0.1	0.1[b]
Nickel	4.649	1-29	0.5-7
Selenium	4.65	0.1–1.7	0.1–0.105
Silver	2.189	1.0[b]	0.2–1.9
Zinc	80.08	14–75.5	5.5–65.6

Note: Bolded COPECs are greater than background.

[a] LANL 1998, 059730.

[b] BV used.

Table I-5.4-2
Comparison of EPCs to
Background Concentrations for AOC 00-030(eS)

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)[a]	Tuff Background Concentrations (mg/kg)[a]
Barium	115.2	21–410	1.4–51.6
Calcium	5049	500-14000	200-2230
Chromium	12.42	1.9–36.5	0.25–13
Copper	51.07	0.25–16	0.25–6.2
Cyanide (total)	0.224	0.5[b]	0.5[b]
Lead	198.8	2–28	1.6–15.5
Mercury	0.138	0.05–0.1	0.1[b]
Selenium	8.62(U)	0.1–1.7	0.1–0.105
Silver	0.839	1[b]	0.2–1.9
Zinc	219	14–75.5	5.5–65.6

Note: Bolded COPECs are greater than background.

[a] LANL 1998, 059730.

[b] BV used.

Table I-5.4-3
Comparison of EPCs to
Background Concentrations for AOC 00-030(f)

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)[a]	Tuff Background Concentrations (mg/kg)[a]
Antimony	1.07(UJ)	0.1–1.0	0.5[b]
Beryllium	0.975	0.04–3.95	0.04–1.8
Chromium	18.61	1.9–36.5	0.25–13
Cyanide	0.221	0.5[b]	0.5[b]
Lead	22.2	2–28	1.6–15.5
Manganese	587.6	76–1100	22–752
Mercury	0.0887	0.05–0.1	0.1[b]
Selenium	1.77(U)	0.1–1.7	0.1–0.105

[a] LANL 1998, 059730.

[b] BV used.

Table I-5.4-4
Comparison of EPCs to
Background Concentrations for AOC 00-030(h)

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)*	Tuff Background Concentrations (mg/kg)*
Antimony	1.13 (U)	0.1–1	0.05–0.4
Barium	111	21–410	1.4–51.6
Calcium	2397	500-14000	200-2230
Copper	21.52	0.25–16	0.25–6.2
Lead	25.59	2–28	1.6–15.5
Selenium	1.9 (U)	0.1–1.7	0.1–0.105
Thallium	0.365	0.063–1	0.05–1.7
Zinc	116.6	14–75.5	5.5–65.6

Note: Bolded COPECs are above background.

*LANL 1998, 059730.

Table I-5.4-5
Comparison of EPCs to
Background Concentrations for SWMU 31-001

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)*	Tuff Background Concentrations (mg/kg)*
Arsenic	3.7	0.3–9.3	0.25–5
Barium	87.9	21–410	1.4–51.6
Calcium	51094	500-14000	200–2230
Chromium	7.52	1.9–36.5	0.25–13
Copper	11.93	0.25–16	0.25–6.2
Lead	12.73	2–28	1.6–15.5
Selenium	1.31	0.1–1.7	0.1–0.105
Zinc	48.05	14–75.5	5.5–65.6

Note: Bolded COPECs are above background.
*LANL 1998, 059730.

Table I-5.4-6
Comparison of EPCs to
Background Concentrations for Consolidated Unit 45-001-00

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)[a]	Tuff Background Concentrations (mg/kg)[a]
Antimony	1.36 (UJ)	0.1–1.0	0.5[b]
Cadmium	0.201	0.2–2.6	0.1–1.5
Chromium	8.125	1.9–36.5	0.25–13
Copper	7.112	0.25–16	0.25–6.2
Lead	16.12	2–28	1.6–15.5
Mercury	0.782	0.05–0.1	0.1[b]
Selenium	0.691	0.1–1.7	0.1–0.105
Silver	5.181	1.0[b]	0.2–1.9
Zinc	45.84	14–75.5	5.5–65.6

Note: Bolded COPECs are above background.
[a] LANL 1998, 059730.
[b] BV used.

Table I-5.4-7
PAUFs for Ecological Receptors

Receptor	Home Range[a] (ha)	Population Area[a] (ha)	PAUF[b] 00-018(a) 2.8 ha	PAUF 00-030(eS) 1.0 ha	PAUF 00-030(f) 0.18 ha	PAUF 00-030(h) 0.47 ha	PAUF 31-001 1.4 ha	PAUF 45-001-00 1.8 ha
American robin	0.42	16.8	0.166	0.060	0.011	0.028	0.083	0.107
American kestrel	106	4240	0.00066	0.00024	0.00004	0.00011	0.00033	0.00042
Deer mouse	0.077	3.0	0.93	0.333	0.060	0.157	0.467	0.600
Desert cottontail	3.1	124	0.0226	0.008	0.001	0.004	0.011	0.015
Montane shrew	0.39	15.6	0.179	0.064	0.012	0.030	0.090	0.115
Red fox	1038	41,520	0.000067	0.000024	0.000004	0.000011	0.000034	0.000043
Mexican spotted owl[c]	366	n/a[d]	0.0076	0.003	0.0005	0.0013	0.0038	0.0049

[a] Values from EPA 1993, 059384.
[b] PAUF is calculated as the area of each site divided by the population area.
[c] Value for Mexican spotted owl is the AUF based on individual HR.
[d] n/a = Not applicable.

Table I-5.4-8
Adjusted HQs and HIs for SWMU 00-018(a)

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	33.3	0.0002	0.00016	0.15	**0.37**	0.25	**0.48**	0.0027	**0.42**	**0.48**	0.16	5.9E-07
Cyanide (total)	0.955	0.0013	0.012	**1.6**	**1.6**	**1.6**	0.0026	0.000029	na*	na	0.00055	2.9E-08
Lead	47.56	0.00026	0.00045	**0.38**	**0.56**	**0.5**	**0.37**	0.0029	0.028	**0.4**	0.12	8.7E-07
Mercury	0.567	0.0046	0.015	**1.3**	**7.3**	**4.3**	0.18	0.00059	**11**	0.017	0.059	8.0E-07
Selenium	4.65	0.00055	0.00036	**0.78**	**1**	**0.88**	**5.2**	0.05	**1.1**	**8.9**	**1.3**	3.7E-06
Silver	2.189	0.000079	0.00002	0.033	0.14	0.085	0.085	0.00034	na	0.0039	0.029	3.6E-08
Organic Chemicals (mg/kg)												
Aroclor-1242	0.0139	0.000035	0.000075	0.0023	0.056	0.03	0.017	0.00001	na	na	0.0066	5.8E-08
Aroclor-1254	0.0446	0.00017	0.0015	0.0056	0.18	0.093	0.047	0.000019	na	0.00028	0.018	2.0E-05
Aroclor-1260	0.0418	0.0000073	0.000069	0.00015	0.008	0.0042	0.002	0.00000032	na	na	0.00075	2.0E-05
Benzoic acid	0.458	na	na	na	na	na	**0.33**	0.0025	na	na	0.082	8.7E-08
Bis(2-ethylhexyl)phthalate	0.129	0.0019	0.03	0.0011	**1.1**	**0.53**	0.11	0.0000011	na	na	0.039	7.4E-06
Chloroaniline[4-]	2	na	na	na	na	na	na	na	**1.1**	**2**	na	na
DDD[4,4'-]	0.00262	0.000064	0.00055	0.0032	0.07	0.037	0.00031	0.00000023	na	na	0.00011	6.3E-09
Dieldrin	0.00336	0.000035	0.00021	0.0016	0.046	0.025	**0.35**	0.00023	na	0.00034	0.13	0.0000039
Di-n-octylphthalate	2.7	na	na	na	na	na	**1.2**	3.8E-06	na	na	**0.45**	0.000011

Table I-5.4-8 (continued)

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) (continued)												
Endrin	0.000568	0.000046	0.00021	0.002	0.068	0.033	0.011	0.0000063	na	0.17	0.0045	9.4E-08
HI		0.01	0.06	**4**	**13**	**9**	**9**	0.06	**14**	**12**	**3**	0.00007

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-9
Adjusted HQs and HIs for AOC 00-030(eS)

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	51.07	0.00011	0.000096	0.078	0.2	0.14	0.26	0.0015	**0.64**	**0.73**	0.083	3.1E-07
Lead	198.8	0.00041	0.00075	**0.57**	**0.84**	**0.72**	**0.56**	0.0043	0.12	**1.7**	0.18	1.3E-06
Mercury	0.138	0.00041	0.0015	0.12	**0.66**	**0.38**	0.015	0.00005	**2.8**	0.0041	0.0052	7.2E-08
Selenium	8.62 (U)	0.00036	0.00027	**0.52**	**0.66**	**0.59**	**3.3**	0.033	**2.1**	**17**	**0.83**	2.4E-06
Zinc	219	0.00016	0.00027	0.038	0.28	0.16	**0.43**	0.00096	**1.8**	**1.4**	0.14	8.9E-07
Organic Chemicals (mg/kg)												
Aroclor-1254	0.0353	0.00005	0.00048	0.0016	0.052	0.026	0.013	5.4E-06	na*	0.00022	0.0051	5.8E-06
Bis(2-ethylhexyl)phthalate	0.119	0.00062	0.011	0.00036	**0.36**	0.18	0.036	3.5E-07	na	na	0.013	2.4E-06
HI		0.002	0.01	1	**3**	**2**	**5**	0.04	**6**	**21**	1	0.00001

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-10
Adjusted HQs and HIs for AOC 00-030(f)

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	0.0135	0.0000032	0.0000031	0.00011	0.0036	0.0019	0.0009	2.6E-07	na*	na	0.00037	0.00000036
Benzoic acid	0.35	na	na	na	na	na	0.016	0.000083	na	na	0.0042	0.000000004
DDT[4,4'-]	0.107	0.0000036	0.0000045	0.000042	0.0033	0.0017	0.072	8.9E-06	na	na	0.029	0.0000022
HI		0.000007	0.000008	0.0002	0.007	0.004	0.09	0.00009	na	na	0.03	0.000003

* na = Not available.

Table I-5.4-11
Adjusted HIs at AOC 00-030(h)

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	21.52	0.000022	0.000017	0.016	0.039	0.027	0.053	0.00032	0.27	**0.31**	0.017	6.3E-08
Zinc	116.6	0.00004	0.000064	0.0092	0.067	0.039	0.11	0.00026	**0.97**	**0.73**	0.036	2.1E-07
Organic Chemicals (mg/kg)												
Bis(2-ethylhexyl)phthalate	24.49	0.059	**0.96**	0.034	**34**	**17**	**3.5**	0.000036	na*	na	**1.3**	0.00022
DDD[4,4'-]	0.015	0.000062	0.00055	0.0031	0.067	0.036	0.0003	2.3E-07	na	na	0.00011	5.9E-09
DDE[4,4'-]	0.18	0.000058	0.00078	0.0009	0.045	0.024	0.0039	1.2E-06	na	na	0.0015	1.7E-07
DDT[4,4'-]	0.568	0.000052	0.00061	0.00056	0.045	0.022	**1**	0.00019	na	0.14	**0.39**	0.000033
Dieldrin	0.0032	0.0000056	0.000035	0.00025	0.0076	0.0039	0.057	0.000039	na	0.00032	0.021	6.1E-07
Di-n-butylphthalate	3.97	0.0064	0.022	0.28	**10**	**5.3**	0.0017	0.000001	na	0.025	0.00066	8.7E-09
HI		0.07	1	0.3	**44**	**23**	**5**	0.0009	1	1	**2**	0.0003

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* na = Not available.

Table I-5.4-12
Adjusted HQs and HIs for SWMU 31-001

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-1260	0.135	0.000012	0.00011	0.00024	0.012	0.0066	0.0032	5E-07	na*	na	0.0013	0.000033
Bis(2-ethylhexyl)phthalate	0.291	0.0021	0.033	0.0012	**1.2**	**0.61**	0.12	1.2E-06	na	na	0.044	8.2E-06
DDT[4,4'-]	0.0278	0.0000076	0.000087	0.000082	0.0064	0.0032	0.14	0.000025	na	0.0068	0.057	5.1E-06
Di-n-butylphthalate	0.0772	0.00036	0.0012	0.017	**0.58**	**0.31**	0.000098	5.3E-08	na	0.00048	0.000039	5.1E-10
HI		0.003	0.04	0.02	**2**	0.9	0.3	0.00003	na	0.007	0.1	0.00005

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-13
Adjusted HIs at Consolidated Unit 45-001-00

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)												
Mercury	0.782	0.0041	0.0012	**1.2**	**6.4**	**3.8**	0.16	0.00053	**16**	0.023	0.053	7E-07
Silver	5.181	0.00011	0.0000025	0.05	0.21	0.13	0.13	0.00052	na*	0.0093	0.043	5.6E-10
Organic Chemicals (mg/kg)												
Acenaphthene	0.136	na	na	na	na	na	0.00051	0.0000041	na	**0.54**	0.00068	9E-12
Aroclor-1242	0.0207	0.000043	0.000026	0.0022	0.054	0.028	0.016	0.00001	na	na	0.0063	5.6E-10
Aroclor-1254	0.0141	0.000035	0.000027	0.0012	0.037	0.019	0.0096	0.000004	na	0.000088	0.0037	4E-06
Benzoic acid	4.88	na	na	na	na	na	**2.3**	0.018	na	na	**0.56**	6E-07
Bis(2-ethylhexyl)phthalate	0.12	0.0011	0.0015	0.00064	**0.64**	**0.32**	0.065	0.0000006	na	na	0.023	4.3E-06
DDT[4,4'-]	0.0278	0.0000097	0.0000097	0.0038	0.0083	0.0041	0.19	0.000035	na	0.0068	0.073	6.2E-06
Dieldrin	0.0118	0.000079	0.000041	0.0036	0.1	0.055	**0.78**	0.00054	na	0.0012	0.3	8.6E-06
HI		0.005	0.003	1	**7**	**4**	**4**	0.02	**16**	0.6	1	0.00003

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-14
Summary of LOAEL-Based ESLs for Terrestrial Receptors

COPEC	Receptor	LOAEL-Based TRVs	Unit	LOAEL-Based ESLs (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Copper	American Robin (insectivore)	12.1	mg/kg/d	4.60E+01	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Deer Mouse	9.34	mg/kg/d	1.00E+02	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Earthworm	530	mg/kg	5.30E+02	The lowest observed effect concentration (LOEC) is extrapolated from EPA geometric mean no observed effect concentration (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	4.90E+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.
Cyanide(total)	American Robin (herbivore)	0.4	mg/kg/d	1.00E+00	LOAEL was derived from a lethal dose (LD) 50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL, except an uncertainty factor of 0.01 was applied.
	American Robin (insectivore)	0.4	mg/kg/d	1.00E+00	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL, except an uncertainty factor of 0.01 was applied.
	American Robin (omnivore)	0.4	mg/kg/d	1.00E+00	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL, except an uncertainty factor of 0.01 was applied.

