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Phase II Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)]

Los Alamos
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EXECUTIVE SUMMARY

The Los Alamos National Laboratory (LANL or the Laboratory) Environmental Programs Directorate–Corrective Action Projects has conducted a Phase II investigation and remediation at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f) at Technical Area 16. These Laboratory sites are collectively referred to as the TA-16-340 Complex. Investigation activities were conducted between June 2008 and August 2008. This report presents data from the 2008 investigation and remediation activities as well as data from the 1995 Phase I RCRA facility investigation and the 2005 investigation to meet the requirements set forth in the Compliance Order on Consent.

The TA-16-340 Complex operated from 1952 to 1999 and processed and produced large quantities of plastic-bonded explosives. High explosives and solvent-contaminated wastewater were routed to six sumps and drainlines associated with building 16-340 at SWMU 16-003(o). Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-026(j2) and 16-029(f) were included in the investigation because they share a similar operational history with SWMU 16-003(o).

The 2005 investigation removed man-made fixtures and contaminated soil at Consolidated Unit 16-003(n)-99 and SWMU 16-003(o). Removed fixtures included manholes, sumps, vitrified-clay pipe drainlines, and the former fishladder structure (approximately 350 ft of polyvinyl chloride trough and wood framework) on the south slope of upper Fishladder Canyon. Approximately 100 yd^3 of contaminated soil was removed. The 2005 confirmation sampling results indicated the vertical and lateral extent of contamination were not defined for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f). The total excess cancer risk for SWMU 16-003(o) exceeded the New Mexico Environment Department (NMED) target cancer risk level of 1×10^{-5}.

The 2008 Phase II investigation was conducted to (1) define vertical and lateral nature and extent of potential contamination present in soil and tuff at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f); and (2) remove soil containing elevated concentrations of organic and inorganic chemicals of potential concern (COPCs) (specifically arsenic and benzo[a]pyrene) within SWMU 16-003(o). Twenty-one boreholes were drilled, 106 samples were collected, and 88 yd^3 of soil and tuff was excavated to meet these goals.

Based on the 2008 investigation, COPCs for the TA-16-340 Complex include 25 inorganic chemicals and 73 organic chemicals (particularly semivolatile organic compounds, including polyaromatic hydrocarbons).

The nature and extent of contamination were evaluated for Consolidated Units 13-003(a)-99 and 16-003(n)-99, and SWMUs 16-003(o), 16-026(j2), and 16-029(f). The lateral and vertical extent of all inorganic and organic COPCs are defined using data from the 2008 investigation, coupled with those from previous investigations. In addition, the lateral and vertical extent of isotopic uranium are defined at SWMU 16-003(o). Volatile organic compounds (VOCs) were detected in the 2008 pore-gas samples in the intermediate borehole next to the former TA-16-340 drainline. The results of the screening evaluation indicate that VOCs in subsurface pore gas are not a potential source of groundwater contamination. Several inorganic chemicals, radionuclides, and/or organic chemicals were detected in surface water and alluvial groundwater but were sporadically above standards or screening levels with no clear trends.

With the exception of SWMU 16-003(o), the exposure point concentrations (EPCs) for carcinogenic COPCs were less than their respective industrial soil screening levels (SSLs). The total excess cancer risks for the industrial scenario were less than 1×10^{-5} for Consolidated Units 13-003(a)-99 and 16-003(n)-99, and SWMUs 16-026(j2) and 16-029(f). For SWMU 16-003(o), the cancer risk was approximately 3×10^{-5}, which is slightly above the NMED target cancer risk level of 1×10^{-5}. However, the cancer risk calculated for this SWMU is overestimated because the area of contamination is primarily on the hillslope near the drainage but away from where a worker may be exposed at a frequency and duration in keeping with the scenario exposure assumptions. Industrial activities are not likely to occur on the hillslope because of the steep slope. In addition, the EPC for arsenic is similar to background and the elevated concentrations of benzo(a)pyrene are located within a 10 ft^2 area on the steep hillslope. The total excess cancer risk is reduced to approximately 1×10^{-5} if arsenic is removed as a COPC and the EPC for benzo(a)pyrene is adjusted to the mean because of the skewed distribution and low detection percentage above the SSL. The industrial hazard indexes (HIs) ranged from 0.1 to 0.3 and were less than the NMED target HI of 1.0. For SWMU 16-003(o), the total dose was 0.21 mrem/yr for the industrial scenario, which is less than the U.S. Department of Energy target dose of 15 mrem/yr.

Based on the ecological risk screening assessment, several chemicals of potential ecological concern were identified within the TA-16-340 Complex. Receptors were evaluated using several lines of evidence. These lines of evidence, including previous field studies in other canyons, support the conclusion that there are no potential ecological risks to the receptors at the TA-16-340 Complex.

No further characterization or removal of contaminated media is necessary at the TA-16-340 Complex. However, surface water and alluvial groundwater will continue to be monitored at this site.

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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. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above sea level (asl). The eastern portion of the plateau stands 300 to 1000 ft above the Rio Grande.

The Laboratory's Environmental Programs (EP) Directorate, which includes the former Environmental Stewardship Division–Environmental Remediation and Surveillance (ENV-ERS) Program and Environmental Restoration (ER) Project, is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the EP Directorate is to ensure past operations do not threaten human and environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the EP Directorate is currently investigating sites potentially contaminated by past Laboratory operations.

This Phase II investigation report details the 2008 investigation and removal conducted at the TA-16-340 Complex. Technical Area 16 (TA-16) is located in the southwest corner of the Laboratory (Figure 1.0-1). TA-16-340 Complex consists of Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f) (Figure 1.0-2). The TA-16-340 Complex investigation work plan was approved by the New Mexico Environment Department (NMED) in a letter dated June 28, 2004 (NMED 2004, 091143).

All field activities described in this investigation report were executed and completed in accordance with: (1) the approved investigation work plan (LANL 2004, 087345); (2) remediation requirements as identified in Section 9 of the [Phase I] investigation report for the TA-16-340 Complex (LANL 2006, 091450); (3) LANL's response to the NMED notice of deficiency (NOD) for the TA-16-340 Complex investigation report (LANL 2006, 094410); and (4) the final NMED acceptance with modifications letter for the TA-16-340 Complex investigation report (NMED 2006, 094381).

Corrective actions at the Laboratory are subject to the March 1, 2005, Compliance Order on Consent (the Consent Order), issued pursuant to the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978,§ 74-4-10, and the New Mexico Solid Waste Act (SWA), NMSA 1978, § 74-9-36(D). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the NMED in accordance with DOE policy.

1.1 General Site Information

TA-16 covers approximately 2410 acres (3.8 mi^2) of land acquired in 1943 by the Department of the Army for the Manhattan Project and is surrounded by a security fence. TA-16 is bordered by Bandelier National Monument along NM 4 to the south and by the Santa Fe National Forest along NM 501 to the west. To the north and east, it is bordered by TA-08, TA-09, TA-11, TA-14, TA-15, TA-37, and TA-49 (Figure 1.0-1). Water Canyon, a 200-ft-deep ravine with steep walls, separates NM 4 from active sites at TA-16. Cañon de Valle forms the northern boundary of TA-16.

The TA-16-340 Complex (also referred to as the Fishladder site or the 340 Complex) is located near the eastern end of the TA-16 mesa, close to the head of a small canyon known as Fishladder Canyon

(Figure 1.0-2) and is divided into multiple consolidated units and SWMUs. These sites include Consolidated Unit 13-003(a)-99, the septic system associated with the western area of the P-Site Firing Site (at former TA-13); Consolidated Unit 16-003(n)-99, the sump and drainline for former building 16-342; SWMU 16-003(o), the sumps and drainlines for former building 16-340; and SWMUs 16-029(f) and 16-026(j2), the sump and drainline for former building 16-345, respectively.

1.2 Purpose of the Investigation and Remediation Activities

The purpose of the investigation at the TA-16-340 Complex was to characterize the nature and extent of potential contamination present in surface and subsurface material. Soil and tuff were excavated within the TA-16-340 Complex as part of the 2008 activities to remove elevated concentrations of organic and inorganic chemicals of potential concern (COPCs), specifically arsenic and benzo[a]pyrene. The goal of the removal was to reduce the risk these COPCs might pose to human health and the environment. This report presents data from the 2008 investigation and remediation activities as well as data from the previous 1995 Phase I Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) and the 2005 investigation to meet the requirements set forth in the Consent Order.

1.3 Document Organization

This investigation report is presented in nine sections, including this introduction, with multiple supporting appendixes. Section 2 presents an overview of the site, its operational history, the results of previous investigations, and details on additional investigation data requirements. Section 3 discusses in detail the scope of investigatory activities. Section 4 presents a description of current surface and subsurface conditions at TA-16, and section 5 summarizes the regulatory criteria governing the interpretation of results and implementation of the investigation. Section 6 summarizes site contamination, including the analytical results, identifies COPCs, and discusses the nature and extent of contamination with a focus on the 2008 results. Section 7 presents conclusions based on both historical and 2008 investigation data and summarizes the risk-screening assessments.

Appendix A includes a list of acronyms and abbreviations, a metric conversion table, and data qualifier definitions. The field methods are discussed in Appendix B. Appendix C contains field documentation such as field-screening results, a geodetic survey, and borehole logs and well-construction information. Appendix D contains photographs, and Appendix E includes the analytical reports. The analytical program is discussed in Appendix F, and analytical suites and results are in Appendix G. (Appendixes C, D, E, and G are included electronically with this document.) Appendix H presents a detailed analysis of analytical data, discusses the COPC identification process, and presents an analysis of the nature and extent of contamination. Appendix I presents the risk assessments. Appendix J contains the waste management and investigation-derived waste (IDW) disposal documentation.

2.0 BACKGROUND

TA-16 was established to develop explosive formulations, cast and machine explosive charges, and assemble and test explosive components for the implosion method as part of the U.S. nuclear weapons program. Present-day use of TA-16 is essentially the same, although the facilities have been upgraded and expanded as explosives and manufacturing technologies have advanced.

2.1 Site Description and Operational History

The TA-16-340 Complex operated from 1952 to 1999 and processed and produced large quantities of plastic-bonded explosives. The plastic-bonded explosives were produced by slurrying high explosives

(HE) and solvents together with inert binders. HE and solvent-contaminated wash water was routed as waste to six sumps associated with building 16-340 and to the single sump and outfall associated with building 16-342 (Figure 2.1-1). Historically, discharges from building 16-340 and 16-342 sumps were routed to the building 16-340 and 16-342 outfalls, respectively.

During the 1970s, the U.S. Environmental Protection Agency (EPA) issued National Pollutant Discharge Elimination System (NPDES) permits for the operation of the building 16-340 outfall as EPA Outfall 05A054, and for the building 16-342 outfall as EPA Outfall 05A062 (EPA 1990, 012454). Building 16-345 sump and outfall were never issued permits under NPDES. The final NPDES permitting for the building 16-340 outfall occurred in 1994, and the outfall was deactivated on July 20, 1998. The building 16-342 outfall was deactivated on July 31, 1996. During the mid-1990s, the discharge to the building 16-340 outfall amounted to more than 3.5 million gal./yr and the discharge to the building 16-342 outfall measured 4600 gal./yr (LANL 1994, 076858). The TA-16-340 Complex has been inactive since 1999. Decommissioning and decontamination (D&D) of the facilities occurred in 2004–2005.

2.1.1 Consolidated Unit 13-003(a)-99

Consolidated Unit 13-003(a)-99 consists of SWMU 13-003(a) and Area of Concern (AOC) 13-003(b), which were part of a septic system associated with activities at former TA-13 (Figure 2.1-1) (LANL 1993, 020948, pp. 5-98–5-99). Former TA-13, originally called P-Site, was located at the eastern end of the current TA-16 explosives manufacturing area. Former TA-13 was built in 1944 to support the HE portion of the Manhattan Project and was principally designed as a site for counter x-ray diagnostics of HE lens configurations. Activities that supported the diagnostics included the operation of counter x-ray equipment, the assembly of HE test devices, and research for the magnetic method program. Buildings in the western half of former TA-13, including those associated with the septic system, were demolished in the early 1950s to build the TA-16-340 Complex.

SWMU 13-003(a) is the location of a decommissioned and removed septic tank (former structure 13-12) that received liquid wastes from an office and shop building (former building P-1, later renumbered as building 16-475) associated with implosion and initiator testing conducted during the early years of Laboratory operations. The building had a lavatory and a small darkroom next to the sewer hookup. The septic tank served building 16-475 from the 1940s to 1951 when the tank was decommissioned and removed and the entire area was leveled to make room for construction of building 16-340. Parts of building 16-340 were built on top of the original location of the septic tank. The types of liquid wastes discharged to the septic tank are unknown.

AOC 13-003(b) is the drain field associated with the former septic tank. The drain field is located about 100 ft southwest of the former location of the decommissioned and removed septic tank. No records document that the drain field was removed.

Potential contaminants at Consolidated Unit 13-003 (a)-99 are HE; volatile organic compounds (VOC); inorganic chemicals, including uranium; and gamma-emitting radionuclides (the former building associated with the septic system supported the P-Site Firing Site).

2.1.2 Consolidated Unit 16-003(n)-99

Consolidated Unit 16-003(n)-99 is the site of the HE sump and drainline associated with building 16-342 (Figure 2.1-1) and includes the soil within the discharge area of the outfall. Consolidated Unit 16-003(n)-99 was consolidated from SWMUs 16-003(n) and 16-029(i), both of which were identified as the building 16-342 sump. SWMU 16-029(i) was recommended for no further action because it was a duplicate of SWMU 16-003(n) (LANL 1994, 039440, p. 6-3). Building 16-342 was used for HE processes in which the constituents of plastic-bonded explosive formulations were mixed and blended (LANL 1993, 020948, pp. 5-35–5-36). The sump was a rectangular tank with dimensions approximately 5 ft long by 3 ft wide by 4 ft deep. The sump walls and bottom were constructed of 6-in.-thick, steel-reinforced concrete and lined with 0.25-in.-thick aluminum. The sump also had a removable 0.25-in.-thick aluminum lid. The sump removed suspended solids from process water before it was discharged to the outfall. HE fines were collected in a cloth filter bag and secured inside a metal filter basket. The baskets and filter bags were periodically removed and taken to the TA-16 basket-washing facility for cleaning. HE fines too small to collect in the filter bags settled to the bottom of the sump. To help separate the suspended solids, the water flowed under an aluminum baffle and over a concrete weir before it discharged to the outfall. HE fines in the bottom of the sump were periodically removed and burned. The sump was connected to a 6-in. vitrified-clay pipe (VCP) that discharged to the outfall northeast of the sump. This outfall surfaced in a small tributary to Fishladder Canyon that ultimately connects to Cañon de Valle.

Wastes consisted primarily of HE and organic solvents, byproducts of cleaning activities (LANL 1993, 020948, pp. 5-35–5-36), which were transported in the washdown water. The primary types of HE used at TA-16 were trinitrotoluene (TNT), cyclotrimethylenetrinitramine (RDX), and cyclotetramethylenetetranitramine (HMX). Because barium nitrate was used to process baratol, an explosive formerly produced in great quantity, barium is another key HE-related contaminant.

During the early 1970s, three evaluations of chemical use in building 16-342 were completed. Wilder (1970, 034564) classified the use of HE in building 16-342 as high but intermittent and the probability of HE in the sump as low. Panowski and Salgado (1971, 015271) stated that effluents from the building were negligible and did not identify any solvents used in the building. A 1979 Laboratory document (LASL 1979, 001808) noted that natural uranium had been used in the building. By the 1990s, organic solvents were containerized for disposal, but historically solvents had been discharged to the sump. The potential contaminants at Consolidated Unit 16-003(n)-99 are HE, VOCs, and inorganic chemicals, including uranium.

2.1.3 SWMU 16-003(o)

SWMU 16-003(o) is the site of six inactive HE sumps and the drainline associated with building 16-340 (Figure 2.1-1). The sump and drainline received effluent from sink, floor, equipment, and roof drains (LANL 1993, 020948, p. 5-37). Historically, discharge from the building 16-340 sumps was routed to the building 16-340 outfall, which became known as the “fishladder” because an air stripper installed at the outfall in the late 1980s resembled a fishladder. This SWMU also includes the fishladder/air stripper and the soil downgradient of the discharge point of the outfall.

Building 16-340 was used for HE processes in which constituents of plastic-bonded explosive formulations were mixed and blended (LANL 1993, 020948, pp. 5-37–5-38). All the sumps were rectangular tanks and were approximately 5 ft long by 3 ft wide by 4 ft deep. The walls and bottoms of each sump were constructed of 6-in.-thick, steel-reinforced concrete and lined with 0.25-in.-thick aluminum. Each sump had a removable 0.25-in.-thick aluminum lid. Sump operations were similar to those described for Consolidated Unit 16-003(n)-99. The sumps were connected to a 10-in. VCP, which discharged to the outfall east of building 16-340. This outfall surfaces in Fishladder Canyon, which ultimately connects to Cañon de Valle. In the 1980s, the outfall was plumbed to the air stripper designed to eliminate VOCs from the outfall. The air stripper discharged approximately 250 ft east of the sumps into Fishladder Canyon. Splashing caused by the air stripper may have resulted in the dispersal of outfall liquids over a larger area.

Wastes discharged from building 16-340 to SWMU 16-003(o) consisted primarily of HE and organic solvents, byproducts of HE processing activities (LANL 1993, 020948, pp. 5-37–5-38), which were transported in the washdown. Three evaluations of chemical use in building 16-340 were completed during the early 1970s. The HE use in building 16-340 was historically classified as moderate, and therefore the probability of HE found in the sump is low (Wilder 1970, 034564). Panowski and Salgado inventoried chemicals used in the facility and stated that the use of solvents at TA-16 was greatest in building 16-340 (1971, 015271). Panowski and Salgado (1971, 015271) noted that during a 6-mo period that began in 1970 and ended in 1971, 700 gal. of acetone; 500 lb of ammonium sulfate; 330 gal. of n-butyl-acetate; 3 gal. of chloroform; 55 gal. of 1,2-dichloroethane; 11 gal. of ethyl acetate; 72 gal. of isopropyl alcohol; 110 gal. of methanol; 72 gal. of methylene chloride; 750 gal. of butanone[2-]; and 110 gal. of toluene had been used within building 16-340. They determined that the building had released large quantities of HE, organic solvents, gases, and other materials. Natural uranium may have been used in the building (LASL 1979, 001808). By the 1990s, organic solvents were containerized for disposal, but historically the solvents were discharged to the sump. Potential contaminants at SWMU 16-003(o) are HE, VOCs, SVOCs, and inorganic chemicals, including uranium.

2.1.4 SWMUs 16-026(j2) and 16-029(f)

SWMUs 16-026(j2) and 16-029(f) are associated with building 16-345. SWMU 16-029(f) is the inactive HE sump and SWMU 16-026(j2) is the drainline and outfall (Figure 2.1-1). SWMU 16-026(j2) also includes the soil within the outfall.

Building 16-345 was an HE rest house that served as a storage facility for building 16-340 (LANL 1993, 020948, p. 5-38). The sump was a rectangular tank with dimensions approximately 8 ft long by 4 ft wide by 5 ft deep. The walls and bottom were constructed of 8-in.-thick, steel-reinforced concrete. The sump had a removable 0.25-in.-thick aluminum lid. The sump operations were the same as for Consolidated Unit 16-003(n)-99. The sump was connected to a 6-in. VCP, which discharged to an outfall that was not visible on the surface. This outfall was located southeast of building 16-345. Wastes discharged from building 16-345 consisted primarily of HE (LANL 1993, 020948, p. 5-38) transported by washdown resulting from cleaning activities.

Two evaluations of chemical use in building 16-345 were completed during the early 1970s. Wilder (1970, 034564) noted the HE in building 16-345 was stored in containers, and it was not likely the HE was washed into the sump. Panowski and Salgado (1971, 015271) stated that effluents from the building were negligible. The potential contaminants at SWMUs 16-029(f) and 16-026(j2) are HE, VOCs, and inorganic chemicals.

2.2 Relationship to Other SWMUs and AOCs

Several groups of SWMUs and AOCs near the TA-16-340 Complex have the potential to influence aspects of the TA-16-340 Complex investigations. These groups are associated with World War II–era facilities, the TA-16 Burning Ground and Material Disposal Area (MDA) P, the P-Site (TA-13) Firing Site, and the TA-16 Sanitary Wastewater Treatment Plant (Figure 2.2-1). The SWMUs and AOCs are discussed briefly below.

2.2.1 SWMUs 16-024(u) and 16-025(d2) and AOCs C-16-049, C-16-050, and C-16-060

SWMUs 16-024(u) and 16-025(d2) and AOCs C-16-049, C-16-050, and C-16-060 are located near the TA-16-340 Complex and are building footprints associated with World War II–era facilities, which were part of P-Site West. Decontamination and decommissioning activities did not disrupt these sites, and sampling may be conducted during future investigation activities at TA-16.

2.2.2 Consolidated Units 16-010(h)-99 and 16-016(c)-99 and SWMUs 16-010(b,c,d,e,f), 16-018, and 16-028(a)

Consolidated Units 16-010(h)-99 and 16-016(c)-99 and SWMUs 16-010(b,c,d,e,f), 16-018, and 16-028(a) are located on the mesa in the northeast corner of TA-16 (Figure 2.2-1) and are associated with the TA-16 Burning Ground and MDA P. Runoff from several of these SWMUs trends in a southerly direction to Fishladder Canyon, so it is likely contaminants from these sites commingled in Fishladder Canyon with contaminants originating from the TA-16-340 Complex.

The burning ground was constructed in 1951 for the treatment and disposal of HE waste. Over the years, hundreds of thousands of pounds of HE and HE-contaminated waste materials have been burned at this location. Noncombustible material remaining after burning was subsequently either placed in MDA P, north of the burning ground (through 1984), or taken to TA-54 for storage while awaiting off-site disposal (1984 to present). MDA P contained the wastes from the synthesis, processing, and testing of HE; residues from the burning of HE-contaminated equipment; and construction debris. For many years, a barium nitrate pile, which is part of Consolidated Unit 16-016(c)-99, was located at the TA-16 Burning Ground. In 1995, site investigations were conducted at several of these SWMUs (LANL 2003, 076876).

MDA P (SWMU 16-018) and the flash pad [SWMU 16-010(b)] associated with structure 16-387 recently underwent RCRA closure, including soil removal and decontamination. A voluntary corrective action (VCA) was conducted simultaneously at Consolidated Unit 16-016(c)-99, including the barium nitrate pile area. Altogether, approximately 55,000 yd^3 of soil and debris was removed during the combined RCRA closure and the VCA (LANL 2005, 092251).

2.2.3 Consolidated Units 13-001-99 and 16-029(h)-99 and SWMU 16-031(h)

Consolidated Units 13-001-99 and 16-029(h)-99 and SWMU 16-031(h) are located on the mesa southeast of the TA-16-340 Complex and are associated with the P-Site (TA-13) Firing Site. P-Site was used for a variety of Laboratory activities, most dating back to World War II (LANL 1993, 020948, pp. 5-226–5-228; LANL 1994, 039440, pp. 5-291–5-294). P-Site was constructed in 1944 as a firing site to support implosion method development for the Manhattan Project. Key diagnostic methods at the firing site included the x-ray method and the magnetic method. Later, the site was used for initiator testing and experimental HE machining operations. No sampling has been conducted at P-Site.

2.2.4 Consolidated Unit 16-004(a)-99

Consolidated Unit 16-004(a)-99, the TA-16 Sanitary Wastewater Treatment Plant, is located southeast of the TA-16-340 Complex (Figure 2.2-1). This inactive wastewater treatment plant received waste from the TA-16 sewer system, which consisted of thousands of feet of piping and numerous lift stations and manholes (LANL 1993, 020948, pp. 5-133–5-135). The wastewater treatment plant was built during 1953 and was disconnected in 1992, after which it was connected to the Laboratory-wide sewage system during the sanitary waste system consolidation project. The TA-16 Sanitary Wastewater Treatment Plant received primarily sanitary waste.

2.3 Historical Investigations

An historical investigation report (HIR) was completed in 2004 to provide a summary of the field investigations and associated environmental data collected to date for the TA-16-340 Complex (LANL 2004, 087345, Appendix B). The HIR provides supporting documentation to assist in the nature and extent of contamination associated with the TA-16-340 Complex.

2.3.1 Pre-RFI Results

No detailed waste inventory exists for the TA-16-340 Complex. The wastes likely discharged into the environment were determined from a combination of fragmentary historical records, pre-RFI sampling data, and the 1995 RFI sampling data. A waste inventory and disposal history indicated the release of VOCs (e.g., acetone, n-butyl acetate, toluene, and butanone [2-]), inorganic chemicals (e.g., barium), and HE (e.g., RDX, HMX, and TNT) in sump water from building 16-340, with possible releases of smaller amounts of similar chemicals in the sumps at buildings 16-342 and 16-345 (LANL 1993, 020948, pp. 5-42–5-49). Less information was available on chemicals discharged into the P-Site septic system associated with Consolidated Unit 13-003(a)-99, but those chemicals probably included firing-site-related compounds such as VOCs, inorganic chemicals, HE, and uranium.

Sampling and analysis activities began in 1970 to determine the extent of environmental contamination at the TA-16-340 Complex. Soil samples from building 16-340, building 16-342, and building 16-345 outfalls were analyzed for HE. In 1970, HE was detected at a maximum of 0.6 weight percent (wt%) at the building 16-340 outfall, with levels of 0.2 wt% in 1984 and 1985. Building 16-342 outfall contained a maximum of 0.2 wt% HE in 1984, with lower levels detected in 1971, 1973, 1976, and 1985. The building 16-345 outfall was sampled in 1970 and HE was not detected (LANL 1993, 020948, pp. 5-42–5-49).

Sump water was sampled at building 16-340 for HE and a limited suite of solvents (VOCs) over a period of 10 days in 1988, at which time HMX was detected at levels up to 0.41 parts per million (ppm), but solvents were not detected (LANL 1993, 020948, p. 5-45). Three sediment samples and six water samples were collected at building 16-340 outfall in the late 1980s, as reported in the RFI work plan for Operable Unit (OU) 1082 (LANL 1993, 020948, p. 5-46). Acetone and butanone[2-] were detected in all water samples, with butanone[2-] reported at levels up to 390 ppm. Beryllium, chromium, uranium, and RDX were detected in one to two water samples each. Barium, cadmium, chromium, RDX, uranium, and cesium-137 were detected in sediment. Three sediment samples from the building 16-342 outfall were also collected in the late 1980s (LANL 1993, 020948, p. 5-48). Barium; chromium; cesium-137; trichloroethane[1,1,1-]; HMX; and dinitrotoluene[2,4-] were detected.

2.3.2 Results of 1995 RFI

In 1995, RFI fieldwork was conducted at the TA-16-340 Complex. The approved RFI work plan for OU 1082 specified the sampling of surface soil and sediment, subsurface soil, and subsurface bedrock (tuff) and the analysis for inorganic chemicals, VOCs, semivolatile organic compounds (SVOCs), HE, and radionuclides (LANL 1993, 020948, p. 5-66). The objectives of the 1995 RFI were to determine whether COPCs were present and if additional investigation or corrective actions were warranted (Figure 2.3-1). Of particular concern were HE in drainages associated with the TA-16-340 Complex sumps and outfalls.

Surface water samples were collected at the Fishladder Spring (also referred to as Fishladder Seep) and at the confluence of Fishladder Canyon and Cañon de Valle as part of the RFI (Figure 2.3-2). Phase I RFI sampling was based on data quality objectives from the RFI work plan (LANL 1993, 020948, pp. 5-56–5-62). Subsurface samples were collected by hand auger or hollow-stem auger. The 0- to 6-in. interval and the deepest interval of each core were sent for analysis. The outfalls and drainages were sampled in the center of each drainage channel because it was unlikely that contaminants had migrated out of the well-defined drainages and because it was assumed that the highest contaminant concentrations would be near the center of the drainages. The historical sampling results for the TA-16-340 Complex SWMUs and surface water sampling results for the Fishladder Spring and confluence of Fishladder Canyon and Cañon de Valle are summarized below.

Consolidated Unit 13-003(a)-99

Five inorganic chemicals were detected above the background values (BVs) in the tuff (aluminum, barium, calcium, chromium, and copper) but were not detected above the BVs in overlying soil. Uranium concentrations in tuff were slightly higher than in overlying soil, with both above BV. Two organic chemicals, diethylphthalate and di-n-octylphthalate, were detected in the tuff but not the overlying soil (LANL 2004, 087345).

Consolidated Unit 16-003(n)-99

All inorganic chemicals were below BVs in the three samples collected farthest down the drainage. For two locations at the building 16-342 outfall, arsenic, chromium, and lead were detected above BVs in tuff but not in overlying soil or sediment, and the arsenic and lead concentrations increased in concentration from soil to tuff. The following inorganic chemicals showed decreasing trends with depth and were above tuff BVs: barium, cobalt, copper, and vanadium. With the exception of nitrobenzene, organic chemicals were not detected along the Consolidated Unit 16-003(n)-99 drainage (LANL 2004, 087345, pp. B-5–B-6).

SWMU 16-003(o)

Inorganic chemicals were detected above BVs even at the farthest sampling location (location 16-01542 in Figure 2.3-1) downgradient along the drainage. Concentration trends with distance from the outfall were weak, and the contaminant distribution was heterogeneous. Near the upslope portion of the SWMU, many inorganic chemicals were above BVs in the tuff but not in the overlying soil. Acetone was detected in the tuff but not the soil at this location (LANL 2004, 087345, pp. B-5–B-6).

SWMUs 16-026(j2) and 16-029(f)

The inorganic chemical concentrations in the samples collected farthest down the drainage at SWMU 16-026(j2) were below BVs, with the exception of lead, which occurred in a heterogeneous distribution along the drainage. Chromium, copper, and nickel were detected above BVs in tuff but not above BVs in overlying soil and sediment at two sampling locations closest to the building 16-345 outfall (locations 16-01551 and 16-02166 in Figure 2.3-1). The farthest sampling location down the drainage had detected concentrations of polycyclic aromatic hydrocarbons (PAHs). At location 16-02166 (Figure 2.3 1) near the outfall, acetone was detected in the tuff but not in the overlying soil. No RFI sampling activities or results are documented for SWMU 16-029(f) (LANL 2004, 087345, pp. B-5–B-6).

Fishladder Canyon

Several inorganic chemicals were detected in water at Fishladder Spring and the confluence of Fishladder Canyon and Cañon de Valle. Of these, aluminum, barium, iron, and manganese exceeded the New Mexico Water Quality Control Commission (NMWQCC) groundwater standards for human health, domestic water supply, and irrigation, as contained in the New Mexico Administrative Code (NMAC) (20.6.4 NMAC). Several organic chemicals were detected at Fishladder Spring, including acetone; dichloroethene [cis-1,2-]; HMX; RDX; tetrachloroethene; and trichloroethene. However, at the confluence location, only HMX and RDX were detected. Tetrachloroethene and trichloroethene exceeded the EPA drinking water maximum contaminant levels. Tritium was detected at low levels in surface water samples collected from the Fishladder Spring and at the confluence of Fishladder Canyon and Cañon de Valle (LANL 2004, 087345, p. B-6).

2.3.3 Results of 2005 Investigation

In 2005, an investigation was performed at the TA-16-340 Complex to follow-up on the 1995 RFI results. The investigation included remediation followed by confirmation sampling. Man-made fixtures and contaminated soil were removed at Consolidated Unit 16-003(n)-99 and SWMU 16-003(o) (Figure 2.3-3). Removed fixtures included the building structures (those not removed by the D&D program), two manholes, one sump associated with former building 16-342, approximately 500 ft of vitrified-clay pipe drainlines associated with former buildings 16-340 and 16-342, and the former fishladder structure (approximately 350 ft of polyvinyl chloride trough and wood framework) on the south slope of upper Fishladder Canyon. Approximately 100 yd^3 of contaminated soil was removed from four locations at SWMU 16-026(j2) and from seven locations within SWMU 16-003(o). The areas of suspected contamination, as determined by the 1995 Phase I RFI results, contained arsenic and/or benzo(a)pyrene that exceeded NMED industrial soil screening levels (SSLs).

Upon completion of remediation activities, confirmation samples were collected (based on field-screening results) below drainline joints/couplings and areas where additional contamination was suspected (e.g., observations of staining/leakage or questionable fixture/structure integrity) (Figure 2.3-3). Results of the confirmation sampling indicated the vertical and/or lateral extent of contamination remain undefined for Consolidated Units 13-003(a)-99 and 16-003(n)-99; and SWMUs 16-003(o), 16-026(j2), and 16-029(f).

Results from the 2005 investigation are summarized below.

Consolidated Unit 13-003(a)-99

Silver exceeded background in the deepest tuff sample collected from the borehole drilled at location 13-23558 (Figure 2.3-3). PAHs, metals, and anions were detected in samples collected farthest from the suspected source of contamination.

Consolidated Unit 16-003(n)-99

Contaminant concentrations were less than NMED industrial SSLs and generally decreased with depth; however, several organic and inorganic chemicals were detected at elevated concentrations at depth at former sump and drainline locations. Although most COPC concentrations decreased in both frequency and magnitude with increased distance from the source, the extent for several COPCs remained undefined. Cobalt was detected at a concentration greater than 2 times the BV at location 16-23570(Figure 2.3-3). PAHs were detected in samples collected in upper Fishladder Canyon at locations farthest downgradient in the former building 16-342 drainage channel.

SWMU 16-003(o)

Most organic COPC concentrations decreased with depth; however, several organic COPCs (including RDX) were detected at elevated concentrations at the base of the sump excavations. In addition, benzo(a)pyrene and arsenic were detected sporadically at elevated concentrations downslope from the drainline outfall. Numerous organic chemicals (primarily PAHs and HE compounds) and inorganic chemicals (arsenic, barium, chromium, and zinc) were detected in surface samples near the location where the former fishladder structure turned to the southeast (Figure 2.3-3). Barium, cobalt, and multiple VOCs were detected in the samples collected farthest downgradient in the drainage channel.

SWMUs 16-026(j2) and 16-029(f)

Benzo(a)pyrene and lead were detected at elevated concentrations in samples collected at the base of the sump for 16-345 (Figure 2.3-3). In addition, cobalt, silver, pyrene, and fluoranthene were detected at elevated concentrations in the sample collected farthest downgradient in the drainage channel.

Fishladder Canyon

Several inorganic and organic chemicals were detected in the surface water at Fishladder Spring and Cañon de Valle; these chemicals included metals, acetone, acetonitrile, cis-1,2-dichloroethene, HMX, MNX (mononitrosodimethylamine), RDX, tetrachloroethene, and trichloroethene (Figure 2.3-2). Alluvial wells 16-25278, 16-25279, and 16-25280 were installed in Fishladder Canyon during October 2005, and the wells were developed in November 2005. Well 16-25280 was bailed dry during development activities and did not recharge before the groundwater sampling activities began; therefore, only wells 16-25278 and 16-25279 were sampled as part of the field activities. Metals, HMX, and toluene were detected in these wells.

2.3.4 Nature and Extent of Contamination Based on Historical Investigations

The lateral nature and extent of contamination were not defined for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f) and their associated drainages based on the 2004–2005 sampling results. The vertical extent of contamination also was not defined, particularly for areas near the outfalls. The primary COPCs at the TA-16-340 Complex are HE (primarily RDX), PAHs, phthalates, acetone, and metals (such as arsenic, barium, chromium, copper, and lead). PAHs and arsenic were detected above NMED industrial SSLs. Contamination was concentrated near the outfall areas for buildings 16-340, 16-342, and 16-345 and was detected sporadically at mostly lower concentrations along the drainages downslope from these outfalls.

3.0 SCOPE OF ACTIVITIES

This section identifies activities performed during the 2008 investigation and remediation at the TA-16-340 Complex. Discussions include field activities conducted at each consolidated unit and SWMU, implemented health and safety measures, and waste management and disposal. Detailed discussions of the field-investigation methods are presented in Appendix B. Field activities were documented and photographed; the documentation is presented in Appendixes C, D, and E.

3.1 Field Activities

Specific goals of the 2008 investigation and remediation as delineated in (1) Section 9 of the Phase I investigation report for the TA-16-340 Complex (LANL 2006, 091450); (2) the Laboratory's response to the NMED NOD for the TA-16-340 Complex investigation report (LANL 2006, 094410); and (3) the final NMED acceptance with modifications letter for the TA-16-340 Complex investigation report (NMED 2006, 094381*)*. The goals include the following:

Goal 1: Define the vertical and lateral extent of contamination present in soil and tuff at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f).

Goal 2: Removal of soil containing elevated concentrations of organic and inorganic chemicals (specifically arsenic and benzo[a]pyrene) in the Fishladder Canyon drainage within SWMU 16-003(o).

Eighteen boreholes were drilled to meet Goal 1 (Figure 3.1-1), and 91 yd^3 of soil and tuff was excavated to meet Goal 2 (Figure 3.1-2). Drilling, sampling, and excavation strategies were based on the results from previous investigations as summarized in sections 2.3.2 and 2.3.3.

The following TA-16-340 Complex field-investigation activities were conducted from June 20, 2008, to July 15, 2008:

- site mobilization and setup (including prejob geomorphic surveys),
- surface and shallow subsurface sampling of soil and tuff,
- drilling and subsurface sampling of soil and tuff,
- field screening,
- installation of a pore-gas monitoring well and subsurface vapor sampling,
- borehole abandonment,
- excavation and soil removal,
- postexcavation surface and shallow subsurface confirmation sampling,
- shallow groundwater sampling,
- IDW management and disposal, and
- site restoration.

The following section briefly describes the sampling and removal actions at the consolidated units and SWMUs within the TA-16-340 Complex. Table 3.1-1 and Figures 3.1-1 and 3.1-2, respectively, present borehole and excavation location information.

3.1.1 Consolidated Unit 13-003(a)-99

Investigation activities at Consolidated Unit 13-003(a)-99 were conducted between June 24, 2008, and July 11, 2008. The following activities were completed to define the vertical extent of metal contamination previously identified at this site:

- One shallow borehole was drilled to 20 ft below ground surface (bgs) at historical sampling location 13-23558 (the former septic system) to characterize the vertical extent of contamination. One tuff sample was collected at the total depth (18 to 20 ft bgs) of the borehole.
- An area 25 ft south of historical sampling location 13-23552 (location 16-603358) was drilled to characterize the vertical extent of contamination. One surface sample was collected from 0 to 0.6 ft bgs, and a tuff sample was collected from 8.5 to 10 ft bgs.

3.1.2 Consolidated Unit 16-003(n)-99

Investigation activities at Consolidated Unit 16-003(n)-99 were conducted between June 24, 2008, and July 11, 2008. The following activities were completed to define the vertical extent of contamination for various COPCs (primarily arsenic, PAHs, barium, and HMX):

- Two shallow boreholes (locations 16-23574 and 16-23579) were drilled to 13.5 and 15 ft bgs, respectively, at former sump and drainline locations associated with building 16-342. Borehole locations corresponded with historical sampling locations 16-23574 and 16-23579 and were drilled and sampled to define the vertical extent of contamination previously identified at these locations during the 2005 sampling campaign (elevated arsenic and PAHs at 6 to 6.5 ft at 16-23574, elevated barium and HMX at 8 to 8.5 ft at 16-23579). Tuff samples were collected from 12.5 to 13.5 ft bgs at location 16-23754 and from 13.5 to 15 ft bgs at location 16-23579.

3.1.3 SWMU 16-003(o)

Investigation activities at Consolidated Unit 16-003(o)-99 were conducted between June 20, 2008, and July 15, 2008, to remove contamination and confirmation sampling was conducted to define vertical and lateral extent of contamination. In addition, the following subsurface drilling and sampling activities were completed to define the vertical extent of contamination for various COPCs (primarily TATB [triaminotrinitrobenzene], RDX, SVOCs, dibenzofuran, cobalt, silver, and nitrate):

- Three shallow boreholes corresponding to historical locations 16-23591, 16-23597, and 16-23619 were drilled at former sumps associated with former building 16-340. The boreholes were drilled to define the vertical extent of contamination previously identified at these locations during the 2005 sampling campaign. Previous investigations revealed elevated organic chemical concentrations at 4.5 ft at location 16-23591; elevated TATB at 4 to 6.5 ft at location 16-23597; and elevated RDX at 4.5 ft at location 16-23619. Tuff samples were collected from 12.5 to 14.5 ft bgs at location 16-23591, from 12.5 to 14.2 ft bgs at location 16-23597, and from 13 to 15 ft bgs at location 16-23619.
- Two shallow boreholes (locations 16-603396 and 16-603397) were drilled immediately east of former building 16-340 beneath former drainline couplings that connected former sumps 105 and 106/107 with sumps 106/107 and 108/109. Samples were collected from these boreholes to determine whether contaminants were released into the surrounding soil/tuff below drainline joints/couplings. Tuff samples were collected from 12.5 to 14.5 ft bgs at location 16-603396 and from 13 to 15 ft bgs at location 16-603397.
- An intermediate depth borehole was drilled to 206.3 ft bgs (location 16-603511) along the former building 16-340 drainline, approximately 10 ft west of historical sample location 16-24899. Data from the borehole are used to define the vertical extent of contamination for various COPCs previously identified during the 2005 sampling campaign. Tuff samples were collected from 38 to 40 ft bgs, from 77 to 79 ft bgs, from 100 to 101 ft bgs, from 118 to 120 ft bgs, from 158–160 ft bgs, and from 204.5 to 206.3 ft bgs. Field-screening samples were taken for VOCs using a photoionization detector (PID), RDX using an RDX D-Tech test kit, select metals using an x-ray fluorescence spectrometer (XRF), and a HE spot test every 20 ft from 20 ft to total depth (TD) at location 16-603511.
- A pore-gas monitoring well was installed with sample ports at 50 ft bgs, 98.5 ft bgs, and 200 ft bgs in borehole location 16-603511. Pore-gas sampling results are used to measure the vertical extent of VOCs in subsurface vapors beneath the 16-340 drainline area. Two rounds of pore-gas samples were collected from location 16-603511.
- Two boreholes (locations 16-603398 and 16-603399*)* were drilled at historical sampling locations 16-23636 and 16-23639, respectively and resampled at specified depths (4.0 to 4.5 ft bgs and 6.0 to 6.5 ft bgs) for nitrate only at both locations. Data from these boreholes fulfill the NMED NOD requirement (LANL 2006, 094410) and replace 2005 rejected nitrate data previously collected at these locations.
- Two boreholes were drilled at historical locations 16-24894 (on the mesa top) and 16-23693 (in Fishladder Canyon drainage). Data obtained from these boreholes are used to define the vertical extent of contamination previously identified during the 2005 sampling campaign. Previous investigations revealed elevated SVOCs at 10.5 ft at location 16-24894 and elevated cobalt and

silver at 3.5 ft at location 16-23693. A tuff sample was collected from 31 to 32 ft bgs at location 16-24894 and a soil sample was collected from 2.5 to 2.8 ft bgs from location 16-23693. Hand-auger refusal was met at 2.8 ft bgs at location 16-23693; the proposed sample depth of 23 to 25 ft bgs could not be obtained. Steep canyon walls with no existing access road preventing sampling location 16-23693 with a drill rig.

- Two boreholes (locations 16-603400 and 16-603401) were drilled and hand-augered at two locations (16-3402 and 16-603403) to soil/tuff interface (4 ft bgs) to define lateral extent of contamination at SWMU 16-003(o). One soil and one tuff sample were collected from each location. At location 16-603400, a soil sample was collected from 0 to 1.5 ft bgs, and a tuff sample was collected from 1.5 to 4 ft bgs. At location 16-603401, a soil sample was collected from 0 to 2 ft bgs, and a tuff sample was collected from 3 to 4 ft bgs. At locations 16-603402 and 16-603403, one soil and one tuff sample were collected from 0 to 0.5 ft bgs and 1.5 to 2 ft bgs, respectively, at each location.
- A total of 88 yd^3 of soil was excavated from five areas within upper Fishladder Canyon drainage [SWMU 16-003(o)] to beneath the soil/tuff interface, and 73 confirmation soil and tuff samples were collected from 37 locations from beneath and outside the perimeter of the excavation areas.

3.1.4 SWMUs 16-029(f) and 16-026(j2)

Investigation activities at SWMUs 16-029(f) and 16-026(j2) were conducted between June 25, 2008, and July 07, 2008. The following activities were completed to define the vertical and lateral extent of various organic and inorganic COPCs.

- Two boreholes (locations 16-23706 and 16-603404) were drilled to define the vertical extent of contamination associated with former building 345 HE sump and drainline at SWMU 16-029(f). One borehole was drilled at historical location 16-23706 where elevated organic and inorganic chemicals were reported at 6.5 ft bgs during the 2005 sampling campaign. The second borehole was drilled approximately 50 ft southeast of historical location 16-23706 to coincide with the end of the former drainline. Borehole locations 16-23706 and 16-603404 were drilled to 13.6 and 14 ft bgs, respectively. Tuff samples were collected from 12.5 to 13.6 ft bgs at location 16-23706 and from 12.5 to 14 ft bgs at location 16-603404.
- One borehole (location 16-603405) was drilled on the mesa top to define the lateral extent of contamination associated with Consolidated Unit 16-003(a)-99, SWMU 16-026(j2), and the top of the former fishladder structure at SWMU 16-003(o). One soil sample was collected from the surface (0 to 0.5 ft bgs), and a tuff sample was collect from 1.5 to 2 ft bgs.

3.2 Health, Safety, and Security

The 2008 investigation activities were conducted in accordance with a site-specific health and safety plan and an integrated work document, which detailed work steps, potential hazards, hazard controls, and required training to conduct the work. The TA-16-340 Complex is located in a secure area. A project specific security plan, approved by TA-16 facility operations, was completed and work was carried out in accordance with the plan.

3.3 Waste Management and Disposal

The IDW from the TA-16-340 Complex investigations included (1) drill cuttings; (2) contaminated personal protective equipment (PPE); (3) other wastes such as plastic, glass, disposable sampling supplies and solid decontamination wastes that came in contact with contaminants; and (4) spent field-screening supplies.

All the wastes generated were characterized, stored, managed, and disposed of per the approved site-specific waste characterization strategy form (WCSF) and in accordance with all applicable standard operating procedures (SOPs), available at http://www.lanl.gov/environment/all/qa/adep.shtml.

Drill cuttings and excavated material were stored in waste wranglers and roll off containers and were characterized using analytical results from direct sampling of the media. One yd^3 waste containers (drill cuttings) and roll-off containers (excavated material) were individually labeled with a unique identification number and with information detailing waste classification, contained item(s), associated samples, locations from which waste was generated, and date generated. The waste was contained in two clearly marked less than 90-day waste storage areas. A total of 92 yd^3 of waste was generated (including 4 yd^3 of drill cuttings). Final waste determination of each waste stream is pending and will determine the disposal path and facility. The WCSF, waste profile forms, chemical waste disposal request forms, and uniform hazardous waste manifests currently available are included in Appendix J.

3.4 Deviations

The following deviations from the scope of activities, as defined in the approved Phase II work plan (LANL 2006, 091450; LANL 2006, 094410; NMED 2006, 094381), occurred during the implementation of the 2008 TA-16-340 Complex investigation.

Borehole locations 16-603398 and 16-603399 were moved approximately 5 ft west from their proposed locations because of the presence of utilities. Borehole location 16-603511 was moved about 10 ft west from the proposed location because of the presence of an earthen berm. Borehole location 16-603403 was moved approximately 30 ft south of its proposed location because of access difficulties. The planned location was north of the original fishladder structure on the north side of the drainage channel. No vehicle access was permitted to the north side of the drainage. Instead, the location was sampled on the south side of the drainage, still north of the former fishladder structure, as intended in the original work plan. Borehole location 16-603358 was drilled about 70 ft south of the proposed location at the southwest corner of AOC C-16-049. The location was sampled to bound the southern extent of arsenic, barium, cobalt, manganese, and fluoride at Consolidated Unit 13-003(a)-99. The southwest corner of adjacent AOC C-16-049 was inadvertently surveyed as borehole location 16-603358 instead of the southwest corner of Consolidated Unit 13-003(a)-99, which effectively stepped out the lateral coverage an additional 70 ft. The above deviations in locations still meet the intent of the work plan and are properly sited to characterize the lateral and vertical extent of contamination.

Only one of two proposed samples was collected from excavation Area A at location 16-23672; no sample was collected from the 2- to 2.5-ft interval because the interval had been excavated; instead, a sample was collected from 3.5 to 3.8 ft bgs. Only one of two proposed samples was collected from excavation Area E at location 16-603409; no sample was collected from the 2- to 2.5-ft interval because of hand-auger refusal.

Field screening using XRF analysis was conducted for two of the five proposed metals, barium, and chromium; XRF analyses for copper and lead were not conducted because no copper or lead calibration standard was available for the XRF.

4.0 FIELD INVESTIGATION RESULTS

The following section presents the results of the 2008 field investigation activities performed at the TA-16-340 Complex. These activities included surface sampling, shallow and intermediate drilling, subsurface sampling, well installation for pore-gas monitoring, pore-gas sampling, excavation and confirmation sampling, and shallow alluvial groundwater sampling. Additional details regarding the procedures and methods used to carry out these activities are presented in Appendix B.

4.1 Surface Conditions

The TA-16-340 Complex is located on the TA-16 mesa, a 200-ft-high mesa that trends east to west. The mesa is bounded on the north by Cañon de Valle (approximately 1200 ft north of the TA-16-340 Complex) and on the south by Water Canyon (approximately 3500 ft south of the TA-16-340 Complex). The elevation of the mesa ranges from 7500 ft to 7700 ft asl; the elevation at the TA-16-340 Complex ranges from approximately 7350 ft asl (in Fishladder Canyon near Fishladder Spring) to approximately 7530 ft asl (on the mesa top). The topography at the TA-16-340 Complex is relatively level, with a gentle slope from west to east.

Fishladder Canyon and associated tributary canyons drop steeply (more than 50 ft vertically over 200 ft laterally) into a west-to-east trending drainage approximately 200 ft east of the TA-16-340 Complex (Figure 1.0-2). The severity of flooding events in this canyon is substantially less than in the larger canyons of the Sierra de los Valles, based on historical occurrences.

The area next to the TA-16-340 Complex and Fishladder Canyon burned at a low-to-moderate level during the Cerro Grande fire. The effects of the fire contributed to erosion, but the vegetation present today has helped the area to recover. The surface vegetation community at TA-16 consists of species typical of the Rocky Mountain Montane Conifer forest, which consists of several distinct habitat types (LANL 1998, 059891, pp. B-41–B-43).

The most prevalent habitat type on the mesa top and in the area around the TA-16-340 Complex is ponderosa pine/Gambel oak. Canyon bottoms, such as Fishladder Canyon, may grade into ponderosa pine/Douglas fir. Dominant trees within the mesa overstory canopy are ponderosa pine and aspen; the mesa-top shrub layer is primarily Gambel oak and New Mexico locust; and dominant forbs and grasses include bluegrass, mountain muhly, blue gramma, pine dropseed, wormwood, false tarragon, tall lupine, and cinquefoil. Additional details on the vegetation communities and habitat types at TA-16 are presented in Appendix B of the Phase I RFI report for SWMU 16-021(c)-99 (LANL 1998, 059891).

4.2 Subsurface Conditions

The subsurface conditions including the geology and stratigraphy, perched intermediate groundwater, the regional aquifer, and the vadose zone at the TA-16-340 Complex are discussed in the sections below.

4.2.1 Geology

The subsurface conditions and geology of the TA-16 mesa has been studied by the former ER Project and the current Laboratory Water Stewardship Program. Multiple intermediate and deep boreholes have been drilled and logged and have provided information relevant to the interpretation of the subsurface stratigraphy in the vicinity of the TA-16-340 Complex. Reports associated with the following wells include descriptions of the stratigraphy of the mesa:

- Regional well R-25, located approximately 1000 ft north of the TA-16-340 Complex area (Broxton et al. 2002, 072640, p. 8)

- Regional well R-26, located approximately 5000 ft northwest of the TA-16-340 Complex area (Kleinfelder 2005, 087846, p. 17)
- Intermediate well CdV-R-37-2, located approximately 5000 ft southeast of the TA-16-340 Complex area (LANL 2002, 073707, p. 16)
- Intermediate well CdV-16-1(i), located approximately 1500 ft north of the TA-16-340 Complex area (Kleinfelder 2004, 087844, p. 4)
- Intermediate borehole CdV-16-2(i), located approximately 2000 ft northeast of the TA-16-340 Complex area (Kleinfelder 2004, 087843, p. 3)
- Intermediate borehole CdV-16-3(i), located approximately 1000 ft southeast of the TA-16-340 Complex area (Kleinfelder 2004, 087845, p. 4)

The locations of the boreholes, wells, and stratigraphy beneath the Pajarito Plateau are shown in Figures 4.2-1 and 4.2-2. A brief description of the geology underlying the area follows.

The Pajarito Plateau (on which the Laboratory and TA-16 are situated) is composed of a thick accumulation of Pleistocene age volcanic and volcaniclastic rocks including the Bandelier Tuff. The Bandelier Tuff is a sequence of ash-flow and air-fall deposits that include three members; they are from bottom to top, the Guaje, Otowi, and Tshirege Members. The Tshirege Member stratigraphically underlies TA-16.

The Tshirege Member comprises several units and resulted from successive ash-flow depositions separated by periods of inactivity allowing for the partial cooling of individual units. Properties related to water flow and contaminant migration (e.g., density, porosity, degree of welding, fracture content, and mineralogy) vary vertically and laterally throughout the unit as a result of variations in local emplacement temperature, cooling history, thickness, gas content, and chemical composition. The Tshirege Member of the Bandelier Tuff is 384 ft thick in regional well R-25 (Broxton et al. 2002, 072640, p. 20). Unit 4 of the Tshirege Member (Qbt 4) is composed of a series of variably welded vitric to devitrified ash-flow tuffs that extend to a depth of 84 ft in regional well R-25. Qbt 4 is characterized by discontinuous, crystal-rich, fine- to coarse-grained volcanic surge deposits. The lower, more indurated parts of Qbt 4 are also fractured. These fractures and surge beds are potential groundwater pathways. Qbt 4 makes up the mesa-top unit at TA-16 and outcrops on the slopes extending into the canyons.

Unit 3 of the Tshirege Member (Qbt 3 and Qbt 3t) is poorly to moderately welded and indurated to slightly indurated. It tends to be a cliff-forming unit of the Pajarito Plateau. Qbt 3t is transitional and is a devitrified ignimbrite that grades from moderately welded at the top to nonwelded at the base. Qbt 3 is a second devitrified ignimbrite that grades from moderately welded at the top to nonwelded at the base. Qbt 3t and upper Qbt 3 also contain localized thin, discontinuous, crystal-rich, fine- to coarse-grained surge deposits that may represent potential groundwater pathways. Unit 3 (including Qbt 3 and Qbt 3t) is 145-ft thick in well R-25 (Broxton et al. 2002, 072640, p. 22).

Unit 2 of the Tshirege Member (Qbt 2) is a competent, resistant unit that forms cliffs where it is exposed on the sides of the mesa. It is a moderately welded, well-indurated, devitrified ignimbrite. Welding grades from moderately welded at the top to partially welded at the base. Qbt 2 is 103 ft thick in well R-25 (Broxton et al. 2002, 072640, p. 22). Qbt 2 is extensively fractured in many outcrops across the Laboratory as a result of contraction during postdepositional cooling. The cooling fractures are visible on the mesa edges. In general, such fractures are vertical to subvertical and dissipate near the bottom of the unit. The base of Qbt 2 has a series of thin, discontinuous, crystal-rich, fine- to coarse-grained surge deposits, some with clearly defined bedding structures.

Unit 1v of the Tshirege Member (Qbt 1v) is a vapor-phase, altered cooling unit that underlies Qbt 2. This unit forms sloping outcrops that contrast with the near-vertical cliffs of Qbt 2. Qbt 1v is further subdivided into Qbt 1vu and Qbt1vc. Qbt 1v is 29.5 ft thick in well R-25 but was not broken into subunits (Broxton et al. 2002, 072640, p. 22). Qbt 1vu is the uppermost portion. It is devitrified and consists of vapor-phase, altered ash-fall and ash-flow tuff. This subunit is unconsolidated at its base and becomes moderately welded near overlying Qbt 2. Only the most prominent cooling fractures that originate in Qbt 2 continue into the more welded upper section of Qbt 1vu, but these end in the less-consolidated lower section of the unit. Qbt 1vc is named for the columnar jointing visible in cliffs forming from this unit. Qbt1vc is poorly welded, devitrified ash-flow tuff at its base and top becoming more welded in its interior.

The basal contact of Qbt 1vc is characterized by an abrupt change from devitrified (crystallized) matrix to vitric (glassy) matrix in the underlying Qbt 1g. Vitric pumices in Qbt 1g stand out in relief against the weathered outcrops, but devitrified pumices above this interval are weathered out. In outcrop, this devitrification interval forms a prominent erosional recess termed the “vapor-phase notch.” No depositional or compositional break are associated with the vapor-phase notch; the abrupt transition indicates this feature is the base of the devitrification front that occurred in the hot interior of the cooling ash-flow sheets after emplacement. Qbt 1g is a massive, poorly consolidated, vitric ash-flow tuff. Few fractures are observed in outcrops of this unit, and the weathered cliff faces have a distinct Swiss-cheese appearance that reflects the variable hardness of the unit. The upper portion of Qbt 1g is resistant to erosion, which helps to preserve the vapor-phase notch in outcrop. A distinctive pumice-poor surge bed forms the base of Qbt1g. The unit is about 20 ft thick in well R-25 (Broxton et al. 2002, 072640, p. 22).

The Tsankawi Pumice Bed is the basal Plinian air-fall deposit of the Tshirege Member of the Bandelier Tuff. It is a thin bed of gravel-sized vitric pumice. The unit thickness in well R-25 is 2.2 ft (Broxton et al. 2002, 072640, p. 22).

The Cerro Toledo interval separates the Tshirege and Otowi Members of the Bandelier Tuff and consists of thin beds of tuffaceous sandstones, paleosols, siltstones, ash, and pumice falls. The Cerro Toledo interval also includes localized gravel- and cobble-rich fluvial deposits predominantly derived from intermediate-composition lavas eroded from the Jemez Mountains west of the Pajarito Plateau. Numerous large lithics, including dacite lava derived from Sawyer Dome, were present in well R-25; the interval is 125 ft thick (Broxton et al. 2002, 072640, p. 22). This large thickness indicates well R-25 was located in a paleodrainage on the surface of the underlying Otowi Member of the Bandelier Tuff.

The Otowi Member is 341.5 ft thick in well R-25 (Broxton et al. 2002, 072640, p. 22). The tuff is massive, poorly consolidated, nonwelded, pumice-rich, and mostly vitric ash flows. The pumices are fully inflated and support tubular structures that have not collapsed as a result of welding. The matrix is an unsorted mix of glass shards, phenocrysts, perlite clasts, and broken pumice fragments.

The Guaje Pumice Bed forms the lowermost 6.7 ft of the Otowi Member in well R-25. It is the basal air-fall deposit of the Otowi Member of the Bandelier Tuff. The occurrence of the Guaje Pumice Bed at well R-25 is thinner than occurrences farther to the east and north, indicating this area was either south of the main dispersal axis for this fall deposit or that this deposit was partly eroded before or during emplacement of the main Otowi ignimbrite. Two cycles of pumice fall were noted in well R-25. The Puye Formation is an alluvial fan deposit made up primarily of coarse clastic rocks derived from the rhyodacite units of the Tschicoma Formation that crop out in the Jemez Mountains west of the Pajarito Fault. Because of the proximity of these source rocks, these fanglomerate deposits consist of poorly consolidated and poorly sorted boulders, cobble, gravels, and sands. Boulders up to 2 ft in diameter are present in well R-25.

The Puye Formation is more than 1090 ft thick in well R-25, extending from a depth of 852 ft to below the total depth of 1942 ft (Broxton et al. 2002, 072640, p. 22). It is overlain by a 1.5-ft-thick late-Miocene paleosol deposit characterized by brown, massive, generally fine-grained sediment with highly scattered pebbles. Two subunits of the Puye Formation are recognized in well R-25 and are classified based on the provenance of their dominant clasts: (1) the upper Pajarito Mountain unit at depths from 852 to 1657 ft and (2) the Rendija Canyon unit at depths from 1657 to 1942 ft. The upper Pajarito Mountain unit is the eastern part of a fan that was contemporaneous with eruption of the upper dacite of Pajarito Mountain. The Rendija Canyon unit represents the southern part of a fan that was contemporaneous with eruption of the rhyodacite of Rendija Canyon. Lithification at both units is poor and as such is likely to sustain open fractures.

Lava flows of the Tschicoma Formation occur in well CdV-R-37-2 (LANL 2002, 073707, p. 23), to the southeast of well R-25, but were not found in well R-25. In addition, they were intercepted in the CdV-16-3(i) borehole located southeast of the TA-16-340 Complex area (Kleinfelder 2004, 087845, p. 12).

Thus, the transition between subsurface dacite and the Puye Formation probably occurs in the vicinity of the TA-16-340 Complex. The dacite lavas are massive, apparently homogeneous, locally rubbly intermediate lavas. Minor siltstones are present in the upper 142 ft at the CdV-R-37-2 borehole. The Tschicoma dacite lavas extend from a depth of 1072 ft to total depth (1664 ft) in borehole CdV-R-37-2 and from 900 ft to a total depth of approximately 1400 ft in borehole CdV-16-3(i).

4.2.2 Perched Intermediate Groundwater

Perched groundwater occurs in the Bandelier Tuff and in basalts of the Pajarito Plateau (LANL 2000, 066802, p. 2-32). Perched groundwater frequently forms at horizons where medium properties change dramatically, such as at paleosol horizons, surge beds, or zones containing clays or caliche. Perched groundwater has been observed in mesa top boreholes at TA-16 (LANL 1996, 055077, pp. 11-12; LANL 1998, 059891, section 4; Broxton et al. 2002, 072640, pp. 44-47).

Springs and seeps in the canyon bottoms of TA-16 represent discharge points of shallow (less than 200 ft depth) perched groundwater in the vadose zone. The Phase II RFI report for TA-16-260 (LANL 1998, 059891, section 4) and the Phase III RFI report (LANL 2003, 077965, section 4) provide details on these springs, seeps, and the perched zones. The investigations for the TA-16-260 outfall have shown that (1) connectivity between the mesa top and springs is rapid (less than 6 m), based on a tracer study; (2) the springs are manifestations of zones of saturated ribbons in the vadose zone (most boreholes drilled on the mesa top have not intersected perched waters); (3) the perched zones appear to be concentrated within the transition zone between Qbt 3 and Qbt 4, which is characterized by several localized basal surge units; and (4) there are multiple recharge zones for these shallow perched zones, including outfalls from buildings used for processing, mesa-top ponding, and diffuse recharge from east of the Pajarito fault zone (LANL 2003, 077965, section 4).

Two mesa-top boreholes (locations 16-02666 and 16-02665) drilled during previous investigations intersected groundwater but dried up soon after drilling and only occasionally rewet during high-recharge time periods (LANL 1998, 059891, p. 4-6). A third borehole (location 16-02669) drilled during this earlier investigation intersected groundwater at a depth of approximately 145 ft bgs (LANL 1998, 059891, p. 4-6). Analytical results from one of these wells indicated that HE has migrated vertically to at least the first perched groundwater interval at approximately 120 ft bgs (LANL 2003, 077965, p. 4-58). Perennial perched intermediate groundwater has been found in wells SHB-3, R-25, R-26, borehole CdV-16-1(i), and well CdV-16-2(i)r (Figures 4.2-1). Well SHB-3 had a static water level of 664 ft in 1992, which is consistent with its containing a perennial perched zone. Perched groundwater was encountered in well R-25 at a depth of 747 ft within the Otowi Member of the Bandelier Tuff and extending intermittently to a depth of 1132 ft within the Puye Formation (Broxton et al. 2002, 072640, p. ix). Hydraulic head measurements in this zone decrease with depth, indicating that there is a downward vertical gradient and that this well is located in a recharge area. Well R-26 encountered what is probably a perched zone at 604 ft (Kleinfelder 2005, 087846, p. 9). Well CdV-16-1(i) encountered groundwater at a depth of 563 ft (Kleinfelder 2004, 087844, p. 4), which is consistent with the depth to the perched zone in well R-25. Well CdV-16-2(i)r intersected groundwater at a depth of 836 ft.

Borehole video logs and drilling observations for boreholes CdV-R-15-3, CdV-R-37-2, and CdV-16-1(i) record small quantities of what may be perched groundwater (Kopp et al. 2002, 073179, p. 27; LANL 2002, 073707, p. 27; Kleinfelder 2004, 087843, p. 10). However, the screens installed to capture groundwater from these zones have never produced enough water for sampling. Small, ephemeral perched groundwater zones apparently exist in these boreholes, but they are not of the scale of the perched zones in well R-25. Well CdV-16-2(i)r has produced sufficient groundwater for sampling and appears to intersect a saturated zone several feet thick; however, data indicate the zone is extremely limited in areal extent (Kleinfelder 2004, 087843).

The groundwater from the perched zone in well R-25 contains concentrations of RDX (Broxton et al. 2002, 072640, p. 59) greater than the EPA lifetime health advisory (HA) limit (maximum RDX concentration of 84 µg/L compared with the current EPA lifetime HA limit of 2 µg/L) (EPA 2004, 085204, p. 6). Data from boreholes CdV-16-1(i) and CdV-16-2(i)r also have levels of RDX greater than the EPA HA limit (LANL 2007, 098734; LANL 2007, 095787), although the levels are lower than those in well R-25 (Broxton et al. 2002, p. 58, 072640, p. 59).

4.2.3 Regional Aquifer

The regional aquifer of the Pajarito Plateau is the only aquifer capable of supporting a large-scale municipal water supply (Purtymun 1984, 006513, p. 1). The regional aquifer extends throughout the Española basin (an area of roughly 6000 km^2) and reaches its maximum thickness beneath the Pajarito Plateau (Cordell 1979, 076049). The regional aquifer is located primarily in the Santa Fe Group and the Puye Formation.

The depths to the regional aquifer range from approximately 1500 ft (along the western edge of the plateau) to about 600 ft (to the east of the Laboratory). The depths to the regional aquifer at TA-16 are 1490.5 ft (at well R-26 west of the TA-16-340 Complex) (Kleinfelder 2005, 087846, p. 22); 1245 ft (at well CdV-R-15-3 east of Cañon de Valle); 1197 ft (at well CdV-R-37-2 southeast of TA-16); and 1286 ft (at well R-25 north of the TA-16-340 Complex) (LANL 2003, 077965, p. B-20). The regional aquifer may have been penetrated at a depth of 1350 ft in the CdV-16-3(i) borehole (Kleinfelder 2004, 087845). The nearest production well to TA-16 is PM-2 in Pajarito Canyon 4 to 5 mi east of the operational areas at TA-16. Figure 4.2-3 depicts water-table elevations in the regional aquifer across the Pajarito Plateau.

The regional aquifer at well R-25 also exhibits a downward head gradient, indicating this area is a zone of recharge (Broxton et al. 2002, 072640, p. 47). Lateral gradients in the regional aquifer are typically on the order of 0.02 to 0.03. Estimates of groundwater flow and contaminant transport have been evaluated using the existing aquifer model (Nylander 2003, 076059.1) and site-specific modeling in support of the deep groundwater corrective measure evaluation for Consolidated Unit 16-021(c)-99 and the evaluation of TA-16 monitoring wells (LANL 2007, 098734; LANL 2007, 095787). These evaluations consider the three-dimensionality of the groundwater flow paths, the spatial distribution of recharge along the canyons, media heterogeneity, and the time variation of pumping in water-supply wells.

4.2.4 Vadose Zone

The region beneath the ground surface and above the regional aquifer is called the vadose (unsaturated) zone. This discussion focuses on the vadose zone beneath the TA-16 mesa top. The principal source of moisture in the vadose zone is either rain or snowmelt. Infiltration occurs either on mesa tops or canyon bottoms. Subsurface movement of moisture is predominantly vertical and is influenced by the properties and conditions of the vadose zone. Lateral flow can also occur when there are significant contrasts in hydrologic properties between adjacent units. Surge beds may be a particularly favorable zone of lateral mobility because of their high porosity; however, the bed thickness and lateral extent can be very discontinuous.

The geologic properties of the Bandelier Tuff that most influence fluid flow in the vadose zone are the degree of welding and the presence of fractures or deformation bands (LANL 2007, 095787, p. 35-38). There are significant heterogeneities in these properties within the TA-16 vadose zone. Welded tuffs tend to have less matrix porosity and more fractures than nonwelded tuffs. Fractures in welded tuffs may include relatively closely spaced cooling joints as well as tectonic fractures. Nonwelded tuffs also have fractures but generally fewer than welded tuffs. Saturated hydraulic conductivities in the Bandelier Tuff beneath the TA-16 mesa top range over 5 orders of magnitude between subunits in Qbt 4 and Qbt 3t (LANL 2003, 077965, p. 4-58). In boreholes drilled at TA-16, saturated hydraulic conductivity ranges from 3.8×10^{-3}cm/s in a surge unit to 9.8×10^{-9} cm/s in a densely welded subunit.

Several competing effects determine moisture content, degree of saturation, and resultant likelihood of flow and contaminant transport. Although water moves slowly through unsaturated tuff matrix, it can move relatively rapidly through fractures and surge beds if saturated conditions exist (Hollis et al. 1997, 063131). Because of the higher precipitation levels at TA-16, volumetric moisture levels at TA-16 tend to be higher than at TAs east of TA-16. Isolated intermittent saturated zones have been found in boreholes at TA-16 near the 90s Line Pond and near the head of Martin Spring Canyon (LANL 2003, 077965, p. 4-55). Such zones are the basis for the saturated ribbons on the conceptual site model diagram (Figure 4.2-4).

4.3 Exploratory Drilling, Sampling and Excavation Investigations

Exploratory drilling, sampling, and excavation activities are described in the following sections.

4.3.1 Exploratory Drilling

A total of 428.8 vertical feet were drilled and sampled from 18 boreholes during the 2008 investigation; 17 shallow boreholes (4 to 20 ft bgs) and 1 intermediate borehole (206.3 ft bgs) were drilled at the TA-16-340 Complex (Figure 3.1-1). Shallow boreholes were continuously cored using a Stratastar-10 hollow-stem auger (HSA) drill rig, with 4.25-in.-inside-diameter augers equipped with a split barrel sampler. The sample barrel was connected to a cable on a hexagonal rod that extends through the augers. The split sample barrels were 5 ft in length and provided continuous 3-in.-outside-diameter cores. Immediately upon retrieval, core was visually inspected and geologically logged. All core was field screened (monitored) for VOCs for health and safety purposes.

The intermediate-depth borehole was drilled using a Stratastar-10 with HSA to 15 ft bgs then completed to 206.3 ft using an air-coring setup. The same drill rig was converted to air coring system to drill the more densely welded tuff. The air-coring system also produced continuous 5-ft core samples. The drilling methods are presented in Appendix B.

Detailed lithologic logs were completed for each boring and include percent recovery, lithology, lithologic unit thickness, color, relative moisture content, grain size and distribution; and any other field observations. The borehole logs are presented in Appendix C.

The intermediate borehole location 16-603511 is located at a surface elevation of approximately 7500 ft asl. The soil/Qbt 4 contact was encountered at approximately 6 ft bgs The thickness of Qbt 4 is approximately 118 ft and is underlain by Qbt 3t to a bottom depth of 206.3 ft. Fractures were encountered at various depths; the fractures contained clay coatings and had variable (dry to moist) moisture content. Further details on the boreholes are provided in the sections below.

4.3.2 Soil and Rock Characterization Sampling

Soil and rock characterization samples were collected from core recovered from all 18 borehole locations at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-029(f), and 16-026(j2) to determine the lateral and vertical extent of contamination. A total of 30 samples were collected from soil and tuff during the investigation.

A summary of all investigation samples collected in solid media by borehole location and corresponding sampled depths, media, and the analyses requested is presented in Section 6 and Appendix H.
A summary of all quality assurance/quality control (QA/QC) samples collected in solid media by borehole location and corresponding depths, sample type, media, and the analyses requested is also presented in Appendix H. The analytical data program QA/QC review of the rejected data is presented in Appendix F. All analytical data and data packages are presented with field chain of custody (COC) and SCLs forms in Appendix E.

All soil and tuff samples were submitted to the Sample Management Office (SMO) for processing and transport to off-site contract laboratories. The soil and tuff samples were analyzed for VOCs, SVOCs, HE, inorganic chemicals, cyanide, nitrate, uranium, anions, and perchlorate. Pore gas samples were analyzed for VOCs only.

4.3.3 Environmental Field Screening

Samples were qualitatively screened for health and safety purposes and to select sample locations for fixed-laboratory analysis. Field-screening methods included (1) screening for gross radioactivity (beta-gamma) using a sodium iodide detector; (2) HE spot testing; (3) immunoassay testing for RDX; (4) total organic vapor headspace screening using a PID; and (5) metals screening of barium and chromium using an XRF analyzer. Appendix B describes these methods.

D TECH immunoassay test kits from Strategic Diagnostics, Inc. were used to field screen both soil and tuff samples for RDX and TNT. This semiquantitative field-screening method was used to guide drilling and sampling investigation activities. Organic vapors in soil and tuff samples were screened by placing a sample in a 125-mL jar and covering the top with aluminum foil. The screening sample was allowed to stand for a minimum of 5 min to allow for vapor equilibration. Vapors in the container headspace were measured using a PID with the probe inserted through a small opening. A Laboratory-owned Innov-X model alpha-4000 XRF instrument was used to field screen for barium and chromium at selected elevations in the intermediate boring.

Field screening was conducted for health and safety purposes and to guide the selection of samples submitted to off-site laboratories for analysis. No elevated field-screening results were observed during the 2008 investigation. Appendix C presents the field-screening results.

4.3.4 Installation of a Pore-Gas Monitoring Well and Sampling of Subsurface Vapors

Once drilling and core retrieval was complete at the 205-ft borehole, a pore-gas monitoring well equipped with multiple sampling ports was installed. Sample ports were installed within an approximately 6-ft sand interval centered at 50 ft bgs, 98.5 ft bgs, and at 200 ft bgs. Bentonite chips were tremied into the borehole and hydrated to isolate the sampling intervals. Air flow through the ports was confirmed using a carbon dioxide and oxygen monitor. Figure 4.3-1 provides an as-built schematic of the vapor monitoring well.

4.3.5 Excavation Investigations

Soil removal activities at the upper Fishladder Canyon drainage [SWMU 16-003(o)] were based on results obtained from the 2005 sampling and D&D efforts, which showed that soil at multiple locations contained elevated concentrations of arsenic and PAHs [specifically benzo(a)pyrene].

Excavation activities were conducted between June 27, 2008 and July 10, 2008. A John Deere 644J frontend loader, John Deere backhoe, and John Deere 200LC excavator were used to excavate the soil. A water truck was used to minimize dust. A total of 91 yd^3 of soil and tuff was removed from five areas within upper Fishladder Canyon drainage to the soil/tuff interface (Figure 3.1-2). Excavated soil was placed in appropriate containers and stored onsite in a less-than-90-day storage area pending waste characterization results (Appendix J). Excavation activities are discussed in further detail in Appendix B.

4.4 Exploratory and Monitoring Well Boring Geophysical Logging

No geophysical logging was performed during the 2008 investigation at the TA-16-340 Complex.

4.5 Monitoring Well Construction and Boring or Excavation Abandonment

The following sections describe borehole abandonment and excavation abandonment. No groundwater monitoring wells were installed during the 2008 investigation at the TA-16-340 Complex.

4.5.1 Exploratory Borehole Abandonment

All boreholes drilled during the 2008 investigation have been plugged and abandoned. The shallow boreholes were abandoned by emplacing bentonite grout from the bottom of the boring to the surface in accordance with EP-ERSS-SOP-5034, Monitoring Well and Borehole Abandonment.

4.5.2 Site Restoration

Following the excavation activities and confirmation sampling, the excavated areas were reseeded, mulched, and matting was emplaced atop the slope of the excavated areas. On July 14, 2008, seed and straw mats were placed on the regraded areas to stabilize the slope. Restored areas were reseeded using a seed mix approved by the Water Quality and Hydrology (WQH) Group.

4.6 Groundwater Conditions

Alluvial groundwater is present in Fishladder Canyon at depths of less than 5 ft bgs and is free-flowing at Fishladder Spring during wet seasons. Alluvial groundwater has decreased in flow since the cessation of discharge from the NPDES outfall at former building 16-340 in 1998 (LANL 1998, 059891, pp. B-16–B-17).

Alluvial wells 16-25278, 16-25279, and 16-25280 were installed in Fishladder Canyon during October 2005 (Figure 2.3-2). As part of the 2008 investigation and continued monitoring requirements, the three alluvial wells in Fishladder Canyon were inspected for the presence of water on June 20, 2008, and July 14, 2008. However, not enough groundwater was present to collect a sample. These wells will continue to be inspected for the presence of groundwater on a quarterly basis. If sufficient groundwater is present, filtered and unfiltered groundwater samples will be collected for analysis. Analysis of samples collected in August 2008, after monsoonal rains, is pending.

4.7 Surface Water Conditions

Surface water in the vicinity of the TA-16-340 Complex consists of storm and snowmelt runoff that flows by small drainages or sheet flow into Fishladder Canyon and Martin Spring Canyon (the watershed divide between the Cañon de Valle and Martin Spring (S-Site) Canyon watersheds runs through the southern third of the TA-16-340 Complex area) (Figure 2.3-2). Fishladder Canyon also contains flowing water during snowmelt and storm events. Alluvial groundwater occasionally discharges at Fishladder Spring, approximately 2000 ft east of the outfall discharge area for former building 16-340. The surface flow in Fishladder Canyon has decreased significantly during the past years. The large volumes of process discharge during the operational period for the former building 16-340 outfall may have helped sustain surface flow in Fishladder Canyon. There was flowing water at the confluence of Fishladder Canyon and Cañon de Valle from surface water runoff in Fishladder Canyon before the 2003 drought and before the former building 16-340 NPDES outfall was discontinued in the mid-1990s. Except for significant runoff events, such flows are no longer typically observed.

Surface water runoff, alluvial groundwater flow, and associated sediment transport represent key potential pathways by which contaminants may be transported to off-site receptors. Surface water at Fishladder Spring and at the confluence of Fishladder Canyon and Cañon de Valle contained contaminants that might have originated from the TA-16-340 Complex. The historical sampling of these surface water bodies will be assessed in this report to aid in understanding the transport pathways for TA-16-340 Complex contaminants.

During the late 1990s, surface water assessments were conducted for the consolidated units and SWMUs associated with the TA-16-340 Complex. Under these assessments, scores were assigned to SWMUs, where higher scores indicate higher erosion potential (Laboratory-wide scores for various SWMUs range from 0 to 100). Consolidated Unit 16-003(n)-99 received a score of 25, SWMU 16-003(o) received a score of 27.3, SWMUs 16-029(f) and 16-026(j2) received a score of 15.8, and Consolidated Unit 13-003(a)-99 received a score of 8.8. These scores indicate a moderate potential for erosion from these sites. Best management practices (BMPs) included the installation of straw wattles along the upper slope and drainage to Fishladder Canyon at Consolidated Unit 16-003(n)-99. At SWMU 16-003(o), BMPs included several straw wattles installed along with geotextile and jute matting on the steep south slope of Fishladder Canyon (at the former fishladder location); silt fences installed along the Fishladder Canyon access road; and a gabion/rock check dam installed in the drainage channel at the crossing of the access road.

4.8 Subsurface Vapor Conditions

The first round of subsurface vapor (pore-gas) samples was collected from the intermediate borehole (location 16-603511 in Figure 4.3-1) on July 15, 2008. The second round of sampling, 30 d after well installation, was conducted on August 15, 2008. Before samples were collection, all sample ports were purged using a Landtec GEM500 instrument until the percent carbon dioxide and oxygen levels stabilized. Subsurface vapor characterization samples were collected in SUMMA canisters from the prescribed intervals (50 ft, 98.5 ft, and 200 ft bgs) and submitted to SMO for off-site laboratory analysis. Pore-gas sampling follows the procedures described in EP-ERSS-SOP-06.31, Sampling of Subatmospheric Air, and summarized in Appendix B. The results are presented in Appendix H.

5.0 REGULATORY CRITERIA

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

The objective of the current investigation is to define the extent of contamination at the TA-16-340 Complex. For each consolidated unit and SWMU, the regulatory criteria and the data gathered during the investigation are used to identify COPCs (Appendix H), their distribution in the environment (sections 6.1 and 6.2 and Appendix H), and the resulting potential human and ecological risks (sections 7.2 and 7.4 and Appendix I). The results of the data assessment as well as the screening-level risk evaluations will determine whether additional corrective actions are required at the sites.

5.1 Current and Future Land Use

The current land use within and surrounding the TA-16-340 Complex area is industrial. TA-16 is a Laboratory high-security site maintained by fencing and manned access control points. It is expected the land use will remain industrial for the foreseeable future. The residential scenario is also evaluated as required by the Consent Order.

Per the Laboratory's response to the NOD on the investigation work plan (LANL 2004, 087395, Comment 1), the Laboratory will also "evaluate the verification sampling data by using the construction worker SSLs for comparison purposes and provide contaminant and risk information to construction/D&D organizations that need to evaluate the potential for worker exposure at this site" (LANL 2004, 087345). This evaluation will occur before any construction work in the TA-16-340 Complex area.

5.2 Screening Levels

Human health risk screening assessments were conducted for Consolidated Units 13-003(a)-99 and 16-003(n)-99, and SWMUs 16-003(o), 16-029(f), and 16-026(j2) using NMED SSLs (NMED 2006, 092513). For chemicals for which NMED SSLs were not available, EPA Region 6 (EPA 2007, 099314) or EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/index.html) screening levels (adjusted to a risk level of 10^{-5} for carcinogens) were used. An ecological risk screening assessment was performed using the Laboratory's ecological screening levels (ESLs) (LANL 2005, 090032). Surface water was compared to available water-quality standards including NMWQCC surface water standards (20.6.4 New Mexico Administrative Code [NMAC]), NMWQCC groundwater standards (20.6.2 NMAC) and the EPA maximum contaminant levels (MCLs).

5.2.1 Screening Levels for Soil

Human health risk screening assessments (Appendix I) were performed according to NMED guidance (NMED 2006, 092513). Soil screening levels (SSLs) are used to evaluate the COPCs in soil, sediment, and tuff for the industrial, construction worker, and residential scenarios (Table 5.2-1). The SSLs used for noncarcinogenic and carcinogenic COPCs are presented in Appendix I.

The Laboratory's ecological risk screening methodology (LANL 2004, 087630) and ESLs from the ECORISK Database, Version 2.2 (LANL 2005, 090032) were used to evaluate potential ecological risk. The ESLs used are presented in Appendix I.

5.2.2 Screening Levels for Surface Water

The Laboratory has not established BVs for chemicals in surface water; therefore, all detected chemicals in the surface water collected are screened against available state surface water quality standards. The NMWQCC standards for interstate and intrastate surface waters are the primary standards for comparing surface water data (20.6.4 NMAC). As multiple NMWQCC standards for surface water are available based on the criteria for surface water usage, all COPCs identified in surface water were compared to the following NMWQCC surface water standards, as available: domestic water supply, irrigation, livestock, wildlife habitat, aquatic life (acute), and human health (Appendix I).

VOC pore gas data were screened to determine whether VOCs in the subsurface pore gas were a potential source of groundwater contamination through a migration of the pore gas to the groundwater. This screening process, which is presented in Appendix I, accounts for equilibrium partitioning between VOCs in the gas and liquid phases and compares measured concentrations of VOCs in pore gas to concentrations that would be required to cause groundwater standards to be exceeded.

5.3 Cleanup Goals

The cleanup goals specified in Section VIII of the Consent Order are a target risk of 1×10^{-5} for carcinogens and a hazard index of 1 for noncarcinogens. The SSLs described in section 5.2 are based on these cleanup goals. As specified in Section VIII.B.1 of the Consent Order, the screening levels are used as cleanup levels unless determined to be impracticable or unless SSLs do not exist for the current and reasonably foreseeable future land use.

6.0 SITE CONTAMINATION

The following sections describe sampling intervals, sampled media, and methods for collection of soil, tuff, groundwater, surface water, and pore-gas samples used to characterize the sites. All site data representative of current conditions were reviewed to identify COPCs and to establish the spatial distributions and define extent of COPCs.

Data included in this review were derived from the historical 1995 and 2005 investigations and the recent 2008 investigation at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f). The 2008 investigation was conducted to further assess the inorganic, organic, and radionuclide COPCs identified during the historical investigations and to establish extent of contamination. Additional COPCs identified during the recent investigation were also assessed for extent. Several factors were considered in determining whether the extent of COPCs was defined, including decreasing trends in chemical concentrations with vertical or lateral distance, the absence of given chemicals in underlying tuff, the presence of chemicals at trace levels, the natural occurrence of chemicals (less than 2 times BVs), and use of data from adjacent consolidated units and SWMUs. The 2008 intermediate borehole was used to define the vertical extent of historically detected contamination. A detailed discussion of these factors and the analysis of the nature and extent of site releases for all COPCs are presented in Appendix H.

6.1 Soil, Rock, and Sediment Sampling

Soil, rock, and sediment sampling was conducted in accordance with Laboratory SOPs (available at http://www.lanl.gov/environment/all/qa/adep.shtml) and is summarized in Appendix B. The following sections describe the sampling frequency, sampled media, and COPCs detected in soil, tuff, groundwater, surface water, and pore-gas samples used to characterize site contamination.

6.1.1 Field-Screening Samples

A total of nine field-screening samples were collected from core recovered from the 206-ft borehole. Field screening samples were collected at 20-ft intervals, starting at 20 ft bgs. Additional samples were collected at depths where fractures and/or surge beds were encountered. Field screening included (1) screening for gross radioactivity (beta-gamma) using a sodium iodide detector; (2) HE spot-testing; (3) immunoassay testing for RDX; (4) total organic vapor headspace screening using a PID; and (5) total metals screening, primarily for barium, using an XRF analyzer. Appendix B describes these methods. Details such as screening sampling locations and collection dates are included in Table 6.1-1.

6.1.2 Investigation Sampling

A total of 104 soil, fill, tuff, and sediment samples were collected from the TA-16-340 Complex from June 20 to July 15, 2008. The samples were collected using the spade-and-scoop method, hand- or power-driven augers/corers, or split-spoon core barrels, depending on the depth and the medium sampled. Sample characteristics and lithologic information were recorded in sample collection logs. The samples were containerized in the field and stored on ice or in a refrigerator located in a locked sample storage container, then delivered to the SMO for shipment to off-site analytical laboratories. To document sample handling and custody, chain-of-custody forms were completed for all samples. The chain-of-custody forms and sample collection logs are included in Appendix C (provided electronically).

The samples were analyzed for: inorganic chemicals, including anions, perchlorate, total cyanide, and target analyte list (TAL) metals; organic chemicals, including explosive compounds, SVOCs, and VOCs; and total uranium and isotopic uranium. A summary of the analytical methods and data-quality review is presented in Appendix F. Analytical sample information including sample locations, collection dates, and analyses requested for each consolidated unit and SWMU are summarized in Table 6.1-2 to Table 6.1-5.

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

A total of nine intervals were screened for the constituents detailed in section 6.1.1. No elevated results were recorded. HE spot test results were all less than 100 ppm. HE analyses, using the D TECH kit, were all less than 1 ppm. Organic vapors using a PID were all 0 ppm. Barium analyses using the XRF were all less than BVs (highest value was 424 ppm). One chromium analysis using the XRF was 38 ppm, which was within standard error of background of 36 ppm. All other chromium analyses were below detection limit. All gross radioactivity (beta-gamma) results were less than background. The screening results are presented in Appendix D.

6.3 Soil, Rock, and Sediment Sampling Analytical Results

Analytical results for the soil, rock, and sediment samples are discussed in Appendix H, and complete data packages are included in Appendix G (provided electronically).

6.3.1 Consolidated Unit 13-003(a)-99

The following sections include discussions of inorganic, organic, and radionuclide COPCs for Consolidated Unit 13-003(a)-99.

Inorganic Chemicals

Historical soil and tuff samples collected at Consolidated Unit 13-003(a)-99 during the 1995 and 2005 investigations were analyzed for TAL metals and total cyanide. Three of the four soil samples were also analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). All but one tuff sample were analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). Fourteen historical inorganic COPCs were identified.

Soil and tuff samples collected during the 2008 investigation at Consolidated Unit 13-003(a)-99 were analyzed for TAL metals, anions, and isotopic uranium (Table 6.1-2). Five inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation.

Based on the 1995 and 2005 historical investigations and the 2008 investigation, the 14 inorganic COPCs at Consolidated Unit 13-003(a)-99 include aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, manganese, nitrate, selenium, silver, and vanadium.

Table 6.3-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 13-003(a)-99. Inorganic chemicals above BVs at Consolidated Unit 13-003(a)-99 are presented in Table 6.3-2.

Organic Chemicals

Historical soil and tuff samples collected at Consolidated Unit 13-003(a)-99 were analyzed for HE, SVOCs, and VOCs. Twenty-one organic COPCs were historically identified at Consolidated Unit 13-003(a)-99.

Soil and tuff samples collected during the 2008 investigation at Consolidated Unit 13-003(a)-99 were analyzed for PAHs and SVOCs. Eight organic COPCs were identified in soil samples during the 2008 investigation (no organic chemicals were identified in tuff).

Based on the 1995 and 2005 historical investigations and the 2008 investigation, 22 organic COPCs at Consolidated Unit 13-003(a)-99 include acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, di-n-octylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, styrene, and 1,3-xylene+1,4-xylene.

Table 6.3-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 13-003(a)-99. Organic chemicals detected at Consolidated Unit 13-003(a)-99 are presented in Table 6.3-3.

Radionuclides

Historical soil and tuff samples at Consolidated Unit 13-003(a)-99 were analyzed for gamma-emitting radionuclides by gamma spectroscopy.

Soil and tuff samples collected during the 2008 investigation were analyzed for isotopic uranium (Table 6.1-2).

No radionuclides were retained as COPCs in soil or tuff for the historical and 2008 investigation.

6.3.2 Consolidated Unit 16-003(n)-99

The following sections include discussions of inorganic, organic, and radionuclide COPCs for Consolidated Unit 16-003(n)-99.

Inorganic Chemicals

Historical soil and tuff samples collected at Consolidated Unit 16-003(n)-99 during the 1995 and 2005 investigations were analyzed for TAL metals and total cyanide. All fill samples, all but one soil sample, no sediment samples, and all but two tuff samples were analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). Nineteen inorganic COPCs were identified during the historical investigations.

Two tuff samples collected during the 2008 investigation at Consolidated Unit 16-003(n)-99 were analyzed for TAL metals, anions, and isotopic uranium (Table 6.1-3). Five inorganic COPCs were identified in tuff samples during the 2008 investigation.

Based on the results from the 1995 and 2005 historical investigations and the 2008 investigation, 20 inorganic chemicals were identified as COPCs at Consolidated Unit 16-003(n)-99, including aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nitrate, nickel, perchlorate, selenium, uranium, vanadium, and zinc.

Table 6.3-1 presents the complete list of COPCs for sediment, soil and tuff at Consolidated Unit 16-003(n)-99. Inorganic chemicals above BVs at Consolidated Unit 16-003(n)-99 are presented in Table 6.3-4.

Organic Chemicals

Historical soil, fill, and sediment samples at Consolidated Unit 16-003(n)-99 were analyzed for HE. All but five sediment samples were analyzed for SVOCs. All but six sediment samples (all surface samples) and one soil sample were also analyzed for VOCs. Historical tuff samples collected at Consolidated Unit 16-003(n)-99 were analyzed for HE, SVOCs, and VOCs. A total of 37 organic COPCs (present in soil and/or tuff) were identified during the historical 1995 and 2005 investigations.

Two tuff samples collected during the 2008 investigation at Consolidated Unit 16-003(n)-99 were analyzed for HE, SVOCs, and VOCs (Table 6.1-3). Two organic COPCs were identified in tuff samples during the 2008 investigation.

Based on the results from the 1995 and 2005 historical investigations and the 2008 investigation, 37 organic COPCs were identified at Consolidated Unit 16-003(n)-99: acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl)phthalate, 2-butanone, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, diethylphthalate, 1,3-dinitrobenzene, di-n-butylphthalate, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, nitrobenzene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene.

Table 6.3-1 presents the complete list of COPCs for sediment, soil and tuff at Consolidated Unit 16-003(n)-99. Organic COPCs detected at Consolidated Unit 16-003(n)-99 are presented in Table 6.3-5.

Radionuclides

Historical soil and tuff samples at Consolidated Unit 16-003(n)-99 were not analyzed for radionuclides.

Soil and tuff samples collected during the 2008 investigation were analyzed for isotopic uranium (Table 6.1-3). No radionuclides were retained as COPCs in soil or tuff for the historical and 2008 investigation.

6.3.3 SWMU 16-003(o)

The following sections include discussions of inorganic, organic, and radionuclide COPCs for SWMU 16-003(o). Given the areal extent and number of samples collected at the site, the 2008 investigation results are discussed in two parts: (1) SWMU 16-003(o)–west [building 16-340 former sump and drainline] and (2) SWMU 16-003(o)–east [former fishladder structure area].

Inorganic Chemicals

Historical fill samples and all but three soil samples collected during the 1995 and 2005 investigations were analyzed for total cyanide and TAL metals. All but 11 soil samples were also analyzed for the following anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. Historical tuff samples were analyzed for total cyanide and TAL metals. All but five samples were also analyzed for the following anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate (Table 6.1-4). A total of 23 inorganic COPCs (present in soil and/or tuff) were identified during the 1995 and 2005 historical investigations.

SWMU 16-003(o)–West: Two soil samples collected during the 2008 investigation at SWMU 16-003(o)-west, were analyzed for TAL metals, and six samples were analyzed for fluoride and nitrate. All fill samples collected during the 2008 investigation at SWMU 16-003(o)–west were analyzed for TAL metals, and 10 samples were analyzed for fluoride and nitrate. Twenty-one tuff samples collected during the 2008 investigation at SWMU 16-003(o)–west were analyzed for TAL metals, and 32 samples were analyzed for fluoride and nitrate (Table 6.1-4). Ten inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation at SWMU 16-003(o)-west.

SWMU 16-003(o)–East: All soil samples collected during the 2008 investigation at the former fishladder structure area at SWMU 16-003(o)–east were analyzed for TAL metals, and 10 soil samples were analyzed for fluoride and nitrate. All tuff samples collected during the 2008 investigation at the former fishladder structure at SWMU 16-003(o)–east were analyzed for TAL metals. Four tuff samples were analyzed for fluoride and nitrate, and seven samples were analyzed for perchlorate (Table 6.1-4). Twenty-three inorganic COPCs (present in soil and/or tuff) were identified at SWMU 16-003(o)–east during the 2008 investigation and will be discussed for nature and extent.

In summary, a total of 24 inorganic COPCs (present in soil and/or tuff) were identified during the 1995 and 2005 historical investigations and the 2008 investigation at SWMU 16-003(o) (east and west). These inorganic COPCs include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, uranium, vanadium, and zinc.

Table 6.3-1 presents the complete list of COPCs for sediment, soil and tuff at SWMU 16-003(o). Inorganic COPCs detected at SWMU 16-003(o) are presented in Table 6.3-6.