Table I-5.4-14 (continued)

COPEC	Receptor	LOAEL-Based TRVs	Unit	LOAEL-Based ESLs (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Lead	American Robin (herbivore)	3.26	mg/kg/d	4.20E+01	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	American Robin (insectivore)	3.26	mg/kg/d	2.80E+01	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	American Robin (omnivore)	3.26	mg/kg/d	3.30E+01	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Deer Mouse	8.9	mg/kg/d	2.30E+02	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Plant	576	mg/kg	5.70E+02	LOEC is extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf). Applied an uncertainty factor of 5 for MATCs and calculated the geometric mean.
Mercury	American Robin (herbivore)	0.19	mg/kg/d	7.00E-01	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL, except an uncertainty factor of 0.01 was applied.
	American Robin (insectivore)	0.19	mg/kg/d	1.30E-01	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL, except an uncertainty factor of 0.01 was applied.
	American Robin (omnivore)	0.19	mg/kg/d	2.20E-01	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same LD50 as the LOAEL was, except an uncertainty factor of 0.01 was applied.
	Earthworm	0.5	mg/kg	5.00E-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.

Table I-5.4-14 (continued)

COPEC	Receptor	LOAEL-Based TRVs	Unit	LOAEL-Based ESLs (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Selenium	American Robin (herbivore)	0.579	mg/kg/d	2.00E+00	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_selenium.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	American Robin (insectivore)	0.579	mg/kg/d	1.50E+00	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_selenium.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	American Robin (omnivore)	0.579	mg/kg/d	1.70E+00	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_selenium.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Deer Mouse	0.215	mg/kg/d	1.20E+00	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_selenium.pdf) and is the lowest bounded LOAEL in the data set. The NOAEL is from the same study as the LOAEL.
	Earthworm	41	mg/kg	4.10E+01	LOEC is from the literature. The NOEC is derived from this LOEC by applying an uncertainty factor of 0.1.
	Montane Shrew	0.215	mg/kg/d	9.90E-01	LOAEL is the pair to the NOAEL, which is highest bounded NOAEL below the lowest bounded LOAEL for reproduction, growth, or survival.
	Plant	3.4	mg/kg	3.40E+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	Deer Mouse	754	mg/kg/d	1.70E+03	LOAEL is extrapolated from a NOAEL by applying an uncertainty factor of 10.
	Earthworm	939	mg/kg	9.30E+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 10 for EC10s and calculated the geometric mean.
	Plant	812	mg/kg	8.10E+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.

Table I-5.4-14 (continued)

COPEC	Receptor	LOAEL-Based TRVs	Unit	LOAEL-Based ESLs (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Benzoic acid	Deer Mouse	40	mg/kg/d	1.30E+01	LOAEL is equal to a LOAEL taken directly from the literature. The NOAEL was derived from this LOAEL by applying an uncertainty factor 0.1.
Bis(2-ethylhexyl)phthalate	American Robin (insectivore)	11	mg/kg/d	2.00E-01	LOAEL extrapolated from a NOAEL by applying an uncertainty factor of 10.
	American Robin (omnivore)	11	mg/kg/d	4.00E-01	LOAEL extrapolated from a NOAEL by applying an uncertainty factor of 10.
	Deer Mouse	183	mg/kg/d	1.10E+01	LOAEL is equal to a LOAEL taken directly from the literature. The NOAEL was derived from this LOAEL by applying an uncertainty factor 0.1.
	Montane Shrew	183	mg/kg/d	5.90E+00	LOAEL is equal to a LOAEL taken directly from the literature. The NOAEL was derived from this LOAEL by applying an uncertainty factor 0.1.
Chloroaniline[4-]	Plant	10	mg/kg	1.00E+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.
	Earthworm	18	mg/kg	1.80E+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.
DDT [4,4'-]	Deer Mouse	6.94E-01	mg/kg/d	4.40E-01	LOAEL is from the literature. LOAEL is the paired value of the NOAEL.
	Montane Shrew	6.94E-01	mg/kg/d	2.20E-01	LOAEL is from the literature. LOAEL is the paired value of the NOAEL.
Dieldrin	Deer Mouse	0.03	mg/kg/d	1.70E-02	LOAEL is from EPA (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_dieldrin.pdf). NOAEL is from the same study as the LOAEL.
Di-n-butylphthalate	Robin (insectivore)	1.4	mg/kg/d	1.10E-01	LOAEL is equal to a LOAEL taken directly from the literature. The NOAEL was derived from this LOAEL by applying an uncertainty factor 0.1.
	Robin (omnivore)	1.4	mg/kg/d	2.10E-01	LOAEL is equal to a LOAEL taken directly from the literature. The NOAEL was derived from this LOAEL by applying an uncertainty factor 0.1.

Table I-5.4-14 (continued)

COPEC	Receptor	LOAEL-Based TRVs	Unit	LOAEL-Based ESLs (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Di-n-octylphthalate	Deer Mouse	794	mg/kg/d	2.20E+01	LOAEL extrapolated from a NOAEL by applying an uncertainty factor of 10.
	Montane Shrew	794	mg/kg/d	1.10E+01	LOAEL extrapolated from a NOAEL by applying an uncertainty factor of 10.

Note: Some COPECs (e.g., inorganic chemicals from EPA Eco-SSL documents) do not have LOAELs or LOECs. In these cases, an uncertainty factor of 10 was applied to the NOAEL/NOEC (i.e., EC10 and EC20) data in accordance with the acknowledged uncertainty between the LOAEL/LOEC and NOAEL/NOEC in Dourson and Stara (1983, 073474), Calbrese and Baldwin (1993, 110405), and EPA (http://www.epa.gov/epawaste/hazard/tsd/td/combust/ecorisk.htm). In the cases where EPA used MATCs for the NOAEL/NOEC data, an uncertainty factor of 5 was used to adjust to the LOAEL/LOEC because the MATC is between the NOAEL/NOEC and the LOAEL/LOEC.

Table I-5.4-15
HI Analysis Using LOAEL-Based ESLs for SWMU 00-018(a)

COPECs	EPC (mg/kg)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Montane Shrew	Earthworm	Plant
Copper	33.3	n/a*	**0.7**	n/a	0.3	n/a	0.06	0.07
Cyanide	0.955	**0.96**	**0.96**	**0.96**	n/a	n/a	n/a	n/a
Lead	47.56	**1.1**	**1.7**	**1.4**	0.2	n/a	n/a	0.08
Mercury	0.567	**0.8**	**4.4**	**2.6**	n/a	n/a	**1.1**	n/a
Selenium	4.65	**2.3**	**3.1**	**2.7**	**3.9**	**4.7**	0.1	**1.4**
Benzoic acid	0.458	n/a	n/a	n/a	0.04	n/a	n/a	n/a
Bis(2-ethylhexyl)phthalate	0.129	n/a	**0.6**	0.3	n/a	n/a	n/a	n/a
Chloroaniline[4-]	2	n/a	n/a	n/a	n/a	n/a	0.11	0.2
Dieldrin	0.0336	n/a	n/a	n/a	0.07	na	n/a	n/a
Di-n-octylphthalate	2.7	n/a	n/a	n/a	0.1	0.3	n/a	n/a
HI		**5**	**11**	**8**	**5**	**5**	1	**2**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not applicable.

Table I-5.4-16
Adjusted HI Analysis for LOAEL-Based ESLs for SWMU 00-018(a)

COPECs	EPC (mg/kg)	American Robin (herbivore)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Montane Shrew
Copper	33.3	n/a*	0.1	n/a	0.3	n/a
Cyanide	0.955	0.2	0.2	0.2	n/a	n/a
Lead	47.56	0.2	0.3	0.2	0.2	n/a
Mercury	0.567	0.1	**0.7**	**0.4**	n/a	n/a
Selenium	4.65	**0.4**	**0.5**	**0.4**	**3.6**	**0.8**
Bis(2-ethylhexyl)phthalate	0.129	n/a	0.1	0.05	n/a	n/a
Di-n-octylphthalate	2.7	na	n/a	n/a	0.11	0.04
Adjusted HI		0.8	**2**	1	**4**	0.9

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-17
HI Analysis Using LOAEL-Based ESLs for AOC 00-030(eS)

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Earthworm	Plant
Copper	51.07	n/a*	n/a	n/a	0.1	0.1
Lead	198.8	**7.1**	**6.0**	**0.9**	n/a	0.3
Mercury	0.138	**1.1**	**0.6**	n/a	0.3	n/a
Selenium	8.62(U)	**5.7**	**5.1**	**7.2**	0.2	**2.5**
Zinc	219	n/a	n/a	0.1	0.2	0.3
Bis(2-ethylhexyl)phthalate	0.119	**0.6**	n/a	n/a	n/a	n/a
HI		**15**	**12**	**8**	0.8	**3**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-18
Adjusted HI Analysis for LOAEL-Based ESLs for AOC 00-030(eS)

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse
Lead	198.8	**0.4**	**0.4**	0.3
Mercury	0.138	0.06	0.04	n/a*
Selenium	8.62(U)	0.3	0.3	**2.4**
Bis(2-ethylhexyl)phthalate	0.119	0.04	n/a	n/a
Adjusted HI		0.8	0.7	**3**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-19
HI Analysis Using LOAEL-Based ESLs for AOC 00-030(h)

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Montane Shrew
Bis(2-ethylhexyl)phthalate	24.49	**122**	**61**	**2.2**	**4.2**
DDT[4,4'-]	0.568	n/a*	n/a	**1.3**	**2.6**
D-n-butylphthalate	3.97	**36**	**19**	n/a	n/a
HI		**159**	**80**	**4**	**7**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-20
Adjusted HI Analysis for LOAEL-Based ESLs for AOC 00-030(h)

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Montane Shrew
Bis(2-ethylhexyl)phthalate	21.52	**3**	**2**	0.3	0.1
DDT[4,4'-]	0.568	n/a*	n/a	0.2	0.1
Di-n-butylphthalate	3.97	**1**	**0.5**	n/a	n/a
	Adjusted HI	**4**	**3**	0.5	0.2

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-21
HI Analysis Using LOAEL-Based ESLs for SWMU 31-001

COPECs	EPC (mg/kg)	American Robin (insectivore)
Bis(2-ethylhexyl)phthalate	0.291	**1.5**
Di-n-butylphthalate	0.0772	**0.7**
	HI	**2**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

Table I-5.4-22
Adjusted HI Analysis for LOAEL-Based ESLs for SWMU 31-001

COPECs	EPC (mg/kg)	American Robin (insectivore)
Bis(2-ethylhexyl)phthalate	0.291	0.1
Di-n-butylphthalate	0.0772	0.06
	Adjusted HI	0.2

Table I-5.4-23
HI Analysis for LOAEL-Based ESLs for Consolidated Unit 45-001-00

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)	Deer Mouse	Earthworm
Mercury	0.782	**6.0**	**3.6**	n/a*	**1.6**
Benzoic acid	4.88	n/a	n/a	**0.4**	n/a
Bis(2-ethylhexyl)phthalate	0.12	**0.6**	0.3	n/a	n/a
Dieldrin	0.0118	n/a	n/a	**0.7**	n/a
HI		**7**	**4**	1	**2**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-24
Adjusted HI Analysis for LOAEL-Based ESLs for Consolidated Unit 45-001-00

COPECs	EPC (mg/kg)	American Robin (insectivore)	American Robin (omnivore)
Mercury	0.782	**0.6**	**0.4**
Bis(2-ethylhexyl)phthalate	0.12	0.06	0.03
Adjusted HI		0.7	0.4

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 Checklists

I2-1.0 SWMU 00-018(a)

I2-1.1 Part A—Scoping Meeting Documentation

Site ID	
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.	SWMU 00-018(a) is the decommissioned Pueblo Canyon waste water treatment plant (WWTP), located at the end of Olive Street in Pueblo Canyon on Los Alamos County property. The plant began operating in 1951, primarily receiving waste from residential and business properties, including the Los Alamos Medical Center. This WWTP also received laboratory-scale (e.g., less than 10 liters [L] per month) waste from the Health Research Laboratory (HRL) at TA-43 from 1953 to 1983, the only known laboratory contributor to the waste stream at the plant. From 1983 to 1991, the plant received only sanitary waste from Los Alamos businesses and residences. The Pueblo Canyon WWTP was decommissioned during 1991 and 1992. After decontamination and decommissioning (D&D), sludge was transferred from the plant's digester to sludge drying beds. The plant structures still exist and remain connected to the main county sewer system, although waste water bypasses the plant structures and pipelines. It is unknown whether the sludge beds were lined with concrete beneath the sand and cobbles, or if the sludge beds were membrane lined beneath the sand and cobbles (LANL 2005, 090579, p. 3). Releases of effluent discharged into Pueblo Canyon may have occurred. Subsurface infiltration of water-soluble contaminants originating from the sludge drying beds into the underlying filter media is another potential mechanism of release.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water** – n/a **Bare Ground/Unvegetated** – X **Spruce/fir/aspen/mixed conifer** – n/a **Ponderosa pine** – X **Piñon juniper/juniper savannah** – n/a **Grassland/shrubland** – X **Developed** – X **Burned** – n/a In addition to the asphalt roads, structures and limited pavement, the area within the boundary of SWMU 00-018(a) is primarily of high vegetative cover consisting of perennial grasses and weedy species. The over canopy consists primarily of ponderosa pine (*Pinus ponderosa*) with a mixture of smaller woody shrubs such as mountain mahogany (*Cerocarpus montanus*) and scrub oak (*Quercus gambelii*).
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0394).