Organic Chemicals

Historical fill and all but two soil samples were analyzed for HE. All fill samples and all but one soil sample were analyzed for SVOCs. All fill and all but 11 soil samples were analyzed for VOCs. Historical tuff samples were analyzed for HE and SVOCs. All but four tuff samples were analyzed for VOCs. A total of 55 organic COPCs (present in soil and/or tuff) were identified at SWMU 16-003(o) during the historical investigations.

SWMU 16-003(o)–West: All soil, fill, and tuff samples collected during the 2008 investigation at SWMU 16-003(o)–west were analyzed for HE, SVOCs, and VOCs (Table 6.1-4). Twenty-five organic COPCs were identified in soil during the 2008 investigation.

SWMU 16-003(o)–East: All soil and tuff samples collected during the 2008 investigation at SWMU 16-003(o)-east were analyzed for HE, SVOCs, and VOCs (Table 6.1-4). Twenty-two organic COPCs were identified in soil during the 2008 investigation.

In summary, the following 55 organic chemicals were identified as COPCs at SWMU 16-003(o) (east and west) during the historical 1995 and 2005 investigations and during the 2008 investigation: acenaphthene, acenaphthylene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, 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, chloroform, 2-chloronaphthalene, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, cis-1,2-dichloroethene, diethylphthalate, 2,4-dinitrotoluene, 3,5-dinitroaniline, di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, isopropylbenzene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, methylene chloride, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, tetryl, toluene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3-xylene+1,4-xylene.

Table 6.3-1 presents the complete list of COPCs for sediment, soil, and tuff at SWMU 16-003(o). The organic COPCs for this site are presented in Table 6.3-7.

Radionuclides

One historical soil sample at SWMU 16-003(o) was analyzed for isotopic uranium. Soil and tuff samples collected during the 2008 investigation were analyzed for isotopic uranium.

Based on the results from the 1995 and 2005 historical investigations and the 2008 investigation, three radionuclides were identified as COPCs at SWMU 16-003(o): uranium-234, uranium-235/236, and uranium-238 (Table 6.3-1).

Table 6.3-1 presents the complete list of COPCs for sediment, soil, and tuff at SWMU 16-003(o). Radionuclides detected above BVs at SWMU 16-003(o) are presented in Table 6.3-8.

6.3.4 SWMUs 16-026(j2) and 16-029(f)

The following sections include discussions of inorganic, organic, and radionuclide COPCs for SWMUs 16-026(j2) and 16-029(f).

Inorganic Chemicals

Historical soil, fill, sediment, and tuff samples collected at SWMUs 16-026(j2) and 16-029(f) during the 1995 and 2005 investigations were analyzed for TAL metals. All fill and sediment samples, all but two soil samples, and all but two tuff samples were analyzed for total cyanide. All fill samples, all but six sediment samples, no soil samples, and all but three tuff samples were analyzed for anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. A total of 18 inorganic COPCs (present in soil and/or tuff) were identified during the historical investigations at SWMUs 16-026(j2) and 16-029(f).

Soil and tuff samples collected during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) were analyzed for TAL metals and anions (Table 6.1-5). Six inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f).

Based on the results from the 1995 and 2005 historical investigations and the 2008 investigation, 19 inorganic chemicals were identified as COPCs at SWMUs 16-026(j2) and 16-029(f): aluminum, antimony, arsenic, barium, bromide, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, and zinc.

Table 6.3-1 presents the complete list of COPCs for sediment, soil, and tuff at SWMUs 16-026(j2) and 16-029(f), and the inorganic COPCs are presented in Table 6.3-9.

Organic Chemicals

Historical soil, fill, and sediment samples at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE and SVOCs. All soil, fill, and all but five sediment samples were also analyzed for VOCs. Historical tuff samples collected at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE, SVOCs, and VOCs. A total of 35 organic COPCs (present in soil and/or tuff) were identified during the historical investigations.

One soil sample collected during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) was analyzed for HE and SVOCs. Tuff samples collected near the sump and drainline during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE, SVOCs, and VOCs. One tuff sample collected down-drainage from the sump and drainline was analyzed for HE and SVOCs (Table 6.1-5). Nine organic COPCs were identified in soil, fill, sediment, and tuff samples during the 2008 investigation.

Based on the results from the 1995 and 2005 historical investigations and the 2008 investigation, 35 organic COPCs were identified at SWMUs 16-026(j2) and 16-029(f): acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 1,1-dichloroethene, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, phenol, pyrene, RDX, TATB, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene+1,4-xylene (Table 6.3-1).

Table 6.3-1 presents the complete list of COPCs for sediment, soil and tuff at SWMUs 16-026(j2) and 16-029(f). Organic chemicals detected at SWMUs 16-026(j2) and 16-029(f) are presented in Table 6.3-10.

Radionuclides

Historical samples at SWMUs 16-026(j2) and 16-029(f) were not analyzed for radionuclides. Soil and tuff collected during the 2008 investigation were analyzed for isotopic uranium (Table 6.1-5). No radionuclides were detected above BVs and retained as COPCs.

6.4 Groundwater Sampling

Groundwater conditions in the vicinity of the TA-16-340 Complex are described in section 4.6. Three alluvial wells (16-25278, 16-25279, and 16-25280) were installed in Fishladder Canyon during the 2005 investigation. Saturated alluvium and shallow groundwater were observed in all three boreholes.

The alluvial wells in Fishladder Canyon were inspected for the presence of water on a quarterly basis since 2005 and were sampled when water was present. Not enough groundwater was present in any of the wells to collect samples during the 2008 investigation. This section discusses post-2005 groundwater sampling and results for the three alluvial wells. These wells will continue to be inspected for the presence of groundwater on a quarterly basis, and samples will be collected for analysis if groundwater is present.

Locations of the alluvial wells are shown in Figure 2.3-2. Table 6.4-1 presents the surface and alluvial groundwater samples collected since the 2005 investigation and the requested analyses.

6.5 Groundwater General Chemistry

Field-quality parameters including pH, specific conductivity, dissolved oxygen, temperature, and turbidity have been measured since 2005 to ensure stability of the groundwater prior to sampling. The results are shown in Tables 6.5-1 to 6.5-3.

The filtered alkalinity CO^3 + HCO^3 values for the alluvial wells ranged from 18 mg/L to 77 mg/L. One sample analyzed for ammonia as nitrogen in well 16-25279 was reported at 0.035 mg/L. Hardness values for the alluvial wells ranged from 24.9 mg/L to 62.2 mg/L. The pH in the alluvial wells ranged from 6.05 to 6.74. Specific conductance levels in the alluvial wells ranged from 67 µS/cm to 159 µS/cm. Total dissolved solids in the alluvial wells ranged from 136 mg/L to 194 mg/L. Total Kjeldahl nitrogen ranged from 0.517 mg/L to 0.823 mg/L.

The unfiltered alkalinity CO^3 + HCO^3 values for the alluvial wells ranged from 57 mg/L to 107.2 mg/L. Hardness values for the alluvial wells ranged from 30.4 mg/L to 64.1 mg/L. Suspended sediment in the alluvial wells ranged from 2.6 mg/L to 124 mg/L. Total Kjeldahl nitrogen ranged from 0.573 mg/L to 1.02 mg/L. Total organic carbon ranged from 11.5 mg/L to 22.8 mg/L.

6.6 Groundwater Analytical Results

Analytical results for the alluvial groundwater samples (including general chemistry results) are presented in Tables 6.5-1 to 6.5-3. Inorganic chemical, organic chemical, and radionuclide results are discussed in Appendix H. Alluvial groundwater data packages are included in Appendix G (provided electronically). Comparisons of inorganic chemical, organic chemical, and radionuclide sample results to applicable standards are presented in Appendix I.

Inorganic Chemicals

The filtered groundwater samples collected at the three alluvial wells, post-2005 investigation, were analyzed for anions, TAL metals, nitrate, total cyanide, alkalinity, hardness, pH, specific conductance, and total suspended solids. Table 6.4-1 presents the samples collected and their requested analyses. The following inorganic chemicals were detected and retained as COPCs in filtered alluvial groundwater in Fishladder Canyon: aluminum, antimony, arsenic, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, iron, lead, manganese, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, uranium, vanadium, and zinc.

The unfiltered groundwater samples collected at the three alluvial wells during the post-2005 investigation were analyzed for anions, TAL metals, nitrate, total cyanide, perchlorate, alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids. Table 6.4-1 summarizes all the samples collected and their requested analyses. The following inorganic chemicals were detected and retained as COPCs in unfiltered alluvial groundwater in Fishladder Canyon: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, cyanide, iron, lead, manganese, mercury, molybdenum, nickel, silver, strontium, thallium, uranium, vanadium, and zinc.

Inorganic chemicals detected in alluvial groundwater in Fishladder Canyon are presented in Table 6.5-1.

Organic Chemicals

The unfiltered alluvial groundwater samples collected in Fishladder Canyon were analyzed for HE, SVOCs, and VOCs. Table 6.4-1 summarizes all the samples collected and their requested analyses. The following organic chemicals were detected and retained as COPCs in unfiltered alluvial groundwater:

cis-1,2-dichloroethene, HMX, 4-isopropyltoluene, RDX, tetrachloroethene, toluene, and trichloroethene. Organic chemicals detected at in alluvial groundwater in Fishladder Canyon are presented in Table 6.5-2.

Radionuclides

Three filtered groundwater samples collected at the three alluvial wells during the post-2005 investigation were analyzed for americium-241, gamma spectroscopy, isotopic plutonium, isotopic uranium, and strontium-90. Two filtered groundwater samples were analyzed for gross alpha and gross beta. Table 6.4-1 summarizes all the samples collected and their requested analyses. The following radionuclides were detected and therefore are identified as COPCs in filtered alluvial groundwater in Fishladder Canyon: gross beta, strontium-90, uranium-234, and uranium-235.

Three unfiltered groundwater samples collected at the three alluvial wells during the post-2005 investigation were analyzed for americium-241, gamma spectroscopy, isotopic plutonium, isotopic uranium, and strontium-90. Two unfiltered groundwater samples were analyzed for gross alpha and gross beta. Table 6.4-1 summarizes all the samples collected and their requested analyses. The following radionuclides were detected and therefore identified as COPCs in unfiltered alluvial groundwater in Fishladder Canyon: gross alpha, gross beta, radium-226, radium-228, tritium, uranium-234, and uranium-235. Radionuclides detected in alluvial groundwater in Fishladder Canyon are presented in Table 6.5-3.

6.7 Surface Water Sampling

Surface water in the vicinity of the TA-16-340 Complex consists of storm and snowmelt runoff that flows by small drainages or sheet flow into Fishladder Canyon and Martin Spring Canyon. Fishladder Canyon also contains flowing water during snowmelt and storm events. Two surface water locations, Fishladder Spring (location 16-02654) and the confluence of Fishladder Canyon and Cañon de Valle (location 16-06121), have been sampled historically. This section discusses surface water sampling and results from post-2005 sampling events. Surface water bodies were dry during the 2008 investigation.

Surface water sampling locations are shown in Figure 2.3-2. Table 6.4-1 presents the surface water samples collected and the requested analyses.

6.8 Surface Water General Chemistry

The analyses requested for samples from Fishladder Spring and Fishladder at Cañon de Valle included alkalinity, hardness, pH, specific conductance, suspended sediment concentration, and total dissolved solids.

The filtered alkalinity CO^3 + HCO^3 values ranged from 23.1 mg/L to 40.8 mg/L at Fishladder Spring. Hardness values ranged from 27.1 mg/L to 34.4 mg/L at Fishladder Spring, and hardness was 32.2 mg/kg at Fishladder at Cañon de Valle. The pH ranged from 6.86 to 7.17 in Fishladder Spring. Specific conductance levels ranged from 105 µS/cm to 106 µS/cm in Fishladder Spring. Total dissolved solids ranged from 119 mg/L to 224 mg/L in Fishladder Spring and was 197 mg/L in one sample at Fishladder at Cañon de Valle. Total Kjeldahl nitrogen ranged from 1.41 mg/L to 1.56 mg/L in Fishladder Spring.

The unfiltered alkalinity CO^3 + HCO^3 values ranged from 26.6 mg/L to 57.72 mg/L at Fishladder Spring and 42.4 mg/L to 61.8 mg/L at Fishladder at Cañon de Valle. Hardness values ranged from 29.6 mg/L to 44.7 mg/L at Fishladder Spring and 43.7 mg/L, and hardness was 166 mg/L for Fishladder at Cañon de Valle. The pH ranged from 6.45 to 7.21 at Fishladder Spring and 6.86, and pH was 7.56 at Fishladder at Cañon de Valle. Specific conductance levels ranged from 89.1 µS/cm to 92.7 µS/cm at Fishladder Spring was 125 µS/cm at Fishladder at Cañon de Valle. Suspended sediment concentration ranged from 90 mg/L to 212 mg/L in Fishladder Spring and was 2570 mg/L in Fishladder at Cañon de Valle. Total Kjeldahl nitrogen ranged from 1.23 mg/L to 2.3 mg/L in Fishladder Spring. Total organic carbon ranged from 18.9 mg/L to 22.1 mg/L in Fishladder Spring. Total suspended solids were 27.2 mg/L in one sample in Fishladder Spring.

6.9 Surface Water Analytical Results

Analytical results for the surface water samples (including general chemistry results) are presented in Tables 6.5-1 to 6.5-3. Inorganic chemical, organic chemical, and radionuclide results are discussed and Appendix H. Surface water data and data packages are included in Appendix G. Comparisons of inorganic chemical, organic chemical, and radionuclide sample results to applicable standards are presented in Appendix I.

Inorganic Chemicals

The surface water samples collected at Fishladder Spring and Fishladder at Cañon de Valle during the post-2005 investigation were analyzed for anions, TAL metals, alkalinity, hardness, pH, specific conductance, total dissolved solids, total organic carbon, and total suspended solids. Table 6.4-1 summarizes all the samples collected and their requested analyses. The following inorganic chemicals were detected and retained as COPCs in filtered surface water in Fishladder Canyon: aluminum, barium, beryllium, boron, cadmium, chromium, cobalt, copper, fluoride, iron, lead, manganese, molybdenum, nickel, silicon dioxide, strontium, sulfate, uranium, vanadium, and zinc.

The unfiltered surface water samples collected at Fishladder Spring and Fishladder Canyon at Cañon de Valle, during the post-2005 investigation were analyzed for anions, TAL metals, total cyanide, alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids (Table 6.4-1). The following inorganic chemicals were detected and retained as COPCs in unfiltered surface water in Fishladder Canyon: aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, calcium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, silicon dioxide, silver, sodium, strontium, sulfate, thallium, tin, uranium, vanadium, and zinc.

Inorganic chemicals detected in surface water in Fishladder Canyon are presented in Table 6.5-1.

Organic Chemicals

The unfiltered surface water samples collected in Fishladder Canyon were analyzed for HE, SVOCs, and VOCs. Table 6.4-1 presents all the samples collected and their requested analyses. The following organic chemicals were detected and retained as COPCs in unfiltered surface water: acetone, 1,2,3,4,5,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxins (total), 1,2,3,4,5,6,7,8-heptachlorodibenzofuran, heptachlorodibenzofurans (total), HMX, methlylene chloride, 1,2,3,4,5,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,5,6,7,8,9-octachlorodibenzofuran, RDX, and toluene. Organic chemicals detected in surface water in Fishladder Canyon are presented in Table 6.5-2.

Radionuclides

One filtered surface water sample, collected during the post-2005 investigation, was analyzed for americium-241, gamma spectroscopy, gross alpha, gross beta, isotopic plutonium, isotopic uranium, and strontium-90. Table 6.4-1 presents all the samples collected and their requested analyses. The following radionuclides were detected and therefore identified as COPCs in filtered surface water in Fishladder Canyon: gross beta, uranium-234, and uranium-235.

One unfiltered surface water sample, collected during the post-2005 investigation, was analyzed for americium-241, gamma emitters by gamma spectroscopy, gross alpha, gross beta, isotopic plutonium, isotopic uranium, and strontium-90. Table 6.4-1 presents all the samples collected and their requested analyses. The following radionuclides were detected and therefore identified as COPCs in unfiltered surface water in Fishladder Canyon: gross alpha, gross beta, tritium, and uranium-234.

Radionuclides detected at in surface water in Fishladder Canyon are presented in Table 6.5-3.

6.10 Subsurface Pore-Gas Sampling

Two rounds of subsurface pore-gas sampling were conducted at borehole 16-603511 (Figure 4.3-1). The first round of subsurface pore-gas samples was collected on July 15, 2008. The second round of sampling was collected 30 d after well installation was conducted, on August 15, 2008. Before samples were collected, all ports were purged using a Landtec GEM500 instrument until the percent carbon dioxide and oxygen levels stabilized. Subsurface pore-gas samples were collected in SUMMA canisters. Table 6.10-1 presents the subsurface pore-gas samples collected and the requested analyses.

6.11 Subsurface Pore-Gas Analytical Results

Pore-gas samples were analyzed for VOCs, and the following VOCs were detected in the two rounds of 2008 pore-gas sampling: acetone, 2-butanone, carbon disulfide, carbon tetrachloride, chloroform, 1,2-dichloroethane, ethylbenzene, hexane, methylene chloride, n-heptane, propylene, tetrachloroethene, toluene, trichloroethene, 1,2-xylene, and 1,3-xylene+1,4-xylene.

The VOC results of pore gas for the 2008 investigation are presented in Table 6.11-1.

6.12 Nature and Extent of Contamination in Soil, Rock, and Sediment

Nature and extent of contamination are discussed for each consolidated unit and SWMU in the following sections.

Nature and extent of contamination determinations use (1) decreasing trends in contaminant concentration both laterally downgradient and vertically; (2) the three deep boreholes (drilled at the top and bottom of the Fishladder Canyon slope in 2005 and near the TA-16-340 building site in 2008) as delineators of vertical extent of contamination (LANL 2006, 091450, Appendix B) both for SWMU 16-003(o) and for nearby SWMUs; (3) a 2-times-background level for inorganics and radionuclides to define nature and extent per the approved TA-16-340 Complex investigation work plan (LANL 2004, 087345) and the previous investigation report (LANL 2006, 091450, Appendix B); and (4) define extent of organic constituents to nondetect of trace-levels (generally defined as J flagged of close to the detection limit).

6.12.1 Consolidated Unit 13-003(a)-99

Inorganic Chemicals

The 1995 and 2005 historical investigations did not define the extent of eight inorganic COPCs (arsenic, barium, cobalt, fluoride, manganese, nitrate, selenium and silver). Lateral and vertical extent of all eight inorganic COPCs were defined using data from the 2008 investigation. The extent for two of the COPCs was defined using data from neighboring SWMUs approximately 225 ft downgradient.

A detailed assessment of the historical and 2008 data is presented in section H-8.1.1.

Organic Chemicals

The 1995 and 2005 historical investigations did not define the extent of 12 organic COPCs (acenaphthene, anthracene, benzo[k]fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, chrysene, fluoranthene, phenanthrene, and pyrene). Lateral and vertical extent of all 12 organic COPCs were defined using data from the 2008 investigation. An additional COPC (benzo[a]anthracene) was detected during the 2008 investigation and was not identified during the historical investigations; extent of contamination for this additional COPC was defined using 2008 and historical data from a neighboring SWMU approximately 250 ft downgradient.

A detailed assessment of the historical and 2008 data is presented in section H-8.1.2.

6.12.2 Consolidated Unit 16-003(n)-99

Inorganic Chemicals

The 1995 and 2005 historical investigations did not define the extent of contamination of 10 inorganic chemicals (aluminum, arsenic, barium, cobalt, copper, fluoride, lead, nitrate, selenium, and vanadium). Lateral and vertical extent of all 10 inorganic COPCs were defined using data from the 2008 investigation. The extent for two of these COPCs was defined using sample data collected from within Fishladder Canyon drainage, approximately 250 ft downgradient.

A detailed assessment of the historical and 2008 data is presented in section H-8.2.1.

Organic Chemicals

The 1995 and 2005 historical investigations did not define the extent of contamination of 10 organic COPCs (acetone, benzo[g,h,i]perylene, bis[2-ethylhexyl]phthalate, chrysene, di-n-octylphthalate, fluoranthene, HMX, phenanthrene, pyrene, and TATB). Lateral and vertical extent of all 10 organic COPCs were defined using data from the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.2.2.

6.12.3 SWMU 16-003(o)

Inorganic Chemicals

SWMU 16-003(o)–West: The 1995 and 2005 historical investigations did not define the extent of 12 inorganic COPCs (arsenic, barium, cadmium, chromium, cobalt, copper, fluoride, nickel, nitrate, lead, selenium, and zinc) at the former sumps and drainlines. Lateral and vertical extent of all 12 inorganic COPCs were defined using data from the 2008 investigation. Two additional inorganic COPCs (aluminum and beryllium) were detected during the 2008 investigation and were not identified during the historical investigations; the extent of contamination for these additional COPCs was defined using 2008 and historical data.

A detailed assessment of the historical and 2008 data is presented in section H-8.3.1.

SWMU 16-003(o)–East: The 1995 and 2005 historical investigations did not define the extent of nine inorganic COPCs (cobalt, fluoride, nitrate, lead, mercury, nickel, selenium, uranium, and vanadium) at the former fishladder structure. Twelve additional inorganic COPCs (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, iron, manganese, perchlorate, silver, and zinc) were identified during the

2008 investigation and were detected during the historical investigations, and extent was defined. Lateral and vertical extent of all 21 inorganic COPCs were defined using data from the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.3.1.

Organic Chemicals

SWMU 16-003(o)–West: The 1995 and 2005 historical investigations did not define the extent of 24 organic COPCs (acenaphthene, acetone, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo(b)fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, HMX, indeno[1,2,3-cd]pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, and toluene) at the former sumps and drainlines. Six additional organic COPCs (bis[2-ethylhexyl]phthalate, ethylbenzene, isopropylbenzene, trimethylbenzene[1,2,4-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-]) were detected during the 2008 investigation (and were not detected during the historical investigations). Lateral and vertical extent of all 30 organic COPCs were defined using data from the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.3.2.

SWMU 16-003(o)–East: The 1995 and 2005 historical investigations did not define the extent of 29 COPCs (acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, benzoic acid, bis[2-ethylhexyl]phthalate, 2-butanone, chrysene, dibenz[a,h]anthracene, dibenzofuran, 1,1 dichloroethene, fluoranthene, fluorene, HMX, indeno[1,2,3-cd]pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene) at the former fishladder structure. Three additional organic COPCs (acenaphthylene, chloronaphthalene[2-], and xylene[1,3-]+xylene[1,4-]) were detected during the 2008 investigation and were not detected during the historical investigations. Lateral and vertical extent of all 32 inorganic COPCs were defined using data from the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.3.2.

Radionuclides

SWMU 16-003(o)–West: One radionuclide COPC (uranium-235/236) was detected at the former fishladder structure area during the 2008 investigation. This radionuclide was not analyzed during the historical 1995 and 2005 investigations. Lateral and vertical extent for uranium-235/236 were defined.

A detailed assessment of the historical and 2008 data is presented in section H-8.3.3.

SWMU 16-003(o)–East: Three radionuclide COPCs (uranium-234, uranium-235/236, uranium-238) were detected at the former fishladder structure during the 2008 investigation. These radionuclides were not analyzed during the historical 1995 and 2005 investigations. The lateral and vertical extent of two radionuclide COPCs (uranium-234, and uranium-238) were defined based on the 2008 results. The extent of uranium-235/236 was not defined and is discussed in the following paragraph.

Uranium-235/236 was detected in 8 soil samples and 17 tuff samples. The highest concentrations were in surface soil at upgradient locations at Areas C and D. Uranium-235/236 was detected in the most downgradient locations (16-603406, 16-603408, and 16-24906) at 3.0-ft depths. The lateral extent of uranium-235/236 is defined because the concentrations decrease in the downgradient locations. The vertical extent of uranium-235/236 is not defined at the downgradient location because this radionuclide was detected at the bottom depth and no data are available at deeper depths. However, the concentration of uranium-235/236 was low (2 times BV), and total uranium was not detected to depths to

6.5 ft bgs at adjacent historical locations 16-23651 and 16-23651. Background levels of uranium (all components of natural uranium [uranium-234, uranium-235/236, and uranium-238] will be affected) have been shown to be higher at TA-16 than at many other Laboratory TAs (see the NMED-approved V-Site voluntary corrective measure report) (LANL 1999, 063973, Appendix E).

A detailed assessment of the historical and 2008 data is presented in section H-8.3.3.

6.12.4 SWMUs 16-026(j2) and 16-029(f)

Inorganic Chemicals

The 1995 and 2005 historical investigations did not define the extent of 11 inorganic COPCs (aluminum, barium, chromium, cobalt, copper, fluoride, nitrate, nickel, perchlorate, selenium, and silver). One additional COPC (bromide) was detected during the 2008 investigation and was not identified during the historical investigations. Lateral and vertical extent of contamination of all 12 inorganic COPCs were defined using data from the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.4.1.

Organic Chemicals

The 1995 and 2005 historical investigations did not define the extent of 25 organic COPCs identified during historical investigations (acenaphthene, anthracene, acetone, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, 2-butanone, chrysene, dibenz[a,h]anthracene, 1,1-dichloroethene, dibenzofuran, fluorene, 2-methylnaphthalene, fluoranthene, HMX, indeno[1,2,3-cd]pyrene, 4- isopropyltoluene, naphthalene, phenanthrene, pyrene, TATB, toluene, and 1,2,4-trimethylbenzene). The lateral and vertical extent of contamination of all of these organic COPCs were defined based on the 2008 investigation.

A detailed assessment of the historical and 2008 data is presented in section H-8.4.2.

6.13 Nature and Extent of Contamination in Groundwater

Inorganic Chemicals

Twenty-eight inorganic COPCs were detected in filtered and unfiltered groundwater (in three alluvial wells): aluminum, antimony, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, thallium, uranium, vanadium, and zinc. One sampling event conducted during the previous 2005 investigation at two alluvial wells identified 18 of these 28 inorganic COPCs: aluminum, arsenic, barium, beryllium, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, lead, manganese, nickel, sulfate, uranium, vanadium, and zinc.

Trends in inorganic COPCs, observed for two sampling events (October 2007 and April 2008) conducted at alluvial wells 16-25278 and 16-25279 and one sampling event at alluvial well 16-25280 (April 2008), are presented in section H-8.5.1.

Organic Chemicals

Seven organic COPCs were detected in unfiltered groundwater (in three alluvial wells): cis-1,2-dichloroethene, HMX, 4-isopropyltoluene, RDX, tetrachloroethene, toluene, and trichloroethene. One sampling event conducted during the previous 2005 RFI (at two alluvial wells) identified two of these COPCs: HMX and toluene.

Trends in organic COPCs, observed for two post-2005 sampling events at the three alluvial wells, 16-25278, 16-25279, and 16-25280, are presented in section H-8.5.2.

Radionuclides

Seven radionuclide COPCs were detected in unfiltered groundwater (in three alluvial wells) during the post-2005 investigation: gross alpha, gross beta, radium-226, radium-228, tritium, uranium-234, and uranium-235. Trends in radionuclides, observed for two sampling events (October 2007 and April 2008) conducted at alluvial wells 16-25278 and 16-25279 and one sampling event at alluvial well 16-25280 (April 2008), are presented in section H-8.5.3.

6.14 Nature and Extent of Contamination in Surface Water

Inorganic Chemicals

Twenty-eight inorganic chemicals COPCs were detected in filtered and unfiltered surface water: aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, thallium, tin, uranium, vanadium, and zinc. Previous surface-water sampling events identified 24 of these COPCs: aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, lead, manganese, mercury, molybdenum, nickel, silver, strontium, sulfate, thallium, uranium, vanadium, and zinc.

Trends for seven surface water samples collected at Fishladder Spring and two samples collected at Fishladder Canyon at Cañon de Valle during the post-2005 investigation are presented in section H-8.5.4.

Organic Chemicals

Eleven COPCs were detected in unfiltered surface water: acetone, 1,2,3,4,5,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxins (total), 1,2,3,4,5,6,7,8-heptachlorodibenzofuran, heptachlorodibenzofurans (total), HMX, methlylene chloride, 1,2,3,4,5,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,5,6,7,8,9-octachlorodibenzofuran, RDX, and toluene. Two organic chemicals (acetonitrile and MNX) were identified during previous investigations and were not detected post-2005.

Trends for five surface water samples collected at Fishladder Spring and one sample collected at Fishladder Canyon at Cañon de Valle conducted as part of the post-2005 investigation are presented in section H-8.5.5.

Radionuclides

Five radionuclide COPCs (gross alpha, gross beta, tritium, uranium-234, and uranium-235) were detected in filtered and unfiltered surface water at Fishladder Spring during three sampling events. No trends are observed.

6.15 Nature and Extent of Contamination in Subsurface Vapor at SWMU 16-003(o)

Sixteen organic COPCs were detected in the 2008 pore gas samples (acetone, butanone[2-], carbon disulfide, carbon tetrachloride, chloroform, dichloroethane[1,2-], ethylbenzene, hexane, methylene chloride, n-heptane, propylene, tetrachloroethene, toluene, trichloroethene, xylene[1,2-], and xylene[1,3-]+xylene[1,4-]). The concentrations of VOCs were very low.

Results for the 2008 sampling indicate that 14 of these chemicals either decreased in concentrations from July 2008 to August 2008, decreased in concentrations to the deepest depths, were detected at low concentrations at bottom depths and undetected at shallower depths, or were detected at low concentrations at the shallowest depths and undetected at other depths. Toluene concentrations increased slightly from July-2008 to August-2008 sampling. Trichloroethene was detected at high concentrations at the shallow and middle intervals (up to 1200 µg/m^3), and it was undetected at bottom depth during the July-2008 and August-2008 sampling.

These chemicals were either not detected, were not detected in the deepest intervals, or were reported at low levels (and therefore no further sampling is warranted) during the 2005 sampling at boreholes 16-23691 and 16-23693.

The results for the 2008 and 2005 pore gas sampling are not indicative of a significant vapor plume beneath the TA-16-340 Complex.

7.0 CONCLUSIONS

The TA-16-340 Complex consists of Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f). Multiple investigations conducted at the TA-16-340 Complex have included a 1995 RFI investigation, 2005 Phase I investigation and remediation (soil removal from the former fishladder structure), and this 2008 Phase II investigation and remediation (further soil removal from the former fishladder structure). Soil, fill, and tuff were sampled at each site during the 2008 investigation in an effort to complete characterization at all TA-16-340 Complex sites. In addition, groundwater and surface water were sampled at Fishladder Canyon.

Data from the 1995 and 2005 investigations were used in conjunction with 2008 data to assess the TA-16-340 Complex for extent of contamination and potential human health and ecological risks. All data were collected in accordance with the approved investigation work plan, investigation report, and NOD response (LANL 2004, 087345; LANL 2006, 091450; LANL 2006, 094410; NMED 2006, 094381) to provide a comprehensive assessment. Where necessary and as applicable based on proximity, data associated with one consolidated unit are used to complete the understanding of contaminant distributions in the other consolidated unit and/or SWMUs.

7.1 Summary of Nature and Extent

Nature and extent of contamination were evaluated for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f). Details are presented in section 6.12 and Appendix H and summarized below.

Consolidated Unit 13-003(a)-99: Lateral and vertical extent of all inorganic and organic COPCs are defined using data from the 2008 investigation. No radionuclide COPCs were identified during any investigation.

Consolidated Unit 16-003(n)-99: Lateral and vertical extent of all inorganic and organic COPCs are defined using data from the 2008 investigation. No radionuclide COPCs were identified during any investigation.

SWMU 16-003(o): Lateral and vertical extent of all inorganic, radionuclide, and organic COPCs are defined using data from the 2008 investigation. Sixteen organic COPCs were detected in the 2008 pore-gas samples at the intermediate borehole next to the former TA-16-340 drainline. The results are not indicative of a significant vapor plume beneath the drainline.

SWMUs 16-026(j2) and 16-029(f): Lateral and vertical extent of all inorganic and organic COPCs are defined using data from the 2008 investigation. No radionuclide COPCs were identified during any investigation.

Fishladder Canyon Groundwater: Twenty-eight inorganic COPCs were detected in filtered and unfiltered groundwater. Seven organic COPCs were detected in unfiltered groundwater. Seven radionuclide COPCs were detected in unfiltered groundwater.

Fishladder Canyon Surface Water: Twenty-eight inorganic COPCs were detected in filtered and unfiltered surface water. Eleven organic COPCs were detected in unfiltered surface water. Five radionuclide COPCs were detected in filtered and unfiltered surface water.

7.2 Summary of Risk Evaluation

Human health and ecological risk screening assessments were performed for each site using the industrial scenario. Sites were also assessed using the residential scenario as required by the Consent Order. Details of the risk assessment approach, exposure parameters, supporting data, and risk calculations are presented in Appendix I and are summarized below.

7.2.1 Human Health Risk Screening Assessment

Industrial Scenario

Concentrations of carcinogenic COPCs are less than their respective industrial SSLs for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and combined SWMUs 16-026(j2) and 16-029(f). The total excess cancer risks for the three sites are 1×10^{-5}, 4×10^{-6}, and 2×10^{-6}, respectively. These risk levels are less than the NMED target cancer risk level of 1×10^{-5} (NMED 2006, 092513). The total excess cancer risk for SWMU 16-003(o) is 3×10^{-5}, which is slightly above the NMED target risk level of 1×10^{-5} (NMED 2006, 092513).

All noncarcinogenic hazard indices (HIs) are less than 1.0 and range from 0.1 to 0.3, with a maximum HI at SWMU 16-003(o). Therefore, none of the consolidated units and SWMUs within the TA-16-340 Complex exceeds the NMED target HI of 1.0 (NMED 2006, 092513).

SWMU 16-003(o) is the only site within the TA-16-340 Complex where radionuclide COPCs were detected. The total dose for the industrial scenario is 0.21 mrem/yr, which is less than DOE target dose of 15 mrem/yr (DOE 2000, 067489). This dose corresponds to a radiological risk of 3×10^{-6} based on a comparison to EPA radionuclide preliminary remediation goals (PRGs) for an outdoor worker (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

The total excess cancer risk for the industrial scenario at SWMU 16-003(o) is slightly above target risk of 1×10^{-5}. The largest contributors to potential risk at this SWMU are arsenic and benzo(a)pyrene. The arsenic exposure point concentration (EPC) is similar to background concentrations. The total excess cancer risk is reduced to approximately 1×10^{-5} if arsenic is removed as a COPC and the EPC for benzo(a)pyrene is adjusted to the mean [based on the skewed distribution and low detection percentage (section I-4.4.3)]. The highest two concentrations of benzo(a)pyrene are located within a 10-ft^2 area at the top of the steep hillslope of the former fishladder structure. The exposure assumptions associated with the industrial scenario overestimate the exposure and risk associated with this SWMU (Appendix I, section I-4.4-2). Exposure to a worker on the hillslope within the SWMU is overestimated because it has not been, is not currently, nor will it be used in such a fashion that a worker will be exposed at the frequency and duration assumed by the scenario. Industrial activities are not likely to occur on the hillslope because of the steep slope. In addition, benzo(a)pyrene is a PAH found in asphalt; the presence of this compound at the top part of the slope of the former fishladder structure is due at least in part to runoff from the nearby roads as evidenced by the asphalt pieces observed on the hillslope during removal activities. During the investigation, storm water runoff was observed flowing from the asphalt road onto the hillslope. As part of site restoration, a straw waddle check dam was installed to prevent additional runoff from the road to the hillslope.

Residential Scenario

The total excess cancer risk for the residential scenario is greater than 1×10^{-5} for all consolidated units and SWMUs within the TA-16-340 Complex. The cancer risks for Consolidated Units 13-003(a)-99, 16-003(n)-99, combined SWMUs 16-026(j2) and 16-029(f), and SWMU 16-003(o) are 2×10^{-5}, 2×10^{-5}, 6×10^{-5}, and 4×10^{-5}, respectively. The largest contributors to the cancer risk are arsenic and benzo(a)pyrene at all consolidated units and SWMUs within the TA-16-340 Complex. However, the arsenic EPCs are within the range of background concentrations.

Residential noncarcinogenic HIs are 0.9 and 0.4 for Consolidated Unit 13-003(a)-99 and SWMUs 16-026(j2) and 16-029(f), which are below the target HI of 1.0 (NMED 2006, 092513). The residential noncarcinogenic HIs are approximately 2 at SWMU 16-003(o) and 1.5 at 16-003(n)-99. These slightly elevated HIs are primarily because of aluminum, iron, and vanadium. The EPCs for aluminum, iron, and vanadium are similar to background concentrations, indicating that exposure is similar to background.

The total radiological dose for the residential scenario is 0.75 mrem/yr, which is less than the DOE target dose of 15 mrem/yr (DOE 2000, 067489). This dose corresponds to a radiological risk of 4×10^{-6} based on a comparison to EPA radionuclide preliminary remediation goals (PRGs) for a resident (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

7.2.2 Ecological Risk Screening Assessment

An ecological risk screening assessment was conducted to determine whether chemicals of potential ecological concern (COPECs) within the TA-16-340 Complex result in potential risks to ecological receptors. Based on the ecological risk screening assessment, several COPECs (including COPECs without ESLs) were identified. Receptors were evaluated for potential risk using the following lines of evidence: minimum ESL comparisons, HI analyses, comparisons to background concentrations, potential effects to populations (individuals for threatened and endangered [T&E] species), the relative toxicity of related compounds, and the infrequency of detection. In addition, field and laboratory studies conducted and reported as part of the ecological investigations in Los Alamos and Pueblo Canyons (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Cañon de Valle (LANL 2003, 077965) have found that similar concentrations of COPCs have not adversely impacted small mammals, birds, earthworms, and plant populations, laboratory testing of sensitive organisms and individual Mexican spotted owls. These lines of evidence, and the analysis of COPECs with no ESLs, support the conclusion that no potential ecological risks exists at the TA-16-340 Complex.

7.2.3 Surface and Groundwater in Fishladder Canyon

All detected surface water and groundwater chemicals that are not essential nutrients or general water chemistry indicators were screened against NMWQCC standards, EPA maximum contaminant levels, and EPA Regions 6 and 9 human health tap water screening levels. The following chemicals were detected above one or more standards or screening levels: aluminum, arsenic, boron, beryllium, chromium, cyanide, lead, iron, manganese, uranium, vanadium, methylene chloride, RDX, tetrachloroethene, and trichloroethene.

7.3 Summary of Phase II Investigation

For each consolidated unit and SWMU at the TA-16-340 Complex, the nature and extent of all COPCs are defined (or cannot be further defined, as at location 16-23693 in Fishladder Canyon). A total of 88 yd^3 of soil was removed from five separate areas on the SWMU 16-003(o) hillslope. Total excess cancer risk for SWMU 16-003(o) was reduced from approximately 7×10^{-5} in 2005 to approximately 3×10^{-5} in 2008. The slightly elevated risk at SWMU 16-003(o) is probably overestimated because COPC EPCs are similar to background and there is minimal exposure of a worker on the hillslope. Several chemicals sporadically exceeded standards for surface water and groundwater, but no clear trends are discernable.

8.0 RECOMMENDATIONS

The Consolidated Units 13-003(a)-99 and 16-003(n)-99, and SWMUs 16-026(j2) and 16-029(f) have been found not to pose potential unacceptable risks or doses to human health under an industrial scenario. These sites have also been determined to pose no potential unacceptable risk to the environment. The Laboratory is requesting Certificates of Completion from NMED for corrective action complete with controls for these sites. The current and reasonably foreseeable future land use is industrial and all of TA-16 is currently a high security area with restricted access. The Laboratory intends to retain ownership of the property indefinitely and will continue to restrict the property to industrial use only. The controls required include continuation of the current land use (i.e., industrial) and maintenance of current site conditions. The Laboratory has several processes in place to ensure that work conducted within the TA-16-340 Complex boundary is performed with the appropriate controls to protect future workers from exposure to potential contamination.

Alluvial water downgradient of SWMU 16-003(o) shows concentrations of inorganic, radionuclide, and organic constituents, including periodic detections above standards. Continued monitoring of the three alluvial groundwater wells is recommended for characterizing chemical concentrations and variability in the alluvial groundwater.

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 number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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

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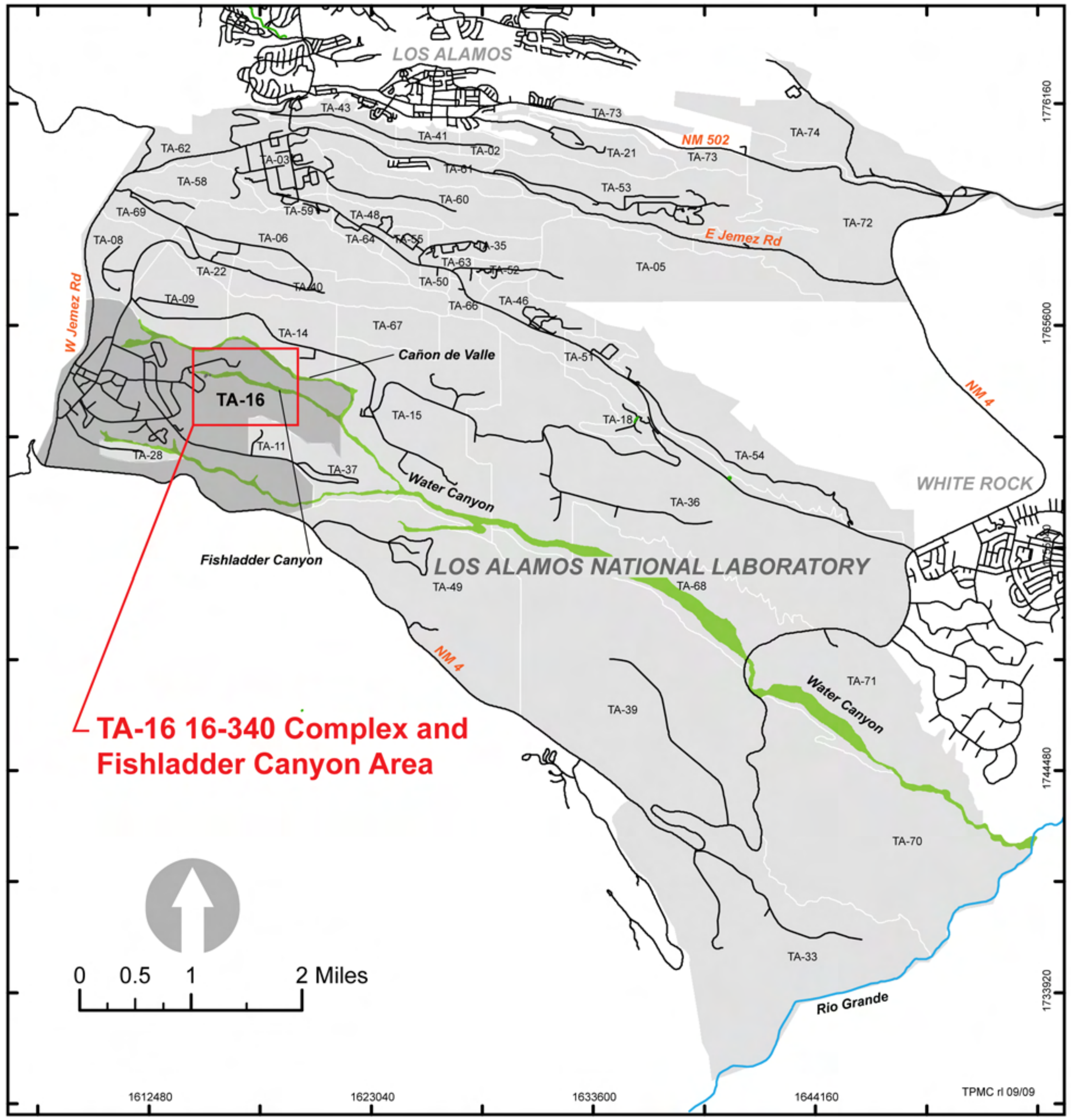


Figure 1.0-1 Location of TA-16-340 Complex with respect to Laboratory TAs

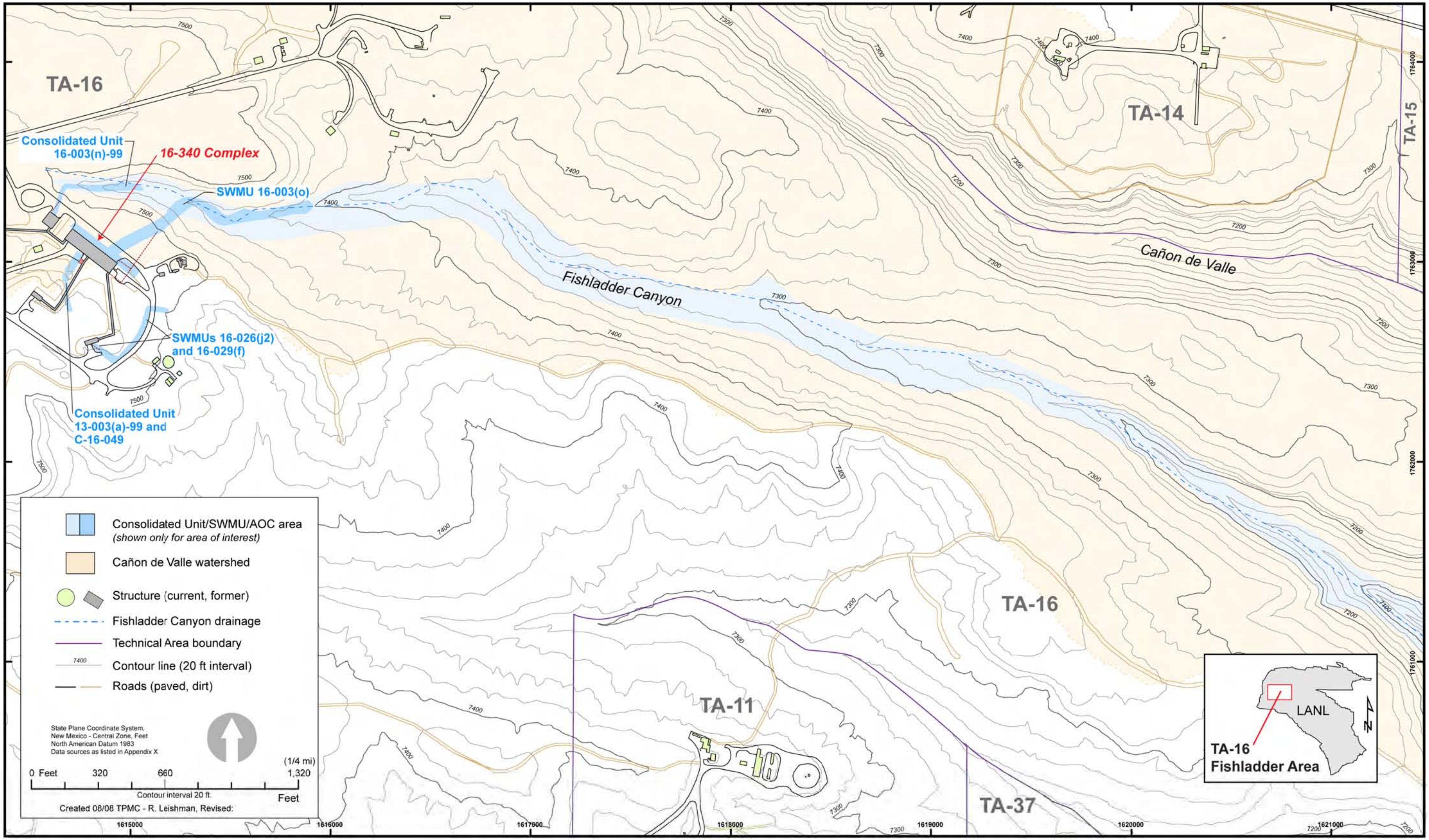


Figure 1.0-2 The TA-16-340 Complex-associated consolidated units and SWMUs and Fishladder Canyon

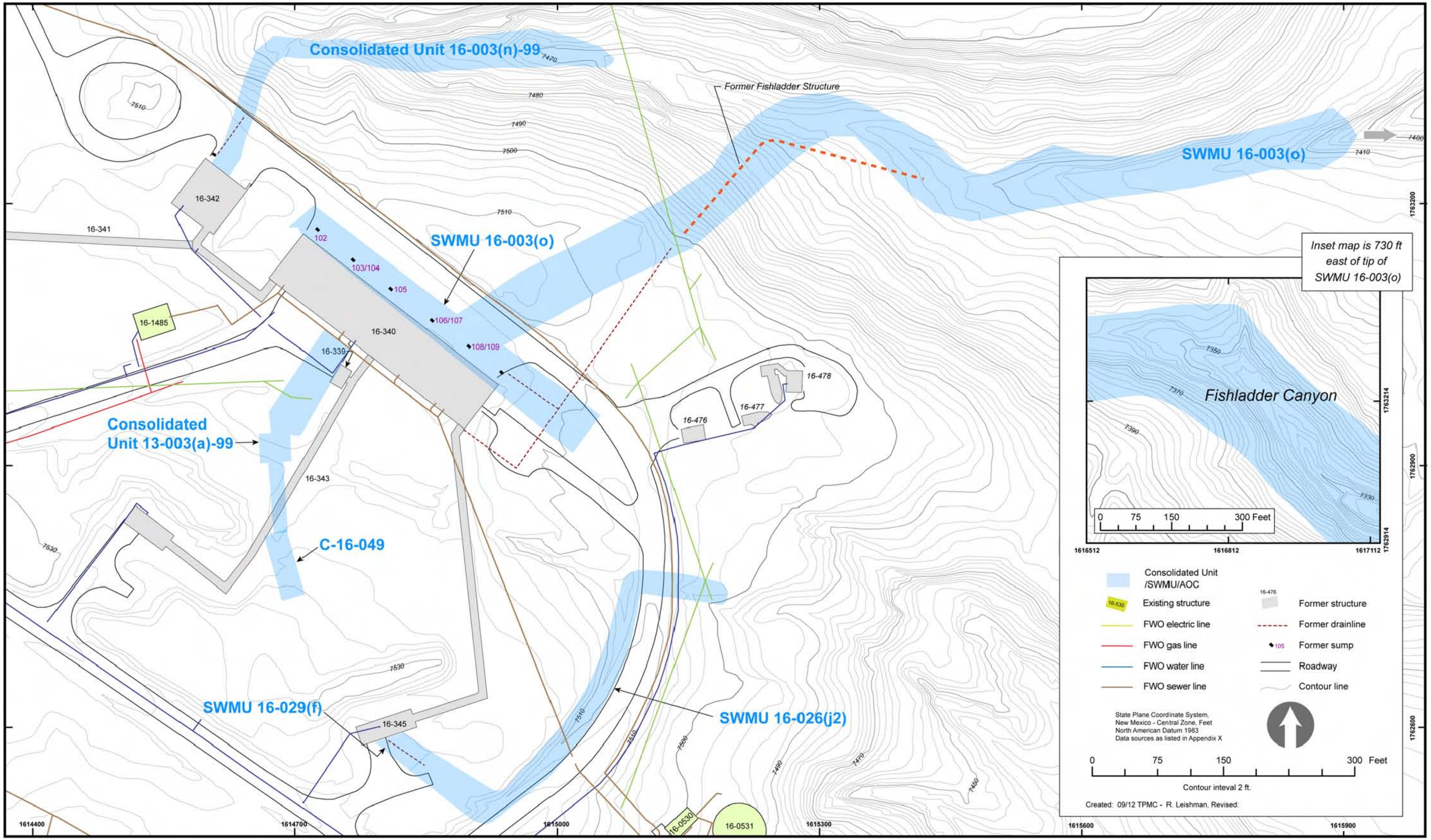


Figure 2.1-1 The TA-16-340 Complex and associated features

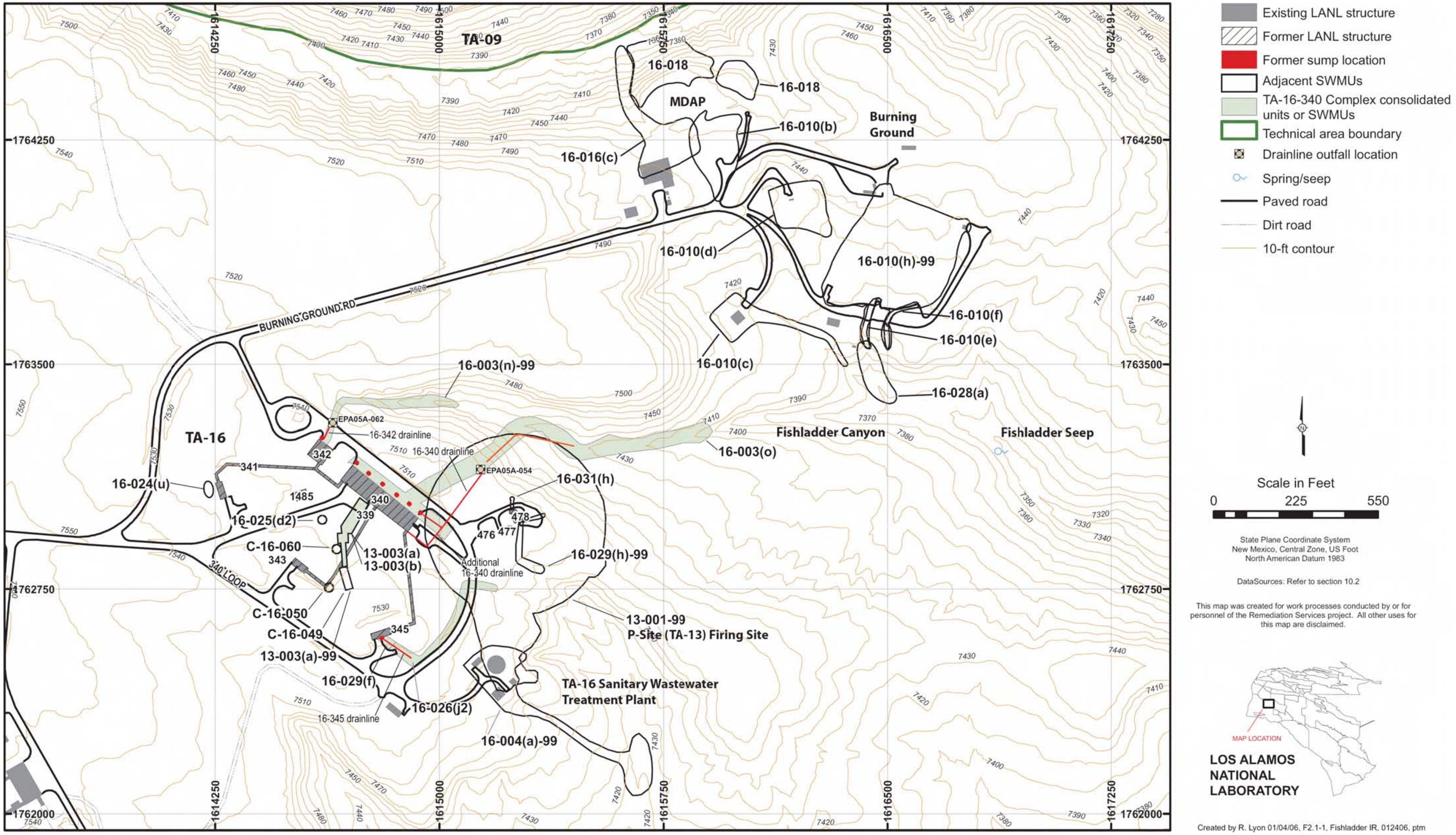


Figure 2.2-1 Consolidated units, SWMUs and AOCS within the vicinity of the TA-16-340 Complex

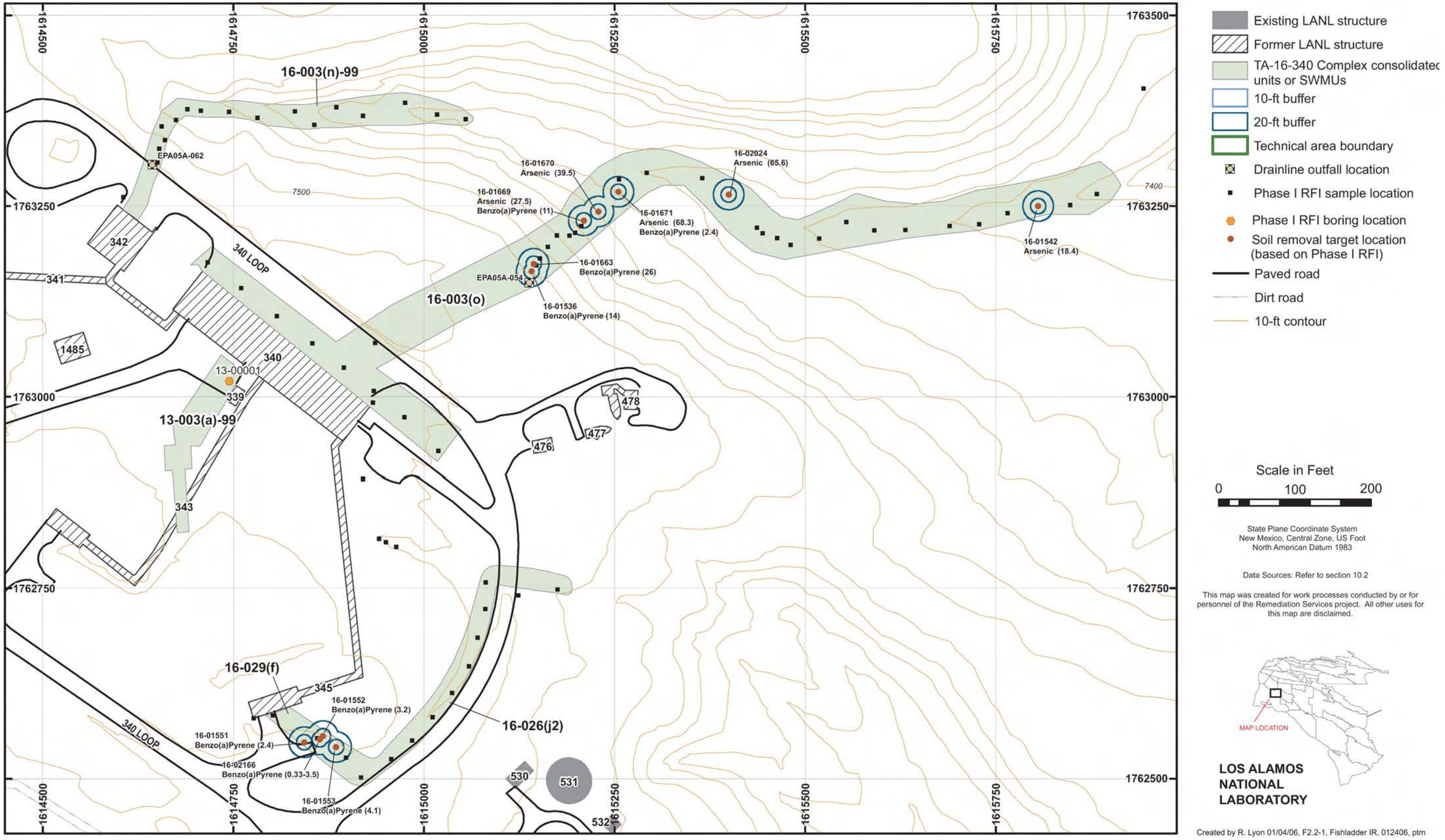


Figure 2.3-1 Phase I RFI sampling locations with results exceeding industrial SSLs

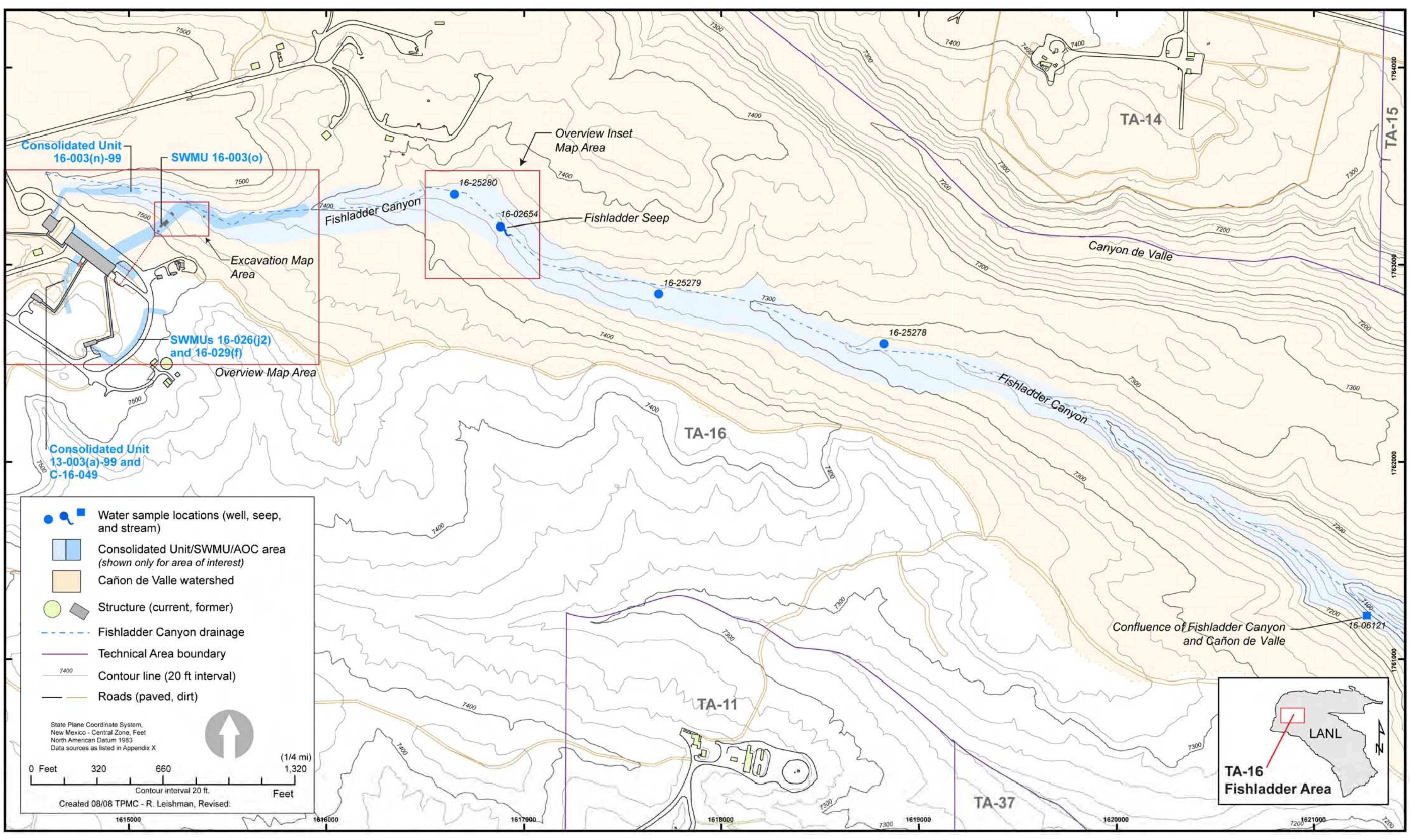


Figure 2.3-2 Surface water and alluvial groundwater sampling locations in Fishladder Canyon

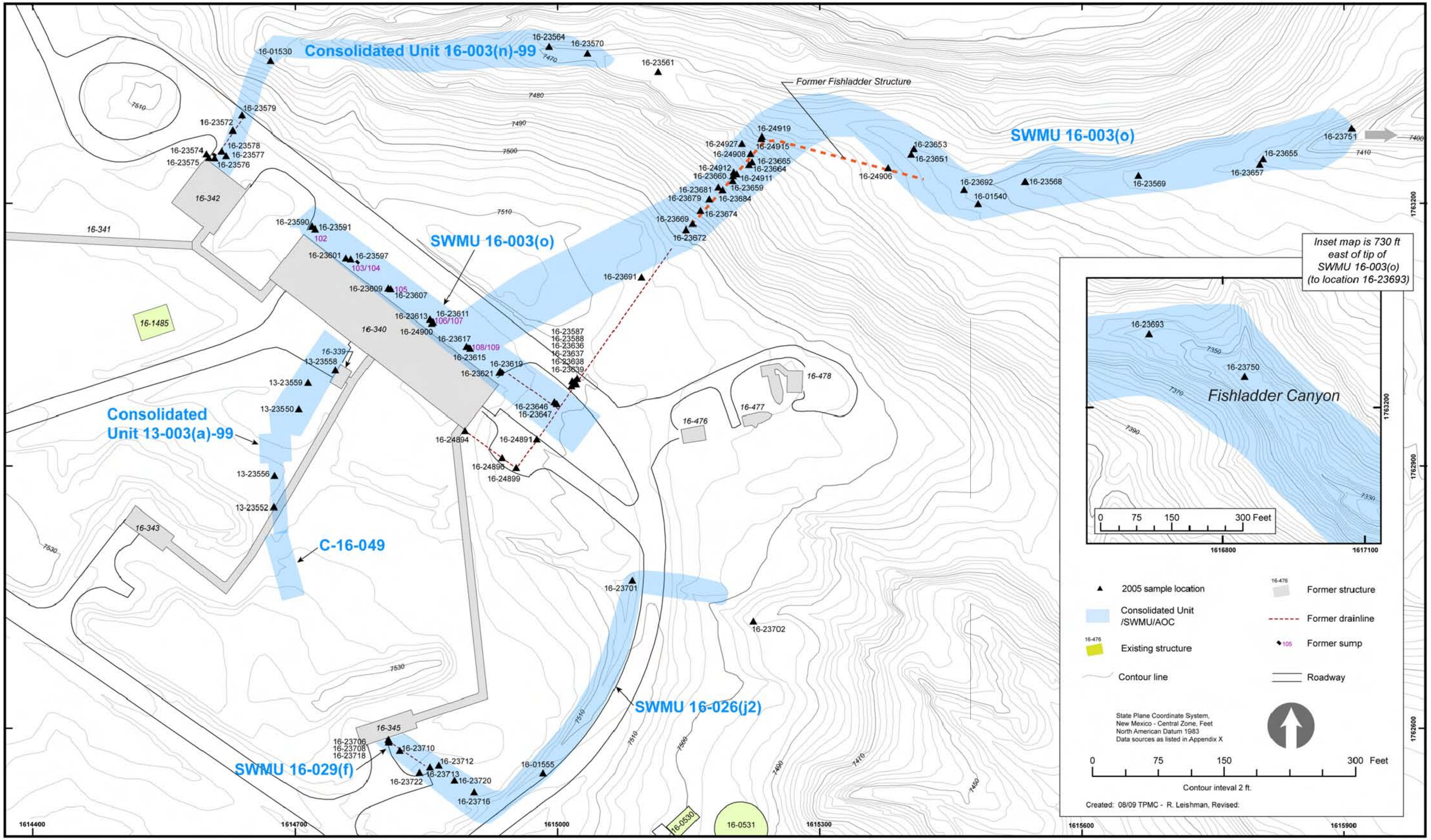


Figure 2.3-3 2005 investigation sampling locations

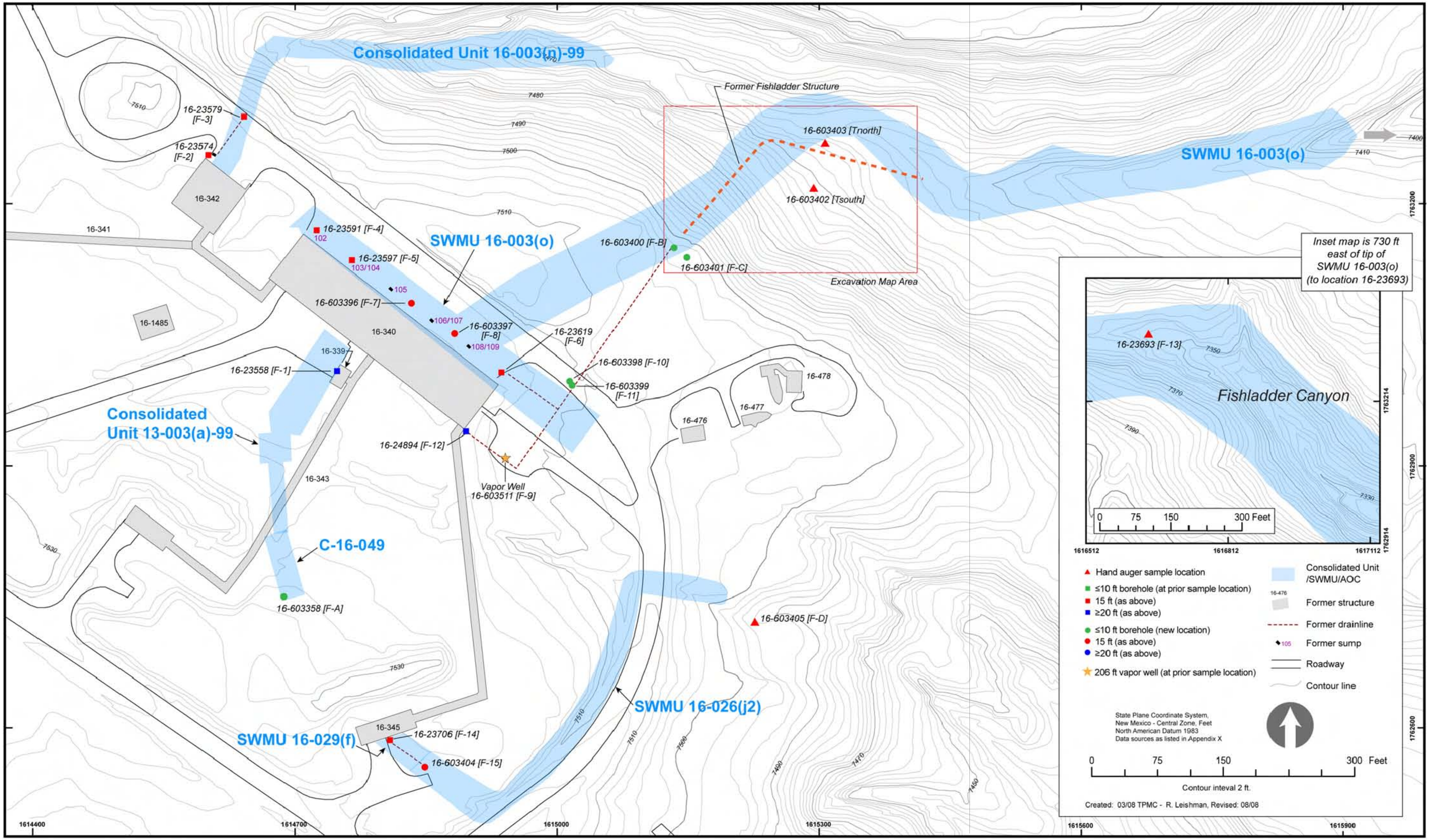


Figure 3.1-1 **2008 characterization sampling locations**

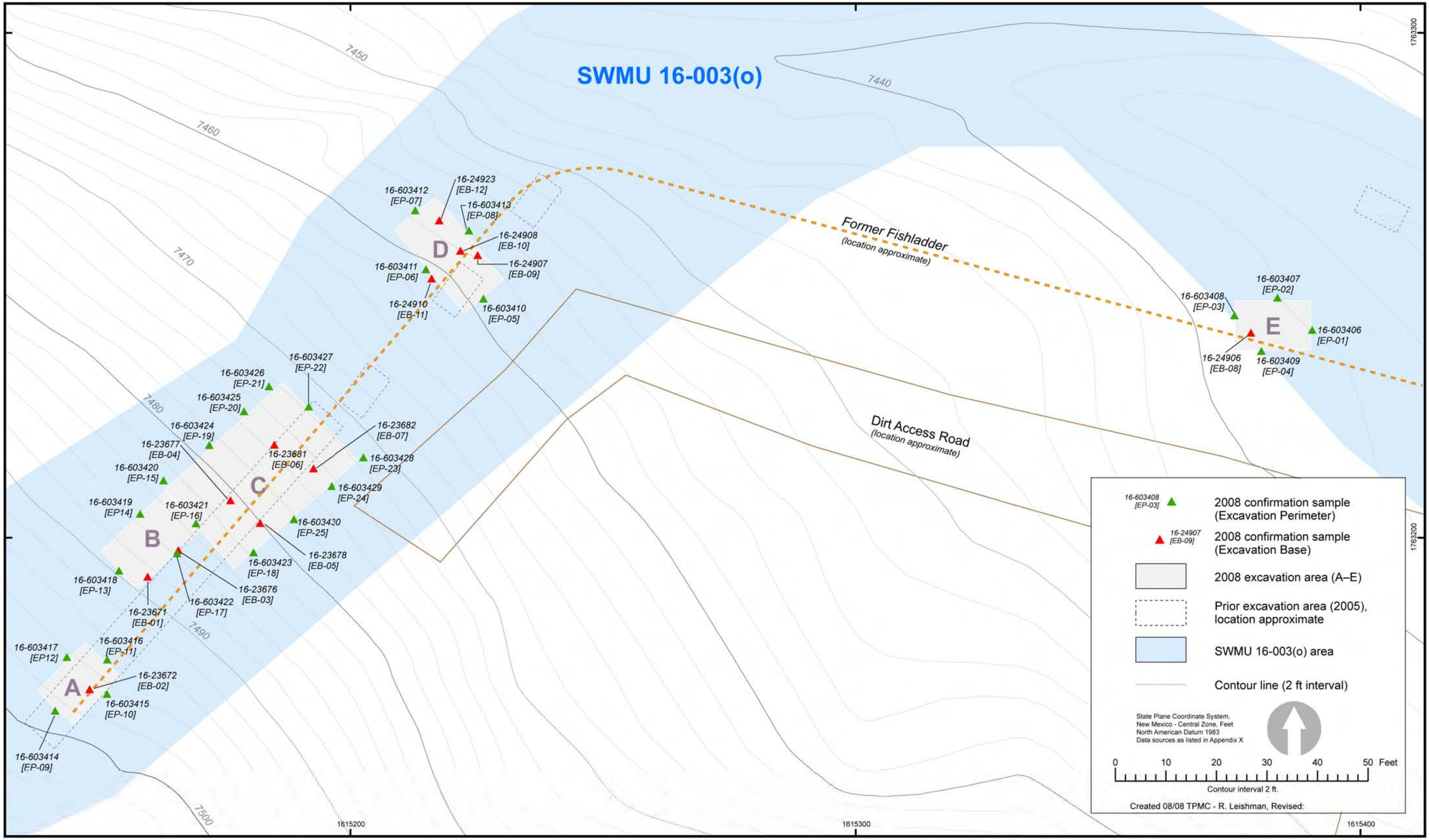
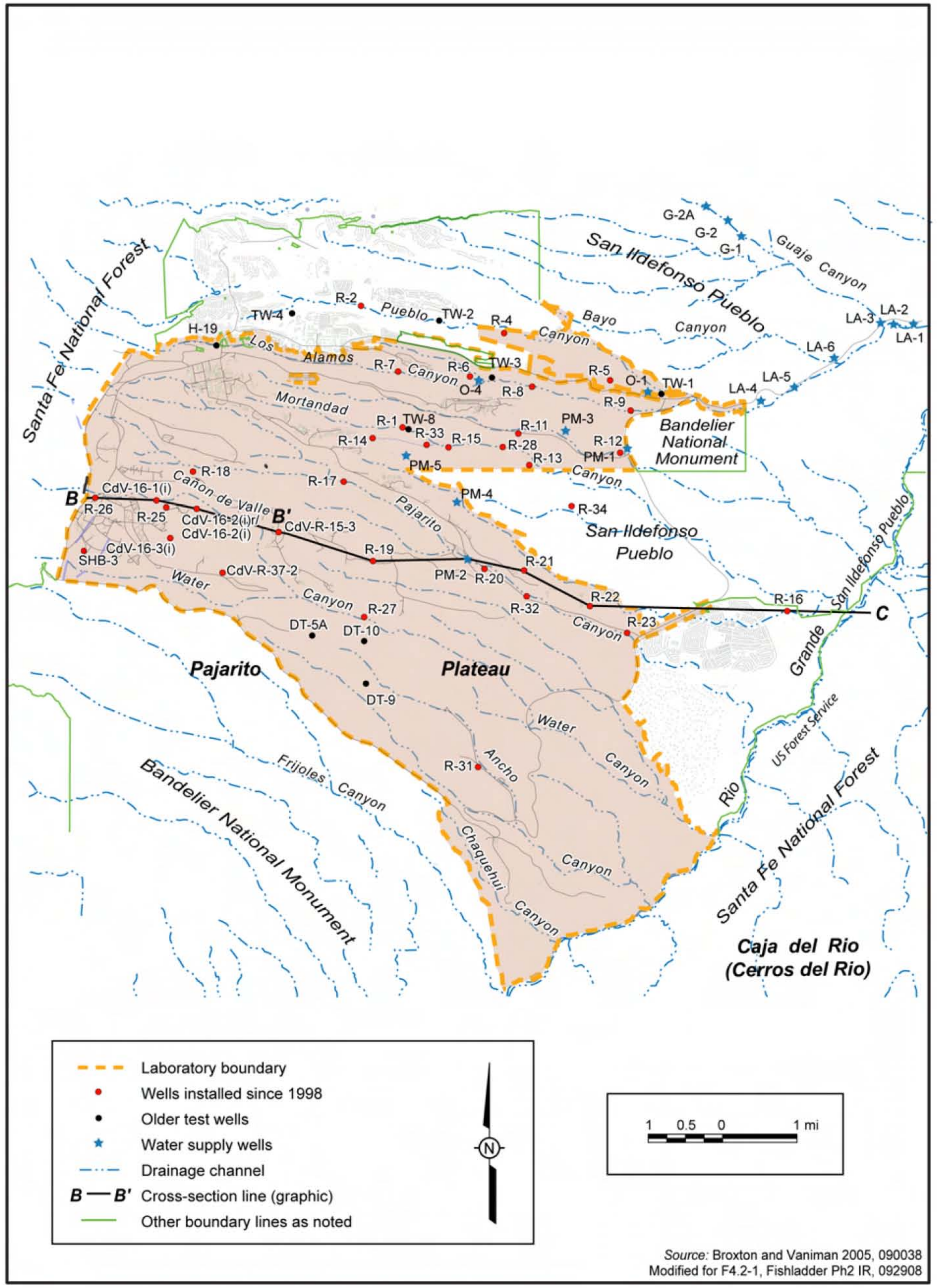
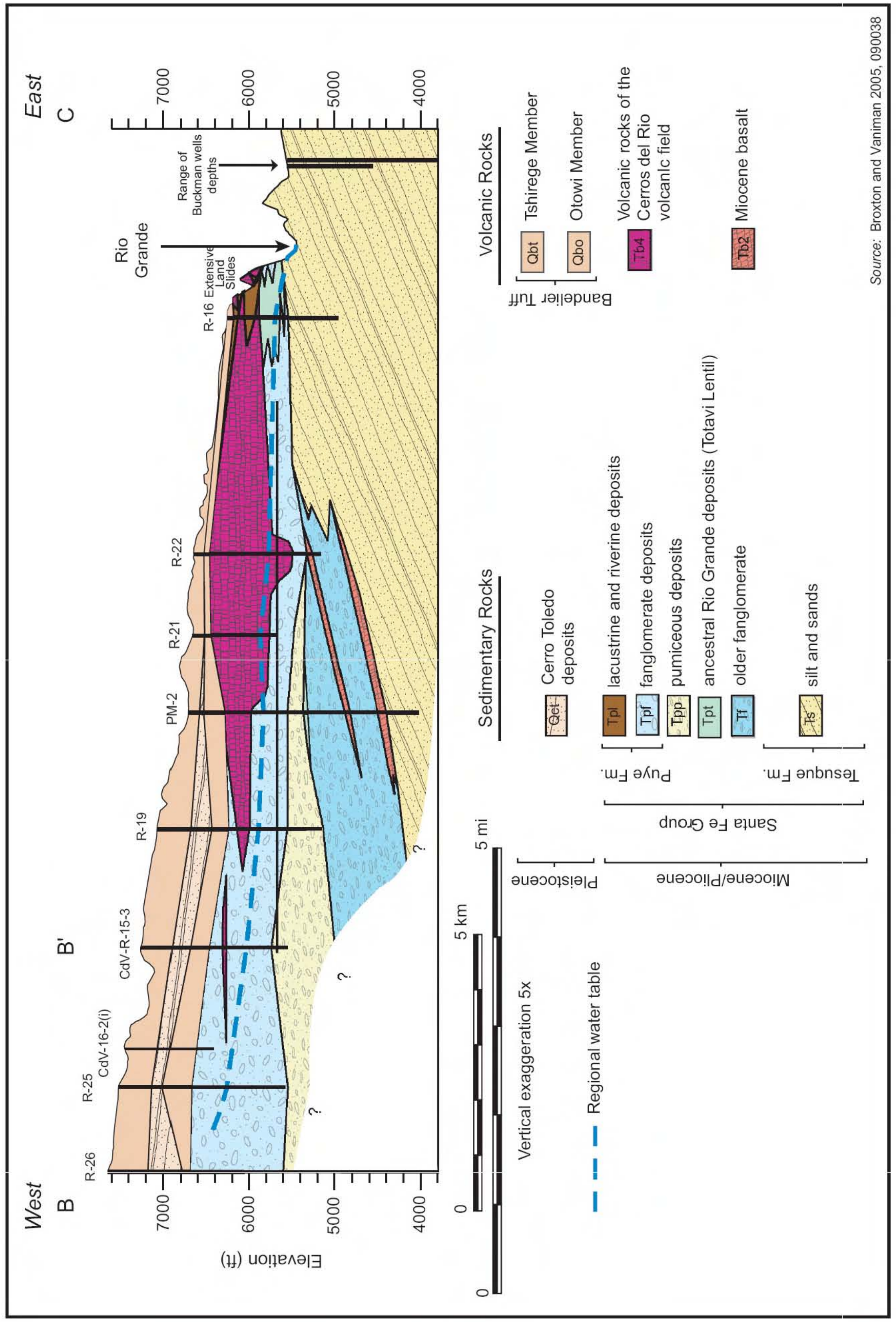


Figure 3.1-2 **2008 soil removal and confirmation sampling locations**



Source: Broxton and Vaniman 2005, 090038
Modified for F4.2-1, Fishladder Ph2 IR, 092908

Figure 4.2-1 Regional and intermediate wells and cross-section transect for Pajarito Plateau



Source: Broxton and Vaniman 2005, 090038

Figure 4.2-2 West-to-east cross-section showing primary subsurface hydrogeology beneath the Pajarito Plateau

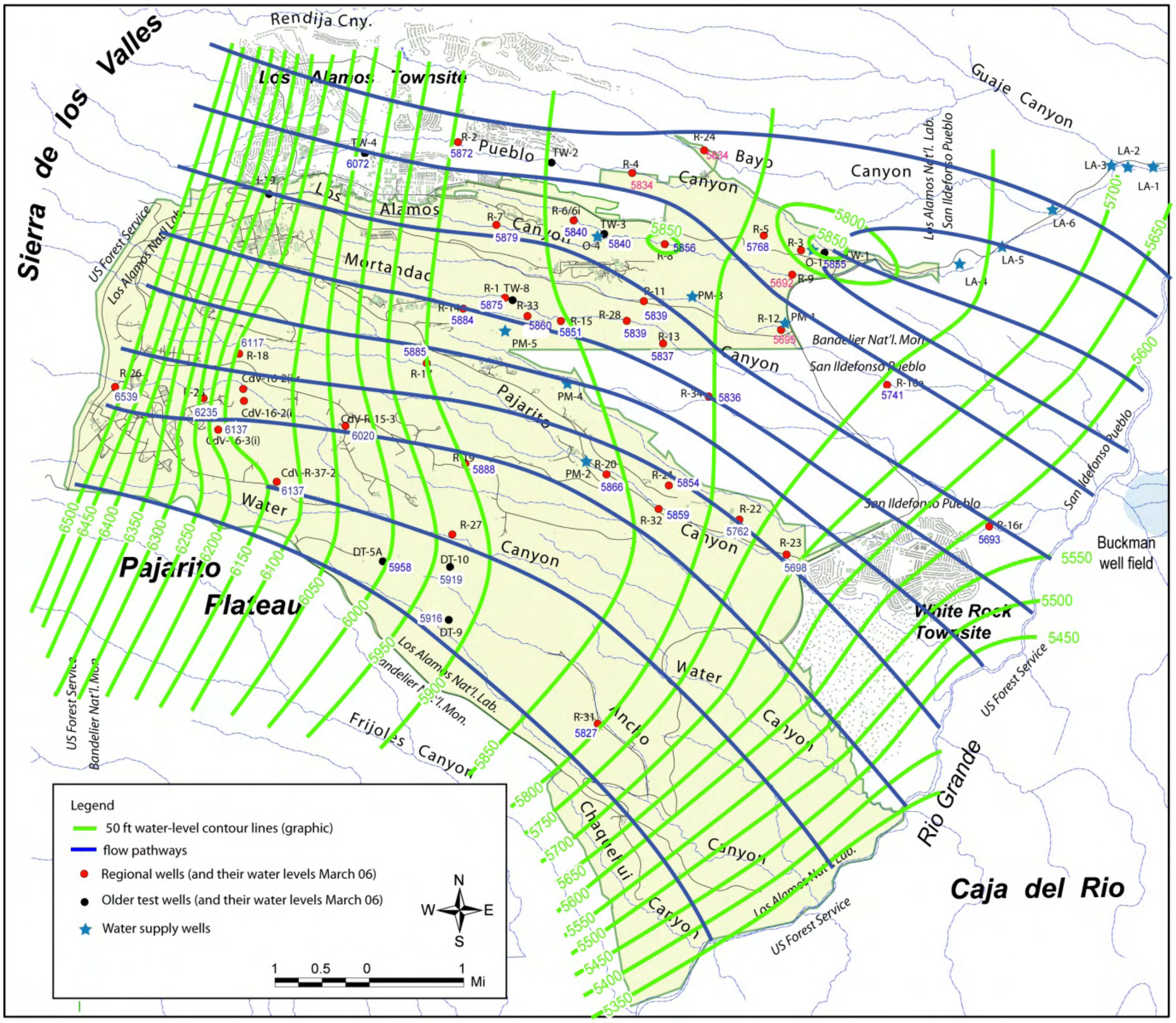
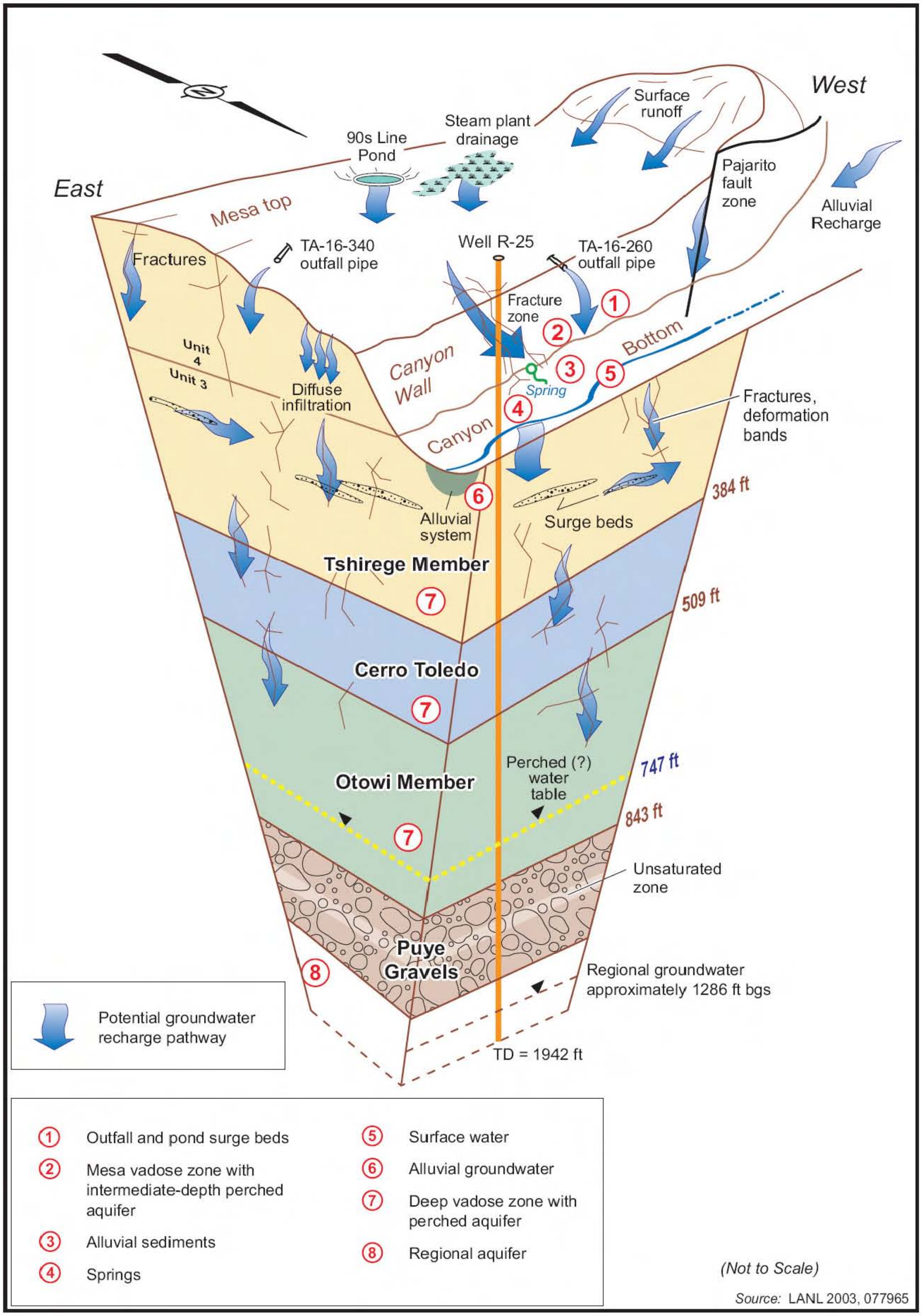
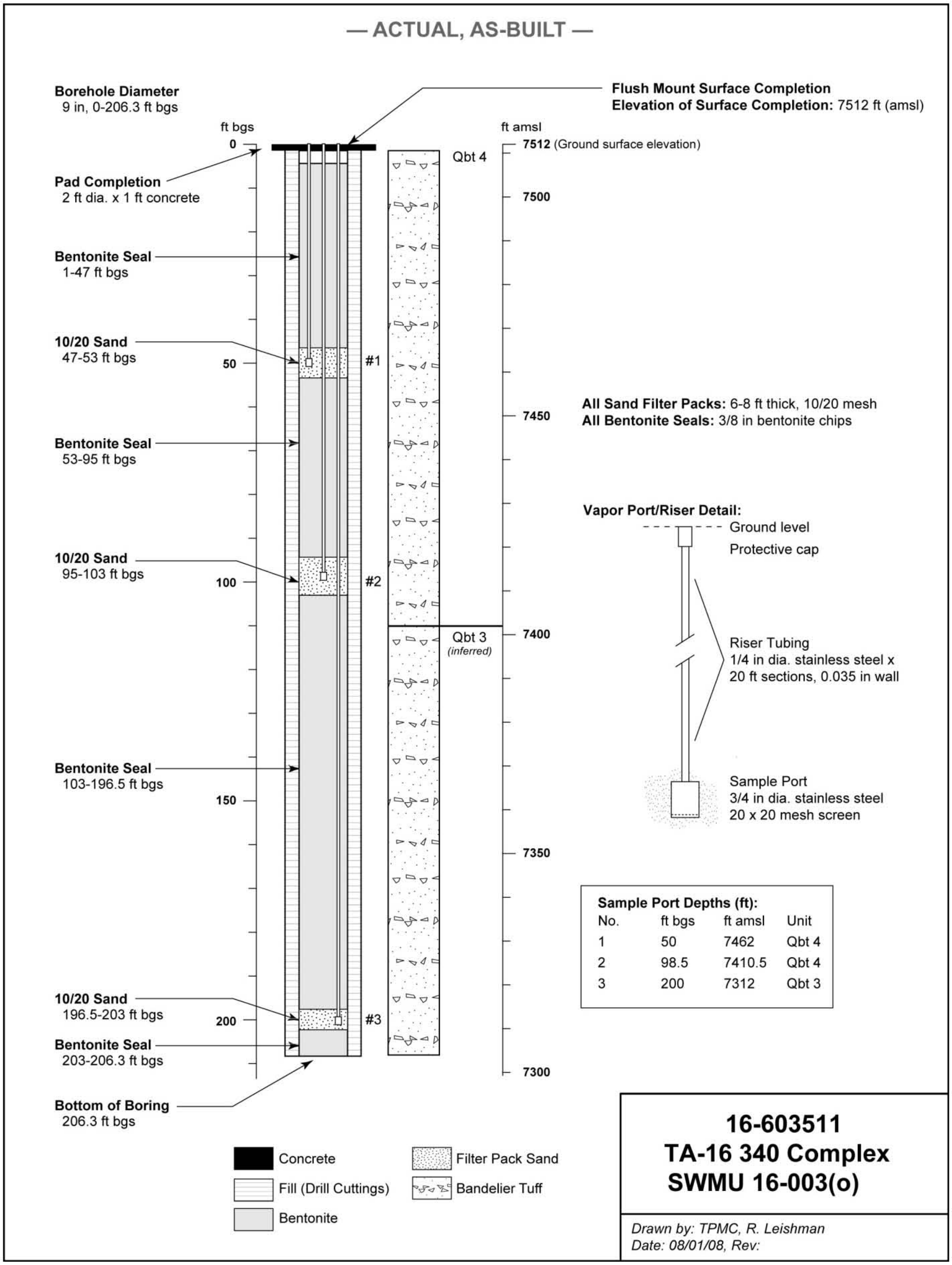


Figure 4.2-3 Groundwater contours and flow paths for regional groundwater on the Pajarito Plateau



Source: LANL 2003, 077965

Figure 4.2-4 TA-16 conceptual site model



Sample Port Depths (ft):

No.	ft bgs	ft amsl	Unit
1	50	7462	Qbt 4
2	98.5	7410.5	Qbt 4
3	200	7312	Qbt 3

Figure 4.3-1 As built of vapor monitoring well 16-603511

Table 3.1-1
2008 Sampling Locations at TA-16-340 Complex

Event ID(s)	Consolidated Unit/SWMU	Borehole ID	Location ID	Sampling Method	Total Depth (ft)	Depth of Soil/Tuff Contact (ft bgs)	Depth of Qbt 4/ Qbt 3 Contact (ft bgs)
Characterization Drilling and Sampling Locations							
363	13-003(a)-99	F-1	13-23558	BH[a]	20	2.5	n/a[b]
363	13-003(a)-99	F-A	16-603358	BH	10	8.5	n/a
404	16-003(n)-99	F-2	16-23574	BH	15	6	n/a
404	16-003(n)-99	F-3	16-23579	BH	15	1.5	n/a
408	16-003(o)	F-4	16-23591	BH	15	6	n/a
408	16-003(o)	F-5	16-23597	BH	15	3	n/a
408	16-003(o)	F-6	16-23619	BH	15	6	n/a
408	16-003(o)	F-7	16-603396	BH	15	1	n/a
408	16-003(o)	F-8	16-603397	BH	15	2.9	n/a
408	16-003(o)	F-10	16-603398	BH	7.5	3.5	n/a
408	16-003(o)	F-11	16-603399	BH	7.5	5.5	n/a
408	16-003(o)	F-12	16-24894	BH	32.5	8.3	n/a
408	16-003(o)	F-13	16-23693	HA[c]	2.8	2.5	n/a
408	16-003(o)	F-B	16-603400	BH	5	1.5	n/a
408	16-003(o)	F-C	16-603401	BH	5	0.8	n/a
408	16-003(o)	T-South	16-603402	HA	2	2	n/a
408	16-003(o)	T-North	16-603403	HA	2	2	n/a
409/410/413	16-003(o)	F-9	16-603511	BH	206.3	6	110
411	16-029(f)	F-14	16-23706	BH	15	3.8	n/a
411	16-029(f)	F-15	16-603404	BH	15	1.5	n/a
411	16-026(j2)	F-D	16-603405	HA	2	1.5	n/a
Soil Removal Confirmation Sampling Locations							
412	16-003(o)	EP[d]-1	16-603406	SS[e]	3	<2.5	n/a
412	16-003(o)	EP-2	16-603407	SS	2.5	<2	n/a
412	16-003(o)	EP-3	16-603408	SS	2.5	<2	n/a
412	16-003(o)	EP-4	16-603409	SS	0.5	na[f]	n/a
412	16-003(o)	EP-5	16-603410	SS	2.5	<2	n/a
412	16-003(o)	EP-6	16-603411	SS	2.5	<2	n/a
412	16-003(o)	EP-7	16-603412	SS	3	<2.5	n/a
412	16-003(o)	EP-8	16-603413	SS	2.5	na	n/a
412	16-003(o)	EP-9	16-603414	SS	3.5	<3	n/a
412	16-003(o)	EP-10	16-603415	SS	2.7	na	n/a
412	16-003(o)	EP-11	16-603416	SS	2.4	<2	n/a
412	16-003(o)	EP-12	16-603417	SS	3.4	<3	n/a

Table 3.1-1 (continued)

Event ID(s)	Consolidated Unit/SWMU	Borehole ID	Location ID	Sampling Method	Total Depth (ft)	Depth of Soil/Tuff Contact (ft bgs)	Depth of Qbt 4/ Qbt 3 Contact (ft bgs)
412	16-003(o)	EP-13	16-603418	SS	2	<1.5	n/a
412	16-003(o)	EP-14	16-603419	SS	3	<2	n/a
412	16-003(o)	EP-15	16-603420	SS	2	n/a	n/a
412	16-003(o)	EP-16	16-603421	SS	3	<2	n/a
412	16-003(o)	EP-17	16-603422	SS	2.8	n/a	n/a
412	16-003(o)	EP-18	16-603423	SS	2.6	<2.2	n/a
412	16-003(o)	EP-19	16-603424	SS	2	<1.6	n/a
412	16-003(o)	EP-20	16-603425	SS	2	<1.7	n/a
412	16-003(o)	EP-21	16-603426	SS	2.5	<2	n/a
412	16-003(o)	EP-22	16-603427	SS	4	<3.5	n/a
412	16-003(o)	EP-23	16-603428	SS	2.5	0	n/a
412	16-003(o)	EP-24	16-603429	SS	2.5	<2	n/a
412	16-003(o)	EP-25	16-603430	SS	2.5	<2	n/a
412	16-003(o)	EB[g]-1	16-23671	SS	4	<2	n/a
412	16-003(o)	EB-2	16-23672	SS	3.8	<2	n/a
412	16-003(o)	EB-3	16-23676	SS	4	<2	n/a
412	16-003(o)	EB-4	16-23677	SS	3.7	<2	n/a
412	16-003(o)	EB-5	16-23678	SS	3.8	<2	n/a
412	16-003(o)	EB-6	16-23681	SS	4	<2	n/a
412	16-003(o)	EB-7	16-23682	SS	3.8	<2	n/a
412	16-003(o)	EB-8	16-24906	SS	2.75	<2	n/a
412	16-003(o)	EB-9	16-24907	SS	4.5	<2	n/a
412	16-003(o)	EB-10	16-24908	SS	4.5	<2	n/a
412	16-003(o)	EB-11	16-24910	SS	4.5	<2	n/a
412	16-003(o)	EB-12	16-24923	SS	4	<2	n/a

[a] BH= Borehole drilling sampling method.

[b] n/a = Not applicable.

[c] HA = Hand auger sampling method.

[d] EP = Excavation perimeter sample location.

[f] na = Not available.

[e] SS = Spade and scoop sampling method.

[g] EB = Excavation perimeter sample location.

Table 5.2-1
Summary of Human Health Screening Levels for Chemicals and Radionuclides

Chemical/Radionuclide	Residential	Industrial
Acenaphthene	3730	33500
Acenaphthylene (use Pyrene)	2290	30900
Acetone	28100	100000
Amino-4,6-dinitrotoluene[2-] (use Dinitrotoluene[2,6-])[a]	61	680
Amino-2,6-dinitrotoluene[4-] (use Dinitrotoluene[2,6-])[a]	61	680
Anthracene	22000	100000
Aroclor-1242	1.12	8.26
Aroclor-1248	1.12	8.26
Aroclor-1254	1.12	8.26
Aroclor-1260	1.12	8.26
Benzene	10.3	25.8
Benzo(a)anthracene	6.21	23.4
Benzo(a)pyrene	0.621	2.34
Benzo(b)fluoranthene	6.21	23.4
Benzo(k)fluoranthene	62.1	234
Benzo(g,h,i)perylene (use Pyrene)	2290	30900
Benzoic acid[a]	100000	100000
BHC[alpha-]	0.902	3.99
BHC[beta-]	3.16	14
BHC[gamma-]	4.37	19.3
Bis(2-ethylhexyl)phthalate	347	1370
Butanone[2-] or Methyl ethyl ketone	31800	48700
Butylbenzene[n-]	62.1	62.1
Butylbenzene[sec-]	60.6	60.6
Butylbenzene[tert-]	106	106
Butylbenzylphthalate[a]	240	240
Carbon disulfide[a]	460	460
Carbon tetrachloride	3.47	8.64
Chlordane (Technical Grade)	16.2	71.9
Chlordane[alpha-] (use Chlordane)	16.2	71.9
Chlordane[gamma-] (use Chlordane)	16.2	71.9
Chloroform	4	9.59
Chloronaphthalene[2-] or [b-]	3990	27800
Chloronitrobenzene[o-]	1.49	5.48
Chlorophenol[2-]	166	885
Chlorotoluene[2-] or [o-]	202	202
Chrysene	615	2310

Table 5.2-1 (continued)

Chemical/Radionuclide	Residential	Industrial
DDD[4,4'-]	24.4	111
DDE[4,4'-]	17.2	78.1
DDT[4,4'-]	17.2	78.1
Dibenz(a,h)anthracene	0.621	2.34
Dibenzofuran	142	1620
Dibromo-3-chloropropane[1,2-]	1.84	9.68
Dibromoethane[1,2-]	0.504	1.31
Dibromomethane or Methylene bromide	179	785
Dichlorobenzene[1,2-]	37.4	37.4
Dichlorobenzene[1,3-]	32.6	37.4
Dichlorobenzene[1,4-]	39.5	103
Dichloroethane[1,1-]	1400	1420
Dichloroethane[1,2-]	6.04	15.2
Dichloroethene[1,1-]	206	777
Dichloroethene[cis-1,2-]	76.5	300
Dichloroethene[trans-1,2-]	112	429
Diethylphthalate	48900	100000
Dimethyl phthalate	100000	100000
Dimethylphenol[2,4-]	1220	13700
Di-n-butylphthalate	6110	68400
Di-n-octylphthalate[b]	2400	25000
Dinitrobenzene[1,3-]	6.1	68
Dinitrotoluene[2,4-]	122	1370
Dinitrotoluene[2,6-][a]	61	680
Ethylbenzene	128	128
Fluoranthene	2290	24400
Fluorene	2660	26500
Hexane or Hexane[n-]	38	38
Hexanone[2-] (use Butanone[2-])	31800	48700
HMX	3060	34200
Indeno(1,2,3-cd)pyrene	6.21	23.4
Isopropylbenzene or Cumene	271	389
Isopropyltoluene[4-] (use Isopropylbenzene)	271	389
Methyl-2-pentanone[4-] or Methyl isobutyl ketone	5510	7010
Methylene chloride	182	490
Methylnaphthalene[2-] (use Naphthalene)	79.5	300
Naphthalene	79.5	300
Nitrobenzene	22.8	147
Nitrophenol[2-] (use Chlorophenol[2-])	166	885

Table 5.2-1 (continued)

Chemical/Radionuclide	Residential	Industrial
Nitrotoluene[3-] or [m-]	569	569
Nitrotoluene[2-] or [o-}	10.8	32.3
Nitrotoluene[4-] or [p-]	146	437
Pentachlorophenol	29.8	100
Phenanthrene	1830	20500
Phenol	18300	100000
Propylbenzene[1-] or [n-]	62.1	62.1
Pyrene	2290	30900
RDX	44.2	174
Styrene	100	100
Tetrachlorodibenzodioxin[2,3,7,8-] or Dioxin[a]	0.000039	0.00018
Tetrachloroethene	12.5	31.6
Toluene	252	252
Trichlorobenzene[1,2,4-]	69.3	269
Trichloroethane[1,1,1-]	563	563
Trichloroethene	0.638	1.56
Trichlorofluoromethane	588	983
Trimethylbenzene[1,2,4-]	58	213
Trimethylbenzene[1,3,5-]	24.8	69.2
Trinitrobenzene[1,3,5-]	1800	21000
Trinitrotoluene[2,4,6-]	30.6	342
Xylene[1,2-] or [m-]	82	82
Xylene[1,3-] or [o-]	99.5	99.5
Xylene[1,3] + [1,4-]	82	82
Xylenes (Total)	82	82
Aluminum	77800	100000
Antimony	31.3	454
Arsenic	3.9	17.7
Barium	15600	100000
Beryllium	156	2250
Boron	15600	100000
Cadmium	39	564
Chromium[a]	2100	5000
Cobalt	1520	20500
Copper	3130	45400
Cyanide (Total)	1220	13700
Iron	23500	100000
Lead	400	800
Manganese	3590	48400

Table 5.2-1 (continued)

Chemical/Radionuclide	Residential	Industrial
Mercury[a]	23	340
Molybdenum	391	5680
Nickel	1560	22700
Nitrate	100000	100000
Nitrite	7820	100000
Perchlorate	55	790
Selenium	391	5680
Silver	391	5680
Strontium	46900	100000
Thallium	5.16	74.9
Uranium[b]	16	200
Vanadium	78.2	1140
Zinc	23500	100000
Uranium-234[c]	170	1500
Uranium-235[c]	17	87
Uranium-238[c]	86	430

Note: Units are mg/kg for chemicals and pCi/g for radionuclides. SSLs are from NMED (2006, 092513) unless otherwise noted.

[a] SSLs are from EPA Region 6 (EPA 2007, 101002).

[b] SSLs from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

[c] SALs from LANL (2005, 088493).

Table 6.1-1
2008 Field Screening Results Performed at TA-16-340 Complex

Location ID	Top Depth (ft)	Bottom Depth (ft)	HE Spot Test Result (>100 ppm)	PID Headspace Result (ppm)	RDX DTECHTOR Result Color % (ppm range)	XRF Barium Result (ppm)	XRF Chromium Result (ppm)
16-603511	18	20	Negative	0.0	ND*	329 +/- 50	ND <33
16-603511	38	40	Negative	0.0	ND	361 +/- 56	38 +/- 12
16-603511	59	61	Negative	0.0	ND	166 +/- 38	ND <26
16-603511	77	79	Negative	0.0	ND	267 +/- 44	ND <28
16-603511	95	97.7	Negative	0.0	ND	215 +/- 43	ND < 29
16-603511	118	120	Negative	0.0	ND	223 +/- 48	ND <33
16-603511	138	140	Negative	0.0	ND	254 +/- 45	ND <27
16-603511	158	160	Negative	0.0	ND	244 +/- 45	ND <29
16-603511	205	205	Negative	0.0	ND	365 +/- 43	ND <31

*ND = Not detected.

Table 6.1-2
Soil and Tuff Samples Collected at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Gamma Spectroscopy	Explosive Compounds	Isotopic Uranium	Metals	PAH	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)														
0313-95-0001	13-00001	1.5–2.5	9/27/1995	SOIL	—*	1244	1242	—	1243,1244	—	—	1242	1242	1243
0313-95-0002	13-00001	3.0–4.0	9/27/1995	QBT4	—	1244	1242	—	1243,1244	—	—	1242	1242	1243
RE13-05-61975	13-23550	4.0–4.5	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61976	13-23550	6.0–6.5	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61977	13-23552	3.0–3.5	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61978	13-23552	5.0–5.5	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61981	13-23556	4.5–5.0	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61982	13-23556	6.5–7.0	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-63822	13-23558	11.5–12.2	9/15/2005	QBT4	3982S	3982S	3982S	—	3982S	—	3982S	3982S	3982S	3982S
RE13-05-63823	13-23559	11.0–12.0	9/15/2005	QBT4	3982S	3982S	3982S	—	3982S	—	3982S	3982S	3982S	3982S
2008 Samples														
RE16-08-11400	13-23558	18.0–20.0	6/24/2008	QBT4	08-1458	—	—	08-1458	08-1458	—	—	—	—	—
RE16-08-11401	16-603358	0.0–0.6	6/25/2008	SOIL	08-1496	—	—	08-1496	08-1496	08-1496	—	08-1496	—	—
RE16-08-11402	16-603358	8.5–10.0	6/25/2008	QBT4	08-1496	—	—	08-1496	08-1496	08-1496	—	08-1496	—	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 6.1-3
Fill, Sediment, Soil, and Tuff Samples Collected at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-95-0214	16-01529	0.0–0.5	8/16/1995	SED	—*	969	—	970,971	—	969	—	970
0316-95-0215	16-01529	2.0–2.5	8/16/1995	SOIL	—	969	—	970,971	—	969	969	970
0316-95-0216	16-01529	4.0–5.0	8/30/1995	QBT4	—	1052	—	1053,1054	—	1052	1052	1053
0316-95-0220	16-01530	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
RE16-05-55815	16-01530	6.0–7.0	11/12/2004	QBT4	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
0316-95-0221	16-01531	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0222	16-01532	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0223	16-01533	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0224	16-01534	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0218	16-01662	0.0–0.16	8/16/1995	SED	—	1007	—	1008,1009	—	1007	1007	1008
0316-95-0219	16-01662	2.5–3.5	9/26/1995	QBT4	—	1222	—	1223,1224	—	1222	1222	1223
RE16-05-55816	16-23561	0.0–0.5	11/12/2004	FILL	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
RE16-05-55817	16-23561	3.0–4.0	11/12/2004	QBT4	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
RE16-05-55819	16-23564	0.0–0.5	1/6/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-55821	16-23564	2.0–3.0	1/6/2005	QBT4	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-06-66203	16-23564	2.0–3.0	11/15/2005	QBT4	—	—	—	4138S	—	—	—	—
RE16-05-55825	16-23570	0.0–0.5	1/6/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-06-66204	16-23570	0.0–0.5	11/15/2005	SOIL	—	—	—	4138S	—	—	—	—
RE16-05-55822	16-23570	5.0–5.4	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	—	2764S
RE16-05-55827	16-23572	4.0–4.5	5/17/2005	FILL	3277S	3276S	—	3277S	3276S	3276S	3276S	3277S
RE16-05-55828	16-23572	6.0–6.5	5/17/2005	QBT4	3277S	3276S	—	3277S	3276S	3276S	3276S	3277S
RE16-05-55829	16-23574	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S

Table 6.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55835	16-23574	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55830	16-23575	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55836	16-23575	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55831	16-23576	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55837	16-23576	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55832	16-23577	4.5–5.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55838	16-23577	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55833	16-23578	4.5–5.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55839	16-23578	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55834	16-23579	2.5–3.0	6/9/2005	FILL	3409S	3408S	—	3409S	3409S	3408S, 3409S	3408S	3409S
RE16-05-55840	16-23579	8.0–8.5	6/9/2005	QBT4	3409S	3408S	—	3409S	3409S	3408S, 3409S	3408S	3409S
2008 Samples												
RE16-08-12211	16-23574	12.5–13.5	6/24/2008	QBT4	08-1457	08-1457	08-1457	08-1457	—	08-1457	08-1457	—
RE16-08-12210	16-23579	13.5–15.0	7/11/2008	QBT4	08-1543	08-1543	08-1543	08-1543	—	08-1543	08-1543	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 6.1-4
Fill, Soil, and Tuff Samples Collected at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-95-0226	16-01536	0.0–0.33	8/16/1995	SOIL	—*	1007	—	1008,1009	—	1007	1007	1008
0316-95-0227	16-01536	3.0–3.5	8/31/1995	QBT4	—	1052	—	1053,1054	—	1052	1052	1053
0316-95-0236	16-01537	2.5–3.5	10/4/1995	QBT4	—	1297	—	1298,1299	—	1297	1297	1298
0316-95-0240	16-01538	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0241	16-01539	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0242	16-01540	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
RE16-05-55820	16-01540	2.0–3.0	1/5/2005	QBT4	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
0316-95-0243	16-01541	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0238	16-01664	0.0–0.33	8/16/1995	SOIL	—	969	—	970, 971	—	969	969	970
0316-95-0239	16-01664	2.0–3.5	10/4/1995	QBT4	—	1297	—	1298,1299	—	1297	1297	1298
0316-95-0231	16-01669	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0232	16-01670	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0233	16-01671	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0498	16-02023	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
RE16-05-55823	16-23568	0.0–0.67	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56150	16-23568	0.8–2.0	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-55824	16-23569	0.0–0.67	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56151	16-23569	1.7–3.7	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	2767S
RE16-05-55851	16-23587	4.0–4.5	4/15/2005	FILL	3137S	3136S	—	3137S	3136S	3136S	3136S	3137S
RE16-05-55852	16-23588	4.0–4.5	4/15/2005	FILL	3137S	3136S	—	3137S	3136S	3136S	3136S	3137S
RE16-05-55854	16-23590	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55859	16-23590	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55855	16-23591	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55860	16-23591	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55861	16-23597	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55869	16-23597	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55865	16-23601	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55870	16-23601	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55871	16-23607	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55872	16-23607	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55873	16-23609	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55874	16-23609	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55875	16-23611	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55876	16-23611	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55877	16-23613	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55878	16-23613	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55879	16-23615	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55880	16-23615	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55881	16-23617	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55882	16-23617	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55883	16-23619	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55884	16-23619	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55885	16-23621	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55886	16-23621	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55908	16-23636	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55915	16-23636	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55909	16-23637	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55914	16-23637	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55910	16-23638	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55913	16-23638	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55911	16-23639	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55912	16-23639	6.0–6.5	5/14/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55918	16-23646	8.0–8.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55921	16-23646	10.0–10.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55919	16-23647	8.0–8.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55920	16-23647	10.0–10.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55923	16-23651	4.0–4.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55924	16-23651	6.0–6.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55925	16-23653	4.0–4.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55926	16-23653	6.0–6.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55927	16-23655	3.0–3.5	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55928	16-23655	5.0–5.5	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55929	16-23657	3.5–4.0	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55930	16-23657	5.5–6.0	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55931	16-23659	5.0–5.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55934	16-23659	10.0–10.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55932	16-23660	4.0–4.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55935	16-23660	9.0–9.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55936	16-23664	4.5–5.0	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55938	16-23664	9.0–9.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55937	16-23665	4.0–4.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55939	16-23665	9.0–9.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-62035	16-23669	1.0–1.5	7/8/2005	SOIL	3505S	3504S	—	3505S	3504S	3504S	3504S	3505S
RE16-05-62036	16-23669	3.0–3.5	7/8/2005	QBT4	3505S	3504S	—	3505S	3504S	3504S	3504S	3505S
RE16-05-62039	16-23672	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62040	16-23674	1.5–2.0	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62041	16-23674	3.5–4.0	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62045	16-23679	1.0–1.5	7/11/2005	SOIL	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62046	16-23679	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62047	16-23681	3.0–3.5	7/11/2005	SOIL	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62051	16-23684	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-55978	16-23691	0.0–1.0	10/25/2004	SOIL	—	2564S	—	—	2564S	2564S	2564S	—
RE16-05-55981	16-23691	30.0–31.0	10/26/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55982	16-23691	64.0–67.0	10/27/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55984	16-23691	77.0–79.0	10/27/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55904	16-23691	84.0–86.0	10/29/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S
RE16-05-55905	16-23691	120.0–122.0	11/1/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S
RE16-05-55906	16-23691	157.0–160.0	11/2/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55907	16-23691	190.0–191.0	11/2/2004	QBT4	—	2574S	—	—	—	2574S	2574S	—
RE16-05-55983	16-23692	0.0–1.0	11/4/2004	SOIL	2592S	2591S	—	2592S	2591S, 2592S	2591S	2591S	2592S
RE16-05-55963	16-23692	17.5–19.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55964	16-23692	36.0–38.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55965	16-23692	44.0–46.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55966	16-23692	78.0–80.0	11/5/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55960	16-23692	159.0–160.0	11/11/2004	QBT4	2646S	2645S	—	2646S	2645S	2645S	—	2646S
RE16-05-55961	16-23692	192.0–194.0	11/12/2004	QBT4	2646S	2645S	—	2646S	2645S	2645S	—	2646S
RE16-05-55986	16-23693	0.0–0.25	1/10/2005	SOIL	2768S	2768S	—	2768S	2768S	2768S	2768S	2768S
RE16-05-55987	16-23693	2.8–3.5	1/10/2005	QBT4	2768S	2768S	—	2768S	2768S	2768S	2768S	2768S
RE16-05-56163	16-23750	0.25–0.83	1/10/2005	SOIL	2767S	2767S	—	2767S	2767S	2767S	2767S	2767S
RE16-05-56146	16-23750	1.0–1.5	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-56152	16-23751	0.0–0.58	1/12/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-56153	16-23751	1.4–2.5	1/12/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	—	2767S
RE16-05-61914	16-24891	8.0–8.5	7/15/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61928	16-24891	10.0–10.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61917	16-24894	8.0–8.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61927	16-24894	10.0–10.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61919	16-24896	6.0–6.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61926	16-24896	8.0–8.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61922	16-24899	6.0–6.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61925	16-24899	8.0–8.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61923	16-24900	3.0–3.5	7/20/2005	SOIL	3545S	3544S	—	3545S	3544S	3544S	3544S	3545S

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-61924	16-24900	5.0–5.5	7/20/2005	QBT4	3545S	3544S	—	3545S	3544S	3544S	3544S	3545S
RE16-05-61948	16-24906	2.0–2.5	8/16/2005	SOIL	3735S	3735S	—	3735S	3735S	3735S	3735S	3735S
RE16-05-61947	16-24908	4.0–4.5	8/16/2005	QBT4	3735S	3735S	—	3735S	3735S	3735S	3735S	3735S
RE16-05-61934	16-24911	0.0–0.5	8/5/2005	SOIL	3655S	3654S	—	3655S	3654S	3654S	3654S	3655S
RE16-05-61935	16-24912	0.0–0.5	8/5/2005	SOIL	3655S	3654S	—	3655S	3654S	3654S	3654S	3655S
RE16-05-61938	16-24915	0.0–0.5	8/9/2005	SOIL	3682S	3681S	—	3682S	3681S	3681S	3681S	3682S
RE16-05-61941	16-24915	2.0–2.5	8/10/2005	QBT4	3682S	3681S	—	3682S	3681S	3681S	3681S	3682S
RE16-05-61942	16-24919	0.0–0.5	8/11/2005	SOIL	3711S	3710S	3711S	3711S	3710S	3710S	3710S	3711S
RE16-05-61950	16-24927	0.0–0.5	8/18/2005	SOIL	3771S	3770S	—	3771S	3770S	3770S	3770S	3771S
2008 Samples												
RE16-08-12259	16-23591	12.5–14.5	6/24/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12260	16-23597	12.5–14.2	6/24/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12261	16-23619	13.0–15.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12364	16-23671	2.0–2.5	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12365	16-23671	3.5–4.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12362	16-23672	3.5–3.8	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12366	16-23676	0.0–0.5	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12367	16-23676	3.5–4.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12368	16-23677	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12369	16-23677	3.2–3.7	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12370	16-23678	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12371	16-23678	3.2–3.8	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12372	16-23681	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12373	16-23681	3.5–4.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12374	16-23682	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12375	16-23682	3.7–3.8	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12269	16-23693	2.5–2.8	7/11/2008	QBT4	08-1541	08-1541	08-1541	08-1541	—	08-1541	08-1541	—
RE16-08-12268	16-24894	31.0–32.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12384	16-24906	2.0–2.35	7/2/2008	QBT4	—	-	08-1511	08-1511	—	08-1511	—	—
RE16-08-12385	16-24906	2.35–2.75	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12376	16-24907	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12377	16-24907	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12378	16-24908	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12379	16-24908	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12380	16-24910	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12381	16-24910	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12382	16-24923	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12383	16-24923	3.5–4.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12262	16-603396	12.5–14.5	6/23/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12263	16-603397	13.0–15.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12264	16-603398	4.0–4.5	7/11/2008	QBT4	08-1541	—	08-1541	—	—	—	—	—
RE16-08-12265	16-603398	6.0–6.5	7/11/2008	QBT4	08-1541	—	08-1541	—	—	—	—	—
RE16-08-12266	16-603399	4.0–4.5	6/25/2008	SOIL	08-1494	—	08-1494	—	—	—	—	—
RE16-08-12267	16-603399	6.0–6.5	6/25/2008	QBT4	08-1494	—	08-1494	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	6/26/2008	SOIL	08-1495	08-1495	08-1495	08-1495	—	08-1495	08-1495	08-1495
RE16-08-12271	16-603400	1.5–4.0	6/26/2008	QBT4	08-1494	08-1494	08-1494	08-1494	—	08-1494	08-1494	08-1494

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12272	16-603401	0.0–2.0	6/25/2008	SOIL	08-1495	08-1495	08-1495	08-1495	—	08-1495	08-1495	08-1495
RE16-08-12273	16-603401	3.0–4.0	6/25/2008	QBT4	08-1494	08-1494	08-1494	08-1494	—	08-1494	08-1494	08-1494
RE16-08-12274	16-603402	0.0–0.5	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12275	16-603402	1.5–2.0	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12276	16-603403	0.0–0.5	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12277	16-603403	1.5–2.0	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12312	16-603406	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12313	16-603406	2.5–3.0	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12314	16-603407	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12315	16-603407	2.0–2.5	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12316	16-603408	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12317	16-603408	2.0–2.5	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12318	16-603409	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12320	16-603410	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12321	16-603410	2.0–2.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12322	16-603411	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12323	16-603411	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12324	16-603412	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12325	16-603412	2.5–3.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12327	16-603413	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12326	16-603413	2.0–2.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12328	16-603414	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12329	16-603414	3.0–3.5	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12330	16-603415	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12331	16-603415	2.2–2.7	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12332	16-603416	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12333	16-603416	2.0–2.4	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12334	16-603417	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12335	16-603417	3.0–3.4	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12336	16-603418	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12337	16-603418	1.5–2.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12338	16-603419	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12339	16-603419	2.0–3.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12340	16-603420	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12341	16-603420	1.5–2.0	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12342	16-603421	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12343	16-603421	2.0–3.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12344	16-603422	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12345	16-603422	2.3–2.8	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12346	16-603423	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12347	16-603423	2.2–2.6	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12348	16-603424	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12349	16-603424	1.6–2.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12350	16-603425	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12351	16-603425	1.7–2.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12352	16-603426	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—

Table 6.1-4 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12353	16-603426	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12354	16-603427	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12355	16-603427	3.5–4.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12356	16-603428	0.0–0.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12357	16-603428	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12358	16-603429	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12359	16-603429	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12360	16-603430	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12361	16-603430	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12286	16-603511	38.0–40.0	6/27/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12287	16-603511	77.0–79.0	6/27/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12291	16-603511	100.0–101.0	7/1/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12288	16-603511	118.0–120.0	7/2/2008	QBT3	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510
RE16-08-12289	16-603511	158.0–160.0	7/2/2008	QBT3	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510
RE16-08-12290	16-603511	204.5–206.3	7/10/2008	QBT3	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 6.1-5
Fill, Sediment, Soil, and Tuff Samples Collected at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-97-0608	16-01551	0.5–2.5	9/3/1997	SOIL	—*	3677R	—	3676R	—	3675R	3675R	—
0316-97-0609	16-01551	2.5–4.0	9/3/1997	QBT4	—	3677R	—	3676R	—	3675R	3675R	—
0316-95-0253	16-01554	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0254	16-01555	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0500	16-01555	0.0–0.5	5/22/1995	SED	—	—	—	—	—	—	289	—
RE16-05-56044	16-01555	3.5–4.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
0316-95-0255	16-01556	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0503	16-02166	5.0–7.0	7/21/1995	QBT4	—	731	—	730	—	729	729	730
0316-97-0610	16-02166	8.9–9.0	9/4/1997	QBT4	—	—	—	3676R	—	—	—	—
RE16-05-56045	16-23701	0.0–0.5	11/11/2004	SED	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56046	16-23701	2.5–3.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56047	16-23702	0.0–0.5	11/11/2004	SED	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56048	16-23702	2.5–3.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56049	16-23706	4.0–4.5	4/7/2005	FILL	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56050	16-23706	6.0–6.5	4/7/2005	QBT4	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56051	16-23708	4.0–4.5	4/7/2005	FILL	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56052	16-23708	6.0–6.5	4/7/2005	QBT4	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56053	16-23710	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56054	16-23710	5.0–5.5	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56055	16-23712	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56057	16-23712	4.5–5.0	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56056	16-23713	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S

Table 6.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-56058	16-23713	4.5–5.0	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56059	16-23716	3.0–3.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56060	16-23716	5.0–5.5	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56061	16-23718	2.5–3.0	7/20/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56062	16-23718	4.5–5.0	7/20/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56063	16-23720	2.5–3.0	7/22/2005	SED	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56064	16-23720	4.5–5.0	7/22/2005	QBT4	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56065	16-23722	2.0–2.5	7/22/2005	SED	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56066	16-23722	4.0–4.5	7/22/2005	QBT4	3573S	—	—	3573S	3572S	3572S	3572S	3573S
2008 Samples												
RE16-08-12305	16-23706	12.5–13.6	6/25/2008	QBT4	08-1493	08-1493	08-1493	08-1493	—	08-1493	08-1493	—
RE16-08-12306	16-603404	12.5–14.0	6/25/2008	QBT4	08-1493	08-1493	08-1493	08-1493	—	08-1493	08-1493	—
RE16-08-12311	16-603405	0.0–0.5	7/7/2008	SOIL	08-1517	08-1516	08-1517	08-1517	—	08-1516	—	—
RE16-08-12310	16-603405	1.5–2.0	7/7/2008	QBT4	08-1517	08-1516	08-1517	08-1517	—	08-1516	—	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table 6.3-1
COPCs in Fill, Pore Gas, Sediment, Soil, and Tuff at the TA-16-340 Complex

COPC	Media	Reason Retained
Consolidated Unit 13-003(a)-99		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Soil, Tuff	Detection limit exceeds background.
Arsenic	Tuff	Detected and exceeds background.
Barium	Tuff	Detected and exceeds background.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Tuff	Detected and exceeds background.
Cyanide (Total)	Soil, Tuff	Detection limit exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Manganese	Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Selenium	Soil	Detection limit exceeds background.
Selenium	Tuff	Detected and exceeds background.
Silver	Tuff	Detected and exceeds background.
Vanadium	Tuff	Detected and exceeds background.
Organic Chemicals		
Semivolatile Organic Compounds		
Acenaphthene	Soil	Chemical detected.
Anthracene	Soil	Chemical detected.
Benzo(a)anthracene	Soil	Chemical detected.
Benzo(a)pyrene	Soil	Chemical detected.
Benzo(b)fluoranthene	Soil	Chemical detected.
Benzo(g,h,i)perylene	Soil	Chemical detected.
Benzo(k)fluoranthene	Soil	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil	Chemical detected.
Chrysene	Soil, Tuff	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-octylphthalate	Tuff	Chemical detected.
Fluoranthene	Soil, Tuff	Chemical detected.
Fluorene	Soil	Chemical detected.
Indeno(1,2,3-cd)pyrene	Soil	Chemical detected.
Phenanthrene	Soil	Chemical detected.
Pyrene	Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Butylbenzene[n-]	Soil	Chemical detected.
Dichlorobenzene[1,2-]	Tuff	Chemical detected.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
Dichlorobenzene[1,3-]	Tuff	Chemical detected.
Dichlorobenzene[1,4-]	Tuff	Chemical detected.
Styrene	Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Soil, Tuff	Chemical detected.
Consolidated Unit 16-003(n)-99		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Sediment, Soil, Tuff	Detection limit exceeds background.
Arsenic	Tuff	Detected and exceeds background.
Barium	Sediment, Soil, Tuff	Detected and exceeds background.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Sediment, Soil, Tuff	Detected and exceeds background.
Cyanide (Total)	Sediment, Soil, Tuff	Detection limit exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Iron	Tuff	Detected and exceeds background.
Lead	Sediment, Soil, Tuff	Detected and exceeds background.
Manganese	Soil	Detected and exceeds background.
Mercury	Sediment	Detection limit exceeds background.
Mercury	Soil, Tuff	Detected and exceeds background.
Nickel	Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Perchlorate	Tuff	Detected and no background available.
Selenium	Soil	Detection limit exceeds background.
Selenium	Tuff	Detected and exceeds background.
Uranium	Sediment	Detected and background.
Vanadium	Tuff	Detected and exceeds background.
Zinc	Sediment	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
Amino-2,6-dinitrotoluene[4-]	Sediment	Chemical detected.
Amino-4,6-dinitrotoluene[2-]	Sediment	Chemical detected.
Dinitrobenzene[1,3-]	Tuff	Chemical detected.
Dinitrotoluene[2,4-]	Sediment, Tuff	Chemical detected.
HMX	Sediment, Soil, Tuff	Chemical detected.
Nitrobenzene	Sediment	Chemical detected.
RDX	Sediment	Chemical detected.
TATB	Soil, Tuff	Chemical detected.
Trinitrotoluene[2,4,6-]	Tuff	Chemical detected.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
Semivolatile Organic Compounds		
Acenaphthene	Sediment, Soil	Chemical detected.
Anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Sediment	Chemical detected.
Benzo(a)pyrene	Sediment, Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzo(g,h,i)perylene	Sediment, Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzoic Acid	Sediment, Soil	Chemical detected.
Benzyl Alcohol	Sediment	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil, Tuff	Chemical detected.
Butylbenzylphthalate	Sediment	Chemical detected.
Chrysene	Sediment, Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Sediment	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-butylphthalate	Sediment	Chemical detected.
Dinitrotoluene[2,4-]	Sediment	Chemical detected.
Di-n-octylphthalate	Sediment, Soil, Tuff	Chemical detected.
Fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Fluorene	Sediment, Soil	Chemical detected.
Indeno(1,2,3-cd)pyrene	Sediment, Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Soil	Chemical detected.
Naphthalene	Soil	Chemical detected.
Phenanthrene	Sediment, Soil, Tuff	Chemical detected.
Pyrene	Sediment, Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Soil, Tuff	Chemical detected.
Butanone[2-]	Soil, Tuff	Chemical detected.
Isopropyltoluene[4-]	Tuff	Chemical detected.
Methyl-2-pentanone[4-]	Soil	Chemical detected.
Toluene	Soil	Chemical detected.
SWMU 16-003(o)		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Soil	Detected and exceeds background.
Antimony	Tuff	Detection limit exceeds background.
Arsenic	Soil, Tuff	Detected and exceeds background.
Barium	Soil, Tuff	Detected and exceeds background.
Beryllium	Tuff	Detected and exceeds background.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
Cadmium	Soil	Detected and exceeds background.
Chromium	Soil, Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Soil, Tuff	Detected and exceeds background.
Cyanide (Total)	Soil, Tuff	Detected and exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Iron	Soil, Tuff	Detected and exceeds background.
Lead	Soil, Tuff	Detected and exceeds background.
Manganese	Tuff	Detected and exceeds background.
Mercury	Soil, Tuff	Detected and exceeds background.
Nickel	Soil, Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Perchlorate	Tuff	Detected and no background available.
Selenium	Soil, Tuff	Detected and exceeds background.
Silver	Soil, Tuff	Detected and exceeds background.
Thallium	Soil	Detected and exceeds background.
Uranium	Soil, Tuff	Detected and exceeds background.
Vanadium	Soil, Tuff	Detected and exceeds background.
Zinc	Soil, Tuff	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
Dinitroaniline[3,5-]	Soil	Chemical detected.
Amino-2,6-dinitrotoluene[4-]	Soil, Tuff	Chemical detected.
Amino-4,6-dinitrotoluene[2-]	Soil	Chemical detected.
Dinitrotoluene[2,4-]	Soil, Tuff	Chemical detected.
HMX	Soil, Tuff	Chemical detected.
Nitrobenzene	Soil	Chemical detected.
PETN	Soil, Tuff	Chemical detected.
RDX	Soil, Tuff	Chemical detected.
TATB	Soil, Tuff	Chemical detected.
Tetryl	Soil	Chemical detected.
Trinitrotoluene[2,4,6-]	Soil, Tuff	Chemical detected.
Semivolatile Organic Compounds		
Acenaphthene	Soil, Tuff	Chemical detected.
Acenaphthylene	Soil	Chemical detected.
Anthracene	Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Soil, Tuff	Chemical detected.
Benzo(a)pyrene	Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Soil, Tuff	Chemical detected.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
Benzo(g,h,i)perylene	Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Soil, Tuff	Chemical detected.
Benzoic Acid	Soil	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil, Tuff	Chemical detected.
Chloronaphthalene[2-]	Soil	Chemical detected.
Chrysene	Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Soil, Tuff	Chemical detected.
Dibenzofuran	Soil, Tuff	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-butylphthalate	Soil, Tuff	Chemical detected.
Di-n-octylphthalate	Tuff	Chemical detected.
Fluoranthene	Soil, Tuff	Chemical detected.
Fluorene	Soil, Tuff	Chemical detected.
Indeno(1,2,3-cd)pyrene	Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Soil, Tuff	Chemical detected.
Methylphenol[4-]	Soil	Chemical detected.
Naphthalene	Soil, Tuff	Chemical detected.
Phenanthrene	Soil, Tuff	Chemical detected.
Pyrene	Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Pore Gas, Soil, Tuff	Chemical detected.
Butanone[2-]	Pore Gas, Soil, Tuff	Chemical detected.
Carbon Disulfide	Gas	Chemical detected.
Carbon Tetrachloride	Gas	Chemical detected.
Chloroform	Pore Gas, Soil	Chemical detected.
Cyclohexane	Gas	Chemical detected.
Dichloroethane[1,2-]	Gas	Chemical detected.
Dichloroethene[1,1-]	Soil, Tuff	Chemical detected.
Dichloroethene[cis-1,2-]	Soil, Tuff	Chemical detected.
Ethylbenzene	Pore Gas, Soil, Tuff	Chemical detected.
Hexane	Gas	Chemical detected.
Isopropylbenzene	Soil	Chemical detected.
Isopropyltoluene[4-]	Soil, Tuff	Chemical detected.
Methyl-2-pentanone[4-]	Pore Gas, Tuff	Chemical detected.
Methylene Chloride	Pore Gas, Soil, Tuff	Chemical detected.
n-Heptane	Gas	Chemical detected.
Propanol[2-]	Gas	Chemical detected.
Propylene	Gas	Chemical detected.
Tetrachloroethene	Pore Gas, Soil, Tuff	Chemical detected.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
Toluene	Pore Gas, Soil, Tuff	Chemical detected.
Trichloroethane[1,1,1-]	Soil, Tuff	Chemical detected.
Trichloroethene	Pore Gas, Soil, Tuff	Chemical detected.
Trichlorofluoromethane	Soil	Chemical detected.
Trimethylbenzene[1,2,4-]	Soil, Tuff	Chemical detected.
Trimethylbenzene[1,3,5-]	Soil, Tuff	Chemical detected.
Xylene[1,2-]	Pore Gas, Soil, Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Pore Gas, Soil, Tuff	Chemical detected.
Radionuclides		
Uranium-234	Soil, Tuff	Detected and exceeds background.
Uranium-235/236	Soil, Tuff	Detected and exceeds background.
Uranium-238	Soil, Tuff	Detected and exceeds background.
SWMUs 16-026(j2) and 16-029(f)		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Sediment, Tuff	Detection limit exceeds background.
Arsenic	Soil, Tuff	Detection limit exceeds background.
Barium	Tuff	Detected and exceeds background.
Bromide	Tuff	Detected and no background available.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Tuff	Detected and exceeds background.
Copper	Tuff	Detected and exceeds background.
Cyanide (Total)	Sediment, Tuff	Detection limit exceeds background.
Fluoride	Sediment, Soil, Tuff	Detected and no background available.
Lead	Sediment, Tuff	Detected and exceeds background.
Mercury	Soil, Tuff	Detection limit exceeds background.
Nickel	Tuff	Detected and exceeds background.
Nitrate	Sediment, Soil, Tuff	Detected and no background available.
Perchlorate	Soil, Tuff	Detected and no background available.
Selenium	Sediment	Detection limit exceeds background.
Selenium	Soil, Tuff	Detected and exceeds background.
Silver	Soil	Detection limit exceeds background.
Silver	Tuff	Detected and exceeds background.
Thallium	Soil, Tuff	Detection limit exceeds background.
Zinc	Sediment, Tuff	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
HMX	Tuff	Chemical detected.
RDX	Sediment	Chemical detected.

Table 6.3-1 (continued)

COPC	Media	Reason Retained
TATB	Soil, Tuff	Chemical detected.
Semivolatile Organic Compounds		
Acenaphthene	Sediment, Soil, Tuff	Chemical detected.
Anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)pyrene	Sediment, Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzo(g,h,i)perylene	Sediment, Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzoic Acid	Sediment	Chemical detected.
Chrysene	Sediment, Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Sediment, Tuff	Chemical detected.
Dibenzofuran	Sediment, Soil, Tuff	Chemical detected.
Di-n-butylphthalate	Sediment, Tuff	Chemical detected.
Fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Fluorene	Sediment, Soil, Tuff	Chemical detected.
Indeno(1,2,3-cd)pyrene	Sediment, Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Sediment, Soil, Tuff	Chemical detected.
Naphthalene	Sediment, Soil, Tuff	Chemical detected.
Phenanthrene	Sediment, Soil, Tuff	Chemical detected.
Phenol	Tuff	Chemical detected.
Pyrene	Sediment, Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Sediment, Soil, Tuff	Chemical detected.
Butanone[2-]	Sediment	Chemical detected.
Dichloroethene[1,1-]	Soil	Chemical detected.
Ethylbenzene	Soil	Chemical detected.
Isopropylbenzene	Soil	Chemical detected.
Isopropyltoluene[4-]	Sediment, Tuff	Chemical detected.
Propylbenzene[1-]	Soil	Chemical detected.
Toluene	Tuff	Chemical detected.
Trichloroethene	Sediment, Tuff	Chemical detected.
Trimethylbenzene[1,2,4-]	Soil, Tuff	Chemical detected.
Trimethylbenzene[1,3,5-]	Soil, Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Soil	Chemical detected.

Note: For Consolidated Unit 16-003(n)-99 and SWMUs 16-026(j2) and 16-029(f) sediment samples were evaluated against the LANL background range for soil.

Table 6.3-2
Inorganic Chemicals above BV in Soil and Tuff at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Nitrate	Selenium	Silver	Thallium	Uranium	Vanadium
QBT2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**	**1690**	**482**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**
0313-95-0001	13-00001	1.5–2.5	SOIL	—[c]	6.2 (U)	—	—	0.62 (U)	—	—	—	—	1.3 (U)	NA[d]	—	—	—	—	NA	—	—	—	2.57	—
0313-95-0002	13-00001	3.0–4.0	QBT4	10200	6.2 (U)	—	110	—	5350	17.8	—	4.8	1.2 (U)	NA	—	—	—	—	NA	0.31 (UJ)	—	—	2.64	—
RE13-05-61975	13-23550	4.0–4.5	SOIL	—	—	—	—	0.599 (U)	—	—	—	—	—	2.86 (J-)	—	—	—	—	—	1.8 (U)	—	—	—	—
RE13-05-61976	13-23550	6.0–6.5	QBT4	8130	—	—	67.3 (J+)	—	—	—	—	—	—	3.92 (J-)	—	—	—	—	0.537 (J)	1.77 (U)	—	—	—	—
RE13-05-61977	13-23552	3.0–3.5	SOIL	—	—	—	—	0.607 (U)	—	—	—	—	—	6.23 (J-)	—	—	—	—	—	1.82 (U)	—	—	—	—
RE13-05-61978	13-23552	5.0–5.5	QBT4	13700	—	5.61	228 (J+)	—	2800 (J-)	7.59	13.9	5.65	—	3.82 (J-)	15700	—	1770 (J+)	1450 (J+)	—	1.77 (U)	—	—	—	22.2
RE13-05-61981	13-23556	4.5–5.0	SOIL	—	—	—	—	0.588 (U)	—	—	—	—	—	7.12 (J-)	—	—	—	—	1.63	1.77 (U)	—	0.983	—	—
RE13-05-61982	13-23556	6.5–7.0	QBT4	16600	—	7.49	101 (J+)	—	2740 (J-)	9.5	—	5.8	—	5.08 (J-)	15400	12.2	2290 (J+)	—	—	1.75 (U)	—	—	—	21
RE13-05-63822	13-23558	11.5–12.2	QBT4	—	—	—	—	—	—	—	—	6.63	—	0.573 (J)	—	—	—	—	0.653 (J)	1.68 (U)	3.2 (J)	—	—	—
RE16-08-11400	13-23558	18.0–20.0	QBT4	—	0.504 (UJ)	—	—	—	—	—	—	—	NA	1.09 (J)	17000	—	—	—	—	7.81	—	—	—	—
RE13-05-63823	13-23559	11.0–12.0	QBT4	—	—	3.23	—	—	—	—	—	—	—	0.803 (J)	—	—	—	—	—	1.73 (U)	—	—	—	—
RE16-08-11401	16-603358	0.0–0.6	SOIL	—	—	—	—	—	—	—	19.4	—	NA	0.633 (J-)	—	—	—	—	—	—	—	—	—	—
RE16-08-11402	16-603358	8.5–10.0	QBT4	—	—	—	—	—	—	—	—	—	NA	0.451 (J-)	—	—	—	—	0.764 (J)	0.797 (J)	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

Table 6.3-3
Organic Chemicals Detected in Soil and Tuff at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Chrysene	Di-n-octylphthalate	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Diethylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Styrene	Xylene[1,3-]+Xylene[1,4-]
0313-95-0001	13-00001	1.5–2.5	SOIL	—[a]	—	—	—	—	—	—	0.16(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	NA
0313-95-0002	13-00001	3.0–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	0.13(J)	—	—	—	0.046(J)	—	—	—	—	—	—	NA
RE13-05-61975	13-23550	4.0–4.5	SOIL	0.0334(J)	0.0685	—	—	0.0329(J)	—	—	—	0.00028(J)	0.06	—	—	—	—	—	0.179	—	—	0.116	0.199	—	0.00035(J)
RE13-05-61976	13-23550	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	0.0215(J)	—	0.00025(J)	0.00027(J)	0.00035(J)	—	0.0361(J)	—	—	—	0.0412	0.00027(J)	0.0005(J)
RE13-05-61977	13-23552	3.0–3.5	SOIL	0.032(J)	0.0625	—	0.135	0.134	0.0876	0.093	—	—	0.151	—	—	—	—	—	0.308	0.0349(J)	0.101	0.229	0.323	—	—
RE13-05-61978	13-23552	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0392(J)	—	—	—	0.0412	—	—
RE13-05-61981	13-23556	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.014(J)	—	—
RE13-05-61982	13-23556	6.5–7.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0121(J)	—	—	—	0.014(J)	—	—
RE16-08-11401	16-603358	0.0–0.6	SOIL	—	—	0.0222(J-)	0.0212(J-)	0.0264(J-)	0.017(J-)	—	NA[b]	NA	0.0209(J-)	NA	NA	NA	NA	NA	0.0424(J-)	—	—	0.0359(J-)	0.0345(J-)	NA	NA

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 6.3-4
Inorganic Chemicals above BV in Fill, Sediment, Soil, and Tuff at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**2.4**	**17**	**63.5**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1.82**	**39.6**	**48.8**
0316-95-0214	16-01529	0.0–0.5	SED[c]	—[d]	5.87(U)	—	3040	0.587(U)	—	NA[e]	—	—	21	1.19(U)	NA	—	—	—	—	0.11(U)	—	NA	NA	—	1.96	—	101(J-)
0316-95-0215	16-01529	2.0–2.5	SOIL	—	5.37(U)	—	424	0.537(U)	—	NA	—	—	—	1.11(U)	NA	—	—	—	—	—	—	NA	NA	—	2.05	—	—
0316-95-0216	16-01529	4.0–5.0	QBT4	—	5.7(U)	3.7	143	—	—	NA	190	3.5(J)	5.3	1.2(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0220	16-01530	0.0–0.5	SED	—	6.6(U)	—	564	0.66(U)	—	NA	—	—	—	1.3(U)	NA	—	—	—	—	—	—	NA	NA	—	2.58	—	—
RE16-05-55815	16-01530	6.0–7.0	QBT4	12700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.572(U)	—	—	—
0316-95-0221	16-01531	0.0–0.5	SED	—	5.6(U)	—	—	0.56(U)	—	NA	—	—	—	1.1(U)	NA	—	28.7	—	—	—	—	NA	NA	—	—	—	—
0316-95-0222	16-01532	0.0–0.5	SED	—	5.3(U)	—	—	0.53(U)	—	NA	—	—	—	1.1(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0223	16-01533	0.0–0.5	SED	—	6.6(U)	—	—	0.66(U)	—	NA	—	—	—	1.3(U)	NA	—	—	—	—	—	—	NA	NA	—	2.22	—	—
0316-95-0224	16-01534	0.0–0.5	SED	—	5.5(U)	—	—	0.55(U)	—	NA	—	—	—	1.1(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0218	16-01662	0.0–0.16	SED	—	7.7(U)	—	5910	1.1	—	NA	—	—	62.6	1.6(U)	NA	—	46.3	—	—	—	—	NA	NA	—	6.6	—	229
0316-95-0219	16-01662	2.5–3.5	QBT4	9540	5.1(U)	12.8(J-)	884(J-)	—	—	NA	7.7	—	13.7	1.1(U)	NA	—	134	—	—	—	—	NA	NA	—	—	19.4	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	8800	—	—	—	—	—	—	—	83.6	5.82	—	1.29	—	—	—	—	—	—	—	—	0.523(U)	—	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	0.847(J)	—	—	—	—	—	—	1.09(J)	—	—	—	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	—	1.2	NA	NA	NA	NA	NA	NA	—	0.000827(J)	NA	—	NA	NA
RE16-06-66203	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	NA	—	—	—	—	0.108	—	NA	NA	1.61(U)	NA	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	—	1.16(J)	NA	NA	NA	NA	NA	NA	2.23	—	NA	—	NA	NA
RE16-06-66204	16-23570	0.0–0.5	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	NA	—	—	—	—	0.262	—	NA	NA	1.73(U)	NA	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	—	—	—	—	—	—	—	—	—	—	1.53	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	—	—	—	0.558(U)	—	—	—	—	—	—	1.1(J-)	—	—	—	—	—	—	NA	—	1.67(U)	—	—	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	27600(J+)	—	4.24	268(J+)	—	3200	228	15.3	5.65	9.93	—	6.61(J-)	19900(J+)	15.1	3160(J+)	—	—	8.11	NA	—	1.83(U)	—	32.5	—
RE16-05-55829	16-23574	3.5–4.0	FILL	—	—	—	308(J+)	0.578(U)	—	—	—	25.5	—	—	5.02(J-)	22800(J+)	29.4	—	2260	—	—	—	—	8.67(U)	—	47.5	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	11600(J+)	—	8.57	86.8	—	—	—	—	—	5.51	—	6.09(J-)	—	—	—	—	—	—	—	—	1.77(U)	—	18.2	—
RE16-08-12211	16-23574	12.5–13.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.58	—	—	—	—	—	—	1.04(J)	NA	2.08	—	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	—	—	—	—	0.563(U)	—	—	—	—	—	—	7.08(J-)	—	—	—	—	—	—	1.7	—	1.69(U)	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	—	3.21	49.1	—	—	—	—	—	—	—	2.4(J-)	—	—	—	—	—	—	—	—	8.38(U)	—	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	—	—	—	—	0.565(U)	—	—	—	—	—	—	2.21(J-)	—	—	—	—	—	—	—	—	1.7(U)	—	—	—
RE16-05-55837	16-23576	6.0–6.5	QBT4	—	—	4.92	57.3	—	—	—	—	—	—	—	4.27(J-)	—	—	—	—	—	—	—	—	1.65(U)	—	—	—
RE16-05-55832	16-23577	4.5–5.0	FILL	—	—	—	—	—	—	—	—	—	—	—	5.42(J-)	—	—	—	—	—	—	0.276(J)	—	8.71(U)	—	—	—
RE16-05-55838	16-23577	6.0–6.5	QBT4	—	—	3.46	—	—	—	—	—	—	—	—	0.748(J-)	—	—	—	—	—	—	—	—	1.64(U)	—	—	—
RE16-05-55833	16-23578	4.5–5.0	FILL	—	—	—	—	—	—	—	—	—	—	—	4.97(J-)	—	—	—	—	—	—	0.236(J)	—	8.5(U)	—	—	—
RE16-05-55839	16-23578	6.0–6.5	QBT4	—	—	3.32	—	—	—	—	—	—	—	—	2.12(J-)	—	—	—	—	—	—	—	—	1.66(U)	—	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	—	—	399	—	—	—	—	—	20.1	—	—	—	25.6	—	—	—	—	—	—	—	—	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	14100(J+)	—	3.67	383	—	—	—	8.27	—	5.12	—	3.31(J-)	—	—	—	—	—	—	—	—	1.04(J)	—	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.22(J-)	—	—	—	—	—	—	1.8(J-)	NA	3.14	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] Sediment sample results are compared to the appropriate Soil BV. For further explanation, see Appendix H, Section 2.0.

[d] — = Not detected or not detected above BV.

[e] NA = Not analyzed.

Table 6.3-5
Organic Chemicals Detected in Fill, Sediment, Soil, and Tuff at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzylphthalate	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Diethylphthalate	Dinitrobenzene[1,3-]
0316-95-0214	16-01529	0.0–0.5	SED	—[a]	NA[b]	—	—	0.05(J)	0.14(J)	0.18(J)	0.27(J)	0.081(J)	0.11(J)	1(J)	—	—	NA	—	0.22(J)	—	—	—	—	—
0316-95-0216	16-01529	4.0–5.0	QBT4	—	0.015(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.077
0316-95-0220	16-01530	0.0–0.5	SED	NA	NA	0.446	0.714	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—
0316-95-0224	16-01534	0.0–0.5	SED	NA	NA	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—
0316-95-0218	16-01662	0.0–0.16	SED	0.083(J)	—	—	—	0.11(J)	0.33	0.43	0.61	0.19(J)	0.31(J)	1.2(J)	0.25(J)	—	—	13	0.5	0.18(J)	4.5	0.062(J)	—	—
0316-95-0219	16-01662	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.003(J)	—	—	—	—	—	0.26(J)	—
RE16-05-55816	16-23561	0.0–0.5	FILL	—	—	—	—	—	—	0.0226(J)	0.0303(J)	—	—	—	—	—	—	—	0.029(J)	—	—	—	—	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	—	0.0082	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	—	—	—	—	—	0.0438	0.0461	—	0.0253(J)	—	—	0.0413(J)	—	—	—	—	—	—	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.0366(J)	—	—	—	—	—	—	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	—	0.0487	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	NA	—	—	—	—	—	—	—	—	—	—	0.0656(J)	NA	—	—	—	—	—	—	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	0.227	—	—	—	—	—	—	—	—	—	—	—	0.0017(J)	—	—	—	—	—	—	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	—	0.0182	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	—	—	—	—	0.0088(J)	—	0.129	0.132(J)	0.137(J)	0.0136(J)	—	—	—	—	—	0.0255(J)	—	0.325(J)	—	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	0.0227(J)	—	—	—	0.0445	—	0.165	0.203(J)	0.164(J)	—	—	—	—	—	—	0.0852	—	—	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	—	—	—	—	—	0.117	0.13(J)	—	—	—	—	—	—	—	0.019(J)	—	—	—	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	0.0342(J)	—	—	—	0.058	—	0.192	0.249(J)	0.186(J)	—	—	—	—	—	—	0.105	—	0.326(J)	—	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	—	—	—	0.0206(J)	—	0.158(J)	0.218(J)	—	—	0.76	—	0.198(J)	—	—	0.123	—	—	—	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.1(J)	—	—	—	—	—	—	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Methylnaphthalene[2-]	Naphthalene	Nitrobenzene	Phenanthrene	Pyrene	RDX	TATB	Toluene	Trinitrotoluene[2,4,6-]
0316-95-0214	16-01529	0.0–0.5	SED	—	0.33(J)	—	3.35	0.086(J)	NA	NA	—	—	—	0.22(J)	0.35(J)	—	NA	NA	—
0316-95-0216	16-01529	4.0–5.0	QBT4	0.073	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	0.242
0316-95-0220	16-01530	0.0–0.5	SED	0.612	NA	NA	0.35	NA	NA	NA	NA	NA	—	NA	NA	—	—	NA	—
0316-95-0224	16-01534	0.0–0.5	SED	—	NA	NA	—	NA	NA	NA	NA	NA	0.101	NA	NA	—	—	NA	—
0316-95-0218	16-01662	0.0–0.16	SED	0.21(J)	0.63	0.069(J)	624	0.22(J)	—	—	—	—	—	0.59	1.4	4.44	NA	—	—
0316-95-0219	16-01662	2.5–3.5	QBT4	—	—	—	0.931	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55816	16-23561	0.0–0.5	FILL	—	0.0482	—	—	—	—	—	—	—	—	0.0273(J)	0.0377	—	NA	—	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	0.0607	—	—	0.0225(J)	—	—	—	—	—	0.037(J)	0.0683	—	NA	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	—	0.0269(J)	—	—	—	—	—	—	—	—	—	0.0355(J)	—	NA	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	—	—	—	—	NA	NA	—	—	—	—	—	—	NA	NA	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	—	—	0.169(J)	—	—	0.0011(J)	—	—	—	—	—	—	0.659(J+)	0.00039(J)	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	—	—	—	—	—	0.00034(J)	—	—	—	—	—	—	—	—	—	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	—	0.0413	—	0.118(J-)	0.171(J)	—	—	—	—	—	0.035(J)	0.0396	—	0.252(J+)	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	—	0.168	0.0203(J)	0.199(J-)	0.192(J)	—	—	0.0079(J)	0.0209(J)	—	0.165	0.144	—	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	0.0308(J)	—	—	0.162(J)	—	—	—	—	—	0.0236(J)	0.0264(J)	—	0.64(J+)	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	—	0.243	0.0275(J)	—	0.203(J)	—	—	0.0115(J)	—	—	0.227	0.214	—	2.3(J+)	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	0.192	0.0128(J)	0.512	0.124(J)	—	—	—	—	—	0.145	0.252	—	14.3	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	—	—	—	21.4	—	—	—	—	—	—	—	—	—	8.95	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	0.0161(J)	—	—	—	—	—	—	—	—	0.0119(J)	—	—	—	—	—

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 6.3-6
Inorganic Chemicals above BV in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	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**	**na[b]**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
0316-95-0226	16-01536	0.0–0.33	SOIL	—[c]	7.8(U)	9.3	—	2.2	3.7	9170	192	—	1420	1.6(U)	NA[d]	44400(J)	190	—	—	1.21
0316-95-0227	16-01536	3.0–3.5	QBT4	8840	5.7(U)	3.3	52.3	—	—	2360	17.6	—	14.8	1.2(U)	NA	—	11.4	—	—	NA
0316-95-0236	16-01537	2.5–3.5	QBT4	8960(J)	5.76(U)	—	174(J)	—	—	—	7.9(J)	8.53(J)	91.9(J)	1.18(U)	NA	17500	—	—	1080(J)	—
0316-95-0240	16-01538	0.0–0.5	SOIL	—	6.42(U)	—	—	—	0.64(U)	—	—	—	19.1	1.3(U)	NA	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	6.7(U)	—	—	—	0.67(U)	—	—	—	—	1.4(U)	NA	—	—	—	—	—
0316-95-0242	16-01540	0.0–0.5	SOIL	—	12.8(U)	—	—	—	1.3(U)	—	—	—	32.6	2.6(U)	NA	—	—	—	—	0.11(J)
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.968(J)	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	—	10.2(U)	9.2	—	—	1(U)	—	53.1	—	125	2.1(U)	NA	—	29	—	—	0.14(J)
0316-95-0238	16-01664	0.0–0.33	SOIL	—	20.7(U)	—	—	2.1(U)	2.07(U)	—	31	—	102	4.17(U)	NA	—	31.4	—	—	0.38(J)
0316-95-0239	16-01664	2.0–3.5	QBT4	—	5.96(U)	—	—	—	—	—	—	—	13(J)	1.2(U)	NA	—	14.9	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	—	7.8(U)	27.5	—	—	1.8	—	190	—	805	1.6(U)	NA	—	111	—	—	1(J)
0316-95-0232	16-01670	0.0–0.5	SOIL	—	8.3(U)	39.5	314	—	2.7	—	137	—	736	1.7(U)	NA	—	78.9	—	—	0.43(J)
0316-95-0233	16-01671	0.0–0.5	SOIL	—	7.5(U)	68.3	358	—	1.2	—	40.1	12.5	175	1.5(U)	NA	—	50.5	—	—	0.26(J)
0316-95-0498	16-02023	0.0–0.5	SOIL	—	5.1(U)	—	—	—	0.51(U)	—	—	—	—	1(U)	NA	—	—	—	—	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—	2.34	NA	NA	NA	NA	NA
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	3.42	—	—	—	—	—	94.2	—	NA	1.63	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.38	2.45	NA	NA	NA	NA	NA
RE16-05-56151	16-23569	1.7–3.7	QBT4	10200	—	3.34	106	1.27	—	—	7.44	275	8.25	—	1.16	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	0.6(U)	—	—	—	—	—	1.67	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	1.21	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	—	—	—	0.607(U)	—	—	—	—	—	7.32(J-)	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	15700	—	3.96	83.2(J+)	—	—	2800	8.07	—	6.12	—	5.29(J-)	—	—	1920(J+)	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	—	—	—	0.584(U)	8270	—	—	—	—	1(J-)	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	11500	—	4.13	98.1(J+)	—	—	5630	—	5.06	7.59	13.8(UJ)	1.97(J-)	—	12.3	—	—	—
RE16-08-12259	16-23591	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.64	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	—	—	—	0.576(U)	18000	—	—	—	—	—	—	—	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	2.97	93.3(J+)	—	—	4850	—	—	5.8	—	0.757(J-)	—	—	—	—	—
RE16-08-12260	16-23597	12.5–14.2	QBT4	—	—	—	—	—	—	—	—	—	—	NA	0.986	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	—	0.591(U)	10300	—	—	—	—	4.77(J-)	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	20700	—	5.78	433(J+)	—	—	6860	10.1	3.17	8.83	—	9.39(J-)	14700	14.5	2100(J+)	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-55871	16-23607	4.0–4.5	FILL	35800	—	8.73	—	—	0.634(U)	27500	—	—	15.4	—	15.8(J-)	22600	25.6	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	18200	—	6.72	158(J+)	—	—	4250	16	—	6.67	—	34.4(J-)	—	—	1860(J+)	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	—	—	—	0.602(U)	14400	—	—	—	—	2.91(J-)	—	23.4	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	11300	—	5.23	91.6(J+)	—	—	8990	7.78	3.34	9.37	—	4.73(J-)	—	14.7	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	9.61	—	—	—	7100	—	—	23	—	1.9(J-)	—	43.9	—	—	—
RE16-05-55876	16-23611	6.0–6.5	QBT4	17900	—	4.8	99.8(J+)	—	—	12100	12.1	3.18	15.9	—	1.8(J-)	20000	25.4	2110(J+)	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	0.605(U)	6410	—	—	—	—	3.49(J-)	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	27100	0.52(UJ)	5.73	183(J+)	1.4	—	8960	13.9	3.4	10.3	—	9.95(J-)	19600	13.4	3420(J+)	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	0.554(U)	6540	—	—	—	—	1.77(J-)	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	7840	—	—	57.8(J+)	—	—	3270	—	—	—	—	2.05(J-)	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	—	0.634(U)	10200	—	—	—	—	3.94(J-)	—	27.1	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	9780	—	—	110(J+)	—	—	3730	—	—	5.08	—	5.11(J-)	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	NA	—	—	—	0.637(U)	—	—	—	19.1(J+)	—	8.49(J-)	25400	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	34000	NA	—	307(J+)	1.4	—	8690	15.2	—	11.2(J+)	—	17.1(J-)	20700	15.4	3520	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	4.91	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	NA	—	—	—	0.6(U)	14800	—	—	—	—	11.9(J-)	22000	38.1	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	34700	NA	2.93	291(J+)	1.23	—	21700	15.4	—	10.6(J+)	—	8.61(J-)	22300	16.6	3470	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	NA	—	—	—	0.618(U)	—	—	10.4(J)	—	—	5.64(J-)	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	11700	NA	3.63	91.3	—	—	2270	7.29	—	4.86	—	4.78(J-)	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	NA	—	—	—	0.593(U)	—	—	—	—	—	4.84(J-)	—	—	—	—	0.102
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	NA	—	49.4	—	—	—	—	—	—	—	2.57(J-)	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	NA	—	—	—	0.619(U)	—	—	—	—	—	6.89(J-)	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	12600	NA	—	88.3	—	—	2680	—	—	—	—	7.14(J-)	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	NA	—	—	—	0.629(U)	—	—	—	—	—	5.95(J-)	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	NA	—	59.4	—	—	—	—	—	—	—	1.83(J-)	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	50.1(J+)	—	—	—	—	—	—	—	3.72	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	8430	—	5.06	104(J+)	—	—	2330(J+)	—	—	—	—	8.2	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	54.3(J+)	—	—	—	—	—	—	0.848	4.55	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	4.79	90(J+)	—	—	2430(J+)	—	—	—	—	9.41	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	7.64	200	—	—	—	11.7	—	76.8(J-)	—	—	—	14(J)	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	4.3	50.9	—	—	—	—	—	12.1(J-)	—	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	3.58	87.3	—	—	—	—	—	11.2(J-)	—	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	5.15	118	—	—	—	—	—	14.3(J-)	—	—	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-55927	16-23655	3.0–3.5	QBT4	9210	—	4.18	149	—	—	—	—	—	11.9(J-)	—	1.11(J-)	—	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.643(J-)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55930	16-23657	5.5–6.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—	—	—	48(J-)	—	1.47(J-)	—	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	0.53(J)	—	—	9.53	—	—	2.47(J-)	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	0.564(J)	—	—	—	22(J-)	—	2.51(J-)	—	—	—	—	—
RE16-05-55937	16-23665	4.0–4.5	SOIL	—	—	—	—	—	0.526(J)	—	—	—	—	—	4.48(J-)	—	—	—	—	—
RE16-05-55939	16-23665	9.0–9.5	SOIL	—	—	—	—	—	0.683	—	—	—	—	—	1.86(J-)	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	—	—	—	25.9(J+)	—	116(J+)	—	—	—	25.7	—	—	0.143(J+)
RE16-05-62036	16-23669	3.0–3.5	QBT4	9980	—	4.07	202	—	—	—	12.3(J+)	—	28.6(J+)	—	—	—	13.1	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	23400	—	8.47(U)	157	—	—	3020	9.82	—	13.1	NA	NA	19200	—	2990(J+)	—	—
RE16-08-12365	16-23671	3.5–4.0	QBT4	—	—	7.88(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	7350	—	8.22	127(J-)	—	—	—	NA	—	224(J)	NA	4.42(J-)	17300	62.3(J-)	—	—	0.696
RE16-08-12362	16-23672	3.5–3.8	QBT4	27800	—	8.18(U)	70.9	—	—	3080	12.5(J-)	—	8.7	NA	NA	19400	12.2(J)	3440(J-)	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	5.22	173(J-)	—	—	—	NA	—	80.2(J)	NA	2.88(J-)	—	24.2(J-)	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	3.64	93.9(J-)	—	—	—	NA	—	46.9(J)	NA	3.02(J-)	—	13.1(J-)	—	—	—
RE16-08-12366	16-23676	0.0–0.5	QBT4	—	—	—	175	—	—	—	—	—	12.6	NA	NA	—	—	—	—	—
RE16-08-12367	16-23676	3.5–4.0	QBT4	30700	—	9.17(U)	184	2.53	—	3690	15.4	3.3	15.7	NA	NA	20500	—	4540(J+)	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	—	—	—	134(J+)	—	—	—	57.1	—	235	NA	NA	—	28.8	—	—	—
RE16-08-12369	16-23677	3.2–3.7	QBT4	—	—	3.25	74.2(J+)	—	—	—	14.4	—	6.84	NA	NA	—	—	—	—	—
RE16-08-12370	16-23678	2.0–2.5	QBT4	—	—	—	104	—	—	—	10.7	—	—	NA	NA	—	—	—	—	—
RE16-08-12371	16-23678	3.2–3.8	QBT4	—	—	—	75.6(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	—	—	—	—	—	NA	—	176(J)	NA	5.52(J-)	—	32.8(J-)	—	—	0.121
RE16-05-62046	16-23679	3.0–3.5	QBT4	8760	—	3.47	77.4(J-)	—	—	—	NA	—	22.8(J)	NA	4.98(J-)	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	—	—	91.1(J+)	—	—	—	—	—	6.11	NA	NA	—	—	—	—	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	—	39.5	724(J-)	—	2.94(J)	6450(J)	NA	—	1210(J)	NA	5.92(J-)	—	171(J-)	—	—	0.705
RE16-08-12373	16-23681	3.5–4.0	QBT4	11000	—	—	56.8	—	—	—	—	—	5.16	NA	NA	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	—	—	78.6(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	6.77	182(J-)	—	—	—	NA	—	36.7(J)	NA	5.48(J-)	—	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	ALLH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—	—	—	4.85	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	28900	—	8.77	1280	1.67	—	25600(J-)	22.7	9.85	16.3	—	—	23700	13.8	9480	—	—
RE16-05-55905	16-23691	120.0–122.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	19.6	—	34.9	—	—	—	23.2	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	656	—	—	—	—	—	—	—	1.15(J)	—	—	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	8.12(U)	318(J)	—	—	—	12.5	—	—	NA	2.16(J-)	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	7420	0.536(UJ)	—	259	—	—	—	9.67	84.6	—	—	2.2	—	—	—	564	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	675	—	—	—	—	—	—	—	2.9	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	68.2	—	—	—	—	89.9	—	NA	0.558(J)	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—
RE16-05-56153	16-23751	1.4–2.5	QBT4	—	—	—	—	—	—	—	—	68.5	—	—	1.08	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	NA	—	—	—	0.573(U)	—	—	—	—	—	2.11(J-)	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	23000	—	3.22	169	—	—	3940	12.9	4.48	7.46	—	2.16	16700	14.3	3020	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	NA	—	—	—	—	—	21.3	—	182	—	2.35(J-)	—	48.3	—	—	0.144(J)
RE16-05-61927	16-24894	10.0–10.5	QBT4	14700	—	7.76	105	—	—	3560	8.53	6.78	5.93	—	1.05(J)	15500	20.1	1820	515(J+)	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	0.612(J)	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	NA	—	—	—	0.572(U)	—	—	—	—	—	2.25(J-)	—	29.3	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	13700	—	—	104	—	—	2350	8.53	3.89	5.92	—	3.81	—	—	1890	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	NA	—	—	—	0.531(U)	—	—	—	—	—	1.76(J-)	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	14500	—	—	110	—	—	2210	10	5.98	6.12	—	3.65	—	12	2030	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	NA	—	—	—	0.602(U)	—	—	—	—	—	11	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	NA	5.06	—	—	—	—	—	—	—	—	6.86	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12384	16-24906	2.0–2.35	QBT4	9240	—	7.99(U)	115(J)	—	—	2340(J-)	8.92	4.94(J)	8.77	NA	NA	—	13.8	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	0.607(U)	—	—	—	—	—	3.21(J-)	—	—	—	—	—
RE16-08-12385	16-24906	2.3500–2.75	QBT4	9530	—	—	62.7(J)	—	—	—	8.21	3.83(J)	8.93	NA	NA	14700	12.9	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	11500	—	—	152(J+)	—	—	—	13.4	7.62	29.6	NA	NA	—	15.3(J)	1930(J+)	—	—
RE16-08-12377	16-24907	4.0–4.5	QBT4	11000	—	—	94(J+)	—	—	—	—	6.58	7.97	NA	NA	16000	14.4(J)	1810(J+)	507	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	12800	—	2.85	235(J+)	—	—	2220(J+)	20.1	5.21	41.6	NA	NA	14800	20(J)	2010(J+)	—	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	11000(J+)	—	4.38	218	—	—	—	—	3.95	8.05	—	4.33(J-)	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	14100	—	—	166	—	—	—	12.6	13.4	17.7	NA	NA	17900	24.3(J)	2280	894	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	15100	—	—	164(J+)	—	—	2860(J+)	13.4	11.2	14.9	NA	NA	—	13(J)	2210(J+)	—	—
RE16-08-12381	16-24910	4.0–4.5	QBT4	10100	—	8.69(U)	71.3	—	—	—	—	3.98	5.86	NA	NA	—	—	—	610	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	15.6(J+)	548	—	0.626	—	52.1(J+)	—	197(J+)	—	6.24(J-)	—	36.1	—	—	0.106
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	—	12.3(J+)	—	—	—	—	26.8(J+)	—	75.1(J+)	—	2.96(J-)	—	—	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	12.8	—	—	0.517(J)	—	38.7	—	88.7	0.501	4.22(J-)	—	22.9	—	—	NA
RE16-05-61941	16-24915	2.0–2.5	QBT4	16900	—	4.49	75	—	—	—	13.6	48.3	11	—	3.35(J-)	—	—	2290	—	NA
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	8.26	—	—	0.415(J)	—	29.3	—	77.6	0.682	6.23	—	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	13000	—	4.28	286	—	—	2330	17.9	11.9	35.1	NA	NA	17900	29.1(J)	1710	—	—
RE16-08-12383	16-24923	3.5–4.0	QBT4	—	—	—	53.4(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-61950	16-24927	0.0–0.5	SOIL	—	—	—	424	—	0.569(U)	—	—	—	—	—	3.13(J)	—	—	—	—	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	2	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	2.24	—	—	—	—	—
RE16-08-12264	16-603398	4.0–4.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12265	16-603398	6.0–6.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12266	16-603399	4.0–4.5	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.948(J-)	NA	NA	NA	NA	NA
RE16-08-12267	16-603399	6.0–6.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.89(J-)	NA	NA	NA	NA	NA
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—	—	—	33	—	1.16(J-)	—	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	3.47(U)	62.3	—	—	—	—	—	—	—	1.13(J-)	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	1.08(J-)	—	—	—	—	—
RE16-08-12273	16-603401	3.0–4.0	QBT4	—	—	4.11	90.3	—	—	—	—	—	—	—	2.08(J-)	—	—	—	—	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	8.34(U)	—	—	—	—	—	—	—	—	8.76(J-)	—	—	—	—	—
RE16-08-12275	16-603402	1.5–2.0	SOIL	—	—	8.79(U)	—	—	—	—	—	—	—	—	3.93(J-)	25100	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	14.7(U)	—	—	—	—	—	—	—	—	0.887(J-)	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	15.5(U)	—	—	—	—	—	—	—	—	2.24(J-)	—	—	—	—	—
RE16-08-12312	16-603406	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12313	16-603406	2.5–3.0	QBT4	8610	—	7.88(U)	211(J)	—	—	—	—	5.51(J)	5.85	NA	NA	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12315	16-603407	2.0–2.5	QBT4	15600	—	8.5(U)	122(J)	1.25	—	2270(J-)	12.9	3.15(J)	14.1	NA	NA	23200	—	4280(J-)	—	—
RE16-08-12316	16-603408	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	—	7.84(U)	79.2(J)	—	—	—	—	4.47(J)	4.71	NA	NA	—	—	—	—	—
RE16-08-12318	16-603409	0.0–0.5	SOIL	—	—	18.1	—	—	—	—	—	—	19	NA	NA	—	—	—	—	—
RE16-08-12320	16-603410	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	35.8	NA	NA	—	—	—	—	—
RE16-08-12321	16-603410	2.0–2.5	SOIL	—	—	—	377	—	0.404(J)	—	—	13.1	34.3(J+)	NA	NA	—	25.7	—	774(J+)	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	—	—	—	—	—	0.471(J)	—	45.5	—	108	NA	NA	—	24.1(J)	—	—	—
RE16-08-12323	16-603411	2.0–2.5	QBT4	—	—	7.89(U)	58.5	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	—	—	—	1790	—	—	9910	—	—	—	NA	NA	—	—	—	814	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	9540	—	—	262	—	—	—	7.39	4.38	9.31	NA	NA	—	11.3(J)	—	—	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	28.4	NA	NA	—	—	—	—	—
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	—	8.69(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	—	—	15.6(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	11100	—	16.1(U)	89.2	—	—	—	8.59(J-)	—	19.2	NA	NA	—	12.9(J)	—	—	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	—	—	15.4(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12331	16-603415	2.2–2.7	SOIL	—	—	15.8(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	—	—	—	—	—	0.547	—	26.1(J-)	—	103	NA	NA	—	28.3	—	—	0.119
RE16-08-12333	16-603416	2.0–2.4	QBT4	8960	—	16(U)	89.2	—	—	—	8.2(J-)	—	15.2	NA	NA	—	—	—	—	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	—	—	—	—	—	1.16	—	129(J-)	—	408	NA	NA	—	77.4	—	—	0.606
RE16-08-12335	16-603417	3.0–3.4	QBT4	11500	—	7.79(U)	—	—	—	—	—	—	5.54	NA	NA	16500	—	—	—	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	—	—	—	—	—	0.862	—	37.4	—	174	NA	NA	—	89.6	—	—	0.168
RE16-08-12337	16-603418	1.5–2.0	QBT4	—	—	7.9(U)	890	—	—	—	13.7	—	26.3	NA	NA	—	12.7	—	—	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	—	2.22(J-)	—	867	—	0.855	29100	45.7	—	66.9	NA	NA	—	42.2	—	—	—
RE16-08-12339	16-603419	2.0–3.0	QBT4	—	—	7.84(U)	421	—	—	—	7.42	—	6.28	NA	NA	—	—	—	—	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	—	—	—	408	—	1.24(J)	13700	28.7	—	92.5	NA	NA	54800	29.4	—	—	—
RE16-08-12341	16-603420	1.5–2.0	SOIL	—	—	—	473	—	0.444(J)	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12342	16-603421	0.0–0.5	SOIL	—	—	15.5(U)	—	—	—	—	—	—	19.2	NA	NA	—	—	—	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	—	—	4.49	178	—	—	3060	16.9	—	67	NA	NA	—	13.8	—	—	—
RE16-08-12344	16-603422	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	15	NA	NA	—	—	—	—	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	—	—	176	—	—	—	—	—	4.99(J+)	NA	NA	—	—	—	—	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	—	—	—	346(J+)	—	0.472(J)	—	35	—	94.1	NA	NA	—	42.7	—	—	0.281
RE16-08-12349	16-603424	1.6–2.0	QBT4	—	—	—	59.7(J+)	—	—	—	8.02	—	—	NA	NA	—	—	—	—	—
RE16-08-12350	16-603425	0.0–0.5	SOIL	—	—	—	—	—	0.655	—	37.5	—	141	NA	NA	—	31.5(J)	—	—	0.103
RE16-08-12351	16-603425	1.7–2.0	QBT4	—	—	—	51.5(J+)	—	—	—	9.11	—	—	NA	NA	—	—	—	—	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	—	—	—	—	—	0.856	—	43	—	130	NA	NA	—	32.7(J)	—	—	0.137
RE16-08-12353	16-603426	2.0–2.5	QBT4	—	—	—	74.6	—	—	—	—	—	8.54	NA	NA	—	—	—	—	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	—	—	—	328(J+)	—	0.518(J)	—	33.7	—	124	NA	NA	—	31.7	—	—	0.106
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	—	—	83	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	54.8	NA	NA	—	—	—	—	0.124
RE16-08-12359	16-603429	2.0–2.5	QBT4	—	—	8.37(U)	84(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	44.3(J+)	NA	NA	—	—	—	—	—
RE16-08-12361	16-603430	2.0–2.5	QBT4	—	—	—	97.8	—	—	—	—	—	8.95	NA	NA	—	—	—	556	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.884(J)	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	1.77	—	34(J)	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	15600(J+)	—	4.67	71.6(J+)	2.3	—	2890(J+)	9.72	—	21.7	—	6.21	16600	12.7(J)	2350(J+)	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	7.71(U)	—	—	—	—	—	—	—	—	0.553(J)	—	18.3	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	7.86(U)	—	—	—	—	—	—	—	—	0.647(J)	—	13.9	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	7.9(U)	—	—	—	—	—	—	—	—	0.635(J-)	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
0316-95-0226	16-01536	0.0–0.33	SOIL	22.3	NA	NA	—	4.6	4.1	—	—	11.4	78.7	967(J)
0316-95-0227	16-01536	3.0–3.5	QBT4	—	NA	NA	—	—	—	—	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	11.4(J-)	NA	NA	—	—	—	—	—	—	26.6(J)	133(J+)
0316-95-0240	16-01538	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.36	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.83	—	—
0316-95-0242	16-01540	0.0–0.5	SOIL	—	NA	NA	—	—	1.3(U)	—	—	5.24	75	104
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	0.000863(J)	—	0.366(J)	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	6.77	106	210
0316-95-0238	16-01664	0.0–0.33	SOIL	—	NA	NA	—	—	2.07(U)	1520(J)	1(U)	3.44	50.8	152(J-)
0316-95-0239	16-01664	2.0–3.5	QBT4	—	NA	NA	—	—	—	—	—	2.46	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	—	NA	NA	—	1.7	1.4(J)	—	—	16.3	134	494
0316-95-0232	16-01670	0.0–0.5	SOIL	—	NA	NA	—	2.7	—	—	—	13.3	170	493
0316-95-0233	16-01671	0.0–0.5	SOIL	—	NA	NA	—	1.7	—	—	—	12.3	193	255
0316-95-0498	16-02023	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.32	41.5	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	—	—	NA	NA	NA	NA	NA	6.44	NA	NA
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	0.558(U)	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	12.8	—	NA	NA	NA	NA	NA	4.6	NA	NA
RE16-05-56151	16-23569	1.7–3.7	QBT4	8.19	—	—	—	0.564(U)	1.21	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	1.84	—	—	—	—	—	—	—	—	51.3
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	2	—	—	1.01(J)	—	—	—	—	17.2	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	1.46	—	—	—	—	—	—	—	—	55.1
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	0.612(J)	—	—	1.23(J)	—	—	—	—	—	—
RE16-08-12259	16-23591	12.5–14.5	QBT4	—	2.02	NA	—	1.7(U)	—	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	57
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	—	—	0.76(J)	—	—	—	—	—	153
RE16-08-12260	16-23597	12.5–14.2	QBT4	—	0.968	NA	—	1.65(U)	—	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	1.61(J)	—	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	6.64(J-)	—	—	—	1.46(J)	—	—	—	—	19.9	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	0.935(J)	—	4160(J+)	2.03	—	—	1.01	—	—	76.1
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	—	—	0.924(J)	—	—	—	—	17.3	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	76.4

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	—	—	1.33(J)	—	—	—	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	89.9
RE16-05-55876	16-23611	6.0–6.5	QBT4	9.29(J-)	—	—	—	2.21	—	—	—	—	18.5	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	13.9(J-)	—	—	3550(J+)	1.27(J)	—	—	—	—	25.2	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	1.91	—	—	—	—	—	56.3
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	1.82(U)	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	NA	—	—	—	2.17	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	NA	—	—	—	2.13	—	—	—	—	20.5	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	1.02(J)	NA	—	1.66(U)	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	NA	—	—	—	1.82	—	—	—	—	—	52.8
RE16-05-55886	16-23621	6.0–6.5	QBT4	NA	—	—	—	1.45(J)	—	—	—	—	21.8	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	NA	—	—	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	NA	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	NA	—	—	1.78(U)	—	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	NA	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	NA	—	—	1.86(U)	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	NA	—	—	0.763(J)	—	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	NA	—	—	1.89(U)	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	NA	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	1.78(U)	—	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	1.82(U)	—	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	1.6	—	—	1.17(J)	—	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	1.75(U)	—	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	2.24(J+)	—	—	1.6(U)	—	—	—	—	29	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	1.66(J+)	—	—	1.58(U)	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	1.67(J+)	—	—	1.6(U)	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	1.8(J+)	—	—	1.6(U)	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	1.16(J)	—	—	—	—	25.6	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	1.68(U)	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	1.64(U)	—	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55930	16-23657	5.5–6.0	QBT4	—	—	—	—	1.61(U)	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	1.96(U)	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	1.99(U)	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	1.35(J+)	—	—	1.87(U)	—	—	—	2.02	—	51.3
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	2.16(U)	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	1.73(U)	—	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	1.73(U)	—	—	—	—	—	—
RE16-05-55937	16-23665	4.0–4.5	SOIL	—	—	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55939	16-23665	9.0–9.5	SOIL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	1.56(U)	—	—	—	4.78	57.2	145
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	—	—	0.677(J)	—	—	—	2.78	34.5	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	—	NA	NA	—	6.63	—	—	—	—	26	66.8
RE16-08-12365	16-23671	3.5–4.0	QBT4	—	NA	NA	—	4.1(U)	—	—	—	—	—	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	2.93	—	—	1.13(J)	—	—	—	2.67	51.6	200(J)
RE16-08-12362	16-23672	3.5–3.8	QBT4	—	NA	NA	—	4.78	—	—	—	—	27.1(J+)	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	5.47	—	—	0.791(J)	—	—	—	3.01	25.3	94.1(J)
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	2.56	—	—	1.69(U)	—	—	—	—	—	64(J)
RE16-08-12366	16-23676	0.0–0.5	QBT4	—	NA	NA	—	3.53(U)	—	—	—	—	28	—
RE16-08-12367	16-23676	3.5–4.0	QBT4	16	NA	NA	—	3.66(U)	—	—	—	—	30.1	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	—	NA	NA	—	3.37(J)	—	—	—	2.47	26.2	107
RE16-08-12369	16-23677	3.2–3.7	QBT4	—	NA	NA	—	3.82(J)	—	—	—	—	—	—
RE16-08-12370	16-23678	2.0–2.5	QBT4	—	NA	NA	—	3.22(U)	—	—	—	—	—	—
RE16-08-12371	16-23678	3.2–3.8	QBT4	16.3	NA	NA	—	3.01(J)	—	—	—	—	—	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	6.19	—	—	—	—	—	—	4.91	—	142(J)
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	1.27	—	—	0.698(J)	—	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	NA	NA	—	2.53(J)	—	—	—	—	—	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	6.8	—	—	3.11	1.99	—	—	49.2	168	713(J)
RE16-08-12373	16-23681	3.5–4.0	QBT4	—	NA	NA	—	4.41(U)	—	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	NA	NA	—	2.95(J)	—	—	—	—	—	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	NA	NA	—	1.64(J)	—	—	—	—	—	—
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	1.22	—	—	1.69(U)	—	—	—	—	31	76.7(J)
RE16-05-55978	16-23691	0.0–1.0	ALLH	NA	NA	—	NA	NA	NA	NA	NA	NA	NA	NA
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	0.000679(J)	—	0.529(U)	—	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	0.000785(J)	—	0.552(U)	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	0.515(U)	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	24.4	—	0.000671(J)	5420	0.735(U)	—	—	—	—	41.5	—
RE16-05-55905	16-23691	120.0–122.0	QBT4	—	—	0.0396(J)	—	0.859(U)	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	0.348(U)	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	1.77	—	—	—	2.73	55.3	69.9
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	0.000603(J)	—	0.51(U)	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	0.509(U)	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	QBT4	—	—	—	—	0.635	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	QBT4	—	—	—	—	0.512(U)	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	QBT4	—	NA	—	—	0.507(U)	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	QBT4	—	NA	—	—	0.615(U)	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	3.12	—	—	—	—	—	—	—	—	55.9
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	1.74(J-)	NA	—	2.2	—	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	1.23(J)	—	—	0.66(U)	4.39	—	—	—	—	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	1.15	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	0.588(U)	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	0.525(U)	—	—	—	—	—	—
RE16-05-56153	16-23751	1.4–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	1.72(U)	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	7.15	1.57	—	—	1.77(U)	—	—	—	—	28.5	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	—	—	1.83(U)	—	—	0.759	—	—	179
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	2.94	—	—	1.78(U)	—	—	—	—	30.8	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	1.13	NA	—	1.57(U)	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	0.448(J)	—	—	1.71(U)	—	—	—	—	18.4	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	1.59(U)	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	4.92	—	—	1.64(U)	—	—	—	—	24.2	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	0.000927(J)	—	1.77(U)	—	—	—	—	—	—
RE16-08-12384	16-24906	2.0–2.35	QBT4	—	NA	NA	—	3.85	—	—	—	—	23.7	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	NA	—	—	1.82(U)	—	—	—	—	—	—
RE16-08-12385	16-24906	2.3500–2.75	QBT4	8.78(J-)	NA	NA	—	5.8	—	—	—	—	21.7	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12376	16-24907	2.0–2.5	QBT4	7.31	NA	NA	—	2.62(J)	—	—	—	—	34.4	—
RE16-08-12377	16-24907	4.0–4.5	QBT4	7.79	NA	NA	—	3.45(J)	—	—	—	—	26.2	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	6.71	NA	NA	—	1.8(J)	—	—	—	3.01	48.5	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	1.26(J-)	0.000589(J-)	—	1.65(U)	—	—	—	—	21.4(J)	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	NA	NA	—	1.02(U)	—	—	—	—	42	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	7.11	NA	NA	—	2.67(J)	—	—	—	—	36.6	—
RE16-08-12381	16-24910	4.0–4.5	QBT4	8.62	NA	NA	—	2.65(U)	—	—	—	—	—	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	14.5	—	—	—	—	—	—	8.31	65.3	193
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	17.3	—	—	—	—	—	—	9.81	74.9	116
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	11.5	—	—	1.74(U)	—	—	—	8.81	61.1	146
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	1.19	—	—	1.62(U)	—	—	—	—	24.7	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	3.26	—	—	1.79(U)	—	—	—	NA	50.5	187
RE16-08-12382	16-24923	2.0–2.5	QBT4	—	NA	NA	—	8.4(J)	—	—	—	—	47.2	—
RE16-08-12383	16-24923	3.5–4.0	QBT4	—	NA	NA	—	0.863(J)	—	—	—	—	—	—
RE16-05-61950	16-24927	0.0–0.5	SOIL	—	NA	—	—	1.71(U)	—	—	—	—	—	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	1.31	NA	—	1.63(U)	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	0.826(J)	NA	—	1.69(U)	—	—	—	—	—	—
RE16-08-12264	16-603398	4.0–4.5	QBT4	NA	1.91(J-)	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12265	16-603398	6.0–6.5	QBT4	NA	3.04(J-)	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12266	16-603399	4.0–4.5	SOIL	NA	2.43	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12267	16-603399	6.0–6.5	QBT4	NA	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	1.1(J)	NA	—	3.54	—	—	—	2.02	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	1.05(J)	NA	—	1.26(J)	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	0.831(J)	NA	—	—	—	—	—	—	—	—
RE16-08-12273	16-603401	3.0–4.0	QBT4	—	0.775(J)	NA	—	3.07	—	—	—	—	—	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	1.01(J-)	NA	—	5.61	—	—	—	—	—	—
RE16-08-12275	16-603402	1.5–2.0	SOIL	—	1.04(J-)	NA	—	1.86	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	0.958(J-)	NA	—	1.95	—	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	NA	—	3.15	—	—	—	—	—	—
RE16-08-12312	16-603406	0.0–0.5	SOIL	—	NA	NA	—	2.89	—	—	—	—	—	—
RE16-08-12313	16-603406	2.5–3.0	QBT4	—	NA	NA	—	5.13	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	—	NA	NA	—	3.52	—	—	—	1.9	—	—
RE16-08-12315	16-603407	2.0–2.5	QBT4	11(J-)	NA	NA	—	4.56	—	—	—	—	20.4	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12316	16-603408	0.0–0.5	SOIL	—	NA	NA	—	3.46	—	—	—	—	—	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	NA	NA	—	4.91	—	—	—	—	—	—
RE16-08-12318	16-603409	0.0–0.5	SOIL	—	NA	NA	—	3.5	—	—	—	—	—	71.4
RE16-08-12320	16-603410	0.0–0.5	SOIL	—	NA	NA	—	2.15(U)	—	—	—	2.15	43.6	67.3
RE16-08-12321	16-603410	2.0–2.5	SOIL	—	NA	NA	—	6.9	—	—	—	—	40.9	55.1
RE16-08-12322	16-603411	0.0–0.5	SOIL	—	NA	NA	—	2.66(U)	—	—	—	6.42	50.7	102
RE16-08-12323	16-603411	2.0–2.5	QBT4	—	NA	NA	—	2.01(U)	—	—	—	—	—	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	—	NA	NA	—	4.62(J)	—	—	—	—	—	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	—	NA	NA	—	3.67(U)	—	—	—	—	21.3	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	—	NA	NA	—	2.84(U)	—	—	—	2.72	—	66.3
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	NA	NA	—	4.35(U)	—	—	—	—	—	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	—	NA	NA	—	6.11	—	—	—	—	—	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	—	NA	NA	—	4	—	—	—	—	18.6(J+)	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	—	NA	NA	—	4.99	—	—	—	—	—	—
RE16-08-12331	16-603415	2.2–2.7	SOIL	—	NA	NA	—	3.22	—	—	—	—	—	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	—	NA	NA	—	5.46	—	—	—	5.09(J+)	51.4(J+)	121
RE16-08-12333	16-603416	2.0–2.4	QBT4	—	NA	NA	—	2.6	—	—	—	—	29.5(J+)	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	—	NA	NA	—	7.29	—	—	—	11.7(J+)	71.4(J+)	235
RE16-08-12335	16-603417	3.0–3.4	QBT4	—	NA	NA	—	3.18	—	—	—	—	18.1(J+)	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	—	NA	NA	—	6.8	—	—	—	13.6	66	219
RE16-08-12337	16-603418	1.5–2.0	QBT4	—	NA	NA	—	3.18(U)	—	—	—	6.73	57.6	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	41.2	NA	NA	—	3.59(U)	—	—	—	2.22	—	453
RE16-08-12339	16-603419	2.0–3.0	QBT4	—	NA	NA	—	3.83(U)	—	—	—	—	26.3	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	—	NA	NA	—	19.8	—	—	—	3.74	—	230
RE16-08-12341	16-603420	1.5–2.0	SOIL	—	NA	NA	—	4.43(U)	—	—	—	2.31	57.2	50.9
RE16-08-12342	16-603421	0.0–0.5	SOIL	—	NA	NA	—	2.47(U)	—	—	—	—	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	—	NA	NA	—	4.21(U)	—	—	—	11.8	86.7	206
RE16-08-12344	16-603422	0.0–0.5	SOIL	—	NA	NA	—	4.37(U)	—	—	—	1.86	—	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	NA	NA	—	4.63(U)	—	—	—	—	—	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	—	NA	NA	—	2.05(J)	—	—	—	—	—	—
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	NA	NA	—	4.35	—	—	—	—	—	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	—	NA	NA	—	3.65(J)	—	—	—	5.41	43.1	148
RE16-08-12349	16-603424	1.6–2.0	QBT4	—	NA	NA	—	2.69(J)	—	—	—	—	—	—