Provide list, of Neighboring/ Contiguous/ Up gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	No other SWMUs or AOCs exist within approximately one half mile of SWMU 00-018(a).
Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	SWMU 00-018(a) exists within a small "basin," collecting runoff from up gradient areas on all sides except for the eastern end of the site, which itself is up gradient of a small tributary to Pueblo Canyon. The area within SWMU 00-018(a) is on flat terrain (<10% slope), the surface of which is highly disturbed by historical operations and consists of asphalt roads and pavement, structures, concrete drying beds, a Los Alamos County gravel borrow pit, dirt access roads, with otherwise relatively high vegetation cover consisting of disturbed mature grasses and weedy species. The shallow basin within which SWMU 00-018(a) is located collects run-on from upgradient areas surrounding the SWMU. Run-off from SWMU 00-018(a) discharges into terminal point either directly into Pueblo Canyon or a small tributary canyon to the east, discharging (terminal point) into Pueblo Canyon. SWMU 00-018(a) was given an erosion matrix score of 46.3, indicating a moderate potential for erosion/sediment transport (LANL 2005, 088428). There is run-on to the site from structure rooftops and potential for run-on to the site from a natural drainage to the south of Olive Street.

I2-1.2 Part B—Site Visit Documentation

Site ID	SWMU 00-018(a)
Date of Site Visit	October 30, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental and Sharon Wirth, Shaw Environmental Inc.

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = medium to high **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = medium
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Overstory vegetation within the site consists primarily of ponderosa pine (*Pinus ponderosa*) with a mixture of smaller woody shrubs such as mountain mahogany (*Cerocarpus montanus*) and scrub oak (*Quercus gambelii*). Understory vegetation is dominated by perennial grasses and weedy species.
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. Terrestrial receptors can access portions of the site. No aquatic community exists on site.

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 potential is moderate in the area upgradient of SWMU 00-018(a) because of the high vegetation cover and medium grade (10–30% slope) within SWMU 00-018(a) and because of the site's relatively flat terrain (<10% slope) and high development (e.g., asphalt, concrete, and sludge beds). The terminal point of surface water transport is in Pueblo Canyon to the northeast and east of the site.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Runoff from the site may occur, the amount of which is expected to be in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Transport of potential contamination in surface soil at the site may occur via this pathway. **Groundwater**: No. Depth to groundwater (GW) is approximately 900 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been major physical disturbance at SWMU 00-018(a). The relatively flat area within the site is comprised of asphalt roadways and parking areas, concrete buildings and structures, and a gravel borrow pit currently used by Los Alamos County.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. The disturbance from historical operations at the site SWMU 00-018(a) has negatively impacted the habitat quality at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at SWMU 00-018(a).

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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at SWMU 00-018(a).

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-1.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10^{-5} atm-m^3/mol and molecular weight < 200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) detected at SWMU 00-018(a) were at trace concentrations and have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Air transport via fugitive dust of potential surface contamination is possible, though unlikely, at SWMU 00-018(a) because the source of contamination was largely subsurface in origin and subsurface soil would need to be brought to the surface for exposure to occur. Dust exposure to burrowing animals is unlikely at SWMU 00-018(a) because of the very low probability of animal presence and disturbance within the boundary of the site (asphalt paving, concrete sludge beds, building structures, and gravel borrow pit operations).

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no aquatic environments at SWMU 00-018(a), nor are there pathways from SWMU 00-018(a) to aquatic environments off site.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW at SWMU 00-018(a) (approximately 900 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminants to GW is unlikely due to depth of GW at SWMU 00-018(a) (approximately 900 ft bgs). Surface discharge of GW does not occur at the site.

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: Though the site is located near the mesa edge of a small tributary to Pueblo Canyon, mass wasting is not expected to be a release mechanism, mainly because potential contamination at SWMU 00-018(a) is limited to near-surface soil and tuff (less than 10 ft bgs). Additionally, the surface proximal to the mesa edge is primarily covered with vegetation, which has a moderate potential for erosion.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor, given the trace concentrations of detected organic chemicals at SWMU 00-018(a) and the low volatility of the majority of organic chemicals detected at the site (Henry's Law constant $\leq 10^{-5}$ atm-m^3/mol and molecular weight >200 g/mol). Additionally, the shallow soil on the mesa top and the steep slope down gradient of SWMU 00-018(a) limit burrowing and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**

- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals are minor pathways at SWMU 00-018(a). Dust exposure to burrowing animals within SWMU 00-018(a) has a low probability because of the highly disturbed conditions at the site (ecological receptors are not expected to live or perform significant burrowing at the site due to the high degree of disturbance). Dust exposure to burrowing animals down gradient of SWMU 00-018(a) has a low probability because of the high amount of vegetation cover and the steep slopes. Additionally, the relatively shallow soil limits burrowing activities and subsequent exposure to burrowing animals. Finally, exposure to contaminants in tuff has a low probability for occurrence because of the weathering that must occur to the tuff prior to exposure.

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: Residual contaminants in soil could be taken up through plant roots and is a minor pathway at the site. Rain splash from surface soil onto the aboveground portions of plants has a low probability at SWMU 00-018(a) because contamination at the site is largely subsurface in nature.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bio-accumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from SWMU 00-018(a) (Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, chlordane[alpha-], chlordane[gamma-], DDD[4,4'-], DDE[4,4'-], DDT[4,4'-], and dieldrin). This is a minor pathway at SWMU 00-018(a) because of the trace

concentrations at which organic chemicals were detected, the highly disturbed nature of the site, and the resultant low probability of animal presence at the site.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion. This is a minor pathway at SWMU 00-018(a) because of the highly disturbed nature of the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because of the minimal amount of burrowing expected at the site and because of the trace concentrations of organic chemicals detected in soil and tuff at the site.

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: 2

Terrestrial Animals: 2

Provide explanation: Because of the low number of detections of gamma-emitting radiological COPCs, external irradiation is a minor pathway of exposure at SWMU 00-018(a).

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at SWMU 00-018(a).

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

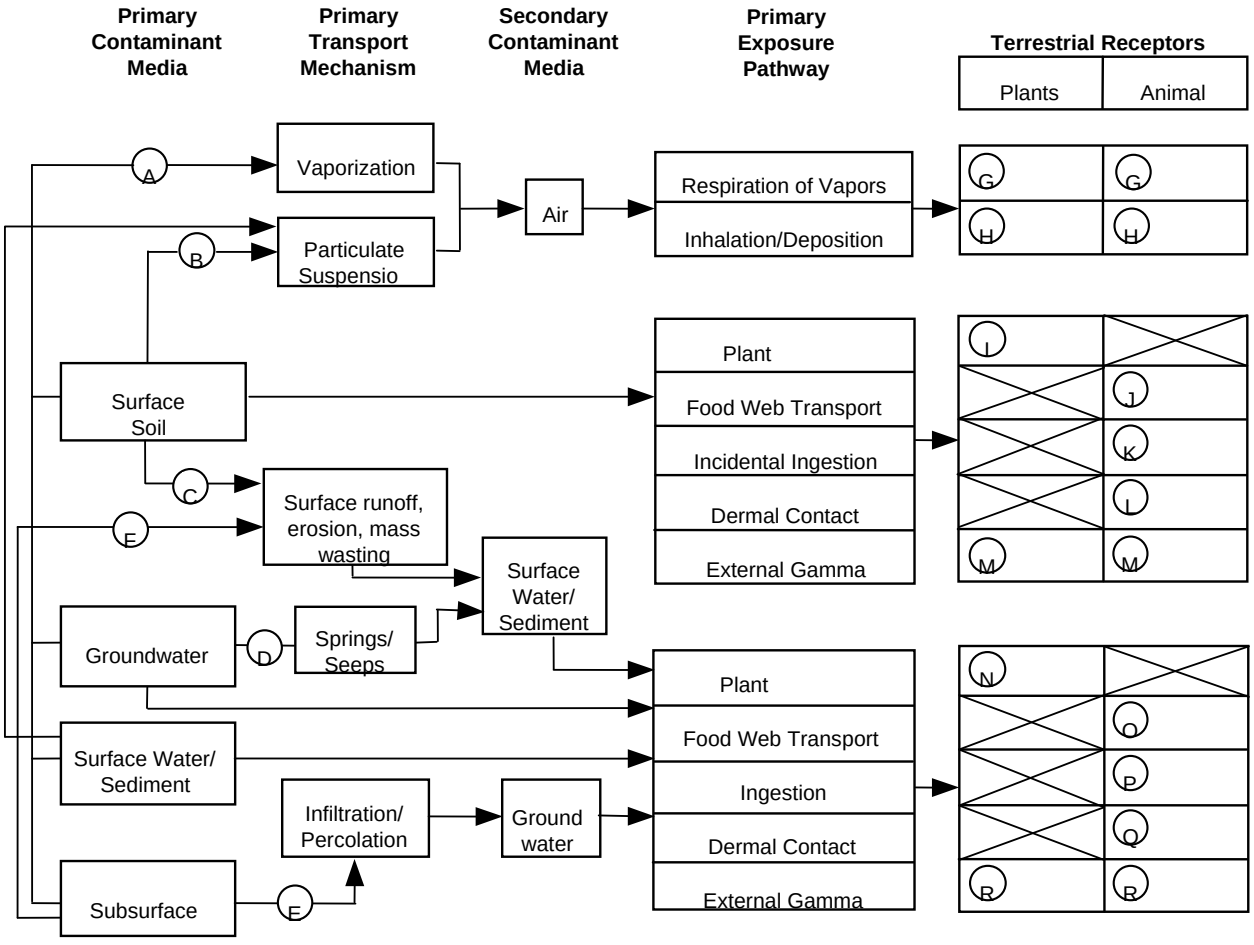
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 00-018(a), and there are no pathways to aquatic environments located off site.

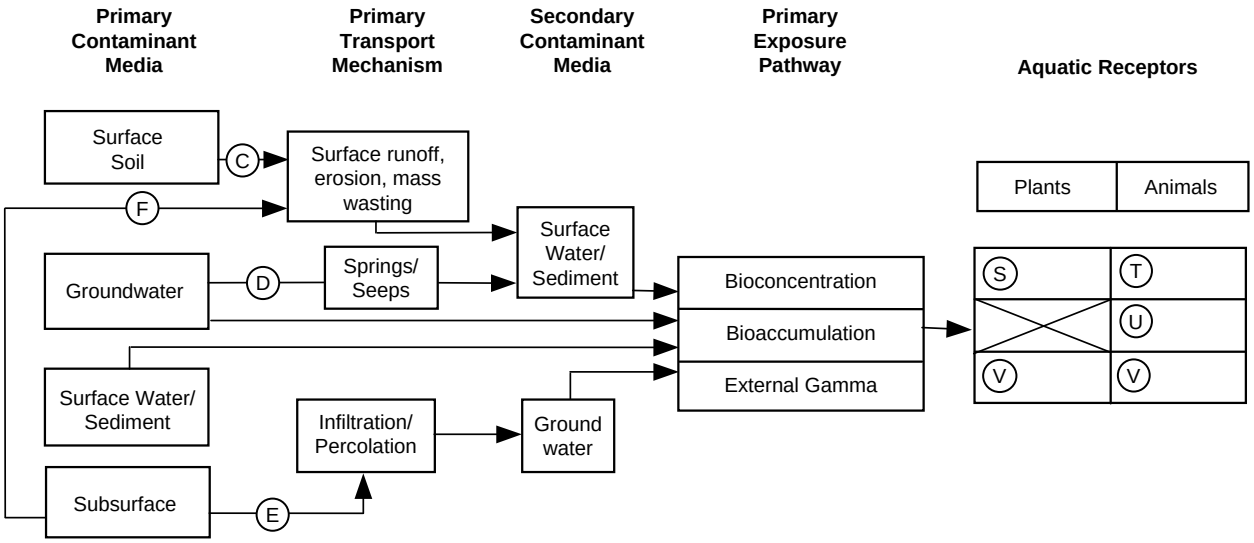
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



I2-2.0 AOC 00-030(eS)

I2-2.1 Part A—Scoping Meeting Documentation

Site ID	
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	AOC 00-030(eS), a septic tank located on private property south of Canyon Road at the Chapel Apartments, was installed sometime between 1943 and 1947. The tank served residences and may have been connected to TA-01. However, it is not likely that the septic tank received waste from a gravity-feed system originating in TA-01 downgradient of AOC 00-030(eS). The tank ceased operating when the Central waste water treatment plant (WWTP) became operational in 1947. The tank was removed when the Chapel Apartments were built in 1949. The site is currently a paved parking lot. The outlet pipe located in Pueblo Canyon is still in place (LANL 2005, 090579, p. 17). Releases from AOC 00-030(eS) may have included effluent discharged at the septic tank's outfall into Acid Canyon.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** n/a **Bare Ground/Unvegetated –** n/a **Spruce/fir/aspen/mixed conifer –** n/a **Ponderosa pine –** X **Piñon juniper/juniper savannah –** n/a **Grassland/shrubland –** n/a **Developed –** X **Burned –** n/a The area within the boundary of AOC 00-030(eS) at the location of the former septic tank is highly disturbed and consists primarily of the Chapel Apartments asphalt parking lot/road on Union Street. The area outside tank location is a combination of developed and undeveloped areas consisting of the Chapel Apartments, asphalt parking lot/road, asphalt roadway and disturbed as well as undisturbed vegetative areas including grass parkway, planted ornamentals, and vegetation typical of the canyon slopes (ponderosa pine [*Pinus ponderosa*], scrub oak [*Quercus gambelii*], and an understory of perennial grasses).
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0399).

Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	AOC 00-030(eS) is within 200 ft of AOC 00-030(eN), the only other SWMU or AOC in proximity to AOC 00-030(eS). AOC 00-030(eN) consists of two parallel septic tanks set 5 ft apart and are located on private property north of Canyon Road at the former Boy Scout Lodge. The septic tanks probably received waste from the apartments, dormitories, and some original Ranch School buildings now located on private property and from the outfall from septic tank AOC-00-030(q). It is not likely that AOC 00-030(eN) received waste from a gravity-feed system originating in TA-01, which is downgradient of AOC 00-030(eN). The tanks ceased operating when the Central WWTP became operational in 1947 (LANL 2005, 090579, p.14).
Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	AOC 00-030(eS) is on flat terrain (<10% slope), the surface of which is developed (apartment buildings and an asphalt parking lot) with low to medium vegetative cover. Potential run-on could occur from the roadway leading to the parking lot further upgradient to the southeast. Potential for run-off from the site is unlikely, but would discharge to the north into Acid Canyon, a tributary of Pueblo Canyon. AOC 00-030(eS) was given an erosion matrix score of 35.4, indicating a moderate potential for erosion/sediment transport (LANL 2005, 088428). There is no visible evidence of run-off from the site. There is no potential for run-on to the site (LANL 2005, 088428).