Table 6.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12350	16-603425	0.0–0.5	SOIL	—	NA	NA	—	3.78(U)	—	—	—	10.6	68.1	169
RE16-08-12351	16-603425	1.7–2.0	QBT4	—	NA	NA	—	2.52(J)	—	—	—	—	—	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	—	NA	NA	—	1.76(U)	—	—	—	13.8	57.9	181
RE16-08-12353	16-603426	2.0–2.5	QBT4	—	NA	NA	—	2.31(U)	—	—	—	—	—	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	—	NA	NA	—	2.74(J)	—	—	—	4.84	44.8	137
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	NA	NA	—	3.09(U)	—	—	—	—	—	—
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	NA	NA	—	1.67(J)	—	—	—	—	—	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	NA	NA	—	2.03(J)	—	—	—	—	—	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	—	NA	NA	—	4.09(U)	—	—	—	3.51	—	99.7
RE16-08-12359	16-603429	2.0–2.5	QBT4	—	NA	NA	—	1.45(J)	—	—	—	—	—	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	—	NA	NA	—	2.53	—	—	—	2.43	—	57.7
RE16-08-12361	16-603430	2.0–2.5	QBT4	—	NA	NA	—	1.69(U)	—	—	—	—	—	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	0.972(J)	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	1.25	—	—	2.45	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	10.1	1.02(J)	—	—	2.71	—	—	—	—	18.2	74.2(J)
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	0.999(J)	—	—	2.84	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	0.955(J)	—	—	1.9	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	2.25	—	—	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

Table 6.3-7
Organic Chemicals Detected in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
0316-95-0226	16-01536	0.0–0.33	SOIL	NA[a]	4.5	—[b]	—	1.07	—	7.1	14	14	18	5.2	7.3	—	—	—	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	NA	0.12(J)	—	0.012(J)	—	—	0.19(J)	0.39	0.47	0.59	0.26(J)	0.27(J)	—	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	NA	—	—	0.026	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	—	0.071(J)	—	—	—	—	NA	NA	—
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE16-05-55820	16-01540	2.0–3.0	QBT4	NA	—	—	—	—	—	—	—	—	—	—	—	—	0.0412(J)	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.13(J)	0.19(J)	—	—	—	—	NA	NA	—
0316-95-0238	16-01664	0.0–0.33	SOIL	NA	—	—	—	—	—	—	0.24(J)	0.32(J)	0.51(J)	—	0.22(J)	1.2(J)	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	NA	—	—	0.034	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	3.8(J)	—	NA	—	—	5.7	9.6	11	14	5.1(J)	6.5	—	—	NA	NA	—
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.9(J)	1.1(J)	0.43(J)	0.47(J)	—	—	NA	NA	—
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	0.71(J)	—	NA	—	—	1.2(J)	1.9(J)	2.4(J)	2.9(J)	1.3(J)	1.3(J)	—	—	NA	NA	—
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.053(J)	0.076(J)	—	—	—	—	NA	NA	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	—	—	0.0812	—	—	—	—	—	—	—	—	—	0.511(J)	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	NA	—	—	0.0102	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	—	—	0.109	—	—	—	—	—	—	—	—	—	3.49(J)	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	NA	—	—	0.024	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	NA	—	—	0.0288	—	—	—	—	0.0393(J)	0.0499	—	0.0188(J)	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0011	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	0.144(J-)	—	—	—	—	0.216(J-)	0.306(J-)	0.304(J-)	0.368(J-)	0.184(J-)	0.148(J-)	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	0.0413(J-)	—	—	—	—	0.067(J-)	—	0.131(J-)	0.157(J-)	0.0629(J-)	0.0507(J-)	—	—	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	0.152(J-)	—	0.0164(J+)	—	—	0.185(J-)	—	0.232(J-)	0.384(J-)	0.15(J-)	—	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	0.368(J-)	—	0.0167(J+)	—	—	0.512(J-)	—	0.606(J-)	0.731(J-)	—	0.345(J-)	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	0.338(J-)	1.43(J-)	—	0.045(J+)	—	—	1.84(J-)	1.98(J-)	0.509(J-)	2.11(J-)	0.868(J-)	1.18(J-)	—	—	0.0061	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	0.175(J-)	—	0.0074(J+)	—	—	0.214(J-)	—	0.0809(J-)	0.373(J-)	0.143(J-)	0.187(J-)	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	0.307(J-)	—	0.0112(J+)	—	—	0.377(J-)	0.0915(J-)	0.138(J-)	0.0799(J-)	0.24(J-)	0.0815(J-)	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	0.143(J-)	—	—	—	—	0.171(J-)	0.236(J-)	0.0624(J-)	0.249(J-)	0.117(J-)	0.147(J-)	—	—	—	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	0.301(J-)	—	0.0082(J+)	—	—	0.411(J-)	0.509(J-)	0.124(J-)	0.573(J-)	—	—	—	—	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	0.132(J-)	—	—	—	—	0.166(J-)	—	0.0707(J-)	0.04(J-)	—	—	—	—	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	0.233(J-)	—	0.0296(J+)	—	—	0.31(J-)	—	—	—	—	—	—	—	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	0.245(J-)	—	0.0286(J-)	NA	NA	0.271(J-)	0.0678(J-)	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55875	16-23611	4.0–4.5	FILL	—	0.175(J-)	—	0.0095(J-)	—	—	0.257(J-)	0.359(J-)	0.337(J-)	0.388(J-)	0.197(J-)	0.183(J-)	—	0.0948(J-)	—	—	—
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	0.106(J-)	—	0.0213(J-)	—	—	0.134(J-)	0.201(J-)	—	0.244(J-)	—	—	—	—	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	—	—	0.0359(J-)	—	—	—	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	0.0082(J-)	0.0179(J-)	—	—	—	—	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	0.071	—	0.0344(J-)	—	—	0.0938	—	0.142	0.157	0.0751	0.0857	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	0.0793	—	0.0288(J-)	—	—	0.112	0.0285(J)	0.0422(J)	—	—	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	0.26	—	0.0251(J-)	—	—	0.323	0.443	—	—	—	—	—	0.184(J)	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	0.0164(J)	—	0.0097(J-)	—	—	0.0204(J)	0.0293(J)	—	—	—	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	0.0956	—	—	—	—	0.116	—	—	0.188	—	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	0.187	—	0.0095	—	—	0.266	—	0.284	0.392	0.156	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	0.0351	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	0.398	—	0.0102	—	—	0.513	0.638	0.59	0.698	0.337	0.363	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	0.175	—	0.0107	—	—	0.236	—	0.266	0.32	0.152	0.165	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	0.0026(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	0.0426	—	—	—	—	0.0722	0.163	0.169	0.173	—	0.105	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	0.0029(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	0.0026(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.164(J)	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.164(J)	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	0.12	0.126	—	—	—	0.162(J)	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.16(J)	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	0.016(J)	—	0.0764	0.137	—	—	—	0.571	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	0.0071(J)	—	—	—	—	—	—	0.257(J)	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.114(J)	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.373(J)	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.312(J-)	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.154(J-)	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0086(J)	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	0.02(J-)	—	—	—	—	0.0267(J-)	—	0.117(J-)	0.142(J-)	0.103(J-)	0.0639(J-)	—	62.4	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	0.0091	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.205(J-)	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	1.48(J-)	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	NA	0.575	—	—	—	—	1.16	2.02	—	3.71	0.868(J)	—	—	4.27(J)	—	—	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	NA	0.0798	—	—	—	—	0.156	0.274	0.301	0.419	—	0.14	—	2.47(J)	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	0.0151(J)	—	—	—	—	NA	NA	NA	NA	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	NA	6.51(J-)	—	—	—	—	10.7(J-)	17.2(J-)	—	22.4(J-)	6.25(J)	10.4(J-)	—	37(J-)	—	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	NA	1.39(J-)	—	—	0.165(J-)	—	1.94(J-)	3.07(J-)	—	3.76(J-)	—	1.5(J-)	—	23.8(J-)	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	NA	0.51(J-)	—	—	—	—	0.756(J-)	2.01(J-)	—	2.53(J-)	1.06(J)	—	—	25.8(J-)	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	0.338	—	NA	NA	NA	0.456	0.676	0.846	1.4	0.404	—	NA	NA	NA	NA	—
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	0.0677	—	NA	NA	NA	0.0961	0.201	0.208	0.337	0.0987	—	NA	NA	NA	NA	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	NA	2.73(J-)	—	—	0.162(J-)	—	4.04(J-)	7.08(J-)	—	9.17(J-)	—	3.35(J-)	—	11.2(J-)	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	NA	0.0502(J-)	—	—	—	—	0.0779(J-)	—	—	0.374(J-)	0.0676(J)	—	—	0.9(J-)	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.0107(J)	0.0417	0.0367(J)	0.0629	—	—	NA	NA	NA	NA	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	NA	0.204(J-)	—	—	—	—	0.346(J-)	1.52(J-)	—	3.01(J-)	0.937(J)	—	—	8.34(J-)	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-05-62051	16-23684	3.0–3.5	QBT4	NA	—	—	—	—	—	0.0112(J-)	—	—	0.216(J-)	—	—	—	2.33(J-)	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.078(J)	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	0.0072	—	—	—	—	—	—	—	—	—	0.0576(J)	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	0.0076(J)	—	—	—	—	—	—	—	—	—	0.0492(J)	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	0.0062(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.174(J)	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.232(J)	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	0.118(J)	0.14(J)	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	—	—	0.0185(J)	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55987	16-23693	2.8–3.5	QBT4	NA	—	—	—	NA	NA	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	NA	—	—	0.0175	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	NA	—	—	0.0272	—	—	—	—	—	—	—	—	—	—	0.0068	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	NA	—	—	0.0237	—	—	—	—	—	—	—	—	—	—	0.0071	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	0.0025	0.0033	—	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	0.0154(J)	0.025(J)	—	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	0.0205	—	—	—	—	0.0394	0.11	0.124	0.122	0.0537	—	—	0.0158	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	0.194	—	0.0113	—	—	0.405	0.568	0.546	0.924	0.215	—	—	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	0.0134	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	0.0012(J)	—	—	—	—	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	0.0377	—	—	—	—	0.0682	0.143	0.137	0.22	0.0717	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	0.0362	—	—	—	—	0.0015	0.0022	—	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	0.0036(J)	—	—	0.0417	0.413	0.542	0.637	0.217	0.295	—	—	—	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	0.0201(J)	—	—	—	—	0.029(J)	—	0.041	0.0466	—	—	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	0.212(J)	—	—	—	—	—	—	—	—	—	—	0.0053(J)	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.00853(J)	—	0.0232(J)	0.0392(J)	0.0155(J)	—	NA	NA	NA	NA	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0224(J)	0.0437	0.0164(J)	—	NA	NA	NA	NA	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	0.0086(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0722	0.0124(J)	0.0745(J)	—	NA	NA	NA	NA	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0166(J)	0.0279(J)	—	—	NA	NA	NA	NA	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	0.147	—	—	—	—	0.227	0.525	0.602	0.759	0.356(J)	0.342	0.503(J)	8.2	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	0.145	—	—	0.176(J+)	—	0.196	0.479	0.538	0.691	0.308(J)	0.254	0.549(J)	53.9	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	0.0363(J)	—	—	—	—	—	—	0.266	0.274	0.183	0.159	—	9.68	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	0.0365(J+)	—	—	—	—	—	—	—	—	—	—	0.0043(J)	—	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	12.9	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0641	0.0144(J)	0.0673(J)	—	NA	NA	NA	NA	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	0.022	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	0.196	—	—	—	—	0.389	0.929	0.866	1.23	0.467	—	—	4.09	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	0.0959	0.0974	—	—	0.472(J)	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	0.00687(J)	—	0.0862	0.09	—	—	0.419(J)	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.432(J)	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0234(J)	0.0241(J)	0.0276(J)	—	—	NA	NA	NA	NA	—
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0158(J)	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	0.0143(J)	—	NA	NA	NA	0.0187(J)	0.0773	0.141	0.137	0.139(J)	—	NA	NA	NA	NA	—
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	—	—	NA	NA	NA	0.0163(J)	0.0537	0.0609	0.109	0.0509	—	NA	NA	NA	NA	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	6.45	0.147	NA	NA	NA	9.35	10.5	7.99	12	3.5(J)	4.32	NA	NA	NA	NA	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	—	0.0823	0.0427	0.0813(J)	—	NA	NA	NA	NA	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	—	—	NA	NA	NA	—	—	0.0627	—	0.0643(J)	—	NA	NA	NA	NA	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	0.0105(J)	0.0593	0.133	0.0983	0.127(J)	0.0414	NA	NA	NA	NA	—
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	—	—	NA	NA	NA	—	—	0.0652	—	—	—	NA	NA	NA	NA	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	0.089	—	NA	NA	NA	0.113	0.273	0.345	0.497	0.252(J)	—	NA	NA	NA	NA	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	0.105	—	NA	NA	NA	0.148	0.337	0.437	0.65	0.322(J)	—	NA	NA	NA	NA	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	0.0273(J)	—	NA	NA	NA	0.0687	0.476	0.6	0.854	0.382(J)	—	NA	NA	NA	NA	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	0.844	—	NA	NA	NA	1.17	2.32	2.51	3.68	1.65(J)	—	NA	NA	NA	NA	—
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	—	—	NA	NA	NA	—	—	0.0948	0.101	—	—	NA	NA	NA	NA	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	8.39	—	NA	NA	NA	9.93	21.7	21.4	26	13.4(J)	—	NA	NA	NA	NA	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	0.215	0.0116(J)	NA	NA	NA	0.345	1.13	1.32(J)	2.01(J)	0.792(J)	0.685(J)	NA	NA	NA	NA	—
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	0.0123(J)	—	NA	NA	NA	0.0158(J)	0.069	0.081	0.111	0.0596	0.0417	NA	NA	NA	NA	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	0.0161(J)	—	NA	NA	NA	0.0191(J)	0.0479(J)	0.0626(J)	0.0763(J)	0.045(J)	0.033(J)	NA	NA	NA	NA	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	0.0137(J)	—	NA	NA	NA	0.0194(J)	0.0527	0.0581	0.0741	0.0354(J)	0.0308(J)	NA	NA	NA	NA	—
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	—	—	NA	NA	NA	0.00922(J)	0.037	0.0431(J)	0.0646(J)	—	0.0147(J)	NA	NA	NA	NA	—
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	0.0886	—	NA	NA	NA	0.142	0.378	0.451(J)	0.59(J)	0.239(J)	0.248(J)	NA	NA	NA	NA	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	0.0728	—	NA	NA	NA	0.0937	0.222	0.28	0.362	0.141	0.139	NA	NA	NA	NA	—
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	0.148	—	NA	NA	NA	0.188	0.354	0.414	0.525	0.199	0.203	NA	NA	NA	NA	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	0.0374(J)	—	NA	NA	NA	0.0484	0.111	0.136	0.21	0.0883	—	NA	NA	NA	NA	—
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	1.17	0.0396	NA	NA	NA	2.07	4.09	4.25(J)	8.88(J)	1.67(J)	0.0396(J)	NA	NA	NA	NA	0.0396
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	0.055	—	NA	NA	NA	0.0727	0.254	0.359	0.557	0.3(J)	—	NA	NA	NA	NA	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0502	0.129	0.166	0.149(J)	—	NA	NA	NA	NA	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0698	0.019(J)	0.0715(J)	—	NA	NA	NA	NA	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	0.379	—	NA	NA	NA	0.728	1.54	1.59	2.5	0.989	—	NA	NA	NA	NA	—
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	—	—	NA	NA	NA	—	—	0.0648(J-)	—	—	—	NA	NA	NA	NA	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.0081(J)	—	0.0218(J)	0.035(J)	0.0172(J)	—	NA	NA	NA	NA	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	0.289	0.016(J)	NA	NA	NA	0.42	1.09	1.34	2.59	0.931(J)	—	NA	NA	NA	NA	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	0.532	—	NA	NA	NA	0.892	1.68	1.68	2.67	0.899	—	NA	NA	NA	NA	—
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.087	0.0336(J)	0.0882(J)	—	NA	NA	NA	NA	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	0.0602	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	0.0231	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.161(J)	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	0.00907(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	0.00726(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	0.00317(J)	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
0316-95-0226	16-01536	0.0–0.33	SOIL	18	0.18(J)	—	1.7	2.7	—	—	—	—	—	26	4.6	2.28	5.9	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	0.6	—	—	0.062(J)	0.066(J)	—	—	—	—	—	1	0.11(J)	2.05	0.27(J)	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	—	—	—	—	NA	NA	—	—	NA	0.14(J)	—	—	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	—	—	—	—	—	NA	NA	—	—	NA	0.16(J)	—	0.443	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	0.14(J)	—	—	—	—	NA	NA	—	—	NA	0.26(J)	—	0.339	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	0.41(J)	—	—	—	—	—	—	—	—	—	0.69(J)	—	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	—	—	0.23(J)	—	—	—	—	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	11	—	—	1.5(J)	1.5(J)	NA	NA	—	0.136	NA	24	3(J)	7.59	5.7	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	0.61(J)	—	—	0.61(J)	—	NA	NA	—	—	NA	0.96(J)	—	6.67	0.47(J)	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	2.4(J)	—	—	1.1(J)	—	NA	NA	—	—	NA	5.5	0.62(J)	25.2	1.3(J)	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	0.057(J)	—	—	—	—	NA	NA	—	—	NA	0.098(J)	—	—	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	—	—	—	—	0.0726	—	0.303(J)	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.474	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	0.0584	—	—	0.0868	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	0.302(J-)	—	—	—	0.0937(J-)	—	—	—	—	—	0.674(J-)	0.148(J-)	0.746(J-)	0.17(J-)	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	0.128(J-)	—	—	—	—	—	—	—	—	—	0.26(J-)	0.044(J-)	0.551(J-)	0.0623(J-)	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	0.272(J-)	—	—	—	—	—	—	—	—	—	0.543(J-)	0.151(J-)	0.107(J-)	0.13(J-)	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	0.623(J-)	—	—	—	—	—	—	—	—	0.0004(J)	1.32(J-)	0.407(J-)	0.71(J-)	0.305(J-)	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	1.84(J-)	—	—	0.12(J-)	1.08(J-)	—	—	—	—	—	4.27(J-)	1.52(J-)	9.74(J-)	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	0.307(J-)	—	—	—	0.127(J-)	—	—	—	—	—	0.616(J-)	0.162(J-)	2.23(J-)	0.139(J-)	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	0.0979(J-)	—	—	—	—	—	—	—	—	—	1.01(J-)	0.279(J-)	0.846(J-)	0.222(J-)	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	0.228(J-)	—	—	—	0.102(J-)	—	—	—	—	—	0.454(J-)	0.136(J-)	0.858(J-)	0.108(J-)	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	0.531(J-)	—	—	—	0.231(J-)	—	—	—	—	—	0.99(J-)	0.294(J-)	2.3(J-)	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	0.22(J-)	—	—	—	0.094(J-)	—	—	—	—	—	0.419(J-)	0.125(J-)	0.189(J-)	0.105(J-)	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	0.504(J-)	—	—	—	—	—	—	—	—	—	0.966(J-)	0.219(J-)	1.21(J-)	—	—	0.00084(J-)
RE16-05-55874	16-23609	6.0–6.5	QBT4	0.0725(J-)	—	—	—	—	—	—	—	—	—	0.748(J-)	0.214(J-)	0.539(J-)	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	0.353(J-)	—	—	—	0.12(J-)	—	—	—	—	—	0.795(J-)	0.162(J-)	0.973(J-)	0.19(J-)	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	0.19(J-)	—	—	—	—	—	—	—	—	—	0.385(J-)	0.0991(J-)	2.38(J-)	—	—	0.0011(J-)
RE16-05-55877	16-23613	4.0–4.5	FILL	0.0384(J-)	—	—	—	—	—	—	—	—	—	0.0774(J-)	0.0133(J-)	2.62(J-)	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	0.0192(J-)	—	—	—	—	—	—	—	—	—	0.0338(J-)	—	0.938(J-)	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	0.147	—	—	—	—	—	—	—	—	—	0.288	0.0679	0.187(J)	0.0712	—	0.0058(J-)
RE16-05-55880	16-23615	6.0–6.5	QBT4	0.0305(J)	—	—	—	—	—	—	—	—	—	0.309	0.0778	0.469(J)	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	0.41	—	—	—	0.193(J)	—	—	—	—	—	0.844	0.227	5.63	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	0.0314(J)	—	—	—	—	—	—	—	—	—	0.0648	0.013(J)	0.446(J)	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	0.395	0.0801	5.65(J-)	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	0.342	—	—	—	0.117(J)	—	—	—	—	—	0.795	0.174	—	0.16	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	0.674	—	—	—	0.232(J)	—	—	—	—	—	1.46	0.349	—	0.338	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	0.318	—	—	—	0.107(J)	—	—	—	—	—	0.719	0.157	—	0.151	—	0.00048(J)
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—	—	0.293(J)	—	—	—	4.56	—	—	0.0022
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	1.75	—	—	0.00095
RE16-05-55909	16-23637	4.0–4.5	FILL	0.177	—	—	—	—	—	—	—	—	—	0.421	0.0405	2.28(J+)	0.104	—	0.00034(J)
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	2.68	—	—	0.0012
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	9.92	—	—	0.001
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	0.331(J)	—	—	—	0.403(J)	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—	—	0.327(J)	—	—	—	2.83	—	—	0.0022
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.006
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.193(J)	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.142(J)	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	0.331(J)	—	—	—	—	—	—	—	0.0185(J)	—	0.341(J)	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	0.328(J)	—	—	—	—	—	—	—	—	—	0.19(J)	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	0.0892	—	—	—	—	—	—	—	—	—	0.156	—	0.144(J)	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	0.0451	—	—	—	—	—	—	—	—	—	0.0673	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0196(J)	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0273(J)	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	0.0018	—	—	—	—	0.0136(J)	—	0.351(J)	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	0.0016	—	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	0.0018	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	0.132(J-)	—	—	—	—	—	—	—	—	—	0.246(J-)	0.0147(J-)	1.76	0.117(J-)	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	0.0139(J-)	—	0.11(J+)	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	0.0248(J-)	—	—	—	—	0.0013	—	—	—	—	0.044(J-)	—	0.134(J+)	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	2.08	—	—	—	0.294(J)	—	—	—	—	—	4.34	0.612	12.1	0.783(J)	—	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	0.293	—	—	—	—	—	—	—	—	0.00023(J)	0.662	0.0921	3.36	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0176(J)	—	NA	—	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	17.8(J-)	—	—	—	3.69(J-)	—	—	—	—	—	32.1(J-)	6.83(J-)	16.1(J-)	—	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	2.95(J-)	—	—	—	0.817(J-)	—	—	—	—	—	6.59(J-)	1.44(J-)	25.7(J-)	1.23(J)	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	2.04(J-)	—	—	—	—	—	—	—	—	—	4.32(J-)	0.519(J-)	5.74(J-)	0.816(J)	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	0.831	NA	NA	—	NA	NA	NA	NA	NA	NA	1.67	0.331	NA	0.378	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	0.195	NA	NA	—	NA	NA	NA	NA	NA	NA	0.42	0.055	NA	0.102	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	6.86(J-)	—	—	—	1.45(J-)	—	—	—	—	—	14.4(J-)	2.8(J-)	8.97(J-)	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	0.209(J-)	—	—	—	—	—	—	—	—	—	0.408(J-)	0.0452(J-)	1.26(J-)	0.0835(J)	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	0.0342(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.063	—	NA	0.0164(J)	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	1.67(J-)	—	—	—	—	—	—	—	—	—	2.92(J-)	0.198(J-)	4.73(J-)	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0133(J)	—	NA	—	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	0.095(J-)	—	—	—	—	—	—	—	—	—	0.106(J-)	—	1.07(J-)	—	—	0.0019
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	0.0402	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	0.0278(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	0.0272(J)	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—	0.0518(J)	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.549	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	0.0725(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.634	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	—	—	—	0.0222(J)	—	0.183(J)	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	0.001(J)
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	—	0.0022	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	—	—	0.00096(J)	—	—	—	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	0.00067(J)	—	—	—	—	—	—	—	—	—	0.00072(J)
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.00084(J)	—	—	0.0015	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	0.0145(J)	—	—	—	—	—	—	—	—	—	0.0317(J)	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	0.134	—	—	0.0159	0.0095(J)	—	—	—	—	—	0.188	0.0202	0.139(J-)	0.052	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	0.604	—	—	—	0.121(J)	—	—	—	—	—	1.46	0.203	—	0.168	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	0.0028(J)	—	—	—	—	—	—	—	—	—	0.0036(J)	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	0.14	—	—	—	—	—	—	—	—	—	0.302	0.0347(J)	—	0.0174(J)	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	0.0011	—	—	—	—	—	—	—	—	—	0.0011	—	—	—	—	0.0688
RE16-05-61925	16-24899	8.0–8.5	QBT4	0.542	—	—	—	—	—	—	—	—	0.00028(J)	0.49	—	—	0.185	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.0216(J)	—	0.249(J-)	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	0.0586	—	—	—	—	—	—	—	—	—	0.118	0.016(J)	0.938(J-)	0.013(J)	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0041(J+)
RE16-08-12376	16-24907	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0583	—	NA	0.0129(J)	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0377(J)	—	NA	0.0135(J)	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0134(J)	—	NA	0.072(J)	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.018(J)	—	NA	—	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	0.605	—	—	—	—	—	—	—	—	—	1.19	0.148	34.1	0.354	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	0.54	—	—	—	—	0.0012(J)	—	—	—	0.00043(J+)	1.13	0.146	27.2(J+)	0.315	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	0.251(J)	—	—	—	—	—	—	—	—	—	0.475(J)	—	3.91	0.226	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.179(J)	—	—	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.208(J)	—	7.58	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	0.0657(J)	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0116(J)	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	0.788	—	—	—	0.119(J)	—	—	—	—	—	1.69	0.235	1.37	0.488	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.26(J)	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	0.00025(J)	—	—	—	—	0.000497(J)	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	0.0248(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0483	—	NA	—	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	0.0116(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0174(J)	—	NA	—	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	0.0967	NA	NA	—	NA	NA	NA	NA	NA	NA	0.196	—	NA	0.123(J)	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	0.0731	NA	NA	—	NA	NA	NA	NA	NA	NA	0.123	—	NA	0.0442	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	8.67	NA	NA	—	NA	NA	NA	NA	NA	NA	25.5	6.68	NA	3.65(J)	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	0.0263(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0521	—	NA	0.071(J)	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0148(J)	—	NA	0.0639(J)	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	0.0678	NA	NA	—	NA	NA	NA	NA	NA	NA	0.107	—	NA	0.12(J)	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	—	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	0.259	NA	NA	—	NA	NA	NA	NA	NA	NA	0.474	0.0717	NA	0.253(J)	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	0.348	NA	NA	—	NA	NA	NA	NA	NA	NA	0.611	0.109	NA	0.3(J)	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	0.476	NA	NA	—	NA	NA	NA	NA	NA	NA	0.468	0.0258(J)	NA	0.391(J)	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	2.14	NA	NA	—	NA	NA	NA	NA	NA	NA	3.96	0.707	NA	1.66(J)	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0125(J)	—	NA	—	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	21.5	NA	NA	—	NA	NA	NA	NA	NA	NA	44.7	7.04	NA	13.1(J)	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	1.34	NA	NA	—	NA	NA	NA	NA	NA	NA	2.43	0.201	NA	0.794(J)	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	0.086	NA	NA	—	NA	NA	NA	NA	NA	NA	0.176	—	NA	0.123(J)	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	0.063(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.101	0.0134(J)	NA	0.113(J)	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	0.0589	NA	NA	—	NA	NA	NA	NA	NA	NA	0.121	—	NA	0.109(J)	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	0.0418	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0831	—	NA	—	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	0.412	NA	NA	—	NA	NA	NA	NA	NA	NA	0.803	0.0805	NA	0.295(J)	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	0.261	NA	NA	—	NA	NA	NA	NA	NA	NA	0.529	0.0555	NA	0.212(J)	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	0.379	NA	NA	—	NA	NA	NA	NA	NA	NA	0.871	0.136	NA	0.245(J)	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.013(J)	—	NA	—	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	0.143	NA	NA	—	NA	NA	NA	NA	NA	NA	0.266	0.0295(J)	NA	0.0851	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0156(J)	—	NA	—	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	3.73	NA	NA	0.0396(J)	NA	NA	NA	NA	NA	NA	12.6	1.15	NA	1.74(J)	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	0.295	NA	NA	—	NA	NA	NA	NA	NA	NA	0.53	0.047	NA	0.266(J)	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	0.0852	NA	NA	—	NA	NA	NA	NA	NA	NA	0.088	—	NA	0.134(J)	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	0.0147(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0191(J)	—	NA	0.0717(J)	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	1.57	NA	NA	—	NA	NA	NA	NA	NA	NA	3.06	0.369	NA	0.927	NA	NA

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	—	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0478	—	NA	0.0145(J)	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	1.26	NA	NA	—	NA	NA	NA	NA	NA	NA	2.67	0.266	NA	0.885(J)	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	1.62	NA	NA	—	NA	NA	NA	NA	NA	NA	3.39	0.532	NA	0.907	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	0.0265(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0423	—	NA	0.0822(J)	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—	—	—	—	0.015(J)	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
0316-95-0226	16-01536	0.0–0.33	SOIL	—	—	1.7	—	3.6	0.215	NA	22	22	0.688	NA	—	3.04	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	—	—	0.039(J)	—	0.099(J)	—	NA	0.78	0.72	—	NA	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.11(J)	0.11(J)	—	NA	NA	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.1(J)	0.12(J)	—	NA	NA	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.13(J)	0.2(J)	—	NA	NA	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	—	—	—	1(J)	—	—	NA	0.39(J)	0.51(J)	—	NA	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	NA	0.92(J)	—	2.7(J)	—	NA	19	22	5.3	NA	NA	0.226	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.58(J)	0.72(J)	6.32	NA	NA	—	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	NA	—	—	0.77(J)	—	NA	4.5(J)	4.8(J)	40.7	NA	NA	—	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.054(J)	0.099(J)	—	NA	NA	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	NA	—	0.0774	0.581(J)	NA	—	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	0.0057	—	0.00037(J)	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	NA	0.0688	0.137	0.464(J)	NA	—	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	0.00039(J)	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	NA	—	0.0678	—	NA	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	0.0808(J-)	—	0.25(J-)	—	—	0.678(J-)	0.628(J-)	0.502(J-)	2.93(J-)	0.0014	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	—	0.0201(J-)	—	0.0685(J-)	—	—	0.214(J-)	0.257(J-)	0.775(J-)	1.23(J-)	0.002	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	0.0875(J-)	—	0.287(J-)	—	—	0.677(J-)	0.673(J-)	0.134(J-)	2.12(J-)	0.0017	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	—	0.245(J-)	—	0.68(J-)	—	—	1.76(J-)	1.52(J-)	0.289(J-)	9.92(J-)	0.0018	—	0.00038(J)	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	1.07(J-)	—	4(J-)	—	—	5.78(J-)	4.18(J-)	0.116(J-)	12(J-)	0.0116	—	0.00053(J)	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	0.129(J-)	—	0.466(J-)	—	—	0.793(J-)	0.739(J-)	0.487(J-)	18.3(J-)	0.0055(J-)	—	0.0016(J-)	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	0.179(J-)	—	0.511(J-)	—	—	1.41(J-)	1.22(J-)	0.467(J-)	14.5(J-)	0.0106	—	—	0.0028
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	—	0.0976(J-)	—	0.281(J-)	—	—	0.601(J-)	0.573(J-)	0.201(J-)	15(J-)	0.0015(J-)	—	0.0014(J-)	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	—	0.197(J-)	—	0.609(J-)	—	—	1.38(J-)	1.24(J-)	0.297(J-)	6.92(J-)	0.006(J-)	—	0.00034(J-)	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	0.0804(J-)	—	0.277(J-)	—	—	0.574(J-)	0.552(J-)	0.111(J-)	2.96(J-)	0.0032(J-)	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	0.122(J-)	—	0.334(J-)	—	—	1.15(J-)	1.28(J-)	0.162(J-)	3.3(J-)	0.0067(J-)	—	0.0011(J-)	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	0.151(J-)	—	0.448(J-)	NA	NA	1.03(J-)	0.96(J-)	NA	9.85(J-)	0.0018(J-)	NA	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	0.0917(J-)	—	0.273(J-)	—	—	0.922(J-)	0.725(J-)	0.54(J-)	9.3(J-)	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	—	0.0531(J-)	—	0.172(J-)	—	0.452(J-)	0.49(J-)	0.517(J-)	1.08(J-)	2.17(J-)	0.0013(J-)	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	0.0139(J-)	—	—	0.021(J-)	0.0982(J-)	1.14(J-)	0.641(J-)	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0297(J-)	0.0426(J-)	0.439(J-)	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	0.0342(J)	—	0.099	—	—	0.333	0.336	0.135(J)	—	0.00085(J-)	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	0.0455	—	0.158	—	—	0.368	0.369	0.129(J)	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	0.169	—	0.552	—	—	1.12	1.12	6.89	0.38(J-)	—	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	0.0275(J)	—	—	0.0747	0.0767	0.186(J)	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	0.0447	—	0.133	—	—	0.448	0.339	89.9(J-)	NA	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	—	0.0923	—	0.283	—	—	0.93	0.675	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	0.122(J)	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	—	0.199	—	0.61	—	—	1.75	1.4	—	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	—	0.0912	—	0.285	—	—	0.842	0.63	0.115(J-)	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	1.43	—	—	—	9.21(J+)	—	—	0.00028(J)	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	4.02(J+)	0.00026(J)	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	0.002(J)	—	—	—	—	—	0.325	0.344	—	1.51(J+)	—	—	0.0011	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	1.47(J+)	—	—	0.00026(J)	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	0.0024(J)	—	—	—	—	—	—	0.0646(J)	—	0.613(J+)	—	—	0.00077(J)	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	0.0048(J)	—	—	—	—	—	—	—	—	1.25(J+)	—	—	0.0056	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	0.148(J)	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	0.11(J)	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—	0.0176(J)	0.0141(J)	0.11(J)	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	0.151(J)	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	—	0.0893	0.135	0.273(J)	4.48	—	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0445	0.0988	0.149(J)	4.99	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	0.0126(J)	0.0267(J)	0.112(J)	5.16	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0171(J)	0.0362	0.189(J)	4.73	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—	—	—	0.882	0.936(J)	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	0.237(J)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	0.106(J+)	—	—	—	0.00045(J)	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—	0.15(J-)	0.215(J-)	1.89	7.05	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	0.0155(J-)	0.177(J+)	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	—	0.0276(J-)	0.0503(J-)	0.207(J+)	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	0.133(J)	—	0.293	—	NA	3.85	4.86	2.35	NA	—	—	0.0078	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	0.0282(J)	—	0.0765	—	NA	0.576	0.63	1.88	NA	—	—	0.0027	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0141(J)	NA	NA	NA	NA	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	—	2.26(J-)	—	—	—	NA	32(J-)	41.3(J-)	3.12(J-)	NA	—	—	—	0.00045(J)
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	0.559(J-)	—	—	—	NA	7.6(J-)	8.76(J-)	12.4(J-)	NA	—	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	0.138(J-)	—	—	—	NA	3.93(J-)	5.6(J-)	2.48(J-)	NA	—	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	NA	0.192	NA	0.616	NA	NA	1.63	1.57	NA	NA	NA	NA	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	NA	0.0214(J)	NA	0.0582	NA	NA	0.35	0.381	NA	NA	NA	NA	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	0.97(J-)	—	—	—	NA	14.6(J-)	19.1(J-)	3.63(J-)	NA	—	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	—	0.0127(J-)	—	—	—	NA	0.351(J-)	0.523(J-)	0.223(J-)	NA	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0456	0.0661	NA	NA	NA	NA	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	—	0.0328(J-)	—	—	—	NA	1.83(J-)	3.82(J-)	4.48(J-)	NA	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0146(J)	NA	NA	NA	NA	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	—	—	—	—	NA	0.0634(J-)	0.168(J-)	0.815(J-)	NA	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	NA	—	0.0425	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	0.0018(J)	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	NA	—	—	0.563	—	—	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	0.313(J-)	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	0.0129(J)	0.0164(J)	—	1.2	0.0888	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	—	—	—	—	NA	NA	—	—	NA	NA	0.0994	NA	0.0017	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	0.0074	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	0.0049	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	0.00078(J)	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	0.0011	—	0.451(J-)	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—	0.0222(J)	0.03(J)	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	0.0036	—	0.0041	—	—	0.174	0.271	—	14.8(J-)	—	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	—	0.0777	—	0.245	—	—	1.3	1.43	—	0.728(J+)	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	—	—	0.0052	—	0.264(J-)	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	—	0.0123(J)	—	0.0342(J)	—	—	0.244	0.322	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	—	—	—	0.00034(J)	0.0015	—	—	—	—	0.0013	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	—	—	—	—	0.0775	0.626	—	—	—	—	0.0015	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	0.0182(J)	0.0213(J)	0.148(J-)	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	—	—	—	—	—	0.104	0.123	0.318(J-)	—	—	—	0.00056(J)	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0421	0.0618	NA	NA	NA	NA	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0276(J)	0.0382(J)	NA	NA	NA	NA	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0208(J)	NA	NA	NA	NA	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	0.0428	—	0.111	—	—	0.893	1.08	7.28	9.4(J+)	—	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	—	0.0447	—	0.124	—	—	0.874	0.957	59.3(J+)	13.1(J+)	—	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	—	—	—	—	—	0.305(J)	0.487(J)	6.96	10.3(J+)	—	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	0.0035(J)	—	—	—	—	—	—	—	—	—	3.1(J+)	—	—	0.00077(J)	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	0.134(J)	0.246(J)	11.1	10.6(J+)	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	0.0126(J)	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—	1.51	1.51	4.97	18.4	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	0.435(J)	1.79	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00107	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000755(J)	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000432(J)	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.034(J)	0.043	NA	NA	NA	NA	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0114(J)	0.0139(J)	NA	NA	NA	NA	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.118	0.148	NA	NA	NA	NA	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0689	0.109	NA	NA	NA	NA	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	NA	3.13	NA	10.6	NA	NA	27.2	18.8	NA	NA	NA	NA	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0301(J)	0.0432	NA	NA	NA	NA	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0585	0.0804	NA	NA	NA	NA	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	NA	0.0279(J)	NA	0.0861	NA	NA	0.468	0.587	NA	NA	NA	NA	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	NA	0.038	NA	0.0931	NA	NA	0.616	0.787	NA	NA	NA	NA	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	NA	0.0135(J)	NA	0.0421	NA	NA	0.179	0.809	NA	NA	NA	NA	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	NA	0.24	NA	0.694	NA	NA	4.28	5.54	NA	NA	NA	NA	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	NA	1.78	NA	3.98	NA	NA	42.1	51.4	NA	NA	NA	NA	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	NA	0.0481	NA	0.108	NA	NA	1.66	2.25	NA	NA	NA	NA	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	NA	—	NA	—	NA	NA	0.102	0.129	NA	NA	NA	NA	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0883	0.107(J)	NA	NA	NA	NA	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0911	0.0997	NA	NA	NA	NA	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	NA	—	NA	—	NA	NA	0.0461	0.0785	NA	NA	NA	NA	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	NA	0.0151(J)	NA	0.0343(J)	NA	NA	0.612	0.811	NA	NA	NA	NA	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	NA	0.0162(J)	NA	0.0397	NA	NA	0.39	0.472	NA	NA	NA	NA	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	NA	0.0672	NA	0.224	NA	NA	0.779	0.785	NA	NA	NA	NA	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	NA	0.00969(J)	NA	0.0226(J)	NA	NA	0.205	0.274	NA	NA	NA	NA	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	NA	0.391	NA	1.02	NA	NA	10.9	14.9	NA	NA	NA	NA	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	NA	0.0168(J)	NA	0.0459	NA	NA	0.367	0.455	NA	NA	NA	NA	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0362(J)	0.0674	NA	NA	NA	NA	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0138(J)	NA	NA	NA	NA	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	NA	0.0982	NA	0.25	NA	NA	2.57	3.61	NA	NA	NA	NA	NA	NA

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0341(J)	0.0453	NA	NA	NA	NA	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	NA	0.0842	NA	0.204	NA	NA	1.96	2.48	NA	NA	NA	NA	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	NA	0.241	NA	0.578	NA	NA	3.08	3.21	NA	NA	NA	NA	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0204(J)	0.0352(J)	NA	NA	NA	NA	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	0.184(J)	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—	0.011(J)	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
0316-95-0226	16-01536	0.0–0.33	SOIL	—	—	—	—	3.03	NA	NA
0316-95-0227	16-01536	3.0–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	—	—	—	—	—	NA	NA
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	NA	NA	NA	0.222	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	NA	NA	NA	0.316	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	—	0.00069(J)	0.00023(J)	—	—	0.00045(J)
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	0.00048(J)	—	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	—	—	—	—	—	0.00044(J-)
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	0.00042(J-)	—	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	—	—	NA	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	—	0.00051(J-)	—	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	—	—	—	0.00032(J)
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	0.00032(J)
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	0.00033(J)
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	0.00031(J)
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	—	0.00025(J)	0.00063(J)
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	—	—	—	0.00025(J)	0.00063(J)
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	—	—	—	0.065(J-)	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	—	—	0.174(J-)	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	—	—	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	—	—	0.583(J-)	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	0.0049	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	0.0026	—	—	—	0.403	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	0.00264	—	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	0.0052	—	0.0014(J)	—	NA	0.00072(J)	0.0012(J)
RE16-05-56163	16-23750	0.25–0.83	SOIL	0.0063	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	0.0029	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	—	—	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	—	—	0.00026(J)	0.0009(J)
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	0.00029(J)
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	0.001(J)	—	—	—	—	0.00039(J+)	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	—	—	—	0.00053(J)
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	0.00065(J)	0.000219(J)	—	0.000438(J)	0.000962(J)
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—

Note: Results are in mg/kg.

[a] NA = Not analyzed.

[b] — = Not detected.

Table 6.3-8
Radionuclides Detected above BV in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
QBT 2,3,4 BV[a]				**1.98**	**0.09**	**1.93**
SOIL BV[a]				**2.59**	**0.2**	**2.29**
RE16-08-12365	16-23671	3.5–4.0	QBT4	—[b]	—	3.69
RE16-08-12368	16-23677	2.0–2.5	QBT4	2.3	0.287	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	0.183	4.92
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	0.0959	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	0.103	—
RE16-08-12385	16-24906	2.35–2.75	QBT4	—	0.12	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	—	0.112	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	—	0.183	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	0.142	4.41
RE16-08-12380	16-24910	2.0–2.5	QBT4	—	0.222	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	6.93	0.373	4.59
RE16-08-12382	16-24923	2.0–2.5	QBT4	3.57	0.31	2.67
RE16-08-12313	16-603406	2.5–3.0	QBT4	—	0.121	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	0.096	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	3.48	0.313	2.53
RE16-08-12327	16-603413	0.0–0.5	SOIL	3.46	—	2.58
RE16-08-12329	16-603414	3.0–3.5	QBT4	—	0.0901	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	3.67	—	2.35
RE16-08-12334	16-603417	0.0–0.5	SOIL	9.15	0.338	5.45
RE16-08-12336	16-603418	0.0–0.5	SOIL	8.1 (J+)	0.355 (J+)	4.9 (J+)
RE16-08-12337	16-603418	1.5–2.0	QBT4	3.74	0.161	3.13
RE16-08-12340	16-603420	0.0–0.5	SOIL	2.77	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	8.31	0.349	5.9
RE16-08-12348	16-603424	0.0–0.5	SOIL	4.69	0.248	3.29
RE16-08-12352	16-603426	0.0–0.5	SOIL	11.9	0.582	8.02
RE16-08-12354	16-603427	0.0–0.5	SOIL	3.84	0.56	2.68
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	0.0924	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	0.174	6.43
RE16-08-12358	16-603429	0.0–0.5	SOIL	3.19	0.237	2.44
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	0.109	—

Note: Results are in pCi/g.

[a] BVs are from LANL 1998, 059730.

[b] — = Not detected or not detected above BV.

Table 6.3-9
Inorganic Chemicals above BV in Fill, Sediment, Soil, and Tuff at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Zinc
QBT 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na[b]**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**63.5**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**48.8**
0316-97-0608	16-01551	0.5–2.5	SOIL	—[c]	NA[d]	—	—	NA	0.59(U)	—	27	—	—	NA	NA	—	—	0.12(U)	—	NA	NA	NA	2.4(U)	NA	1.5(U)	—
0316-97-0609	16-01551	2.5–4.0	QBT4	—	NA	—	—	NA	—	—	12	—	100	NA	NA	—	—	0.11(U)	21	NA	NA	NA	2.2(U)	NA	1.4(U)	83
0316-95-0253	16-01554	0.0–0.5	SED[e]	—	5.3(U)	—	—	NA	0.53(U)	—	—	—	—	1.1(U)	NA	31.3	—	—	—	NA	NA	—	—	NA	—	—
0316-95-0254	16-01555	0.0–0.5	SED	—	5.57(U)	—	—	NA	0.557(U)	—	—	—	—	1.1(U)	NA	71.5	—	—	—	NA	NA	—	—	NA	—	—
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	—	—	47.3	—	—	—	—	56.7	9.99	—	—	—	—	—	—	—	—	0.58(U)	7.77	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	—	6.29(U)	—	—	NA	0.629(U)	—	—	—	—	1.3(U)	NA	—	—	—	—	NA	NA	—	—	NA	—	—
0316-95-0503	16-02166	5.0–7.0	QBT4	—	13(UJ)	—	—	NA	—	—	260	11(U)	5.6(U)	0.56(U)	NA	—	—	0.11(U)	9(U)	NA	NA	1.1(UJ)	2.2(U)	NA	2.2(U)	—
0316-97-0610	16-02166	8.9–9.0	QBT4	—	NA	—	—	NA	—	—	77	—	56	NA	NA	—	—	0.12(U)	14	NA	NA	NA	2.4(U)	NA	1.5(U)	—
RE16-05-56045	16-23701	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.65	—	—	—	—	—	—	—	—	—	—	224
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	186	20.7	—	—	—	—	—	—	—	—	0.556(U)	24.9	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	—	—	0.611(U)	—	—	—	—	—	—	—	—	—	—	3.14	—	—	—	—	—	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	21.9	—	—	3.38	—	—	—	—	—	—	0.542(U)	2	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	—	—	—	—	—	—	29000(J)	—	—	—	—	1.08(J-)	—	—	—	—	—	—	1.84(U)	—	—	—	63.3(J-)
RE16-05-56050	16-23706	6.0–6.5	QBT4	10000	—	—	86.2	—	—	5260(J)	—	—	7.76	—	0.888(J-)	28.2(J)	—	—	6.64	—	—	1.05(J)	—	—	—	—
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	—	—	—	4.07	—	—	—	—	—	NA	—	—	—	—	—	0.799(J)	—	1.61(U)	—	—	—	—
RE16-05-56051	16-23708	4.0–4.5	FILL	—	—	—	—	—	0.595(U)	—	—	—	—	—	0.694(J-)	—	—	—	—	1.09(J-)	—	—	—	—	—	—
RE16-05-56052	16-23708	6.0–6.5	QBT4	8620	—	—	80.5	—	—	21500(J)	—	—	8.84	—	0.63(J-)	16.9(J)	—	—	—	0.858(J-)	—	0.944(J)	—	—	—	—
RE16-05-56053	16-23710	2.0–2.5	FILL	—	NA	—	—	—	—	7170	—	—	—	—	21.2	—	—	—	—	—	—	1.8(U)	—	—	—	—
RE16-05-56054	16-23710	5.0–5.5	QBT4	13700	NA	3.17	139	—	—	3970	—	—	—	—	9.1	12.6	1860(J+)	—	—	—	—	1.79(U)	—	—	—	—
RE16-05-56055	16-23712	2.0–2.5	FILL	—	NA	—	—	—	—	—	—	—	—	—	4.66	—	—	—	—	—	—	1.74(U)	—	—	—	—
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	NA	—	62.4	—	—	5850	—	—	—	—	1.48	—	2130(J+)	—	—	—	—	1.59(U)	—	—	—	—
RE16-05-56056	16-23713	2.0–2.5	FILL	—	NA	—	393	—	0.421(J)	—	—	—	—	—	1.55	—	—	—	—	—	—	1.7(U)	—	—	—	—
RE16-05-56058	16-23713	4.5–5.0	QBT4	15600	NA	3.32	163	—	—	3060	8.63	—	6.11	—	2.76	11.3	2300(J+)	—	10.3	—	—	1.79(U)	—	—	—	—
RE16-05-56059	16-23716	3.0–3.5	FILL	—	NA	—	—	—	0.502(J)	—	—	—	—	—	4.5	—	—	—	—	—	0.0028	1.79(U)	—	368	—	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	10500	NA	—	76.7	—	—	—	—	—	—	—	3.21	—	—	—	—	—	0.00222(J)	1.67(U)	—	343	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	—	NA	—	—	—	—	7070	—	—	—	—	2.87	—	—	—	—	—	—	1.79(U)	—	—	—	—
RE16-05-56062	16-23718	4.5–5.0	QBT4	11500	NA	—	286	—	—	4670	—	—	5.2	—	2.19	—	—	—	7.41	—	—	1.75(U)	—	—	—	—
RE16-05-56063	16-23720	2.5–3.0	SED	—	—	—	—	—	0.571(U)	—	—	—	—	—	7.45	—	—	—	—	—	—	1.71(U)	—	—	—	—
RE16-05-56064	16-23720	4.5–5.0	QBT4	14300	—	—	157	—	—	2960	8.05	—	5.81	—	4.38	—	2110	—	11.3	—	—	1.7(U)	—	—	—	—
RE16-05-56065	16-23722	2.0–2.5	SED	29800	—	—	—	—	0.602(U)	—	—	—	—	—	1.92	—	—	—	—	—	—	1.81(U)	—	—	—	—
RE16-05-56066	16-23722	4.0–4.5	QBT4	13100	—	—	95	—	—	2270	—	—	5.15	—	1.74	—	1700	—	—	—	—	1.68(U)	—	—	—	—
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	3.35(J-)	—	—	—	—	—	NA	2.89	—	—	—	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	—	—	14.9(U)	—	—	—	—	—	—	—	NA	1.71(J-)	—	—	—	—	0.977(J-)	NA	3.72	—	—	—	—
RE16-08-12310	16-603405	1.5–2.0	QBT4	9590	—	8.35(U)	—	—	—	—	8.34(J-)	—	—	NA	2.99(J-)	—	—	—	—	1.07(J-)	NA	2.36	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

[e] Sediment sample results are compared to the appropriate Soil BV. For further explanation, see Appendix H, Section 2.0..

Table 6.3-10
Organic Chemicals Detected in Fill, Sediment, Soil, and Tuff at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Butanone[2-]	Chrysene	Di-n-butylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene
0316-95-0253	16-01554	0.0–0.5	SED	—[a]	NA[b]	—	0.094(J)	0.11(J)	0.13(J)	0.074(J)	0.057(J)	—	NA	0.12(J)	—	—	—	NA	NA	0.25(J)	—
0316-95-0254	16-01555	0.0–0.5	SED	0.67(J)	NA	1	1.5	1.6	2	0.77	0.8	—	NA	1.8	—	0.2(J)	0.28(J)	NA	NA	3.3	0.62(J)
0316-95-0500	16-01555	0.0–0.5	SED	NA	—	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	—	—	NA	NA
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	0.013	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	0.21(J)	NA	0.27(J)	0.74	0.78	1	0.36(J)	0.44	0.18(J)	NA	0.81	—	0.085(J)	0.097(J)	NA	NA	1.8	0.17(J)
0316-95-0503	16-02166	5.0–7.0	QBT4	—	0.058	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.0342(J)	—	—	—	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	0.0237(J)	—	—	—	—	—	—	0.0253(J)	0.0587(J)	—	—	—	—	0.0418	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	6.09	—	10.7	18.4	15.8	22.7	7.28	9.12	—	—	18.1	—	—	3.83	0.0022	—	39.6	6.32
RE16-05-56050	16-23706	6.0–6.5	QBT4	3.65	—	6.18	9.51	7.82	9.06	5.63	3.63	—	—	9.08	—	—	2.19	—	—	19.6	3.71
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	—	0.00965(J)	—	0.0282(J)	0.0417	0.0179(J)	—	—	—	—	—	—	—	—	—	0.0593	—
RE16-05-56051	16-23708	4.0–4.5	FILL	0.806	0.0104(J)	1.55	2.31	2.09	2.45	1.03	1.28	—	—	2.42	—	—	0.496(J)	0.0013(J)	0.00037(J)	5.72	0.891
RE16-05-56052	16-23708	6.0–6.5	QBT4	1.55	0.008(J)	2.68	4.34	4.07	5.22	2.03	2.09	—	—	4.64	—	—	0.949(J)	—	—	10.2	1.68
RE16-05-56053	16-23710	2.0–2.5	FILL	0.0027	—	0.0053	—	0.0131	0.0204	0.0063	—	—	—	0.0141	—	—	—	—	—	0.0246	0.0028
RE16-05-56054	16-23710	5.0–5.5	QBT4	0.119(J-)	0.0263	0.222(J-)	0.577(J-)	0.572(J-)	0.757(J-)	0.372(J-)	0.274(J-)	—	—	0.599(J-)	—	0.143(J-)	—	—	—	1.27(J-)	0.11(J-)
RE16-05-56055	16-23712	2.0–2.5	FILL	0.356	—	0.384	0.758	0.694	1.1	0.27	—	—	—	0.841	—	—	0.215(J)	—	—	1.69	0.332
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	—	0.00037(J)	—	0.0011	0.0021	—	—	—	—	0.0015	—	—	—	—	—	0.0026	—
RE16-05-56056	16-23713	2.0–2.5	FILL	0.151(J-)	—	0.218(J-)	0.391(J-)	0.37(J-)	0.394(J-)	0.244(J-)	0.212(J-)	—	—	0.4(J-)	—	—	—	—	—	0.968(J-)	0.142(J-)
RE16-05-56058	16-23713	4.5–5.0	QBT4	0.0064	—	0.0081	0.017	0.0151(J)	0.0228(J)	0.0087(J)	—	—	—	0.0178	—	—	0.0037(J)	—	—	0.0286	0.0061
RE16-05-56059	16-23716	3.0–3.5	FILL	—	—	0.0113(J)	—	0.0403	0.0642	—	—	—	—	—	—	—	—	—	—	0.0751	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	0.0181	0.0119	0.0333	0.0595	0.0509	0.0786	0.0218	—	—	—	0.0625	—	—	—	—	—	0.114	0.02
RE16-05-56062	16-23718	4.5–5.0	QBT4	0.07	0.0057(J)	0.161	0.225	0.2	0.331	0.0813	—	—	—	0.242	—	—	0.0421(J)	—	—	0.437	0.0893
RE16-05-56063	16-23720	2.5–3.0	SED	0.0939	0.0042(J)	0.139	0.342	0.332	0.451	0.143(J)	0.166	—	—	0.364	—	—	—	—	—	0.914	0.0824
RE16-05-56064	16-23720	4.5–5.0	QBT4	—	—	0.0111(J)	—	0.0371	0.0632	0.023(J)	—	—	—	0.0407	—	—	—	—	—	0.0926	—
RE16-05-56065	16-23722	2.0–2.5	SED	0.0372(J)	0.286	0.0568	—	0.114	0.2	0.0595(J)	—	—	0.156	0.135	—	—	—	—	—	0.285	0.0301(J)
RE16-05-56066	16-23722	4.0–4.5	QBT4	0.17	0.0144	0.225	0.62	0.596	0.91	0.493	—	—	—	0.646	—	—	—	—	—	1.3	0.141(J)
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	—	—	—	0.0228(J)	0.0321(J)	0.0204(J)	—	—	—	—	—	—	—	—	—	0.0528	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	0.0222(J)	NA	—	—	—	0.0979	—	—	—	NA	—	—	—	—	NA	NA	0.0185(J)	—

Table 6.3-10 (continued)

Sample ID	Location ID	Depth (ft)	Media	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol	Propylbenzene[1-]	Pyrene	RDX	TATB	Toluene	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,3-]+Xylene[1,4-]
0316-95-0253	16-01554	0.0–0.5	SED	—	0.078(J)	NA	NA	—	—	0.14(J)	—	NA	0.23(J)	—	—	NA	NA	NA	NA	NA
0316-95-0254	16-01555	0.0–0.5	SED	—	0.87	NA	NA	0.18(J)	0.47(J)	3.1	—	NA	4.6	—	—	NA	NA	NA	NA	NA
0316-95-0500	16-01555	0.0–0.5	SED	NA	NA	—	0.021	NA	NA	NA	NA	—	NA	NA	NA	—	—	—	—	NA
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	—	0.4(J)	NA	NA	0.069(J)	0.17(J)	1.2	—	NA	2.4	—	—	NA	NA	NA	NA	NA
0316-95-0503	16-02166	5.0–7.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	NA
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	—	—	—	0.023(J)	—	—	0.0425	0.151(J)	NA	—	—	—	—	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	0.0487(J)	—	—	—	NA	—	—	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	—	7.54	—	—	2.67	7.83	39.1	—	—	40.9	—	1.14(J-)	—	—	—	—	—
RE16-05-56050	16-23706	6.0–6.5	QBT4	—	5.38	—	—	1.6	5.22	19.4	—	—	17.4	—	0.298(J-)	—	—	—	—	—
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	0.0162(J)	—	—	—	—	0.0394	—	—	0.051	—	—	—	—	—	—	—
RE16-05-56051	16-23708	4.0–4.5	FILL	—	1.04	—	—	0.248	0.712	5.22	—	0.00036(J)	4.7	—	—	—	—	0.0018	0.00059(J)	0.0009(J)
RE16-05-56052	16-23708	6.0–6.5	QBT4	0.786(J-)	2	—	—	0.579	1.7	9.31	—	—	8.92	—	—	0.0004(J)	—	0.0012(J)	0.0004(J)	—
RE16-05-56053	16-23710	2.0–2.5	FILL	—	0.0059	—	—	0.00071(J)	—	0.0203	—	—	0.0285	—	NA	—	—	—	—	—
RE16-05-56054	16-23710	5.0–5.5	QBT4	—	0.346(J-)	—	—	0.0286(J-)	0.0792(J-)	0.877(J-)	—	—	1.24(J-)	—	NA	0.0019	—	—	—	—
RE16-05-56055	16-23712	2.0–2.5	FILL	—	0.261	—	—	0.157	0.534	1.88	—	—	1.75	—	NA	—	—	—	—	—
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	0.00055(J)	—	—	—	—	0.0023	—	—	0.0033	—	NA	—	—	—	—	—
RE16-05-56056	16-23713	2.0–2.5	FILL	—	0.242(J-)	—	—	0.0666(J-)	0.237(J-)	0.832(J-)	—	—	0.823(J-)	—	NA	—	—	—	—	—
RE16-05-56058	16-23713	4.5–5.0	QBT4	—	0.0075(J)	—	—	0.0025	0.0076	0.0377	—	—	0.043	—	NA	—	—	—	—	—
RE16-05-56059	16-23716	3.0–3.5	FILL	—	—	—	—	—	—	0.0487	—	—	0.0885	—	NA	—	—	—	—	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	—	0.0194	0.0003(J)	—	0.0061(J)	0.0165	0.125	—	—	0.131	—	NA	—	—	0.00051(J)	—	0.00046(J)
RE16-05-56062	16-23718	4.5–5.0	QBT4	—	0.076	—	—	0.0153	0.0332	0.462	—	—	0.478	—	NA	—	—	0.00065(J)	—	—
RE16-05-56063	16-23720	2.5–3.0	SED	NA	0.084	—	—	0.0257(J)	0.0519	0.692	—	—	0.875	NA	NA	—	0.00034(J)	—	—	—
RE16-05-56064	16-23720	4.5–5.0	QBT4	NA	—	—	—	—	—	0.0625	—	—	0.0944	NA	NA	—	—	—	—	—
RE16-05-56065	16-23722	2.0–2.5	SED	NA	—	—	0.01	0.0147(J)	0.0459	0.222	—	—	0.293	NA	NA	—	—	—	—	—
RE16-05-56066	16-23722	4.0–4.5	QBT4	NA	0.525	—	0.0026	0.0454(J)	0.138(J)	1.15	—	—	1.52	NA	NA	—	0.0004(J)	—	—	—
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	0.0169(J)	—	—	—	—	0.0328(J)	—	—	0.0429	—	—	—	—	—	—	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	—	—	NA	NA	—	—	—	—	NA	0.0156(J)	—	—	NA	NA	NA	NA	NA

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 6.4-1
Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
Surface Water																									
Historical Samples (1995–2005)																									
0316-97-3102	16-02654	Fish Ladder Seep	F[a]	9/19/1997	0–0	—[b]	—	—	—	—	—	3746R	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-3102	16-02654	Fish Ladder Seep	UF[b]	9/19/1997	0–0	—	—	—	—	3745R	—	3746R	—	—	—	—	—	—	—	—	—	—	—	3744R	3744R
0316-97-3103	16-02654	Fish Ladder Seep	F	9/19/1997	0–0	—	—	—	—	3745R	—	3746R	—	—	—	—	—	—	—	—	—	—	—	3744R	—
EU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11785, 8022, 8103	—	—	—
EU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11293, 11816	—	—	—
GF05070SFLS01	16-02654	Fish Ladder Seep	F	8/25/2005	0–0	—	—	—	—	—	—	144191	—	—	—	—	—	—	—	—	—	—	—	—	—
GF05100SFLS01	16-02654	Fish Ladder Seep	F	11/14/2005	0–0	—	—	—	—	—	—	150272	—	—	—	—	—	—	—	—	—	—	—	—	—
GU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	144191	144191	—	144191	—	144191	—	—	—	—	—	—	144191	—	—	—	—	—	144191
GU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	150272	150272	—	150272	—	150272	—	—	—	—	—	—	150272	—	—	—	—	—	150272
RE16-00-3133	16-02654	Fish Ladder Seep	UF	3/30/2000	0–0	—	—	—	—	6663R	—	6664R, 6665R	—	—	—	—	—	—	—	—	—	6667R, 6668R	—	—	6662R
RE16-00-3134	16-02654	Fish Ladder Seep	F	3/30/2000	0–0	—	—	—	—	—	—	6664R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-01-3126	16-02654	Fish Ladder Seep	UF	4/17/2001	0–0	—	—	—	—	8686R	—	8684R, 8685R	—	—	—	—	—	—	—	—	—	8687R	—	8683R	8683R
RE16-01-3127	16-02654	Fish Ladder Seep	F	4/17/2001	0–0	—	—	—	—	—	—	8684R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-03-50737	16-02654	Fish Ladder Seep	UF	3/27/2003	0–0	—	—	—	—	1682S, 1683S	—	1683S	—	—	—	—	—	—	—	—	—	1680S	—	—	1683S
RE16-03-50738	16-02654	Fish Ladder Seep	F	3/27/2003	0–0	—	—	—	—	—	—	1683S	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-04-53120	16-02654	Fish Ladder Seep	UF	4/5/2004	0–0	—	—	—	—	2073S, 2074S	—	2073S, 2075S	—	—	—	—	—	—	—	—	—	2076S	—	2073S	2073S
RE16-04-53121	16-02654	Fish Ladder Seep	F	4/5/2004	0–0	—	—	—	—	—	—	2075S	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3020	16-02654	Fish Ladder Seep	F	3/30/1998	0–0	—	—	—	—	4191R	—	4192R	—	—	—	—	—	—	—	—	—	—	—	4190R	4190R
RE16-98-3021	16-02654	Fish Ladder Seep	F	3/30/1998	0–0	—	—	—	—	—	—	4192R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3021	16-02654	Fish Ladder Seep	UF	3/30/1998	0–0	—	—	—	—	4191R	—	4192R	—	—	—	—	—	—	—	—	—	—	—	4190R	4190R
UU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WG9506025851	16-02654	Fish Ladder Seep	F	6/2/1995	0–0	—	UNK[d]	—	—	—	—	UNK	UNK	UNK	—	—	—	—	—	—	—	—	—	—	—
WG9506025851	16-02654	Fish Ladder Seep	UF	6/2/1995	0–0	—	—	—	—	UNK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	UNK
EU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a[e]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8119	—	—	—
EU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11516, 11750	—	—	—
GF0507FLCDV01	16-06121	Fishladder Canyon at CDV	F	8/23/2005	n/a	—	—	—	—	—	—	144031	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.4-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GF0510FLCDV01	16-06121	Fishladder Canyon at CDV	F	11/10/2005	n/a	—	—	—	—	—	—	150010	—	—	—	—	—	—	—	—	—	—	—	—	—
GU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a	—	144031	144031	—	144031	—	144031	—	—	—	—	—	—	144031	—	—	—	—	—	144031
GU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	150010	150010	—	150010	—	150010	—	—	—	—	—	—	150010	—	—	—	—	—	150010
RE16-01-3140	16-06121	Fishladder Canyon at CDV	UF	4/25/2001	n/a	—	—	—	—	8709R	—	8710R, 8716R	—	—	—	—	—	—	—	—	—	8711R	—	8708R	8708R
RE16-01-3141	16-06121	Fishladder Canyon at CDV	F	4/25/2001	n/a	—	—	—	—	—	—	8710R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3084	16-06121	Fishladder Canyon at CDV	UF	12/21/1998	n/a	—	—	—	—	5090R	—	5091R	—	—	—	—	—	—	—	—	—	5092R, 5093R	—	5089R	5089R
UU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2006–2008 Samples																									
AU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	28999	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	29775	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EF071000SFLS01	16-02654	Fish Ladder Seep	F	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22651	—	—	—
EU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11740, 11905, 18171	—	—	—
EU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19504	—	—	—
EU071000SFLS02	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	WG-08044-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	Fish Ladder Seep	F	4/3/2006	0–0	—	—	—	—	—	—	159873	—	—	—	—	—	—	—	—	—	—	—	—	—
GF070500SFLS01	16-02654	Fish Ladder Seep	F	5/11/2007	0–0	—	185982	—	—	—	—	185982	—	—	—	—	—	—	185982	—	—	—	—	—	—
GF071000SFLS01	16-02654	Fish Ladder Seep	F	10/19/2007	0–0	196215	196215	—	—	—	196215	196215	196215	196215	—	196215	196215	—	196215	—	—	—	196215	—	—
GU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	159873	159873	—	159873	—	159873	—	—	—	—	—	—	159873	—	—	—	—	159873	159873
GU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	185982	—	185982	—	185982	—	—	—	—	—	185982	—	185982	—	—	—	185982	185982
GU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	196215	—	196215	—	196215	196215	196215	196215	196215	196215	196215	196215	196215	—	196215	—	—	196215	196215	196215
SU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	—	F7E120132	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	WG-08002-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EU0602FLCDV01	16-06121	Fishladder Canyon at CDV	UF	4/10/2006	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11756, 11928, 18191	—	—	—
GF0602FLCDV01	16-06121	Fishladder Canyon at CDV	F	4/10/2006	n/a	—	—	—	—	—	—	160579	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.4-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GU0602FLCDV01	16-06121	Fishladder Canyon at CDV	UF	4/10/2006	n/a	—	160579	160579	—	160579	—	160579	—	—	—	—	—	—	160579	—	—	—	—	160579	160579
Alluvial Groundwater																									
Historical Samples (1995–2005)																									
RE16-06-64300	16-25278	Fishladder Canyon Alluvial Well #3	UF	11/17/2005	5.21–6.0	—	—	—	—	4135S	—	4135S, 4136S	—	—	—	—	—	—	—	—	—	—	—	4135S	4135S
RE16-06-64301	16-25278	Fishladder Canyon Alluvial Well #3	F	11/17/2005	5.21–6.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-06-64302	16-25279	Fishladder Canyon Alluvial Well #2	UF	11/17/2005	6.66–7.2	—	—	—	—	4135S	—	4135S, 4136S	—	—	—	—	—	—	—	—	—	—	—	4135S	4135S
RE16-06-64303	16-25279	Fishladder Canyon Alluvial Well #2	F	11/17/2005	6.66–7.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2006–2008 Samples																									
CAWA-08-11597	16-25278	Fishladder Canyon Alluvial Well #3	F	4/10/2008	1.6–3.2	—	08-984	—	—	—	—	08-984	—	—	—	—	—	—	08-984	—	—	—	—	—	—
CAWA-08-11599	16-25278	Fishladder Canyon Alluvial Well #3	UF	4/10/2008	1.6–3.2	—	—	08-984	—	08-984, 08-985	—	08-984	—	—	—	—	—	—	—	—	08-984	—	—	—	08-984
EF071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	F	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22652	—	—	—
EU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19506	—	—	—
EU071000FLC302	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	WG-08041-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	F	10/22/2007	1.6–3.2	196275	196275	—	—	—	196275	196275	196275	196275	—	196275	196275	—	196275	—	—	—	196275	—	—
GU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	196275	—	196275	—	196275	196275	196275	196275	196275	196275	196275	196275	196275	—	196275	196275	—	196275	196275	196275
SU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	WG-08003-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAWA-08-11601	16-25279	Fishladder Canyon Alluvial Well #2	UF	4/10/2008	2.7–4.3	—	—	08-984	—	08-984, 08-985	—	08-984	—	—	—	—	—	—	—	—	08-984	—	—	—	08-984
CAWA-08-11602	16-25279	Fishladder Canyon Alluvial Well #2	F	4/10/2008	2.7–4.3	—	08-984	—	—	—	—	08-984	—	—	—	—	—	—	08-984	—	—	—	—	—	—
EF071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	F	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22653	—	—	—
EU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19507	—	—	—
EU071000FLC202	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	WG-08042-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	F	10/24/2007	2.7–4.3	196433	196433	—	—	—	196433	196433	196433	196433	—	196433	196433	—	196433	—	—	—	196433	—	—

Table 6.4-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	196433	—	196433	—	196433	196433	196433	196433	196433	196433	196433	196433	196433	—	196433	196433	—	196433	196433	196433
SU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	WG-08004-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAWA-08-11604	16-25280	Fishladder Canyon Alluvial Well #1	F	4/3/2008	2.6–4.2	08-930	08-930	—	—	—	08-930	08-930	—	—	—	08-930	08-930	—	08-930	—	—	—	08-930	—	—
CAWA-08-11605	16-25280	Fishladder Canyon Alluvial Well #1	UF	4/3/2008	2.6–4.2	08-930	—	08-930	—	08-930, 08-931	08-930	08-930	—	—	08-930	08-930	08-930	08-930	—	08-930	08-930	—	08-930	08-930	08-930
GU06020FLC101	16-25280	Fishladder Canyon Alluvial Well #1	UF	2/16/2006	2.6–4.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	156396

Note: Numbers in analyte columns are request numbers.

[a] F = Filtered

[b] — = Not requested.

[c] UF = Unfiltered

[d] UNK = Unknown

[e] n/a = Not applicable.

Table 6.5-1
Inorganic Chemicals Detected in Surface and Alluvial Groundwater Water Collected in Fishladder Canyon from 2006–2008

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Alkalinity-CO_3+HCO_3 (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Bromide (mg/L)	Cadmium (µg/L)	Calcium (mg/L)	Chloride (mg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (mg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (mg/L)
Surface Water																								
EU071000SFLS02	16-02654	n/a[a]	10/19/2007	UF[b]	57.716	—[c]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	n/a	4/3/2006	F[d]	—	3310	—	—	—	206	29.1	—	—	6.55	—	1.3	9.2	4.2	—	—	24.4	1890	1.3	1.96
GF070500SFLS01	16-02654	n/a	5/11/2007	F	23.1	1590	—	—	2.7	221	35.9	—	—	7.52	8.42	—	—	—	—	0.189	27.1	910	—	2.03
GF071000SFLS01	16-02654	n/a	10/19/2007	F	40.8	1210	—	—	—	238	40.9	—	0.14	9.54	4.99	—	1.5 (J-)	—	—	0.261	34.4	850	0.75	2.56
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	26.6	5870	—	—	352	—	30.3	0.088	—	7.97	2.68	2.6	1.3	5.8	—	—	29.6	3500	2.8	2.36
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	—	23200 (J)	—	5.2	633	1.2	41.3	—	0.22	10.3	—	12.6	3.8	7.8 (J-)	0.00452 (J-)	—	44.7	13400 (J+)	11.2	4.58
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	5730	—	—	487	—	38.4	—	0.51	11.2	—	8.7	1.8 (J-)	—	—	—	41.3	4130	13.8	3.26
GF0602FLCDV01	16-06121	n/a	4/10/2006	F	—	5070	—	—	—	177	36.8	—	—	9.01	—	—	4.1	—	—	—	32.2	2820	1.3	2.68
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	61.8	112000	—	25.8	6430	9.2	85.6	—	3.3	52.9	2.63	53.2	45.4	80.1	0.013	0.108	166	79400	83.9	18.2
Alluvial Groundwater																								
CAWA-08-11597	16-25278	1.6	4/10/2008	F	24.3	8830	—	0.58	—	315	24.7	—	—	7.33	2.43	3.6	—	4.3	—	0.14	28.7	4980	1.7	2.54
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	11000	—	—	349	—	24.5	—	0.14	7.38	—	4.9	—	5	0.00182	—	30.4	6550	2.6	2.9
EU071000FLC302	16-25278	1.6	10/22/2007	UF	107.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	77.4	94.2	—	—	—	618	27.7	0.114	—	17.9	2.4	—	7.9	—	—	0.236 (J+)	62.2	2520	—	4.22
GU071000FLC301	16-25278	1.6	10/22/2007	UF	—	221	—	2.1	644	—	26.7	—	—	18.5	—	1.5	8.2	—	0.00402 (J-)	—	64.1	3460	—	4.34
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	33100	—	—	299	1.4	28.4	—	0.15	7.5	—	3.2	8.7	10.2	—	—	37.6	18900	3.9	4.58
CAWA-08-11602	16-25279	2.7	4/10/2008	F	18	12100	0.035	—	—	184	25	—	0.18	5.95	3.03	5.9	8.2	4.3	—	0.116	24.9	7210	3.3	2.44
EU071000FLC202	16-25279	2.7	10/24/2007	UF	57.359	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	2.7	10/24/2007	F	41.3	4060	—	—	—	218 (J+)	44.2 (J+)	0.107	0.24	9.62	3.82	2.6	18	7.1 (J-)	—	0.204 (J+)	34.8	2770 (J+)	1.9	2.62
GU071000FLC201	16-25279	2.7	10/24/2007	UF	—	14200	—	—	355 (J+)	—	46.8 (J+)	—	0.28	10.3	—	8.7	13.1	10.8 (J-)	0.0021 (J-)	—	40.7	8840 (J+)	6.1	3.66
CAWA-08-11604	16-25280	2.6	4/3/2008	F	31.8	14000	—	—	—	462	34.7	—	0.13	7.65	3.39	10.2	5.7	7.3	—	0.213	30.3	7900	5.2	2.72
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	29900	0.64	—	708	1.3	36.8	—	0.35	8.83	—	17.4	2.1	12.7	—	—	40.3	16700	11.4	4.43

Table 6.5-1 (continued)

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Manganese (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	pH (SU)	Potassium (mg/L)	Silicon Dioxide (mg/L)	Silver (µg/L)	Sodium (mg/L)	Specific Conductance (uS/cm)	Strontium (µg/L)	Sulfate (mg/L)	Suspended Sediment Concentration (mg/L)	Thallium (µg/L)	Tin (µg/L)	Total Dissolved Solids (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Organic Carbon (mg/L)	Total Phosphate as Phosphorus (mg/L)	Total Suspended Solids (mg/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Surface Water																											
EU071000SFLS02	16-02654	n/a	10/19/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	n/a	4/3/2006	F	222	—	2.7	3.8	—	3.72	—	—	7.07 (J)	—	39.9	—	—	—	—	70	—	—	—	—	—	4.2	13.3
GF070500SFLS01	16-02654	n/a	5/11/2007	F	299	—	—	2.1	7.17 (J)	3.43	35.1	—	8.99	105	49.9	6.13	—	—	—	177	1.41	—	0.282	—	0.07 (J-)	—	—
GF071000SFLS01	16-02654	n/a	10/19/2007	F	151	—	—	3	6.98 (J)	3.96 (J)	33.2	—	9.9	106	59.4	3.46	—	—	—	119	1.56	—	—	—	0.2 (J)	—	4
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	312	—	2.5	3.9	6.45 (J)	4.25	39.9	—	7.23 (J)	89.1	51.2	4.89	—	—	—	—	1.23	—	—	27.2	—	7.1	18.2
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	533	—	—	8.4	—	6.67	—	0.47	9.5	—	72.9	—	90	—	2.6	—	2.3	18.9	—	—	0.83	24.9	45.4 (J)
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	308	—	—	8.2	—	4.85 (J)	—	0.44	10.4	—	73.2	—	212	—	—	—	1.9	22.1	—	—	1.2 (J)	9.8 (J+)	15.9
GF0602FLCDV01	16-06121	n/a	4/10/2006	F	23.5	—	—	2.2	—	3.8	—	—	7.77	—	60.1	—	—	—	—	—	—	—	—	—	0.2	4.3	14.1
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	15500	0.58	—	48.2	6.86 (J)	19	170	0.96	9.67	125	447	8.87	2570	1.1	9.3	—	—	—	—	—	25.6	126	420
Alluvial Groundwater																											
CAWA-08-11597	16-25278	1.6	4/10/2008	F	105	—	0.65	2.2	6.74	3.63	53.5	0.29	6.07	74.2	47.8	4.01	—	—	—	142	—	—	0.087	—	0.22	9.5	19.4
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	118	—	0.74	2.9	—	3.86	—	0.35	6	—	49.1	NA	3.6	—	—	—	0.766	12.5	—	—	0.3	11.5	22.2
EU071000FLC302	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	1370	—	—	7 (J)	6.39 (J)	3.12	27.9	—	8.13	159	125	1.78	—	—	—	139	0.823	—	0.088 (J-)	—	0.18	2.1	3.7
GU071000FLC301	16-25278	1.6	10/22/2007	UF	1460	—	—	7.3 (J)	—	3.16	—	—	8.32	—	130	—	2.6	—	—	—	0.924	22.8	—	—	0.18	2.4	4.2
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	709	—	0.56	5	—	6.28	—	0.61	6.68	—	54.8	—	49.7	—	—	—	1.02	11.5	—	—	0.42	28.5	55.2
CAWA-08-11602	16-25279	2.7	4/10/2008	F	565	—	0.93	5.5	6.21	3.65	67.4	0.27	6.12	67	41.1	4.52	—	—	—	164	—	—	0.103	—	0.31	12.5	25.2
EU071000FLC202	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	2.7	10/24/2007	F	1030 (J+)	—	—	10 (J)	6.05 (J)	3.98	48.3 (J+)	—	9.95	109	66.7 (J+)	4.94	—	—	—	136	0.517	—	—	—	0.22 (J)	—	14.6
GU071000FLC201	16-25279	2.7	10/24/2007	UF	1100 (J+)	0.042 (J-)	—	13.3 (J)	—	5.69	—	0.37	10.3	—	76.2 (J+)	—	124	—	—	—	0.9	15	—	—	0.66 (J)	16.5	31.4
CAWA-08-11604	16-25280	2.6	4/3/2008	F	73.1	—	1.9	6.2	6.36	3.56	78.3	0.34	11.2	94.4	52.1	4.87	—	—	—	194	—	—	0.116	—	0.49	16.6	30.5
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	109	0.032	2.4	11.8	—	5.42	—	0.76	11.1	—	64.2	—	24	0.36	—	—	0.573	13.3	—	—	0.91	32	59.4

[a] n/a = Not applicable.

[b] UF = Unfiltered.

[c] — = Not detected or not analyzed.

[d] F = Filtered.

Table 6.5-2
Organic Chemicals Detected in Surface and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Acetone (µg/L)	cis-1,2-Dichloroethene (µg/L)	1,2,3,4,6,7,8-Heptachlorodibenzodioxin (µg/L)	Heptachlorodibenzodioxins (Total) (µg/L)	1,2,3,4,6,7,8-Heptachlorodibenzofuran (µg/L)	Heptachlorodibenzofurans (Total) (µg/L)	HMX (µg/L)	4-Isopropyltoluene (µg/L)	Methylene Chloride (µg/L)	1,2,3,4,6,7,8,9-Octachlorodibenzodioxin (µg/L)	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (µg/L)	RDX (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)
Surface Water																			
AU070500SFLS01	16-02654	n/a[a]	5/11/2007	UF[b]	—[c]	—	0.0000096 (J)	0.0000208 (J)	0.00000279 (J)	0.0000067 (J)	—	—	—	0.0000671 (J)	0.00000703 (J)	—	—	—	—
AU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	—	0.000012 (J)	0.0000315 (J)	—	—	—	—	—	0.000074 (J)		—	—	—	—
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	17.2	—	—	—	—	—	3.71	—	—	—	—	—	—	0.281	—
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	4.3 (J-)	—	—	—	—	—	10.2 (J+)	—	—	—	—	0.304 (J+)	—	—	—
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	3.96 (J-)	—	—	—	—	—	11.1 (J+)	—	—	—	—	0.172 (J+)	—	—	—
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	—	—	—	—	—	—	2.7 (J+)	—	5.04	—	—	—	—	—	—
Alluvial Groundwater																			
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	—	—	—	—	—	3.79	—	—	—	—	0.256	—	—	—
GU071000FLC301	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	—	3.8 (J-)	0.93	—	—	—	—	—	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	—	—	—	—	—	4.75	—	—	—	—	0.146	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	—	9.86 (J-)	—	—	—	—	—	—	—	—
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	9.55	—	—	—	—	33.3	—	—	—	—	7.47	193	—	11.8
GU06020FLC101	16-25280	2.6	2/16/2006	UF	—	26.7	—	—	—	—	—	—	—	—	—	—	6.09	0.462	3.99

[a] n/a = Not applicable.

[b] UF = Unfiltered.

[c] — = Not detected or not analyzed.

Table 6.5-3
Radionuclides Detected in Surface and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date	Field Prep	Gross alpha (pCi/L)	Gross beta (pCi/L)	Radium-226 (pCi/L)	Radium-228 (pCi/L)	Strontium-90 (pCi/L)	Tritium (pCi/L)	Uranium-234 (pCi/L)	Uranium-235/236 (pCi/L)	Uranium-238 (pCi/L)
Surface Water													
GF071000SFLS01	16-02654	n/a[a]	10/19/2007	F[b]	—[c]	9.25	—	—	—	—	0.153	—	0.119
GU071000SFLS01	16-02654	n/a	10/19/2007	UF[d]	14.3	18.2	—	—	—	—	0.5	—	0.528
UU06020SFLS01	16-02654	n/a	4/3/2006	UF	—	—	—	—	—	127.0814	—	—	—
UU070500SFLS01	16-02654	n/a	5/11/2007	UF	—	—	—	—	—	87.1689	—	—	—
UU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	—	—	—	—	47.2564	—	—	—
Alluvial Groundwater													
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	—	0.652	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	—	3.1 (J)	—	—	—	—	0.0708 (J)	—	0.0494 (J)
GU071000FLC301	16-25278	1.6	10/22/2007	UF	2.36 (J)	5.51 (J)	0.879 (J)	0.957 (J)	—	—	—	—	0.0501 (J)
UU071000FLC301	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	47.5757	—	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	—	0.888	1.41	—	—	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	UF	9.29	10.1	2.56	0.919 (J)	—	—	0.225	—	0.184
UU071000FLC201	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	50.7687	—	—	—
CAWA-08-11604	16-25280	2.6	4/3/2008	F	—	—	—	—	0.542	—	0.218	—	0.187
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	—	—	0.863	—	—	0.42	0.0431	0.47

[a] n/a = Not applicable.

[b] F = Filtered.

[c] — = Not detected or not analyzed.

[d] UF = Unfiltered.

Table 6.10-1
Pore-Gas Samples Collected at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	VOC
Historical Samples (2004–2005)				
RE16-05-56179	16-23691	49.2500–50.0	10/27/2004	2560S
RE16-05-56000	16-23691	50.0–51.0	4/27/2005	3182S
RE16-05-56002	16-23691	98.5–100.0	11/1/2004	2560S
RE16-05-55999	16-23691	100.0–101.0	4/27/2005	3182S
RE16-05-55997	16-23691	175.0–176.0	4/27/2005	3182S
RE16-05-56025	16-23691	199.0–200.0	11/3/2004	2579S
RE16-05-55988	16-23692	47.5–50.0	11/5/2004	2593S
RE16-06-64294	16-23692	48.0–50.0	12/15/2005	4212S
RE16-05-55990	16-23692	98.0–100.0	11/8/2004	2593S
RE16-06-64295	16-23692	98.0–100.0	12/15/2005	4212S
RE16-06-64296	16-23692	110.0–147.6	12/15/2005	4212S
RE16-05-55994	16-23692	132.0–137.0	11/10/2004	2628S
RE16-05-55995	16-23692	198.0–200.0	11/12/2004	2628S
2008 Samples				
RE16-08-12394	16-603511	47.0–53.0	8/15/2008	08-1693
RE16-08-12300	16-603511	47.0–53.0	7/15/2008	08-1557
RE16-08-12395	16-603511	95.0–103.0	8/15/2008	08-1693
RE16-08-12301	16-603511	95.0–103.0	7/15/2008	08-1557
RE16-08-12396	16-603511	196.5–203.0	8/15/2008	08-1693
RE16-08-12302	16-603511	196.5–203.0	7/15/2008	08-1557

Note: Numbers in analyte columns are request numbers.

Table 6.11-1
Organic Chemicals Detected in Pore Gas at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	Acetone	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Cyclohexane	Dichloroethane[1,2-]	Ethylbenzene	Hexane	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Tetrachloroethene	Toluene	Trichloroethene	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-56179	16-23691	49.25–50.0	10/27/2004	16	6.7	—*	—	—	24	—	—	—	5.5	—	—	—	—	30	92	55	—	5.8
RE16-05-56000	16-23691	50.0–51.0	4/27/2005	66	13	29	7.8	—	—	—	—	—	—	—	—	—	—	—	60	—	—	5.2
RE16-05-56002	16-23691	98.5–100.0	11/1/2004	42	6.7	—	—	—	37	—	—	—	9.2	—	—	—	—	—	31	6.9	4.8	11
RE16-05-55999	16-23691	100.0–101.0	4/27/2005	28	4.6	—	—	—	—	—	—	—	—	—	—	—	—	—	24	—	—	—
RE16-05-55997	16-23691	175.0–176.0	4/27/2005	285	76.6	40.5	15.1	—	—	—	—	5.28	—	—	4.92	—	—	—	339	—	—	6.7
RE16-05-56025	16-23691	199.0–200.0	11/3/2004	44	6.4	—	—	—	—	—	—	—	—	—	—	—	—	—	18	7	—	5.2
RE16-05-55988	16-23692	47.5–50.0	11/5/2004	9.9	—	—	—	—	—	—	—	—	—	—	—	27	—	—	32	—	—	—
RE16-06-64294	16-23692	48.0–50.0	12/15/2005	29	20	6.1	—	—	—	—	—	—	—	—	—	—	—	—	12	5.2	—	8.2
RE16-05-55990	16-23692	98.0–100.0	11/8/2004	19	3.7	—	—	—	14	—	—	—	—	—	—	—	—	—	18	—	—	4.1
RE16-06-64295	16-23692	98.0–100.0	12/15/2005	14	7.5	3.7	—	—	—	—	—	—	—	—	—	—	—	—	9.6	7.5	—	6.7
RE16-06-64296	16-23692	110.0–147.6	12/15/2005	15	9.5	7.4	—	—	—	—	—	—	—	—	—	—	—	—	4.8	—	—	—
RE16-05-55995	16-23692	198.0–200.0	11/12/2004	10	—	—	—	—	37	—	—	—	—	—	—	8.3	—	—	31	—	—	6.5
RE16-08-12394	16-603511	47.0–53.0	8/15/2008	—	—	—	6.4	12	—	78	—	—	—	4.5	—	—	—	140	6	1100	—	—
RE16-08-12300	16-603511	47.0–53.0	7/15/2008	—	—	—	—	12	—	13	—	—	—	—	—	—	—	15	—	120	—	—
RE16-08-12395	16-603511	95.0–103.0	8/15/2008	46	6.7	5.8	21	11	—	33	—	—	—	—	—	—	23	120	—	1200	—	—
RE16-08-12301	16-603511	95.0–103.0	7/15/2008	11	—	6.4	27	16	—	27	—	—	—	—	—	—	10	140	—	1200	—	—
RE16-08-12396	16-603511	196.5–203.0	8/15/2008	—	—	—	—	14	—	—	5.1	—	—	—	—	—	—	—	11	—	4.7	6.4
RE16-08-12302	16-603511	196.5–203.0	7/15/2008	62	21	5.6	—	200	—	—	5.5	3.2	—	—	4	—	26	—	8.6	—	5.6	12

Note: Results are in µg/m^3.

*— = Not detected.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
bgs	below ground surface
BV	background value
CCV	continuing calibration verification
COC	chain of custody
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cps	counts per second
CSM	conceptual site model
CVAA	cold vapor atomic absorption
%D	% detection
D&D	decontamination and decommissioning
DAF	dilution attenuation factors
DER	duplicate error ratio
DNB	1,3-dinitrobenzene
DNT	2,4- and 2,6-dinitrotoluene
DNX	hexahydro-1,3-nitro-1,3,5-triazine
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
EDL	estimated detection limit
Eh	oxidation/reduction potential
EOD	explosive ordinance device
EP	Environmental Programs
EPA	Environmental Protection Agency (U.S.)
EPC	exposure point concentration
EDL	estimated detection limit
EQL	estimated quantitation limit
ER	environmental restoration
ESL	ecological screening level

eV	electron volt
FV	fallout value
GC/MS	gas chromatography-mass spectrometry
GPC	gas proportional counting
HA	health advisory
HAS	hollow-stem auger
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosives
HI	hazard index
HIR	historical investigation report
HMX	cyclotetramethylenetetranitramine (1,3,5,7-tetranitro-1,3,5,7,-tetracyclo-octane)
HQ	hazard quotient
HR	home range
H-UCL	upper confidence limit based on Land’s H-statistic
IA	Information Architecture
ICS	interference check sample
ICV	initial calibration verification
I.D.	inside diameter
ID	identification
IDL	instrument detection limit
IDW	investigation-derived waste
IS	internal standard
IWD	integrated work document
K_d	partition coefficient
K_{oc}	organic carbon partition coefficient
K_{ow}	octanol/water partition coefficient
LAL	lower acceptance limit
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LIG	Laboratory implementation guideline
LIR	Laboratory implementation requirement
LOAEL	lowest-observed-adverse-effect level
MCL	maximum contaminant level
MDA	material disposal area

MDC	minimum detectable concentration
MDL	method detection limit
MNX	mononitrosodimethylamine
MS	matrix spike
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NMWQCC	New Mexico Water Quality Control Commission
NOAEL	no-observed-adverse-effect level
NOD	notice of disapproval
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
O.D.	outside diameter
OU	operable unit
%R	percent recovery
%RSD	percent relative standard deviation
%vwc	percent volumetric water content
PAH	polyaromatic hydrocarbon
PAUF	population area use factor
PB	preparation blank
PETN	pentaerythritol tetranitrate
PID	photoionization detector
PPE	personal protective equipment
ppm	part per million
PQL	practical quantitation limit
PRG	preliminary remediation goal
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylenetrinitramine (also 1,3,5-trinitro-1,3,5-triazacyclohexane)
RfD	reference dose
RFI	RCRA facility investigation
RL	reporting limit

RPD	relative percent difference
RRF	relative response factor
RSD	risk-specific dose
SAL	screening action level
SF	slope factor
SL	screening level
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SSL	soil screening level
SV	screening value
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list
TD	total depth
T&E	threatened and endangered
TATB	triaminotrinitrobenzene
TNB	1,3,5-trinitrobenzene
TNT	trinitrotoluene
TOC	total organic carbon
TPH-DRO	total petroleum hydrocarbons–diesel range organic
TRV	toxicity reference value
UAL	upper acceptance limit
UCL	upper confidence limit
VCA	voluntary corrective action
VOC	volatile organic compound
WCSF	waste characterization strategy form
wt%	weight percent
XRF	x-ray fluorescence

A-2.0 METRIC TO ENGLISH CONVERSIONS

Multiply SI (Metric) Unit	by	To Obtain US 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
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.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.
U	The analyte was analyzed for but not detected.
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.

Appendix B

Field Methods

B-1.0 INTRODUCTION

This appendix summarizes field methods used for the 2008 investigation and remediation conducted at Technical Area (TA) 16-340 Complex; the complex consists of Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f). All activities were conducted in accordance with the applicable standard operating procedures (SOPs), quality procedures (QPs), Los Alamos National Laboratory (LANL or the Laboratory) implementation requirements, Laboratory procedural requirements, Laboratory implementation guidance (LIG), and Laboratory implementation requirements (LIRs). The Laboratory procedures may be found at the following URL: http://www.lanl.gov/environment/all/qa/adep.shtml. The activities described in the approved investigation work plan (LANL 2004, 087345; LANL 2004, 087395; NMED 2004, 091143) were conducted from June 20, 2008, through July 15, 2008.

The following sections provide a description of field methods used during the 2008 investigation and removal at TA-16-340 Complex. Table B-1.0-1 provides a summary of the specific field methods followed during the investigation, and Table B-1.0-2 lists the general procedures followed during the investigation.

B-2.0 FIELD METHODS

All work was conducted per a site-specific health and safety plan and an integrated work document. Field activities conducted according to SOPs are discussed below.

B-2.1 Premobilization Site Surveys

All field activities were conducted in accordance with SOP-5055, General Instructions for Field Investigations. Several field activities were performed before setup and mobilization of the field crew and heavy equipment, including a geomorphic assessment of drainage sample locations and geodetic survey of all proposed sampling locations. The objective of these premobilization site surveys was to ensure that the field area was established and that all proposed sampling locations and/or excavation areas were properly identified and marked before any ground-disturbing activities began. Details regarding each of these prejob surveys are discussed below.

B-2.1.1 Geomorphic Assessment of Drainage Sample Locations

Several characterization samples were required from geomorphically significant locations (e.g., sediment traps, undisturbed areas) to bound the lateral extent of contamination associated with one or more drainage(s). As a result, a field reconnaissance was performed by qualified team members (e.g., geologists) to identify and mark appropriate sampling locations. The reconnaissance team marked all locations with a survey stake and identification number. This work was conducted in accordance with SOP-5027, Geomorphic Characterization.

B-2.1.2 Prejob Geodetic Survey

Before soil-disturbing activities began, a presampling geodetic survey was conducted to properly identify, mark, and stake all proposed drilling and sampling locations. The survey was conducted using methods consistent with established professional survey procedures. Work was completed following SOP-5028, Coordinating and Evaluating Geodetic Surveys.

B-2.2 Site Mobilization and Setup

The investigation area is located within TA-16, which is on Laboratory property, and thus all fieldwork activities complied with facility requirements set forth by the Laboratory. In addition, all areas lie within the current TA-16 high explosive (HE) exclusion zone, and public access to the site is restricted by security fences, guards, HE-access control, and other site controls. A security clearance is required to enter the site.

Because previous investigation results indicated the presence of elevated concentrations of potentially hazardous (either listed or characteristic) inorganic chemicals and organic chemicals in the soil and tuff at these sites, all fieldwork was implemented in accordance with Resource Conservation and Recovery Act Hazardous Waste Operations and Emergency Response (HAZWOPER) guidelines.

Site setup for this fieldwork included the establishment of the following work zones (as applicable to each investigation scope): HAZWOPER exclusion zones, contaminant reduction zones, parking and muster areas, equipment storage areas, waste storage and containment area(s) for investigation-derived waste (IDW), sample staging areas; field screening area/lab; and equipment-decontamination areas.

Specific requirements are anticipated for IDW management. Borehole cuttings and decontamination fluids were anticipated to be hazardous. In addition, the soil excavated at SWMU 16-003(o) is potentially characteristically hazardous. The IDW streams consisted of borehole cuttings, disposable sampling equipment such as gloves, and spent acetone from field-screening operations. A less-than-90-day storage area and a satellite accumulation area were set up. Waste storage area setup and management were completed in accordance with SOP-5022, Characterization and Management of Environmental Restoration Project Wastes. Appendix J provides details regarding waste management.

B-2.3 Drilling

The boreholes were drilled using a Stratastar-10 hollow-stem auger (HSA) drill rig, with 4.25-in.-inside-diameter augers equipped with a split barrel sampler. The sample barrel was connected to a cable on a hexagonal rod that extends through the augers. The split sample barrels were 5 ft length and provided continuous 3 in. outside diameter cores. The shallow boreholes were drilled to approximate total depth (TD) of 5 ft below the soil/tuff interface (approximately 7–20 ft below ground surface [bgs]).

One intermediate-depth borehole was drilled. When the HSA met refusal, the Stratastar-10 drill rig was converted to air coring system to drill through intervals of more densely welded tuff. The air-coring system also produced continuous 5-ft core samples. The intermediate-depth borehole was drilled to TD of 208 ft.

All drilling activities were in accordance with appropriate Laboratory guidance documents and protocols. Drilling equipment was decontaminated after use at each borehole. Decontamination was conducted in accordance with SOP-5061, Field Decontamination of Equipment. Rinsate blanks on drilling equipment were collected at a frequency of one per every 10 samples according to SOP-5059, Field Quality Control Samples.

Drill cuttings generated during sampling activities were placed in waste containers (1 yd^3 supersacks) and staged in an appropriate waste storage area. Waste remained on-site pending receipt of waste characterization results and was disposed of at an off-site facility. Waste characterization was managed per the approved waste characterization strategy form included in Appendix J and in accordance with SOP-5022, Characterization and Management of Environmental Restoration Project Wastes.

B-2.4 Core Retrieval, Screening of Core, and Borehole Logging

Continuous core was recovered for purposes of collecting subsurface soil and tuff in the intermediate-depth borehole. Core was collected from the split-spoon core barrel in accordance with SOP-6.24, Sample Collection from Split-Spoon Samplers and Shelby Tube Samplers. The core was inspected visually for fractures, staining and discoloration, saturated conditions, and unconsolidated sediment. The core was described for lithologic and structural features per SOP-5077, Field Sampling of Core and Cuttings for Geological Analysis, and SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials. Appendix C presents the borehole logs for the 2008 investigation.

The core was screened for volatile organic compounds (VOCs) for health and safety and environmental purposes using a hand-held photoionization detector (PID) equipped with an 11.7-eV lamp. Headspace vapor screening was conducted per SOP-6.33, Headspace Vapor Screening with a Photoionization Detector. Observations were recorded on borehole logs and/or on daily field-screening logs per SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials. Field trip blanks were obtained from the Sample Management Office (SMO) for VOC samples. Duplicate, rinsate, and blank quality-control (QC) samples were collected according to SOP-5059, Field Quality Control Samples.

Upon collection, samples remained in controlled custody of the field team at all times and were either stored in a cooler at the sample site or in the sample trailer until delivered to the SMO. All samples were field screened for radioactivity before they were submitted to the SMO to ensure compliance with U.S. Department of Transportation (DOT) requirements. Upon receipt of the samples, the SMO was given custody to deliver the samples to a preapproved off-site analytical laboratory. Samples were handled and managed per SOP-5056, Samples, Containers, and Preservations; SOP-5057, Handling, Packaging, and Transporting Field Samples; and SOP-5058, Sample Control and Field Documentation.

B-2.5 Collection and Analysis of Environmental Field-Screening Samples

Environmental field-screening activities entailed one or more of the following: (1) VOC headspace screening using a PID, (2) total HE screening using an HE spot test kit (detection limit 100 parts per million [ppm]), (3) RDX (1,3,5-trinitro-1,3,5-triazacyclohexane) and TNT (trinitrotoluene) screening using a D-TECH kit (detection limit 1 ppm), and (4) metals screening using an x-ray fluorescence (XRF) spectroscopy. All environmental field-screening results were recorded on the appropriate daily record log, lithologic log, and/or logbook per SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials.

All environmental screening samples collected were analyzed for VOC headspace and total HE. VOC headspace was performed by first taking a background reading, then placing and sealing part of the screening sample in a resealable glass jar, allowing the jar headspace to equilibrate (about 5 min), and taking a sample headspace reading with the 11.7-eV PID. Headspace vapor screening was conducted per SOP-6.33, Headspace Vapor Screening with a Photoionization Detector. Results were recorded on a daily field-screening log and on the corresponding lithologic boring log (Appendix C).

Screening for total HE was performed by the field team using the Laboratory-developed HE spot test kit. TA-16 experts in HE analyses trained field personnel on the use of the HE spot test kit. Provided?

For a select subset of environmental screening samples, semiquantitative analyses were performed (D-TECH and XRF). Semiquantitative-screening samples were determined by the selection criteria outlined in the approved work plan (detailed below) and by the results of the initial screening process (HE spot test) and borehole logging.

D-TECH screening was performed in accordance with Strategic Diagnostics, Inc., procedures. Screening was conducted on-site for samples having one or more of the following characteristics:

- the sample was collected at the surface (0.0–0.5 ft bgs);
- the sample showed staining or discoloration or another sign of potential contamination;
- the sample was collected at a major lithologic change (i.e., fill/tuff contact, unconsolidated sediments);
- the sample had major fractures and/or surge bed(s);
- the sample was collected at TD; and/or
- the sample tested positive using the HE spot test.

XRF screening for metals was performed for samples collected at selected intervals in the intermediate borehole. The samples were prepared in the field by sieving and placing them into appropriate labeled containers and transported to the Laboratory's Earth and Environmental Sciences laboratory where they were analyzed for metals (after they were screened for radioactivity and released from TA-16). A Laboratory-owned Innov-X model alpha-4000 XRF instrument (serial number 8157, LANL bar code 1235223) was used to field screen for barium and chromium. Analyses were carried out according to manufacturers' methods and requirements.

D-TECH and XRF results were recorded per SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials.

B-2.6 Borehole Abandonment

Abandonment of all of the shallow borings was completed using bentonite chips and hydrating from the bottom of the boring to surface grade. After approximately 24 hr, the backfilled level was checked for settlement and additional concrete/grout was added as needed.

B-2.7 Installation of a Pore-Gas Monitoring Well in Intermediate Borehole

Subsurface pore-gas samples were collected from one borehole in accordance with SOP 6.31, "Sampling of Subatmospheric Air."

A packer system was used to collect pore gas samples. Sampling through the augers with a single packer system allowed access to the TD sample. All other pore gas samples were collected using a straddle packer system that isolates a 2-ft interval within the borehole. Before sampling began, each depth interval was purged using a CES Landtec air-analyzer until measurements of carbon dioxide and oxygen were stable and representative of subsurface conditions. Subsurface pore gas samples were collected in SUMMA canisters and submitted for VOC analysis using U.S. Environmental Protection Agency (EPA) Method TO-15.

B-2.8 Excavation Investigations

Excavation activities were conducted between June 27, 2008, and July 10, 2008. A John Deere 644J frontend loader, John Deere backhoe, and John Deere 200LC excavator were used to excavate the soil. A water truck was used to minimize the dust. A total of 91 yd^3 of soil was removed from five areas within the upper Fishladder Canyon drainage to the soil/tuff interface. Excavated soil was placed in appropriate containers and stored onsite in a less than 90-day storage area pending waste characterization results (Appendix J).

B-2.9 Decontamination of Equipment

Decontamination of drilling and sampling equipment took place between boreholes to minimize the potential for cross-contamination between sampling locations. Primarily dry decontamination methods were used. Decontamination procedures followed SOP-5061, Field Decontamination of Equipment.

B-2.10 Site Demobilization and Restoration

Upon completion of investigation activities, all investigation-related equipment was removed from the site and the site was restored to previous conditions. A closeout checklist is in process to ensure demobilization from the site is complete in accordance with SOP-1.12, Field Site Closeout Check List.

B-3.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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), March 2004. "Investigation Work Plan for the TA-16-340 Complex, Solid Waste Management Units 13-003(a)-99, 16-003(n)-99, 16-003(o), 16-026(j2), and 16-029(f) at Technical Area 16," Los Alamos National Laboratory document LA-UR-04-1466, Los Alamos, New Mexico. (LANL 2004, 087345)

LANL (Los Alamos National Laboratory), June 2004. "Response to Notice of Disapproval, 'Investigation Work Plan for the TA-16-340 Complex, Solid Waste Management Units 13-003(a)-99, 16-003(n)-99, 16-003(o), 16-026(j2), and 16-029(f) at Technical Area (TA)-16' (LA-UR-04-1466; ER-2004-0095)," Los Alamos National Laboratory document LA-UR-04-4071, Los Alamos, New Mexico. (LANL 2004, 087395)

NMED (New Mexico Environment Department), June 28, 2004. "Approval of the Investigation Work Plan for the TA-16-340 Complex, Solid Waste Management Units 13-003(a)-99, 16-003(n)-99, 16-003(o), 16-026(j2), and 16-029(f) at Technical Area 16," New Mexico Environment Department letter to D. Gregory (DOE LASO) and G.P. Nanos (LANL Director) from D. Goering (NMED-HWB), Santa Fe, New Mexico. (NMED 2004, 091143)

Table B-1.0-1
Summary of Field Methods

Method	Summary
General Instructions for Field Investigations	This general procedure provides an overview of instructions regarding activities to be performed before, during, and after field investigations. It is assumed that field investigations involve standard sampling equipment, personal protective equipment (PPE), waste management, and site-control equipment/materials. The procedure covers premobilization activities, mobilization to the site, documentation and sample collection activities, sample media evaluation, surveillance, and completion of lessons learned.
Sample Containers and Preservation	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on the EPA guidance for environmental sampling, preservation, and quality assurance. Specific requirements are met for each sample and are printed in the sample collection logs provided by the SMO (size and type of container, preservatives, etc.). All samples are preserved by placing them in insulated containers with ice to maintain a temperature of 4°C.
Handling, Packaging, and Transporting Field Samples	Field team members seal and label samples before packing to ensure that the sample containers and the containers used for transport are free of external contamination. All environmental samples are collected, preserved, packaged, and transported to the SMO under chain-of-custody. The SMO arranges for shipping of the samples to analytical laboratories. Any levels of radioactivity (i.e., action-level or limited-quantity ranges) are documented in sample collection logs submitted to the SMO.
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented in standard forms generated by the SMO. These forms include sample collection logs, chain-of-custody forms, sample container labels, and custody seals. Collection logs are completed at the time of sample collection and are signed by the sampler and a reviewer who verifies the logs for completeness and accuracy. Corresponding labels are initialed and applied to each sample container, and custody seals are placed around container lids or openings. Chain-of-custody forms are completed and signed to verify that the samples are not left unattended.
Field Quality Control Samples	Field QC samples are collected as follows: Field duplicates are collected at a frequency of 10% at the same time as a regular sample and submitted for the same analyses. Equipment rinsate blanks, collected at a frequency of 10%, are taken by rinsing sampling equipment with deionized water, which is collected in a sample container and submitted for laboratory analyses. Trip blanks, required for all field events that include collecting samples for VOC analyses, are collected. Trip blanks are kept with the other sample containers during the sampling process and are submitted for laboratory analyses.
Characterization and Management of Environmental Restoration Project Waste	This procedure outlines the preparation, approval, and retention of all required documents associated with waste generation. The procedure covers: waste identification and characterization; waste minimization/recycling; waste generation/storage; segregation; waste treatment; authorization of release limits; packaging/transportation; disposal options; and project policies including area of contamination policy, environmental media, and contained in policy.
Operational Guidelines for Taking Soil and Water Samples in Explosive Areas	The Laboratory has performed explosives development, processing, and testing operations at several TAs (including TA-16). Because of the inherently hazardous behavior of explosive compounds, more stringent safety requirements apply to explosives areas. This procedure differentiates between homogeneous and heterogeneous areas and identifies HE-related hazards. Collection of soil and water samples must be carried out using specified precautions including walkovers of heterogeneous areas by explosive experts.

Table B-1.0-1 (continued)

Method	Summary
HE spot test (in accordance with manufacturer's instructions)	This qualitative field-screening method is used to test for the presence of HE in soil, fill, sediment, and tuff samples at the TA-16-340 Complex. In addition, HE spot testing is also used on smear samples collected from the surfaces of equipment used during the investigation (e.g., drill rig, forklift, and sampling equipment).
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is the preferred method of decontamination used at the TA-16-340 Complex to minimize the generation of liquid waste. Dry decontamination included the use of a wire brush or other tool for removal of soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes.
Field Site Closeout Checklist	This checklist is designed to ensure that upon demobilization from a field site all necessary field compliance activities, equipment accountability, and documentation are complete. Field activities included in this procedure are site investigation, remediation, and interim action projects. The checklist documents final site housekeeping, waste management, stormwater compliance, equipment management, sample collection summary, record management, and lessons learned.
Geomorphic Characterization	This procedure is used as a guide to characterize potentially contaminated sediment deposits or to identify former structures such as drainlines. Geomorphic units are identified (i.e., as post-1942 floodplain or channel units) and maps devised. This level of geomorphic characterization may not be required. Geomorphic characterization was used at TA-16 to locate general landscape features and associated sampling locations in the field.
Geodetic Surveys	The geodetic survey focuses on obtaining survey data of acceptable quality for use during project investigations. The geodetic survey is conducted with a Trimble 5700 instrument. The survey data followed the Laboratory Information Architecture (IA) 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 SPCS 83, New Mexico Central, and U.S. ft coordinates. All elevation data are reported relative to the National Geodetic Vertical Datum of 1983.
Borehole Abandonment	Shallower boreholes are abandoned by filling with bentonite chips or pellets, which are then hydrated. Boreholes with a TD greater than 20 ft are abandoned with bentonite grout by filling upward from the bottom via tremie pipe to within 2 ft of the surface. The remainder is cemented/grouted to surface grade. After 24 hr, the backfilled level is checked for settlement and additional concrete/grout added as needed.
Sampling of Volatile Organic Compounds in Groundwater	This procedure describes the responsibilities and describes the process for sampling for VOCs in groundwater and the selection of equipment and materials used in the sampling process. The objectives are to collect valid samples for volatile organic analysis and to subject samples to the least amount of turbulence and subsequent possible aeration. The procedure covers conducting preoperation activities, sampling, preparing documentation, and conducting postoperation activities.
Spade-and-Scoop Method for Collection of Soil Samples	This method is used to collect surface (i.e., 0–6 in.) soil or fill samples. A hole is dug to the desired depth, as prescribed in the work plan, and a discrete grab sample is collected. The sample is homogenized in a decontaminated stainless steel bowl before transferring to appropriate sample containers.

Table B-1.0-1 (continued)

Method	Summary
Sample Collection from Split Spoon Sampler	In this method, a stainless-steel core barrel (typically 4 in. in diameter and 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock that can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so the two halves can be separated to expose the core sample. Once it is extracted, the section of core is typically screened for radioactivity and organic vapors, then photographed and described in a geologic log. A portion of the core may then be collected as a discrete sample from the desired depth.
Hollow-Stem Augering	In this method, HSA (sections of seamless pipe with auger flights welded to the pipe) act as a screw conveyor to bring cuttings of sediment, soil, and/or rock to the surface. Auger sections are typically 5 ft in length and have outside diameters of 4.25 to 14 in. Drill rods, split-spoon core barrels, Shelby tubes, and other samplers can pass through the center of the HSA sections to collect discrete samples from desired depths. The HSAs are used as temporary casings when setting wells to prevent cave-ins of the borehole walls.
Direct Air Rotary Drilling	In this method, air is used to lift the cuttings from the borehole. A large compressor is used to force air down the drill rods, where it passes through ports in the drill bit. As the bit cuts through the formation, cuttings are discharged to the surface and are collected in a dust-suppression system.
Headspace Vapor Screening	Every 5-ft interval, an individual soil, rock, or sediment sample is field-screened for VOCs by placing a portion of the sample in a glass container with a foil-sealed cover. The container is sealed and gently shaken and allowed to equilibrate for 5 min. The sample is then screened by inserting a photoionization detector probe, equipped with an 11.7-eV lamp, into the container to measure and record any detected vapors.
Sampling of Sub-Atmospheric Air	Vapor sampling was performed on the intermediate-depth borehole in accordance with SOP 6.31 and analyzed for VOCs and tritium. This SOP describes the process of sampling subatmospheric air from vapor ports in monitoring wells and boreholes. Procedure covers: pre-sampling activities, sampling to detect and quantify gaseous organic concentration in air, SUMMA sampling (a passive collection and containment system of laboratory-quality air samples), adsorbent column sampling, sampling through the packer system (a sampling system that uses inflatable bladders to seal off a desired interval in an open borehole, or at the end of drill casing, to obtain a sample from a discrete section), and post sampling activities
Water Level Measurements	Water-level measurements are used to determine depth to water surface, groundwater flow direction, hydraulic gradients, and impacts caused by environmental or aquifer stresses. Water level is measured from boreholes or new monitor wells in less than a 24-hr period from detection of water using a well sounder. Proper equipment is used and measurements are documented.
Field Analytical Measurements of Groundwater	This procedure describes the methods used to evacuate stagnant water from a well bore in sufficient quantities so that water samples that are collected afterwards are representative of the formation interval open to the well bore. This procedure involves the removal of three well volumes; a turbidity reading, which should be 5 nephelometric turbidity units (NTUs); and stabilizing the specific conductance and pH.
Field Sampling of Core and Cuttings for Geological Analysis	A continuous length of core is extracted from the core barrel. Once extracted, the section of core is screened for radioactivity and organic vapors, photographed, and described in a geologic log. If located within a targeted sample interval, a portion of the core is then collected for fixed laboratory analysis.

Table B-1.0-1 (continued)

Method	Summary
Field Logging, Handling, and Documentation of Borehole Materials	Core barrels are opened for field screening, logging, and sampling. Logging of borehole materials includes run number, core recovery percentage, depth interval (in 5-ft increments), field-screening results, lithological and structural description, and a photograph. Once the core material is logged, selected samples are taken from discrete intervals of the core.
XRF Analyzer (in accordance with manufacturer's specifications)	X-ray fluorescence (XRF) spectroscopy is a nondestructive semiquantitative to quantitative method used to determine the elemental composition of solid, liquid, thin film, and powder samples. Samples are bombarded with x-rays generated by an x-ray tube and secondary fluorescence is measured. A semiquantitative bench-top XRF method is use to field screen soil, fill, sediment, and tuff sample to determine the concentrations of select metals including barium, chromium, copper, and lead.
D TECH immunoassay testing (EPA SW-846 Method 4051)	This semiquantitative field screening method is used—in accordance with the manufacturer's instructions—to determine the concentration of RDX and TNT present with soil, fill, sediment, and tuff samples. The methods are based on an immunoassay response and have a detection limit of 1 ppm.
Performing and Documenting Gross Gamma Radiation Surveys	A Laboratory radioactivity control technician (RCT) from the Health Physics Group conducts radiological screening of all samples for alpha, beta, and gamma emitters. Radiological screening consists of a direct frisk survey using a Ludlum 139 to measure alpha activity and an Eberline ESP-1 to measure beta/gamma activity.

Table B-1.0-2
List of Applicable General Procedures for the TA-16 Field Investigations

Document Number	LANL Procedure Title
EP-DIR-SOP-2011 R3	Personnel Training and Qualification
EP-DIR-SOP-4004 R0	Records Transmittal and Retrieval Process
EP-ERSS-SOP-4005 R0	Peer Review Process
EP-ERRS-SOP-5018 R0	Integrated Fieldwork Planning and Authorization
EP-ERSS-SOP-5022 R0	Characterization & Management of ER Project Wastes
EP-ERSS-SOP-5055 R0	General Instructions for Field Investigations
ISD101-3.1	Lockout/Tagout For Hazardous Energy Control
Notice 0184	Requirements for Photographic Activities at LANL
P101-4 R0	Forklifts and Powered Industrial Trucks
P101-6 R0	Personal Protective Equipment
P101-14 R0	Chemical Management
P101-15 R0	Biological Safety
P117.0	MSA Process for Startup and Restart Activities
P217.0	Portable Electronic Devices (PEDs)
SOP-01.12 R0 ICN2	Field Site Closeout Checklist
QP-5.7, R2 ICN3	Notebook Documentation for Environmental Restoration Technical Activities

Appendix C

Field-Screening Results,
Geodetic Survey Coordinates, and Borehole Logs
(on CD included with this document)

Appendix D

Photographs
(on CD included with this document)

Appendix E

Analytical Reports
(on DVD included with this document)

Appendix F

Analytical Program

F-1.0 INTRODUCTION

This appendix discusses the analytical methods and data-quality review for samples collected during investigations at Technical Area (TA) 16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f)] and adjacent Fishladder Canyon.

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 Los Alamos National Laboratory's statements of work (SOWs) for analytical laboratories (LANL 1995, 049738; LANL 2000, 071233). The results of the QA/QC procedures were used to estimate the accuracy, bias, and precision of the analytical measurements. Samples for QC include method blanks, matrix spikes (MSs), laboratory control samples (LCSs), internal standards, initial calibration verifications (ICVs) and continuing calibration verifications (CCVs), surrogates, and tracers.

The type and frequency of laboratory QC analyses are described in the SOWs for analytical laboratories (LANL 1995, 049738; LANL 2000, 071233). Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in standard operating procedure (SOP) EP-ERSS-SOP-5056, Sample Containers and Preservation.

The following SOPs, available at http://www.lanl.gov/environment/all/qa/adep.shtml, were used for data validation:

- SOP-5161, Routine Validation of Volatile Organic Data
- SOP-5162, Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data
- SOP-5163, Routine Validation of Organochlorine Pesticides and PCB Analytical Data
- SOP-5164, Routine Validation of High Explosives Analytical Data
- SOP-5165, Routine Validation of Metals Analytical Data
- SOP-5166, Routine Validation of Gamma Spectroscopy Data, Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Analytical Data
- SOP-5169, Routine Validation of Dioxin Furan Analytical Data (EPA Method 1618 and SW-846 EPA Method 1668A)
- Model Data Validation Procedure, Revision 4.1

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 AND VINTAGE

The TA-16-340 Complex is located near the eastern end of the TA-16 mesa, close to the head of a small canyon known as Fishladder Canyon (Figure 1.0-2 of the investigation report). The complex is divided into multiple consolidated units and SWMUs: Consolidated Unit 13-003(a)-99, the septic system associated with the western area of the P-Site Firing Site (at former TA-13); Consolidated

Unit 16-003(n)-99, the sump and drainline for former building 16-342; SWMU 16-003(o), the sumps and drainlines for former building 16-340; and SWMUs 16-029(f) and 16-026(j2), the sump and drainline for former building 16-345, respectively.

F-2.1 Laboratory Data and Sample Documentation

Only analytical data for which complete data packages and sample documentation are available are appropriate for decision-making purposes and included in reporting datasets. In addition, all analytical historical data are reviewed and revalidated to current QA standards.

F-2.1.1 Historical Samples

Solid media historical samples were collected at TA-16-340 Complex in 1995, 1997, 2004, and 2005 in association with investigations. All samples associated with these investigations were submitted for analysis to an approved off-site analytical laboratory and have complete data packages provided in Appendix E.

Surface water and alluvial groundwater samples collected from various locations in adjacent Fishladder Canyon in 1995, 1997–1998, 2000–2001, and 2003–2005 are also analyzed as part of the investigations at the TA-16-340 Complex. These locations include three alluvial groundwater wells (wells 16-25278, 16-25279, and 16-25280); Fishladder Seep (location16-06254); and the confluence of Fishladder Canyon with Cañon de Valle (location 16-06121).

Details regarding the quality review of historical analytical data at the TA-16-340 Complex are summarized in Appendix E of the 2005 investigation report for the TA-16-340 Complex (LANL 2006, 091450). Only changes to the historical data set as presented in the 2005 investigation report resulting from data review and revalidation procedures as applied in this investigation are identified and summarized in this appendix.

F-2.1.2 2008 Investigation (Current) Samples

A total of 146 soil or tuff samples and 6 pore-gas samples were collected during the 2008 investigation at the TA-16-340 Complex and submitted for off-site analysis. In addition, 20 surface water and 21 alluvial groundwater samples have been collected in Fishladder Canyon since 2005 and submitted for off-site analysis.

F-3.0 INORGANIC CHEMICAL ANALYTICAL METHODS

The TA-16-340 Complex solid media samples collected during the 2008 investigation were analyzed by one or more of the following inorganic chemical methods: anions, target analyte list (TAL) metals, perchlorate, and wet chemistry. Samples were analyzed for TAL metals using EPA SW-846 Methods 6010B, 6020, and 7471A. Other analytical methods included wet-chemistry EPA SW-846 Method 9012A for cyanide, EPA SW-846 Method 6850 for perchlorate, and EPA Method 300.0 for anions. The analytical methods used for inorganic chemicals are listed in Table F-3.0-1.

Surface water and alluvial groundwater samples collected since 2005 in Fishladder Canyon were analyzed for one or more of the following inorganic chemicals: anions, cyanide, general inorganics, metals, and perchlorate.

For the solid media, a total of 102 samples were submitted for analysis of TAL metals, 34 were submitted for analysis of anions, 6 were submitted for analysis of perchlorate, and 14 s were submitted for analysis of total cyanide. For surface water and alluvial groundwater, a total of 18 samples (filtered and unfiltered) were submitted for analysis of metals; 9 samples were submitted for analysis of anions (filtered and unfiltered), perchlorate (filtered and unfiltered), and cyanide (unfiltered only); and 21 samples were submitted for general inorganics analysis (filtered and unfiltered).

Tables H-1.1-1 to H-1.5-1 in Appendix H summarize, by data set, all samples collected and the analyses requested from the TA-16-340 Complex. All inorganic chemical results are included in Appendix G (provided electronically).

F-3.1 Inorganic Chemical QA/QC Samples

To assess the accuracy and precision of inorganic chemical analyses, LCSs, preparation blanks (PBs), MS samples, laboratory duplicate samples, interference check samples (ICSs), and serial dilution samples were analyzed as part of the TA-16-340 Complex investigations. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and is described briefly in the sections below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. Following Laboratory SOP guidance, analytical results were qualified according to EPA National Functional Guidelines (EPA 1994, 048639) if the individual LCS recovery indicated an unacceptable bias in the measurement of individual analytes. For inorganic chemicals in soil/tuff, LCS percent recoveries (%R) should fall into the control limits of 75%–125% (LANL 1995, 049738; LANL 2000, 071233).

Preparation blanks are used to measure bias and potential cross-contamination. All inorganic chemical results for the PB should be below the method detection limit (MDL).

The accuracy of inorganic chemical analyses is also assessed using MS samples. 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 criteria are 75%–125%, inclusive for all spiked analytes (LANL 1995, 049738; LANL 2000, 071233).

Laboratory duplicate samples assess the precision of inorganic chemical analyses. All relative percent differences (RPDs) between the sample and laboratory duplicate should be ±35% for soil and ±20% for water (LANL 1995, 049738; LANL 2000, 071233).

The ICSs assess the accuracy of the analytical laboratory’s interelement and background correction factors used for inductively coupled plasma emission spectroscopy. The ICS %R should be within the acceptance range of 80%–120%. The QC acceptance limits are ±20%.

Serial dilution samples measure potential physical or chemical interferences and correspond to a sample dilution ratio of 1:5. The chemical concentration in the undiluted sample must be at least 50 times the MDL (100 times for inductively coupled plasma mass spectroscopy) for valid comparison. For sufficiently high concentrations, the RPD should be within 10%.

Details regarding the quality of the inorganic chemical analytical data included in each TA-16-340 Complex data set are summarized in the following subsections.

F-3.1.1 Consolidated Unit 13-003(a)-99

During the 2008 investigation, two tuff samples and one soil sample were collected at Consolidated Unit 13-003(a)-99 and submitted for the analysis of TAL metals and anions.

No inorganic chemical data were rejected.

Inorganic chemical data qualified as estimated (J) included

- Two manganese results: both the sample and duplicate sample results were greater than or equal to 5 times the reporting limit (RL) and the duplicate RPD exceeded 35%.
- Two copper and one vanadium: detected in the method blank but was greater than 5 times the sample result.
- Nine metal results and four anion results: analytical laboratory qualified as estimated because the result is between the MDL and estimated quantitation limit (EQL).

Inorganic chemical data qualified as estimated biased high (J+) included

- Two aluminum, one magnesium, and one zinc result: MS %Rs exceeded the upper acceptance level (UAL) but were less than 150%.

Inorganic chemical data qualified as estimated biased low (J-) included

- Two fluoride results: the associated MS %Rs were greater than 10% but less than the lower acceptance level (LAL) of 75%.

A total of 75 inorganic chemical results were qualified as not detected (U) because in the preparation blank, the sample result was greater than the estimated detection limit (EDL) but less than or equal to 5 times the concentration of in the blank, or the result was not detected

Three antimony results were qualified as estimated and not detected (UJ) because the associated MS %Rs were greater than 10% but less than the LAL of 75%.

All inorganic chemical data collected from Consolidated Unit 13-003(a)-99 in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-3.1.2 Consolidated Unit 16-003(n)-99

During the 2008 investigation, two samples collected in tuff at Consolidated Unit 16-003(n)-99 were submitted for the analysis of TAL metals and anions.

No inorganic chemical data were rejected.

Inorganic chemical data qualified as estimated (J) included

- One barium, one magnesium, and one zinc result: both the sample and duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD exceeded 35%.
- One sodium result: detected in the method blank but was greater than 5 times the sample result.
- Five TAL metal results and two anion results: analytical laboratory qualified as estimated because the result is between the MDL and EQL.

Inorganic chemical data qualified as estimated biased high (J+) included

- Five TAL metal results: MS %Rs exceeded the UAL but were less than 150%.

Inorganic chemical data qualified as estimated biased low (J-) included

- One fluoride result and one nitrate result: the associated MS %Rs were greater than 10% but less than the LAL of 75%.

A total of 199 inorganic chemical results were qualified as not detected (U) because in the preparation blank, the sample result was greater than the EDL but less than or equal to 5 times the concentration in the blank.

One antimony result was qualified as estimated and not detected (UJ) because the associated MS %R was greater than 10% but less than the LAL of 75%.

All inorganic chemical data collected from Consolidated Unit 16-003(n)-99 in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-3.1.3 SWMU 16-003(o)

During the 2008 investigation, 7 samples collected in soil and 18 samples collected in tuff at SWMU 16-003(o) were submitted for the analysis of anions; 35 soil samples and 58 tuff samples were submitted for the analysis of TAL metals; 6 tuff samples were submitted for the analysis of perchlorate; and six soil samples and 8 tuff samples were submitted for the analysis of cyanide.

No inorganic chemical data were rejected.

Inorganic chemical data qualified as estimated (J) included

- Twenty-two metals results: both the sample and duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD exceeded 35%.
- Fifteen metals results: detected in the method blank but was greater than 5 times sample results.
- Eleven anion results, 50 metals results, and three cyanide results: analytical laboratory qualified as estimated because the result is between the MDL and EQL.

Inorganic chemical data qualified as estimated biased high (J+) included

- Sixty-three metals results: MS %Rs exceeded the UAL but were less than 150%.

Inorganic chemical data qualified as estimated biased low (J-) included

- Fourteen anion results and 11 metals results: the associated MS %Rs were greater than 10% but less than the LAL of 75%.
- Two aluminum results: the associated MS %Rs were greater than 10% but less than the LAL of 75%.

A total of 848 inorganic chemical results were qualified as not detected (U) because in the preparation blank, the sample result was greater than the EDL but less than or equal to 5 times the concentration in the blank.

A total of 16 inorganic chemical results were qualified as estimated and not detected (UJ) because either (1) the associated MS %Rs were greater than10% but less than the LAL of 75% or (2) MS %Rs exceeded the UAL but were less than 150%.

All inorganic chemical data collected from SWMU 16-003(o) in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-3.1.4 SWMUs 16-026(j2) and 16-029(f)

During the 2008 investigation, one sample collected in soil and three samples collected in tuff at SWMUs 16-026(j2) and 16-029(f) were submitted for the analysis of anions and metals.

No inorganic chemical data were rejected.

Inorganic chemical data qualified as estimated (J) included

- One nitrate result, one sulfate result, and six TAL metals results: analytical laboratory qualified as estimated because the result is between the MDL and EQL.
- One manganese result: both the sample and duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD exceeded 35%.
- One vanadium result: detected in the method blank but was greater than 5 times sample result.

Inorganic chemical data qualified as estimated biased high (J+) included

- Nine TAL metals results: MS %Rs exceeded the UAL but were less than 150%.

Inorganic chemical data qualified as estimated biased low (J-) included

- Nine anion results and two TAL metals results: the associated MS %Rs were greater than 10% but less than the LAL of 75%.

A total of 218 inorganic chemical results were qualified as not detected (U) because in the preparation blank, the sample result was greater than the EDL but less than or equal to 5 times the concentration in the blank or the sample result was less than or equal to 5 times the concentration in the trip blank, equipment blank, or rinsate blank.

Six inorganic chemical results were qualified as estimated and not detected (UJ) because the associated MS %Rs were greater than 10% but less than the LAL of 75%.

All inorganic chemical data collected from SWMUs 16-026(j2) and 16-029(f) in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-3.1.5 Fishladder Canyon

F-3.1.5.1 Surface Water

Since 2005, a total of two surface water samples (filtered and unfiltered) have been collected from Fishladder Canyon and submitted for off-site analysis for anions; four samples (unfiltered only) for total cyanide; five unfiltered and four filtered samples for general inorganics; two samples (filtered and unfiltered) for perchlorate; and four (filtered and unfiltered) samples for metals.

Inorganic chemical data qualified as rejected (R) included

- Two ammonia as nitrogen results, two nitrate-nitrite as nitrogen results, and one copper result: nonspecified quality-control failure.

Inorganic chemical data qualified as estimated (J) included

- Eight results for pH: holding times were exceeded.
- One total cyanide, one copper, one cobalt, and one uranium result: negative blank sample results were greater than the MDL.
- One perchlorate result: holding time for sample analysis was exceeded.
- One calcium, one sodium, one aluminum, three silicon dioxide results: the MS analysis was not performed on a sample associated with the request number
- One sodium and one potassium result: RPD was greater than 10% in the serial dilution sample
- One zinc and one uranium result: duplicate sample RPD was greater than the advisory limit and the sample result was detected.

Inorganic chemical data qualified as estimated biased high (J+) included:

- One iron and one uranium result: the spike %Rs were greater than or equal to the UAL (125%) but less than or equal to 150%.
- One zinc result: analyte was identified in the method blank.
- Inorganic chemical data qualified as estimated biased low (J–) included:
- Two copper and two silicon dioxide results: nonspecified quality-control failure.
- One tin and one vanadium result: reporting limit verification recovery was greater than the acceptance criteria.
- One aluminum and one iron result: spike %Rs were less than 30%.

A total of 11 inorganic chemical results were qualified as estimated and not detected (UJ).

The rejected data does not substantially affect the assessment of the nature and extent of inorganic chemicals in surface water at the TA-16-340 Complex. All other qualified data were used in the evaluation (Appendix H).

F-3.1.5.2 Alluvial Groundwater

Since 2005, a total of five alluvial groundwater samples (filtered only) have been collected from Fishladder Canyon and submitted for off-site analysis for anions; five samples (unfiltered only) for total cyanide; seven unfiltered and five filtered samples for general inorganics; five samples (filtered only) for perchlorate; and five (filtered and unfiltered pairs) samples for metals.

Inorganic chemical groundwater data qualified as rejected (R) included

- One total phosphate result: non-specified quality-control failure.

Inorganic chemical groundwater data qualified as estimated (J) included

- Two results for pH: holding times were exceeded.
- Two nickel results and one uranium result: the duplicate sample RPD was greater than the advisory limit.

Inorganic chemical groundwater data qualified as estimated biased high (J+) included

- Two fluoride results: nonspecified quality-control failure.
- One silicon dioxide, one barium, one boron, one iron, one manganese, and one strontium result: the spike %R was greater than or equal to the UAL (125%) but less than or equal to 150%.

Inorganic chemical groundwater data qualified as estimated biased low (J-) included

- Two total cyanide results and one copper result: nonspecified quality-control failure.
- Two total cyanide, one total phosphate, one mercury, and one copper result: negative blank samples results were greater than the MDL.

A total of three inorganic chemical results were qualified as estimated and not detected (UJ).

The rejected data does not substantially affect the assessment of the nature and extent of inorganic chemicals in alluvial groundwater at the TA-16-340 Complex. All other qualified data were used in the evaluation (Appendix H).

F-4.0 ORGANIC CHEMICAL ANALYSIS METHODS

TA-16-340 Complex soil and tuff samples collected during 2008 investigation were analyzed by one or more of the following organic chemical methods: high explosives (HEXP), polyaromatic hydrocarbons (PAHs), semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). Samples were analyzed using SW-846 Methods 8260B (VOCs), 8270C (SVOCs), 8321A (HEXP), and 8310 (PAHs). Pore-gas samples collected during 2008 investigation were analyzed by EPA Method TO-15 (VOCs). Surface water and alluvial groundwater samples collected since 2005 in Fishladder Canyon were analyzed for one or more of the following organic chemicals: dioxin/furan, herbicides, HEXP, polychlorinated biphenyls (PCBs), pesticides, SVOCs, and VOCs. All QC procedures were followed as required by the analytical laboratory SOWs (LANL 1995, 049738; LANL 2000, 071233). The analytical methods used for organic chemicals are listed in Table F-3.0-1.

For the solid media, a total of 27 samples were submitted for analysis of HEXP, 2 samples were submitted for analysis of PAHs, 101 samples were submitted for analysis of SVOCs, and 25 samples were submitted for analysis of VOCs.

For pore gas, a total of six samples were submitted for analysis of VOCs.

For surface water and alluvial groundwater, a total of 2 samples (unfiltered) were submitted for analysis of dioxins/furans, 4 samples were submitted for analysis of herbicides (unfiltered), 13 samples were submitted for analysis of HEXP (unfiltered), 5 samples were submitted for analysis of PCBs and pesticides (unfiltered), 7 samples were submitted for analysis of SVOCs (unfiltered), and 10 samples were submitted for analysis of VOCs (unfiltered).

Tables H-1.1-1 to H-1.5-1 (Appendix H) summarize, by data set, all samples collected from the TA-16-340 Complex and the analyses requested. All organic chemical results are included in Appendix G (provided electronically.

F-4.1 Organic Chemical QA/QC Samples

The QC samples are designed to produce a qualitative measure of the reliability of a specific part of an analytical procedure. The methods for validating organic chemical results on the basis of the various QA/QC sample types are specified in the SOPs. Some of the historical analyses may have been performed before the current SOW was implemented (LANL 1995, 049738; LANL 2000, 071233).

Calibration verifications, LCSs, method blanks, surrogates, and internal standards were analyzed to assess the accuracy and precision of organic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and the applicable analytical methods, and summarized below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical instrument and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the linearity of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration verifies that the initial calibration is still linear and valid. 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 the same matrix spiked with the target analytes and serves to monitor the overall performance. Following Laboratory SOP guidance, analytical results were qualified according to EPA National Functional Guidelines (EPA 1999, 066649) if the individual LCS recoveries were not within 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 and 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.

A surrogate compound (surrogate) is an organic chemical used in the analyses of organic target analytes. The surrogate is similar in composition and behavior to the target analytes but is not normally found in environmental samples. Surrogates are added to every blank, sample, and spike to evaluate the efficiency with which analytes are recovered during extraction and analysis. The recovery percentage of the surrogates must be within specified ranges, or the sample may be rejected or assigned a qualifier.

Internal standards are chemical compounds added to every blank, sample, and standard extract at a known concentration. Internal standards are used as the basis for quantitation of target analytes. The %R for internal standards should be within the range of 50%–200%.

Details regarding the quality of the organic chemical analytical data included in each TA-16-340 Complex data set are summarized in the following subsections.

F-4.1.1 Consolidated Unit 13-003(a)-99

During the 2008 investigation, one sample collected in tuff and one sample collected in soil at Consolidated Unit 13-003(a)-99 were submitted for the analysis of PAHs and SVOCs.

No organic chemical data were rejected.

Organic chemical data qualified as estimated biased low (J-) included

- Five PAH results: the sample surrogate %R was less than the LAL but greater than 10%.
- Eight SVOC results: the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

Three PAH results were qualified as not detected (U) because the mass spectrum did not meet specifications.

A total of 52 organic chemical results were qualified as estimated and not detected (UJ) because either (1) the sample surrogate %R was less than the LAL but greater than 10% or (2) the extraction/analytical holding times were exceeded by less than two times the published method for holding times.

All organic chemical data collected from Consolidated Unit 13-003(a)-99 in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-4.1.1.1 Changes to Historical Data

During revalidation, three acetone and two toluene results originally reported as detections in the 2005 investigation report (LANL 2006, 091450, Appendix F) were requalified as not detected (U) because the sample results were less than 5 times/10 times the concentration in the method blank.

F-4.1.2 Consolidated Unit 16-003(n)-99

During the 2008 investigation, two samples collected in tuff at Consolidated Unit 16-003(n)-99 were submitted for the analysis of HEXP, SVOCs, and VOCs.

Organic chemical data qualified as rejected (R) included

One chloroaniline[4-] result: the sample was analyzed with a relative response factor (RRF) of <0.05 in the initial calibration and/or CCV.

Organic chemical data qualified as estimated (J) included

- Two SVOC results (phenanthrene and fluoranthene): analytical laboratory qualified as estimated because the result is between the MDL and EQL.

A total of 80 organic chemical results were qualified as estimated and not detected (UJ) for one of the following reasons: (1) the LCS %R was less than the LAL but greater than 10%; (2) the ICV and/or CCV were recovered outside the method-specific limits; (3) the ICV exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995; or (4) the extraction/analytical holding times were exceeded by less than two times the published method for holding times.

The loss of rejected data do not substantially affect the assessment of risk or the nature and extent of organic chemicals at Consolidated Unit 16-003(n)-99. All other qualified data were used in the evaluation of the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-4.1.2.1 Changes to Historical Data

During revalidation, five acetone and four toluene results originally reported at detections in the 2005 investigation report (LANL 2006, 091450, Appendix F) were requalified as not detected (U) because the sample results were less than 5 times/10 times the concentration in the method blank.

F-4.1.3 SWMU 16-003(o)

During the 2008 investigation, 6 soil samples and 15 tuff samples were submitted for the analysis of HEXP and VOCs, and 35 soil samples and 58 tuff samples were submitted for the analysis of SVOCs for a total of 1889 organic results. In addition, six pore-gas samples were collected from monitoring well location 16-603511 and submitted for the analysis of VOCs (section F-4.1.3.1).

Organic chemical data qualified as rejected (R) included

- Two chloroaniline[4-] results: samples were analyzed with an RRF of <0.05 in the ICV and/or CCV.

Organic chemical data qualified as estimated (J) included

- One HMX (cyclotetramethylene-tetranitramine) result, two acetone results, and two benzo(b)fluoranthene results: the ICV and/or CCV were recovered outside the method-specific limits.
- Three RDX (cyclotrimethylenetrinitramine) and one HMX result; 55 SVOC results; and seven VOC results: analytical laboratory qualified as estimated because the result is between the MDL and EQL
- Twelve SVOC results: the internal standard (IS) area count is less than 50% but greater than 10%.
- Six SVOC results: the ICV exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995*.*

Organic chemical data qualified as estimated biased low (J-) included

- One benzo(a)pyrene result: surrogate %R was less than the LAL but greater than 10%.

A total of 171 organic chemical results were qualified as estimated and not detected (UJ) for one of the following reasons: (1) the LCS %R was less than the LAL but greater than 10%; (2) the ICV and/or CCV were recovered outside the method-specific limits; (3) the IS area count is less than 50% but greater than 10%; (4) the surrogate %R was less than the LAL but greater than 10%; or (5) the ICV exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995.

The loss rejected data does not substantially affect the assessment of risk or the nature and extent of organic chemicals at SWMU 16-003(o). All other qualified data were used in the evaluation of the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-4.1.3.1 Changes to Historical Data

During revalidation, 124 HEXP results associated with eight samples collected in 2005 originally not reported in the 2005 investigation report (LANL 2006, 091450, Appendix F) were requalified as estimated and not detected (UJ) because the extraction/analytical holding times were exceeded by less than 2 times the published method for holding times.

F-4.1.3.2 Pore-Gas Analytical Results

A total of 153 VOC results were obtained from pore-gas samples collected during the 2008 investigation.

No VOC pore-gas data were rejected.

Four results were qualified as estimated and not detected (UJ) because either (1) the ICV exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995 or (2) the ICV and/or CCV were recovered outside the method-specific limits.

All pore-gas data collected from SWMU 16-003(o) in 2008 were used to evaluate the nature and extent of contamination (Appendixes H and I).

F-4.1.4 SWMUs 16-026(j2) and 16-029(f)

During the 2008 investigation, one soil sample and one tuff sample were submitted for analysis of HEXP and SVOCs, and two tuff samples were submitted for analysis of HEXP, SVOCs, and VOCs.

No organic chemical data were rejected.

Organic chemical data qualified as estimated (J) included

- None SVOC results: analytical laboratory qualified as estimated because the result is between the MDL and EQL.
- Two SVOC results (benzo[g,h,i]perylene and indeno[1,2,3-cd]pyrene): the ICV and/or CCV were recovered outside the method-specific limits.

A total of 30 organic chemical results were qualified as estimated and not detected (UJ) for one of the following reasons: (1) the ICV and/or CCV were recovered outside the method-specific limits; or (2) the ICV exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient is <0.995.

All organic chemical data collected from SWMUs 16-026(j2) and 16-029(f) in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential risk (Appendix I).

F-4.1.2.1 Changes to Historical Data

During revalidation, two ethylbenzene results, one isopropyltoluene[4-] result, one xylene[1,2-] result, four xylene[1,3-]+xylene[1,4-] results, and two toluene results originally reported at detections in the 2005 investigation report (LANL 2006, 091450, Appendix F) were requalified as not detected (U) because the sample results were less than 5 times the concentration in the method blank.

F-4.1.5 Fishladder Canyon

F-4.1.5.1 Surface Water

Since 2005, a total of two unfiltered surface water samples have been collected from Fishladder Canyon and submitted for off-site analysis for dioxin/furans, pesticides and PCBs; one unfiltered sample for herbicides; six unfiltered samples for HEXP; and four unfiltered samples for SVOCs and VOCs.

Organic chemical surface water data qualified as rejected (R) included

- One HE result: the initial calibration % RSD or correlation coefficient failed to meet acceptance criteria.
- Three HE results: the initial y-intercept criteria were not met.
- Two HE results: the LCS %R failed low.
- One SVOC result: spike %R is less than 10%.
- One SVOC result and two VOC results: nonspecified quality-control failure
- Seventy SVOC results were nondetect and a surrogate in the related fraction was less than 10%R.
- Fourteen VOC results: analyzed with a RRF of less than 0.05.

Organic chemical data qualified as estimated (J) included

- Two HE results: extraction holding times were exceeded
- Three HE results: applicable matrix spike/matrix spike duplicate (MS/MSD analysis was not performed
- Nine SVOC results: nonspecified quality-control failure

Organic chemical data qualified as estimated biased high (J+) included

- One VOC result: nonspecified quality-control failure.
- Seven HE results: the CCV%D failed high
- Three HE results: the MS/MSD %R failed high.

Organic chemical data qualified as estimated biased low (J–) included

- One HE result: the CCV %D failed low.
- Two VOC results: calibration Verification %D was greater than the acceptance criteria but less than 60%
- Three VOC results: the spike %R was greater than 10% and less than the LAL.

One organic chemical result was qualified as estimated and not detected (UJ).

The rejected data does not substantially affect the assessment of the nature and extent of organic chemicals in surface water at the TA-16-340 Complex. All other qualified data were used in the evaluation (Appendix H).

F-4.1.5.2 Alluvial Groundwater

Since 2005, a total of three unfiltered groundwater samples have been collected from Fishladder Canyon and submitted for off-site analysis for herbicides, pesticides, PCBs, and SVOCs; seven unfiltered samples for HEXP; and six unfiltered samples for VOCs.

Organic chemical groundwater data qualified as rejected (R) included

- Seventeen SVOC results: results were not detected and a surrogate in the related fraction was less than 10%R.
- Two SVOC results: nonspecified quality-control failure.
- Eighteen VOC results: analyzed with a RRF of less than 0.05.

Organic chemical data qualified as estimated (J) included

- One HE result: applicable MS/MSD analysis was not performed.
- One VOC result: ICV and/or CCV recovered outside the method specific criteria.

Organic chemical data qualified as estimated biased low (J-) included

- One HE result: the ICV %D failed low

The loss rejected data does not substantially affect the assessment of the nature and extent of organic chemicals in surface water at the TA-16-340 Complex. All other qualified data were used in the evaluation (Appendix H).

F-5.0 RADIONUCLIDE ANALYSIS METHODS

The TA-16-340 Complex soil and tuff samples collected during the 2008 investigation were analyzed only by HASL Method 300 for isotopic uranium. A total of 106 soil/tuff samples were submitted for analysis of isotopic uranium.

Surface water and groundwater samples collected since 2005 in Fishladder Canyon were analyzed by one or more of the following radiochemical methods: (1) gamma spectroscopy (EPA Method 901.1 and generic gamma spectroscopy); (2) isotopic uranium, plutonium, and/or americium-241 (HASL Method 300); (3) strontium-90 (EPA Method 905); (4) low level tritium (EPA 906.0, Generic LLEE); (5) radium-226,-228 (EPA 903.1, EPA 904); and (6) gross-alpha/-beta (EPA Method 900).

A total of 8 samples (filtered and unfiltered) were submitted for gamma spectroscopy analysis; 12 samples (filtered and unfiltered) were submitted for the analysis of gross-alpha/-beta; 8 samples (filtered and unfiltered) were submitted for the analysis of americium-241, isotopic plutonium, and isotopic uranium; 5 samples (unfiltered only) were submitted for the analysis of low-level tritium and radium-226, -228; and 8 samples (filtered and unfiltered) were submitted for the analysis of strontium-90.

Tables H-1.1-1 through H-1.5-1 (Appendix H) summarize, by data set, all samples collected from the TA-16-340 Complex and the analyses requested. All radiochemical results are included in Appendix G (provided electronically).

F-5.1 Radionuclide QA/QC Samples

The minimum detectable concentration (MDC) for each radionuclide in PBs, method blanks, laboratory duplicates, tracer/carrier recovery, LCSs, and MS samples were analyzed as part of the TA-16-340 Complex investigations to assess the accuracy and precision of radionuclide analyses. These QA/QC qualifiers and sample types for radionuclides are defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233), are described in the applicable SOPs, and are discussed briefly below. The validation of radionuclide data using QA/QC samples and other methods may have resulted in the rejection of data or the assignment of various qualifiers to individual sample results.

The MDC for each radionuclide is defined as the minimum activity concentration that the analytical laboratory equipment can detect in 95% of the analyzed samples and is used to assess analytical performance.

The PBs and method blanks are used to measure bias and assess potential cross-contamination of samples during preparation and analysis. Blank results should be less than the MDC for each radionuclide.

Laboratory duplicates are used to assess or demonstrate acceptable laboratory method precision at the time of analysis as well as to assess the long-term precision of an analytical method on various matrices. For radionuclide analyses, duplicate results are used to calculate a duplicate error ratio (DER). The DER is based on one standard deviation of the sample and the duplicate sample and should be less than 4.

The LCS serves as a monitor of the overall performance of each step during the analysis, and the acceptance criteria for LCSs are method-specific. For radionuclide methods, LCS %Rs should fall into the control limits of 80%–120%.

The accuracy of radionuclide analyses is also assessed using MS samples. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS %Rs should be within the acceptance range of 75%–125%; however, if the sample result is more than four times the amount of the spike added, these acceptance criteria do not apply.

Details regarding the quality of the radionuclide analytical data included in each TA-16-340 Complex data set are summarized in the following subsections.

F-5.1.1 Consolidated Unit 13-003(a)-99

During the 2008 investigation, two samples collected in tuff and one sample collected in soil at Consolidated Unit 13-003(a)-99 were submitted for the analysis of isotopic uranium.

No radionuclide data were rejected.

There were no QA/QC issues for the isotopic uranium data.

All isotopic uranium collected from Consolidated Unit 13-003(a)-99 in 2008 was used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential dose (Appendix I).

F-5.1.2 Consolidated Unit 16-003(n)-99

During the 2008 investigation, two samples collected in tuff at Consolidated Unit 16-003(n)-99 were submitted for the analysis of isotopic uranium.

No radionuclide data were rejected.

There were no QA/QC issues for the isotopic uranium data.

All isotopic uranium data collected from Consolidated Unit 16-003(n)-99 in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential dose (Appendix I).

F-5.1.3 SWMU 16-003(o)

During the 2008 investigation, 36 soil samples and 61 tuff samples were submitted for the analysis of isotopic uranium.

No radionuclide data were rejected.

Eight results were qualified as estimated biased high (J+) because the tracer %R was greater than the UAL.

All isotopic uranium data collected from SWMU 16-003(o) in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential dose (Appendix I).

F-5.1.4 SWMUs 16-026(j2) and 16-029(f)

During the 2008 investigation, one soil sample and three tuff samples were submitted for the analysis of isotopic uranium.

No radionuclide data were rejected.

There were no QA/QC issues for the isotopic uranium data.

All isotopic uranium data collected from SWMUs 16-026(j2) and 16-029(f) in 2008 were used to evaluate the nature and extent of contamination (Appendix H) and, if applicable, the potential dose (Appendix I).

F-5.1.5 Fishladder Canyon

Since 2005, a total of 15 surface water or groundwater samples have been collected from Fishladder Canyon and submitted for off-site analysis for radionuclides (eight samples for americium-241, strontium-90, isotopic uranium, isotopic plutonium, and gamma spectroscopy; six samples for gross alpha/beta; five samples for tritium and radium-226, -228).

No radionuclide data were rejected.

There were no QA/QC issues for the radionuclide data.

All radionuclide data collected from surface water and groundwater in Fishladder Canyon since 2005 were used to assess the nature and extent of contamination (Appendix H).

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 number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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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Table F-3.0-1
Analytical Methods for Inorganic Chemical, Organic Chemical, and Radionuclide Analyses for TA-16-340 Complex and Fishladder Canyon Samples

Analytical Method	Analytical Description	Analytical Suite
EPA 900	Gas proportional counting (GPC)	Gross alpha/beta
EPA 901.1	Gamma spectroscopy	Cesium-134, cesium-137, cobalt-60, europium-152, ruthenium-106, sodium-22
EPA 905	GPC	Strontium-90
EPA SW-846: 6010B	Inductively coupled plasma emission spectroscopy—atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc
EPA SW-846:6020	Inductively coupled plasma mass spectrometry	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc
EPA SW-846:6850	Liquid chromatography–mass spectrometry/mass spectrometry	Perchlorate
EPA SW-846:7471A	cold vapor atomic absorption (CVAA)	Mercury
EPA SW-846: 8260B	Gas chromatography-mass spectrometry (GC/MS)	VOCs
EPA SW-846: 8270C	GC/MS	SVOCs
EPA SW-846: 8321A	High performance liquid chromatography	HEXP
EPA SW-846: 9012A	Automated colorimetric/off-line distillation	Total cyanide
Generic: Gamma spectroscopy	Gamma spectroscopy	Americium-241, cesium-134, cesium-137, cobalt-60, europium-152, ruthenium-106, sodium-22, strontium-90, uranium-235
HASL Method 300	Chemical separation alpha spectrometry	Isotopic uranium, isotopic plutonium, americium-241
EPA SW-846: 8290	GC/MS	Dioxin and furans
EPA-SW-846: 8081A	GC	Pesticides
EPA-SW-846: 8082A	GC	PCBs
EPA-SW-846: 8151A	GC	Herbicides
EPA: TO15	SUMMA	VOC in pore gas

Appendix G

Analytical Suites and Results
(on CD included with this document)

Appendix H

Analytical Data Review and Assessment

H-1.0 INTRODUCTION

Technical Area (TA) 16-340 Complex consists of Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f) at Los Alamos National Laboratory (the Laboratory). In addition, Fishladder Canyon includes surface water bodies (Fishladder Spring and Fishladder at confluence with Cañon de Valle) and three shallow alluvial groundwater wells. Data discussed in this appendix are from the historical 1995 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI), the 2005 investigation, and the 2008 investigation. All data discussed in this appendix are included in Appendix G (provided electronically). Excavation activities were performed at the TA-16-340 Fishladder as part of this 2008 investigation. Samples related to these excavated locations (postexcavation, confirmation samples) are included in the tables listing the chemicals of potential concern (COPCs) for discussion of nature and extent. However, the results from excavated soil, sediment, and tuff are not included in the COPC tables and nature and extent discussions because this material has been removed and does not represent current site conditions. Data from the excavated soil, sediment and tuff are included in Appendix G (provided electronically).

The final data set used to assess nature and extent of contamination at TA 16-340 Complex includes analytical results of both historical sampling activities and the 2008 investigation. Only data determined to be of sufficient decision-level quality following the data-quality assessment (Appendix F) are included in the final data set. TA 16-340 Complex investigation data (including those data excluded from the final data set) are presented in Appendix G (provided electronically).

One of the principal objectives of the data review is to evaluate the spatial distribution of COPCs and to determine if the extent of COPCs is defined by the existing data. For the assessment presented below, the extent of a COPC is considered defined if the concentrations decrease vertically and laterally or downgradient. Note that in the discussion below, inorganic and radionuclide constituents are described as ‘detected’ if they are found at or above background values (BV); all the inorganic and radionuclide constituents are naturally occurring and are detected at background levels in the majority of the samples. Organic chemicals are frequently detected below, at, or near the estimated quantitation limit (EQL) and are considered trace levels. Organic COPC concentrations at trace levels are also considered to be sufficient to demonstrate that the extent has been defined.

H-1.1 Consolidated Unit 13-003(a)-99

One soil sample and one tuff sample were collected at Consolidated Unit 13-003(a)-99 in 2008. The solid media samples collected and the requested analyses are presented in Table H-1.1-1. The 2008 sampling locations for Consolidated Unit 13-003(a)-99 are shown in Figure 3.1-1 of the investigation report.

H-1.2 Consolidated Unit 16-003(n)-99

No soil samples and two tuff samples were collected at Consolidated Unit 16-003(n)-99 in 2008. The samples collected and the requested analyses are presented in Table H-1.2-1. The 2008 sampling locations for Consolidated Unit 16-003(n)-99 are shown in Figure 3.1-1.

H-1.3 SWMU 16-003(o)

Thirty-six soil and fill samples and 61 tuff samples were collected at SWMU 16-003(o) in 2008. The solid media samples collected and the associated analyses are presented in Table H-1.3-1. Six pore-gas samples were collected in the 206-ft borehole drilled at SWMU 16-003(o). The pore-gas samples collected and the requested analyses are presented in Table H-1.3-2. The locations of samples collected from the sumps and drainlines [at SWMU 16-003(o)–west] and from upper and lower Fishladder Canyon [at SWMU 16-003(o)–east] are shown in Figures 3.1-1 and 3.1-2.

H-1.4 SWMUs 16-026(j2) and 16-029(f)

One soil sample and three tuff samples were collected at SWMUs 16-026(j2) and 16-029(f) in 2008. Sampling locations are shown in Figure 3.1-1. The samples collected and the requested analyses are presented in Table H-1.4-1.

H-1.5 Fishladder Canyon

Three alluvial wells were installed in Fishladder Canyon in 2005 (Figure 2.3-2). All of the wells were dry during the July 2008 investigation. Results presented in this report are from sampling events following the 2005 installation and before July 2008. Twelve groundwater samples (five filtered and seven unfiltered) were collected. The samples collected and the requested analyses are presented in Table H-1.5-1.

Seven surface water samples (three filtered and four unfiltered) were collected at Fishladder Seep. Two surface water samples (one filtered and one unfiltered) were collected at the Fishladder Canyon/Cañon de Valle confluence. These sampling locations are shown in Figure 2.3-2. These samples were collected as part of the TA-16-260 corrective measures study conducted over the past several years ([see the NMED-approved V-Site voluntary corrective measure report] LANL 1998, 062413; LANL 1999, 064873). The samples collected and the associated analyses are presented in Table H-1.5-1.

H-2.0 IDENTIFICATION OF COPCs

This section identifies the COPCs for TA-16-340 Complex. The data for all identified COPCs were reviewed to determine nature and extent of contamination at the site (section H-8) and were used in the human health and ecological risk screening assessments (Appendix I). The COPCs for the TA-16-340 Complex are listed in Table H-2.0-1.

For all sampling media COPCs are identified differently for inorganic chemicals, organic chemicals, and radionuclides. An inorganic chemical is identified as a COPC if at least one result or the analytical detection limit exceeds the BV. If additional comparisons with the background data set demonstrate sample inorganic chemical concentrations are within the range of background concentrations, the chemical is eliminated as a COPC. If there is no associated BV, the inorganic chemical is a COPC if it is detected in site samples.

Any organic chemical detected is a COPC.

Radionuclides are divided into fallout and naturally occurring radionuclides. Fallout radionuclides include tritium, strontium-90, cesium-137, plutonium-238, plutonium-239/240, and americium-241. Fallout values (FVs) exist for the top 0 to 6 in. of soil and fill. If the activity of a fallout radionuclide exceeds the FV in a sample from the top 6 in., it is identified as a COPC. If additional comparisons with the background data set demonstrate that activities are within the range of background activities, the radionuclide is eliminated as a COPC. Fallout radionuclides detected in site samples collected below 6 in. or detected in tuff are COPCs. Naturally occurring radionuclides detected at activities above their respective BVs are identified as COPCs. If additional comparisons with the background data set demonstrate that sampling activities are within the range of background activities, the radionuclide is eliminated as a COPC. If there is no associated BV or FV and the radionuclide is detected in site samples, it is retained as a COPC.

Background data are available for soil (all soil horizons, designated by the media code ALLH); sediment (media code SED); and several geologic units, including Bandelier Tuff (media codes Qbt 4, Qbt 3, Qbt 2, Qbt 1v, Qbt 1g, Qct, and Qbo). Fill material is undifferentiated and may include soil and crushed tuff in varying proportions. Soil BVs are used for fill (LANL 1998, 059730), and soil and fill samples are evaluated together. Samples identified as sediment in the TA-16-340 Complex are on the mesa top and do not have the same geomorphic setting as the canyon bottom sediments on which the sediment background data set is based (LANL 1998, 059730). Because the TA-16-340 sediments are more similar to the soils on which the ALLH BVs are based, all sediment samples (from historical and 2008 investigations) were compared with ALLH BVs for COPC identification.

There are no BVs for surface water and pore gas. For these media, any detected chemicals are identified as COPCs. Naturally occurring chemicals in groundwater are discussed in the groundwater background investigation report (LANL 2005, 090580). The COPCs for surface and alluvial groundwater are listed in Table H-2.0-2.

Excavated samples are excluded from the COPC identification discussion below, because they are no longer representative of current site conditions. The COPCs for the TA-16-340 Complex are listed in Table H-2.0-1. Excavated sample results are provided in Appendix G (provided electronically).

In surface water and groundwater, COPCs are any detected chemical or radionuclide.

In some cases, individual analytical results are qualified as rejected (R) because of data-quality issues. Rejected results are not included in the data review and the evaluations of nature and extent. Data quality issues, data qualifiers, and rejected results are discussed in Appendix F.

H-3.0 COPCs FOR CONSOLIDATED UNIT 13-003(a)-99

The following subsections include discussions of inorganic, organic, and radionuclide COPCs for Consolidated Unit 13-003(a)-99. Historical 1995 RFI and 2005 investigation data are summarized, and the 2008 data are presented to determine whether data gaps have been addressed and whether extent of contamination has been defined.

H-3.1 Inorganic Chemicals in Soil and Tuff

Inorganic chemicals in soil and tuff are discussed below for historical and recent investigations at Consolidated Unit 13-003(a)-99.

H-3.1.1 Results from Historical Investigations

Historical soil samples collected at Consolidated Unit 13-003(a)-99 during the 1995 and 2005 investigations were analyzed for target analyte list (TAL) metals and total cyanide. Three of the four soil samples were also analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). The following COPCs were identified in soil samples: antimony, cyanide, fluoride, nitrate, and selenium (LANL 2006, 091450, Table B-3.1-2).

Historical tuff samples collected during the 1995 and 2005 investigations were analyzed for TAL metals and total cyanide. All but one sample were analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). The following COPCs were identified in tuff samples: aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, manganese, nitrate, selenium, silver, and vanadium (LANL 2006, 091450, Table B-3.1-2).

In summary, a total of 14 inorganic COPCs (present in soil and/or tuff) were identified during the historical investigations and include

- aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, manganese, nitrate, selenium, silver, and vanadium.

H-3.1.2 Results from the 2008 Investigation

Soil and tuff samples collected during the 2008 investigation at Consolidated Unit 13-003(a)-99 were analyzed for TAL metals and anions. Table H-1.1-1 lists the samples collected and the requested analyses at Consolidated Unit 13-003(a)-99.

The following three inorganic chemicals were detected in soil samples: calcium, cobalt, and fluoride.

- Calcium was detected in 1 out of 13 samples at concentrations exceeding soil BV. Calcium is not retained as a COPC because the frequency of detection is low (only detected in one sample), the concentration did not exceed 2 times the BV, and calcium is an essential nutrient.
- Cobalt is retained as a COPC because at least one concentration was detected above the range of background concentrations.
- Fluoride is retained as a COPC because it was detected and no background data are available.

The following five inorganic chemicals were detected in tuff samples: antimony, fluoride, nitrate, and selenium.

- Calcium was detected in 2 out of 13 samples at concentrations exceeding the tuff BV. Calcium is not retained as a COPC because the frequency of detection is low (only two samples were detected), the concentrations did not exceed 2 times the BV, and calcium is an essential nutrient.
- Selenium is retained as a COPC because the detection limits exceeded the tuff BV and were above the range of background concentrations.
- Antimony is retained as a COPC because the detection limit for one sample exceeded the tuff BV.
- Fluoride and nitrate are retained as COPCs because they were detected, and no background data are available.

In summary, the following five inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation: antimony, cobalt, fluoride, nitrate, and selenium.

These five COPCs were also identified during the historical 1995 and 2005 investigations. No additional COPCs were identified during the 2008 investigation. The 14 inorganic COPCs at Consolidated Unit 13-003(a)-99, based on the 1995 and 2005 historical investigations and the 2008 investigation, are aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, manganese, nitrate, selenium, silver, and vanadium.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 13-003(a)-99 from the historical and 2008 investigations. The inorganic chemicals detected above BVs are presented in Table H-3.1-1.

H-3.2 Organic Chemicals in Soil and Tuff

Organic chemicals in soil and tuff are discussed below for both historical and 2008 investigations at Consolidated Unit 13-003(a)-99.

H-3.2.1 Results from Historical Investigations

Historical soil samples collected at Consolidated Unit 13-003(a)-99 were analyzed for high explosives (HE), semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The following 15 organic chemicals were detected in soil and retained as COPCs during the historical investigations: acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and 1,3-xylene + 1,4-xylene (LANL 2006, 091450, Table B-3.2-2). Acetone had previously been identified as a COPC in soil during the historical investigation; however, after data-quality revalidation was performed for this investigation report, acetone results were requalified as not detected (see Appendix F).

Historical tuff samples collected at Consolidated Unit 13-003(a)-99 were analyzed for HE, SVOCs, and VOCs. The following 10 organic chemicals were detected in tuff and retained as COPCs during the historical investigations: chrysene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, di-n-octylphthalate, fluoranthene, pyrene, styrene, and 1,3-xylene + 1,4- xylene (LANL 2006, 091450, Table B-3.2-2). Acetone and toluene had previously been identified as COPCs in tuff during the historical investigation; after data revalidation using current validation standards for this investigation report (per EP Directorate policy), acetone and toluene results were requalified as not detected (see Appendix F).

In summary, a total of 21 organic COPCs (present in soil and/or tuff) were identified during the historical investigations and include

- acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, di-n-octylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, styrene, and 1,3-xylene + 1,4-xylene

H-3.2.2 Results from the 2008 Investigation

The one soil sample collected during the 2008 investigation at Consolidated Unit 13-003(a)-99 was analyzed for polycyclic aromatic hydrocarbons (PAHs) and SVOCs. Table H-1.1-1 lists the samples collected and the requested analyses for Consolidated Unit 13-003(a)-99. The following organic chemicals were detected in soil: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene.

The tuff sample collected at the farthest location during the 2008 investigation at Consolidated Unit 13-003(a)-99 was analyzed for PAHs and SVOCs. No organic chemicals were detected in tuff during the 2008 investigation.

In summary, the following eight organic chemicals were identified in soil samples during the 2008 investigation (no organic chemicals were identified in tuff): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene.

Seven of these COPCs were also identified during the historical 1995 and 2005 investigations. The eighth COPC (benzo[a]anthracene) was detected only in the 2008 investigation sample and was not identified as a COPC in the historical investigations.

A total of 22 organic COPCs at Consolidated Unit 13-003(a)-99, based on the 1995 and 2005 historical investigations and the 2008 investigation, include acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, diethylphthalate, di-n-octylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, styrene, and 1,3-xylene + 1,4-xylene.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 13-003(a)-99 from the historical and 2008 investigations. The organic chemicals detected are presented in Table H-3.2-1.

H-3.3 Radionuclides in Soil and Tuff

Soil and tuff samples collected at Consolidated Unit 13-003(a)-99 were analyzed for isotopic uranium. No radionuclides were retained as COPCs in soil or tuff.

H-4.0 COPCs FOR CONSOLIDATED UNIT 16-003(n)-99

The following subsections include discussions of inorganic, organic, and radionuclide COPCs for Consolidated Unit 16-003(n)-99. Historical 1995 RFI and 2005 investigation data are summarized, and the 2008 data are presented to determine whether extent of contamination has been defined.

H-4.1 Inorganic Chemicals in Soil, Sediment and Tuff

Inorganic chemicals in soil and tuff are discussed below for historical and 2008 investigations at Consolidated Unit 16-003(n)-99.

H-4.1.1 Results from Historical Investigations

Historical soil samples collected at Consolidated Unit 16-003(n)-99 during the 1995 and 2005 investigations were analyzed for TAL metals and total cyanide. All fill samples, all but one soil sample, and no sediment samples were analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). The following COPCs were identified in soil samples: antimony, barium, cobalt, copper, cyanide, fluoride, lead, manganese, mercury, nitrate, selenium, uranium, and zinc (LANL 2006, 091450, Table B-4.1-2).

Historical tuff samples collected during the 1995 and 2005 investigations were analyzed for TAL metals and total cyanide. All but two tuff samples were analyzed for anions (bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate). The following COPCs were identified in tuff samples: aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, and vanadium (LANL 2006, 091450, Table B-4.1-2).

In summary, a total of 19 inorganic COPCs (present in soil and/or tuff) were identified during the historical investigations and include aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, lead, manganese, mercury, nitrate, nickel, perchlorate, selenium, uranium, vanadium, and zinc.

H-4.1.2 Results from the 2008 Investigation

Two tuff samples collected during the 2008 investigation at Consolidated Unit 16-003(n)-99 were analyzed for TAL metals and anions. Table H-1.2-1 lists the samples collected and their requested analyses.

The following five inorganic chemicals were detected in tuff samples during the 2008 investigation: calcium, fluoride, magnesium, nitrate, and selenium.

- Calcium and magnesium were each detected in 1 out of 33 samples at concentrations exceeding the tuff BVs. Calcium and magnesium are not retained as COPCs because the frequency of detections is low (only detected in one sample for each), the concentrations did not exceed 2 times the BVs, and calcium and magnesium are essential nutrients.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.
- Selenium is retained as a COPC because the detection limits exceeded the tuff BV and was above the range of background concentrations.

In summary, the following three inorganic COPCs (present in tuff) were identified at Consolidated Unit 16-003(n)-99 during the 2008 investigation: fluoride, nitrate, and selenium. These three COPCs were also identified during the historical 1995 and 2005 investigations. No additional COPCs were identified during the 2008 investigation.

The 20 COPCs at Consolidated Unit 16-003(n)-99, based on the 1995 and 2005 historical investigations and the 2008 investigation, include aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nitrate, nickel, perchlorate, selenium, uranium, vanadium, and zinc.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 16-003(n)-99 from the historical and 2008 investigations. The inorganic chemicals detected above BVs are presented in Table H-4.1-1.

H-4.2 Organic Chemicals in Soil, Sediment and Tuff

Organic chemicals in soil and tuff are discussed below for historical and 2008 investigations at Consolidated Unit 16-003(n)-99.

H-4.2.1 Results from Historical Investigations

Historical soil, fill, and sediment samples at Consolidated Unit 16-003(n)-99 were analyzed for HE. All but five sediment samples were analyzed for SVOCs. All but six sediment samples (all surface samples) and one soil sample were also analyzed for VOCs. The following organic chemicals were detected and identified as COPCs at Consolidated Unit 16-003(n)-99: acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl)phthalate, 2-butanone, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, di-n-butylphthalate, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, fluorene, 1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), indeno(1,2,3-cd)pyrene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, nitrobenzene, phenanthrene, pyrene, cyclotrimethylenetrinitramine (RDX), triaminotrinitrobenzene (TATB), and toluene (LANL 2006, 091450, Table B-4.2-2). Previously, 3,5-dinitroaniline had been identified as a COPC in soil during the historical investigation; however, after data revalidation using current validation standards for this investigation report (per Environmental Programs [EP] Directorate policy), 3,5-dinitroaniline results were requalified as not detected (see Appendix F).

Historical tuff samples collected at Consolidated Unit 16-003(n)-99 were analyzed for HE, SVOCs, and VOCs. The following organic chemicals were detected in tuff and retained as COPCs: acetone, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, 2-butanone, chrysene, diethylphthalate, 1,3-dinitrobenzene, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, HMX, indeno(1,2,3- cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, TATB, and 2,4,6-trinitrotoluene (LANL 2006, 091450, Table B-4.2-2).

In summary, a total of 37 organic COPCs (present in soil and/or tuff) were identified during the historical 1995 and 2005 investigations and include

- acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl)phthalate, 2-butanone, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, diethylphthalate, 1,3-dinitrobenzene, di-n-butylphthalate, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, nitrobenzene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene.

H-4.2.2 Results from the 2008 Investigation

Two tuff samples collected during the 2008 investigation at Consolidated Unit 16-003(n)-99 were analyzed for HE, SVOCs, and VOCs. Table H-1.2-1 presents the samples collected and their associated analyses.

The following two organic chemicals were detected in tuff samples during the 2008 investigation: fluoranthene and phenanthrene. These two COPCs were also identified during the historical 1995 and 2005 investigations.

A total of 37 organic COPCs at Consolidated Unit 16-003(n)-99 were identified, based on the 1995 and 2005 historical investigations and the 2008 investigation.

- acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl)phthalate, 2-butanone, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, diethylphthalate, 1,3-dinitrobenzene, di-n-butylphthalate, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, nitrobenzene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 16-003(n)-99 from the historical and 2008 investigations. The organic chemicals detected are presented in Table H-4.2-1.

H-4.3 Radionuclides in Soil and Tuff

Tuff samples at Consolidated Unit 16-003(n)-99 were analyzed for isotopic uranium. No radionuclides were retained as COPCs in tuff.

H-5.0 COPCs FOR SWMU 16-003(o)

The following sections discuss inorganic, organic, and radionuclide COPCs for SWMU 16-003(o). Historical 1995 RFI and 2005 investigation data are summarized, and the 2008 data are presented to determine whether the extent of contamination has been defined.

Because of the complexity of the site, the 2008 investigation results are discussed in two parts: (1) SWMU 16-003(o)–west [TA-16-340 former sump and drainline] and (2) SWMU 16-003(o)–east [former fishladder structure area].

H-5.1 Inorganic Chemicals in Soil and Tuff

Inorganic chemicals in soil and tuff are discussed below for historical and recent investigations at SWMU 16-003(o).

H-5.1.1 Results from Historical Investigations

Historical fill samples and all but three soil samples at collected during the 1995 and 2005 investigations were analyzed for total cyanide and TAL metals. All but 11 soil samples were also analyzed for the following anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. The following inorganic chemicals were identified as COPCs in soil and/or fill remaining at SWMU 16-003(o): antimony, arsenic, barium, cadmium, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, selenium, silver, thallium, uranium, vanadium, and zinc (LANL 2006, 091450, Table B-4.1-2).

Historical tuff samples were analyzed for total cyanide and TAL metals. All but five samples were also analyzed for the following anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. The following inorganic chemicals were identified as COPCs in tuff at SWMU 16-003(o): aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, cyanide, fluoride, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, uranium, vanadium, and zinc (LANL 2006, 091450, Table B-4.1-2).

In summary, a total of 23 inorganic COPCs (present in soil and/or tuff) were identified during the 1995 and 2005 historical investigations and include

- aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, uranium, vanadium, and zinc.

H-5.1.2 Results from the 2008 Investigation at Former Sumps and Drainlines, SWMU 16-003(o)–West

Thirty-six soil samples collected during the 2008 investigation at the former sumps and drainlines at SWMU 16-003(o)-west were analyzed for TAL metals and six soil samples were analyzed for fluoride and nitrate. All sediment samples collected during the 2008 investigation at SWMU 16-003(o)–west were analyzed for TAL metals and 10 samples were analyzed for fluoride and nitrate. Table H-1.3-1 summarizes the samples collected and the requested analyses. The following two inorganic chemicals were detected in soil and sediment samples during the 2008 investigation: fluoride and nitrate.

- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.

Sixty-one tuff samples collected during the 2008 investigation at SWMU 16-003(o)-west were analyzed for TAL metals, and 32 tuff samples were analyzed for fluoride and nitrate. Table H-1.3-1 presents the samples collected and the requested. The following inorganic chemicals were detected in tuff samples during the 2008 investigation: aluminum, barium, beryllium, calcium, copper, fluoride, lead, nickel, nitrate, selenium, and zinc.

- Aluminum, barium, beryllium, copper, lead, nickel, selenium, and zinc are retained as COPCs because they were detected in at least one sample above the tuff BVs and above the ranges of background concentrations.
- Calcium was detected in one sample at a concentration exceeding tuff BV. Calcium is not retained as a COPC because the frequency of detection is low (it was detected in only one sample), the concentration was not high, and calcium is an essential nutrient.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.

In summary, the following 10 inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation at SWMU 16-003(o)–west: aluminum, barium, beryllium, copper, fluoride, lead, nickel, nitrate, selenium, and zinc.

These inorganic COPCs were also identified during the historical 1995 and 2005 investigations. No additional COPCs were identified during the 2008 investigation. The inorganic chemicals detected above BVs are presented in Table H-5.1-1.

H-5.1.3 Results from the 2008 Investigation at Former Fishladder Structure Area, SWMU 16-003(o)–East

All soil samples collected during the 2008 investigation at the former fishladder structure at SWMU 16-003(o)-–east were analyzed for TAL metals, and 10 soil samples were analyzed for fluoride and nitrate. Table H-1.3-1 summarizes the samples collected and the requested analyses. The following inorganic chemicals were detected in soil samples during the 2008 investigation: antimony, arsenic, barium, cadmium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, mercury, nickel, nitrate, selenium, silver, uranium, vanadium, and zinc.

- Antimony, arsenic, barium, cadmium, chromium, cobalt, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, uranium, vanadium, and zinc are retained as COPCs because they were detected in at least one sample above BVs and above the ranges of background concentrations.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.

All tuff samples collected during the 2008 investigation at the former fishladder structure at SWMU 16-003(o)–east were analyzed for TAL metals. Four tuff samples were analyzed for fluoride and nitrate, and seven samples were analyzed for perchlorate. Table H-1.3-1 lists the samples collected and the requested analyses. The following inorganic chemicals were detected in tuff samples during the 2008 investigation: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, magnesium, mercury, nickel, nitrate, perchlorate, selenium, silver, uranium, vanadium, and zinc.

- Aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, iron, lead, manganese, mercury, nickel, perchlorate, selenium, silver, uranium, vanadium, and zinc are retained as COPCs because they were detected in at least one sample above BVs and above the ranges of background concentrations.
- Calcium and magnesium were detected in eight and four samples, respectively, at concentrations exceeding tuff BVs. Calcium and magnesium are not retained as COPCs because the frequency of detections is low, the concentrations did not exceed two times the BVs, and calcium and magnesium are essential nutrients.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.

In summary, the following 23 inorganic COPCs (present in soil and/or tuff) were identified at SWMU 16-003(o)–east during the 2008 investigation:

- aluminum, arsenic, antimony, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, uranium, vanadium, and zinc.

These inorganic COPCs were also identified during the historical 1995 and 2005 investigations. The inorganic chemicals detected above BVs are presented in Table H-5.1-1.

H-5.1.4 Summary of Inorganic COPCs at SWMU 16-003(o)

A total of 24 inorganic COPCs (present in soil and/or tuff) were identified during the 1995 and 2005 historical investigations and the 2008 investigation at SWMU 16-003(o) (east and west). These inorganic chemicals include aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, uranium, vanadium, and zinc.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff from the historical and 2008 investigations. The inorganic chemicals detected above BVs are presented in Table H-5.1-1.

H-5.2 Organic Chemicals in Soil, Tuff, and Pore Gas

H-5.2.1 Results from Historical Investigations

Historical fill and all but two soil samples were analyzed for HE. All fill samples and all but one soil sample were analyzed for SVOCs. All fill and all but 11 soil samples were analyzed for VOCs. The following organic chemicals were detected and retained as COPCs in soil and/or fill remaining at SWMU 16-003(o): 3,5-dinitroaniline, acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, acenaphthylene, 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, chloroform, chloronaphthalene[2-], chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, 3,5-dinitroaniline, di-n-butylphthalate, 2,4-dinitrotoluene, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, pentaerythritol tetranitrate (PETN), phenanthrene, pyrene, RDX, TATB, tetrachloroethene, tetryl, toluene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,4-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3 xylene + 1,4-xylene (LANL 2006, 091450, Table B-5.2-2). Acenaphthylene, chloroform, chloronaphthalene[2-], and isopropylbenzene had previously not been identified as COPCs in soil; however, after data revalidation using current validation standards for this investigation report (per EP Directorate policy), these organic chemicals were requalified and retained as COPCs.

Historical tuff samples were analyzed for HE. All tuff samples were analyzed for SVOCs, and all but four were analyzed for VOCs. The following organic chemicals were detected in tuff and therefore were retained as COPCs: acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, cis-1,2-dichloroethene, diethylphthalate, di-n-butylphthalate, dinitrotoluene[2,4-], di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, methylene chloride, 2-methylnaphthalene, naphthalene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3-xylene + 1,4-xylene (LANL 2006, 091450¸ Table B-5.2-2). Styrene had previously been identified as a COPC in tuff; however, after data revalidation using current validation standards for this investigation report (per EP Directorate policy), styrene was requalified as not detected.

In summary, a total of 55 organic COPCs (present in soil and/or tuff) were identified at SWMU 16-003(o) during the historical investigations and include

- acenaphthene, acenaphthylene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, 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, chloroform, chloronaphthalene[2-], chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, cis-1,2-dichloroethene, diethylphthalate, dinitrotoluene[2,4-], 3,5-dinitroaniline, di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, isopropylbenzene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, methylene chloride, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, tetryl, toluene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3-xylene + 1,4-xylene.

H-5.2.2 Results from the 2008 Investigation at Former Sumps and Drainlines, SWMU 16-003(o)-West

All soil and fill samples collected during the 2008 investigation at SWMU 16-003(o)–west were analyzed for HE, SVOCs, and VOCs. Table H-1.3-1 presents the samples and their requested analyses that are representative of the current site conditions at SWMU 16-003(o)–west. The following organic chemicals were detected in soil during the 2008 investigation: acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, dibenzofuran, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, phenanthrene, pyrene, RDX, TATB, toluene, trichloroethene, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], trinitrotoluene[2,4,6-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

Tuff samples collected near the sump and drainline during the 2008 investigation at SWMU 16-003(o)-west were analyzed for HE, SVOCs, and VOCs. Table H-1.3-1 presents the samples and their requested analyses. The following organic chemicals were detected in tuff during the 2008 investigation: acetone, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, fluoranthene, HMX, phenanthrene, pyrene, RDX, and TATB.

In summary, the following 25 organic chemicals were detected in soil and tuff samples at SWMU 16-003(o)–west during the 2008 investigation:

- acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, dibenzofuran, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, phenanthrene, pyrene, RDX, TATB, toluene, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], trinitrotoluene[2,4,6-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

These COPCs were also identified during the historical 1995 and 2005 investigations. The detected organic chemicals are presented in Table H-5.2-1.

H-5.2.3 Results from the 2008 Investigation at Former Fishladder Structure Area, SWMU 16-003(o)–East

All soil samples collected during the 2008 investigation at SWMU 16-003(o)-east were analyzed for HE, SVOCs and VOCs. Table H-1.3-1 presents the samples and their requested analyses that are representative of the current site conditions at SWMU 16-003(o)–east. The following organic chemicals were detected in soil during the 2008 investigation: acenaphthylene, acenaphthylene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, butanone[2-], chloronaphthalene[2-], chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, isopropyltoluene[4-], methylnaphthalene[2-], naphthalene, phenanthrene, pyrene, and toluene.

Tuff samples collected near the former fishladder structure during the 2008 investigation at SWMU 16-003(o)–east were analyzed for HE, SVOCs, and VOCs. The following organic chemicals were detected in tuff during the 2008 investigation: acenaphthylene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylnaphthalene[2-], naphthalene, phenanthrene, pyrene, and xylene[1,3-]+xylene[1,4-].

In summary, the following 24 organic chemicals were identified in soil and tuff samples at SWMU 16-003(o)–east during the 2008 investigation:

- acenaphthylene, acenaphthylene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, butanone[2-], chloronaphthalene[2-], chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene , indeno(1,2,3-cd)pyrene, isopropyltoluene[4-], methylnaphthalene[2-], naphthalene, phenanthrene, pyrene, toluene, and xylene[1,3-]+xylene[1,4-].

These COPCs were also identified during the historical 1995 and 2005 investigations. The organic chemicals detected are presented in Table H-5.2-1.

H-5.2.4 Summary of Organic COPCs at SWMU 16-003(o)

The following 55 organic chemicals were identified as COPCs at SWMU 16-003(o) during the historical 1995 and 2005 investigations and during the 2008 investigation:

- acenaphthene, acenaphthylene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, 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, chloroform, chloronaphthalene[2-], chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, cis-1,2-dichloroethene, diethylphthalate, dinitrotoluene[2,4-], 3,5-dinitroaniline, di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, isopropylbenzene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, methylene chloride, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, tetryl, toluene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3-xylene + 1,4-xylene.

H-5.2.5 Organic Chemicals in Pore Gas

The following VOCs were detected in the 2008 pore-gas samples:

- acetone, butanone[2-], carbon disulfide, carbon tetrachloride, chloroform, dichloroethane[1,2-], ethylbenzene, hexane, methylene chloride, n-heptane, propylene, tetrachloroethene, toluene, trichloroethene, xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

H-5.3 Radionuclides in Soil and Tuff

Soil and tuff samples at SWMU 16-003(o) were analyzed for isotopic uranium. Table H-1.3-1 presents the samples collected and their requested analyses. The radionuclide COPCs include: uranium-234, uranium-235/236, and uranium-238. Table H-5.3-1 lists the radionuclides detected above BVs.

H-6.0 COPCS FOR SWMUs 16-026(j2) AND 16-029(f)

The following subsections include discussions of inorganic, organic, and radionuclide COPCs for SWMUs 16-026(j2) and 16-029(f). Historical 1995 RFI and 2005 investigation data are summarized, and the 2008 data are presented to determine whether extent has been defined.

H-6.1 Inorganic Chemicals in Soil, Fill, Sediment and Tuff

Inorganic chemicals in soil, fill, sediment and tuff are discussed below for historical and 2008 investigations at SWMUs 16-026(j2) and 16-029(f).

H-6.1.1 Results from Historical Investigations

Historical soil, fill and sediment samples collected at SWMUs 16-026(j2) and 16-029(f) during the 1995 and 2005 investigations were analyzed for TAL metals. All fill and sediment samples, and all but two soil samples, were analyzed for total cyanide. All fill samples, all but six sediment samples, and no soil samples were analyzed for anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. The following inorganic COPCs were identified in soil, fill, and sediment samples during historical investigations: antimony, cyanide, fluoride, lead, mercury, nitrate, perchlorate, selenium, silver, thallium, and zinc (LANL 2006, 091450, Table B-6.1-2).

Historical tuff samples collected during the 1995 and 2005 investigations were analyzed for TAL metals. All tuff samples but two were analyzed for total cyanide. All tuff samples but three were analyzed for the following anions: bromide, chloride, fluoride, nitrate, oxalate, perchlorate, and sulfate. The following inorganic chemicals were retained as COPCs in tuff during historical investigations: aluminum, antimony, barium, bromide, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, and zinc (LANL 2006, 091450, Table B-6.1-2).

In summary, a total of 18 inorganic COPCs (present in soil and/or tuff) were identified during the historical investigations at SWMUs 16-026(j2) and 16-029(f) and include aluminum, antimony, barium, bromide, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, and zinc.

H-6.1.2 Results from the 2008 Investigation

Soil and tuff samples collected during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) were analyzed for TAL metals and anions. Table H-1.4-1 lists the samples collected and the requested analyses.

The following four inorganic chemicals were detected in soil, fill and sediment samples during the 2008 investigation: arsenic, fluoride, nitrate, and selenium.

- Arsenic is retained as a COPC because the detection limit for one sample exceeded the BV and was above the range of background concentrations.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.
- Selenium is retained as a COPC because the detection limits exceeded the BV and was above the range of background concentrations.

The following six inorganic chemicals were detected in tuff samples during the 2008 investigation: aluminum, arsenic, bromide, fluoride, nitrate, and selenium.

- Aluminum is retained as a COPC because the detection limit for one sample exceeded the BV and was above the range of background concentrations.
- Bromide is retained as a COPC because it was detected and no background data are available.
- Arsenic is retained as a COPC because the detection limit for one sample exceeded the BV and was above the range of background concentrations.
- Fluoride and nitrate are retained as COPCs because they were detected and no background data are available.
- Selenium is retained as a COPC because the detection limits exceeded the BV and was above the range of background concentrations.

In summary, the following six inorganic COPCs (present in soil and/or tuff) were identified during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f): aluminum, arsenic, bromide, fluoride, nitrate, and selenium.

All six COPCs were also identified during the historical 1995 and 2005 investigations. No new COPCs were identified during the 2008 investigation.

A total of 19 COPCs were retained at SWMUs 16-026(j2) and 16-029(f), based on the 1995 and 2005 historical investigations and the 2008 investigation: aluminum, antimony, arsenic, barium, bromide, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, and zinc.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at SWMUs 16-026(j2) and 16-029(f) from the historical and 2008 investigations. The inorganic chemicals detected above BVs are presented in Table H-6.1-1.

H-6.2 Organic Chemicals in Soil, Fill, Sediment and Tuff

Organic chemicals in soil and tuff are discussed below for historical and recent investigations at SWMUs 16-026(j2) and 16-029(f).

H-6.2.1 Results from Historical Investigations

Historical soil, fill, and sediment samples at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE and SVOCs. All soil, fill, and all but five sediment samples were also analyzed for VOCs. The following organic chemicals were detected in soil, fill, and/or sediment at SWMUs 16-026(j2) and 16-029(f) and retained as COPCs: acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 1,1-dichloroethene, ethylbenzene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, pyrene, RDX, TATB, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene (LANL 2006, 091450, Table B-6.2-2).

Historical tuff samples collected at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE, SVOCs and VOCs. The following organic chemicals were detected and retained as COPCs: acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, phenol, pyrene, TATB, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene (LANL 2006, 091450, Table B-6.2-2). Previously, 1,2-xylene had been identified as a COPC in tuff; however, after data revalidation using current validation standards for this investigation report (per EP Directorate), 1,2-xylene was requalified as not detected (see Appendix F).

In summary, a total of 35 organic COPCs (present in soil and/or tuff) were identified during the historical investigations and include

- acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 1,1-dichloroethene, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, phenol, pyrene, RDX, TATB, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene.

H-6.2.2 Results from the 2008 Investigation

One soil sample collected during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) was analyzed for HE and SVOCs. Table H-1.4-1 lists the one sample and the requested analyses. The following four organic chemicals were detected in soil, fill and sediment during the 2008 investigation and retained as COPCs: acenaphthene, benzo(b)fluoranthene, fluoranthene, and phenanthrene.

Tuff samples collected near the sump and drainline during the 2008 investigation at SWMUs 16-026(j2) and 16-029(f) were analyzed for HE, SVOCs, and VOCs. One tuff sample collected down the drainage from the sump and drainline was analyzed for HE and SVOCs. The following organic chemicals were detected in tuff during the 2008 investigation and retained as COPCs: acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

In summary, the following nine organic chemicals were detected in soil, fill, sediment, and tuff samples during the 2008 investigation: acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

These nine COPCs were also identified during the historical 1995 and 2005 investigations.

A total of 35 organic COPCs at SWMUs 16-026(j2) and 16-029(f) were identified, based on the 1995 and 2005 historical investigations and the 2008 investigation, include

- acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 1,1-dichloroethene, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, phenol, pyrene, RDX, TATB, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene.

Table H-2.0-1 presents the complete list of COPCs for soil and tuff at Consolidated Unit 16-003(n)-99 from the historical and 2008 investigations. The analytical results are presented in Table H-6.2-1.

H-6.2.3 Radionuclides in Soil and Tuff

Soil and tuff samples at SWMUs 16-026(j2) and 16-029(f) were analyzed for isotopic uranium. Table H-1.4-1 lists the one sample and the requested analyses. No radionuclides were retained as COPCs in soil or tuff.

H-7.0 COPCs FOR FISHLADDER CANYON

The following sections discuss inorganic, organic, and radionuclide COPCs for groundwater and surface water at Fishladder Canyon. Historical 1995 RFI and 2005 investigation data are very limited and will not be summarized. The post-2005 investigation data are presented below.