I2-2.2 Part B—Site Visit Documentation

Site ID	AOC 00-030(eS)
Date of Site Visit	November 14, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental Sharon Wirth, Shaw Environmental, visited the site on December 18, 2007

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = low **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	Vegetation surrounding AOC 00-030(eS) is low and consists primarily of ornamental plants and a maintained lawn. There is no vegetation within the boundary of AOC 00-030(eS) as the site is highly disturbed and is covered by an asphalt parkway/road. Vegetation cover downgradient of AOC 00-030(eS) is typical of the canyon slopes (ponderosa pine, scrub oak, and an understory of perennial grasses).
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, but unlikely due to the development at the site. Although terrestrial receptors might access the site, foraging or nesting activities within the footprint of the former tank is not expected to occur because of 100% coverage by asphalt. Access by receptors downgradient of the former tank footprint is possible, but expected to be minimal due to the high level of disturbance at the site from residential activity and the adjacent parking lot and roadway. No aquatic community exists on site.

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 potential at the site and in the upgradient and downgradient areas of AOC 00-030(eS) is low because of disturbance at the site and the relatively flat terrain (<10% slope). The terminal point of surface water transport is in Acid Canyon to the north of the site, a tributary of Pueblo Canyon.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Run-off from the site may occur, the amount of which is expected to be in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Air transport of potential contamination might occur at, and downgradient of, the outfall but cannot occur within the footprint of the former tank because the area of the tank is covered in asphalt. **Groundwater**: No. Depth to groundwater (GW) at the site is approximately 1,100 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been major physical disturbance at AOC 00-030(eS). The relatively flat area within the footprint of the former tank is comprised of an asphalt parking lot with a nearby apartment building structure and developed areas of ornamental vegitation proximal to and upgradient of the tank location. The area of physical disturbance downgradient of the tank location is flat with gradually sloping terrain, the surface of which includes of a paved asphalt parking lot, roadway, and vegetation (ponderosa pine, scrub oak, and an understory of perennial grasses).
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. The disturbance from residential development at AOC 00-030(eS) and the use of the site as a parking lot has negatively impacted the habitat quality at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.
There are no complete exposure pathways within the footprint of the former tank location because this area of the site is completely covered by asphalt. There are complete exposure pathways downgradient of the tank location along the drainline and at the outfall. Therefore, Part C of this checklist, “Ecological Pathways Conceptual Exposure Model,” applies only to the area downgradient of the tank location.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at AOC 00-030(eS).
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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at AOC 00-030(eS).

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-2.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) were detected at trace concentrations at AOC 00-030(eS) downgradient of the tank location and have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol.

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: Air transport via fugitive dust of potential surface contamination or to burrowing animals is possible at AOC 00-030(eS) downgradient of the tank location.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from AOC 00-030(eS).

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,100 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminant to GW is unlikely due to depth of GW beneath the site (approximately 1,100 ft bgs). Surface discharge of GW does not occur at the site.

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: Potential contamination at AOC 00-030(eS) downgradient of the tank location is limited to the near-surface soil and tuff (less than 10 ft bgs) and the site is not located on or near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor, given the low concentrations of detected organic chemicals. In addition, most of the organic chemicals detected at AOC 00-030(eS) downgradient of the tank location

have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol and are not particularly volatile. The highly disturbed nature in the area surrounding the site limits burrowing activities and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals may expose terrestrial receptors to contaminants in fugitive dust and are minor pathways at AOC 00-030(eS) downgradient of the tank location. Dust exposure to burrowing animals at AOC 00-030(eS) downgradient of the tank location has a low probability of occurrence because of the disturbed conditions surrounding the site (ecological receptors are not likely to be present due to the high degree of disturbance). Exposure to contaminants in tuff has a low probability of occurrence because of the weathering that must occur to the tuff prior to exposure.

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: Residual contaminants in soil could be taken up through plant roots and is a minor pathway. Rain splash from surface soil onto the aboveground portions of plants is possible at AOC 00-030(eS) downgradient of the tank location, but is a minor pathway due to the disturbance surrounding the site.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bio-accumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from AOC 00-030(eS) downgradient of the tank location (Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, chlordane[alpha-], chlordane[gamma-], DDD[4,4'-], DDE[4,4'-], and DDT[4,4'-]) . This is a minor pathway at AOC 00-030(eS) downgradient of the tank location because of the trace concentrations at which these chemicals were detected.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion at AOC 00-030(eS) downgradient of the tank location. This is a minor pathway because of the disturbance surrounding the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because of the trace concentrations of organic chemicals detected in soil and tuff at the site that are lipophilic.

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: 2

Terrestrial Animals: 2

Provide explanation: Because of the low number of radiological COPCs detected, including gamma-emitting radionuclides, external irradiation is a minor pathway of exposure at ACO 00-030(eS) downgradient of the tank location.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at AOC 00-030(eS).

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

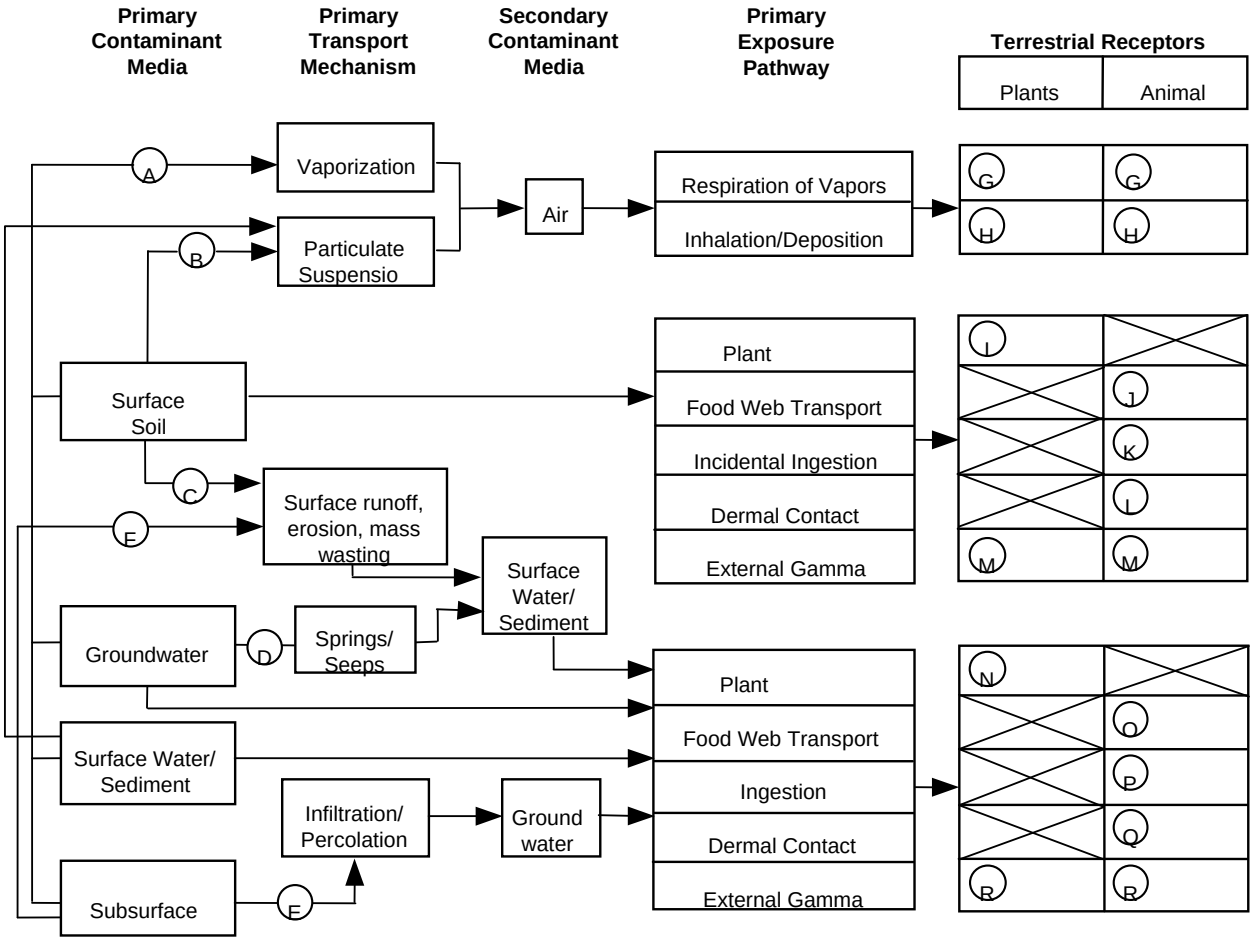
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(eS), and there are no pathways to aquatic environments located off site.

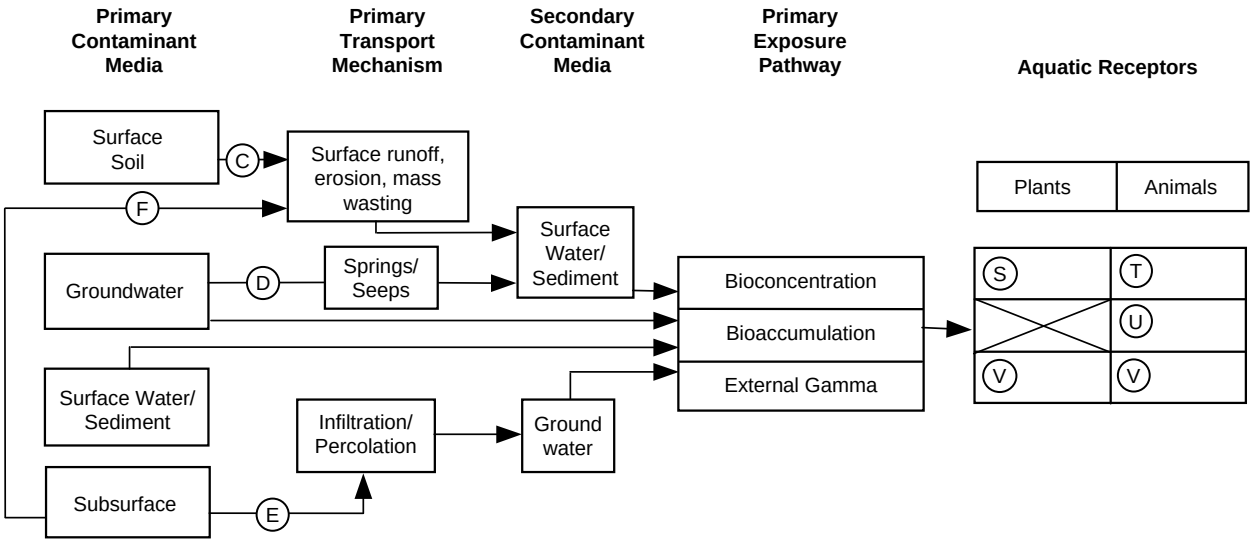
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



I2-3.0 AOC 00-030(f)

I2-3.1 Part A—Scoping Meeting Documentation

Site ID	
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	AOC 00-030(f) is a septic tank system consisting of two septic tanks located on private property south of Canyon Road and north of Rose Street, slightly northeast of the United Church school building in Los Alamos, New Mexico. The tanks connected with sewer lines in the "Apartment Area" and handled sanitary waste from a school, a post exchange, and some of the original Ranch School buildings, but it did not receive waste from TA-01 operations (LANL 2005, 090579, p. 20). The tank ceased operating when the Central Wastewater Treatment Plant became operational in 1947. The tanks are still in place and located beneath existing sidewalks and an asphalt parking lot in a heavily developed area. Releases from AOC 00-030(f) may have included effluent discharged at the septic tank's outfall into Acid Canyon.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** n/a **Bare Ground/Unvegetated –** n/a **Spruce/fir/aspen/mixed conifer –** X **Ponderosa pine –** X **Piñon juniper/juniper savannah –** n/a **Grassland/shrubland –** n/a **Developed –** X **Burned –** n/a The area within the boundary of AOC 00-030(f) at the location of the former septic tanks is highly disturbed and consists primarily of an asphalt parking lot, church, and associated adjacent buildings. The area outside the location of the septic tanks is a mixture of developed areas consisting of buildings, parking lots and a roadway as well as landscaped areas dominated by a mixture of ponderosa pine (*Pinus ponderosa*), fir species, scrub oak (*Quercus gambelii*), and planted ornamentals.
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0400).
Provide list, of Neighboring/ Contiguous/ Up gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	AOC 00-030(f) is within 200 ft and further upgradient of Consolidated Unit 00-001(a)-99, the only other SWMU or AOC in proximity to AOC 00-030(f). Consolidated Unit 01-001(a)-99 is associated with former TA-01 operations and D&D activities. TA-01 covered about 80 acres and was the site of Manhattan Project basic chemical operations, including wet chemistry experimentation and wet and dry chemistry processing. TA-01 also housed several mechanical operations, including casting,

	machining, and powder metallurgy. As operations relocated to new TAs between 1945 and 1965, phased decontamination and demolition (D&D) activities occurred at TA-01. All building superstructures were demolished and removed. Soils surrounding the buildings, within the former building footprints and adjacent to former plumbing structures, were radiologically surveyed between 1974 and 1976. Any identified radioactively contaminated soil was excavated, disposed, and replaced with clean fill. Backfilling and recontouring were completed on the mesa-top where contaminated soils and volcanic tuff were excavated during 1970s D&D activities. Former TA-01 has been the location of substantial residential and commercial development over the years. Aggregate K of Consolidated Unit 01-001(a)-99 consists of SWMU 01-002(a)-00, an industrial (acid) waste line located in the southern and western portions of TA-01. This SWMU has only a mesa-top component. The outfall (SWMU 01-002(b)-00) is within the TA-45 boundary (see Consolidated Unit 45-001-00). Private residences, apartments, townhouse complexes, and commercial establishments occupy the current location of the former industrial-waste line. SWMU 01-002(a)-00 was an industrial drainline for boiler house 2 and D, H, J-2, M, ML, Q and Sigma Buildings. Boiler house 2 supplied steam for TA-01. D Building was used to process plutonium. H Building was used for source preparation of polonium-210. ML Building was a medical laboratory. M Building was used to recover enriched uranium-235. Q Building was used to calibrate laboratory equipment using radium-226 as a check source. Sigma Building was used for machining radionuclides for casting and powder metallurgy. Beginning in 1943, the industrial drainline was used to dispose of chemical and radioactive processing wastes. The drainline had two sections: the main industrial-waste disposal line south of Trinity Drive ran from D Building and the western industrial-waste disposal line ran from former J-2 Building to its junction with the main industrial-waste disposal line south of Trinity Drive. Areas along the western industrial-waste line that were remediated by excavation and disposal in 1976 are designated as SWMU 01-007(j). From the junction, the line ran north as a single unit to the TA-45 waste treatment facility. From 1943 to 1951 the line discharged untreated effluent into Acid Canyon. The TA-45 waste treatment facility was built at the disposal line outfall in 1951 and liquid waste conveyed by the line was treated at the TA-45 plant before disposal to the canyon. SWMU 01-002(b)-00 was created in 2000 when SWMU 01-002 was separated into a drainline portion [SWMU 01-002(a)-00] and an outfall portion [SWMU 01-002(b)-00]. SWMU 01-002(b)-00 consists of a former industrial waste line outfall and its drainage into Acid Canyon. The outfall was located in former TA-45 at the head of a small branch of Acid Canyon known as the south fork of Acid Canyon. From 1943 to 1951, this outfall was used to discharge untreated RLW generated in laboratories and research facilities in former TA-01. Discharges of untreated radioactive liquid waste (RLW) ceased when the TA-45 RLW treatment plant (SWMU 45-001) began operation in 1951. During 1943 to 1951, approximately 4,800,000 gal. of untreated wastewater was discharged annually from SWMU 01-002(b)-00. D&D of TA-45 began in October 1966 and included removal of the SWMU 01-002(b)-00 outlet pipe, an associated weir box, tuff around the outfall, and tuff from the canyon wall below the outfall. Wastes generated during these activities were disposed of at TA-54. In September 1967, the TA-45 property was transferred to Los Alamos County. Several environmental investigations have been conducted at SWMU 01-002(b)-00. The earliest investigations were conducted from 1945 to 1947 and identified radioactivity near the outfall and downstream of the outfall.

Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	The area at and surrounding AOC 00-030(f) at the location of the septic tanks is on flat terrain (<10% slope), the surface of which is a developed asphalt parking lot, concrete sidewalk, and very little vegetation (vegetation is primarily within ornamental beds). Potential run-on could occur from the Church school roof directly adjacent to the AOC to the south. The area downgradient of AOC 00-030(f) is gradual terrain (10-30% slope), the surface is highly developed with medium vegetation cover along the roadway. There is potential for run-off from the site north to Canyon Road, then west to a culvert under, and to the north of, Canyon Road. AOC 00-030(f) was given an erosion matrix score of 10.6, indicating a low potential for erosion/sediment transport (LANL 2005, 088428). There is no visible evidence of run-off from the site. Potential run-on to the site is attributed to existing structures, roof drains, and road/parking lot (LANL 2005, 088428).

I2-3.2 Part B—Site Visit Documentation

Site ID	AOC 00-030(f)
Date of Site Visit	October 30, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental and Sharon Wirth, Shaw Environmental

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = none to low [upgradient and within AOC 00-030(f)] to medium [downgradient of AOC 00-030(f) along the roadway] **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = high [upgradient and within AOC 00-030(f)] to high [downgradient of AOC 00-030(f)]
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Vegetation upgradient of AOC 00-030(f) is none to low and consists primarily of ornamental plants. There is little to no vegetation within the boundary of AOC 00-030(f) as the site is highly disturbed; vegetation that is present consists primarily of Ponderosa pine and planted ornamentals. Vegetation cover downgradient of AOC 00-030(f) is medium and consists primarily of ponderosa pine, fir species, and scrub oak along the roadway.
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, but unlikely due to the development at the site. Although terrestrial receptors may access the site, significant foraging or nesting activities within footprint of the tanks is not expected to occur because of 100% coverage by asphalt and concrete. Access by receptors downgradient of the former tank footprint is possible, but minimal due to disturbance from the development surrounding the site and traffic from the adjacent roadway. No aquatic community exists on site.

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 potential at AOC 00-030(f) is low because of the asphalt parking lot's relatively flat terrain (<10% slope). The terminal point of surface water transport is in Acid Canyon (a tributary of Pueblo Canyon) to the north of the site (via a culvert under Canyon Road).

Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Runoff from the site may occur, the amount of which is expected to be in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Air transport of potential contamination might occur at, and downgradient of, the outfall but cannot occur within the footprint of the tanks because the area of the tanks is covered in asphalt and concrete. **Groundwater**: No. Depth to groundwater (GW) at the site is approximately 1,100 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been major physical disturbance at the site AOC 00-030(f). The relatively flat area within the footprint of the tanks is developed, comprised of an asphalt parking lot, concrete sidewalks, and buildings.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. The disturbance from historical operations at the AOC 00-030(f) and the development at the site has negatively impacted the habitat quality at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport. There are no complete exposure pathways within the footprint of the former tanks' location because this area of the site is completely covered by asphalt and concrete. There are complete exposure pathways downgradient of the tank location along the drainline and at the outfall. Therefore, Part C of this checklist, "Ecological Pathways Conceptual Exposure Model," applies only to the area downgradient of the tanks' location.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at AOC 00-030(f).

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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at AOC 00-030(f).

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-3.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) were detected at trace concentrations at AOC 00-030(f) downgradient of the tanks' location and have a Henry's Law constant $\leq 10^{-5}$ atm-m^3/mol and a molecular weight >200 g/mol.

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: Air transport via fugitive dust of potential surface contamination or to burrowing animals is possible at AOC 00-030(f) downgradient of the tanks' location.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from AOC 00-030(f).

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,100 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminants to GW is unlikely due to depth of groundwater beneath the site (approximately 1,100 ft bgs). Surface discharge of GW does not occur at the site.

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: Potential contamination at AOC 00-030(f) downgradient of the tanks' location is limited to the near-surface soil and tuff (less than 10 ft bgs) and the site is not located on or near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor, given the low concentrations of detected organic chemicals. In addition, most of the organic chemicals detected at AOC 00-030(f) downgradient of the tanks' location have a Henry's Law constant $\leq 10^{-5}$ atm-m^3/mol and molecular weight >200 g/mol and are not particularly volatile. The disturbance surrounding the AOC limits burrowing activities and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals may expose terrestrial receptors to contaminants in fugitive dust and are minor pathways at AOC 00-030(f) downgradient of the tanks' location. Dust exposure to burrowing animals at AOC 00-030(f) downgradient of the tanks' location has a low probability of occurrence because of the disturbance in the area surrounding the site (ecological receptors are not likely to be present due to the high degree of disturbance). Exposure to contaminants in tuff has a low probability of occurrence because of the weathering that must occur to the tuff prior to exposure.

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: Residual contaminants in soil could be taken up through plant roots and is a minor pathway. Rain splash from surface soil onto the aboveground portions of plants is possible at AOC 00-030(f) downgradient of the tanks' location.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bio-accumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from AOC 00-030(f) downgradient of the tanks' location (Aroclor-1260, benzo(a)pyrene, chlordane[alpha-], chlordane[gamma-], DDD[4,4'-], DDE[4,4'-], and DDT[4,4'-]) . This is a minor pathway at AOC 00-030(eS) downgradient of the tanks' location because of the trace concentrations at which these chemicals were detected.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion at AOC 00-030(f) downgradient of the tank location. This is a minor pathway because of the disturbance in the area surrounding the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because organic chemicals detected in soil and tuff are not lipophilic nor can they cross epidermal barriers.

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: 2

Terrestrial Animals: 2

Provide explanation: Because of the low number of radiological COPCs detected, including gamma-emitting radionuclides, external irradiation is a minor pathway of exposure at ACO 00-030(f) downgradient of the tanks' location.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at AOC 00-030(f).

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

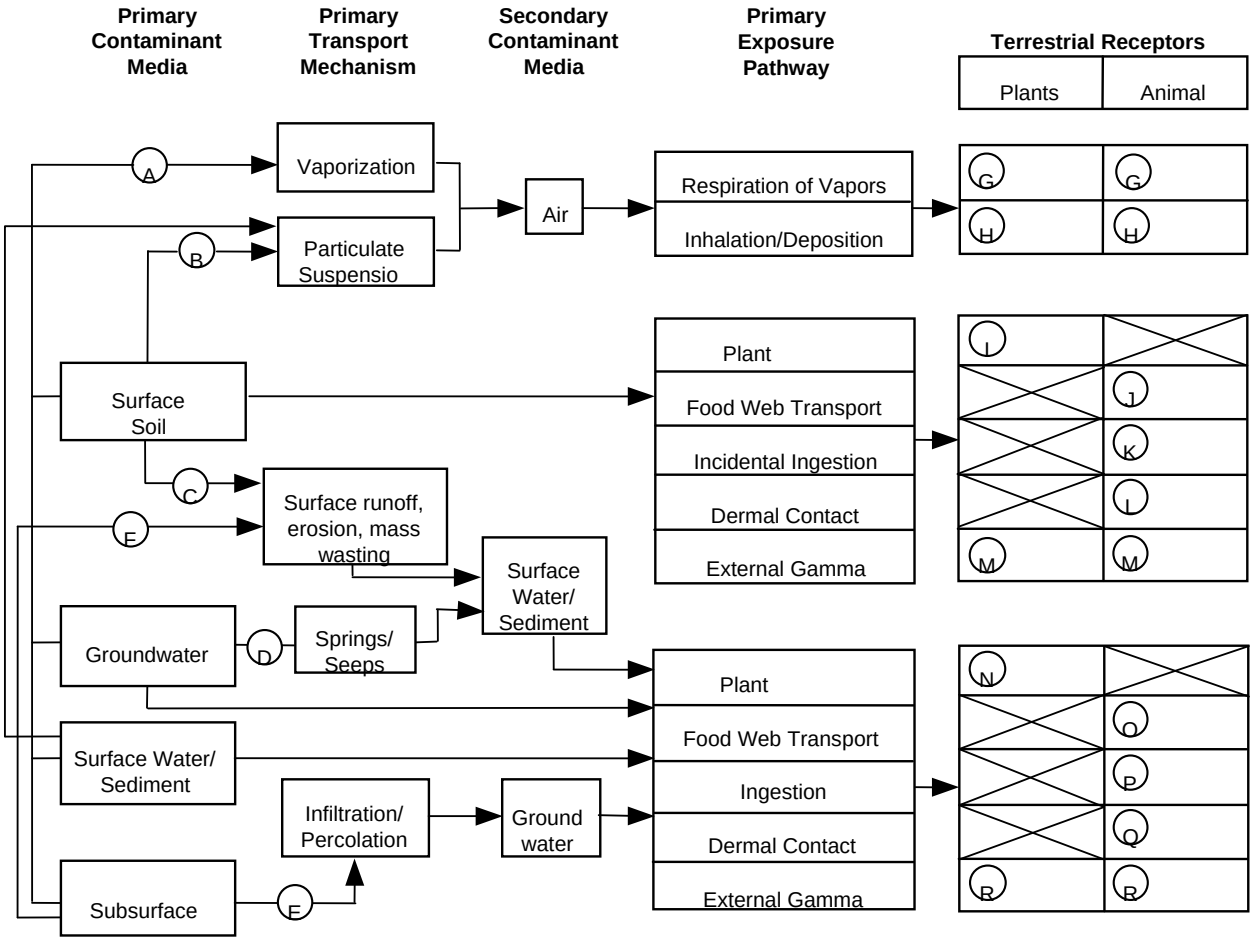
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(f), and there are no pathways to aquatic environments located off site.

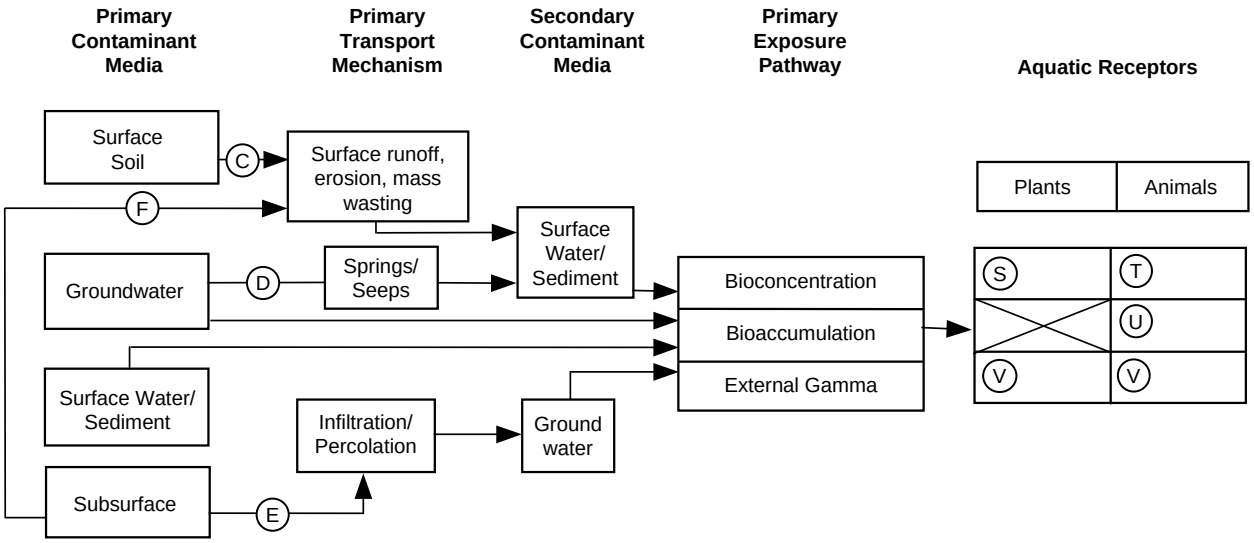
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



I2-4.0 AOC 00-030(h)

I2-4.1 Part A—Scoping Meeting Documentation

Site ID	
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	AOC 00-030(h) is a septic tank located on private property north of Canyon Road, beneath the asphalt-paved west parking lot at the Immaculate Heart of Mary Catholic Church at 3600 Canyon Road. The septic tank, which was bounded on the west by the Los Alamos High School sports field and parking lot access road, probably served the areas between Canyon Road and Trinity Drive. The outlet pipe and outfall for the tank have not been located. Based upon the location and orientation of the tank, the outlet probably discharged to Acid Canyon, a tributary of Pueblo Canyon. Buildings within this area were associated with the special engineering detachment, which included the Fort Leonard Wood housing units, dormitories, military barracks, west mess hall, supply room, gymnasium, post office, and recreational buildings. The septic tank probably did not receive waste from a gravity-feed system originating in TA-01, which is downgradient of AOC 00-030(h). The tank was used from 1945 to 1947, when the Central Wastewater Treatment Plant (WWTP) became operational. The tank was removed in 1996 (LANL 2005, 090579, pp. 23-24). Releases from AOC 00-030(h) may have included effluent discharged at the septic tank's outfall into Acid Canyon.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** n/a **Bare Ground/Unvegetated –** n/a **Spruce/fir/aspen/mixed conifer –** n/a **Ponderosa pine –** X **Piñon juniper/juniper savannah –** n/a **Grassland/shrubland –** n/a **Developed –** X **Burned –** n/a The area within the boundary of AOC 00-030(h) at the location of the septic tank is highly disturbed and consists of an asphalt parking lot. The area outside the boundary of AOC 00-030(h) is a mixture of developed areas (asphalt parking lot, church building, and landscaped areas). The landscaping is dominated by ponderosa pine (*Pinus ponderosa*) and maintained lawns.
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0394).

Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	AOC C-00-043 is within approximately 100 ft and further downgradient of AOC C-00-043, the only other SWMU or AOC in proximity to AOC 00-030(h). AOC C-00-043 was an inactive brick-and-mortar manhole located approximately 50 ft south of the Immaculate Heart of Mary Catholic Church in a landscaped part of the church's parking lot. The manhole was removed in 1996. The manhole may have been connected to sanitary sewer lines serving residential areas for the former Central WWTP (LANL 2005, 090579, p. 45).
Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	The area upgradient of, and within, AOC 00-030(h) is on flat terrain (<10% slope), the surface of which is an asphalt parking lot. Potential run-on could occur from sheet flow from Canyon Road and the asphalt parking lot. The area downgradient of AOC 00-030(h) is medium terrain (10-30% slope), the surface of which is a mixture of developed areas (asphalt parking lot, church building, and landscaped areas). The landscaping is dominated by ponderosa pine and maintained lawns. There is no potential for run-off from the site north into Acid Canyon. AOC 00-030(h) was given an erosion matrix score of 14.6, indicating a low potential for erosion/sediment transport (LANL 2005, 088428). There is no visible evidence of run-off from the site. Potential run-on to the site is attributed to existing structures, roof drains, and road/parking lot (LANL 2005, 088428).

I2-4.2 Part B—Site Visit Documentation

Site ID	AOC 00-030(h)
Date of Site Visit	November 14, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental Sharon Wirth, Shaw Environmental, visited the site on December 18, 2007

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = none [upgradient and within AOC 00-003(h)] to medium [downgradient of AOC 00-030(h)] **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = high [upgradient and within AOC 00-030(h)] to medium [downgradient of AOC 00-003(h)]
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Vegetation in the vicinity of AOC 00-030(h) consists primarily of landscaped areas dominated by a mixture of ponderosa pine, lawns, and ornamental plants.
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, but unlikely due to the development at the site. Although terrestrial receptors might access the site, foraging or nesting activities within the footprint of the former tank are not expected to occur because of 100% coverage by asphalt. Access by receptors downgradient of the former tank footprint is possible, but expected to be minimal due to the high level of disturbance at the site from development and the adjacent school, parking lot, and roadway. No aquatic community exists on site.

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 potential at AOC 00-030(h) is low because of the asphalt parking lot's relatively flat terrain (<10% slope). The terminal point of surface water transport is in Acid Canyon to the north of the site, a tributary of Pueblo Canyon.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Runoff from the site may occur, the amount of which is expected to be in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Air transport of potential contamination might occur at, and downgradient of, the outfall but cannot occur within the footprint of the former tank because the area of the tank is covered in asphalt. **Groundwater**: No. Depth to groundwater (GW) at the site is approximately GW 1,000 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been major physical disturbance at AOC 00-030(h). The relatively flat area within the footprint of the tank is comprised of an asphalt parking lot, surrounded by building structures and other developed areas.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. The disturbance from historical operations at the AOC 00-030(h) and the current use of the site as a parking lot has negatively impacted the habitat quality at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport. There are no complete exposure pathways within the footprint of the former tank location because this area of the site is completely covered by asphalt. There are complete exposure pathways downgradient of the tank location at the outfall. Therefore, Part C of this checklist, "Ecological Pathways Conceptual Exposure Model," applies only to the area downgradient of the tank location.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at AOC 00-030(h).
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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at AOC 00-030(h).

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-4.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) were detected at trace concentrations at AOC 00-0030(h) downgradient of the tank location and have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol.

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: Air transport via fugitive dust of potential surface contamination or to burrowing animals is possible at AOC 00-030(h) downgradient of the tank location.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from AOC 00-030(h).

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,000 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminant to GW is unlikely due to depth of groundwater beneath the site (approximately 1,000 ft bgs). Surface discharge of GW does not occur at the site.

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: Potential contamination at AOC 00-030(h) downgradient of the tank location is limited to the near-surface soil and tuff (less than 10 ft bgs) and the site is not located on or near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor given the low concentrations of detected organic chemicals. In addition, most of the organic chemicals detected at AOC 00-030(h) downgradient of the tank location

have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol and are not particularly volatile.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals may expose terrestrial receptors to contaminants in fugitive dust and are minor pathways at AOC 00-030(h) downgradient of the tank location. Dust exposure to burrowing animals at AOC 00-030(h) downgradient of the tank location has a low probability of occurrence because of the disturbed conditions surrounding the site (ecological receptors are not likely to be present due to the high degree of disturbance). Exposure to contaminants in tuff has a low probability or occurrence because of the weathering that must occur to the tuff prior to exposure.

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: 3

Provide explanation: Residual contaminants in soil could be taken up through plant roots. Rain splash from surface soils onto the aboveground portions of plants is possible at AOC 00-030(h) downgradient of the tank location.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bio-accumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from AOC 00-030(h) downgradient of the tank location (Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, chlordane[alpha-], chlordane[gamma-], DDD[4,4'-], DDE[4,4'-], DDT[4,4'-], and dieldrin). This is a minor pathway at AOC 00-030(h) downgradient of the tank location because of the trace concentrations at which these chemicals were detected.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion at AOC 00-030(h). This is a minor pathway downgradient of the tank location because of the disturbance surrounding the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because of the minimal amount of burrowing expected at the site and because of the trace concentrations of organic chemicals detected in soil and tuff at the site that are lipophilic.

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: 2

Terrestrial Animals: 2

Provide explanation: Because of the low number and concentrations of radiological COPCs, including gamma-emitting radionuclides, and the unlikely presence of terrestrial receptors at the site, external irradiation is a minor pathway of exposure at AOC 00-030(h) downgradient of the tank location.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at AOC 00-030(h).

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

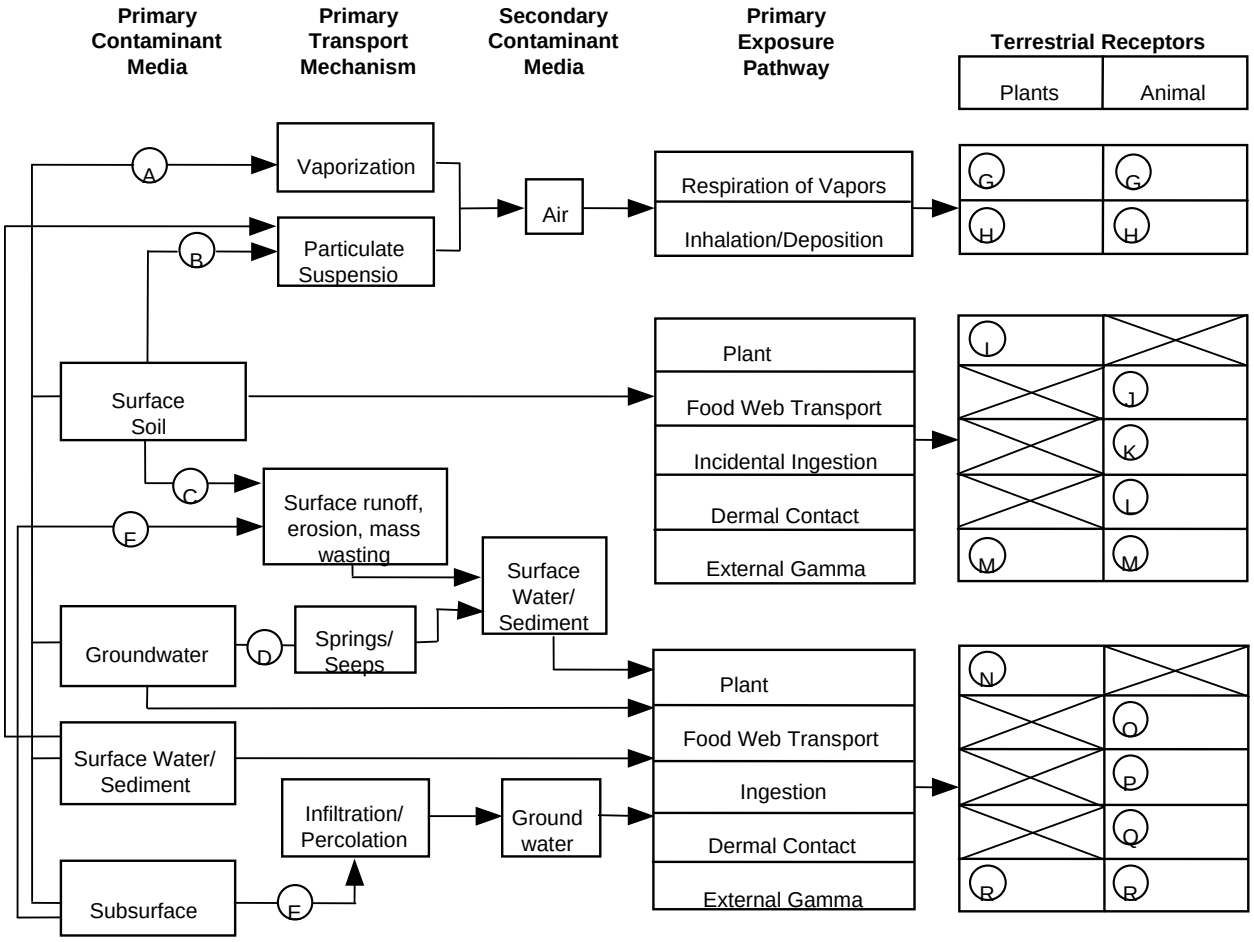
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at AOC 00-030(h), and there are no pathways to aquatic environments located off site.

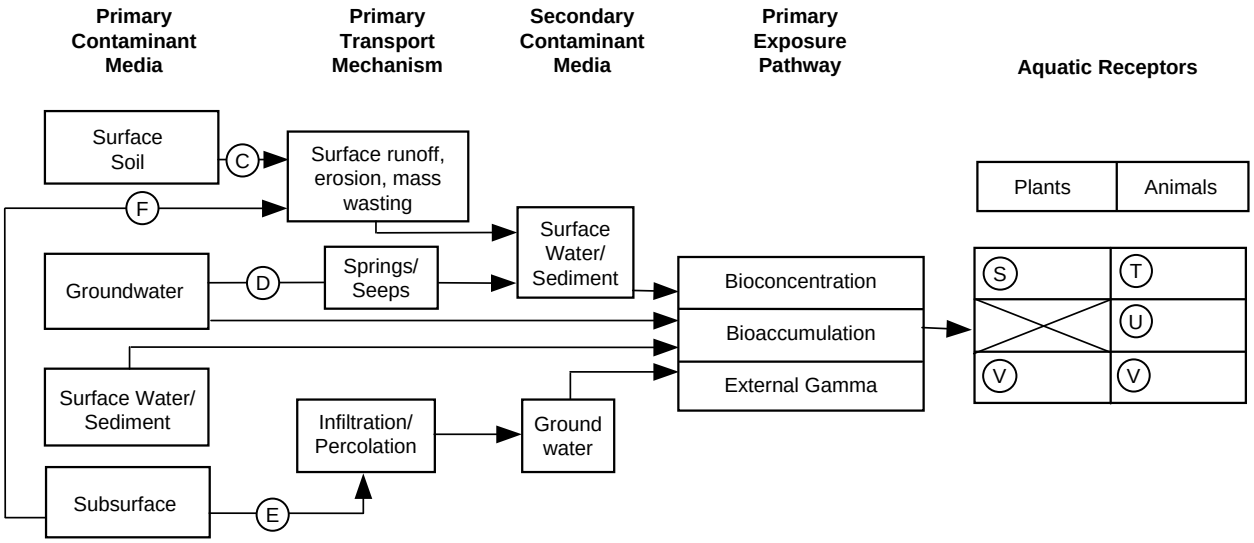
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

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Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



I2-5.0 SWMU 31-001

I2-5.1 Part A—Scoping Meeting Documentation

Site ID	
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.	SWMU 31-001 is a former septic system located at TA-31. This system consisted of a septic tank, two sanitary sewer manholes, associated waste lines, and an outfall. TA-31 served as the receiving area for all truck shipments to the Laboratory from 1945 until 1954 and SWMU 31-001 served former Building 31-7. The septic tank was located aboveground on a small bench above the rim of Pueblo Canyon, north of Building 31-7. TA-31 was located in what is now the eastern residential area of Los Alamos, immediately west of the Los Alamos County Airport. The septic tank was constructed in 1949, operated until 1954, and was removed in 1988. The waste line was not encountered when the septic tank was removed in 1988. The outfall discharged to Pueblo Canyon. The contents of the septic tank were sampled when the tank was removed and found to contain no hazardous materials (LANL 2005, 090579, p. 48). Releases from SWMU 31-001 septic tank may have included effluent discharged at the outfall into Pueblo Canyon.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** n/a **Bare Ground/Unvegetated –** n/a **Spruce/fir/aspen/mixed conifer –** n/a **Ponderosa pine –** X **Piñon juniper/juniper savannah –** n/a **Grassland/shrubland –** n/a **Developed –** X **Burned –** n/a The area within the boundary of, and surrounding, SWMU 31-001 includes both developed and undeveloped areas. Vegetation that is present is dominated by a mixture of ponderosa pine (*Pinus ponderosa*), scrub oak (*Quercus gambelii*), and understory grasses.
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0401).
Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	AOC 00-034(a) trends along the mesa in an east/west direction and is adjacent to the southeastern edge, upgradient of SWMU 31-001. AOC 00-034(a) is the former Eastern Area Landfill, which has been approved for No Further Action (NMED 1997, 057285).

Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	The area upgradient of SWMU 31-001 is on flat terrain (<10% slope), the surface of which is a developed residential neighborhood and easement with medium to high vegetation cover. The southern (upgradient) area of SWMU 31-001 is on medium terrain (10-30% slope), the surface of which is a property easement with an asphalt pathway and high vegetation cover. The northern portion of the SWMU (downgradient) includes an outfall that discharged to a steep slope to Pueblo Canyon (>30%), which includes high vegetative cover. SWMU 31-001 was given an erosion matrix score of 18.8, indicating a low potential for erosion/sediment transport (LANL 2005, 088428). There is no visible evidence of run-off from the site. Potential run-on to the site is attributed to sheet flow from Canyon Road and 15th Street (LANL 2005, 088428).

I2-5.2 Part B—Site Visit Documentation

Site ID	SWMU 31-001
Date of Site Visit	November 14, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental Sharon Wirth, Shaw Environmental, visited the site on December 18, 2007

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = medium to high **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = medium to low
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Vegetation upgradient and within SWMU 31-001 consists primarily of weedy annual species and grasses. Vegetation downgradient of the outfall is undisturbed and is classified best by ponderosa pine/scrub oak woodland/understory grasses.
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. Terrestrial receptors can access the site, though foraging or nesting activities within the AOC boundaries are expected to be moderate due to the area of the site (57,000 ft^2), its proximity to residential development, and the steep slope to the north of the site. No aquatic community exists on site.

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 potential at SWMU 31-001 is low because of the high vegetation cover and moderate terrain (10%-30% slope). Surface water transport potential in the area downgradient of the outfall is somewhat higher because of steep terrain (>30% slope). The terminal point of surface water transport is in Pueblo Canyon to the north of the site.

Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Runoff from the site may occur, the amount of which is in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Transport of potential contamination in surface soil at the site may occur via this pathway. **Groundwater**: No. Depth to groundwater (GW) at the site is approximately 1,200 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been moderate physical disturbance at the site SWMU 31-001. The relatively flat area within the SWMU boundary is comprised of a high amount of vegetation and an asphalt pathway.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. Disturbance from the adjacent residential area , the asphalt paving, and historical operations at the site have had an adverse effect on the habitat.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at SWMU 31-001.
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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at SWMU 31-001.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-5.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) were detected at trace concentrations at SWMU 31-001 and have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Air transport via fugitive dust of potential surface contamination is possible, though unlikely, at SWMU 31-001 because the source of contamination was largely subsurface in origin and subsurface soil would need to be brought to the surface for exposure to occur. Dust exposure to burrowing animals has a low probability at SWMU 31-001 because of the adjacent disturbance to the south (i.e., residential development), the surface disturbance within the boundary of the site, and the extreme topography to the north of the site.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**

- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from the site.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,200 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,200 ft bgs). Surface discharge of GW does not occur at the site.

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: Potential contamination at SWMU 31-001 is limited to the near-surface soil and tuff (less than 10 ft bgs) and, thus, mass wasting would not contribute to transport of contamination from the site at a rate or in an amount greater than that expected from erosion.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor given the low concentrations of detected organic chemicals. In addition, most of the organic chemicals detected at SWMU 31-001 have a Henry's Law constant $\leq 10^{-5}$ atm-m^3/mol and a molecular weight >200 g/mol and are not particularly volatile. The shallow soil on the mesa top, the highly disturbed nature of the SWMU and the area upgradient of the outfall, and the steep slope downgradient of the outfall limit burrowing activities and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals are minor pathways at SWMU 31-001. Dust exposure to burrowing animals at SWMU 31-001 has a low probability because of the highly disturbed conditions at the site (ecological receptors are not expected to live or perform significant burrowing at the site due to the high degree of disturbance). Exposure to contaminants in tuff has a low probability for occurrence because of the weathering that must occur to the tuff prior to exposure.

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: Residual contaminants in soil could be taken up through plant roots and is a minor pathway at the site. Rain splash from surface soil onto the aboveground portions of plants has a low probability due to the lack of surface soil at the site.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bioaccumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from SWMU 31-001 (Aroclor-1254, Aroclor-1260, DDE[4,4'-], DDT[4,4'-], and dieldrin). This is a minor pathway at SWMU 31-001 because of the highly disturbed nature of the site and the low probability of animal presence at the site.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion. This is a minor pathway at SWMU 31-001 because of the highly disturbed nature of the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because of the minimal amount of burrowing expected at the site and because of the trace concentrations of organic chemicals detected in soil and tuff at the site that are lipophilic.

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: Because of a single radionuclide detection, external irradiation is an unlikely pathway of exposure at SWMU 31-001.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**

- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at SWMU 31-001.

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**

- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

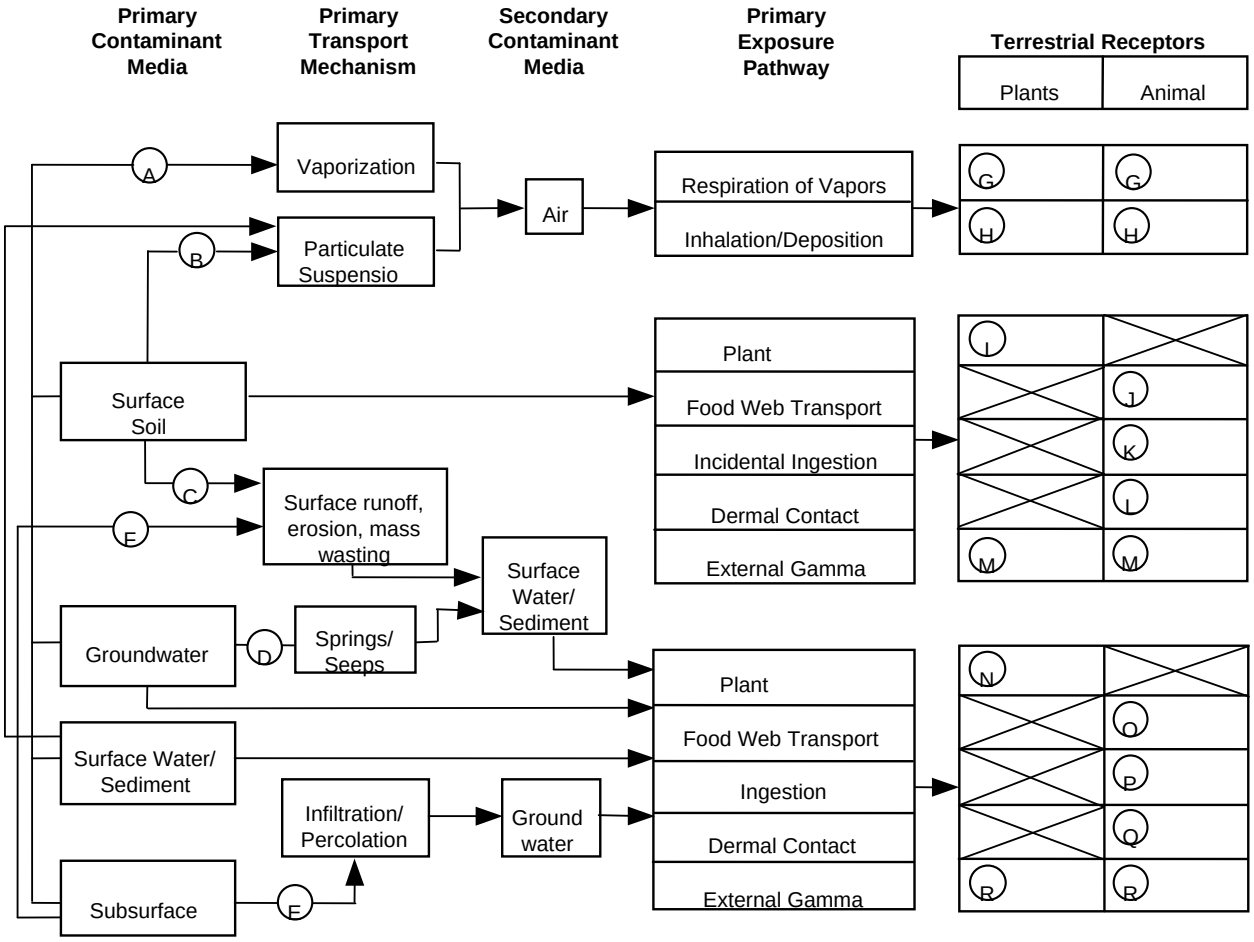
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at SWMU 31-001, and there are no pathways to aquatic environments located off site.

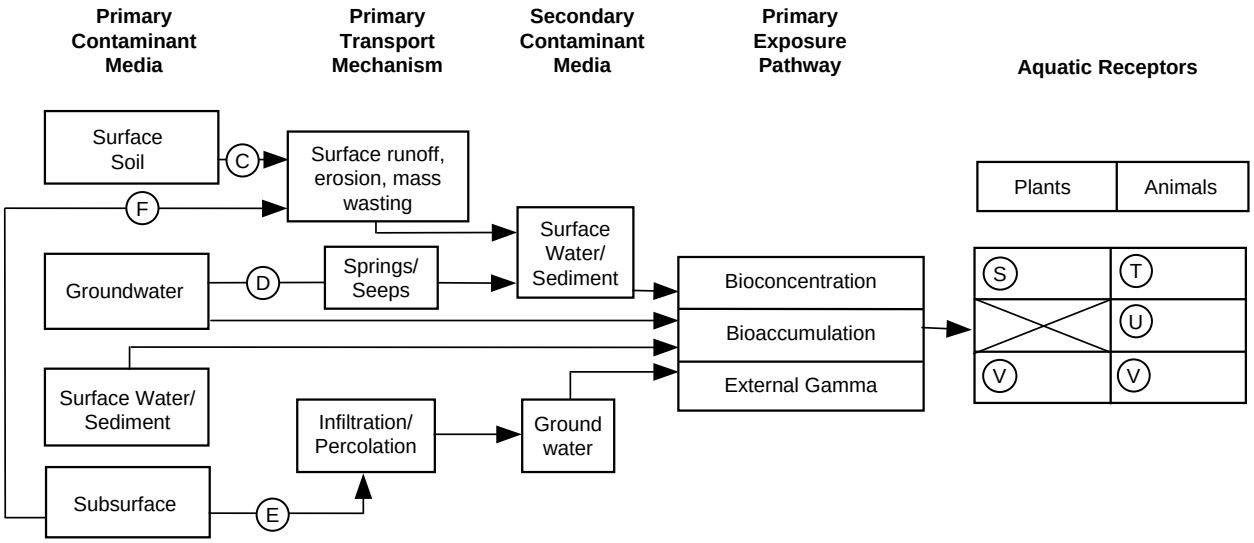
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



I2-6.0 CONSOLIDATED UNIT 45-001-00

I2-6.1 Part A—Scoping Meeting Documentation

Site ID	
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.	Consolidated Unit 45-001-00 consists of Consolidated Unit 01-002(b)-00, SWMUs 45-001, 45-002, 45-003, and 45-004, and AOC C-45-001. These SWMUs and AOC were associated with past wastewater treatment and disposal activities at TA-45, which was used as an industrial waste discharge area and later served as the Laboratory's first radioactive liquid waste (RLW) treatment facility. Decontamination and decommissioning (D&D) of TA-45 began in October 1966 and included excavating and removing industrial waste and contaminated soil and tuff and removing all buildings and structures in the area, with the exception of the sewage lift station. The site was released without restriction to Los Alamos County on July 1, 1967. Consolidated Unit 01-002(b)-00 A former TA-01 industrial waste line outfall and its drainage area into Acid Canyon. The outfall was located within the boundaries of TA-45, at the head of a small branch of Acid Canyon known as the South Fork of Acid Canyon. This outfall discharged untreated RLW generated in laboratories and research facilities in TA-01 between and 1951. D&D at TA-45 included removing the outlet pipe, an associated weir box, and tuff around the outfall and on the canyon wall below the outfall. An interim action (IA) was conducted in the South Fork of Acid Canyon in 2001 downstream of the outfall for the purpose of reducing potential radiation doses to recreational users of the South Fork of Acid Canyon. Approximately 483 yd^3 of sediment were removed during the IA to meet the cleanup goal of 280 pCi/g of plutonium-239,-240 (LANL 2005, 090579, pp.52-53). Releases of effluent discharged into the South Fork of Acid Canyon may have occurred at Consolidated Unit 01-002(b)-00. SWMU 45-001 The former RLW treatment plant and associated outfalls. The treatment plant operated between 1951 and 1964. The plant initially received RLW only from TA-01. As Laboratory operations expanded, RLW from TA-03, -43, and -48 was also sent to SWMU 45-001. D&D activities at SWMU 45-001 included demolition and removal of treatment plant equipment, facilities, and waste lines and the excavation of contaminated soil . Portions of the walls of Acid Canyon below the outfalls were also decontaminated (LANL 2005, 090579, p.53). Releases of effluent discharged into Acid Canyon may have occurred at SWMU 45-001. SWMU 45-002 A former vehicle decontamination facility (former Building 45-1) that was used to decontaminate vehicles and large equipment, including filters from the Sigma Building, trash dumpsters, and wing tanks from airplanes. Vehicles and other equipment were decontaminated by steam-cleaning. SWMU 45-002 was located approximately 40 ft south of the TA-45 RLW treatment plant (SWMU 45-001). SWMU 45-002 began operating in 1952. This facility operated infrequently, approximately once per month. SWMU 45-002 was decommissioned in 1966, along with the other facilities in former TA-45 (LANL 2005, 090579, p.53). Releases to surface soil from vehicle decontamination activities may have occurred at SWMU 45-002.