H-7.1 Inorganic Chemicals in Alluvial Groundwater

The filtered groundwater samples collected at the three alluvial wells, post-2005 investigation, were analyzed for anions, TAL metals, nitrate, total cyanide, alkalinity, hardness, pH, specific conductance, and total suspended solids. Table H-1.5-1 lists the samples collected and their requested analyses.

The following inorganic chemicals were detected and identified as COPCs in filtered alluvial groundwater in Fishladder Canyon: aluminum, antimony, arsenic, beryllium, boron, bromide, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, silicon dioxide, silver, sodium, strontium, sulfate, uranium, vanadium, and zinc.

Calcium, magnesium, potassium, and sodium were not retained as COPCs because they are essential nutrients (EPA 1989, 008021).

Five water-quality parameters were analyzed: alkalinity, hardness, pH, specific conductance, and total suspended solids.

The following 24 inorganic chemicals were retained as COPCs in filtered groundwater: aluminum, antimony, arsenic, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, iron, lead, manganese, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, uranium, vanadium, and zinc.

The unfiltered groundwater samples collected at the three alluvial wells, during the post-2005 investigation, were analyzed for anions, TAL metals, nitrate, total cyanide, perchlorate, alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids.

The following inorganic chemicals were detected and, therefore, are identified as COPCs in unfiltered alluvial groundwater in Fishladder Canyon: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium silver, sodium, strontium, thallium, uranium, vanadium, and zinc

Calcium, magnesium, potassium, and sodium were not retained as COPCs because they are essential nutrients (EPA 1989, 008021).

Six water-quality parameters were analyzed and are not COPCs: alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids.

The following 22 inorganic chemicals were retained as COPCs in unfiltered groundwater:

- aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, cyanide, lead, manganese, mercury, molybdenum, nickel, silver, strontium, thallium, uranium, vanadium, and zinc

The results of inorganic chemicals detected in alluvial groundwater in Fishladder Canyon during the post-2005 investigation are presented in Table H-7.1-1.

H-7.2 Organic COPCs in Alluvial Groundwater

The unfiltered alluvial groundwater samples collected in Fishladder Canyon were analyzed for HE, SVOCs, and VOCs. Table H-1.5-1 lists the samples collected and their requested analyses. The following organic chemicals were detected and retained as COPCs in unfiltered alluvial groundwater.

- Cis-1,2-dichloroethene, HMX, 4-isopropyltoluene, RDX, tetrachloroethene, toluene, and trichloroethene.

The organic chemicals detected in alluvial groundwater during the post-2005 investigation are presented in Table H-7.2-1.

H-7.3 Inorganic Chemicals in Surface Water

The surface water samples collected at Fishladder Spring and Fishladder at Cañon de Valle during the post-2005 investigation were analyzed for anions, TAL metals, alkalinity, hardness, pH, specific conductance, total dissolved solids, total organic carbon, and total suspended solids. Table H-1.5-1 lists all the samples collected and the requested analyses.

The following inorganic chemicals were detected and identified as COPCs in filtered surface water in Fishladder Canyon: aluminum, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, silicon dioxide, sodium, strontium, sulfate, uranium, vanadium, and zinc.

Calcium, magnesium, potassium, and sodium were not retained as COPCs because they are essential nutrients (EPA 1989, 008021).

Seven water-quality parameters were analyzed: alkalinity, hardness, pH, specific conductance, total dissolved solids, total organic carbon, and total suspended solids.

The following 20 inorganic chemicals were retained as COPCs in filtered surface water: aluminum, barium, beryllium, boron, cadmium, chromium, cobalt, copper, fluoride, iron, lead, manganese, molybdenum, nickel, silicon dioxide, strontium, sulfate, uranium, vanadium, and zinc.

The unfiltered surface water samples collected at Fishladder Spring and Fishladder Canyon at Cañon de Valle, during the post-2005 investigation, were analyzed for anions, TAL metals, total cyanide, alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids.

The following inorganic chemicals were detected and therefore identified as COPCs in unfiltered surface water in Fishladder Canyon: aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, calcium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, silicon dioxide, silver, sodium, strontium, sulfate, thallium, tin, uranium, vanadium, and zinc.

Calcium, magnesium, potassium, and sodium were not retained as COPCs because they are essential nutrients (EPA 1989, 008021).

Six water-quality parameters were analyzed and are not COPCs: alkalinity, hardness, pH, specific conductance, total organic carbon, and total suspended solids.

The following 28 inorganic chemicals were retained as COPCs in unfiltered surface water.

- aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, thallium, tin, uranium, vanadium, and zinc.

The inorganic chemicals detected in surface water in Fishladder Canyon during the post-2005 investigation are presented in Table H-7.1-1.

H-7.4 Organic COPCs in Surface Water

The unfiltered surface water samples collected in Fishladder Canyon were analyzed for HE, SVOCs, and VOCs. Table H-1.5-1 lists the samples collected and their requested analyses. The following eight organic chemicals were detected and retained as COPCs in unfiltered surface water: acetone, 1,2,3,4,5,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxins (total), 1,2,3,4,5,6,7,8-heptachlorodibenzofuran, heptachlorodibenzofurans (total), HMX, methlylene chloride, 1,2,3,4,5,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,5,6,7,8,9-octachlorodibenzofuran, RDX, and toluene.

The organic chemicals detected in surface water during the post-2005 investigation are presented in Table H-7.2-1.

H-7.5 Radionuclides in Groundwater and Surface Water

H-7.5.1 Groundwater

Three filtered groundwater samples collected at the three alluvial wells during the post-2005 investigation were analyzed for americium-241, gamma emitters by gamma spectroscopy, isotopic plutonium, isotopic uranium, and strontium-90. Two filtered groundwater samples were analyzed for gross alpha and gross beta. Table H-1.5-1 lists the samples collected and their requested analyses.

The following radionuclides were detected and therefore identified as COPCs in filtered alluvial groundwater in Fishladder Canyon: gross beta, strontium-90, uranium-234, and uranium-235.

Three unfiltered groundwater samples collected at the three alluvial wells during the post-2005 investigation were analyzed for americium-241, gamma emitters by gamma spectroscopy, isotopic plutonium, isotopic uranium, and strontium-90. Two unfiltered groundwater samples were analyzed for gross alpha and gross beta. Table H-1.5-1 lists the samples collected and their requested analyses.

The following radionuclides were detected and therefore identified as COPCs in unfiltered alluvial groundwater in Fishladder Canyon: gross alpha, gross beta, radium-226, radium-228, tritium, uranium-234, and uranium-235.

The radionuclides detected in groundwater during the post-2005 investigation are presented in Table H-7.3-1.

H-7.5.2 Surface Water

One filtered surface water sample, collected during the post-2005 investigation, was analyzed for americium-241, gamma emitters by gamma spectroscopy, gross alpha, gross beta, isotopic plutonium, isotopic uranium, and strontium-90. Table H-1.5-1 lists the samples collected and their requested analyses.

The following radionuclides were detected and therefore identified as COPCs in filtered surface water in Fishladder Canyon: gross beta, uranium-234, and uranium-235.

One unfiltered surface water sample, collected during the post-2005 investigation, was analyzed for americium-241, gamma emitters by gamma spectroscopy, gross alpha, gross beta, isotopic plutonium, isotopic uranium, and strontium-90. Table H-1.5-1 lists the samples collected and their requested analyses.

The following radionuclides were detected and therefore identified as COPCs in unfiltered surface water in Fishladder Canyon: gross alpha, gross beta, tritium, and uranium-234.

The radionuclides detected in groundwater during the post-2005 investigation are presented in Table H-7.3-1.

H-8.0 NATURE AND EXTENT OF CONTAMINATION

The following sections present an analysis of nature and extent of contamination at the TA-16-340 Complex. As with the discussion of data presented above, the nature and extent of contamination are evaluated and presented separately for each consolidated unit and SWMU.

H-8.1 Consolidated Unit 13-003(a)-99

Several historical investigations were conducted at Consolidated Unit 13-003(a)-99. The analytical results from these historical investigations conducted through 2005 indicated the extent of contamination at the consolidated unit was not defined for many COPCs (LANL 2005, 089331, p. B-16).

Based on these previous data, the 2008 investigation was initiated to (1) define the lateral and/or vertical extent of contamination within the consolidated unit, and (2) determine whether additional investigations or corrective actions are warranted.

H-8.1.1 Inorganic Chemicals

The extent of inorganic chemicals at Consolidated Unit 13-003(a)-99 is discussed in the sections below.

Results from Historical Investigations

A total of 14 inorganic COPCs were identified in soil and tuff at Consolidated Unit 13-003(a)-99 during the historical 1995 and 2005 investigations. The 14 COPCs included aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, manganese, nitrate, selenium, silver, and vanadium (LANL 2005, 089331, p. B-16).

Of the 14 COPCs identified, extent was not defined for the following eight inorganic chemicals at Consolidated Unit 13-003(a)-99 during the historical investigations.

- Lateral extent was not defined for arsenic, barium, cobalt, and manganese.
- Vertical extent was not defined for silver.
- Lateral and vertical extent was not defined for selenium.
- Fluoride and nitrate were not evaluated for lateral or vertical extent.

The 2008 investigation was conducted to define the extent of contamination for these eight inorganic COPCs. The results are presented below.

Summary and Results from the 2008 Investigation

Four of the eight inorganic chemicals (arsenic, barium, manganese, and silver) listed above were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of arsenic, barium, manganese, and silver are defined at Consolidated Unit 13-003(a)-99. The other four inorganic COPCs (cobalt, fluoride, nitrate, and selenium) are discussed below. The distribution of inorganic chemicals present above BVs at Consolidated Unit 13-003(a)-99 is shown in Figure H-8.1-1, and the results are presented in Table H-3.1-1.

Cobalt was detected in one tuff sample at 5.0–5.5 ft below ground surface (bgs) at historical location 13-23552 (located downgradient of the former sump). Cobalt was detected in one soil sample, 0–0.6 ft bgs at the 2008 location 16-603358 (distal-most location from former septic system). Cobalt was not detected in the tuff sample at 8.5–10 ft bgs at the same location; therefore, the vertical extent of cobalt is defined. The lateral extent of cobalt in tuff is defined because it was not detected in the downgradient 2008 tuff sample (at location 16-603358), as stated above. Since cobalt was detected in the surface sample at this most downgradient location, the lateral extent of cobalt in surface soil is further assessed by determining the presence of this chemical in soil samples (at the same or lower elevations) at neighboring SWMUs. The lateral extent of cobalt at Consolidated Unit 13-003(a)-99 is defined because this chemical is not detected in surface soils at nearby former structures at SWMU 16-003(o) and SWMUs 16-029(f) and 16-026(j2).

Selenium was detected at a concentration greater than one order of magnitude above the BV in one tuff sample, 18–20 ft bgs at location 13-23558 (former septic system) and at a concentration greater than 2 times the BV in one tuff sample, 8.5–10 ft bgs at the downgradient location 16-603358 during the 2008 investigation. Selenium was reported as undetected in all of the deepest samples collected during the historical investigations. The lateral extent of selenium is defined because concentrations decrease distally from the former septic tank to the downgradient location. The vertical extent of selenium is further assessed by determining the presence of this chemical in tuff at deeper elevations at neighboring SWMU 16-003(o). The vertical extent of selenium is defined at the former septic tank at Consolidated Unit 13-003(a)-99 because this chemical was detected at lower concentrations to bottom depth of 206 ft at location 16-603511, at SWMU 16-003(o), located to the southeast of the former septic tank.

Fluoride was detected at multiple locations during the historical investigations and it was detected during the 2008 investigation at 18–20 ft bgs at location 13-23558 (former septic system) and 0–0.6 ft bgs and 8.5–10 ft bgs at the downgradient location 16-603358. This inorganic chemical is ubiquitous in the consolidated unit, concentrations are low (J qualified) and do not vary greatly from one location to another (based on 2008 data), and there are no clear trends for lateral and vertical extent. Fluoride is a naturally occurring inorganic chemical but has no background data set. It is likely that the low detected concentrations are naturally occurring levels and are not indicative of a release.

Nitrate was detected at multiple locations during the historical investigations and was detected in one sample at 8.5–10 ft bgs at the downgradient location 16-603358 (distal location from former septic system during the 2008 investigation. The lateral extent of nitrate is defined because concentrations decrease to the most distal location (using historical and 2008 data). The vertical extent of nitrate is defined because concentrations decrease to the deepest depth (at historical location 13-23558).

In summary, all eight inorganic chemicals not defined for extent, during the historical investigations, are defined laterally and vertically using 2008 investigation data. Extent for two of these COPCs was defined using sample data collected at neighboring SWMUs approximately 225 ft downgradient.

H-8.1.2 Organic Chemicals

The extent of organic chemicals at Consolidated Unit 13-003(a)-99 is discussed in the sections below.

Results from Historical Investigations

A total of 21 organic COPCs were identified in soil and tuff at Consolidated Unit 13-003(a)-99 during the historical 1995 and 2005 investigations. The organic COPCs included acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4 dichlorobenzene, diethylphthalate, di-n-octylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, styrene, and 1,3-xylene + 1,4-xylene (LANL 2005, 089331, p. B-16).

Of the COPCs identified, extent of contamination was not defined for 12 organic chemicals at Consolidated Unit 13-003(a)-99 during the historical investigations: lateral extent was not defined for acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, phenanthrene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, and pyrene were not defined for lateral extent.

The 2008 investigation was conducted to define the extent of contamination for these 12 organic chemicals. Results are presented below.

Results from the 2008 Investigation

Five of the 12 organic COPCs (acenaphthene, anthracene, benzo(k)fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene) listed above were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of acenaphthene, anthracene, benzo(k)fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene are defined at Consolidated Unit 13-003(a)-99. The extent of the other seven organic COPCs (benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene) as well as benzo(a)anthracene (detected only in 2008 samples) are discussed below. The distribution of organic chemicals present at Consolidated Unit 13-003(a)-99 is depicted in Figure H-8.1-2, and the results are presented in Table H-3.2-1.

Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene were detected downgradient of the former septic system at historical location 13-23552. Some of these chemicals were also detected at historical location 13-23550, located more proximal to the former septic system). Benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene were also detected in soil at low concentrations at 0–0.6 ft bgs at 2008 location 16-603358 (distal-most location from former septic system). None of these organic chemicals were detected in the underlying tuff at the same location; therefore the vertical extent is defined. The lateral extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, and pyrene is also defined because concentrations decrease from the former septic system to the downgradient distal-most location.

Benzo(a)anthracene was detected in one 2008 sample, at an estimated (J-qualified) trace concentration, at 0–0.6 ft bgs at the downgradient location 16-603358 (it was not detected during the historical investigations). Benzo(a)anthracene was not detected in the underlying tuff at the same location, therefore vertical extent is defined. Since benzo(a)anthracene was detected in the surface sample at this most downgradient location, the lateral extent of benzo(a)anthracene in surface soil is assessed by determining the presence of this chemical in soil samples (at lower elevations) at neighboring SWMU 16-003(o). The lateral extent of benzo(a)anthracene at Consolidated Unit 13-003(a)-99 is defined as this chemical is not detected in surface soils at nearby former structures at SWMU 16-003(o).

In summary, all 12 organic COPCs not defined for extent during the historical investigations are defined laterally and vertically using 2008 investigation data. In addition, the lateral extent for the one COPC only detected in 2008, was defined using sample data collected at a neighboring SWMU approximately 250 ft downgradient.

H-8.1.3 Radionuclides

No radionuclides were detected at Consolidated Unit 13-003(a)-99.

H-8.2 Consolidated Unit 16-003(n)-99

Several historical investigations were conducted at Consolidated Unit 16-003(n)-99. Analytical results from these historical investigations conducted through 2005 indicated the extent of contamination at the consolidated unit is not defined for many COPCs (LANL 2005, 089331, p. B-16).

Based on these previous data, the 2008 investigation was initiated to (1) define the lateral and/or vertical extent of contamination within the consolidated unit, and (2) determine whether additional investigations or corrective actions are warranted.

H-8.2.1 Inorganic Chemicals

The extent of inorganic chemicals at Consolidated Unit 16-003(n)-99 is discussed in the sections below.

Results from Historical Investigations

A total of 20 inorganic COPCs were identified in soil and tuff at Consolidated Unit 16-003(n)-99 during the historical 1995 and 2005 investigations. The 19 inorganic COPCs included aluminum, antimony, arsenic, barium, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, nitrate, nickel, perchlorate, selenium, uranium, vanadium, and zinc (LANL 2006, 091450, Table B-4.1-2).

Of the 20 COPCs identified during the historical investigations, extent was not defined for the following ten COPCs at Consolidated Unit 16-003(n)-99.

- Vertical extent was not defined for aluminum, arsenic, barium, copper, lead, selenium, and vanadium.
- Lateral or vertical extent was not defined for cobalt.
- Fluoride and nitrate were not evaluated for lateral or vertical extent.

The 2008 investigation was conducted to define the extent of contamination for these ten inorganic COPCs. Results are presented below.

Results from the 2008 Investigation

Five of the 10 inorganic COPCs (arsenic, barium, copper, lead, and vanadium) listed above were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of arsenic, barium, copper, lead, and vanadium is defined at Consolidated Unit 16-003(n)-99. The extent of the other five inorganic COPCs (aluminum, cobalt, fluoride, nitrate, and selenium) is discussed below. The distribution of inorganic COPCs presented above BVs at Consolidated Unit 16-003(n)-99 is shown in Figure H-8.2-1, and the results are presented in Table H-4.1-1.

Aluminum was detected during an historical investigation at 3.0–4.0 ft bgs at location 16-23561 [the most downgradient location of the former outfall at Consolidated Unit 16-003(n)-99]. The lateral extent of aluminum was defined during the historical investigation. The vertical extent of aluminum is assessed by determining the presence of this chemical at downgradient and at deeper depths within Fishladder

Canyon drainage at neighboring SWMU 16-003(o). The concentrations of aluminum in Fishladder Canyon drainage fluctuate (but rarely exceeds 2 times the BV), and the concentrations decrease to the most downgradient location (16-603406) at SWMU 16-003(o). Aluminum is naturally occurring in tuff, and it is possible for aluminum concentrations in weathered tuff to exceed the BV; the lower aluminum concentrations above BV are most likely not part of a release.

Cobalt was detected during an historical investigation at 3.0–4.0 ft bgs at location 16-23561 [the most downgradient location of the former outfall at Consolidated Unit 16-003(n)-99]. The lateral and vertical extent of cobalt is assessed by determining the presence of this chemical at downgradient and deeper depths within Fishladder Canyon drainage in the neighboring SWMU 16-003(o). The concentrations of cobalt in Fishladder Canyon drainage decrease by more than a factor of ten to the most downgradient location (16-603406) at SWMU 16-003(o). Therefore, lateral and vertical extent of cobalt are defined downgradient in Fishladder Canyon drainage.

Fluoride was detected at a low concentration at 12.5–13.5 ft bgs at location 16-23574 (former sump location at building 16-342). This inorganic chemical was also detected at 13.5–15.0 ft bgs at location 16-23579 (former outfall location and farther downgradient of building 16-342). Fluoride concentrations decrease laterally and vertically from the source to the distal location (using historical and 2008 data). Fluoride is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels.

Nitrate was detected at a low (J-qualified) concentration at 12.5–13.5 ft bgs at location 16-23574 (former sump location at building 16-342). This inorganic chemical was also detected at about the same concentration (also J-qualified) at 13.5–15.0 ft bgs at location 16-23579 (former outfall location and further down gradient from building 16-342). Nitrate is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels.

Selenium was detected at 12.5–13.5 ft bgs at location 16-23574 (former sump location at building 16-342). It was also detected at 13.5–15.0 ft bgs at location 16-23579 (former outfall location and farther downgradient of building 16-342). The concentrations are about the same at these two locations. Vertical extent is defined because selenium was not detected in the most downgradient location (16-23561), which was sampled at a deeper depth beneath ground surface. This downgradient location is situated at about 50 ft lower elevation than locations 16-23574 and 16-23579. The lateral extent of selenium is also defined at Consolidated Unit 16-003(n)-99 because selenium was not detected at downgradient locations during historical investigations.

In summary, the 10 inorganic COPCs not defined for extent during the historical investigations, are defined laterally and vertically using 2008 investigation data. Extent for two of these COPCs was defined using sample data collected from within Fishladder Canyon drainage, approximately 250 ft downgradient.

H-8.2.2 Organic Chemicals

The extent of organic chemicals at Consolidated Unit 16-003(n)-99 is discussed in the subsections below.

Results from Historical Investigations

A total of 37 organic COPCs were identified in soil, sediment and tuff at Consolidated Unit 16-003(n)-99 during the historical 1995 and 2005 investigations. The organic COPCs included acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, benzyl alcohol, bis(2-ethylhexyl)phthalate, 2-butanone, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, diethylphthalate, 1,3-dinitrobenzene, di-n-butylphthalate, 2,4-dinitrotoluene, di-n-octylphthalate, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, nitrobenzene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene (LANL 2006, 091450, Table B-4.2-2).

Twelve of these organic chemicals (acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl alcohol, 2-butanone, dibenz(a,h)anthracene, diethylphthalate, fluorene, 4-isopropyltoluene, 4-methyl-2-pentanone, and naphthalene) were not evaluated for extent during the 2005 investigation report because concentrations were reported to be at trace levels (near or below the EQLs) (LANL 2006, 091450, Appendix B).

Extent for 10 organic COPCs was not defined at Consolidated Unit 16-003(n)-99 during the historical investigations.

- Lateral or vertical extent was not defined for acetone, chrysene, fluoranthene, phenanthrene, and pyrene.
- Vertical extent was not defined for benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, HMX, and TATB.

The 2008 investigation was conducted to define the extent of contamination for these 10 organic COPCs. Results are presented below.

Results from the 2008 Investigation

Five of the ten organic COPCs (benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, HMX, and TATB) listed above were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, HMX, and TATB is defined at Consolidated Unit 16-003(n)-99. The extent of the other five organic COPCs (acetone, chrysene, fluoranthene, phenanthrene, and pyrene) is discussed below. The distribution of organic chemicals detected at Consolidated Unit 16-003(n)-99 is depicted in Figure H-8.2-2, and the results are presented in Table H-4.2-1.

Acetone, chrysene, and pyrene were detected in tuff samples as deep as 5 ft bgs, adjacent to the former sump and outfall, during historical investigations. Acetone, chrysene, and pyrene were not detected at location 16-23579 during the 2008 investigation (which was sampled to 15.0 ft bgs), and therefore the vertical extent of acetone, chrysene, and pyrene is defined using 2008 data. The lateral extent of acetone, chrysene, and pyrene is also defined because the concentrations of these COPCs decrease with distance from the former outfall; the lowest concentrations were detected at the most downgradient location (16-23561).

Fluoranthene and phenanthrene were detected in an historical fill sample at 2.5–3.0 ft bgs at 16-23579 (former outfall location). Fluoranthene and phenanthrene were also detected in one 2008 tuff sample at 13.5–15.0 ft bgs at this same location 16-23579. The vertical extent of fluoranthene and phenanthrene is defined because their concentrations decrease from the fill sample to the underlying tuff. Fluoranthene and phenanthrene were not detected in tuff at locations further downgradient of location 16-23579 during historical investigations. Therefore the lateral extent of fluoranthene and phenanthrene is defined downgradient of the former outfall at Consolidated Unit 16-003(n)-99.

Twelve organic COPCs identified during the historical investigations (acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl alcohol, 2-butanone, dibenz(a,h)anthracene, diethylphthalate, fluorene, 4-isopropyltoluene, 4-methyl-2-pentanone, and naphthalene) were not evaluated for extent as part of the 2005 investigation report. None of these twelve COPCs were detected at location 16-23579 during the 2008 investigation (which was sampled to a deeper depth of 15.0 ft bgs), and therefore the vertical extent is defined for these COPCs. The lateral extent is also defined for acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl alcohol, 2-butanone, dibenz(a,h)anthracene, diethylphthalate, fluorene, 4-isopropyltoluene, 4-methyl-2-pentanone, and naphthalene because concentrations of these COPCs decrease with distance from the former outfall (they were either not detected at the most downgradient location (16-23561) or concentrations were lowest at this location).

In summary, all of the organic COPCs not defined for extent during the historical investigations, are defined laterally and vertically using 2008 investigation data.

H-8.2.3 Radionuclides

No radionuclides were detected at Consolidated Unit 16-003(n)-99.

H-8.3 SWMU 16-003(o)

Several historical investigations were conducted at SWMU 16-003(o). Analytical results from these historical investigations conducted through 2005 indicated the extent of contamination at the SWMU was not defined for many constituents (LANL 2005, 089331, p. B-16).

Based on these previous data, the 2008 investigation was initiated to (1) define the lateral and/or vertical extent of contamination within the SWMU, and (2) determine whether the excavation activities successfully reduced potential risks to human health and the environment or whether additional corrective actions are warranted.

H-8.3.1 Inorganic Chemicals

The extent of inorganic chemicals at SWMU 16-003(o) is discussed in the sections below. The 2008 investigation results are discussed in two parts: (1) SWMU 16-003(o)–west [TA-16-340 former sump and drainline] and (2) SWMU 16-003(o)-east [former fishladder structure].

Results from Historical Investigations

A total of 23 inorganic COPCs were identified in soil and tuff at SWMU 16-003(o) during the historical 1995 and 2005 investigations. The 23 COPCs included aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, fluoride, lead, manganese, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, uranium, vanadium, and zinc (LANL 2006, 091450, Table B-4.1-2).

Of the 23 COPCs identified during the historical investigations, extent of contamination for the following 12 inorganic COPCs were not defined at the former sumps and drainlines at SWMU 16-003(o)–west following the historical investigations.

- Lateral extent was not defined for arsenic and cadmium.
- Vertical extent was not defined for barium, copper, nickel, selenium, and zinc.
- Lateral and vertical extent were not defined for chromium, cobalt, and lead.
- Fluoride and nitrate were not evaluated for lateral or vertical extent.

The 2008 investigation was conducted at SWMU 16-003(o)–west to define the extent of contamination of these 12 inorganic COPCs. The results are presented below.

Of the 23 COPCs identified during the historical investigations, extent for the following nine inorganic COPCs were not defined at the former fishladder structure at SWMU 16-003(o)–east.

- Lateral extent was not defined for cobalt, lead, mercury, nickel, selenium, uranium, and vanadium.
- Fluoride and nitrate were not evaluated for lateral or vertical extent.

The 2008 investigation was conducted at SWMU 16-003(o)–east to define the extent of contamination of these nine inorganic COPCs. Results are presented below.

Results from the 2008 Investigation

The 2008 investigation results from the former sumps and drainlines, at SWMU 16-003(o)–west, and former fishladder structure, at SWMU 16-003(o)–east, are presented below.

Former Sumps and Drainlines, SWMU 16-003(o)–West

Extent of contamination for 12 inorganic COPCs (arsenic, barium, cadmium, chromium, cobalt, copper, fluoride, nickel, nitrate, lead, selenium, and zinc) was not defined at the former sumps and drainlines at SWMU 16-003(o)–west during the historical investigations. Two additional inorganic COPCs (aluminum and beryllium) were detected at SWMU 16-003(o)–west during the 2008 investigation. These 14 inorganic COPCs are evaluated below for extent of contamination. The distribution of inorganic COPCs present at SWMU 16-003(o)–west is shown in Plate 1, and the results are presented in Table H-5.1-1.

Arsenic, cadmium, chromium, cobalt, and nickel were detected at multiple historical locations around the former sumps to depths of 5 ft bgs. Arsenic, cadmium, chromium, cobalt, and nickel were not detected at 2008 locations 16-603396 and 16-603397 to depths of 15 ft bgs. Arsenic, cadmium, chromium, cobalt, and nickel were also detected in the downgradient historical location 16-23691 at 86 ft bgs, and they were not detected at bottom depth of 122 ft bgs. The vertical extent of arsenic, cadmium, chromium, cobalt, and nickel at the former sumps and downgradient location is defined at the former sumps and downgradient locations. The lateral extent of arsenic, cadmium, chromium, cobalt, and nickel is also defined because they were not detected at 2008 boreholes 16-603400 and 16-603401, located downgradient of the sumps and at the top end of the former fishladder Structure (see Plate 2).

Barium and copper were detected at multiple historical locations around the former sumps to depths of 5 ft bgs. Barium and copper were not detected at 2008 locations 16-603396 and 16-603397 to depths of 15 ft bgs. Barium and copper were also detected in the downgradient historical location 16-23691 at 86 ft bgs, and they were not detected at bottom depth of 122 ft bgs. Therefore, the vertical extent of barium and copper at the former sumps and downgradient location is defined. The lateral extent of barium and copper is also defined because barium and copper were detected at lower concentrations at 2008 boreholes 16-603400 and 16-603401, located downgradient of the sumps and at the top end of the former fishladder Structure (see Plate 2). The vertical extent of barium and copper at these locations is defined because they were not detected at deeper locations at the former fishladder structure.

Fluoride was detected in 80 samples at concentrations ranging from 0.55 mg/kg (in a 2008 sample) to 12.8 mg/kg (in a 2005 sample). Fluoride was detected in multiple samples at deep borehole 16-603511. Its concentrations ranged from 1.77 mg/kg at 77 ft to 0.635 mg/kg at bottom depth of 206 ft, and the concentrations decrease to bottom depth; therefore, the vertical extent of fluoride is defined. The lateral extent of fluoride is also defined because it was not detected in the downgradient deep borehole (location 16-23691). Fluoride is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels.

Lead and zinc were detected at multiple historical locations around the former sumps to depths of 5 ft bgs. Lead and zinc were not detected at 2008 locations 16-603396 and 16-603397 to depths of 15 ft bgs; therefore, the vertical extent of lead and zinc at the former sumps are defined. The lateral extent of lead and zinc is also defined because they were not detected at 2008 boreholes 16-603400 and 16-603401, located downgradient of the sumps and at the top end of the former fishladder structure (see Plate 2).

Nitrate was detected in 34 samples at concentrations ranging from 0.448 mg/kg (in a 2005 sample) to 12.8 mg/kg (in a 2005 sample). Nitrate was detected in multiple samples at location 16-603511. Its concentrations ranged from 1.25 mg/kg at 77 ft to 0.955 mg/kg at 160 ft, and not detected at bottom depth of 206 ft. Its concentrations decrease to bottom depth; therefore, the vertical extent of nitrate is defined. The lateral extent of nitrate is also defined because it was not detected in the downgradient, deep borehole (location 16-23691). Nitrate is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels.

Selenium was detected at multiple historical locations around the former sumps; its concentrations ranged from 0.33 mg/kg to 2.21 mg/kg to depths of 5 ft bgs. Selenium was not detected at 2008 locations 16-603396 and 16-603397 to depths of 15 ft bgs; therefore, the vertical extent of selenium at the former sumps is defined. The lateral extent of selenium was also defined during the historical investigations because selenium was not detected in the downgradient historical location 16-23691. Selenium was detected above the BV in five samples at location 16-603511 during the 2008 investigation. Its concentrations ranged from 2.45 mg/kg at 77 ft to 2.25 mg/kg at bottom depth of 206 ft. The concentrations varied little and they decreased slightly at the bottom depth; therefore, the vertical extent for selenium is defined at the 2008 location 16-603511. The lateral extent of selenium is also defined because it was not detected in the downgradient deep borehole (location 16-23691).

Aluminum and beryllium were not reported as COPCs during the historical investigations. They were detected in one sample at 2008 location 16-603511 at a depth of 100 ft bgs. They were not detected at lateral locations, nor were they detected in underlying tuff. Therefore, the lateral and vertical extent of aluminum and beryllium are defined.

In summary, all the inorganic COPCs not defined for nature and extent during the historical investigations, and the two chemicals detected during the 2008 investigation, are defined laterally and vertically using 2008 investigation data.

Former Fishladder Structure Area, SWMU 16-003(o)–East

The extent for nine inorganic COPCs (cobalt, fluoride, nitrate, lead, mercury, nickel, selenium, uranium, and vanadium) was not defined at the former fishladder structure at SWMU 16-003(o)–east during the historical investigations. Twelve additional inorganic COPCs (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, iron, manganese, perchlorate, silver, and zinc) were detected at SWMU 16-003(o)–east during the 2008 investigation (Figure H-8.3-1). These 21 inorganic COPCs are evaluated below for extent of contamination. The distribution of inorganic COPCs present above BVs at SWMU 16-003(o)–east is shown in Plate 2, and the results are presented in Table H-5.1-1. Figure 3.1-2 of the investigation report shows the five areas of soil removal (Areas A–E) at SWMU 16-003(o)–east.

Cobalt and nickel were detected in multiple soil and tuff samples (the maximum concentrations were at upgradient locations). The lateral extent is defined for cobalt and nickel at the former fishladder structure because they were detected at lower concentrations at the most downgradient locations, when data from historical locations (16-23651 and 16-23653) and 2008 locations (16-603406 and 16-603407) were used. The vertical extent of cobalt and nickel is defined because either they were not detected in the underlying tuff at the same location or the concentrations decrease in underlying tuff samples of nearby locations (using historical and 2008 data).

Lead, mercury, selenium, uranium, and vanadium were detected in multiple soil and tuff samples (maximum concentrations were at upgradient locations). The lateral extent is defined for lead, mercury, selenium, uranium, and vanadium at the former fishladder structure because either they were not detected at the most downgradient locations or were detected at lower concentrations at the most downgradient locations, when data from historical locations (16-23651 and 16-23653) and 2008 locations (16-603406 and 16-603407) were used. The vertical extent of lead, mercury, selenium, uranium, and vanadium is defined because concentrations decrease in underlying tuff samples (using historical data and 2008 data).

Fluoride was detected in 22 samples at concentrations ranging from 0.887mg/kg (J–) (in a 2008 sample) to 8.76 mg/kg (J–) (in a 2008 sample). The highest fluoride concentrations are at location 16-603402, and fluoride is not detected in the downgradient locations; therefore, the lateral extent is defined for fluoride. The vertical extent is also defined because concentrations either decrease or are equivalent from surface to bottom depth. Fluoride is a naturally occurring inorganic chemical but has no background data set. It is likely that the low detected concentrations are naturally occurring levels and are not part of a release.

Nitrate was detected in 19 samples at concentrations ranging from 0.958 mg/kg (J–) (in a 2008 sample) to 17.3 mg/kg (in a 2005 sample). The highest concentrations were in Area C, and concentrations decreased to the downgradient locations; therefore, the lateral extent of nitrate is defined. The vertical extent is also defined because concentrations either decrease or are equivalent from surface to bottom depth. Nitrate is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels and are not a part of a release.

The COPCs detected during the 2008 investigation (and not defined as COPCs during the historical investigations) are discussed below.

Aluminum was detected above the BV (and above 2 times BV) in many samples during the 2008 investigation (and historical investigations). The maximum concentrations of aluminum were found at upgradient locations (16-603414 and 16-603417) at the bases of Area A, at 3.5-ft depths. The lowest concentration was located along the perimeter of Area E at location 16-603406. Therefore, the lateral extent of aluminum is defined at the former fishladder structure because concentrations decrease from upgradient to downgradient locations. The vertical extent of aluminum at Area A is defined because aluminum was detected at lower concentrations at adjacent 2005 historical locations 16-01536 and 16-01536 at the same depths. The concentrations of aluminum at the former fishladder structure fluctuate but rarely exceed 2 times BV. Aluminum is naturally occurring in tuff, and it is possible for aluminum concentrations in weathered tuff to exceed the BV; these lower aluminum concentrations most likely are not indicative of a release.

Antimony, cadmium, chromium, manganese, perchlorate, silver, and zinc were detected in multiple soil and tuff samples (maximum concentrations were at upgradient locations) during the 2008 investigation. The lateral extent is defined for antimony, cadmium, chromium, manganese, perchlorate, silver, and zinc at the former fishladder structure because either they were not detected at the most downgradient locations or they were detected at lower concentrations at the most downgradient locations (using historical data from locations 16-23651 and 16-23653 and 2008 data). The vertical extent of antimony, cadmium, chromium, manganese, perchlorate, silver, and zinc is defined because concentrations decrease in underlying tuff samples (using historical data and 2008 data).

Arsenic was detected during the historical investigations, and extent was defined. Arsenic was also detected during the 2008 investigation at one location at 0–0.5 ft depth at a location 16-603409 at the perimeter of Area E. The lateral extent is defined at the former fishladder structure because arsenic was not detected at the most downgradient 2008 locations (16-603406 and 16-603407), and it was also detected at lower concentrations at historical locations 16-25651 and 16-25653. The vertical extent is also defined for arsenic. It was not detected in the underlying tuff at the same location and at nearby locations.

Barium was detected at concentrations above the BV in 41 tuff samples and 4 soil samples. The maximum concentration of barium in tuff was found at an upgradient 2008 location 16-603418 at the perimeter of Area B, at 1.5–2.0 ft depth. The maximum concentration of barium in soil was found at 2008 location 16-603412 at the base of Area D, at 0–0.5 ft depth. Barium concentrations decrease from the highest values at Area B to lower values at the most downgradient locations at Area E. Therefore, the lateral extent is defined. The vertical extent of barium is defined because concentrations decrease in underlying tuff samples (using historical and 2008 data).

Beryllium was detected in one tuff sample at location 16-23676 at 3.5–4.0 ft bgs at the base of Area B. It was not detected in soil samples. Beryllium is laterally defined because it was not detected at downgradient locations. Beryllium is vertically defined because it was not detected at a 2005 historical location 16-23674, at 3.5–4.0 ft depth, which is next to Area B.

Iron was detected at concentrations above the BV in two tuff samples and one soil sample from the 2008 investigation. The maximum concentration of iron in soil was found at an upgradient location 16-603420 at the perimeter of Area B, at 0–0.5 ft depth. The maximum concentration of iron in tuff was found at location 16-603407 at the perimeter of Area E, at 2–2.5 ft depth. The lateral extent is defined for iron at the former fishladder structure because it was not detected at the most downgradient locations (using historical data from locations 16-23651 and 16-23653 and 2008 data). The vertical extent of iron is defined because it was not detected in the tuff at nearby locations (using historical and 2008 data).

In summary, all of the inorganic COPCs not defined for extent during the historical investigations, and the additional COPCs detected only during the 2008 investigation, are defined laterally and vertically using 2008 and historical investigation data.

Location 16-23693 in the lower Fishladder Canyon drainage was sampled to a depth of 2.8 ft during the 2008 investigation (Figure H-8.3-2). Barium, fluoride, nitrate, and selenium were detected at bottom depth during the 2008 investigation. Barium, fluoride, and nitrate were detected at lower concentrations during the historical sampling at deeper depths at the same location (selenium was not detected during previous sampling). In addition, cobalt and silver were not detected during the 2008 investigation and they were detected during historical sampling. This location was sampled, per discussions with NMED (2006, 094381), to determine whether historically detected colbalt and silver may have been result of spalling from augers used during a previous investigation. This location cannot be investigated further for nature and extent because it is inaccessible to motorized drilling equipment.

H-8.3.2 Organic Chemicals

The extent of organic chemicals at SWMUs SWMU 16-003(o) is discussed in the sections below. The 2008 investigation results are discussed in two parts: (1) SWMU 16-003(o)–west [TA-16-340 former sump and drainline] and (2) SWMU 16-003(o)–east [former fishladder structure area].

Results from Historical Investigations

A total of 55 organic COPCs were identified in soil and tuff at SWMU 16-003(o) during the historical 1995 and 2005 investigations. The organic COPCs included acenaphthene, acenaphthylene, acetone, 4-amino-2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, anthracene, 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, chloroform, 2-chloronaphthalene, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, cis-1,2-dichloroethene, diethylphthalate, 2,4-dinitrotoluene, 3,5-dinitroaniline, di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, HMX, isopropylbenzene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, methylene chloride, 2-methylnaphthalene, 4-methylphenol, naphthalene, nitrobenzene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, tetryl, toluene, 1,1,1-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2,4,6-trinitrotoluene, 1,2-xylene, and 1,3-xylene + 1,4-xylene.

Of the 55 COPCs identified during the historical investigations, extent of contamination for the following 24 organic COPCs was not defined at the former sumps and drainlines at SWMU 16-003(o)–west following the historical investigations.

- Vertical extent was not defined for acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, and toluene.

The 2008 investigation was conducted to define the extent of contamination of these 24 organic COPCs at SWMU 16-003(o)–west. Results are presented below.

Of the 55 COPCs identified during the historical investigations, extent for the following 29 organic COPCs was not defined at the former fishladder structure at SWMU 16-003(o)–east following the historical investigations.

- Lateral extent was not defined for acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene.

The 2008 investigation was conducted to define the extent of contamination of these 29 organic COPCs at SWMU 16-003(o)-east. The results are presented below.

Results from the 2008 Investigation

The 2008 investigation results from the former sumps and drainlines, at SWMU 16-003(o)–west, and former fishladder structure, at SWMU 16-003(o)–east, are presented below.

Former Sumps and Drainlines, SWMU 16-003(o)-West

Extent of contamination for 24 organic COPCs (acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, PETN, phenanthrene, pyrene, RDX, TATB, tetrachloroethene, and toluene) was not defined at the former sumps and drainlines at SWMU 16-003(o)–west during the historical investigations. Six additional organic COPCs (bis(2-ethylhexyl)phthalate, ethylbenzene, isopropylbenzene, trimethylbenzene[1,2,4-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-]) were detected at SWMU 16-003(o)-west during the 2008 investigation. These 30 organic COPCs are evaluated below for extent of contamination. The distribution of organic chemicals present at concentrations above BVs at SWMU 16-003(o)–west is depicted in Plate 3 and Figure H-8.3-3, and the results are presented in Table H-5.2-1.

During the historical investigations, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, PETN, pyrene, RDX, TATB, tetrachloroethene, and toluene were detected at multiple locations around the former sumps to depths of 5 ft bgs. They were not detected in the downgradient historical location 16-23691, and they were detected at lower concentrations at this downgradient location. Previously, the lateral extent of contamination was defined at the former sumps and drainlines at SWMU 16-003(o)–west. The vertical extent is defined for acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, PETN, RDX, TATB, tetrachloroethene, and toluene because they were not detected at adjacent 2008 locations 16-603396 and 16-603397 to depths of 15 ft bgs.

During the historical investigations, acetone was detected in 37 samples at concentrations ranging from 0.0026 mg/kg to 0.109 mg/kg, and lateral extent was defined during the historical investigations. Vertical extent for acetone may be defined using data from the 2008 deep borehole location 16-603511. Concentrations are at trace levels at this location and range from 0.0602 mg/kg at 40 ft to 0.00317 mg/kg (J) at bottom depth of 206 ft. This bottom concentration barely exceeds the standard minimum detection limit (which is approximately 0.003 mg/kg); further sampling for extent is not warranted.

During the historical investigations, fluoranthene was detected in 48 samples at concentrations ranging from 0.00084 mg/kg to 14.4 mg/kg (J-). Lateral extent for fluoranthene was defined during the historical investigations. Vertical extent for fluoranthene may be defined using data from the 2008 investigation. Concentrations of fluoranthene were 0.0116 mg/kg (J) at 12.5–14.5 ft at location 16-603396 and were 0.015 mg/kg (J) at 204.5–206 ft bgs at location 16-603511. These concentrations are at trace levels and the bottom concentration barely exceeds the standard minimum detection limit (which is approximately 0.01 mg/kg); further sampling for extent is not warranted.

During the historical investigations, phenanthrene was detected in 44 samples at concentrations ranging from 0.00034 mg/kg (J) to 14.4 mg/kg (J-). Lateral extent for phenanthrene was defined during the historical investigations. Vertical extent for phenanthrene may be defined using data from the 2008 investigation. Concentrations of phenanthrene were 0.0126 mg/kg (J) at 12.5–14.5 ft at location 16-603396 and were 0.011 mg/kg (J) at 204.5–206 ft bgs at location 16-603511. These concentrations are at trace levels and the bottom concentration barely exceeds the standard minimum detection limit (which is approximately 0.01 mg/kg); further sampling for extent is not warranted.

Below is a discussion of COPCs detected during the 2008 investigation (and not defined as COPCs during the historical investigations).

During the 2008 investigation, bis(2-ethylhexyl)phthalate was detected at location 16-603511 at a depth of 100–101 ft. The lateral extent of this chemical is defined because it was detected at lower concentrations at downgradient historical location 16-23691 (at depths ranging from 30 ft to 160 ft). The vertical extent is also defined because bis(2-ethylhexyl)phthalate was not detected at this location from 101 ft to bottom depth.

During the 2008 investigation, isopropylbenzene, ethylbenzene, trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-] were detected in soil samples at location 16-603401, located downgradient from the sumps and at the top end of the former fishladder structure. The lateral extent of these organic COPCs is defined because they are bounded at downgradient locations of the former fishladder structure (see discussion in the subsection below). The vertical extent of these chemicals is defined because they were not detected in underlying tuff.

In summary, all of the organic COPCs not defined for extent during the historical investigations, and the additional COPCs detected only during the 2008 investigation, are defined laterally and vertically using 2008 and historical investigation data.

Former Fishladder Structure, SWMU 16-003(o)–East

Extent of contamination for 29 COPCs (acenaphthene, acetone, 4-amino-2,6-dinitrotoluene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, RDX, TATB, toluene, and 2,4,6-trinitrotoluene) was not defined at the former fishladder structure at SWMU 16-003(o)–east during the historical investigations. Three additional organic COPCs (acenaphthylene, chloronaphthalene[2-], and xylene[1,3-]+xylene[1,4-]) were detected at SWMU 16-003(o)–east during the 2008 investigation. These 32 organic COPCs are evaluated below for extent of contamination. The distribution of organic chemicals present at SWMU 16-003(o)–east is depicted in Plate 4, and the results are presented in Table H-5.2-1.

Acenaphthene, 4-amino-2,6-dinitrotoluene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, toluene, and 2,4,6-trinitrotoluene were detected in multiple historical and 2008 samples, and the maximum concentrations were at upgradient locations. The lateral extent for acenaphthene, 4-amino-2,6-dinitrotoluene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, toluene, and 2,4,6-trinitrotoluene is defined at the former fishladder structure because these organic COPCs were not detected at the most downgradient historical locations (16-23651 and 16-23653) and 2008 locations (16-603407 and 16-603408). The vertical extent of acenaphthene, 4-amino-2,6-dinitrotoluene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, dibenz(a,h)anthracene, dibenzofuran, 1,1-dichloroethene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, toluene, and 2,4,6-trinitrotoluene is defined because either the chemicals were not detected in the underlying tuff at the same location or the concentrations decrease in underlying tuff samples at nearby locations (using historical data and 2008 data).

Acetone was detected in multiple historical and 2008 samples. The maximum concentration (0.212 mg/kg [J]), was detected at historical location 16-603406. The lateral extent is defined for acetone because it was not detected at downgradient historical locations (16-23651 and 16-23653) and 2008 location (16-603407). Vertical extent is defined because acetone was not detected at the same and deeper depths at the adjacent locations.

Anthracene, bis(2-ethylhexyl)phthalate, HMX, RDX, and TATB were detected in multiple historical and 2008 samples, and the maximum concentrations were at upgradient locations. The lateral extent of anthracene, bis(2-ethylhexyl)phthalate, HMX, RDX, and TATB is defined at the former fishladder structure because these organic COPCs were detected at lower concentrations at the most downgradient historical locations (16-23651 and 16-23653), and they were not detected at the 2008 downgradient locations (16-603407 and 16-603408). The vertical extent of anthracene, bis(2-ethylhexyl)phthalate, HMX, RDX, and TATB is defined because either the chemicals were not detected in the underlying tuff at the same location or the concentrations decrease in underlying tuff samples at nearby locations (using historical data and 2008 data).

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in multiple historical and 2008 samples, and the maximum concentrations were at upgradient locations. The lateral extent for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene is defined at the former fishladder structure because these organic COPCs were detected at lower concentrations at the most downgradient historical locations (16-23651 and 16-23653) and 2008 locations (16-603407 and 16-603408). The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene is defined because either the chemicals were not detected in the underlying tuff at the same location or the concentrations decrease in underlying tuff samples at nearby locations (using historical data and 2008 data).

Below is a discussion of COPCs detected during the 2008 investigation (and not defined as COPCs during the historical investigations).

Acenaphthylene and chloronaphthalene[2-] were detected in one or more soil samples and not in the underlying tuff. The lateral extent is defined because acenaphthylene and chloronaphthalene[2-] were not detected in downgradient historical locations (16-23651 and 16-23653) and 2008 locations (16-603407 and 16-603408). The vertical extent is defined because acenaphthylene and chloronaphthalene[2-] were not detected in underlying tuff.

Xylene[1,3-]+xylene[1,4-] was detected in 1 tuff sample at the base of Area D at 4–4.5 ft bgs at a trace concentration of 0.00029 mg/kg (J). This value is below the standard minimum detection level and further sampling for extent is not warranted.

In summary, all of the organic COPCs not defined for extent during the historical investigations, and the additional COPCs detected only during the 2008 investigation, are defined laterally and vertically using 2008 and historical investigation data.

Location 16-23693, in lower Fishladder Canyon drainage, was sampled to a depth of 2.8 ft during the 2008 investigation (Figure H-8.3-2). Benzo(b)fluoranthene, fluoranthene, HMX, phenanthrene, pyrene, TATB, tetrachloroethene, and trichloroethene were detected at trace concentrations at bottom depth during the 2008 investigation. These organic chemicals were not detected during the historical sampling at deeper depths at the same location.

Pore-Gas Sampling at SWMU 16-003(o)

Two rounds of subsurface vapor sampling were completed during the 2008 investigation. A summary of results for the 2008 and previous 2005 investigations is presented below. The analytical results for the 2008 investigation are presented in Table H-5.4-1.

The following VOCs were detected in the 2008 pore gas samples:

- acetone, butanone[2-], carbon disulfide, carbon tetrachloride, chloroform, dichloroethane[1,2-], ethylbenzene, hexane, methylene chloride, n-heptane, propylene, tetrachloroethene, toluene, trichloroethene, xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

Acetone and propylene concentrations decreased from July 2008 to August 2008 in borehole 16-603511. Acetone and propylene were either not detected or were reported at low levels during 2005 sampling at boreholes 16-23691 and 16-23693.

Butanone[2-] and carbon disulfide concentrations decreased, in the deepest depths, from July 2008 to August 2008 in borehole 16-603511. Butanone[2-] and carbon disulfide were reported at low levels during 2005 sampling at borehole 16-23691 and/or 16-23692.

Carbon tetrachloride, dichloroethane[1,2-], and tetrachloroethene were undetected at the deepest intervals during the July 2008 and August 2008 sampling. These chemicals were either undetected or were not detected in the deepest intervals during 2005 sampling at boreholes 16-23691 and 16-23693.

Chloroform was detected at a concentration of 200 µg/m^3 during July 2008 sampling in borehole 16-603511; it was detected at 14 µg/m^3 at the same depth during August 2008 sampling. Chloroform was not detected during 2005 sampling at boreholes 16-23691 and 16-23692.

Ethylbenzene, n-heptane, xylene[1,2-], and xylene[1,3-]+xylene[1,4-] were detected at low concentrations at the deepest interval (and undetected at other depths) during the July 2008 and August 2008 sampling. These chemicals were either not detected or were reported at low concentrations during 2005 sampling at borehole 16-23691 and/or 16-23692.

Hexane was detected at low concentrations at the deepest interval (and undetected at other depths) during the July 2008; it was undetected at all intervals during August 2008 sampling. Hexane was not detected in the deepest intervals during 2005 sampling at boreholes 16-23691 and 16-23693.

Methylene chloride was detected at low concentrations at the shallowest interval (and undetected at other depths) during the August 2008 sampling; it was undetected at all intervals during July 2008 sampling. Methylene chloride was not detected during 2005 sampling at borehole 16-23691 and/or 16-23692.

Toluene concentrations increased slightly from July 2008 to August 2008 in borehole 16-603511. Toluene was reported at low levels during 2005 sampling at boreholes 16-23691 and 16-23693.

Trichloroethene was detected at moderate concentrations at the shallow and middle intervals (up to 1200 µg/m^3), and it was undetected at bottom depths during the July 2008 and August 2008 sampling. Trichloroethene was reported at low levels during 2005 sampling at boreholes 16-23691 and 16-23693.

Vertical profiles for five organic chemicals detected during the 2008 pore-gas sampling are presented in Figures H-8.4-1 and H-8.4-2. Coupled with previous data from 2005, these results do not indicate a large vapor plume exists beneath the TA-16-340 Complex.

H-8.3.3 Radionuclides

The nature and extent of radionuclides at SWMU 16-003(o) is discussed in the sections below. The 2008 investigation results will be discussed in two parts: (1) 16-003(o)–west [16-340 former sump and drainline] and (2) 16-003(o)–east [former fishladder structure].

Former Sumps and Drainlines SWMU 16-003(o)–West

Three COPCs were detected at the former fishladder structure at SWMU 16-003(o)–west during the 2008 investigation and are evaluated below for extent of contamination: uranium-234, uranium-235/236, and uranium-238. These radionuclides were not analyzed during the historical 1995 and 2005 investigations (Table H-2.0-1). The distribution of radionuclides present at 16-003(o)-west is depicted in Plate 1, and the results are presented in Table H-5.3-1.

Uranium-235/236 was detected in one tuff sample at location 16-603511 at a depth of 100–101 ft. The lateral extent of this radionuclide is defined because total uranium was not detected at downgradient historical location 16-23691 (at depths to 160 ft). The vertical extent is also defined at this location because uranium-235/236 is not detected at bottom depths below 101 ft.

Former Fishladder Structure SWMU 16-003(o)–East

Three COPCs were detected at the former fishladder structure area at SWMU 16-003(o)–east during the 2008 investigation and are evaluated below for extent of contamination: uranium-234, uranium-235/236, and uranium-238. These radionuclides were not analyzed during the historical 1995 and 2005 investigations (Table H-2.0-1). The distribution of radionuclides present at 16-003(o)-east is depicted in Plate 5, and the results are presented in Table H-5.3-1.

Uranium-234 was detected in 11 soil samples and four tuff samples. The highest concentrations were in surface soils at upgradient locations 16-603417 and 16-603426. One elevated concentration was detected, also at an upgradient location (16-603421), at a depth of 2.0–3.0 ft bgs. The lateral extent of uranium-234 is defined because this radionuclide is not detected at downgradient locations. The vertical extent of uranium-234 is defined because either the radionuclide was not detected in underlying tuff or was detected at lower concentrations at nearby locations in underlying tuff.

Uranium-235/236 was detected in 8 soil samples and 17 tuff samples. The highest concentrations were in surface soils at upgradient locations at Areas C and D. Uranium-235/236 was detected in the most downgradient locations (16-603406, 16-603408, and 16-24906) at 3.0-ft depths. The lateral extent of uranium-235/236 is defined because this radionuclide decreases in concentration to the downgradient locations. The vertical extent of uranium-235/236 is not defined at the downgradient location because this radionuclide was detected at bottom depth, and no data are available at deeper depths. However, the concentration of uranium-235/236 was low (2 times BV), and total uranium was not detected to depths to 6.5 ft bgs at adjacent historical locations 16-23651 and 16-23651. Background levels of uranium (all components of natural uranium [uranium-234, uranium-235/236, and uranium-238] will be affected) have been shown to be higher at TA-16 than at many other Laboratory TAs (see the NMED-approved V-Site voluntary corrective measure report) (LANL 1999, 063973, Appendix E).

Therefore, further investigation of vertical extent is not warranted.

Uranium-238 was detected in ten soil samples and seven tuff samples. The highest concentrations were in surface soils at upgradient locations 16-603417, 16-603426, and 16-603428. The lateral extent of uranium-238 is defined because this radionuclide is not detected at downgradient locations. The vertical extent of uranium-238 is defined because either the radionuclide was not detected in underlying tuff or was detected at lower concentrations at nearby locations in underlying tuff.

H-8.4 SWMUs 16-026(j2) and 16-029(f)

Several historical investigations were conducted at SWMUs 16-026(j2) and 16-029(f). Analytical results from these historical investigations conducted through 2005 indicated the extent of contamination at the SWMUs was not defined for many COPCs (LANL 2005, 089331, p. B-16).

Based on these previous data, the 2008 investigation was initiated to (1) define the lateral and/or vertical extent of contamination within the SWMUs, and (2) determine whether additional investigations or corrective actions are warranted.

H-8.4.1 Inorganic Chemicals

The extent of inorganic chemicals at SWMUs 16-026(j2) and 16-029(f) is discussed in the sections below.

Results from Historical Investigations

A total of 19 inorganic COPCs were identified in soil, fill, sediment, and tuff at SWMUs 16-026(j2) and 16-029(f) during the historical 1995 and 2005 investigations. These COPCs included aluminum, antimony, arsenic, barium, bromide, chromium, cobalt, copper, cyanide, fluoride, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, thallium, and zinc (LANL 2005, 089331, p. B-16).

Of the 19 COPCs identified, extent was not defined for the following 11 inorganic chemicals at SWMUs 16-026(j2) and 16-029(f) during the historical investigations.

- Vertical extent was not defined for aluminum, barium, chromium, copper, nickel, perchlorate, and selenium.
- Lateral or vertical extent were not defined for cobalt and silver.
- Fluoride and nitrate were not evaluated for lateral or vertical extent.

The 2008 investigation was conducted to define the extent of contamination of these 11 inorganic chemicals. Results are presented below.

Results from the 2008 Investigation

Five of these 11 inorganic COPCs (barium, chromium, copper, nickel, and perchlorate) listed above were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of barium, chromium, copper, nickel, and perchlorate are defined at SWMUs 16-026(j2) and 16-029(f). The remaining inorganic COPCs (aluminum, cobalt, fluoride, nitrate, selenium, and silver) were detected at SWMUs 16-026(j2) and 16-029(f) during the historical and 2008 investigation, and the extent is discussed below. One additional COPC, bromide, was detected during the 2008 investigation but was not detected during the historical investigations. The distribution of inorganic COPCs present above BVs at SWMUs 16-026(j2) and 16-029(f) is shown in Plate 6, and the results are presented in Table H-6.1-1.

Aluminum was detected above the BV in one tuff sample, 1.5–2.0 ft bgs at location 16-603405 (distal-most location from former sump and drainline and in drainage and at the top of former fishladder structure). The concentration of aluminum did not exceed two times BV, and it was not detected in the adjacent 2005 location (16-23702). Vertical extent is defined because aluminum was not detected in the adjacent 2005 location (16-23702), which was sampled at a deeper depth. Aluminum is naturally occurring in tuff, and it is possible for aluminum concentrations in weathered tuff to exceed the BV; the detected aluminum at slightly above BV is most likely not indicative of a release.

Cobalt and silver were detected at the highest concentrations at historical location 16-23701 (and to a lesser extent at location 16-01555). Cobalt and silver concentrations decreased by about one order of magnitude in the 2005 downgradient location (16-23702), and these COPCs were not detected in the most downgradient (and lower elevation) 2008 location (16-603405). Therefore, the lateral and vertical extent of cobalt and silver is defined.

Fluoride was detected in 27 samples at concentrations ranging from 0.63 mg/kg (J–) (in a 2005 sample) to 17.3 mg/kg (in a 2005 sample). The highest concentrations were near the sump, and concentrations decreased to the downgradient locations; therefore lateral extent of fluoride is defined. The vertical extent is also defined because concentrations either decrease or are equivalent from surface to bottom depth. Fluoride is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels and not part of a release.

Nitrate was detected in six samples at concentrations ranging from 0.799 mg/kg (J) (in a 2008 sample) to 3.14 mg/kg (in a 2005 sample). The highest concentration was in the surface sample at the 2005 downgradient location (16-23702), and nitrate was not detected in the underlying tuff at the same location. The nitrate concentrations decreased to the most downgradient 2008 location (16-603405). Therefore both lateral and vertical extent of nitrate is defined. Nitrate is a naturally occurring inorganic chemical but has no background data set. It is likely that the lower detected concentrations are naturally occurring levels and not part of a release.

Selenium was detected above BV at multiple historical locations. It was also detected above the BV in two tuff samples 12.5–14 ft bgs at 2008 locations 16-23706 and 16-603404 (former sump and drainline) and one soil sample, 0–0.5 ft bgs, and one tuff sample, at 1.5–2.0 ft bgs, at 2008 location 16-603405 (distal-most location from former sump and drainline). Lateral extent of selenium is defined because concentrations decrease from the former sump to the downgradient location. Vertical extent of selenium is also defined at the distal-most location from the former sump because the concentration decreases with increasing depth at location 16-603405.

Bromide was detected during the 2008 investigation and not during the historical investigations. Bromide was detected in one tuff sample, 12.5–13.6 ft bgs at location 16-23706 (former sump). The lateral extent of bromide is defined because it was not detected at downgradient locations. Vertical extent is also defined because bromide was not detected in downgradient locations, which were sampled at comparable or deeper depths. These downgradient locations are situated at about 12 ft lower elevation than location 16-23706, and they were sampled to depths of 3.5 ft bgs.

In summary, all the inorganic COPCs not defined for nature and extent during the historical investigations, and the one COPC identified during the 2008 investigation, are defined laterally and vertically using 2008 and historical investigation data.

H-8.4.2 Organic Chemicals

The extent of organic chemicals at SWMUs 16-026(j2) and 16-029(f) is discussed in the sections below.

Results from Historical Investigations

A total of 35 organic COPCs were identified in soil, sediment and tuff at SWMUs 16-026(j2) and 16-029(f) during the historical 1995 and 2005 investigations. The organic COPCs included acenaphthene, acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, di-n-butylphthalate, 1,1-dichloroethene, ethylbenzene, fluoranthene, fluorene, HMX, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4- isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, phenol, pyrene, RDX, TATB, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene (LANL 2006, 091450, Table B-6.2-2).

Ten of the organic COPCs (benzoic acid, di-n-butylphthalate, ethylbenzene, isopropylbenzene, 1-propylbenzene, phenol, RDX, trichloroethene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene) were not evaluated for extent as part of the 2005 investigation report because concentrations were reported to be at trace levels (near or below the EQLs) (LANL 2006, 091450, Appendix B).

The extent of 25 organic COPCs was not defined at SWMUs 16-026(j2) and 16-029(f) during the historical investigations.

- Vertical extent was not defined for acenaphthene, acetone, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, 2-butanone, dibenz(a,h)anthracene, 1,1-dichloroethene, dibenzofuran, fluorene, 2-methylnaphthalene, HMX, indeno(1,2,3-cd)pyrene, 4- isopropyltoluene, naphthalene, phenanthrene, pyrene, TATB, toluene, and 1,2,4-trimethylbenzene.
- Lateral and vertical extent were not defined for benzo(a)anthracene, chrysene, and fluoranthene.

The 2008 investigation was conducted to define the extent of contamination of these 25 organic COPCs. Results are presented below.

Results from the 2008 Investigation

Sixteen of the 25 organic COPCs [acetone, benzo(a)anthracene, benzo(k)fluoranthene, 2-butanone, chrysene, dibenz(a,h)anthracene, 1,1-dichloroethene, dibenzofuran, fluorene, 2-methylnaphthalene, HMX, 4-isopropyltoluene, naphthalene, TATB, toluene, and 1,2,4-trimethylbenzene] were not detected during the 2008 investigation, either at downgradient locations or at deeper depths, from the historical contamination. Therefore, the lateral and vertical extent of acetone, benzo(a)anthracene, benzo(k)fluoranthene, 2-butanone, chrysene, dibenz(a,h)anthracene, 1,1-dichloroethene, dibenzofuran, fluorene, 2-methylnaphthalene, HMX, 4-isopropyltoluene, naphthalene, TATB, toluene, and 1,2,4-trimethylbenzene are defined at SWMUs 16-026(j2) and 16-029(f).

The remaining nine organic COPCs were detected at SWMUs 16-026(j2) and 16-029(f) during the historical and 2008 investigation [acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene]. The extent of the nine organic COPCs is discussed below. The distribution of organic chemicals detected at SWMUs 16-026(j2) and 16-029(f) is shown in Plate 7, and the results are presented in Table H-6.2-1.

Acenaphthene was detected at the highest concentration in a fill sample adjacent to the former sump at historical location 16-23706, and it was not detected in the underlying tuff at bottom depth of 13.6 ft during the 2008 sampling at this same location. Acenaphthene was detected at the lowest concentration in surface soil at the most distal downgradient 2008 location (16-603405), and it was not detected in the underlying tuff at this location. Therefore, the lateral and vertical extent of acenaphthene is defined.

Anthracene was detected at the highest concentration in an historical fill sample adjacent to the former sump at location 16-23706, and it was detected at trace levels (J-qualified) in the underlying tuff at bottom depth of 13.6 ft during the 2008 sampling at this same location. Anthracene was not detected at the 2008 downgradient location 16-603405. Therefore, the lateral and vertical extent of anthracene is defined.

Benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected at multiple historical locations and in two tuff samples, at 12.5–14 ft bgs at 2008 location 16-23706 (former sump) and 2008 location 16-603404 (former drainline). The lateral extent of benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and phenanthrene is defined because they were not detected in the most distal 2008 location 16-603405. The vertical extent of benzo(a)pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and phenanthrene is also defined in the region of the former sump and drainline (using historical and 2008 data) because concentrations decrease with increasing depth.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected at multiple historical locations and in two tuff samples, at 12.5–14 ft bgs, at 2008 location 16-23706 (former sump) and 2008 location 16-603404 (former drainline). They were also detected in one soil sample, at 0–0.5 ft bgs, at 2008 location 16-603405 (distal-most location from former the sump and drainline). Benzo(b)fluoranthene, fluoranthene, and pyrene concentrations decrease from the sump and drainline to the most downgradient location; therefore, the lateral extent has been defined. The vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined in the region of the former sump and drainline (using historical and 2008 data) because concentrations decrease with increasing depth. The vertical extent is also defined in the most distal location because these COPCs were detected in the surface but not in the underlying tuff.

Ten of the organic COPCs (benzoic acid, di-n-butylphthalate, ethylbenzene, isopropylbenzene, 1-propylbenzene, phenol, RDX, trichloroethene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene) were not evaluated for extent as part of the 2005 investigation report because concentrations were reported to be at trace levels. None of these COPCs were detected during the 2008 investigation (which were sampled to deeper depths of 14 ft bgs near the sump and outfall and at the most downgradient location). The lateral and vertical extent is defined for benzoic acid, di-n-butylphthalate, ethylbenzene, isopropylbenzene, 1-propylbenzene, phenol, RDX, trichloroethene, 1,3,5-trimethylbenzene, and 1,3-xylene + 1,4-xylene.

In summary, all of the organic COPCs not defined for nature and extent during the historical investigations are defined laterally and vertically using 2008 investigation data.

H-8.4.3 Radionuclides

No radionuclides were detected at SWMUs 16-026(j2) and 16-029(f).

H-8.5 Fishladder Canyon

Groundwater and surface water within Fishladder Canyon is discussed below.

H-8.5.1 Inorganic Chemicals in Groundwater

Inorganic COPCs identified in alluvial groundwater during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.1. Twenty-eight inorganic COPCs detected in filtered and unfiltered groundwater (in three alluvial wells) include aluminum, antimony, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, thallium, uranium, vanadium, and zinc

(Table H-7.1-1). Figure 2.3-2 shows the locations of the three alluvial wells: upgradient location 16-25280, central location 16-25279, and downgradient location 16-25278.

One sampling event conducted during the previous 2005 investigation at two alluvial wells identified 18 of these 28 inorganic COPCs; aluminum, arsenic, barium, beryllium, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, lead, manganese, nickel, sulfate, uranium, vanadium, and zinc.

The following trends in inorganic COPCs were observed for two sampling events (October 2007 and April 2008) conducted at alluvial wells 16-25278 and 16-25279 and one sampling event at alluvial well 16-25280 (April 2008).

- Aluminum, barium, beryllium, boron, chromium, copper, fluoride, iron, lead, molybdenum, nickel, uranium, vanadium, and zinc show general decreasing trends in concentrations from the upgradient well to the downgradient well.
- Antimony, bromide, cadmium, chloride, cyanide, mercury, silicon dioxide, silver, strontium, and sulfate show no clear trends.
- Arsenic, mercury, and thallium were only detected in one or two samples, and they were not detected in the downgradient well.
- Cobalt showed a general increasing trend in concentrations from the upgradient well to the downgradient well.
- Manganese was detected at elevated concentrations in the middle alluvial well.

H-8.5.2 Organic Chemicals in Groundwater

Organic COPCs identified in alluvial groundwater during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.2. Seven COPCs detected in unfiltered groundwater (in three alluvial wells) include cis-1,2-dichloroethene, HMX, 4-isopropyltoluene, RDX, tetrachloroethene, toluene, and trichloroethene (Table H-7.2-1). One sampling event conducted during the previous 2005 RFI (at two alluvial wells) identified two of these COPCs; HMX and toluene.

The following trends in organic COPCs were observed for two post-2005 sampling events at the three alluvial wells 16-25278, 16-25279, and 16-25280.

- Cis-1,2-dichloroethene, tetrachloroethene, toluene, and trichloroethene were only detected in the upgradient well.
- 4-Isopropyltoluene was detected in one sample at the downgradient well.
- HMX and RDX were detected at concentrations that decrease from the upgradient well to the downgradient well.

H-8.5.3 Radionuclides in Groundwater

Radionuclide COPCs identified in alluvial groundwater during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.3. Seven COPCs detected in unfiltered groundwater (in three alluvial wells) include gross alpha, gross beta, radium-226, radium-228, tritium, uranium-234, and uranium-235 (Table H-7.3-1).

The following trends in radionuclides were observed for two sampling events (October 2007 and April 2008) conducted at alluvial wells 16-25278 and 16-25279 and one sampling event at alluvial well 16-25280 (April 2008).

- Gross alpha, gross beta, and radium-226 were detected in the middle and downgradient alluvial wells, and concentrations decrease to the downgradient well.
- Radium-228 and tritium show no clear trends.
- Strontium-90 and uranium-235/236 were only detected in the upgradient well at concentrations of 0.542 pCi/L and 0.0431 pCi/L, respectively.
- Uranium-234 was detected in all three alluvial wells at low concentrations (ranging from 0.42 pCi/L–0.0708 pCi/L (J), and concentrations decrease to the downgradient well.
- Uranium-238 was detected in all three alluvial wells at low concentrations (ranging from 0.47 pCi/L–0.0494 pCi/L (J), and concentrations decrease to the downgradient well.

H-8.5.4 Inorganic Chemicals in Surface Water

Inorganic COPCs identified in surface water during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.3. Twenty-eight inorganic chemicals COPCs detected in filtered and unfiltered surface water samples: aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, cyanide, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, silicon dioxide, silver, strontium, sulfate, thallium, tin, uranium, vanadium, and zinc (Table H-7.1-1).

Previous surface water sampling events identified 24 of these COPCs; aluminum, arsenic, barium, beryllium, boron, bromide, cadmium, chloride, chromium, cobalt, copper, fluoride, lead, manganese, mercury, molybdenum, nickel, silver, strontium, sulfate, thallium, uranium, vanadium, and zinc.

The following trends were observed for seven surface water samples collected at Fishladder Spring and two samples collected at Fishladder Canyon at Cañon de Valle during the post-2005 investigation.

- Aluminum, arsenic, and barium were detected at the highest concentrations in Fishladder Canyon at Cañon de Valle.
- Beryllium, cadmium, chromium, cobalt, copper, cyanide, iron, lead, manganese, nickel, silicon dioxide, silver, strontium, sulfate, tin, uranium, vanadium, and zinc were detected at lower concentrations downstream in Fishladder Canyon at Cañon de Valle (based on one of the two samples collected at Fishladder Canyon at Cañon de Valle).
- Bromide and molybdenum were detected in only one or two samples in Fishladder Spring.
- Boron, chloride, and fluoride showed no clear trends.
- Mercury was detected in only one sample in Fishladder Canyon at Cañon de Valle.
- Thallium was detected in only one sample in Fishladder Canyon at Cañon de Valle.

H-8.5.5 Organic Chemicals in Surface Water

Organic COPCs identified in surface water during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.4. Eleven COPCs detected in unfiltered surface water include acetone, 1,2,3,4,5,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxins (total), 1,2,3,4,5,6,7,8-heptachlorodibenzofuran, heptachlorodibenzofurans (total), HMX, methlylene chloride, 1,2,3,4,5,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,5,6,7,8,9-octachlorodibenzofuran, RDX, and toluene. Two organic chemicals (acetonitrile and MNX) were identified during previous investigations and were not detected post-2005 (Table H-7.2-1).

The following trends were observed for five surface water samples collected at Fishladder Spring and one sample collected at Fishladder Canyon at Cañon de Valle conducted as part of the post-2005 investigation.

- Acetone was detected in three samples at Fishladder Spring; two samples were at low concentrations and J-qualified.
- 1,2,3,4,5,6,7,8-heptachlorodibenzodioxin, heptachlorodibenzodioxins (total), 1,2,3,4,5,6,7,8-heptachlorodibenzofuran, heptachlorodibenzofurans (total), 1,2,3,4,5,6,7,8,9-octachlorodibenzodioxin, and 1,2,3,4,5,6,7,8,9-octachlorodibenzofuran were detected in one or two samples at Fishladder Spring; all sampling results were at trace concentrations and J–qualified.
- HMX was detected at the highest concentrations in Fishladder Spring.
- Methlylene chloride was detected in one sample in Fishladder Canyon at Cañon de Valle.
- RDX and toluene were detected in one or two samples at Fishladder Spring.
- Acetonitrile and MNX were detected during previous investigations and were not detected in surface water after 2005.

H-8.5.6 Radionuclides in Surface Water

Radionuclide COPCs identified in surface water during the post-2005 investigation at Fishladder Canyon are discussed in section H-7.3. Five radionuclide COPCs (gross alpha, gross beta, tritium, uranium-234, and uranium-235) were detected in filtered and unfiltered surface water at Fishladder Spring during three sampling events (Table H-7.3-1).

The following trends were observed for five surface water samples collected at Fishladder Spring as part of the post-2005 investigation.

- Gross alpha was detected in one unfiltered sample but not the filtered sample.
- Gross beta was detected in the unfiltered and filtered samples; the gross beta level decreased in the filtered sample.
- Uranium-234 and uranium-238 were detected in the unfiltered and filtered samples; concentrations of both isotopes decreased in the filtered samples.
- Tritium was detected in three unfiltered samples during the three sampling events, and concentrations decreased over time.

H-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 number. This information is also included in text citations. ER ID numbers 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; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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LANL (Los Alamos National Laboratory), March 2005. “Investigation Work Plan for Consolidated Solid Waste Management Units 16-007(a)-99 (30s Line) and 16-008(a)-99 (90s Line) at Technical Area 16,” Los Alamos National Laboratory document LA-UR-05-1694, Los Alamos, New Mexico. (LANL 2005, 089331)

LANL (Los Alamos National Laboratory), January 2006. “Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)],” Los Alamos National Laboratory document LA-UR-06-0153, Los Alamos, New Mexico. (LANL 2006, 091450)

NMED (New Mexico Environment Department), October 25, 2006. “Approval with Modifications, Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)],” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2006, 094381)

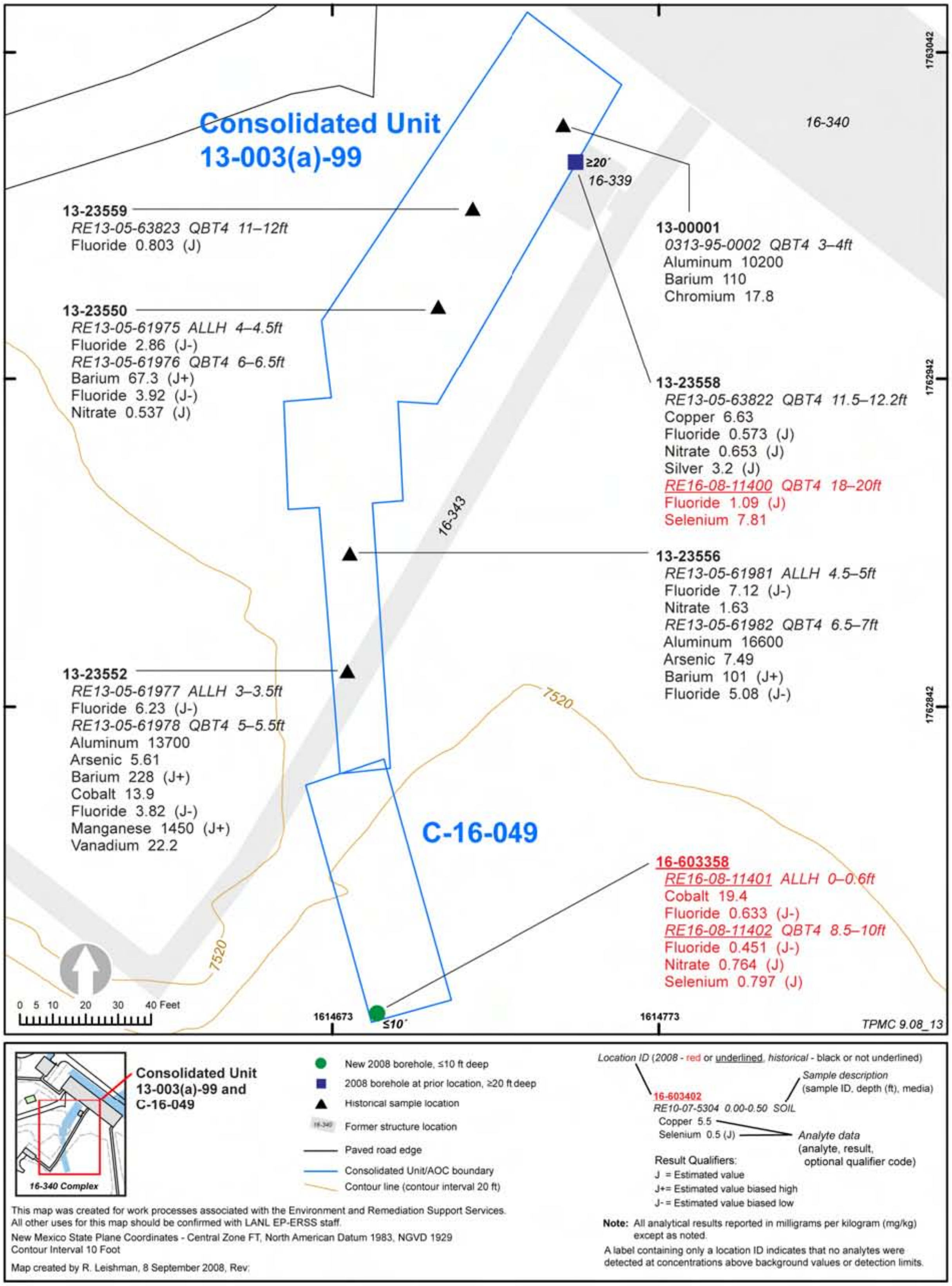


Figure H-8.1-1 Consolidated Unit 13-003(a)-99 and C-16-049 inorganic chemical concentrations detected above background values

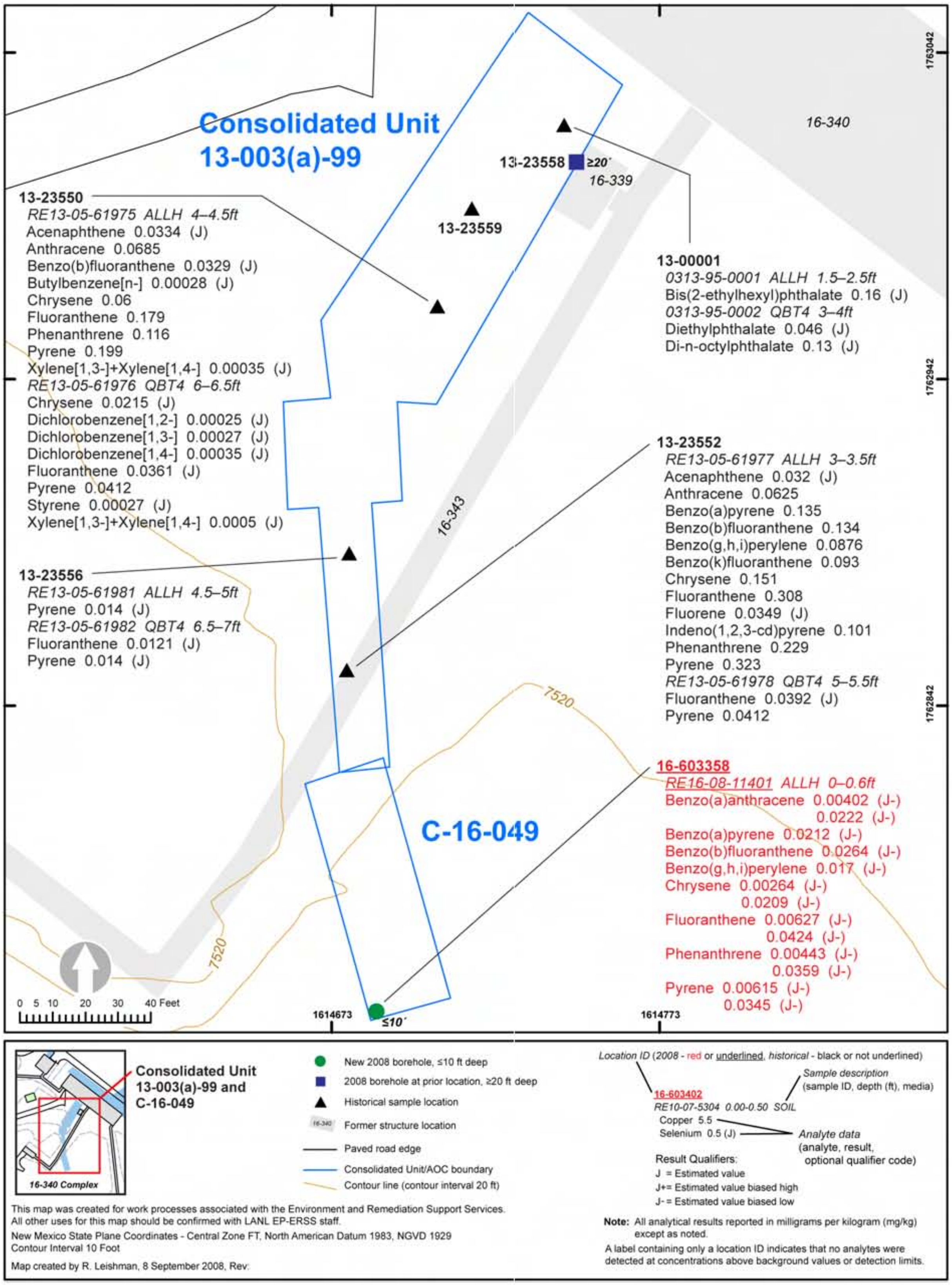


Figure H-8.1-2 Consolidated Unit 13-003(a)-99 and C-16-049 organic chemical concentrations detected

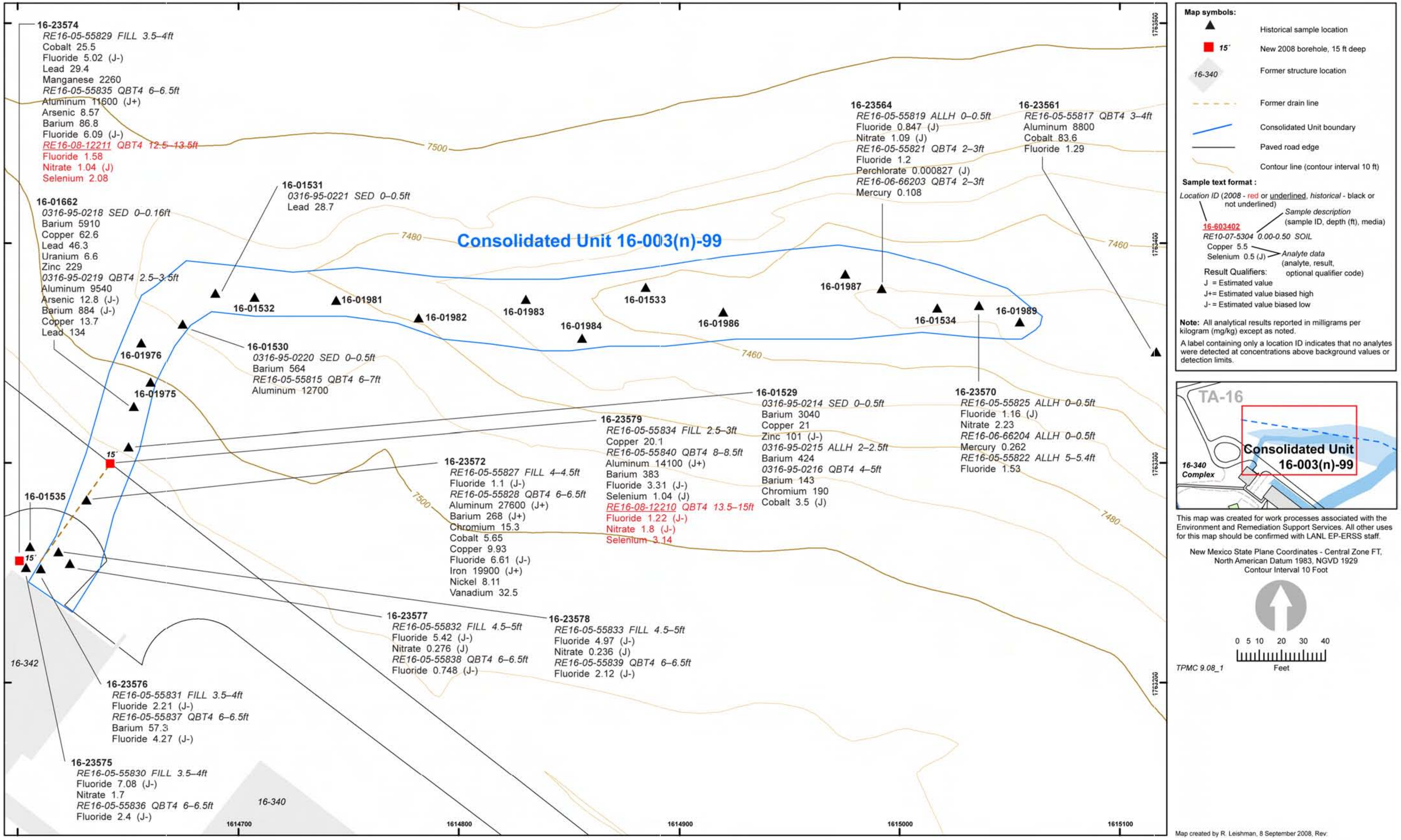
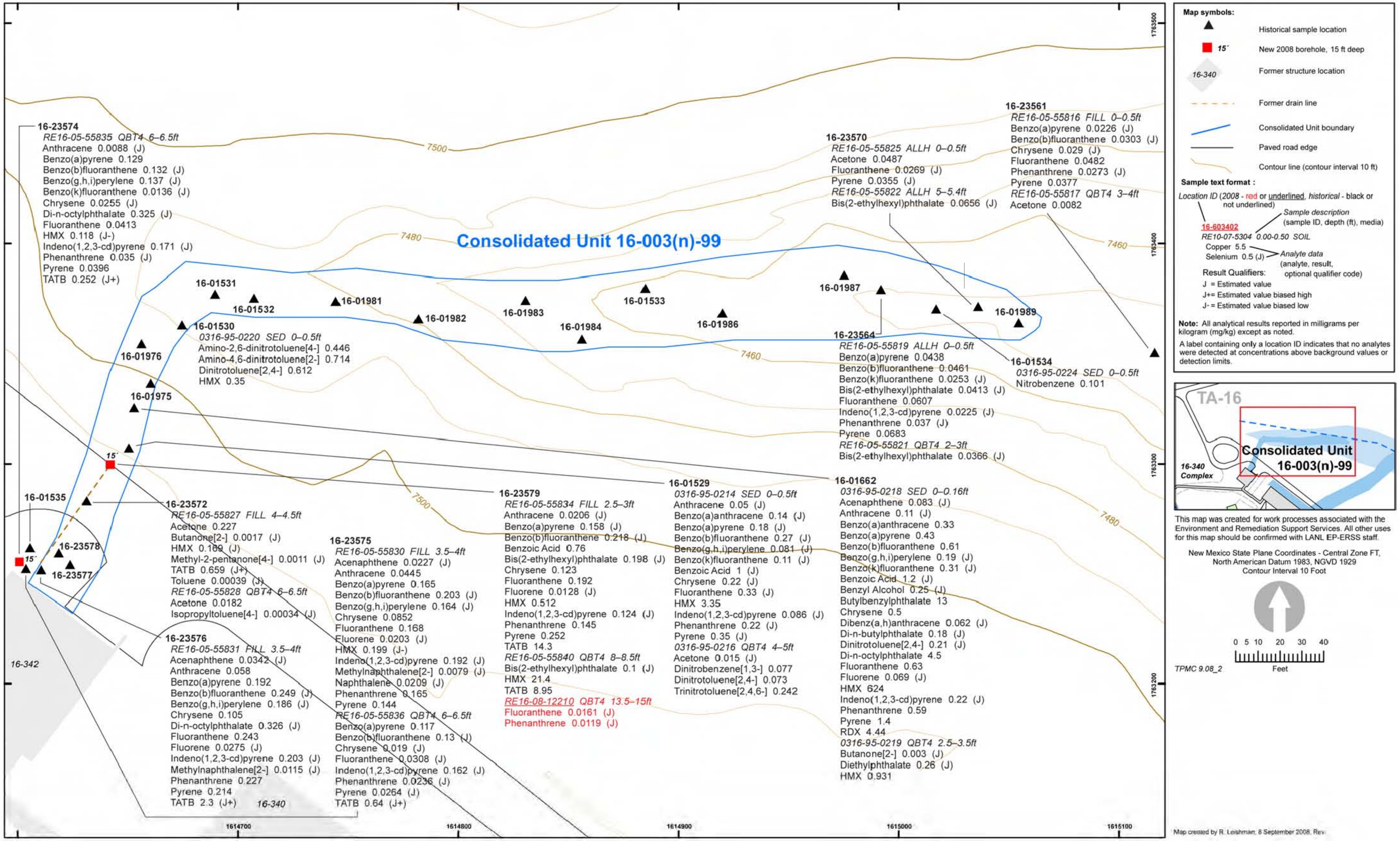


Figure H-8.2-1 Consolidated Unit 16-003(n)-99 inorganic chemical concentrations detected above background values



Note: All analytical results reported in milligrams per kilogram (mg/kg) except as noted.

A label containing only a location ID indicates that no analytes were detected at concentrations above background values or detection limits.

This map was created for work processes associated with the Environment and Remediation Support Services. All other uses for this map should be confirmed with LANL EP-ERSS staff.

New Mexico State Plane Coordinates - Central Zone FT, North American Datum 1983, NGVD 1929
Contour Interval 10 Foot

Map created by R. Leishman, 8 September 2008, Rev.

Figure H-8.2-2 Consolidated Unit 16-003(n)-99 organic chemical concentrations detected

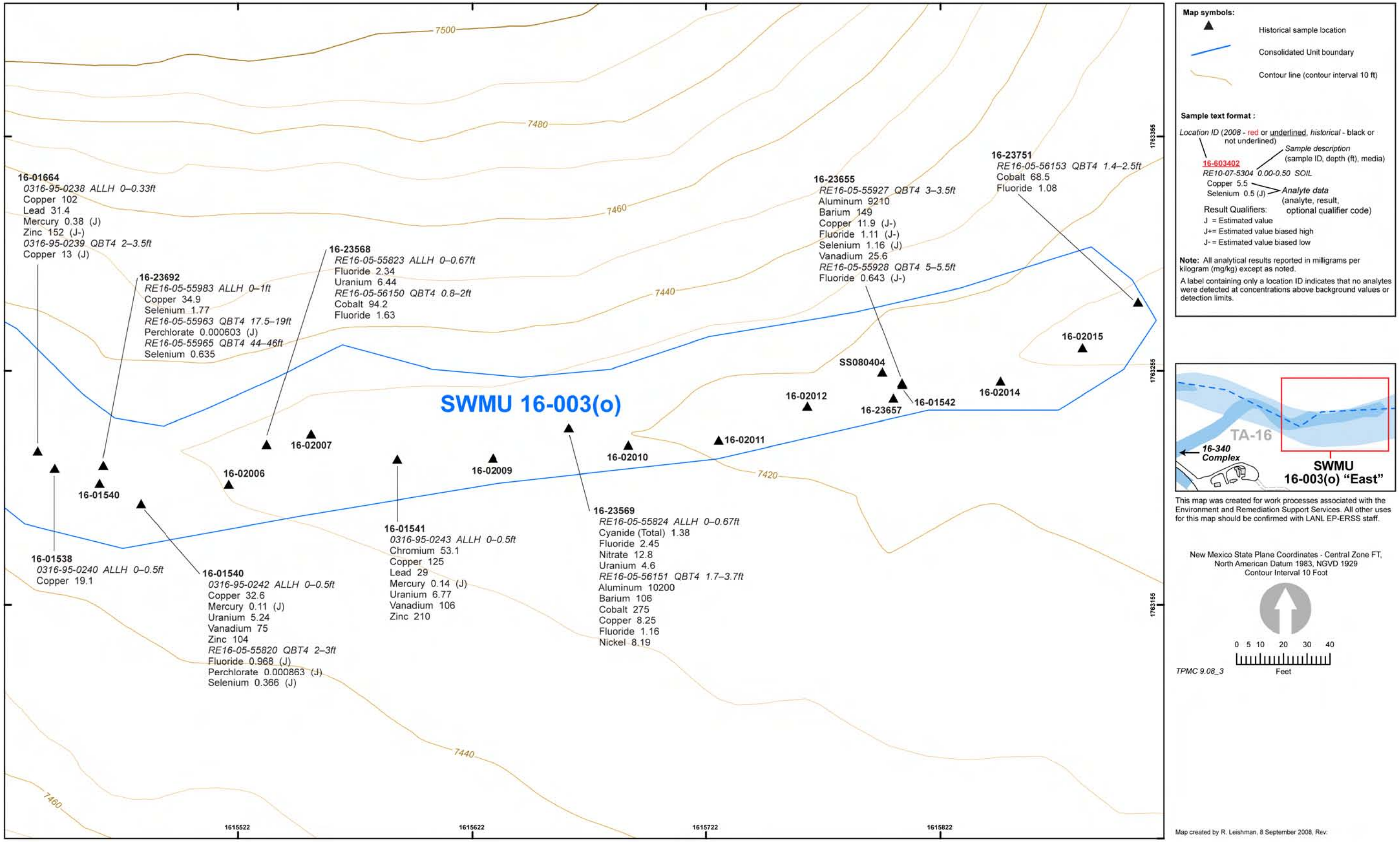
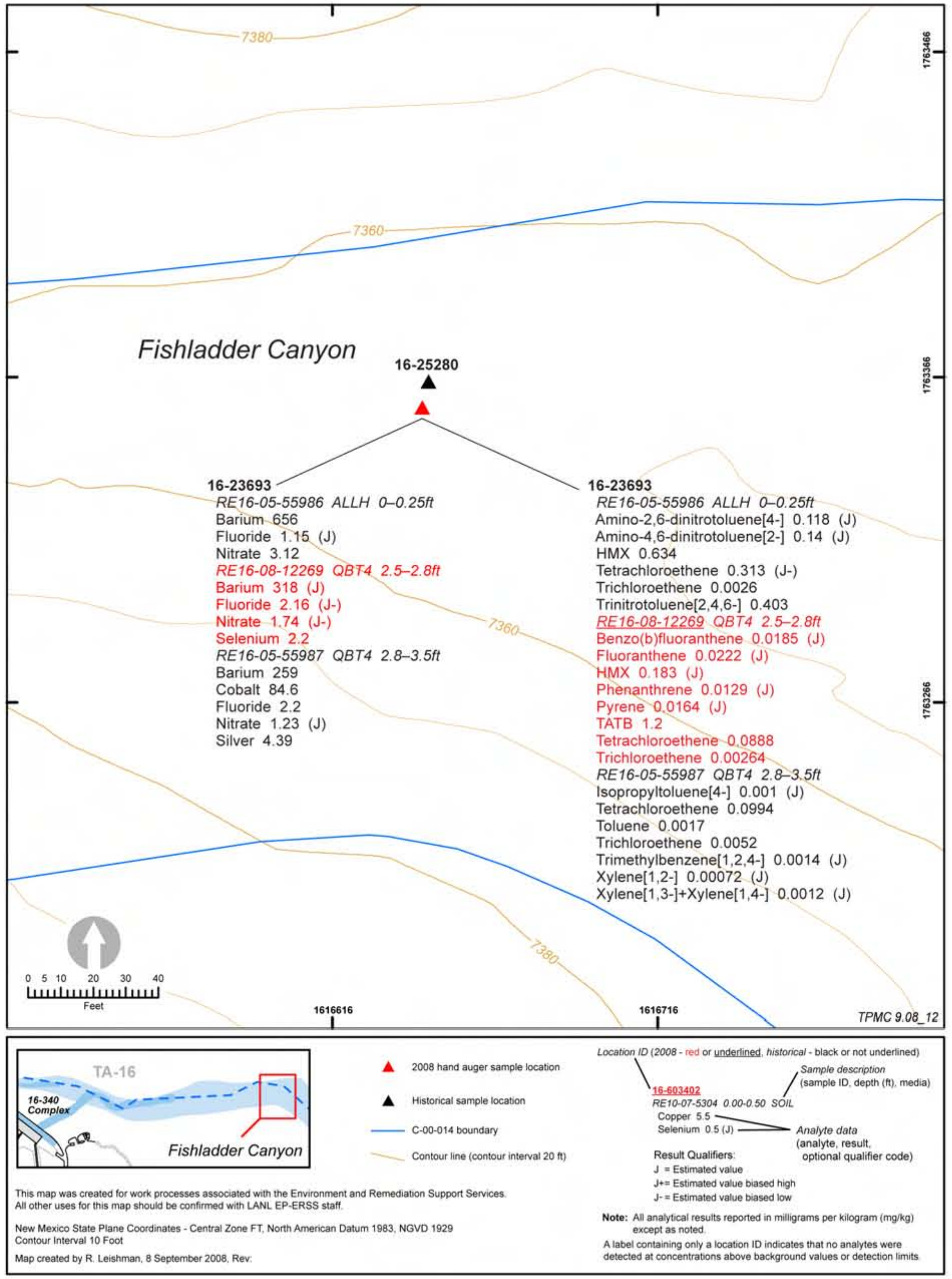


Figure H-8.3-1 Eastern SWMU 16-003(o) inorganic chemical concentrations detected above background values



Result Qualifiers:
J = Estimated value
J+= Estimated value biased high
J- = Estimated value biased low

This map was created for work processes associated with the Environment and Remediation Support Services. All other uses for this map should be confirmed with LANL EP-ERSS staff.