	SWMU 45-003 The former buried industrial waste line and associated manhole. The waste line was used to convey RLW to the TA-45 treatment plant (SWMU 45-001) (LANL 2005, 090579, p.53). Releases of effluent along the waste line may have occurred at SWMU 45-003. SWMU 45-004 A sanitary sewer outfall associated with the sanitary sewer system constructed in 1947 to serve the Los Alamos town site. The sewer system included a sanitary sewer lift station and sanitary sewer manholes (LANL 2005, 090579, p.53). Releases of effluent may have occurred at SWMU 45-004. AOC C-45-001 The site of an accidental release of plutonium-contaminated sludge that occurred in the parking lot south of Building 45-2 (SWMU 45-001) in January 1957. The parking lot was removed as part of the TA-45 D&D activities (LANL 2005, 090579, p.53). Releases to surface soil may have occurred at AOC C-45-001.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** n/a **Bare Ground/Unvegetated –** X **Spruce/fir/aspen/mixed conifer –** n/a **Ponderosa pine –** X **Piñon juniper/juniper savannah –** n/a **Grassland/shrubland –** n/a **Developed –** X **Burned –** n/a The area within the boundary of Consolidated Unit 45-001-00 is highly disturbed and is currently used as a materials storage yard for Los Alamos County and consist of fill- and gravel-surfaced materials storage yard and asphalt pavement. The undisturbed areas outside of the site boundary to the north and west consist of medium to high vegetative cover dominated by a mixture of ponderosa pine (*Pinus ponderosa*), scrub oak (*Quercus gambelii*), and understory grasses. The area upgradient of the site includes an asphalt roadway and roadway easement.
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	There is no T&E habitat present at the site, per LANL's Ecology Group (Biological Resources comments in Excavation Permit Review Request 06X-0394).
Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	There are no other SWMUs or AOCs within 1,000 ft of Consolidated Unit 45-001-00.

Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off sub-score (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	A large portion of Consolidated Unit 45-001-00 is primarily on flat terrain (<10% slope), the surface of which is highly disturbed consisting of a fill- and gravel-surfaced materials storage yard and asphalt pavement. The northern and western portion of Consolidated Unit 45-001-00 is on steep terrain (30% slope) in Acid Canyon, a tributary of Pueblo Canyon. There is potential for run-on from the upgradient roadway and easement. Run-off discharges from the site into Acid Canyon. Four of the individual sites within Consolidated Unit 45-001-00 have had surface water assessments performed: • Consolidated Unit 01-002(b)-00, which was given and erosion matrix score of 71.5 in 1999, indicating a high potential for erosion in this area of the site. • SWMU 45-001, which was given and erosion matrix score of 50.3 in 2001, indicating a high potential for erosion in this area of the site. • SWMU 45-003, which was given an erosion matrix score of 27.6 in 1999, indicating a moderate potential for erosion in this area of the site. • SWMU 45-004, which was given an erosion matrix score of 50.2 in 1999, indicating a high potential for erosion in this area of the site. Consolidated Unit 45-001-00 was given an erosion matrix score of 93.5 indicating a high potential for erosion/sediment transport from the site as a whole (LANL 2005, 088428). There is visible evidence of run off from the site into Acid Canyon tributary channels (LANL 2005, 088428).

I2-6.2 Part B—Site Visit Documentation

Site ID	Consolidated Unit 45-001-00
Date of Site Visit	November 14, 2007
Site Visit Conducted by	Lindsay Hey, Shaw Environmental Sharon Wirth, Shaw Environmental, visited the site on December 18, 2007

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = low [upgradient and within Consolidated Unit 45-001-00] to high [downgradient of Consolidated Unit 45-001-00] **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = high [upgradient and within Consolidated Unit 45-001-00] to none [downgradient of Consolidated Unit 45-001-00]
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Vegetation that is present at, and surrounding, Consolidated Unit 45-001-00 consists primarily of ponderosa pine, scrub oak, and understory grasses, as is typical of canyon vegetation.

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. Terrestrial receptors may access the site, though foraging or nesting activities within the Consolidated Unit boundary are expected to be minimal due to the disturbance from the current operations at the site, and the low amount of developed vegetation within the site. No aquatic community exists on site.

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 potential at Consolidated Unit 45-001-00 is high, given the high erosion matrix score of 93.5. The terminal point of surface water transport is in Acid Canyon to the north/northwest of the site, a tributary of Pueblo Canyon.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water**: Yes. Runoff from the site may occur, the amount of which is expected to be in direct proportion to the amount and intensity of precipitation events. **Air**: Yes. Transport of potential contamination in surface soil at the site may occur via this pathway. **Groundwater**: No. Depth to groundwater (GW) at the site is approximately 1,100 ft below ground surface (bgs), which precludes this transport pathway.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	There has been major physical disturbance at Consolidated Unit 45-001-00. The relatively flat area within the site is comprised of a fill-and gravel-surfaced materials storage yard and asphalt pavement.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	Yes. The disturbance from historical operations at the Consolidated Unit 45-001-00 and the use of the site as a Los Alamos County materials storage yard have negatively impacted the habitat quality at the site.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.

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. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to identify the nature and extent of any potential contamination at Consolidated Unit 45-001-00.
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 be aggregated to characterize potential ecological risk.)**	Yes. The sampling approach in the approved work plan (LANL 2005, 090579) was designed to address potential transport pathways of contamination at Consolidated Unit 45-001-00.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
No additional notes are provided.

I2-6.3 Part C—Ecological Pathways Conceptual Exposure Model

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10-5 atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: The majority of volatile organic chemicals (VOCs) were detected at trace concentrations at Consolidated Unit 45-001-00 and have a Henry's Law constant ≤10^{-5} atm-m^3/mol and a molecular weight >200 g/mol.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Air transport via fugitive dust of potential surface contamination or to burrowing animals is possible, though unlikely, at Consolidated Unit 45-001-00 due to the very low probability of animal presence at the site (high disturbance, asphalt paving, materials storage yard).

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from Consolidated Unit 45-001-00.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,100 ft bgs). There are no seeps or springs present at the site.

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: Migration of contaminants to GW is unlikely due to depth of GW beneath the site (approximately 1,100 ft bgs). Surface discharge of GW does not occur at the site.

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: Potential contamination at Consolidated Unit 45-001-00 is limited to the near-surface soil and tuff (less than 10 ft bgs) and the site is not located on or near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: This pathway is minor, given the trace concentrations of detected organic chemicals. In addition, most of the organic chemicals detected at Consolidated Unit 45-001-00 have a Henry's Law constant $\leq 10^{-5}$ atm-m^3/mol and a molecular weight >200 g/mol and are not particularly

volatile. The highly disturbed nature of the site limits burrowing activities and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants and foraging activities by animals are minor pathways at Consolidated Unit 45-001-00. Dust exposure to burrowing animals at Consolidated Unit 45-001-00 has a low probability because of the asphalt paving and the highly disturbed conditions at the site (ecological receptors are not expected to live or perform significant burrowing at the site due to the high degree of disturbance). Exposure to contaminants in tuff has a low probability of occurrence because of the weathering that must occur to the tuff prior to exposure.

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: Residual contaminants in soil could be taken up through plant roots and is a minor pathway at the site. Rain splash from surface soil onto the aboveground portions of plants is an unlikely pathway due to the lack of surface soil at the site, the highly disturbed nature of the consolidated unit, and the low amount of vegetation present at the site.

Question J:

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bio-accumulate 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: Bio-accumulating chemicals (as defined by the EPA's Persistent Bio-accumulative and Toxic Chemical Program) were detected in samples from Consolidated Unit 45-001-00 (Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, DDE[4,4'-], DDT[4,4'-], and dieldrin). This is a minor pathway at Consolidated Unit 45-001-00 because of the highly disturbed nature of the site and the low probability of animal presence at the site.

Question K:

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure to animals via incidental ingestion. This is a minor pathway at Consolidated Unit 45-001-00 because of the highly disturbed nature of the site and the low probability of animal presence at the site.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Exposure via dermal contact is possible for animals, but is a minor pathway because of the minimal amount of burrowing expected at the site and because none of the concentrations of organic chemicals detected in soil and tuff at the site are lipophilic.

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: 2

Terrestrial Animals: 2

Provide explanation: Because of the low number of radiological COPCs detected, including gamma-emitting radionuclides, external irradiation is a minor pathway of exposure at Consolidated Unit 45-001-00.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: No surface water or sediment is present at Consolidated Unit 45-001-00.

Question O:

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question P:

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question S:

Could contaminants bio-concentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question T:

Could contaminants bio-concentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question U:

Could contaminants bio-accumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

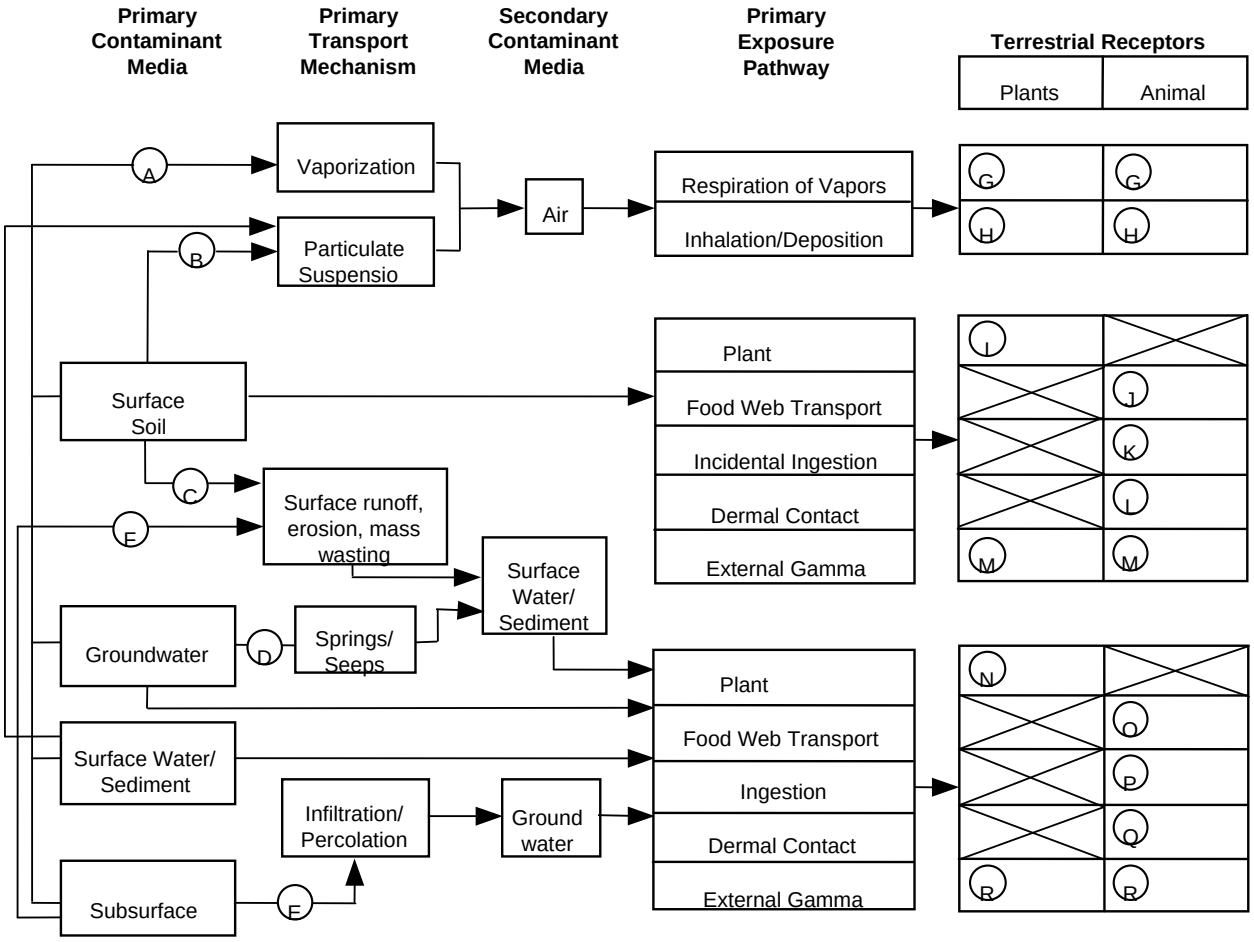
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments at Consolidated Unit 45-001-00, and there are no pathways to aquatic environments located off site.

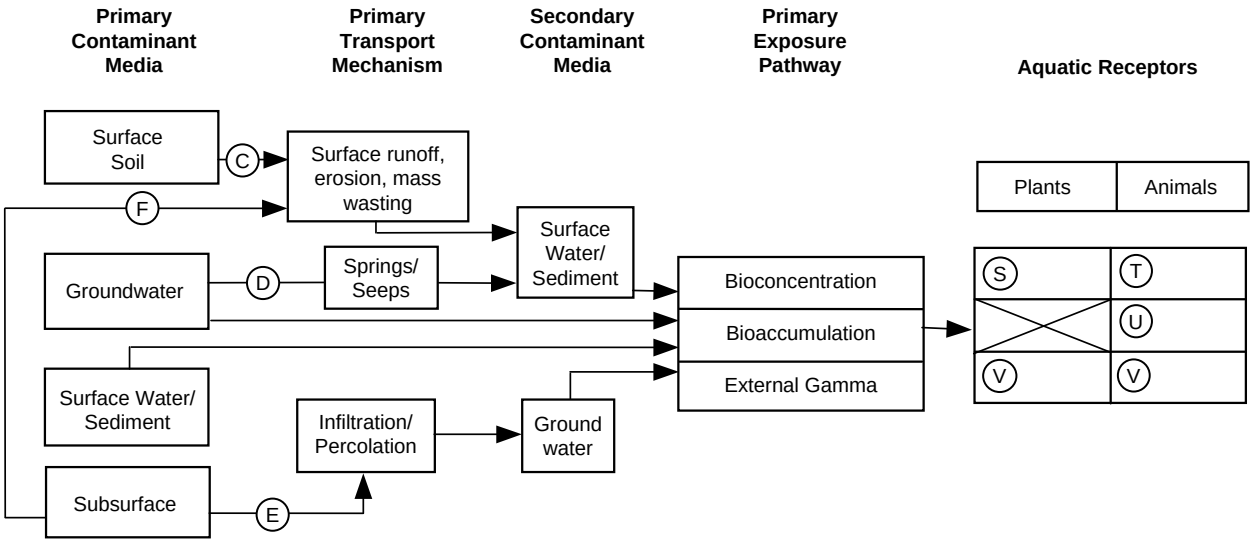
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
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Signatures and certifications:

Checklists completed by (provide name, organization and phone number):

Name (printed): Sharon Wirth, Ecologist

Name (signature): S. Wirth

Organization: Shaw Environmental, Inc.

Phone number: 505-262-8936

Date completed: March 08, 2008

Verification by another party (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.

Name (signature): Richard Mirenda

Organization: Los Alamos National Laboratory, WES-GS

Phone number: 505-665-6953