New Mexico State Plane Coordinates - Central Zone FT, North American Datum 1983, NGVD 1929
Contour Interval 10 Foot

Map created by R. Leishman, 8 September 2008, Rev:

Note: All analytical results reported in milligrams per kilogram (mg/kg) except as noted.

A label containing only a location ID indicates that no analytes were detected at concentrations above background values or detection limits.

Figure H-8.3-2 Northwest C-00-014 organic chemical concentrations detected and inorganic chemical concentrations detected above background values

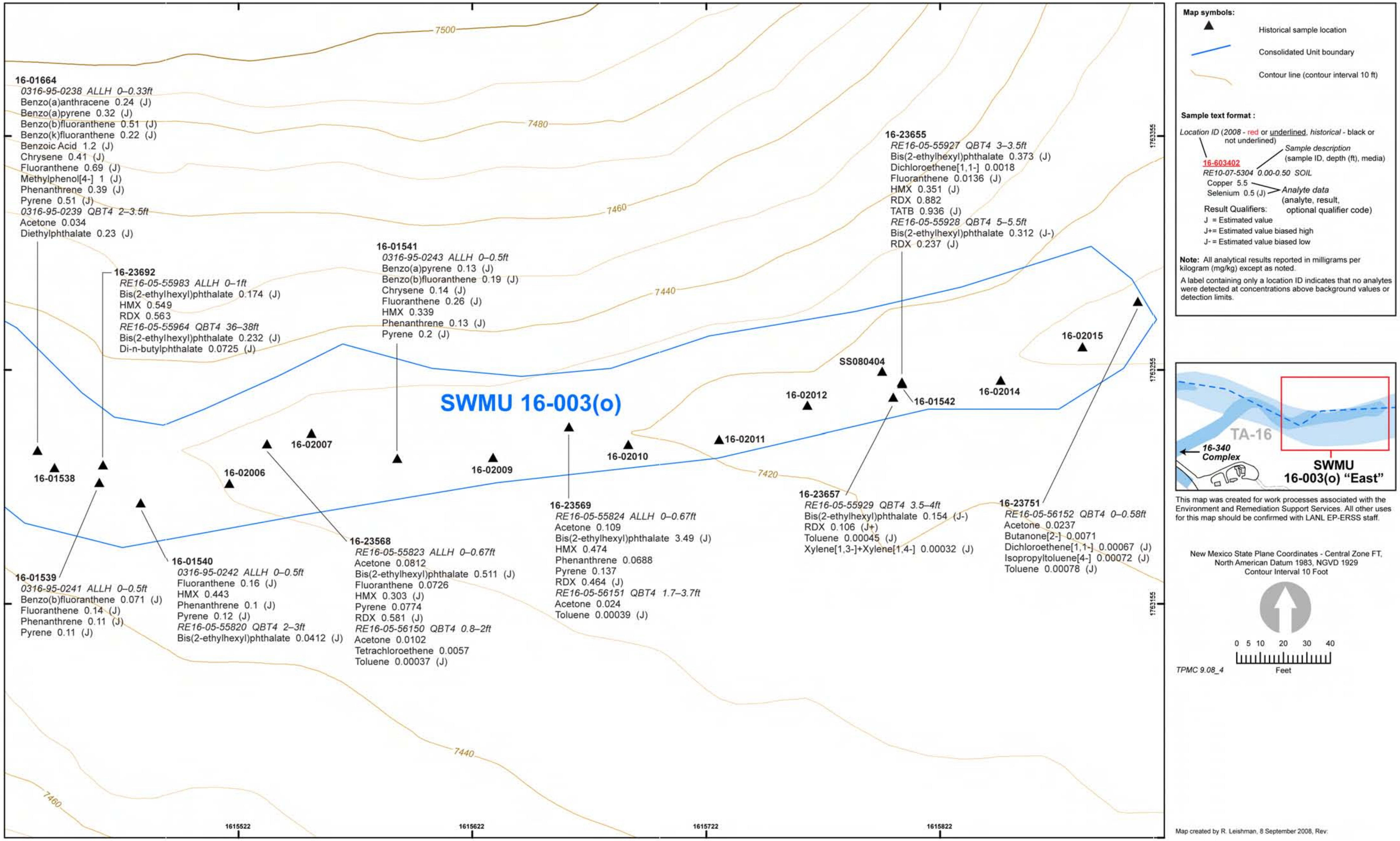


Figure H-8.3-3 Eastern SWMU 16-003(o) organic chemical concentrations detected

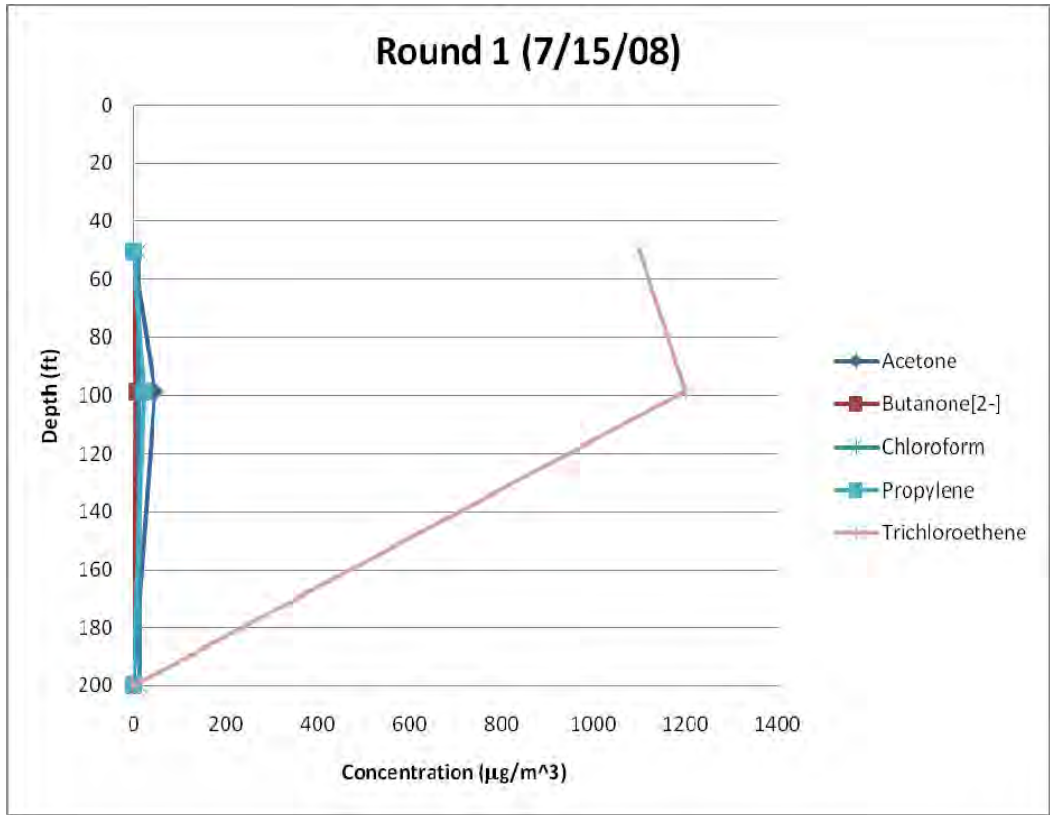


Figure H-8.4-1 SWMU 16-003(o) pore-gas sampling profile of July 2008

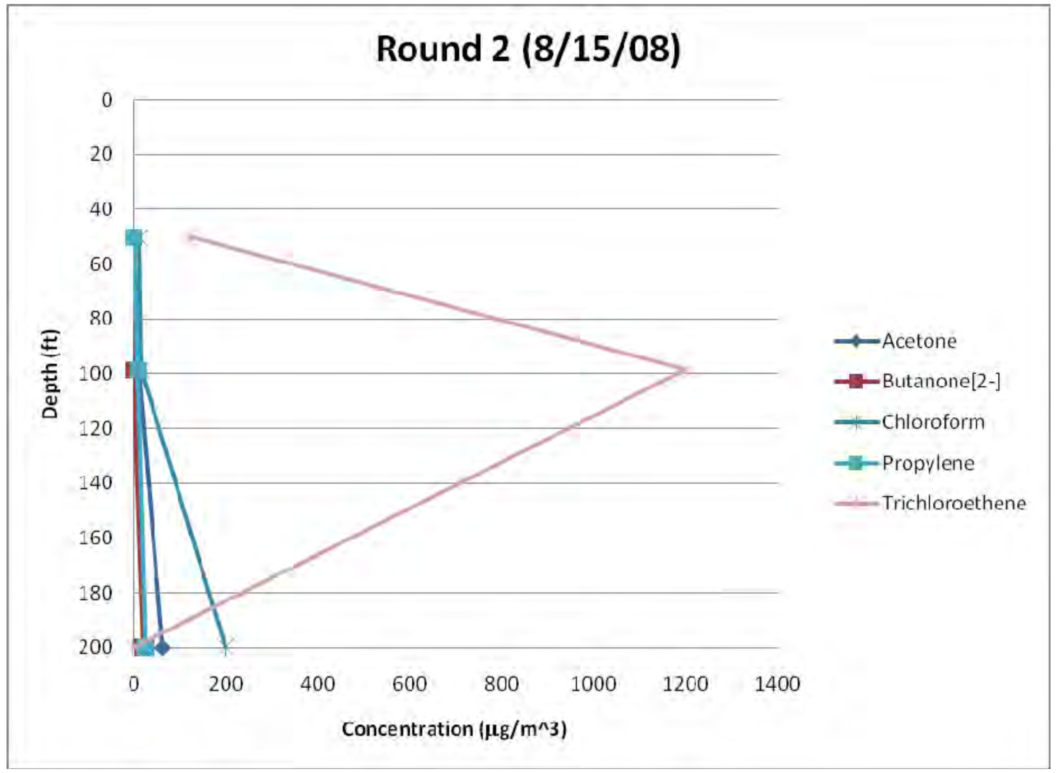


Figure H-8.4-2 SWMU 16-003(o) pore-gas sampling profile of August 2008

Table H-1.1-1
Soil and Tuff Samples Collected at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Gamma Spectroscopy	Explosive Compounds	Isotopic Uranium	Metals	PAH	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)														
0313-95-0001	13-00001	1.5–2.5	9/27/1995	SOIL	—*	1244	1242	—	1243,1244	—	—	1242	1242	1243
0313-95-0002	13-00001	3.0–4.0	9/27/1995	QBT4	—	1244	1242	—	1243,1244	—	—	1242	1242	1243
RE13-05-61975	13-23550	4.0–4.5	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61976	13-23550	6.0–6.5	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61977	13-23552	3.0–3.5	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61978	13-23552	5.0–5.5	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61981	13-23556	4.5–5.0	7/7/2005	SOIL	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-61982	13-23556	6.5–7.0	7/7/2005	QBT4	3494S	3494S	3494S	—	3494S	—	3494S	3494S	3494S	3494S
RE13-05-63822	13-23558	11.5–12.2	9/15/2005	QBT4	3982S	3982S	3982S	—	3982S	—	3982S	3982S	3982S	3982S
RE13-05-63823	13-23559	11.0–12.0	9/15/2005	QBT4	3982S	3982S	3982S	—	3982S	—	3982S	3982S	3982S	3982S
2008 Samples														
RE16-08-11400	13-23558	18.0–20.0	6/24/2008	QBT4	08-1458	—	—	08-1458	08-1458	—	—	—	—	—
RE16-08-11401	16-603358	0.0–0.6	6/25/2008	SOIL	08-1496	—	—	08-1496	08-1496	08-1496	—	08-1496	—	—
RE16-08-11402	16-603358	8.5–10.0	6/25/2008	QBT4	08-1496	—	—	08-1496	08-1496	08-1496	—	08-1496	—	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table H-1.2-1
Fill, Sediment, Soil, and Tuff Samples Collected at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-95-0214	16-01529	0.0–0.5	8/16/1995	SED	—*	969	—	970,971	—	969	—	970
0316-95-0215	16-01529	2.0–2.5	8/16/1995	SOIL	—	969	—	970,971	—	969	969	970
0316-95-0216	16-01529	4.0–5.0	8/30/1995	QBT4	—	1052	—	1053,1054	—	1052	1052	1053
0316-95-0220	16-01530	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
RE16-05-55815	16-01530	6.0–7.0	11/12/2004	QBT4	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
0316-95-0221	16-01531	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0222	16-01532	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0223	16-01533	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0224	16-01534	0.0–0.5	5/10/1995	SED	—	215	—	206,208	—	—	—	206
0316-95-0218	16-01662	0.0–0.16	8/16/1995	SED	—	1007	—	1008,1009	—	1007	1007	1008
0316-95-0219	16-01662	2.5–3.5	9/26/1995	QBT4	—	1222	—	1223,1224	—	1222	1222	1223
RE16-05-55816	16-23561	0.0–0.5	11/12/2004	FILL	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
RE16-05-55817	16-23561	3.0–4.0	11/12/2004	QBT4	2625S	2625S	—	2625S	2625S	2625S	2625S	2625S
RE16-05-55819	16-23564	0.0–0.5	1/6/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-55821	16-23564	2.0–3.0	1/6/2005	QBT4	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-06-66203	16-23564	2.0–3.0	11/15/2005	QBT4	—	—	—	4138S	—	—	—	—
RE16-05-55825	16-23570	0.0–0.5	1/6/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-06-66204	16-23570	0.0–0.5	11/15/2005	SOIL	—	—	—	4138S	—	—	—	—
RE16-05-55822	16-23570	5.0–5.4	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	—	2764S
RE16-05-55827	16-23572	4.0–4.5	5/17/2005	FILL	3277S	3276S	—	3277S	3276S	3276S	3276S	3277S
RE16-05-55828	16-23572	6.0–6.5	5/17/2005	QBT4	3277S	3276S	—	3277S	3276S	3276S	3276S	3277S
RE16-05-55829	16-23574	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S

Table H-1.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55835	16-23574	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55830	16-23575	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55836	16-23575	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55831	16-23576	3.5–4.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55837	16-23576	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55832	16-23577	4.5–5.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55838	16-23577	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55833	16-23578	4.5–5.0	6/9/2005	FILL	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55839	16-23578	6.0–6.5	6/9/2005	QBT4	3387S	3386S	—	3387S	3386S	3386S	3386S	3387S
RE16-05-55834	16-23579	2.5–3.0	6/9/2005	FILL	3409S	3408S	—	3409S	3409S	3408S, 3409S	3408S	3409S
RE16-05-55840	16-23579	8.0–8.5	6/9/2005	QBT4	3409S	3408S	—	3409S	3409S	3408S, 3409S	3408S	3409S
2008 Samples												
RE16-08-12211	16-23574	12.5–13.5	6/24/2008	QBT4	08-1457	08-1457	08-1457	08-1457	—	08-1457	08-1457	—
RE16-08-12210	16-23579	13.5–15.0	7/11/2008	QBT4	08-1543	08-1543	08-1543	08-1543	—	08-1543	08-1543	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table H-1.3-1
Fill, Soil, and Tuff Samples Collected at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-95-0226	16-01536	0.0–0.33	8/16/1995	SOIL	—*	1007	—	1008,1009	—	1007	1007	1008
0316-95-0227	16-01536	3.0–3.5	8/31/1995	QBT4	—	1052	—	1053,1054	—	1052	1052	1053
0316-95-0236	16-01537	2.5–3.5	10/4/1995	QBT4	—	1297	—	1298,1299	—	1297	1297	1298
0316-95-0240	16-01538	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0241	16-01539	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0242	16-01540	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
RE16-05-55820	16-01540	2.0–3.0	1/5/2005	QBT4	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
0316-95-0243	16-01541	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0238	16-01664	0.0–0.33	8/16/1995	SOIL	—	969	—	970, 971	—	969	969	970
0316-95-0239	16-01664	2.0–3.5	10/4/1995	QBT4	—	1297	—	1298,1299	—	1297	1297	1298
0316-95-0231	16-01669	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0232	16-01670	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0233	16-01671	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
0316-95-0498	16-02023	0.0–0.5	5/23/1995	SOIL	—	298	—	299,300	—	298	—	299
RE16-05-55823	16-23568	0.0–0.67	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56150	16-23568	0.8–2.0	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-55824	16-23569	0.0–0.67	1/7/2005	SOIL	2764S	2763S	—	2764S	2763S	2763S	2763S	2764S
RE16-05-56151	16-23569	1.7–3.7	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	2767S
RE16-05-55851	16-23587	4.0–4.5	4/15/2005	FILL	3137S	3136S	—	3137S	3136S	3136S	3136S	3137S
RE16-05-55852	16-23588	4.0–4.5	4/15/2005	FILL	3137S	3136S	—	3137S	3136S	3136S	3136S	3137S
RE16-05-55854	16-23590	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55859	16-23590	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55855	16-23591	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55860	16-23591	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55861	16-23597	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55869	16-23597	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55865	16-23601	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55870	16-23601	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55871	16-23607	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55872	16-23607	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55873	16-23609	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55874	16-23609	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55875	16-23611	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55876	16-23611	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55877	16-23613	4.0–4.5	4/6/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55878	16-23613	6.0–6.5	4/6/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55879	16-23615	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55880	16-23615	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55881	16-23617	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55882	16-23617	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55883	16-23619	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55884	16-23619	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55885	16-23621	4.0–4.5	4/7/2005	FILL	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S
RE16-05-55886	16-23621	6.0–6.5	4/7/2005	QBT4	3125S	3126S	—	3125S	3126S	3126S	3126S	3125S

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55908	16-23636	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55915	16-23636	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55909	16-23637	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55914	16-23637	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55910	16-23638	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55913	16-23638	6.0–6.5	5/16/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55911	16-23639	4.0–4.5	5/14/2005	FILL	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55912	16-23639	6.0–6.5	5/14/2005	QBT4	3275S	3274S	—	3275S	3274S	3274S	3274S	3275S
RE16-05-55918	16-23646	8.0–8.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55921	16-23646	10.0–10.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55919	16-23647	8.0–8.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55920	16-23647	10.0–10.5	6/1/2005	QBT4	3355S	3354S	—	3355S	3354S	3354S	3354S	3355S
RE16-05-55923	16-23651	4.0–4.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55924	16-23651	6.0–6.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55925	16-23653	4.0–4.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55926	16-23653	6.0–6.5	6/21/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55927	16-23655	3.0–3.5	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55928	16-23655	5.0–5.5	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55929	16-23657	3.5–4.0	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55930	16-23657	5.5–6.0	6/22/2005	QBT4	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55931	16-23659	5.0–5.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55934	16-23659	10.0–10.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55932	16-23660	4.0–4.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55935	16-23660	9.0–9.5	6/22/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55936	16-23664	4.5–5.0	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55938	16-23664	9.0–9.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55937	16-23665	4.0–4.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-55939	16-23665	9.0–9.5	6/23/2005	SOIL	3437S	3436S	—	3437S	3436S	3436S	3436S	3437S
RE16-05-62035	16-23669	1.0–1.5	7/8/2005	SOIL	3505S	3504S	—	3505S	3504S	3504S	3504S	3505S
RE16-05-62036	16-23669	3.0–3.5	7/8/2005	QBT4	3505S	3504S	—	3505S	3504S	3504S	3504S	3505S
RE16-05-62039	16-23672	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62040	16-23674	1.5–2.0	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62041	16-23674	3.5–4.0	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62045	16-23679	1.0–1.5	7/11/2005	SOIL	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62046	16-23679	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62047	16-23681	3.0–3.5	7/11/2005	SOIL	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-62051	16-23684	3.0–3.5	7/11/2005	QBT4	3521S	3520S	—	3521S	3520S	3520S	3520S	—
RE16-05-55978	16-23691	0.0–1.0	10/25/2004	SOIL	—	2564S	—	—	2564S	2564S	2564S	—
RE16-05-55981	16-23691	30.0–31.0	10/26/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55982	16-23691	64.0–67.0	10/27/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55984	16-23691	77.0–79.0	10/27/2004	QBT4	2564S	2564S	—	2564S	2564S	2564S	2564S	2564S
RE16-05-55904	16-23691	84.0–86.0	10/29/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S
RE16-05-55905	16-23691	120.0–122.0	11/1/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S
RE16-05-55906	16-23691	157.0–160.0	11/2/2004	QBT4	2575S	2574S	—	2575S	2574S, 2575S	2574S	2574S	2575S

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-55907	16-23691	190.0–191.0	11/2/2004	QBT4	—	2574S	—	—	—	2574S	2574S	—
RE16-05-55983	16-23692	0.0–1.0	11/4/2004	SOIL	2592S	2591S	—	2592S	2591S, 2592S	2591S	2591S	2592S
RE16-05-55963	16-23692	17.5–19.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55964	16-23692	36.0–38.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55965	16-23692	44.0–46.0	11/4/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55966	16-23692	78.0–80.0	11/5/2004	QBT4	2595S	2594S	—	2595S	2594S	2594S	2594S	2595S
RE16-05-55960	16-23692	159.0–160.0	11/11/2004	QBT4	2646S	2645S	—	2646S	2645S	2645S	—	2646S
RE16-05-55961	16-23692	192.0–194.0	11/12/2004	QBT4	2646S	2645S	—	2646S	2645S	2645S	—	2646S
RE16-05-55986	16-23693	0.0–0.25	1/10/2005	SOIL	2768S	2768S	—	2768S	2768S	2768S	2768S	2768S
RE16-05-55987	16-23693	2.8–3.5	1/10/2005	QBT4	2768S	2768S	—	2768S	2768S	2768S	2768S	2768S
RE16-05-56163	16-23750	0.25–0.83	1/10/2005	SOIL	2767S	2767S	—	2767S	2767S	2767S	2767S	2767S
RE16-05-56146	16-23750	1.0–1.5	1/11/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-56152	16-23751	0.0–0.58	1/12/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	2767S	—
RE16-05-56153	16-23751	1.4–2.5	1/12/2005	QBT4	2767S	2767S	—	2767S	2767S	2767S	—	2767S
RE16-05-61914	16-24891	8.0–8.5	7/15/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61928	16-24891	10.0–10.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61917	16-24894	8.0–8.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61927	16-24894	10.0–10.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61919	16-24896	6.0–6.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61926	16-24896	8.0–8.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61922	16-24899	6.0–6.5	7/18/2005	SOIL	3534S	3533S	—	3534S	3533S	3533S	3533S	3534S
RE16-05-61925	16-24899	8.0–8.5	7/21/2005	QBT4	3577S	3576S	—	3577S	3576S	3576S	3576S	3577S
RE16-05-61923	16-24900	3.0–3.5	7/20/2005	SOIL	3545S	3544S	—	3545S	3544S	3544S	3544S	3545S

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-61924	16-24900	5.0–5.5	7/20/2005	QBT4	3545S	3544S	—	3545S	3544S	3544S	3544S	3545S
RE16-05-61948	16-24906	2.0–2.5	8/16/2005	SOIL	3735S	3735S	—	3735S	3735S	3735S	3735S	3735S
RE16-05-61947	16-24908	4.0–4.5	8/16/2005	QBT4	3735S	3735S	—	3735S	3735S	3735S	3735S	3735S
RE16-05-61934	16-24911	0.0–0.5	8/5/2005	SOIL	3655S	3654S	—	3655S	3654S	3654S	3654S	3655S
RE16-05-61935	16-24912	0.0–0.5	8/5/2005	SOIL	3655S	3654S	—	3655S	3654S	3654S	3654S	3655S
RE16-05-61938	16-24915	0.0–0.5	8/9/2005	SOIL	3682S	3681S	—	3682S	3681S	3681S	3681S	3682S
RE16-05-61941	16-24915	2.0–2.5	8/10/2005	QBT4	3682S	3681S	—	3682S	3681S	3681S	3681S	3682S
RE16-05-61942	16-24919	0.0–0.5	8/11/2005	SOIL	3711S	3710S	3711S	3711S	3710S	3710S	3710S	3711S
RE16-05-61950	16-24927	0.0–0.5	8/18/2005	SOIL	3771S	3770S	—	3771S	3770S	3770S	3770S	3771S
2008 Samples												
RE16-08-12259	16-23591	12.5–14.5	6/24/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12260	16-23597	12.5–14.2	6/24/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12261	16-23619	13.0–15.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12364	16-23671	2.0–2.5	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12365	16-23671	3.5–4.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12362	16-23672	3.5–3.8	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12366	16-23676	0.0–0.5	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12367	16-23676	3.5–4.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12368	16-23677	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12369	16-23677	3.2–3.7	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12370	16-23678	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12371	16-23678	3.2–3.8	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12372	16-23681	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12373	16-23681	3.5–4.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12374	16-23682	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12375	16-23682	3.7–3.8	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12269	16-23693	2.5–2.8	7/11/2008	QBT4	08-1541	08-1541	08-1541	08-1541	—	08-1541	08-1541	—
RE16-08-12268	16-24894	31.0–32.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12384	16-24906	2.0–2.35	7/2/2008	QBT4	—	-	08-1511	08-1511	—	08-1511	—	—
RE16-08-12385	16-24906	2.35–2.75	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12376	16-24907	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12377	16-24907	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12378	16-24908	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12379	16-24908	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12380	16-24910	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12381	16-24910	4.0–4.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12382	16-24923	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12383	16-24923	3.5–4.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12262	16-603396	12.5–14.5	6/23/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12263	16-603397	13.0–15.0	6/20/2008	QBT4	08-1456	08-1455	08-1456	08-1456	—	08-1455	08-1455	—
RE16-08-12264	16-603398	4.0–4.5	7/11/2008	QBT4	08-1541	—	08-1541	—	—	—	—	—
RE16-08-12265	16-603398	6.0–6.5	7/11/2008	QBT4	08-1541	—	08-1541	—	—	—	—	—
RE16-08-12266	16-603399	4.0–4.5	6/25/2008	SOIL	08-1494	—	08-1494	—	—	—	—	—
RE16-08-12267	16-603399	6.0–6.5	6/25/2008	QBT4	08-1494	—	08-1494	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	6/26/2008	SOIL	08-1495	08-1495	08-1495	08-1495	—	08-1495	08-1495	08-1495
RE16-08-12271	16-603400	1.5–4.0	6/26/2008	QBT4	08-1494	08-1494	08-1494	08-1494	—	08-1494	08-1494	08-1494

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12272	16-603401	0.0–2.0	6/25/2008	SOIL	08-1495	08-1495	08-1495	08-1495	—	08-1495	08-1495	08-1495
RE16-08-12273	16-603401	3.0–4.0	6/25/2008	QBT4	08-1494	08-1494	08-1494	08-1494	—	08-1494	08-1494	08-1494
RE16-08-12274	16-603402	0.0–0.5	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12275	16-603402	1.5–2.0	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12276	16-603403	0.0–0.5	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12277	16-603403	1.5–2.0	7/3/2008	SOIL	08-1515	08-1514	08-1515	08-1515	—	08-1514	08-1514	08-1515
RE16-08-12312	16-603406	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12313	16-603406	2.5–3.0	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12314	16-603407	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12315	16-603407	2.0–2.5	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12316	16-603408	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12317	16-603408	2.0–2.5	7/2/2008	QBT4	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12318	16-603409	0.0–0.5	7/2/2008	SOIL	—	—	08-1511	08-1511	—	08-1511	—	—
RE16-08-12320	16-603410	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12321	16-603410	2.0–2.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12322	16-603411	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12323	16-603411	2.0–2.5	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12324	16-603412	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12325	16-603412	2.5–3.0	7/9/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12327	16-603413	0.0–0.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12326	16-603413	2.0–2.5	7/9/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12328	16-603414	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12329	16-603414	3.0–3.5	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12330	16-603415	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12331	16-603415	2.2–2.7	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12332	16-603416	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12333	16-603416	2.0–2.4	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12334	16-603417	0.0–0.5	7/7/2008	SOIL	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12335	16-603417	3.0–3.4	7/7/2008	QBT4	—	—	08-1520	08-1519	—	08-1518	—	—
RE16-08-12336	16-603418	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12337	16-603418	1.5–2.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12338	16-603419	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12339	16-603419	2.0–3.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12340	16-603420	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12341	16-603420	1.5–2.0	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12342	16-603421	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12343	16-603421	2.0–3.0	7/7/2008	QBT4	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12344	16-603422	0.0–0.5	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12345	16-603422	2.3–2.8	7/7/2008	SOIL	—	—	08-1523	08-1522	—	08-1521	—	—
RE16-08-12346	16-603423	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12347	16-603423	2.2–2.6	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12348	16-603424	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12349	16-603424	1.6–2.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12350	16-603425	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12351	16-603425	1.7–2.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12352	16-603426	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—

Table H-1.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-08-12353	16-603426	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12354	16-603427	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12355	16-603427	3.5–4.0	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12356	16-603428	0.0–0.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12357	16-603428	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12358	16-603429	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12359	16-603429	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12360	16-603430	0.0–0.5	7/8/2008	SOIL	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12361	16-603430	2.0–2.5	7/8/2008	QBT4	—	—	08-1535	08-1534	—	08-1533	—	—
RE16-08-12286	16-603511	38.0–40.0	6/27/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12287	16-603511	77.0–79.0	6/27/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12291	16-603511	100.0–101.0	7/1/2008	QBT4	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506	08-1506
RE16-08-12288	16-603511	118.0–120.0	7/2/2008	QBT3	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510
RE16-08-12289	16-603511	158.0–160.0	7/2/2008	QBT3	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510	08-1510
RE16-08-12290	16-603511	204.5–206.3	7/10/2008	QBT3	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542	08-1542

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table H-1.3-2
Pore-Gas Samples Collected at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	VOC
Historic Samples (2004–2005)				
RE16-05-56179	16-23691	49.2500–50.0	10/27/2004	2560S
RE16-05-56000	16-23691	50.0–51.0	4/27/2005	3182S
RE16-05-56002	16-23691	98.5–100.0	11/1/2004	2560S
RE16-05-55999	16-23691	100.0–101.0	4/27/2005	3182S
RE16-05-55997	16-23691	175.0–176.0	4/27/2005	3182S
RE16-05-56025	16-23691	199.0–200.0	11/3/2004	2579S
RE16-05-55988	16-23692	47.5–50.0	11/5/2004	2593S
RE16-06-64294	16-23692	48.0–50.0	12/15/2005	4212S
RE16-05-55990	16-23692	98.0–100.0	11/8/2004	2593S
RE16-06-64295	16-23692	98.0–100.0	12/15/2005	4212S
RE16-06-64296	16-23692	110.0–147.6	12/15/2005	4212S
RE16-05-55994	16-23692	132.0–137.0	11/10/2004	2628S
RE16-05-55995	16-23692	198.0–200.0	11/12/2004	2628S
2008 Samples				
RE16-08-12394	16-603511	47.0–53.0	8/15/2008	08-1693
RE16-08-12300	16-603511	47.0–53.0	7/15/2008	08-1557
RE16-08-12395	16-603511	95.0–103.0	8/15/2008	08-1693
RE16-08-12301	16-603511	95.0–103.0	7/15/2008	08-1557
RE16-08-12396	16-603511	196.5–203.0	8/15/2008	08-1693
RE16-08-12302	16-603511	196.5–203.0	7/15/2008	08-1557

Note: Numbers in analyte columns are request numbers.

Table H-1.4-1
Fill, Sediment, Soil, and Tuff Samples Collected at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	Anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
Historical Samples (1995–2005)												
0316-97-0608	16-01551	0.5–2.5	9/3/1997	SOIL	—*	3677R	—	3676R	—	3675R	3675R	—
0316-97-0609	16-01551	2.5–4.0	9/3/1997	QBT4	—	3677R	—	3676R	—	3675R	3675R	—
0316-95-0253	16-01554	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0254	16-01555	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0500	16-01555	0.0–0.5	5/22/1995	SED	—	—	—	—	—	—	289	—
RE16-05-56044	16-01555	3.5–4.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
0316-95-0255	16-01556	0.0–0.5	5/15/1995	SED	—	222	—	223	—	222	—	223
0316-95-0503	16-02166	5.0–7.0	7/21/1995	QBT4	—	731	—	730	—	729	729	730
0316-97-0610	16-02166	8.9–9.0	9/4/1997	QBT4	—	—	—	3676R	—	—	—	—
RE16-05-56045	16-23701	0.0–0.5	11/11/2004	SED	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56046	16-23701	2.5–3.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56047	16-23702	0.0–0.5	11/11/2004	SED	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56048	16-23702	2.5–3.5	11/11/2004	QBT4	2624S	2624S	—	2624S	2624S	2624S	2624S	2624S
RE16-05-56049	16-23706	4.0–4.5	4/7/2005	FILL	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56050	16-23706	6.0–6.5	4/7/2005	QBT4	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56051	16-23708	4.0–4.5	4/7/2005	FILL	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56052	16-23708	6.0–6.5	4/7/2005	QBT4	3124S	3123S	—	3124S	3123S	3123S	3123S	3124S
RE16-05-56053	16-23710	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56054	16-23710	5.0–5.5	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56055	16-23712	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56057	16-23712	4.5–5.0	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56056	16-23713	2.0–2.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S

Table H-1.4-1 (continued)

Sample ID	Location ID	Depth (ft)	Collection Date	Media	anion	Explosive Compounds	Isotopic Uranium	Metals	Perchlorate	SVOC	VOC	Cyanide
RE16-05-56058	16-23713	4.5–5.0	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56059	16-23716	3.0–3.5	7/19/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56060	16-23716	5.0–5.5	7/19/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56061	16-23718	2.5–3.0	7/20/2005	FILL	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56062	16-23718	4.5–5.0	7/20/2005	QBT4	3543S	3542S	—	3543S	3542S	3542S	3542S	3543S
RE16-05-56063	16-23720	2.5–3.0	7/22/2005	SED	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56064	16-23720	4.5–5.0	7/22/2005	QBT4	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56065	16-23722	2.0–2.5	7/22/2005	SED	3573S	—	—	3573S	3572S	3572S	3572S	3573S
RE16-05-56066	16-23722	4.0–4.5	7/22/2005	QBT4	3573S	—	—	3573S	3572S	3572S	3572S	3573S
2008 Samples												
RE16-08-12305	16-23706	12.5–13.6	6/25/2008	QBT4	08-1493	08-1493	08-1493	08-1493	—	08-1493	08-1493	—
RE16-08-12306	16-603404	12.5–14.0	6/25/2008	QBT4	08-1493	08-1493	08-1493	08-1493	—	08-1493	08-1493	—
RE16-08-12311	16-603405	0.0–0.5	7/7/2008	SOIL	08-1517	08-1516	08-1517	08-1517	—	08-1516	—	—
RE16-08-12310	16-603405	1.5–2.0	7/7/2008	QBT4	08-1517	08-1516	08-1517	08-1517	—	08-1516	—	—

Note: Numbers in analyte columns are request numbers.

* — = Analysis not requested.

Table H-1.5-1
Surface Water and Alluvial Groundwater Samples Collected In Fishladder Canyon

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
Surface Water																									
Historical Samples (1995–2005)																									
0316-97-3102	16-02654	Fish Ladder Seep	F[a]	9/19/1997	0–0	—[b]	—	—	—	—	—	3746R	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-97-3102	16-02654	Fish Ladder Seep	UF[b]	9/19/1997	0–0	—	—	—	—	3745R	—	3746R	—	—	—	—	—	—	—	—	—	—	—	3744R	3744R
0316-97-3103	16-02654	Fish Ladder Seep	F	9/19/1997	0–0	—	—	—	—	3745R	—	3746R	—	—	—	—	—	—	—	—	—	—	—	3744R	—
EU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11785, 8022, 8103	—	—	—
EU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11293, 11816	—	—	—
GF05070SFLS01	16-02654	Fish Ladder Seep	F	8/25/2005	0–0	—	—	—	—	—	—	144191	—	—	—	—	—	—	—	—	—	—	—	—	—
GF05100SFLS01	16-02654	Fish Ladder Seep	F	11/14/2005	0–0	—	—	—	—	—	—	150272	—	—	—	—	—	—	—	—	—	—	—	—	—
GU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	144191	144191	—	144191	—	144191	—	—	—	—	—	—	144191	—	—	—	—	—	144191
GU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	150272	150272	—	150272	—	150272	—	—	—	—	—	—	150272	—	—	—	—	—	150272
RE16-00-3133	16-02654	Fish Ladder Seep	UF	3/30/2000	0–0	—	—	—	—	6663R	—	6664R, 6665R	—	—	—	—	—	—	—	—	—	6667R, 6668R	—	—	6662R
RE16-00-3134	16-02654	Fish Ladder Seep	F	3/30/2000	0–0	—	—	—	—	—	—	6664R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-01-3126	16-02654	Fish Ladder Seep	UF	4/17/2001	0–0	—	—	—	—	8686R	—	8684R, 8685R	—	—	—	—	—	—	—	—	—	8687R	—	8683R	8683R
RE16-01-3127	16-02654	Fish Ladder Seep	F	4/17/2001	0–0	—	—	—	—	—	—	8684R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-03-50737	16-02654	Fish Ladder Seep	UF	3/27/2003	0–0	—	—	—	—	1682S, 1683S	—	1683S	—	—	—	—	—	—	—	—	—	1680S	—	—	1683S
RE16-03-50738	16-02654	Fish Ladder Seep	F	3/27/2003	0–0	—	—	—	—	—	—	1683S	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-04-53120	16-02654	Fish Ladder Seep	UF	4/5/2004	0–0	—	—	—	—	2073S, 2074S	—	2073S, 2075S	—	—	—	—	—	—	—	—	—	2076S	—	2073S	2073S
RE16-04-53121	16-02654	Fish Ladder Seep	F	4/5/2004	0–0	—	—	—	—	—	—	2075S	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3020	16-02654	Fish Ladder Seep	F	3/30/1998	0–0	—	—	—	—	4191R	—	4192R	—	—	—	—	—	—	—	—	—	—	—	4190R	4190R
RE16-98-3021	16-02654	Fish Ladder Seep	F	3/30/1998	0–0	—	—	—	—	—	—	4192R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3021	16-02654	Fish Ladder Seep	UF	3/30/1998	0–0	—	—	—	—	4191R	—	4192R	—	—	—	—	—	—	—	—	—	—	—	4190R	4190R
UU05070SFLS01	16-02654	Fish Ladder Seep	UF	8/25/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU05100SFLS01	16-02654	Fish Ladder Seep	UF	11/14/2005	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
WG9506025851	16-02654	Fish Ladder Seep	F	6/2/1995	0–0	—	UNK[d]	—	—	—	—	UNK	UNK	UNK	—	—	—	—	—	—	—	—	—	—	—
WG9506025851	16-02654	Fish Ladder Seep	UF	6/2/1995	0–0	—	—	—	—	UNK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	UNK
EU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a[e]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8119	—	—	—
EU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11516, 11750	—	—	—
GF0507FLCDV01	16-06121	Fishladder Canyon at CDV	F	8/23/2005	n/a	—	—	—	—	—	—	144031	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-1.5-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GF0510FLCDV01	16-06121	Fishladder Canyon at CDV	F	11/10/2005	n/a	—	—	—	—	—	—	150010	—	—	—	—	—	—	—	—	—	—	—	—	—
GU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a	—	144031	144031	—	144031	—	144031	—	—	—	—	—	—	144031	—	—	—	—	—	144031
GU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	150010	150010	—	150010	—	150010	—	—	—	—	—	—	150010	—	—	—	—	—	150010
RE16-01-3140	16-06121	Fishladder Canyon at CDV	UF	4/25/2001	n/a	—	—	—	—	8709R	—	8710R, 8716R	—	—	—	—	—	—	—	—	—	8711R	—	8708R	8708R
RE16-01-3141	16-06121	Fishladder Canyon at CDV	F	4/25/2001	n/a	—	—	—	—	—	—	8710R	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-98-3084	16-06121	Fishladder Canyon at CDV	UF	12/21/1998	n/a	—	—	—	—	5090R	—	5091R	—	—	—	—	—	—	—	—	—	5092R, 5093R	—	5089R	5089R
UU0507FLCDV01	16-06121	Fishladder Canyon at CDV	UF	8/23/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU0510FLCDV01	16-06121	Fishladder Canyon at CDV	UF	11/10/2005	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2006–2008 Samples																									
AU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	28999	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	29775	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EF071000SFLS01	16-02654	Fish Ladder Seep	F	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22651	—	—	—
EU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11740, 11905, 18171	—	—	—
EU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19504	—	—	—
EU071000SFLS02	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	WG-08044-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	Fish Ladder Seep	F	4/3/2006	0–0	—	—	—	—	—	—	159873	—	—	—	—	—	—	—	—	—	—	—	—	—
GF070500SFLS01	16-02654	Fish Ladder Seep	F	5/11/2007	0–0	—	185982	—	—	—	—	185982	—	—	—	—	—	—	185982	—	—	—	—	—	—
GF071000SFLS01	16-02654	Fish Ladder Seep	F	10/19/2007	0–0	196215	196215	—	—	—	196215	196215	196215	196215	—	196215	196215	—	196215	—	—	—	196215	—	—
GU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	159873	159873	—	159873	—	159873	—	—	—	—	—	—	159873	—	—	—	—	159873	159873
GU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	185982	—	185982	—	185982	—	—	—	—	—	185982	—	185982	—	—	—	185982	185982
GU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	196215	—	196215	—	196215	196215	196215	196215	196215	196215	196215	196215	196215	—	196215	—	—	196215	196215	196215
SU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	—	F7E120132	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	WG-08002-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU06020SFLS01	16-02654	Fish Ladder Seep	UF	4/3/2006	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU070500SFLS01	16-02654	Fish Ladder Seep	UF	5/11/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000SFLS01	16-02654	Fish Ladder Seep	UF	10/19/2007	0–0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EU0602FLCDV01	16-06121	Fishladder Canyon at CDV	UF	4/10/2006	n/a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11756, 11928, 18191	—	—	—
GF0602FLCDV01	16-06121	Fishladder Canyon at CDV	F	4/10/2006	n/a	—	—	—	—	—	—	160579	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-1.5-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GU0602FLCDV01	16-06121	Fishladder Canyon at CDV	UF	4/10/2006	n/a	—	160579	160579	—	160579	—	160579	—	—	—	—	—	—	160579	—	—	—	—	160579	160579
Alluvial Groundwater																									
Historical Samples (1995–2005)																									
RE16-06-64300	16-25278	Fishladder Canyon Alluvial Well #3	UF	11/17/2005	5.21–6.0	—	—	—	—	4135S	—	4135S, 4136S	—	—	—	—	—	—	—	—	—	—	—	4135S	4135S
RE16-06-64301	16-25278	Fishladder Canyon Alluvial Well #3	F	11/17/2005	5.21–6.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-06-64302	16-25279	Fishladder Canyon Alluvial Well #2	UF	11/17/2005	6.66–7.2	—	—	—	—	4135S	—	4135S, 4136S	—	—	—	—	—	—	—	—	—	—	—	4135S	4135S
RE16-06-64303	16-25279	Fishladder Canyon Alluvial Well #2	F	11/17/2005	6.66–7.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2006–2008 Samples																									
CAWA-08-11597	16-25278	Fishladder Canyon Alluvial Well #3	F	4/10/2008	1.6–3.2	—	08-984	—	—	—	—	08-984	—	—	—	—	—	—	08-984	—	—	—	—	—	—
CAWA-08-11599	16-25278	Fishladder Canyon Alluvial Well #3	UF	4/10/2008	1.6–3.2	—	—	08-984	—	08-984, 08-985	—	08-984	—	—	—	—	—	—	—	—	08-984	—	—	—	08-984
EF071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	F	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22652	—	—	—
EU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19506	—	—	—
EU071000FLC302	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	WG-08041-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	F	10/22/2007	1.6–3.2	196275	196275	—	—	—	196275	196275	196275	196275	—	196275	196275	—	196275	—	—	—	196275	—	—
GU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	196275	—	196275	—	196275	196275	196275	196275	196275	196275	196275	196275	196275	—	196275	196275	—	196275	196275	196275
SU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	WG-08003-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000FLC301	16-25278	Fishladder Canyon Alluvial Well #3	UF	10/22/2007	1.6–3.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAWA-08-11601	16-25279	Fishladder Canyon Alluvial Well #2	UF	4/10/2008	2.7–4.3	—	—	08-984	—	08-984, 08-985	—	08-984	—	—	—	—	—	—	—	—	08-984	—	—	—	08-984
CAWA-08-11602	16-25279	Fishladder Canyon Alluvial Well #2	F	4/10/2008	2.7–4.3	—	08-984	—	—	—	—	08-984	—	—	—	—	—	—	08-984	—	—	—	—	—	—
EF071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	F	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22653	—	—	—
EU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19507	—	—	—
EU071000FLC202	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	WG-08042-EE	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	F	10/24/2007	2.7–4.3	196433	196433	—	—	—	196433	196433	196433	196433	—	196433	196433	—	196433	—	—	—	196433	—	—

Table H-1.5-1 (continued)

Sample ID	Location ID	Location Name	Field Prep	Date Collected	Depth (ft)	Americium-241	Anions	Cyanide	Dioxin/Furan	Explosive Compounds	Gamma Spec	General Inorganics	Gross Alpha	Gross Beta	Herbicides	Isotopic Plutonium	Isotopic Uranium	PCBs	Perchlorate	Pesticides	Radium-226, 228	Stable Isotopes	Strontium-90	SVOC	VOC
GU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	196433	—	196433	—	196433	196433	196433	196433	196433	196433	196433	196433	196433	—	196433	196433	—	196433	196433	196433
SU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	WG-08004-ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
UU071000FLC201	16-25279	Fishladder Canyon Alluvial Well #2	UF	10/24/2007	2.7–4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CAWA-08-11604	16-25280	Fishladder Canyon Alluvial Well #1	F	4/3/2008	2.6–4.2	08-930	08-930	—	—	—	08-930	08-930	—	—	—	08-930	08-930	—	08-930	—	—	—	08-930	—	—
CAWA-08-11605	16-25280	Fishladder Canyon Alluvial Well #1	UF	4/3/2008	2.6–4.2	08-930	—	08-930	—	08-930, 08-931	08-930	08-930	—	—	08-930	08-930	08-930	08-930	—	08-930	08-930	—	08-930	08-930	08-930
GU06020FLC101	16-25280	Fishladder Canyon Alluvial Well #1	UF	2/16/2006	2.6–4.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	156396

Note: Numbers in analyte columns are request numbers.

[a] F = Filtered

[b] — = Not requested.

[c] UF = Unfiltered

[d] UNK = Unknown

[e] n/a = Not applicable.

Table H-2.0-1
COPCs in Fill, Pore Gas, Sediment, Soil, and Tuff at the TA-16-340 Complex

COPC	Media	Reason Retained
Consolidated Unit 13-003(a)-99		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Soil, Tuff	Detection limit exceeds background.
Arsenic	Tuff	Detected and exceeds background.
Barium	Tuff	Detected and exceeds background.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Tuff	Detected and exceeds background.
Cyanide (Total)	Soil, Tuff	Detection limit exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Manganese	Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Selenium	Soil	Detection limit exceeds background.
Selenium	Tuff	Detected and exceeds background.
Silver	Tuff	Detected and exceeds background.
Vanadium	Tuff	Detected and exceeds background.
Organic Chemicals		
Semivolatile Organic Compounds		
Acenaphthene	Soil	Chemical detected.
Anthracene	Soil	Chemical detected.
Benzo(a)anthracene	Soil	Chemical detected.
Benzo(a)pyrene	Soil	Chemical detected.
Benzo(b)fluoranthene	Soil	Chemical detected.
Benzo(g,h,i)perylene	Soil	Chemical detected.
Benzo(k)fluoranthene	Soil	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil	Chemical detected.
Chrysene	Soil, Tuff	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-octylphthalate	Tuff	Chemical detected.
Fluoranthene	Soil, Tuff	Chemical detected.
Fluorene	Soil	Chemical detected.
Indeno(1,2,3-cd)pyrene	Soil	Chemical detected.
Phenanthrene	Soil	Chemical detected.
Pyrene	Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Butylbenzene[n-]	Soil	Chemical detected.
Dichlorobenzene[1,2-]	Tuff	Chemical detected.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
Dichlorobenzene[1,3-]	Tuff	Chemical detected.
Dichlorobenzene[1,4-]	Tuff	Chemical detected.
Styrene	Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Soil, Tuff	Chemical detected.
Consolidated Unit 16-003(n)-99		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Sediment, Soil, Tuff	Detection limit exceeds background.
Arsenic	Tuff	Detected and exceeds background.
Barium	Sediment, Soil, Tuff	Detected and exceeds background.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Sediment, Soil, Tuff	Detected and exceeds background.
Cyanide (Total)	Sediment, Soil, Tuff	Detection limit exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Iron	Tuff	Detected and exceeds background.
Lead	Sediment, Soil, Tuff	Detected and exceeds background.
Manganese	Soil	Detected and exceeds background.
Mercury	Sediment	Detection limit exceeds background.
Mercury	Soil, Tuff	Detected and exceeds background.
Nickel	Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Perchlorate	Tuff	Detected and no background available.
Selenium	Soil	Detection limit exceeds background.
Selenium	Tuff	Detected and exceeds background.
Uranium	Sediment	Detected and background.
Vanadium	Tuff	Detected and exceeds background.
Zinc	Sediment	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
Amino-2,6-dinitrotoluene[4-]	Sediment	Chemical detected.
Amino-4,6-dinitrotoluene[2-]	Sediment	Chemical detected.
Dinitrobenzene[1,3-]	Tuff	Chemical detected.
Dinitrotoluene[2,4-]	Sediment, Tuff	Chemical detected.
HMX	Sediment, Soil, Tuff	Chemical detected.
Nitrobenzene	Sediment	Chemical detected.
RDX	Sediment	Chemical detected.
TATB	Soil, Tuff	Chemical detected.
Trinitrotoluene[2,4,6-]	Tuff	Chemical detected.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
Semivolatile Organic Compounds		
Acenaphthene	Sediment, Soil	Chemical detected.
Anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Sediment	Chemical detected.
Benzo(a)pyrene	Sediment, Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzo(g,h,i)perylene	Sediment, Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzoic Acid	Sediment, Soil	Chemical detected.
Benzyl Alcohol	Sediment	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil, Tuff	Chemical detected.
Butylbenzylphthalate	Sediment	Chemical detected.
Chrysene	Sediment, Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Sediment	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-butylphthalate	Sediment	Chemical detected.
Dinitrotoluene[2,4-]	Sediment	Chemical detected.
Di-n-octylphthalate	Sediment, Soil, Tuff	Chemical detected.
Fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Fluorene	Sediment, Soil	Chemical detected.
Indeno(1,2,3-cd)pyrene	Sediment, Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Soil	Chemical detected.
Naphthalene	Soil	Chemical detected.
Phenanthrene	Sediment, Soil, Tuff	Chemical detected.
Pyrene	Sediment, Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Soil, Tuff	Chemical detected.
Butanone[2-]	Soil, Tuff	Chemical detected.
Isopropyltoluene[4-]	Tuff	Chemical detected.
Methyl-2-pentanone[4-]	Soil	Chemical detected.
Toluene	Soil	Chemical detected.
SWMU 16-003(o)		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Soil	Detected and exceeds background.
Antimony	Tuff	Detection limit exceeds background.
Arsenic	Soil, Tuff	Detected and exceeds background.
Barium	Soil, Tuff	Detected and exceeds background.
Beryllium	Tuff	Detected and exceeds background.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
Cadmium	Soil	Detected and exceeds background.
Chromium	Soil, Tuff	Detected and exceeds background.
Cobalt	Soil, Tuff	Detected and exceeds background.
Copper	Soil, Tuff	Detected and exceeds background.
Cyanide (Total)	Soil, Tuff	Detected and exceeds background.
Fluoride	Soil, Tuff	Detected and no background available.
Iron	Soil, Tuff	Detected and exceeds background.
Lead	Soil, Tuff	Detected and exceeds background.
Manganese	Tuff	Detected and exceeds background.
Mercury	Soil, Tuff	Detected and exceeds background.
Nickel	Soil, Tuff	Detected and exceeds background.
Nitrate	Soil, Tuff	Detected and no background available.
Perchlorate	Tuff	Detected and no background available.
Selenium	Soil, Tuff	Detected and exceeds background.
Silver	Soil, Tuff	Detected and exceeds background.
Thallium	Soil	Detected and exceeds background.
Uranium	Soil, Tuff	Detected and exceeds background.
Vanadium	Soil, Tuff	Detected and exceeds background.
Zinc	Soil, Tuff	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
Dinitroaniline[3,5-]	Soil	Chemical detected.
Amino-2,6-dinitrotoluene[4-]	Soil, Tuff	Chemical detected.
Amino-4,6-dinitrotoluene[2-]	Soil	Chemical detected.
Dinitrotoluene[2,4-]	Soil, Tuff	Chemical detected.
HMX	Soil, Tuff	Chemical detected.
Nitrobenzene	Soil	Chemical detected.
PETN	Soil, Tuff	Chemical detected.
RDX	Soil, Tuff	Chemical detected.
TATB	Soil, Tuff	Chemical detected.
Tetryl	Soil	Chemical detected.
Trinitrotoluene[2,4,6-]	Soil, Tuff	Chemical detected.
Semivolatile Organic Compounds		
Acenaphthene	Soil, Tuff	Chemical detected.
Acenaphthylene	Soil	Chemical detected.
Anthracene	Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Soil, Tuff	Chemical detected.
Benzo(a)pyrene	Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Soil, Tuff	Chemical detected.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
Benzo(g,h,i)perylene	Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Soil, Tuff	Chemical detected.
Benzoic Acid	Soil	Chemical detected.
Bis(2-ethylhexyl)phthalate	Soil, Tuff	Chemical detected.
Chloronaphthalene[2-]	Soil	Chemical detected.
Chrysene	Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Soil, Tuff	Chemical detected.
Dibenzofuran	Soil, Tuff	Chemical detected.
Diethylphthalate	Tuff	Chemical detected.
Di-n-butylphthalate	Soil, Tuff	Chemical detected.
Di-n-octylphthalate	Tuff	Chemical detected.
Fluoranthene	Soil, Tuff	Chemical detected.
Fluorene	Soil, Tuff	Chemical detected.
Indeno(1,2,3-cd)pyrene	Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Soil, Tuff	Chemical detected.
Methylphenol[4-]	Soil	Chemical detected.
Naphthalene	Soil, Tuff	Chemical detected.
Phenanthrene	Soil, Tuff	Chemical detected.
Pyrene	Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Pore Gas, Soil, Tuff	Chemical detected.
Butanone[2-]	Pore Gas, Soil, Tuff	Chemical detected.
Carbon Disulfide	Gas	Chemical detected.
Carbon Tetrachloride	Gas	Chemical detected.
Chloroform	Pore Gas, Soil	Chemical detected.
Cyclohexane	Gas	Chemical detected.
Dichloroethane[1,2-]	Gas	Chemical detected.
Dichloroethene[1,1-]	Soil, Tuff	Chemical detected.
Dichloroethene[cis-1,2-]	Soil, Tuff	Chemical detected.
Ethylbenzene	Pore Gas, Soil, Tuff	Chemical detected.
Hexane	Gas	Chemical detected.
Isopropylbenzene	Soil	Chemical detected.
Isopropyltoluene[4-]	Soil, Tuff	Chemical detected.
Methyl-2-pentanone[4-]	Pore Gas, Tuff	Chemical detected.
Methylene Chloride	Pore Gas, Soil, Tuff	Chemical detected.
n-Heptane	Gas	Chemical detected.
Propanol[2-]	Gas	Chemical detected.
Propylene	Gas	Chemical detected.
Tetrachloroethene	Pore Gas, Soil, Tuff	Chemical detected.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
Toluene	Pore Gas, Soil, Tuff	Chemical detected.
Trichloroethane[1,1,1-]	Soil, Tuff	Chemical detected.
Trichloroethene	Pore Gas, Soil, Tuff	Chemical detected.
Trichlorofluoromethane	Soil	Chemical detected.
Trimethylbenzene[1,2,4-]	Soil, Tuff	Chemical detected.
Trimethylbenzene[1,3,5-]	Soil, Tuff	Chemical detected.
Xylene[1,2-]	Pore Gas, Soil, Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Pore Gas, Soil, Tuff	Chemical detected.
Radionuclides		
Uranium-234	Soil, Tuff	Detected and exceeds background.
Uranium-235/236	Soil, Tuff	Detected and exceeds background.
Uranium-238	Soil, Tuff	Detected and exceeds background.
SWMUs 16-026(j2) and 16-029(f)		
Inorganic Chemicals		
Aluminum	Tuff	Detected and exceeds background.
Antimony	Sediment, Tuff	Detection limit exceeds background.
Arsenic	Soil, Tuff	Detection limit exceeds background.
Barium	Tuff	Detected and exceeds background.
Bromide	Tuff	Detected and no background available.
Chromium	Tuff	Detected and exceeds background.
Cobalt	Tuff	Detected and exceeds background.
Copper	Tuff	Detected and exceeds background.
Cyanide (Total)	Sediment, Tuff	Detection limit exceeds background.
Fluoride	Sediment, Soil, Tuff	Detected and no background available.
Lead	Sediment, Tuff	Detected and exceeds background.
Mercury	Soil, Tuff	Detection limit exceeds background.
Nickel	Tuff	Detected and exceeds background.
Nitrate	Sediment, Soil, Tuff	Detected and no background available.
Perchlorate	Soil, Tuff	Detected and no background available.
Selenium	Sediment	Detection limit exceeds background.
Selenium	Soil, Tuff	Detected and exceeds background.
Silver	Soil	Detection limit exceeds background.
Silver	Tuff	Detected and exceeds background.
Thallium	Soil, Tuff	Detection limit exceeds background.
Zinc	Sediment, Tuff	Detected and exceeds background.
Organic Chemicals		
Explosive Compounds		
HMX	Tuff	Chemical detected.
RDX	Sediment	Chemical detected.

Table H-2.0-1 (continued)

COPC	Media	Reason Retained
TATB	Soil, Tuff	Chemical detected.
Semivolatile Organic Compounds		
Acenaphthene	Sediment, Soil, Tuff	Chemical detected.
Anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)anthracene	Sediment, Soil, Tuff	Chemical detected.
Benzo(a)pyrene	Sediment, Soil, Tuff	Chemical detected.
Benzo(b)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzo(g,h,i)perylene	Sediment, Soil, Tuff	Chemical detected.
Benzo(k)fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Benzoic Acid	Sediment	Chemical detected.
Chrysene	Sediment, Soil, Tuff	Chemical detected.
Dibenz(a,h)anthracene	Sediment, Tuff	Chemical detected.
Dibenzofuran	Sediment, Soil, Tuff	Chemical detected.
Di-n-butylphthalate	Sediment, Tuff	Chemical detected.
Fluoranthene	Sediment, Soil, Tuff	Chemical detected.
Fluorene	Sediment, Soil, Tuff	Chemical detected.
Indeno(1,2,3-cd)pyrene	Sediment, Soil, Tuff	Chemical detected.
Methylnaphthalene[2-]	Sediment, Soil, Tuff	Chemical detected.
Naphthalene	Sediment, Soil, Tuff	Chemical detected.
Phenanthrene	Sediment, Soil, Tuff	Chemical detected.
Phenol	Tuff	Chemical detected.
Pyrene	Sediment, Soil, Tuff	Chemical detected.
Volatile Organic Compounds		
Acetone	Sediment, Soil, Tuff	Chemical detected.
Butanone[2-]	Sediment	Chemical detected.
Dichloroethene[1,1-]	Soil	Chemical detected.
Ethylbenzene	Soil	Chemical detected.
Isopropylbenzene	Soil	Chemical detected.
Isopropyltoluene[4-]	Sediment, Tuff	Chemical detected.
Propylbenzene[1-]	Soil	Chemical detected.
Toluene	Tuff	Chemical detected.
Trichloroethene	Sediment, Tuff	Chemical detected.
Trimethylbenzene[1,2,4-]	Soil, Tuff	Chemical detected.
Trimethylbenzene[1,3,5-]	Soil, Tuff	Chemical detected.
Xylene[1,3-]+Xylene[1,4-]	Soil	Chemical detected.

Note: For Consolidated Unit 16-003(n)-99 and SWMUs 16-026(j2) and 16-029(f) sediment samples were evaluated against the LANL background range for soil.

Table H-2.0-2
COPCs in Surface and Alluvial Groundwater in Fishladder Canyon

COPC	Media	Reason Retained
Inorganic Chemicals		
Aluminum	Surface Water, Alluvial Groundwater	Chemical Detected.
Ammonia as Nitrogen	Alluvial Groundwater	Chemical Detected.
Antimony	Surface Water, Alluvial Groundwater	Chemical Detected.
Arsenic	Surface Water, Alluvial Groundwater	Chemical Detected.
Barium	Surface Water, Alluvial Groundwater	Chemical Detected.
Beryllium	Surface Water, Alluvial Groundwater	Chemical Detected.
Boron	Surface Water, Alluvial Groundwater	Chemical Detected.
Bromide	Surface Water, Alluvial Groundwater	Chemical Detected.
Cadmium	Surface Water, Alluvial Groundwater	Chemical Detected.
Calcium	Surface Water, Alluvial Groundwater	Chemical Detected.
Cesium	Surface Water	Chemical Detected.
Chloride	Surface Water, Alluvial Groundwater	Chemical Detected.
Chromium	Surface Water, Alluvial Groundwater	Chemical Detected.
Cobalt	Surface Water, Alluvial Groundwater	Chemical Detected.
Copper	Surface Water, Alluvial Groundwater	Chemical Detected.
Cyanide (Total)	Surface Water, Alluvial Groundwater	Chemical Detected.
Fluoride	Surface Water, Alluvial Groundwater	Chemical Detected.
Iodide	Surface Water	Chemical Detected.
Iron	Surface Water, Alluvial Groundwater	Chemical Detected.
Lead	Surface Water, Alluvial Groundwater	Chemical Detected.
Lithium	Surface Water	Chemical Detected.
Magnesium	Surface Water, Alluvial Groundwater	Chemical Detected.
Manganese	Surface Water, Alluvial Groundwater	Chemical Detected.
Mercury	Surface Water, Alluvial Groundwater	Chemical Detected.
Molybdenum	Surface Water, Alluvial Groundwater	Chemical Detected.
Nickel	Surface Water, Alluvial Groundwater	Chemical Detected.
Nitrate-Nitrite as Nitrogen	Surface Water	Chemical Detected.
Perchlorate	Surface Water	Chemical Detected.
Potassium	Surface Water, Alluvial Groundwater	Chemical Detected.
Selenium	Surface Water	Chemical Detected.
Silicon	Surface Water	Chemical Detected.
Silicon Dioxide	Surface Water, Alluvial Groundwater	Chemical Detected.
Silver	Surface Water, Alluvial Groundwater	Chemical Detected.
Sodium	Surface Water, Alluvial Groundwater	Chemical Detected.
Strontium	Surface Water, Alluvial Groundwater	Chemical Detected.
Sulfate	Surface Water, Alluvial Groundwater	Chemical Detected.
Thallium	Surface Water, Alluvial Groundwater	Chemical Detected.

Table H-2.0-2 (continued)

COPC	Media	Reason Retained
Tin	Surface Water	Chemical Detected.
Uranium	Surface Water, Alluvial Groundwater	Chemical Detected.
Vanadium	Surface Water, Alluvial Groundwater	Chemical Detected.
Zinc	Surface Water, Alluvial Groundwater	Chemical Detected.
Organic Chemicals		
Dioxins/Furans		
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	Surface Water	Chemical Detected.
Heptachlorodibenzodioxins (Total)	Surface Water	Chemical Detected.
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	Surface Water	Chemical Detected.
Heptachlorodibenzofurans (Total)	Surface Water	Chemical Detected.
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Surface Water	Chemical Detected.
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	Surface Water	Chemical Detected.
Explosive Compounds		
HMX	Surface Water, Alluvial Groundwater	Chemical Detected.
MNX	Surface Water	Chemical Detected.
RDX	Surface Water, Alluvial Groundwater	Chemical Detected.
Volatile Organic Compounds		
Acetone	Surface Water	Chemical Detected.
Acetonitrile	Surface Water	Chemical Detected.
Dichloroethene[cis-1,2-]	Surface Water, Alluvial Groundwater	Chemical Detected.
Isopropyltoluene[4-]	Alluvial Groundwater	Chemical Detected.
Methylene Chloride	Surface Water	Chemical Detected.
Tetrachloroethene	Surface Water, Alluvial Groundwater	Chemical Detected.
Toluene	Surface Water, Alluvial Groundwater	Chemical Detected.
Trichloroethene	Surface Water, Alluvial Groundwater	Chemical Detected.
Radionuclides		
Gross alpha	Surface Water, Alluvial Groundwater	Chemical Detected.
Gross beta	Surface Water, Alluvial Groundwater	Chemical Detected.
Radium-226	Alluvial Groundwater	Chemical Detected.
Radium-228	Alluvial Groundwater	Chemical Detected.
Strontium-90	Alluvial Groundwater	Chemical Detected.
Tritium	Surface Water, Alluvial Groundwater	Chemical Detected.
Uranium-234	Surface Water, Alluvial Groundwater	Chemical Detected.
Uranium-235/236	Alluvial Groundwater	Chemical Detected.
Uranium-238	Surface Water, Alluvial Groundwater	Chemical Detected.

Table H-3.1-1
Inorganic Chemicals above BVs in Soil and Tuff at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Nitrate	Selenium	Silver	Thallium	Uranium	Vanadium
QBT2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**[b]	**14500**	**11.2**	**1690**	**482**	**na**	**0.3**	**1**	**1.1**	**2.4**	**17**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**na**	**1.52**	**1**	**0.73**	**1.82**	**39.6**
0313-95-0001	13-00001	1.5–2.5	SOIL	—[c]	6.2 (U)	—	—	0.62 (U)	—	—	—	—	1.3 (U)	NA[d]	—	—	—	—	NA	—	—	—	2.57	—
0313-95-0002	13-00001	3.0–4.0	QBT4	10200	6.2 (U)	—	110	—	5350	17.8	—	4.8	1.2 (U)	NA	—	—	—	—	NA	0.31 (UJ)	—	—	2.64	—
RE13-05-61975	13-23550	4.0–4.5	SOIL	—	—	—	—	0.599 (U)	—	—	—	—	—	2.86 (J-)	—	—	—	—	—	1.8 (U)	—	—	—	—
RE13-05-61976	13-23550	6.0–6.5	QBT4	8130	—	—	67.3 (J+)	—	—	—	—	—	—	3.92 (J-)	—	—	—	—	0.537 (J)	1.77 (U)	—	—	—	—
RE13-05-61977	13-23552	3.0–3.5	SOIL	—	—	—	—	0.607 (U)	—	—	—	—	—	6.23 (J-)	—	—	—	—	—	1.82 (U)	—	—	—	—
RE13-05-61978	13-23552	5.0–5.5	QBT4	13700	—	5.61	228 (J+)	—	2800 (J-)	7.59	13.9	5.65	—	3.82 (J-)	15700	—	1770 (J+)	1450 (J+)	—	1.77 (U)	—	—	—	22.2
RE13-05-61981	13-23556	4.5–5.0	SOIL	—	—	—	—	0.588 (U)	—	—	—	—	—	7.12 (J-)	—	—	—	—	1.63	1.77 (U)	—	0.983	—	—
RE13-05-61982	13-23556	6.5–7.0	QBT4	16600	—	7.49	101 (J+)	—	2740 (J-)	9.5	—	5.8	—	5.08 (J-)	15400	12.2	2290 (J+)	—	—	1.75 (U)	—	—	—	21
RE13-05-63822	13-23558	11.5–12.2	QBT4	—	—	—	—	—	—	—	—	6.63	—	0.573 (J)	—	—	—	—	0.653 (J)	1.68 (U)	3.2 (J)	—	—	—
RE16-08-11400	13-23558	18.0–20.0	QBT4	—	0.504 (UJ)	—	—	—	—	—	—	—	NA	1.09 (J)	17000	—	—	—	—	7.81	—	—	—	—
RE13-05-63823	13-23559	11.0–12.0	QBT4	—	—	3.23	—	—	—	—	—	—	—	0.803 (J)	—	—	—	—	—	1.73 (U)	—	—	—	—
RE16-08-11401	16-603358	0.0–0.6	SOIL	—	—	—	—	—	—	—	19.4	—	NA	0.633 (J-)	—	—	—	—	—	—	—	—	—	—
RE16-08-11402	16-603358	8.5–10.0	QBT4	—	—	—	—	—	—	—	—	—	NA	0.451 (J-)	—	—	—	—	0.764 (J)	0.797 (J)	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

Table H-3.2-1
Organic Chemicals Detected in Soil and Tuff at Consolidated Unit 13-003(a)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Chrysene	Di-n-octylphthalate	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]	Dichlorobenzene[1,4-]	Diethylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Styrene	Xylene[1,3-]+Xylene[1,4-]
0313-95-0001	13-00001	1.5–2.5	SOIL	—[a]	—	—	—	—	—	—	0.16(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	NA
0313-95-0002	13-00001	3.0–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	0.13(J)	—	—	—	0.046(J)	—	—	—	—	—	—	NA
RE13-05-61975	13-23550	4.0–4.5	SOIL	0.0334(J)	0.0685	—	—	0.0329(J)	—	—	—	0.00028(J)	0.06	—	—	—	—	—	0.179	—	—	0.116	0.199	—	0.00035(J)
RE13-05-61976	13-23550	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	0.0215(J)	—	0.00025(J)	0.00027(J)	0.00035(J)	—	0.0361(J)	—	—	—	0.0412	0.00027(J)	0.0005(J)
RE13-05-61977	13-23552	3.0–3.5	SOIL	0.032(J)	0.0625	—	0.135	0.134	0.0876	0.093	—	—	0.151	—	—	—	—	—	0.308	0.0349(J)	0.101	0.229	0.323	—	—
RE13-05-61978	13-23552	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0392(J)	—	—	—	0.0412	—	—
RE13-05-61981	13-23556	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.014(J)	—	—
RE13-05-61982	13-23556	6.5–7.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0121(J)	—	—	—	0.014(J)	—	—
RE16-08-11401	16-603358	0.0–0.6	SOIL	—	—	0.0222(J-)	0.0212(J-)	0.0264(J-)	0.017(J-)	—	NA[b]	NA	0.0209(J-)	NA	NA	NA	NA	NA	0.0424(J-)	—	—	0.0359(J-)	0.0345(J-)	NA	NA

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table H-4.1-1
Inorganic Chemicals above BVs in Fill, Sediment, Soil, and Tuff at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.63**	**2200**	**94.6**	**7.14**	**3.14**	**4.66**	**0.5**	**na[b]**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**na**	**0.3**	**2.4**	**17**	**63.5**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**0.4**	**6120**	**231**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1.82**	**39.6**	**48.8**
0316-95-0214	16-01529	0.0–0.5	SED[c]	—[d]	5.87(U)	—	3040	0.587(U)	—	NA[e]	—	—	21	1.19(U)	NA	—	—	—	—	0.11(U)	—	NA	NA	—	1.96	—	101(J-)
0316-95-0215	16-01529	2.0–2.5	SOIL	—	5.37(U)	—	424	0.537(U)	—	NA	—	—	—	1.11(U)	NA	—	—	—	—	—	—	NA	NA	—	2.05	—	—
0316-95-0216	16-01529	4.0–5.0	QBT4	—	5.7(U)	3.7	143	—	—	NA	190	3.5(J)	5.3	1.2(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0220	16-01530	0.0–0.5	SED	—	6.6(U)	—	564	0.66(U)	—	NA	—	—	—	1.3(U)	NA	—	—	—	—	—	—	NA	NA	—	2.58	—	—
RE16-05-55815	16-01530	6.0–7.0	QBT4	12700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.572(U)	—	—	—
0316-95-0221	16-01531	0.0–0.5	SED	—	5.6(U)	—	—	0.56(U)	—	NA	—	—	—	1.1(U)	NA	—	28.7	—	—	—	—	NA	NA	—	—	—	—
0316-95-0222	16-01532	0.0–0.5	SED	—	5.3(U)	—	—	0.53(U)	—	NA	—	—	—	1.1(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0223	16-01533	0.0–0.5	SED	—	6.6(U)	—	—	0.66(U)	—	NA	—	—	—	1.3(U)	NA	—	—	—	—	—	—	NA	NA	—	2.22	—	—
0316-95-0224	16-01534	0.0–0.5	SED	—	5.5(U)	—	—	0.55(U)	—	NA	—	—	—	1.1(U)	NA	—	—	—	—	—	—	NA	NA	—	—	—	—
0316-95-0218	16-01662	0.0–0.16	SED	—	7.7(U)	—	5910	1.1	—	NA	—	—	62.6	1.6(U)	NA	—	46.3	—	—	—	—	NA	NA	—	6.6	—	229
0316-95-0219	16-01662	2.5–3.5	QBT4	9540	5.1(U)	12.8(J-)	884(J-)	—	—	NA	7.7	—	13.7	1.1(U)	NA	—	134	—	—	—	—	NA	NA	—	—	19.4	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	8800	—	—	—	—	—	—	—	83.6	5.82	—	1.29	—	—	—	—	—	—	—	—	0.523(U)	—	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	0.847(J)	—	—	—	—	—	—	1.09(J)	—	—	—	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	—	1.2	NA	NA	NA	NA	NA	NA	—	0.000827(J)	NA	—	NA	NA
RE16-06-66203	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	NA	—	—	—	—	0.108	—	NA	NA	1.61(U)	NA	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	—	1.16(J)	NA	NA	NA	NA	NA	NA	2.23	—	NA	—	NA	NA
RE16-06-66204	16-23570	0.0–0.5	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	NA	—	—	—	—	0.262	—	NA	NA	1.73(U)	NA	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	—	—	—	—	—	—	—	—	—	—	1.53	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	—	—	—	0.558(U)	—	—	—	—	—	—	1.1(J-)	—	—	—	—	—	—	NA	—	1.67(U)	—	—	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	27600(J+)	—	4.24	268(J+)	—	3200	228	15.3	5.65	9.93	—	6.61(J-)	19900(J+)	15.1	3160(J+)	—	—	8.11	NA	—	1.83(U)	—	32.5	—
RE16-05-55829	16-23574	3.5–4.0	FILL	—	—	—	308(J+)	0.578(U)	—	—	—	25.5	—	—	5.02(J-)	22800(J+)	29.4	—	2260	—	—	—	—	8.67(U)	—	47.5	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	11600(J+)	—	8.57	86.8	—	—	—	—	—	5.51	—	6.09(J-)	—	—	—	—	—	—	—	—	1.77(U)	—	18.2	—
RE16-08-12211	16-23574	12.5–13.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.58	—	—	—	—	—	—	1.04(J)	NA	2.08	—	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	—	—	—	—	0.563(U)	—	—	—	—	—	—	7.08(J-)	—	—	—	—	—	—	1.7	—	1.69(U)	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	—	3.21	49.1	—	—	—	—	—	—	—	2.4(J-)	—	—	—	—	—	—	—	—	8.38(U)	—	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	—	—	—	—	0.565(U)	—	—	—	—	—	—	2.21(J-)	—	—	—	—	—	—	—	—	1.7(U)	—	—	—
RE16-05-55837	16-23576	6.0–6.5	QBT4	—	—	4.92	57.3	—	—	—	—	—	—	—	4.27(J-)	—	—	—	—	—	—	—	—	1.65(U)	—	—	—
RE16-05-55832	16-23577	4.5–5.0	FILL	—	—	—	—	—	—	—	—	—	—	—	5.42(J-)	—	—	—	—	—	—	0.276(J)	—	8.71(U)	—	—	—
RE16-05-55838	16-23577	6.0–6.5	QBT4	—	—	3.46	—	—	—	—	—	—	—	—	0.748(J-)	—	—	—	—	—	—	—	—	1.64(U)	—	—	—
RE16-05-55833	16-23578	4.5–5.0	FILL	—	—	—	—	—	—	—	—	—	—	—	4.97(J-)	—	—	—	—	—	—	0.236(J)	—	8.5(U)	—	—	—
RE16-05-55839	16-23578	6.0–6.5	QBT4	—	—	3.32	—	—	—	—	—	—	—	—	2.12(J-)	—	—	—	—	—	—	—	—	1.66(U)	—	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	—	—	399	—	—	—	—	—	20.1	—	—	—	25.6	—	—	—	—	—	—	—	—	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	14100(J+)	—	3.67	383	—	—	—	8.27	—	5.12	—	3.31(J-)	—	—	—	—	—	—	—	—	1.04(J)	—	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.22(J-)	—	—	—	—	—	—	1.8(J-)	NA	3.14	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] Sediment sample results are compared to the appropriate Soil BV. For further explanation, see Appendix H, Section 2.0.

[d] — = Not detected or not detected above BV.

[e] NA = Not analyzed.

Table H-4.2-1
Organic Chemicals Detected in Fill, Sediment, Soil, and Tuff at Consolidated Unit 16-003(n)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzylphthalate	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Diethylphthalate	Dinitrobenzene[1,3-]
0316-95-0214	16-01529	0.0–0.5	SED	—[a]	NA[b]	—	—	0.05(J)	0.14(J)	0.18(J)	0.27(J)	0.081(J)	0.11(J)	1(J)	—	—	NA	—	0.22(J)	—	—	—	—	—
0316-95-0216	16-01529	4.0–5.0	QBT4	—	0.015(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.077
0316-95-0220	16-01530	0.0–0.5	SED	NA	NA	0.446	0.714	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—
0316-95-0224	16-01534	0.0–0.5	SED	NA	NA	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—
0316-95-0218	16-01662	0.0–0.16	SED	0.083(J)	—	—	—	0.11(J)	0.33	0.43	0.61	0.19(J)	0.31(J)	1.2(J)	0.25(J)	—	—	13	0.5	0.18(J)	4.5	0.062(J)	—	—
0316-95-0219	16-01662	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.003(J)	—	—	—	—	—	0.26(J)	—
RE16-05-55816	16-23561	0.0–0.5	FILL	—	—	—	—	—	—	0.0226(J)	0.0303(J)	—	—	—	—	—	—	—	0.029(J)	—	—	—	—	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	—	0.0082	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	—	—	—	—	—	0.0438	0.0461	—	0.0253(J)	—	—	0.0413(J)	—	—	—	—	—	—	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.0366(J)	—	—	—	—	—	—	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	—	0.0487	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	NA	—	—	—	—	—	—	—	—	—	—	0.0656(J)	NA	—	—	—	—	—	—	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	0.227	—	—	—	—	—	—	—	—	—	—	—	0.0017(J)	—	—	—	—	—	—	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	—	0.0182	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	—	—	—	—	0.0088(J)	—	0.129	0.132(J)	0.137(J)	0.0136(J)	—	—	—	—	—	0.0255(J)	—	0.325(J)	—	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	0.0227(J)	—	—	—	0.0445	—	0.165	0.203(J)	0.164(J)	—	—	—	—	—	—	0.0852	—	—	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	—	—	—	—	—	0.117	0.13(J)	—	—	—	—	—	—	—	0.019(J)	—	—	—	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	0.0342(J)	—	—	—	0.058	—	0.192	0.249(J)	0.186(J)	—	—	—	—	—	—	0.105	—	0.326(J)	—	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	—	—	—	0.0206(J)	—	0.158(J)	0.218(J)	—	—	0.76	—	0.198(J)	—	—	0.123	—	—	—	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.1(J)	—	—	—	—	—	—	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-4.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dinitrotoluene[2,4-]	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Methylnaphthalene[2-]	Naphthalene	Nitrobenzene	Phenanthrene	Pyrene	RDX	TATB	Toluene	Trinitrotoluene[2,4,6-]
0316-95-0214	16-01529	0.0–0.5	SED	—	0.33(J)	—	3.35	0.086(J)	NA	NA	—	—	—	0.22(J)	0.35(J)	—	NA	NA	—
0316-95-0216	16-01529	4.0–5.0	QBT4	0.073	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	0.242
0316-95-0220	16-01530	0.0–0.5	SED	0.612	NA	NA	0.35	NA	NA	NA	NA	NA	—	NA	NA	—	—	NA	—
0316-95-0224	16-01534	0.0–0.5	SED	—	NA	NA	—	NA	NA	NA	NA	NA	0.101	NA	NA	—	—	NA	—
0316-95-0218	16-01662	0.0–0.16	SED	0.21(J)	0.63	0.069(J)	624	0.22(J)	—	—	—	—	—	0.59	1.4	4.44	NA	—	—
0316-95-0219	16-01662	2.5–3.5	QBT4	—	—	—	0.931	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55816	16-23561	0.0–0.5	FILL	—	0.0482	—	—	—	—	—	—	—	—	0.0273(J)	0.0377	—	NA	—	—
RE16-05-55817	16-23561	3.0–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55819	16-23564	0.0–0.5	SOIL	—	0.0607	—	—	0.0225(J)	—	—	—	—	—	0.037(J)	0.0683	—	NA	—	—
RE16-05-55821	16-23564	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—
RE16-05-55825	16-23570	0.0–0.5	SOIL	—	0.0269(J)	—	—	—	—	—	—	—	—	—	0.0355(J)	—	NA	—	—
RE16-05-55822	16-23570	5.0–5.4	SOIL	—	—	—	—	—	NA	NA	—	—	—	—	—	—	NA	NA	—
RE16-05-55827	16-23572	4.0–4.5	FILL	—	—	—	0.169(J)	—	—	0.0011(J)	—	—	—	—	—	—	0.659(J+)	0.00039(J)	—
RE16-05-55828	16-23572	6.0–6.5	QBT4	—	—	—	—	—	0.00034(J)	—	—	—	—	—	—	—	—	—	—
RE16-05-55835	16-23574	6.0–6.5	QBT4	—	0.0413	—	0.118(J-)	0.171(J)	—	—	—	—	—	0.035(J)	0.0396	—	0.252(J+)	—	—
RE16-05-55830	16-23575	3.5–4.0	FILL	—	0.168	0.0203(J)	0.199(J-)	0.192(J)	—	—	0.0079(J)	0.0209(J)	—	0.165	0.144	—	—	—	—
RE16-05-55836	16-23575	6.0–6.5	QBT4	—	0.0308(J)	—	—	0.162(J)	—	—	—	—	—	0.0236(J)	0.0264(J)	—	0.64(J+)	—	—
RE16-05-55831	16-23576	3.5–4.0	FILL	—	0.243	0.0275(J)	—	0.203(J)	—	—	0.0115(J)	—	—	0.227	0.214	—	2.3(J+)	—	—
RE16-05-55834	16-23579	2.5–3.0	FILL	—	0.192	0.0128(J)	0.512	0.124(J)	—	—	—	—	—	0.145	0.252	—	14.3	—	—
RE16-05-55840	16-23579	8.0–8.5	QBT4	—	—	—	21.4	—	—	—	—	—	—	—	—	—	8.95	—	—
RE16-08-12210	16-23579	13.5–15.0	QBT4	—	0.0161(J)	—	—	—	—	—	—	—	—	0.0119(J)	—	—	—	—	—

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table H-5.1-1
Inorganic Chemicals above BVs in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	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**	**na**[b]	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
0316-95-0226	16-01536	0.0–0.33	SOIL	—[c]	7.8(U)	9.3	—	2.2	3.7	9170	192	—	1420	1.6(U)	NA[d]	44400(J)	190	—	—	1.21
0316-95-0227	16-01536	3.0–3.5	QBT4	8840	5.7(U)	3.3	52.3	—	—	2360	17.6	—	14.8	1.2(U)	NA	—	11.4	—	—	NA
0316-95-0236	16-01537	2.5–3.5	QBT4	8960(J)	5.76(U)	—	174(J)	—	—	—	7.9(J)	8.53(J)	91.9(J)	1.18(U)	NA	17500	—	—	1080(J)	—
0316-95-0240	16-01538	0.0–0.5	SOIL	—	6.42(U)	—	—	—	0.64(U)	—	—	—	19.1	1.3(U)	NA	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	6.7(U)	—	—	—	0.67(U)	—	—	—	—	1.4(U)	NA	—	—	—	—	—
0316-95-0242	16-01540	0.0–0.5	SOIL	—	12.8(U)	—	—	—	1.3(U)	—	—	—	32.6	2.6(U)	NA	—	—	—	—	0.11(J)
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.968(J)	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	—	10.2(U)	9.2	—	—	1(U)	—	53.1	—	125	2.1(U)	NA	—	29	—	—	0.14(J)
0316-95-0238	16-01664	0.0–0.33	SOIL	—	20.7(U)	—	—	2.1(U)	2.07(U)	—	31	—	102	4.17(U)	NA	—	31.4	—	—	0.38(J)
0316-95-0239	16-01664	2.0–3.5	QBT4	—	5.96(U)	—	—	—	—	—	—	—	13(J)	1.2(U)	NA	—	14.9	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	—	7.8(U)	27.5	—	—	1.8	—	190	—	805	1.6(U)	NA	—	111	—	—	1(J)
0316-95-0232	16-01670	0.0–0.5	SOIL	—	8.3(U)	39.5	314	—	2.7	—	137	—	736	1.7(U)	NA	—	78.9	—	—	0.43(J)
0316-95-0233	16-01671	0.0–0.5	SOIL	—	7.5(U)	68.3	358	—	1.2	—	40.1	12.5	175	1.5(U)	NA	—	50.5	—	—	0.26(J)
0316-95-0498	16-02023	0.0–0.5	SOIL	—	5.1(U)	—	—	—	0.51(U)	—	—	—	—	1(U)	NA	—	—	—	—	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	—	2.34	NA	NA	NA	NA	NA
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	3.42	—	—	—	—	—	94.2	—	NA	1.63	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.38	2.45	NA	NA	NA	NA	NA
RE16-05-56151	16-23569	1.7–3.7	QBT4	10200	—	3.34	106	1.27	—	—	7.44	275	8.25	—	1.16	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	0.6(U)	—	—	—	—	—	1.67	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	1.21	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	—	—	—	0.607(U)	—	—	—	—	—	7.32(J-)	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	15700	—	3.96	83.2(J+)	—	—	2800	8.07	—	6.12	—	5.29(J-)	—	—	1920(J+)	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	—	—	—	0.584(U)	8270	—	—	—	—	1(J-)	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	11500	—	4.13	98.1(J+)	—	—	5630	—	5.06	7.59	13.8(UJ)	1.97(J-)	—	12.3	—	—	—
RE16-08-12259	16-23591	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	1.64	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	—	—	—	0.576(U)	18000	—	—	—	—	—	—	—	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	2.97	93.3(J+)	—	—	4850	—	—	5.8	—	0.757(J-)	—	—	—	—	—
RE16-08-12260	16-23597	12.5–14.2	QBT4	—	—	—	—	—	—	—	—	—	—	NA	0.986	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	—	0.591(U)	10300	—	—	—	—	4.77(J-)	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	20700	—	5.78	433(J+)	—	—	6860	10.1	3.17	8.83	—	9.39(J-)	14700	14.5	2100(J+)	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-55871	16-23607	4.0–4.5	FILL	35800	—	8.73	—	—	0.634(U)	27500	—	—	15.4	—	15.8(J-)	22600	25.6	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	18200	—	6.72	158(J+)	—	—	4250	16	—	6.67	—	34.4(J-)	—	—	1860(J+)	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	—	—	—	0.602(U)	14400	—	—	—	—	2.91(J-)	—	23.4	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	11300	—	5.23	91.6(J+)	—	—	8990	7.78	3.34	9.37	—	4.73(J-)	—	14.7	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	9.61	—	—	—	7100	—	—	23	—	1.9(J-)	—	43.9	—	—	—
RE16-05-55876	16-23611	6.0–6.5	QBT4	17900	—	4.8	99.8(J+)	—	—	12100	12.1	3.18	15.9	—	1.8(J-)	20000	25.4	2110(J+)	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	0.605(U)	6410	—	—	—	—	3.49(J-)	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	27100	0.52(UJ)	5.73	183(J+)	1.4	—	8960	13.9	3.4	10.3	—	9.95(J-)	19600	13.4	3420(J+)	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	0.554(U)	6540	—	—	—	—	1.77(J-)	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	7840	—	—	57.8(J+)	—	—	3270	—	—	—	—	2.05(J-)	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	—	0.634(U)	10200	—	—	—	—	3.94(J-)	—	27.1	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	9780	—	—	110(J+)	—	—	3730	—	—	5.08	—	5.11(J-)	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	NA	—	—	—	0.637(U)	—	—	—	19.1(J+)	—	8.49(J-)	25400	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	34000	NA	—	307(J+)	1.4	—	8690	15.2	—	11.2(J+)	—	17.1(J-)	20700	15.4	3520	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	4.91	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	NA	—	—	—	0.6(U)	14800	—	—	—	—	11.9(J-)	22000	38.1	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	34700	NA	2.93	291(J+)	1.23	—	21700	15.4	—	10.6(J+)	—	8.61(J-)	22300	16.6	3470	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	NA	—	—	—	0.618(U)	—	—	10.4(J)	—	—	5.64(J-)	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	11700	NA	3.63	91.3	—	—	2270	7.29	—	4.86	—	4.78(J-)	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	NA	—	—	—	0.593(U)	—	—	—	—	—	4.84(J-)	—	—	—	—	0.102
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	NA	—	49.4	—	—	—	—	—	—	—	2.57(J-)	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	NA	—	—	—	0.619(U)	—	—	—	—	—	6.89(J-)	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	12600	NA	—	88.3	—	—	2680	—	—	—	—	7.14(J-)	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	NA	—	—	—	0.629(U)	—	—	—	—	—	5.95(J-)	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	NA	—	59.4	—	—	—	—	—	—	—	1.83(J-)	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	50.1(J+)	—	—	—	—	—	—	—	3.72	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	8430	—	5.06	104(J+)	—	—	2330(J+)	—	—	—	—	8.2	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	54.3(J+)	—	—	—	—	—	—	0.848	4.55	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	4.79	90(J+)	—	—	2430(J+)	—	—	—	—	9.41	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	7.64	200	—	—	—	11.7	—	76.8(J-)	—	—	—	14(J)	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	4.3	50.9	—	—	—	—	—	12.1(J-)	—	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	3.58	87.3	—	—	—	—	—	11.2(J-)	—	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	5.15	118	—	—	—	—	—	14.3(J-)	—	—	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-55927	16-23655	3.0–3.5	QBT4	9210	—	4.18	149	—	—	—	—	—	11.9(J-)	—	1.11(J-)	—	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.643(J-)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55930	16-23657	5.5–6.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—	—	—	48(J-)	—	1.47(J-)	—	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	0.53(J)	—	—	9.53	—	—	2.47(J-)	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	0.564(J)	—	—	—	22(J-)	—	2.51(J-)	—	—	—	—	—
RE16-05-55937	16-23665	4.0–4.5	SOIL	—	—	—	—	—	0.526(J)	—	—	—	—	—	4.48(J-)	—	—	—	—	—
RE16-05-55939	16-23665	9.0–9.5	SOIL	—	—	—	—	—	0.683	—	—	—	—	—	1.86(J-)	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	—	—	—	25.9(J+)	—	116(J+)	—	—	—	25.7	—	—	0.143(J+)
RE16-05-62036	16-23669	3.0–3.5	QBT4	9980	—	4.07	202	—	—	—	12.3(J+)	—	28.6(J+)	—	—	—	13.1	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	23400	—	8.47(U)	157	—	—	3020	9.82	—	13.1	NA	NA	19200	—	2990(J+)	—	—
RE16-08-12365	16-23671	3.5–4.0	QBT4	—	—	7.88(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	7350	—	8.22	127(J-)	—	—	—	NA	—	224(J)	NA	4.42(J-)	17300	62.3(J-)	—	—	0.696
RE16-08-12362	16-23672	3.5–3.8	QBT4	27800	—	8.18(U)	70.9	—	—	3080	12.5(J-)	—	8.7	NA	NA	19400	12.2(J)	3440(J-)	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	5.22	173(J-)	—	—	—	NA	—	80.2(J)	NA	2.88(J-)	—	24.2(J-)	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	3.64	93.9(J-)	—	—	—	NA	—	46.9(J)	NA	3.02(J-)	—	13.1(J-)	—	—	—
RE16-08-12366	16-23676	0.0–0.5	QBT4	—	—	—	175	—	—	—	—	—	12.6	NA	NA	—	—	—	—	—
RE16-08-12367	16-23676	3.5–4.0	QBT4	30700	—	9.17(U)	184	2.53	—	3690	15.4	3.3	15.7	NA	NA	20500	—	4540(J+)	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	—	—	—	134(J+)	—	—	—	57.1	—	235	NA	NA	—	28.8	—	—	—
RE16-08-12369	16-23677	3.2–3.7	QBT4	—	—	3.25	74.2(J+)	—	—	—	14.4	—	6.84	NA	NA	—	—	—	—	—
RE16-08-12370	16-23678	2.0–2.5	QBT4	—	—	—	104	—	—	—	10.7	—	—	NA	NA	—	—	—	—	—
RE16-08-12371	16-23678	3.2–3.8	QBT4	—	—	—	75.6(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	—	—	—	—	—	NA	—	176(J)	NA	5.52(J-)	—	32.8(J-)	—	—	0.121
RE16-05-62046	16-23679	3.0–3.5	QBT4	8760	—	3.47	77.4(J-)	—	—	—	NA	—	22.8(J)	NA	4.98(J-)	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	—	—	91.1(J+)	—	—	—	—	—	6.11	NA	NA	—	—	—	—	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	—	39.5	724(J-)	—	2.94(J)	6450(J)	NA	—	1210(J)	NA	5.92(J-)	—	171(J-)	—	—	0.705
RE16-08-12373	16-23681	3.5–4.0	QBT4	11000	—	—	56.8	—	—	—	—	—	5.16	NA	NA	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	—	—	78.6(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	6.77	182(J-)	—	—	—	NA	—	36.7(J)	NA	5.48(J-)	—	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	ALLH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—	—	—	4.85	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	28900	—	8.77	1280	1.67	—	25600(J-)	22.7	9.85	16.3	—	—	23700	13.8	9480	—	—
RE16-05-55905	16-23691	120.0–122.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	19.6	—	34.9	—	—	—	23.2	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	656	—	—	—	—	—	—	—	1.15(J)	—	—	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	8.12(U)	318(J)	—	—	—	12.5	—	—	NA	2.16(J-)	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	7420	0.536(UJ)	—	259	—	—	—	9.67	84.6	—	—	2.2	—	—	—	564	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	675	—	—	—	—	—	—	—	2.9	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	68.2	—	—	—	—	89.9	—	NA	0.558(J)	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—	—
RE16-05-56153	16-23751	1.4–2.5	QBT4	—	—	—	—	—	—	—	—	68.5	—	—	1.08	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	NA	—	—	—	0.573(U)	—	—	—	—	—	2.11(J-)	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	23000	—	3.22	169	—	—	3940	12.9	4.48	7.46	—	2.16	16700	14.3	3020	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	NA	—	—	—	—	—	21.3	—	182	—	2.35(J-)	—	48.3	—	—	0.144(J)
RE16-05-61927	16-24894	10.0–10.5	QBT4	14700	—	7.76	105	—	—	3560	8.53	6.78	5.93	—	1.05(J)	15500	20.1	1820	515(J+)	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	0.612(J)	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	NA	—	—	—	0.572(U)	—	—	—	—	—	2.25(J-)	—	29.3	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	13700	—	—	104	—	—	2350	8.53	3.89	5.92	—	3.81	—	—	1890	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	NA	—	—	—	0.531(U)	—	—	—	—	—	1.76(J-)	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	14500	—	—	110	—	—	2210	10	5.98	6.12	—	3.65	—	12	2030	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	NA	—	—	—	0.602(U)	—	—	—	—	—	11	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	NA	5.06	—	—	—	—	—	—	—	—	6.86	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12384	16-24906	2.0–2.35	QBT4	9240	—	7.99(U)	115(J)	—	—	2340(J-)	8.92	4.94(J)	8.77	NA	NA	—	13.8	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	0.607(U)	—	—	—	—	—	3.21(J-)	—	—	—	—	—
RE16-08-12385	16-24906	2.3500–2.75	QBT4	9530	—	—	62.7(J)	—	—	—	8.21	3.83(J)	8.93	NA	NA	14700	12.9	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	11500	—	—	152(J+)	—	—	—	13.4	7.62	29.6	NA	NA	—	15.3(J)	1930(J+)	—	—
RE16-08-12377	16-24907	4.0–4.5	QBT4	11000	—	—	94(J+)	—	—	—	—	6.58	7.97	NA	NA	16000	14.4(J)	1810(J+)	507	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	12800	—	2.85	235(J+)	—	—	2220(J+)	20.1	5.21	41.6	NA	NA	14800	20(J)	2010(J+)	—	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	11000(J+)	—	4.38	218	—	—	—	—	3.95	8.05	—	4.33(J-)	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	14100	—	—	166	—	—	—	12.6	13.4	17.7	NA	NA	17900	24.3(J)	2280	894	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	15100	—	—	164(J+)	—	—	2860(J+)	13.4	11.2	14.9	NA	NA	—	13(J)	2210(J+)	—	—
RE16-08-12381	16-24910	4.0–4.5	QBT4	10100	—	8.69(U)	71.3	—	—	—	—	3.98	5.86	NA	NA	—	—	—	610	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	15.6(J+)	548	—	0.626	—	52.1(J+)	—	197(J+)	—	6.24(J-)	—	36.1	—	—	0.106
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	—	12.3(J+)	—	—	—	—	26.8(J+)	—	75.1(J+)	—	2.96(J-)	—	—	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	12.8	—	—	0.517(J)	—	38.7	—	88.7	0.501	4.22(J-)	—	22.9	—	—	NA
RE16-05-61941	16-24915	2.0–2.5	QBT4	16900	—	4.49	75	—	—	—	13.6	48.3	11	—	3.35(J-)	—	—	2290	—	NA
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	8.26	—	—	0.415(J)	—	29.3	—	77.6	0.682	6.23	—	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	13000	—	4.28	286	—	—	2330	17.9	11.9	35.1	NA	NA	17900	29.1(J)	1710	—	—
RE16-08-12383	16-24923	3.5–4.0	QBT4	—	—	—	53.4(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-05-61950	16-24927	0.0–0.5	SOIL	—	—	—	424	—	0.569(U)	—	—	—	—	—	3.13(J)	—	—	—	—	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	2	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	2.24	—	—	—	—	—
RE16-08-12264	16-603398	4.0–4.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12265	16-603398	6.0–6.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12266	16-603399	4.0–4.5	SOIL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.948(J-)	NA	NA	NA	NA	NA
RE16-08-12267	16-603399	6.0–6.5	QBT4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.89(J-)	NA	NA	NA	NA	NA
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—	—	—	33	—	1.16(J-)	—	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	3.47(U)	62.3	—	—	—	—	—	—	—	1.13(J-)	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	1.08(J-)	—	—	—	—	—
RE16-08-12273	16-603401	3.0–4.0	QBT4	—	—	4.11	90.3	—	—	—	—	—	—	—	2.08(J-)	—	—	—	—	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	8.34(U)	—	—	—	—	—	—	—	—	8.76(J-)	—	—	—	—	—
RE16-08-12275	16-603402	1.5–2.0	SOIL	—	—	8.79(U)	—	—	—	—	—	—	—	—	3.93(J-)	25100	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	14.7(U)	—	—	—	—	—	—	—	—	0.887(J-)	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	15.5(U)	—	—	—	—	—	—	—	—	2.24(J-)	—	—	—	—	—
RE16-08-12312	16-603406	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12313	16-603406	2.5–3.0	QBT4	8610	—	7.88(U)	211(J)	—	—	—	—	5.51(J)	5.85	NA	NA	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12315	16-603407	2.0–2.5	QBT4	15600	—	8.5(U)	122(J)	1.25	—	2270(J-)	12.9	3.15(J)	14.1	NA	NA	23200	—	4280(J-)	—	—
RE16-08-12316	16-603408	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	—	7.84(U)	79.2(J)	—	—	—	—	4.47(J)	4.71	NA	NA	—	—	—	—	—
RE16-08-12318	16-603409	0.0–0.5	SOIL	—	—	18.1	—	—	—	—	—	—	19	NA	NA	—	—	—	—	—
RE16-08-12320	16-603410	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	35.8	NA	NA	—	—	—	—	—
RE16-08-12321	16-603410	2.0–2.5	SOIL	—	—	—	377	—	0.404(J)	—	—	13.1	34.3(J+)	NA	NA	—	25.7	—	774(J+)	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	—	—	—	—	—	0.471(J)	—	45.5	—	108	NA	NA	—	24.1(J)	—	—	—
RE16-08-12323	16-603411	2.0–2.5	QBT4	—	—	7.89(U)	58.5	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	—	—	—	1790	—	—	9910	—	—	—	NA	NA	—	—	—	814	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	9540	—	—	262	—	—	—	7.39	4.38	9.31	NA	NA	—	11.3(J)	—	—	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	28.4	NA	NA	—	—	—	—	—
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	—	8.69(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	—	—	15.6(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	11100	—	16.1(U)	89.2	—	—	—	8.59(J-)	—	19.2	NA	NA	—	12.9(J)	—	—	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	—	—	15.4(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12331	16-603415	2.2–2.7	SOIL	—	—	15.8(U)	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	—	—	—	—	—	0.547	—	26.1(J-)	—	103	NA	NA	—	28.3	—	—	0.119
RE16-08-12333	16-603416	2.0–2.4	QBT4	8960	—	16(U)	89.2	—	—	—	8.2(J-)	—	15.2	NA	NA	—	—	—	—	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	—	—	—	—	—	1.16	—	129(J-)	—	408	NA	NA	—	77.4	—	—	0.606
RE16-08-12335	16-603417	3.0–3.4	QBT4	11500	—	7.79(U)	—	—	—	—	—	—	5.54	NA	NA	16500	—	—	—	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	—	—	—	—	—	0.862	—	37.4	—	174	NA	NA	—	89.6	—	—	0.168
RE16-08-12337	16-603418	1.5–2.0	QBT4	—	—	7.9(U)	890	—	—	—	13.7	—	26.3	NA	NA	—	12.7	—	—	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	—	2.22(J-)	—	867	—	0.855	29100	45.7	—	66.9	NA	NA	—	42.2	—	—	—
RE16-08-12339	16-603419	2.0–3.0	QBT4	—	—	7.84(U)	421	—	—	—	7.42	—	6.28	NA	NA	—	—	—	—	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	—	—	—	408	—	1.24(J)	13700	28.7	—	92.5	NA	NA	54800	29.4	—	—	—
RE16-08-12341	16-603420	1.5–2.0	SOIL	—	—	—	473	—	0.444(J)	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12342	16-603421	0.0–0.5	SOIL	—	—	15.5(U)	—	—	—	—	—	—	19.2	NA	NA	—	—	—	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	—	—	4.49	178	—	—	3060	16.9	—	67	NA	NA	—	13.8	—	—	—
RE16-08-12344	16-603422	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	15	NA	NA	—	—	—	—	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Iron	Lead	Magnesium	Manganese	Mercury
QBT 2,3,4 BV				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**14500**	**11.2**	**1690**	**482**	**0.1**
SOIL BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**21500**	**22.3**	**4610**	**671**	**0.1**
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	—	—	176	—	—	—	—	—	4.99(J+)	NA	NA	—	—	—	—	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	—	—	—	346(J+)	—	0.472(J)	—	35	—	94.1	NA	NA	—	42.7	—	—	0.281
RE16-08-12349	16-603424	1.6–2.0	QBT4	—	—	—	59.7(J+)	—	—	—	8.02	—	—	NA	NA	—	—	—	—	—
RE16-08-12350	16-603425	0.0–0.5	SOIL	—	—	—	—	—	0.655	—	37.5	—	141	NA	NA	—	31.5(J)	—	—	0.103
RE16-08-12351	16-603425	1.7–2.0	QBT4	—	—	—	51.5(J+)	—	—	—	9.11	—	—	NA	NA	—	—	—	—	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	—	—	—	—	—	0.856	—	43	—	130	NA	NA	—	32.7(J)	—	—	0.137
RE16-08-12353	16-603426	2.0–2.5	QBT4	—	—	—	74.6	—	—	—	—	—	8.54	NA	NA	—	—	—	—	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	—	—	—	328(J+)	—	0.518(J)	—	33.7	—	124	NA	NA	—	31.7	—	—	0.106
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	—	—	83	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	54.8	NA	NA	—	—	—	—	0.124
RE16-08-12359	16-603429	2.0–2.5	QBT4	—	—	8.37(U)	84(J+)	—	—	—	—	—	—	NA	NA	—	—	—	—	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	44.3(J+)	NA	NA	—	—	—	—	—
RE16-08-12361	16-603430	2.0–2.5	QBT4	—	—	—	97.8	—	—	—	—	—	8.95	NA	NA	—	—	—	556	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.884(J)	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	1.77	—	34(J)	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	15600(J+)	—	4.67	71.6(J+)	2.3	—	2890(J+)	9.72	—	21.7	—	6.21	16600	12.7(J)	2350(J+)	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	7.71(U)	—	—	—	—	—	—	—	—	0.553(J)	—	18.3	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	7.86(U)	—	—	—	—	—	—	—	—	0.647(J)	—	13.9	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	7.9(U)	—	—	—	—	—	—	—	—	0.635(J-)	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
0316-95-0226	16-01536	0.0–0.33	SOIL	22.3	NA	NA	—	4.6	4.1	—	—	11.4	78.7	967(J)
0316-95-0227	16-01536	3.0–3.5	QBT4	—	NA	NA	—	—	—	—	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	11.4(J-)	NA	NA	—	—	—	—	—	—	26.6(J)	133(J+)
0316-95-0240	16-01538	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.36	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.83	—	—
0316-95-0242	16-01540	0.0–0.5	SOIL	—	NA	NA	—	—	1.3(U)	—	—	5.24	75	104
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	0.000863(J)	—	0.366(J)	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	6.77	106	210
0316-95-0238	16-01664	0.0–0.33	SOIL	—	NA	NA	—	—	2.07(U)	1520(J)	1(U)	3.44	50.8	152(J-)
0316-95-0239	16-01664	2.0–3.5	QBT4	—	NA	NA	—	—	—	—	—	2.46	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	—	NA	NA	—	1.7	1.4(J)	—	—	16.3	134	494
0316-95-0232	16-01670	0.0–0.5	SOIL	—	NA	NA	—	2.7	—	—	—	13.3	170	493
0316-95-0233	16-01671	0.0–0.5	SOIL	—	NA	NA	—	1.7	—	—	—	12.3	193	255
0316-95-0498	16-02023	0.0–0.5	SOIL	—	NA	NA	—	—	—	—	—	2.32	41.5	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	—	—	NA	NA	NA	NA	NA	6.44	NA	NA
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	0.558(U)	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	12.8	—	NA	NA	NA	NA	NA	4.6	NA	NA
RE16-05-56151	16-23569	1.7–3.7	QBT4	8.19	—	—	—	0.564(U)	1.21	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	1.84	—	—	—	—	—	—	—	—	51.3
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	2	—	—	1.01(J)	—	—	—	—	17.2	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	1.46	—	—	—	—	—	—	—	—	55.1
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	0.612(J)	—	—	1.23(J)	—	—	—	—	—	—
RE16-08-12259	16-23591	12.5–14.5	QBT4	—	2.02	NA	—	1.7(U)	—	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	57
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	—	—	0.76(J)	—	—	—	—	—	153
RE16-08-12260	16-23597	12.5–14.2	QBT4	—	0.968	NA	—	1.65(U)	—	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	1.61(J)	—	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	6.64(J-)	—	—	—	1.46(J)	—	—	—	—	19.9	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	0.935(J)	—	4160(J+)	2.03	—	—	1.01	—	—	76.1
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	—	—	0.924(J)	—	—	—	—	17.3	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	76.4

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	—	—	1.33(J)	—	—	—	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	89.9
RE16-05-55876	16-23611	6.0–6.5	QBT4	9.29(J-)	—	—	—	2.21	—	—	—	—	18.5	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	13.9(J-)	—	—	3550(J+)	1.27(J)	—	—	—	—	25.2	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	1.91	—	—	—	—	—	56.3
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	1.82(U)	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	NA	—	—	—	2.17	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	NA	—	—	—	2.13	—	—	—	—	20.5	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	1.02(J)	NA	—	1.66(U)	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	NA	—	—	—	1.82	—	—	—	—	—	52.8
RE16-05-55886	16-23621	6.0–6.5	QBT4	NA	—	—	—	1.45(J)	—	—	—	—	21.8	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	NA	—	—	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	NA	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	NA	—	—	1.78(U)	—	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	NA	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	NA	—	—	1.86(U)	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	NA	—	—	0.763(J)	—	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	NA	—	—	1.89(U)	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	NA	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	1.78(U)	—	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	1.82(U)	—	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	1.6	—	—	1.17(J)	—	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	1.75(U)	—	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	2.24(J+)	—	—	1.6(U)	—	—	—	—	29	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	1.66(J+)	—	—	1.58(U)	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	1.67(J+)	—	—	1.6(U)	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	1.8(J+)	—	—	1.6(U)	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	1.16(J)	—	—	—	—	25.6	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	1.68(U)	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	1.64(U)	—	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55930	16-23657	5.5–6.0	QBT4	—	—	—	—	1.61(U)	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	1.96(U)	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	1.99(U)	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	1.35(J+)	—	—	1.87(U)	—	—	—	2.02	—	51.3
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	2.16(U)	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	1.73(U)	—	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	1.73(U)	—	—	—	—	—	—
RE16-05-55937	16-23665	4.0–4.5	SOIL	—	—	—	—	1.79(U)	—	—	—	—	—	—
RE16-05-55939	16-23665	9.0–9.5	SOIL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	1.56(U)	—	—	—	4.78	57.2	145
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	—	—	0.677(J)	—	—	—	2.78	34.5	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	—	NA	NA	—	6.63	—	—	—	—	26	66.8
RE16-08-12365	16-23671	3.5–4.0	QBT4	—	NA	NA	—	4.1(U)	—	—	—	—	—	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	2.93	—	—	1.13(J)	—	—	—	2.67	51.6	200(J)
RE16-08-12362	16-23672	3.5–3.8	QBT4	—	NA	NA	—	4.78	—	—	—	—	27.1(J+)	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	5.47	—	—	0.791(J)	—	—	—	3.01	25.3	94.1(J)
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	2.56	—	—	1.69(U)	—	—	—	—	—	64(J)
RE16-08-12366	16-23676	0.0–0.5	QBT4	—	NA	NA	—	3.53(U)	—	—	—	—	28	—
RE16-08-12367	16-23676	3.5–4.0	QBT4	16	NA	NA	—	3.66(U)	—	—	—	—	30.1	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	—	NA	NA	—	3.37(J)	—	—	—	2.47	26.2	107
RE16-08-12369	16-23677	3.2–3.7	QBT4	—	NA	NA	—	3.82(J)	—	—	—	—	—	—
RE16-08-12370	16-23678	2.0–2.5	QBT4	—	NA	NA	—	3.22(U)	—	—	—	—	—	—
RE16-08-12371	16-23678	3.2–3.8	QBT4	16.3	NA	NA	—	3.01(J)	—	—	—	—	—	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	6.19	—	—	—	—	—	—	4.91	—	142(J)
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	1.27	—	—	0.698(J)	—	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	NA	NA	—	2.53(J)	—	—	—	—	—	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	6.8	—	—	3.11	1.99	—	—	49.2	168	713(J)
RE16-08-12373	16-23681	3.5–4.0	QBT4	—	NA	NA	—	4.41(U)	—	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	NA	NA	—	2.95(J)	—	—	—	—	—	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	NA	NA	—	1.64(J)	—	—	—	—	—	—
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	1.22	—	—	1.69(U)	—	—	—	—	31	76.7(J)
RE16-05-55978	16-23691	0.0–1.0	ALLH	NA	NA	—	NA	NA	NA	NA	NA	NA	NA	NA
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	0.000679(J)	—	0.529(U)	—	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	0.000785(J)	—	0.552(U)	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	0.515(U)	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	24.4	—	0.000671(J)	5420	0.735(U)	—	—	—	—	41.5	—
RE16-05-55905	16-23691	120.0–122.0	QBT4	—	—	0.0396(J)	—	0.859(U)	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	0.348(U)	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	1.77	—	—	—	2.73	55.3	69.9
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	0.000603(J)	—	0.51(U)	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	0.509(U)	—	—	—	—	—	—
RE16-05-55965	16-23692	44.0–46.0	QBT4	—	—	—	—	0.635	—	—	—	—	—	—
RE16-05-55966	16-23692	78.0–80.0	QBT4	—	—	—	—	0.512(U)	—	—	—	—	—	—
RE16-05-55960	16-23692	159.0–160.0	QBT4	—	NA	—	—	0.507(U)	—	—	—	—	—	—
RE16-05-55961	16-23692	192.0–194.0	QBT4	—	NA	—	—	0.615(U)	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	3.12	—	—	—	—	—	—	—	—	55.9
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	1.74(J-)	NA	—	2.2	—	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	1.23(J)	—	—	0.66(U)	4.39	—	—	—	—	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	1.15	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	0.588(U)	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	0.525(U)	—	—	—	—	—	—
RE16-05-56153	16-23751	1.4–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	1.72(U)	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	7.15	1.57	—	—	1.77(U)	—	—	—	—	28.5	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	—	—	1.83(U)	—	—	0.759	—	—	179
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	2.94	—	—	1.78(U)	—	—	—	—	30.8	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	1.13	NA	—	1.57(U)	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	1.71(U)	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	0.448(J)	—	—	1.71(U)	—	—	—	—	18.4	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	1.59(U)	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	4.92	—	—	1.64(U)	—	—	—	—	24.2	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	1.81(U)	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	0.000927(J)	—	1.77(U)	—	—	—	—	—	—
RE16-08-12384	16-24906	2.0–2.35	QBT4	—	NA	NA	—	3.85	—	—	—	—	23.7	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	NA	—	—	1.82(U)	—	—	—	—	—	—
RE16-08-12385	16-24906	2.3500–2.75	QBT4	8.78(J-)	NA	NA	—	5.8	—	—	—	—	21.7	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12376	16-24907	2.0–2.5	QBT4	7.31	NA	NA	—	2.62(J)	—	—	—	—	34.4	—
RE16-08-12377	16-24907	4.0–4.5	QBT4	7.79	NA	NA	—	3.45(J)	—	—	—	—	26.2	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	6.71	NA	NA	—	1.8(J)	—	—	—	3.01	48.5	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	1.26(J-)	0.000589(J-)	—	1.65(U)	—	—	—	—	21.4(J)	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	NA	NA	—	1.02(U)	—	—	—	—	42	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	7.11	NA	NA	—	2.67(J)	—	—	—	—	36.6	—
RE16-08-12381	16-24910	4.0–4.5	QBT4	8.62	NA	NA	—	2.65(U)	—	—	—	—	—	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	14.5	—	—	—	—	—	—	8.31	65.3	193
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	17.3	—	—	—	—	—	—	9.81	74.9	116
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	11.5	—	—	1.74(U)	—	—	—	8.81	61.1	146
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	1.19	—	—	1.62(U)	—	—	—	—	24.7	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	3.26	—	—	1.79(U)	—	—	—	NA	50.5	187
RE16-08-12382	16-24923	2.0–2.5	QBT4	—	NA	NA	—	8.4(J)	—	—	—	—	47.2	—
RE16-08-12383	16-24923	3.5–4.0	QBT4	—	NA	NA	—	0.863(J)	—	—	—	—	—	—
RE16-05-61950	16-24927	0.0–0.5	SOIL	—	NA	—	—	1.71(U)	—	—	—	—	—	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	1.31	NA	—	1.63(U)	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	0.826(J)	NA	—	1.69(U)	—	—	—	—	—	—
RE16-08-12264	16-603398	4.0–4.5	QBT4	NA	1.91(J-)	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12265	16-603398	6.0–6.5	QBT4	NA	3.04(J-)	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12266	16-603399	4.0–4.5	SOIL	NA	2.43	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12267	16-603399	6.0–6.5	QBT4	NA	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	1.1(J)	NA	—	3.54	—	—	—	2.02	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	1.05(J)	NA	—	1.26(J)	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	0.831(J)	NA	—	—	—	—	—	—	—	—
RE16-08-12273	16-603401	3.0–4.0	QBT4	—	0.775(J)	NA	—	3.07	—	—	—	—	—	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	1.01(J-)	NA	—	5.61	—	—	—	—	—	—
RE16-08-12275	16-603402	1.5–2.0	SOIL	—	1.04(J-)	NA	—	1.86	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	0.958(J-)	NA	—	1.95	—	—	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	NA	—	3.15	—	—	—	—	—	—
RE16-08-12312	16-603406	0.0–0.5	SOIL	—	NA	NA	—	2.89	—	—	—	—	—	—
RE16-08-12313	16-603406	2.5–3.0	QBT4	—	NA	NA	—	5.13	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	—	NA	NA	—	3.52	—	—	—	1.9	—	—
RE16-08-12315	16-603407	2.0–2.5	QBT4	11(J-)	NA	NA	—	4.56	—	—	—	—	20.4	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12316	16-603408	0.0–0.5	SOIL	—	NA	NA	—	3.46	—	—	—	—	—	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	NA	NA	—	4.91	—	—	—	—	—	—
RE16-08-12318	16-603409	0.0–0.5	SOIL	—	NA	NA	—	3.5	—	—	—	—	—	71.4
RE16-08-12320	16-603410	0.0–0.5	SOIL	—	NA	NA	—	2.15(U)	—	—	—	2.15	43.6	67.3
RE16-08-12321	16-603410	2.0–2.5	SOIL	—	NA	NA	—	6.9	—	—	—	—	40.9	55.1
RE16-08-12322	16-603411	0.0–0.5	SOIL	—	NA	NA	—	2.66(U)	—	—	—	6.42	50.7	102
RE16-08-12323	16-603411	2.0–2.5	QBT4	—	NA	NA	—	2.01(U)	—	—	—	—	—	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	—	NA	NA	—	4.62(J)	—	—	—	—	—	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	—	NA	NA	—	3.67(U)	—	—	—	—	21.3	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	—	NA	NA	—	2.84(U)	—	—	—	2.72	—	66.3
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	NA	NA	—	4.35(U)	—	—	—	—	—	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	—	NA	NA	—	6.11	—	—	—	—	—	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	—	NA	NA	—	4	—	—	—	—	18.6(J+)	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	—	NA	NA	—	4.99	—	—	—	—	—	—
RE16-08-12331	16-603415	2.2–2.7	SOIL	—	NA	NA	—	3.22	—	—	—	—	—	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	—	NA	NA	—	5.46	—	—	—	5.09(J+)	51.4(J+)	121
RE16-08-12333	16-603416	2.0–2.4	QBT4	—	NA	NA	—	2.6	—	—	—	—	29.5(J+)	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	—	NA	NA	—	7.29	—	—	—	11.7(J+)	71.4(J+)	235
RE16-08-12335	16-603417	3.0–3.4	QBT4	—	NA	NA	—	3.18	—	—	—	—	18.1(J+)	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	—	NA	NA	—	6.8	—	—	—	13.6	66	219
RE16-08-12337	16-603418	1.5–2.0	QBT4	—	NA	NA	—	3.18(U)	—	—	—	6.73	57.6	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	41.2	NA	NA	—	3.59(U)	—	—	—	2.22	—	453
RE16-08-12339	16-603419	2.0–3.0	QBT4	—	NA	NA	—	3.83(U)	—	—	—	—	26.3	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	—	NA	NA	—	19.8	—	—	—	3.74	—	230
RE16-08-12341	16-603420	1.5–2.0	SOIL	—	NA	NA	—	4.43(U)	—	—	—	2.31	57.2	50.9
RE16-08-12342	16-603421	0.0–0.5	SOIL	—	NA	NA	—	2.47(U)	—	—	—	—	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	—	NA	NA	—	4.21(U)	—	—	—	11.8	86.7	206
RE16-08-12344	16-603422	0.0–0.5	SOIL	—	NA	NA	—	4.37(U)	—	—	—	1.86	—	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	NA	NA	—	4.63(U)	—	—	—	—	—	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	—	NA	NA	—	2.05(J)	—	—	—	—	—	—
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	NA	NA	—	4.35	—	—	—	—	—	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	—	NA	NA	—	3.65(J)	—	—	—	5.41	43.1	148
RE16-08-12349	16-603424	1.6–2.0	QBT4	—	NA	NA	—	2.69(J)	—	—	—	—	—	—

Table H-5.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
QBT 2,3,4 BV				**6.58**	**na**	**na**	**3500**	**0.3**	**1**	**2770**	**1.1**	**2.4**	**17**	**63.5**
SOIL BV				**15.4**	**na**	**na**	**3460**	**1.52**	**1**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
RE16-08-12350	16-603425	0.0–0.5	SOIL	—	NA	NA	—	3.78(U)	—	—	—	10.6	68.1	169
RE16-08-12351	16-603425	1.7–2.0	QBT4	—	NA	NA	—	2.52(J)	—	—	—	—	—	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	—	NA	NA	—	1.76(U)	—	—	—	13.8	57.9	181
RE16-08-12353	16-603426	2.0–2.5	QBT4	—	NA	NA	—	2.31(U)	—	—	—	—	—	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	—	NA	NA	—	2.74(J)	—	—	—	4.84	44.8	137
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	NA	NA	—	3.09(U)	—	—	—	—	—	—
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	NA	NA	—	1.67(J)	—	—	—	—	—	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	NA	NA	—	2.03(J)	—	—	—	—	—	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	—	NA	NA	—	4.09(U)	—	—	—	3.51	—	99.7
RE16-08-12359	16-603429	2.0–2.5	QBT4	—	NA	NA	—	1.45(J)	—	—	—	—	—	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	—	NA	NA	—	2.53	—	—	—	2.43	—	57.7
RE16-08-12361	16-603430	2.0–2.5	QBT4	—	NA	NA	—	1.69(U)	—	—	—	—	—	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	0.972(J)	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	1.25	—	—	2.45	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	10.1	1.02(J)	—	—	2.71	—	—	—	—	18.2	74.2(J)
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	0.999(J)	—	—	2.84	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	0.955(J)	—	—	1.9	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	2.25	—	—	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

Table H-5.2-1
Organic Chemicals Detected in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
0316-95-0226	16-01536	0.0–0.33	SOIL	NA[a]	4.5	—[b]	—	1.07	—	7.1	14	14	18	5.2	7.3	—	—	—	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	NA	0.12(J)	—	0.012(J)	—	—	0.19(J)	0.39	0.47	0.59	0.26(J)	0.27(J)	—	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	NA	—	—	0.026	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	—	0.071(J)	—	—	—	—	NA	NA	—
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE16-05-55820	16-01540	2.0–3.0	QBT4	NA	—	—	—	—	—	—	—	—	—	—	—	—	0.0412(J)	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.13(J)	0.19(J)	—	—	—	—	NA	NA	—
0316-95-0238	16-01664	0.0–0.33	SOIL	NA	—	—	—	—	—	—	0.24(J)	0.32(J)	0.51(J)	—	0.22(J)	1.2(J)	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	NA	—	—	0.034	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	3.8(J)	—	NA	—	—	5.7	9.6	11	14	5.1(J)	6.5	—	—	NA	NA	—
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.9(J)	1.1(J)	0.43(J)	0.47(J)	—	—	NA	NA	—
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	0.71(J)	—	NA	—	—	1.2(J)	1.9(J)	2.4(J)	2.9(J)	1.3(J)	1.3(J)	—	—	NA	NA	—
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	—	—	NA	—	—	—	—	0.053(J)	0.076(J)	—	—	—	—	NA	NA	—
RE16-05-55823	16-23568	0.0–0.67	SOIL	NA	—	—	0.0812	—	—	—	—	—	—	—	—	—	0.511(J)	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	NA	—	—	0.0102	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	NA	—	—	0.109	—	—	—	—	—	—	—	—	—	3.49(J)	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	NA	—	—	0.024	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	NA	—	—	0.0288	—	—	—	—	0.0393(J)	0.0499	—	0.0188(J)	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	NA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0011	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	0.144(J-)	—	—	—	—	0.216(J-)	0.306(J-)	0.304(J-)	0.368(J-)	0.184(J-)	0.148(J-)	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	0.0413(J-)	—	—	—	—	0.067(J-)	—	0.131(J-)	0.157(J-)	0.0629(J-)	0.0507(J-)	—	—	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	0.152(J-)	—	0.0164(J+)	—	—	0.185(J-)	—	0.232(J-)	0.384(J-)	0.15(J-)	—	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	0.368(J-)	—	0.0167(J+)	—	—	0.512(J-)	—	0.606(J-)	0.731(J-)	—	0.345(J-)	—	—	—	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	0.338(J-)	1.43(J-)	—	0.045(J+)	—	—	1.84(J-)	1.98(J-)	0.509(J-)	2.11(J-)	0.868(J-)	1.18(J-)	—	—	0.0061	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	0.175(J-)	—	0.0074(J+)	—	—	0.214(J-)	—	0.0809(J-)	0.373(J-)	0.143(J-)	0.187(J-)	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	0.307(J-)	—	0.0112(J+)	—	—	0.377(J-)	0.0915(J-)	0.138(J-)	0.0799(J-)	0.24(J-)	0.0815(J-)	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	0.143(J-)	—	—	—	—	0.171(J-)	0.236(J-)	0.0624(J-)	0.249(J-)	0.117(J-)	0.147(J-)	—	—	—	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	0.301(J-)	—	0.0082(J+)	—	—	0.411(J-)	0.509(J-)	0.124(J-)	0.573(J-)	—	—	—	—	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	0.132(J-)	—	—	—	—	0.166(J-)	—	0.0707(J-)	0.04(J-)	—	—	—	—	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	0.233(J-)	—	0.0296(J+)	—	—	0.31(J-)	—	—	—	—	—	—	—	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	0.245(J-)	—	0.0286(J-)	NA	NA	0.271(J-)	0.0678(J-)	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55875	16-23611	4.0–4.5	FILL	—	0.175(J-)	—	0.0095(J-)	—	—	0.257(J-)	0.359(J-)	0.337(J-)	0.388(J-)	0.197(J-)	0.183(J-)	—	0.0948(J-)	—	—	—
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	0.106(J-)	—	0.0213(J-)	—	—	0.134(J-)	0.201(J-)	—	0.244(J-)	—	—	—	—	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	—	—	0.0359(J-)	—	—	—	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	0.0082(J-)	0.0179(J-)	—	—	—	—	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	0.071	—	0.0344(J-)	—	—	0.0938	—	0.142	0.157	0.0751	0.0857	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	0.0793	—	0.0288(J-)	—	—	0.112	0.0285(J)	0.0422(J)	—	—	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	0.26	—	0.0251(J-)	—	—	0.323	0.443	—	—	—	—	—	0.184(J)	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	0.0164(J)	—	0.0097(J-)	—	—	0.0204(J)	0.0293(J)	—	—	—	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	0.0956	—	—	—	—	0.116	—	—	0.188	—	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	0.187	—	0.0095	—	—	0.266	—	0.284	0.392	0.156	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	0.0351	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	0.398	—	0.0102	—	—	0.513	0.638	0.59	0.698	0.337	0.363	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	0.175	—	0.0107	—	—	0.236	—	0.266	0.32	0.152	0.165	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	0.0026(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	0.0426	—	—	—	—	0.0722	0.163	0.169	0.173	—	0.105	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	0.0029(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	0.0026(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.164(J)	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.164(J)	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	0.12	0.126	—	—	—	0.162(J)	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.16(J)	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	0.016(J)	—	0.0764	0.137	—	—	—	0.571	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	0.0071(J)	—	—	—	—	—	—	0.257(J)	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.114(J)	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.373(J)	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.312(J-)	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.154(J-)	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0086(J)	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	0.02(J-)	—	—	—	—	0.0267(J-)	—	0.117(J-)	0.142(J-)	0.103(J-)	0.0639(J-)	—	62.4	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	0.0091	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.205(J-)	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	1.48(J-)	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	NA	0.575	—	—	—	—	1.16	2.02	—	3.71	0.868(J)	—	—	4.27(J)	—	—	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	NA	0.0798	—	—	—	—	0.156	0.274	0.301	0.419	—	0.14	—	2.47(J)	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	0.0151(J)	—	—	—	—	NA	NA	NA	NA	—
RE16-05-62039	16-23672	3.0–3.5	QBT4	NA	6.51(J-)	—	—	—	—	10.7(J-)	17.2(J-)	—	22.4(J-)	6.25(J)	10.4(J-)	—	37(J-)	—	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	NA	1.39(J-)	—	—	0.165(J-)	—	1.94(J-)	3.07(J-)	—	3.76(J-)	—	1.5(J-)	—	23.8(J-)	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	NA	0.51(J-)	—	—	—	—	0.756(J-)	2.01(J-)	—	2.53(J-)	1.06(J)	—	—	25.8(J-)	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	0.338	—	NA	NA	NA	0.456	0.676	0.846	1.4	0.404	—	NA	NA	NA	NA	—
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	0.0677	—	NA	NA	NA	0.0961	0.201	0.208	0.337	0.0987	—	NA	NA	NA	NA	—
RE16-05-62045	16-23679	1.0–1.5	SOIL	NA	2.73(J-)	—	—	0.162(J-)	—	4.04(J-)	7.08(J-)	—	9.17(J-)	—	3.35(J-)	—	11.2(J-)	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	NA	0.0502(J-)	—	—	—	—	0.0779(J-)	—	—	0.374(J-)	0.0676(J)	—	—	0.9(J-)	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.0107(J)	0.0417	0.0367(J)	0.0629	—	—	NA	NA	NA	NA	—
RE16-05-62047	16-23681	3.0–3.5	SOIL	NA	0.204(J-)	—	—	—	—	0.346(J-)	1.52(J-)	—	3.01(J-)	0.937(J)	—	—	8.34(J-)	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-05-62051	16-23684	3.0–3.5	QBT4	NA	—	—	—	—	—	0.0112(J-)	—	—	0.216(J-)	—	—	—	2.33(J-)	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.078(J)	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	0.0072	—	—	—	—	—	—	—	—	—	0.0576(J)	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	0.0076(J)	—	—	—	—	—	—	—	—	—	0.0492(J)	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	0.0062(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.174(J)	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.232(J)	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	0.118(J)	0.14(J)	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	—	—	0.0185(J)	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-05-55987	16-23693	2.8–3.5	QBT4	NA	—	—	—	NA	NA	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	NA	—	—	0.0175	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56146	16-23750	1.0–1.5	QBT4	NA	—	—	0.0272	—	—	—	—	—	—	—	—	—	—	0.0068	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	NA	—	—	0.0237	—	—	—	—	—	—	—	—	—	—	0.0071	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	0.0025	0.0033	—	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	0.0154(J)	0.025(J)	—	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	0.0205	—	—	—	—	0.0394	0.11	0.124	0.122	0.0537	—	—	0.0158	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	0.194	—	0.0113	—	—	0.405	0.568	0.546	0.924	0.215	—	—	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	0.0134	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	0.0012(J)	—	—	—	—	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	0.0377	—	—	—	—	0.0682	0.143	0.137	0.22	0.0717	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	0.0362	—	—	—	—	0.0015	0.0022	—	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	0.0036(J)	—	—	0.0417	0.413	0.542	0.637	0.217	0.295	—	—	—	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	0.0201(J)	—	—	—	—	0.029(J)	—	0.041	0.0466	—	—	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	0.212(J)	—	—	—	—	—	—	—	—	—	—	0.0053(J)	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.00853(J)	—	0.0232(J)	0.0392(J)	0.0155(J)	—	NA	NA	NA	NA	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0224(J)	0.0437	0.0164(J)	—	NA	NA	NA	NA	—
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	0.0086(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0722	0.0124(J)	0.0745(J)	—	NA	NA	NA	NA	—
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0166(J)	0.0279(J)	—	—	NA	NA	NA	NA	—
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	0.147	—	—	—	—	0.227	0.525	0.602	0.759	0.356(J)	0.342	0.503(J)	8.2	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	0.145	—	—	0.176(J+)	—	0.196	0.479	0.538	0.691	0.308(J)	0.254	0.549(J)	53.9	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	0.0363(J)	—	—	—	—	—	—	0.266	0.274	0.183	0.159	—	9.68	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	0.0365(J+)	—	—	—	—	—	—	—	—	—	—	0.0043(J)	—	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	12.9	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0641	0.0144(J)	0.0673(J)	—	NA	NA	NA	NA	—
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	0.022	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	0.196	—	—	—	—	0.389	0.929	0.866	1.23	0.467	—	—	4.09	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	0.0959	0.0974	—	—	0.472(J)	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	0.00687(J)	—	0.0862	0.09	—	—	0.419(J)	—	—	—	—
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.432(J)	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0234(J)	0.0241(J)	0.0276(J)	—	—	NA	NA	NA	NA	—
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0158(J)	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	0.0143(J)	—	NA	NA	NA	0.0187(J)	0.0773	0.141	0.137	0.139(J)	—	NA	NA	NA	NA	—
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	—	—	NA	NA	NA	0.0163(J)	0.0537	0.0609	0.109	0.0509	—	NA	NA	NA	NA	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	6.45	0.147	NA	NA	NA	9.35	10.5	7.99	12	3.5(J)	4.32	NA	NA	NA	NA	—
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	—	0.0823	0.0427	0.0813(J)	—	NA	NA	NA	NA	—
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	—	—	NA	NA	NA	—	—	0.0627	—	0.0643(J)	—	NA	NA	NA	NA	—
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	0.0105(J)	0.0593	0.133	0.0983	0.127(J)	0.0414	NA	NA	NA	NA	—
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	—	—	NA	NA	NA	—	—	0.0652	—	—	—	NA	NA	NA	NA	—
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	0.089	—	NA	NA	NA	0.113	0.273	0.345	0.497	0.252(J)	—	NA	NA	NA	NA	—
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	0.105	—	NA	NA	NA	0.148	0.337	0.437	0.65	0.322(J)	—	NA	NA	NA	NA	—
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	0.0273(J)	—	NA	NA	NA	0.0687	0.476	0.6	0.854	0.382(J)	—	NA	NA	NA	NA	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	0.844	—	NA	NA	NA	1.17	2.32	2.51	3.68	1.65(J)	—	NA	NA	NA	NA	—
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	—	—	NA	NA	NA	—	—	0.0948	0.101	—	—	NA	NA	NA	NA	—
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	8.39	—	NA	NA	NA	9.93	21.7	21.4	26	13.4(J)	—	NA	NA	NA	NA	—
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	0.215	0.0116(J)	NA	NA	NA	0.345	1.13	1.32(J)	2.01(J)	0.792(J)	0.685(J)	NA	NA	NA	NA	—
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	0.0123(J)	—	NA	NA	NA	0.0158(J)	0.069	0.081	0.111	0.0596	0.0417	NA	NA	NA	NA	—
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	0.0161(J)	—	NA	NA	NA	0.0191(J)	0.0479(J)	0.0626(J)	0.0763(J)	0.045(J)	0.033(J)	NA	NA	NA	NA	—
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	0.0137(J)	—	NA	NA	NA	0.0194(J)	0.0527	0.0581	0.0741	0.0354(J)	0.0308(J)	NA	NA	NA	NA	—
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	—	—	NA	NA	NA	0.00922(J)	0.037	0.0431(J)	0.0646(J)	—	0.0147(J)	NA	NA	NA	NA	—
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	0.0886	—	NA	NA	NA	0.142	0.378	0.451(J)	0.59(J)	0.239(J)	0.248(J)	NA	NA	NA	NA	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	0.0728	—	NA	NA	NA	0.0937	0.222	0.28	0.362	0.141	0.139	NA	NA	NA	NA	—
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	0.148	—	NA	NA	NA	0.188	0.354	0.414	0.525	0.199	0.203	NA	NA	NA	NA	—
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	0.0374(J)	—	NA	NA	NA	0.0484	0.111	0.136	0.21	0.0883	—	NA	NA	NA	NA	—
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	—	—	NA	NA	NA	—	—	—	—	—	—	NA	NA	NA	NA	—
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	1.17	0.0396	NA	NA	NA	2.07	4.09	4.25(J)	8.88(J)	1.67(J)	0.0396(J)	NA	NA	NA	NA	0.0396
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	0.055	—	NA	NA	NA	0.0727	0.254	0.359	0.557	0.3(J)	—	NA	NA	NA	NA	—
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	—	—	NA	NA	NA	—	0.0502	0.129	0.166	0.149(J)	—	NA	NA	NA	NA	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,5-Dinitroaniline	Acenaphthene	Acenaphthylene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chloroform	Chloronaphthalene[2-]
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.0698	0.019(J)	0.0715(J)	—	NA	NA	NA	NA	—
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	0.379	—	NA	NA	NA	0.728	1.54	1.59	2.5	0.989	—	NA	NA	NA	NA	—
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	—	—	NA	NA	NA	—	—	0.0648(J-)	—	—	—	NA	NA	NA	NA	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	0.0081(J)	—	0.0218(J)	0.035(J)	0.0172(J)	—	NA	NA	NA	NA	—
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	0.289	0.016(J)	NA	NA	NA	0.42	1.09	1.34	2.59	0.931(J)	—	NA	NA	NA	NA	—
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	0.532	—	NA	NA	NA	0.892	1.68	1.68	2.67	0.899	—	NA	NA	NA	NA	—
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	—	—	NA	NA	NA	—	—	0.087	0.0336(J)	0.0882(J)	—	NA	NA	NA	NA	—
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	0.0602	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	0.0231	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.161(J)	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	0.00907(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	0.00726(J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	0.00317(J)	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
0316-95-0226	16-01536	0.0–0.33	SOIL	18	0.18(J)	—	1.7	2.7	—	—	—	—	—	26	4.6	2.28	5.9	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	0.6	—	—	0.062(J)	0.066(J)	—	—	—	—	—	1	0.11(J)	2.05	0.27(J)	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	—	—	—	—	—	NA	NA	—	—	NA	0.14(J)	—	—	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	—	—	—	—	—	NA	NA	—	—	NA	0.16(J)	—	0.443	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	0.14(J)	—	—	—	—	NA	NA	—	—	NA	0.26(J)	—	0.339	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	0.41(J)	—	—	—	—	—	—	—	—	—	0.69(J)	—	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	—	—	0.23(J)	—	—	—	—	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	11	—	—	1.5(J)	1.5(J)	NA	NA	—	0.136	NA	24	3(J)	7.59	5.7	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	0.61(J)	—	—	0.61(J)	—	NA	NA	—	—	NA	0.96(J)	—	6.67	0.47(J)	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	2.4(J)	—	—	1.1(J)	—	NA	NA	—	—	NA	5.5	0.62(J)	25.2	1.3(J)	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	0.057(J)	—	—	—	—	NA	NA	—	—	NA	0.098(J)	—	—	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	—	—	—	—	0.0726	—	0.303(J)	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.474	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	0.0584	—	—	0.0868	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	0.302(J-)	—	—	—	0.0937(J-)	—	—	—	—	—	0.674(J-)	0.148(J-)	0.746(J-)	0.17(J-)	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	0.128(J-)	—	—	—	—	—	—	—	—	—	0.26(J-)	0.044(J-)	0.551(J-)	0.0623(J-)	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	0.272(J-)	—	—	—	—	—	—	—	—	—	0.543(J-)	0.151(J-)	0.107(J-)	0.13(J-)	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	0.623(J-)	—	—	—	—	—	—	—	—	0.0004(J)	1.32(J-)	0.407(J-)	0.71(J-)	0.305(J-)	—	—
RE16-05-55861	16-23597	4.0–4.5	FILL	1.84(J-)	—	—	0.12(J-)	1.08(J-)	—	—	—	—	—	4.27(J-)	1.52(J-)	9.74(J-)	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	0.307(J-)	—	—	—	0.127(J-)	—	—	—	—	—	0.616(J-)	0.162(J-)	2.23(J-)	0.139(J-)	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	0.0979(J-)	—	—	—	—	—	—	—	—	—	1.01(J-)	0.279(J-)	0.846(J-)	0.222(J-)	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	0.228(J-)	—	—	—	0.102(J-)	—	—	—	—	—	0.454(J-)	0.136(J-)	0.858(J-)	0.108(J-)	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	0.531(J-)	—	—	—	0.231(J-)	—	—	—	—	—	0.99(J-)	0.294(J-)	2.3(J-)	—	—	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	0.22(J-)	—	—	—	0.094(J-)	—	—	—	—	—	0.419(J-)	0.125(J-)	0.189(J-)	0.105(J-)	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	0.504(J-)	—	—	—	—	—	—	—	—	—	0.966(J-)	0.219(J-)	1.21(J-)	—	—	0.00084(J-)
RE16-05-55874	16-23609	6.0–6.5	QBT4	0.0725(J-)	—	—	—	—	—	—	—	—	—	0.748(J-)	0.214(J-)	0.539(J-)	—	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	0.353(J-)	—	—	—	0.12(J-)	—	—	—	—	—	0.795(J-)	0.162(J-)	0.973(J-)	0.19(J-)	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	0.19(J-)	—	—	—	—	—	—	—	—	—	0.385(J-)	0.0991(J-)	2.38(J-)	—	—	0.0011(J-)
RE16-05-55877	16-23613	4.0–4.5	FILL	0.0384(J-)	—	—	—	—	—	—	—	—	—	0.0774(J-)	0.0133(J-)	2.62(J-)	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	0.0192(J-)	—	—	—	—	—	—	—	—	—	0.0338(J-)	—	0.938(J-)	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	0.147	—	—	—	—	—	—	—	—	—	0.288	0.0679	0.187(J)	0.0712	—	0.0058(J-)
RE16-05-55880	16-23615	6.0–6.5	QBT4	0.0305(J)	—	—	—	—	—	—	—	—	—	0.309	0.0778	0.469(J)	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	0.41	—	—	—	0.193(J)	—	—	—	—	—	0.844	0.227	5.63	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	0.0314(J)	—	—	—	—	—	—	—	—	—	0.0648	0.013(J)	0.446(J)	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	0.395	0.0801	5.65(J-)	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	0.342	—	—	—	0.117(J)	—	—	—	—	—	0.795	0.174	—	0.16	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	0.674	—	—	—	0.232(J)	—	—	—	—	—	1.46	0.349	—	0.338	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	0.318	—	—	—	0.107(J)	—	—	—	—	—	0.719	0.157	—	0.151	—	0.00048(J)
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—	—	0.293(J)	—	—	—	4.56	—	—	0.0022
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	1.75	—	—	0.00095
RE16-05-55909	16-23637	4.0–4.5	FILL	0.177	—	—	—	—	—	—	—	—	—	0.421	0.0405	2.28(J+)	0.104	—	0.00034(J)
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	2.68	—	—	0.0012
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	—	—	9.92	—	—	0.001
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	0.331(J)	—	—	—	0.403(J)	—	—	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—	—	0.327(J)	—	—	—	2.83	—	—	0.0022
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.006
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.193(J)	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.142(J)	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	0.331(J)	—	—	—	—	—	—	—	0.0185(J)	—	0.341(J)	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	0.328(J)	—	—	—	—	—	—	—	—	—	0.19(J)	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	0.0892	—	—	—	—	—	—	—	—	—	0.156	—	0.144(J)	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	0.0451	—	—	—	—	—	—	—	—	—	0.0673	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0196(J)	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0273(J)	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	0.0018	—	—	—	—	0.0136(J)	—	0.351(J)	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	0.0016	—	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	0.0018	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	0.132(J-)	—	—	—	—	—	—	—	—	—	0.246(J-)	0.0147(J-)	1.76	0.117(J-)	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	—	—	0.0139(J-)	—	0.11(J+)	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	0.0248(J-)	—	—	—	—	0.0013	—	—	—	—	0.044(J-)	—	0.134(J+)	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	2.08	—	—	—	0.294(J)	—	—	—	—	—	4.34	0.612	12.1	0.783(J)	—	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	0.293	—	—	—	—	—	—	—	—	0.00023(J)	0.662	0.0921	3.36	—	—	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0176(J)	—	NA	—	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	17.8(J-)	—	—	—	3.69(J-)	—	—	—	—	—	32.1(J-)	6.83(J-)	16.1(J-)	—	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	2.95(J-)	—	—	—	0.817(J-)	—	—	—	—	—	6.59(J-)	1.44(J-)	25.7(J-)	1.23(J)	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	2.04(J-)	—	—	—	—	—	—	—	—	—	4.32(J-)	0.519(J-)	5.74(J-)	0.816(J)	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	0.831	NA	NA	—	NA	NA	NA	NA	NA	NA	1.67	0.331	NA	0.378	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	0.195	NA	NA	—	NA	NA	NA	NA	NA	NA	0.42	0.055	NA	0.102	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	6.86(J-)	—	—	—	1.45(J-)	—	—	—	—	—	14.4(J-)	2.8(J-)	8.97(J-)	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	0.209(J-)	—	—	—	—	—	—	—	—	—	0.408(J-)	0.0452(J-)	1.26(J-)	0.0835(J)	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	0.0342(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.063	—	NA	0.0164(J)	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	1.67(J-)	—	—	—	—	—	—	—	—	—	2.92(J-)	0.198(J-)	4.73(J-)	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0133(J)	—	NA	—	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	0.095(J-)	—	—	—	—	—	—	—	—	—	0.106(J-)	—	1.07(J-)	—	—	0.0019
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	0.0402	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	0.0278(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—	0.0272(J)	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—	0.0518(J)	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.549	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	0.0725(J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	0.634	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	—	—	—	0.0222(J)	—	0.183(J)	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	0.001(J)
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	—	0.0022	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	—	—	0.00096(J)	—	—	—	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	0.00067(J)	—	—	—	—	—	—	—	—	—	0.00072(J)
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.00084(J)	—	—	0.0015	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	0.0145(J)	—	—	—	—	—	—	—	—	—	0.0317(J)	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	0.134	—	—	0.0159	0.0095(J)	—	—	—	—	—	0.188	0.0202	0.139(J-)	0.052	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	0.604	—	—	—	0.121(J)	—	—	—	—	—	1.46	0.203	—	0.168	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	0.0028(J)	—	—	—	—	—	—	—	—	—	0.0036(J)	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	0.14	—	—	—	—	—	—	—	—	—	0.302	0.0347(J)	—	0.0174(J)	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	0.0011	—	—	—	—	—	—	—	—	—	0.0011	—	—	—	—	0.0688
RE16-05-61925	16-24899	8.0–8.5	QBT4	0.542	—	—	—	—	—	—	—	—	0.00028(J)	0.49	—	—	0.185	—	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.0216(J)	—	0.249(J-)	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	0.0586	—	—	—	—	—	—	—	—	—	0.118	0.016(J)	0.938(J-)	0.013(J)	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0041(J+)
RE16-08-12376	16-24907	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0583	—	NA	0.0129(J)	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0377(J)	—	NA	0.0135(J)	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0134(J)	—	NA	0.072(J)	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.018(J)	—	NA	—	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	0.605	—	—	—	—	—	—	—	—	—	1.19	0.148	34.1	0.354	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	0.54	—	—	—	—	0.0012(J)	—	—	—	0.00043(J+)	1.13	0.146	27.2(J+)	0.315	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	0.251(J)	—	—	—	—	—	—	—	—	—	0.475(J)	—	3.91	0.226	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.179(J)	—	—	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	0.208(J)	—	7.58	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	0.0657(J)	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	—	—	—	0.0116(J)	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	0.788	—	—	—	0.119(J)	—	—	—	—	—	1.69	0.235	1.37	0.488	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	0.26(J)	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	0.00025(J)	—	—	—	—	0.000497(J)	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	0.0248(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0483	—	NA	—	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	0.0116(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0174(J)	—	NA	—	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	0.0967	NA	NA	—	NA	NA	NA	NA	NA	NA	0.196	—	NA	0.123(J)	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	0.0731	NA	NA	—	NA	NA	NA	NA	NA	NA	0.123	—	NA	0.0442	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	8.67	NA	NA	—	NA	NA	NA	NA	NA	NA	25.5	6.68	NA	3.65(J)	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	0.0263(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0521	—	NA	0.071(J)	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0148(J)	—	NA	0.0639(J)	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	0.0678	NA	NA	—	NA	NA	NA	NA	NA	NA	0.107	—	NA	0.12(J)	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	—	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	0.259	NA	NA	—	NA	NA	NA	NA	NA	NA	0.474	0.0717	NA	0.253(J)	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	0.348	NA	NA	—	NA	NA	NA	NA	NA	NA	0.611	0.109	NA	0.3(J)	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	0.476	NA	NA	—	NA	NA	NA	NA	NA	NA	0.468	0.0258(J)	NA	0.391(J)	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	2.14	NA	NA	—	NA	NA	NA	NA	NA	NA	3.96	0.707	NA	1.66(J)	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0125(J)	—	NA	—	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	21.5	NA	NA	—	NA	NA	NA	NA	NA	NA	44.7	7.04	NA	13.1(J)	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	1.34	NA	NA	—	NA	NA	NA	NA	NA	NA	2.43	0.201	NA	0.794(J)	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	0.086	NA	NA	—	NA	NA	NA	NA	NA	NA	0.176	—	NA	0.123(J)	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	0.063(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.101	0.0134(J)	NA	0.113(J)	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	0.0589	NA	NA	—	NA	NA	NA	NA	NA	NA	0.121	—	NA	0.109(J)	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	0.0418	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0831	—	NA	—	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	0.412	NA	NA	—	NA	NA	NA	NA	NA	NA	0.803	0.0805	NA	0.295(J)	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	0.261	NA	NA	—	NA	NA	NA	NA	NA	NA	0.529	0.0555	NA	0.212(J)	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	0.379	NA	NA	—	NA	NA	NA	NA	NA	NA	0.871	0.136	NA	0.245(J)	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.013(J)	—	NA	—	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	0.143	NA	NA	—	NA	NA	NA	NA	NA	NA	0.266	0.0295(J)	NA	0.0851	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0156(J)	—	NA	—	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	3.73	NA	NA	0.0396(J)	NA	NA	NA	NA	NA	NA	12.6	1.15	NA	1.74(J)	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	0.295	NA	NA	—	NA	NA	NA	NA	NA	NA	0.53	0.047	NA	0.266(J)	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	0.0852	NA	NA	—	NA	NA	NA	NA	NA	NA	0.088	—	NA	0.134(J)	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	0.0147(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0191(J)	—	NA	0.0717(J)	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	1.57	NA	NA	—	NA	NA	NA	NA	NA	NA	3.06	0.369	NA	0.927	NA	NA

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Chrysene	Di-n-butylphthalate	Di-n-octylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Diethylphthalate	Dinitrotoluene[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	—	—	NA	—	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0478	—	NA	0.0145(J)	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	1.26	NA	NA	—	NA	NA	NA	NA	NA	NA	2.67	0.266	NA	0.885(J)	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	1.62	NA	NA	—	NA	NA	NA	NA	NA	NA	3.39	0.532	NA	0.907	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	0.0265(J)	NA	NA	—	NA	NA	NA	NA	NA	NA	0.0423	—	NA	0.0822(J)	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—	—	—	—	0.015(J)	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
0316-95-0226	16-01536	0.0–0.33	SOIL	—	—	1.7	—	3.6	0.215	NA	22	22	0.688	NA	—	3.04	—	—
0316-95-0227	16-01536	3.0–3.5	QBT4	—	—	0.039(J)	—	0.099(J)	—	NA	0.78	0.72	—	NA	—	—	—	—
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.11(J)	0.11(J)	—	NA	NA	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.1(J)	0.12(J)	—	NA	NA	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.13(J)	0.2(J)	—	NA	NA	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	—	—	—	1(J)	—	—	NA	0.39(J)	0.51(J)	—	NA	—	—	—	—
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	NA	0.92(J)	—	2.7(J)	—	NA	19	22	5.3	NA	NA	0.226	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.58(J)	0.72(J)	6.32	NA	NA	—	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	NA	—	—	0.77(J)	—	NA	4.5(J)	4.8(J)	40.7	NA	NA	—	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	NA	—	—	—	—	NA	0.054(J)	0.099(J)	—	NA	NA	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	NA	—	0.0774	0.581(J)	NA	—	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	0.0057	—	0.00037(J)	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	NA	0.0688	0.137	0.464(J)	NA	—	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	0.00039(J)	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	NA	—	0.0678	—	NA	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	NA	—	—	—	NA	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	0.0808(J-)	—	0.25(J-)	—	—	0.678(J-)	0.628(J-)	0.502(J-)	2.93(J-)	0.0014	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	—	0.0201(J-)	—	0.0685(J-)	—	—	0.214(J-)	0.257(J-)	0.775(J-)	1.23(J-)	0.002	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	0.0875(J-)	—	0.287(J-)	—	—	0.677(J-)	0.673(J-)	0.134(J-)	2.12(J-)	0.0017	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	—	0.245(J-)	—	0.68(J-)	—	—	1.76(J-)	1.52(J-)	0.289(J-)	9.92(J-)	0.0018	—	0.00038(J)	—
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	1.07(J-)	—	4(J-)	—	—	5.78(J-)	4.18(J-)	0.116(J-)	12(J-)	0.0116	—	0.00053(J)	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	0.129(J-)	—	0.466(J-)	—	—	0.793(J-)	0.739(J-)	0.487(J-)	18.3(J-)	0.0055(J-)	—	0.0016(J-)	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	0.179(J-)	—	0.511(J-)	—	—	1.41(J-)	1.22(J-)	0.467(J-)	14.5(J-)	0.0106	—	—	0.0028
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	—	0.0976(J-)	—	0.281(J-)	—	—	0.601(J-)	0.573(J-)	0.201(J-)	15(J-)	0.0015(J-)	—	0.0014(J-)	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	—	0.197(J-)	—	0.609(J-)	—	—	1.38(J-)	1.24(J-)	0.297(J-)	6.92(J-)	0.006(J-)	—	0.00034(J-)	—
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	0.0804(J-)	—	0.277(J-)	—	—	0.574(J-)	0.552(J-)	0.111(J-)	2.96(J-)	0.0032(J-)	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	0.122(J-)	—	0.334(J-)	—	—	1.15(J-)	1.28(J-)	0.162(J-)	3.3(J-)	0.0067(J-)	—	0.0011(J-)	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	0.151(J-)	—	0.448(J-)	NA	NA	1.03(J-)	0.96(J-)	NA	9.85(J-)	0.0018(J-)	NA	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	0.0917(J-)	—	0.273(J-)	—	—	0.922(J-)	0.725(J-)	0.54(J-)	9.3(J-)	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	—	0.0531(J-)	—	0.172(J-)	—	0.452(J-)	0.49(J-)	0.517(J-)	1.08(J-)	2.17(J-)	0.0013(J-)	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	0.0139(J-)	—	—	0.021(J-)	0.0982(J-)	1.14(J-)	0.641(J-)	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0297(J-)	0.0426(J-)	0.439(J-)	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	0.0342(J)	—	0.099	—	—	0.333	0.336	0.135(J)	—	0.00085(J-)	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	0.0455	—	0.158	—	—	0.368	0.369	0.129(J)	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	0.169	—	0.552	—	—	1.12	1.12	6.89	0.38(J-)	—	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	0.0275(J)	—	—	0.0747	0.0767	0.186(J)	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	0.0447	—	0.133	—	—	0.448	0.339	89.9(J-)	NA	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	—	0.0923	—	0.283	—	—	0.93	0.675	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	0.122(J)	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	—	0.199	—	0.61	—	—	1.75	1.4	—	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	—	0.0912	—	0.285	—	—	0.842	0.63	0.115(J-)	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	1.43	—	—	—	9.21(J+)	—	—	0.00028(J)	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	4.02(J+)	0.00026(J)	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	0.002(J)	—	—	—	—	—	0.325	0.344	—	1.51(J+)	—	—	0.0011	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—	—	—	—	1.47(J+)	—	—	0.00026(J)	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	0.0024(J)	—	—	—	—	—	—	0.0646(J)	—	0.613(J+)	—	—	0.00077(J)	—
RE16-05-55911	16-23639	4.0–4.5	FILL	—	0.0048(J)	—	—	—	—	—	—	—	—	1.25(J+)	—	—	0.0056	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—	—	—	0.148(J)	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	0.11(J)	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—	0.0176(J)	0.0141(J)	0.11(J)	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—	—	—	0.151(J)	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	—	0.0893	0.135	0.273(J)	4.48	—	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0445	0.0988	0.149(J)	4.99	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—	0.0126(J)	0.0267(J)	0.112(J)	5.16	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—	0.0171(J)	0.0362	0.189(J)	4.73	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—	—	—	0.882	0.936(J)	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	0.237(J)	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	0.106(J+)	—	—	—	0.00045(J)	—
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—	0.15(J-)	0.215(J-)	1.89	7.05	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	—	—	0.0155(J-)	0.177(J+)	—	—	—	—	—
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	—	0.0276(J-)	0.0503(J-)	0.207(J+)	—	—	—	—	—
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	0.133(J)	—	0.293	—	NA	3.85	4.86	2.35	NA	—	—	0.0078	—
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	0.0282(J)	—	0.0765	—	NA	0.576	0.63	1.88	NA	—	—	0.0027	—
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0141(J)	NA	NA	NA	NA	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	—	2.26(J-)	—	—	—	NA	32(J-)	41.3(J-)	3.12(J-)	NA	—	—	—	0.00045(J)
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	0.559(J-)	—	—	—	NA	7.6(J-)	8.76(J-)	12.4(J-)	NA	—	—	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	0.138(J-)	—	—	—	NA	3.93(J-)	5.6(J-)	2.48(J-)	NA	—	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	NA	0.192	NA	0.616	NA	NA	1.63	1.57	NA	NA	NA	NA	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	NA	0.0214(J)	NA	0.0582	NA	NA	0.35	0.381	NA	NA	NA	NA	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	0.97(J-)	—	—	—	NA	14.6(J-)	19.1(J-)	3.63(J-)	NA	—	—	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	—	0.0127(J-)	—	—	—	NA	0.351(J-)	0.523(J-)	0.223(J-)	NA	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0456	0.0661	NA	NA	NA	NA	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	—	0.0328(J-)	—	—	—	NA	1.83(J-)	3.82(J-)	4.48(J-)	NA	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0146(J)	NA	NA	NA	NA	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	—	—	—	—	NA	0.0634(J-)	0.168(J-)	0.815(J-)	NA	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	NA	—	0.0425	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	0.0018(J)	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	NA	—	—	0.563	—	—	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	NA	—	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	0.313(J-)	—	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	—	—	—	—	—	—	—	0.0129(J)	0.0164(J)	—	1.2	0.0888	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	—	—	—	—	—	NA	NA	—	—	NA	NA	0.0994	NA	0.0017	—
RE16-05-56163	16-23750	0.25–0.83	SOIL	—	—	—	—	—	—	NA	—	—	—	NA	0.0074	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	0.0049	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	NA	—	—	—	NA	—	—	0.00078(J)	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—	—	0.0011	—	0.451(J-)	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—	0.0222(J)	0.03(J)	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	0.0036	—	0.0041	—	—	0.174	0.271	—	14.8(J-)	—	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	—	0.0777	—	0.245	—	—	1.3	1.43	—	0.728(J+)	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	—	—	0.0052	—	0.264(J-)	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	—	0.0123(J)	—	0.0342(J)	—	—	0.244	0.322	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	—	—	—	0.00034(J)	0.0015	—	—	—	—	0.0013	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	—	—	—	—	0.0775	0.626	—	—	—	—	0.0015	—
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—	0.0182(J)	0.0213(J)	0.148(J-)	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	—	—	—	—	—	0.104	0.123	0.318(J-)	—	—	—	0.00056(J)	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0421	0.0618	NA	NA	NA	NA	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0276(J)	0.0382(J)	NA	NA	NA	NA	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0208(J)	NA	NA	NA	NA	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	0.0428	—	0.111	—	—	0.893	1.08	7.28	9.4(J+)	—	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	—	—	0.0447	—	0.124	—	—	0.874	0.957	59.3(J+)	13.1(J+)	—	—	—	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	—	—	—	—	—	0.305(J)	0.487(J)	6.96	10.3(J+)	—	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	0.0035(J)	—	—	—	—	—	—	—	—	—	3.1(J+)	—	—	0.00077(J)	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—	0.134(J)	0.246(J)	11.1	10.6(J+)	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—	0.0126(J)	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—	1.51	1.51	4.97	18.4	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—	—	—	0.435(J)	1.79	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00107	—
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000755(J)	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000432(J)	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.034(J)	0.043	NA	NA	NA	NA	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0114(J)	0.0139(J)	NA	NA	NA	NA	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.118	0.148	NA	NA	NA	NA	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0689	0.109	NA	NA	NA	NA	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	NA	3.13	NA	10.6	NA	NA	27.2	18.8	NA	NA	NA	NA	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0301(J)	0.0432	NA	NA	NA	NA	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0585	0.0804	NA	NA	NA	NA	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	NA	0.0279(J)	NA	0.0861	NA	NA	0.468	0.587	NA	NA	NA	NA	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	NA	0.038	NA	0.0931	NA	NA	0.616	0.787	NA	NA	NA	NA	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	NA	0.0135(J)	NA	0.0421	NA	NA	0.179	0.809	NA	NA	NA	NA	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	NA	0.24	NA	0.694	NA	NA	4.28	5.54	NA	NA	NA	NA	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	NA	1.78	NA	3.98	NA	NA	42.1	51.4	NA	NA	NA	NA	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	NA	0.0481	NA	0.108	NA	NA	1.66	2.25	NA	NA	NA	NA	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	NA	—	NA	—	NA	NA	0.102	0.129	NA	NA	NA	NA	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0883	0.107(J)	NA	NA	NA	NA	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0911	0.0997	NA	NA	NA	NA	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	NA	—	NA	—	NA	NA	0.0461	0.0785	NA	NA	NA	NA	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	NA	0.0151(J)	NA	0.0343(J)	NA	NA	0.612	0.811	NA	NA	NA	NA	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	NA	0.0162(J)	NA	0.0397	NA	NA	0.39	0.472	NA	NA	NA	NA	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	NA	0.0672	NA	0.224	NA	NA	0.779	0.785	NA	NA	NA	NA	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	NA	0.00969(J)	NA	0.0226(J)	NA	NA	0.205	0.274	NA	NA	NA	NA	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	NA	0.391	NA	1.02	NA	NA	10.9	14.9	NA	NA	NA	NA	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	NA	0.0168(J)	NA	0.0459	NA	NA	0.367	0.455	NA	NA	NA	NA	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	NA	—	NA	—	NA	NA	0.0362(J)	0.0674	NA	NA	NA	NA	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	—	0.0138(J)	NA	NA	NA	NA	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	NA	0.0982	NA	0.25	NA	NA	2.57	3.61	NA	NA	NA	NA	NA	NA

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methyl-2-pentanone[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Nitrobenzene	PETN	Phenanthrene	Pyrene	RDX	TATB	Tetrachloroethene	Tetryl	Toluene	Trichloroethane[1,1,1-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	NA	—	NA	—	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0341(J)	0.0453	NA	NA	NA	NA	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	NA	0.0842	NA	0.204	NA	NA	1.96	2.48	NA	NA	NA	NA	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	NA	0.241	NA	0.578	NA	NA	3.08	3.21	NA	NA	NA	NA	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	NA	—	NA	—	NA	NA	0.0204(J)	0.0352(J)	NA	NA	NA	NA	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—	—	—	0.184(J)	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—	0.011(J)	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
0316-95-0226	16-01536	0.0–0.33	SOIL	—	—	—	—	3.03	NA	NA
0316-95-0227	16-01536	3.0–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0236	16-01537	2.5–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0241	16-01539	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0242	16-01540	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
RE16-05-55820	16-01540	2.0–3.0	QBT4	—	—	—	—	—	—	—
0316-95-0243	16-01541	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0238	16-01664	0.0–0.33	SOIL	—	—	—	—	—	NA	NA
0316-95-0239	16-01664	2.0–3.5	QBT4	—	—	—	—	—	NA	NA
0316-95-0231	16-01669	0.0–0.5	SOIL	NA	NA	NA	NA	0.222	NA	NA
0316-95-0232	16-01670	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
0316-95-0233	16-01671	0.0–0.5	SOIL	NA	NA	NA	NA	0.316	NA	NA
0316-95-0498	16-02023	0.0–0.5	SOIL	NA	NA	NA	NA	—	NA	NA
RE16-05-55823	16-23568	0.0–0.67	SOIL	—	—	—	—	—	—	—
RE16-05-56150	16-23568	0.8–2.0	QBT4	—	—	—	—	—	—	—
RE16-05-55824	16-23569	0.0–0.67	SOIL	—	—	—	—	—	—	—
RE16-05-56151	16-23569	1.7–3.7	QBT4	—	—	—	—	—	—	—
RE16-05-55851	16-23587	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55852	16-23588	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55854	16-23590	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55859	16-23590	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55855	16-23591	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55860	16-23591	6.0–6.5	QBT4	—	—	0.00069(J)	0.00023(J)	—	—	0.00045(J)
RE16-05-55861	16-23597	4.0–4.5	FILL	—	—	0.00048(J)	—	—	—	—
RE16-05-55869	16-23597	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55865	16-23601	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55870	16-23601	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55871	16-23607	4.0–4.5	FILL	—	—	—	—	—	—	0.00044(J-)
RE16-05-55872	16-23607	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55873	16-23609	4.0–4.5	FILL	—	—	0.00042(J-)	—	—	—	—
RE16-05-55874	16-23609	6.0–6.5	QBT4	—	—	—	—	NA	—	—
RE16-05-55875	16-23611	4.0–4.5	FILL	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-55876	16-23611	6.0–6.5	QBT4	—	—	0.00051(J-)	—	—	—	—
RE16-05-55877	16-23613	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55878	16-23613	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55879	16-23615	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55880	16-23615	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55881	16-23617	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55882	16-23617	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55883	16-23619	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55884	16-23619	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-08-12261	16-23619	13.0–15.0	QBT4	—	—	—	—	—	—	—
RE16-05-55885	16-23621	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55886	16-23621	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55908	16-23636	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55915	16-23636	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55909	16-23637	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55914	16-23637	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55910	16-23638	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55913	16-23638	6.0–6.5	QBT4	—	—	—	—	—	—	0.00032(J)
RE16-05-55911	16-23639	4.0–4.5	FILL	—	—	—	—	—	—	—
RE16-05-55912	16-23639	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55918	16-23646	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-55921	16-23646	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-55919	16-23647	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-55920	16-23647	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-55923	16-23651	4.0–4.5	QBT4	—	—	—	—	—	—	—
RE16-05-55924	16-23651	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55925	16-23653	4.0–4.5	QBT4	—	—	—	—	—	—	—
RE16-05-55926	16-23653	6.0–6.5	QBT4	—	—	—	—	—	—	—
RE16-05-55927	16-23655	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-05-55928	16-23655	5.0–5.5	QBT4	—	—	—	—	—	—	—
RE16-05-55929	16-23657	3.5–4.0	QBT4	—	—	—	—	—	—	0.00032(J)
RE16-05-55931	16-23659	5.0–5.5	SOIL	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-55934	16-23659	10.0–10.5	SOIL	—	—	—	—	—	—	—
RE16-05-55932	16-23660	4.0–4.5	SOIL	—	—	—	—	—	—	—
RE16-05-55935	16-23660	9.0–9.5	SOIL	—	—	—	—	—	—	—
RE16-05-55936	16-23664	4.5–5.0	SOIL	—	—	—	—	—	—	0.00033(J)
RE16-05-55938	16-23664	9.0–9.5	SOIL	—	—	—	—	—	—	0.00031(J)
RE16-05-62035	16-23669	1.0–1.5	SOIL	—	—	—	—	—	0.00025(J)	0.00063(J)
RE16-05-62036	16-23669	3.0–3.5	QBT4	—	—	—	—	—	0.00025(J)	0.00063(J)
RE16-08-12364	16-23671	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62039	16-23672	3.0–3.5	QBT4	—	—	—	—	0.065(J-)	—	—
RE16-05-62040	16-23674	1.5–2.0	QBT4	—	—	—	—	0.174(J-)	—	—
RE16-05-62041	16-23674	3.5–4.0	QBT4	—	—	—	—	—	—	—
RE16-08-12368	16-23677	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12369	16-23677	3.2–3.7	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62045	16-23679	1.0–1.5	SOIL	—	—	—	—	0.583(J-)	—	—
RE16-05-62046	16-23679	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62047	16-23681	3.0–3.5	SOIL	—	0.0049	—	—	—	—	—
RE16-08-12374	16-23682	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-62051	16-23684	3.0–3.5	QBT4	—	—	—	—	—	—	—
RE16-05-55978	16-23691	0.0–1.0	SOIL	—	—	—	—	—	—	—
RE16-05-55981	16-23691	30.0–31.0	QBT4	—	—	—	—	—	—	—
RE16-05-55982	16-23691	64.0–67.0	QBT4	—	—	—	—	—	—	—
RE16-05-55984	16-23691	77.0–79.0	QBT4	—	—	—	—	—	—	—
RE16-05-55904	16-23691	84.0–86.0	QBT4	—	—	—	—	—	—	—
RE16-05-55906	16-23691	157.0–160.0	QBT4	—	—	—	—	—	—	—
RE16-05-55983	16-23692	0.0–1.0	SOIL	—	—	—	—	—	—	—
RE16-05-55963	16-23692	17.5–19.0	QBT4	—	—	—	—	—	—	—
RE16-05-55964	16-23692	36.0–38.0	QBT4	—	—	—	—	—	—	—
RE16-05-55986	16-23693	0.0–0.25	SOIL	0.0026	—	—	—	0.403	—	—
RE16-08-12269	16-23693	2.5–2.8	QBT4	0.00264	—	—	—	—	—	—
RE16-05-55987	16-23693	2.8–3.5	QBT4	0.0052	—	0.0014(J)	—	NA	0.00072(J)	0.0012(J)
RE16-05-56163	16-23750	0.25–0.83	SOIL	0.0063	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-56146	16-23750	1.0–1.5	QBT4	0.0029	—	—	—	—	—	—
RE16-05-56152	16-23751	0.0–0.58	QBT4	—	—	—	—	—	—	—
RE16-05-61914	16-24891	8.0–8.5	SOIL	—	—	—	—	—	—	—
RE16-05-61928	16-24891	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-05-61917	16-24894	8.0–8.5	SOIL	—	—	—	—	—	—	—
RE16-05-61927	16-24894	10.0–10.5	QBT4	—	—	—	—	—	—	—
RE16-08-12268	16-24894	31.0–32.0	QBT4	—	—	—	—	—	—	—
RE16-05-61919	16-24896	6.0–6.5	SOIL	—	—	—	—	—	—	—
RE16-05-61926	16-24896	8.0–8.5	QBT4	—	—	—	—	—	—	—
RE16-05-61922	16-24899	6.0–6.5	SOIL	—	—	—	—	—	—	—
RE16-05-61925	16-24899	8.0–8.5	QBT4	—	—	—	—	—	0.00026(J)	0.0009(J)
RE16-05-61923	16-24900	3.0–3.5	SOIL	—	—	—	—	—	—	—
RE16-05-61924	16-24900	5.0–5.5	QBT4	—	—	—	—	—	—	—
RE16-05-61948	16-24906	2.0–2.5	SOIL	—	—	—	—	—	—	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12378	16-24908	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-61947	16-24908	4.0–4.5	QBT4	—	—	—	—	—	—	0.00029(J)
RE16-08-12379	16-24908	4.0–4.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12380	16-24910	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-05-61934	16-24911	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-05-61935	16-24912	0.0–0.5	SOIL	0.001(J)	—	—	—	—	0.00039(J+)	—
RE16-05-61938	16-24915	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-05-61941	16-24915	2.0–2.5	QBT4	—	—	—	—	—	—	0.00053(J)
RE16-05-61942	16-24919	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-08-12382	16-24923	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12262	16-603396	12.5–14.5	QBT4	—	—	—	—	—	—	—
RE16-08-12263	16-603397	13.0–15.0	QBT4	—	—	—	—	—	—	—
RE16-08-12270	16-603400	0.0–1.5	SOIL	—	—	—	—	—	—	—
RE16-08-12271	16-603400	1.5–4.0	QBT4	—	—	—	—	—	—	—
RE16-08-12272	16-603401	0.0–2.0	SOIL	—	—	0.00065(J)	0.000219(J)	—	0.000438(J)	0.000962(J)
RE16-08-12274	16-603402	0.0–0.5	SOIL	—	—	—	—	—	—	—
RE16-08-12276	16-603403	0.0–0.5	SOIL	—	—	—	—	—	—	—

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-08-12277	16-603403	1.5–2.0	SOIL	—	—	—	—	—	—	—
RE16-08-12314	16-603407	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12316	16-603408	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12320	16-603410	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12321	16-603410	2.0–2.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12322	16-603411	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12324	16-603412	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12325	16-603412	2.5–3.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12327	16-603413	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12326	16-603413	2.0–2.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12328	16-603414	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12329	16-603414	3.0–3.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12330	16-603415	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12332	16-603416	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12333	16-603416	2.0–2.4	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12334	16-603417	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12336	16-603418	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12337	16-603418	1.5–2.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12338	16-603419	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12340	16-603420	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12341	16-603420	1.5–2.0	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12342	16-603421	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12343	16-603421	2.0–3.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12344	16-603422	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12345	16-603422	2.3–2.8	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12346	16-603423	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12347	16-603423	2.2–2.6	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12348	16-603424	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12350	16-603425	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12352	16-603426	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12353	16-603426	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12354	16-603427	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA

Table H-5.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-08-12355	16-603427	3.5–4.0	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12357	16-603428	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12358	16-603429	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12360	16-603430	0.0–0.5	SOIL	NA	NA	NA	NA	NA	NA	NA
RE16-08-12361	16-603430	2.0–2.5	QBT4	NA	NA	NA	NA	NA	NA	NA
RE16-08-12286	16-603511	38.0–40.0	QBT4	—	—	—	—	—	—	—
RE16-08-12287	16-603511	77.0–79.0	QBT4	—	—	—	—	—	—	—
RE16-08-12291	16-603511	100.0–101.0	QBT4	—	—	—	—	—	—	—
RE16-08-12288	16-603511	118.0–120.0	QBT3	—	—	—	—	—	—	—
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	—	—	—	—	—	—
RE16-08-12290	16-603511	204.5–206.3	QBT3	—	—	—	—	—	—	—

Note: Results are in mg/kg.

[a] NA = Not analyzed.

[b] — = Not detected.

Table H-5.3-1
Radionuclides Detected above BVs in Fill, Soil, and Tuff at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
QBT 2,3,4 BV[a]				**1.98**	**0.09**	**1.93**
SOIL BV[a]				**2.59**	**0.2**	**2.29**
RE16-08-12365	16-23671	3.5–4.0	QBT4	—[b]	—	3.69
RE16-08-12368	16-23677	2.0–2.5	QBT4	2.3	0.287	—
RE16-08-12372	16-23681	2.0–2.5	QBT4	—	0.183	4.92
RE16-08-12374	16-23682	2.0–2.5	QBT4	—	0.0959	—
RE16-08-12375	16-23682	3.7–3.8	QBT4	—	0.103	—
RE16-08-12385	16-24906	2.35–2.75	QBT4	—	0.12	—
RE16-08-12376	16-24907	2.0–2.5	QBT4	—	0.112	—
RE16-08-12378	16-24908	2.0–2.5	QBT4	—	0.183	—
RE16-08-12379	16-24908	4.0–4.5	QBT4	—	0.142	4.41
RE16-08-12380	16-24910	2.0–2.5	QBT4	—	0.222	—
RE16-05-61942	16-24919	0.0–0.5	SOIL	6.93	0.373	4.59
RE16-08-12382	16-24923	2.0–2.5	QBT4	3.57	0.31	2.67
RE16-08-12313	16-603406	2.5–3.0	QBT4	—	0.121	—
RE16-08-12317	16-603408	2.0–2.5	QBT4	—	0.096	—
RE16-08-12322	16-603411	0.0–0.5	SOIL	3.48	0.313	2.53
RE16-08-12327	16-603413	0.0–0.5	SOIL	3.46	—	2.58
RE16-08-12329	16-603414	3.0–3.5	QBT4	—	0.0901	—
RE16-08-12332	16-603416	0.0–0.5	SOIL	3.67	—	2.35
RE16-08-12334	16-603417	0.0–0.5	SOIL	9.15	0.338	5.45
RE16-08-12336	16-603418	0.0–0.5	SOIL	8.1 (J+)	0.355 (J+)	4.9 (J+)
RE16-08-12337	16-603418	1.5–2.0	QBT4	3.74	0.161	3.13
RE16-08-12340	16-603420	0.0–0.5	SOIL	2.77	—	—
RE16-08-12343	16-603421	2.0–3.0	QBT4	8.31	0.349	5.9
RE16-08-12348	16-603424	0.0–0.5	SOIL	4.69	0.248	3.29
RE16-08-12352	16-603426	0.0–0.5	SOIL	11.9	0.582	8.02
RE16-08-12354	16-603427	0.0–0.5	SOIL	3.84	0.56	2.68
RE16-08-12356	16-603428	0.0–0.5	QBT4	—	0.0924	—
RE16-08-12357	16-603428	2.0–2.5	QBT4	—	0.174	6.43
RE16-08-12358	16-603429	0.0–0.5	SOIL	3.19	0.237	2.44
RE16-08-12289	16-603511	158.0–160.0	QBT3	—	0.109	—

Note: Results are in pCi/g.

[a] BVs are from LANL 1998, 059730.

[b] — = Not detected or not detected above BV.

Table H-5.4-1
Organic Chemicals Detected in Pore Gas at SWMU 16-003(o)

Sample ID	Location ID	Depth (ft)	Collection Date	Acetone	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform	Cyclohexane	Dichloroethane[1,2-]	Ethylbenzene	Hexane	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Tetrachloroethene	Toluene	Trichloroethene	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
RE16-05-56179	16-23691	49.25–50.0	10/27/2004	16	6.7	—*	—	—	24	—	—	—	5.5	—	—	—	—	30	92	55	—	5.8
RE16-05-56000	16-23691	50.0–51.0	4/27/2005	66	13	29	7.8	—	—	—	—	—	—	—	—	—	—	—	60	—	—	5.2
RE16-05-56002	16-23691	98.5–100.0	11/1/2004	42	6.7	—	—	—	37	—	—	—	9.2	—	—	—	—	—	31	6.9	4.8	11
RE16-05-55999	16-23691	100.0–101.0	4/27/2005	28	4.6	—	—	—	—	—	—	—	—	—	—	—	—	—	24	—	—	—
RE16-05-55997	16-23691	175.0–176.0	4/27/2005	285	76.6	40.5	15.1	—	—	—	—	5.28	—	—	4.92	—	—	—	339	—	—	6.7
RE16-05-56025	16-23691	199.0–200.0	11/3/2004	44	6.4	—	—	—	—	—	—	—	—	—	—	—	—	—	18	7	—	5.2
RE16-05-55988	16-23692	47.5–50.0	11/5/2004	9.9	—	—	—	—	—	—	—	—	—	—	—	27	—	—	32	—	—	—
RE16-06-64294	16-23692	48.0–50.0	12/15/2005	29	20	6.1	—	—	—	—	—	—	—	—	—	—	—	—	12	5.2	—	8.2
RE16-05-55990	16-23692	98.0–100.0	11/8/2004	19	3.7	—	—	—	14	—	—	—	—	—	—	—	—	—	18	—	—	4.1
RE16-06-64295	16-23692	98.0–100.0	12/15/2005	14	7.5	3.7	—	—	—	—	—	—	—	—	—	—	—	—	9.6	7.5	—	6.7
RE16-06-64296	16-23692	110.0–147.6	12/15/2005	15	9.5	7.4	—	—	—	—	—	—	—	—	—	—	—	—	4.8	—	—	—
RE16-05-55995	16-23692	198.0–200.0	11/12/2004	10	—	—	—	—	37	—	—	—	—	—	—	8.3	—	—	31	—	—	6.5
RE16-08-12394	16-603511	47.0–53.0	8/15/2008	—	—	—	6.4	12	—	78	—	—	—	4.5	—	—	—	140	6	1100	—	—
RE16-08-12300	16-603511	47.0–53.0	7/15/2008	—	—	—	—	12	—	13	—	—	—	—	—	—	—	15	—	120	—	—
RE16-08-12395	16-603511	95.0–103.0	8/15/2008	46	6.7	5.8	21	11	—	33	—	—	—	—	—	—	23	120	—	1200	—	—
RE16-08-12301	16-603511	95.0–103.0	7/15/2008	11	—	6.4	27	16	—	27	—	—	—	—	—	—	10	140	—	1200	—	—
RE16-08-12396	16-603511	196.5–203.0	8/15/2008	—	—	—	—	14	—	—	5.1	—	—	—	—	—	—	—	11	—	4.7	6.4
RE16-08-12302	16-603511	196.5–203.0	7/15/2008	62	21	5.6	—	200	—	—	5.5	3.2	—	—	4	—	26	—	8.6	—	5.6	12

Note: Results are in µg/m^3.

*— = Not detected.

Table H-6.1-1
Inorganic Chemicals above BVs in Fill, Sediment, Soil, and Tuff at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Bromide	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Fluoride	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Sulfate	Thallium	Zinc
QBT 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**na[b]**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**na**	**11.2**	**1690**	**0.1**	**6.58**	**na**	**na**	**0.3**	**1**	**157**	**1.1**	**63.5**
SOIL BV[a]				**29200**	**0.83**	**8.17**	**295**	**na**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**na**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1**	**293**	**0.73**	**48.8**
0316-97-0608	16-01551	0.5–2.5	SOIL	—[c]	NA[d]	—	—	NA	0.59(U)	—	27	—	—	NA	NA	—	—	0.12(U)	—	NA	NA	NA	2.4(U)	NA	1.5(U)	—
0316-97-0609	16-01551	2.5–4.0	QBT4	—	NA	—	—	NA	—	—	12	—	100	NA	NA	—	—	0.11(U)	21	NA	NA	NA	2.2(U)	NA	1.4(U)	83
0316-95-0253	16-01554	0.0–0.5	SED[e]	—	5.3(U)	—	—	NA	0.53(U)	—	—	—	—	1.1(U)	NA	31.3	—	—	—	NA	NA	—	—	NA	—	—
0316-95-0254	16-01555	0.0–0.5	SED	—	5.57(U)	—	—	NA	0.557(U)	—	—	—	—	1.1(U)	NA	71.5	—	—	—	NA	NA	—	—	NA	—	—
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	—	—	47.3	—	—	—	—	56.7	9.99	—	—	—	—	—	—	—	—	0.58(U)	7.77	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	—	6.29(U)	—	—	NA	0.629(U)	—	—	—	—	1.3(U)	NA	—	—	—	—	NA	NA	—	—	NA	—	—
0316-95-0503	16-02166	5.0–7.0	QBT4	—	13(UJ)	—	—	NA	—	—	260	11(U)	5.6(U)	0.56(U)	NA	—	—	0.11(U)	9(U)	NA	NA	1.1(UJ)	2.2(U)	NA	2.2(U)	—
0316-97-0610	16-02166	8.9–9.0	QBT4	—	NA	—	—	NA	—	—	77	—	56	NA	NA	—	—	0.12(U)	14	NA	NA	NA	2.4(U)	NA	1.5(U)	—
RE16-05-56045	16-23701	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.65	—	—	—	—	—	—	—	—	—	—	224
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	186	20.7	—	—	—	—	—	—	—	—	0.556(U)	24.9	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	—	—	0.611(U)	—	—	—	—	—	—	—	—	—	—	3.14	—	—	—	—	—	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	21.9	—	—	3.38	—	—	—	—	—	—	0.542(U)	2	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	—	—	—	—	—	—	29000(J)	—	—	—	—	1.08(J-)	—	—	—	—	—	—	1.84(U)	—	—	—	63.3(J-)
RE16-05-56050	16-23706	6.0–6.5	QBT4	10000	—	—	86.2	—	—	5260(J)	—	—	7.76	—	0.888(J-)	28.2(J)	—	—	6.64	—	—	1.05(J)	—	—	—	—
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	—	—	—	4.07	—	—	—	—	—	NA	—	—	—	—	—	0.799(J)	—	1.61(U)	—	—	—	—
RE16-05-56051	16-23708	4.0–4.5	FILL	—	—	—	—	—	0.595(U)	—	—	—	—	—	0.694(J-)	—	—	—	—	1.09(J-)	—	—	—	—	—	—
RE16-05-56052	16-23708	6.0–6.5	QBT4	8620	—	—	80.5	—	—	21500(J)	—	—	8.84	—	0.63(J-)	16.9(J)	—	—	—	0.858(J-)	—	0.944(J)	—	—	—	—
RE16-05-56053	16-23710	2.0–2.5	FILL	—	NA	—	—	—	—	7170	—	—	—	—	21.2	—	—	—	—	—	—	1.8(U)	—	—	—	—
RE16-05-56054	16-23710	5.0–5.5	QBT4	13700	NA	3.17	139	—	—	3970	—	—	—	—	9.1	12.6	1860(J+)	—	—	—	—	1.79(U)	—	—	—	—
RE16-05-56055	16-23712	2.0–2.5	FILL	—	NA	—	—	—	—	—	—	—	—	—	4.66	—	—	—	—	—	—	1.74(U)	—	—	—	—
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	NA	—	62.4	—	—	5850	—	—	—	—	1.48	—	2130(J+)	—	—	—	—	1.59(U)	—	—	—	—
RE16-05-56056	16-23713	2.0–2.5	FILL	—	NA	—	393	—	0.421(J)	—	—	—	—	—	1.55	—	—	—	—	—	—	1.7(U)	—	—	—	—
RE16-05-56058	16-23713	4.5–5.0	QBT4	15600	NA	3.32	163	—	—	3060	8.63	—	6.11	—	2.76	11.3	2300(J+)	—	10.3	—	—	1.79(U)	—	—	—	—
RE16-05-56059	16-23716	3.0–3.5	FILL	—	NA	—	—	—	0.502(J)	—	—	—	—	—	4.5	—	—	—	—	—	0.0028	1.79(U)	—	368	—	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	10500	NA	—	76.7	—	—	—	—	—	—	—	3.21	—	—	—	—	—	0.00222(J)	1.67(U)	—	343	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	—	NA	—	—	—	—	7070	—	—	—	—	2.87	—	—	—	—	—	—	1.79(U)	—	—	—	—
RE16-05-56062	16-23718	4.5–5.0	QBT4	11500	NA	—	286	—	—	4670	—	—	5.2	—	2.19	—	—	—	7.41	—	—	1.75(U)	—	—	—	—
RE16-05-56063	16-23720	2.5–3.0	SED	—	—	—	—	—	0.571(U)	—	—	—	—	—	7.45	—	—	—	—	—	—	1.71(U)	—	—	—	—
RE16-05-56064	16-23720	4.5–5.0	QBT4	14300	—	—	157	—	—	2960	8.05	—	5.81	—	4.38	—	2110	—	11.3	—	—	1.7(U)	—	—	—	—
RE16-05-56065	16-23722	2.0–2.5	SED	29800	—	—	—	—	0.602(U)	—	—	—	—	—	1.92	—	—	—	—	—	—	1.81(U)	—	—	—	—
RE16-05-56066	16-23722	4.0–4.5	QBT4	13100	—	—	95	—	—	2270	—	—	5.15	—	1.74	—	1700	—	—	—	—	1.68(U)	—	—	—	—
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	—	—	—	—	—	—	—	—	—	NA	3.35(J-)	—	—	—	—	—	NA	2.89	—	—	—	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	—	—	14.9(U)	—	—	—	—	—	—	—	NA	1.71(J-)	—	—	—	—	0.977(J-)	NA	3.72	—	—	—	—
RE16-08-12310	16-603405	1.5–2.0	QBT4	9590	—	8.35(U)	—	—	—	—	8.34(J-)	—	—	NA	2.99(J-)	—	—	—	—	1.07(J-)	NA	2.36	—	—	—	—

Note: Results are in mg/kg.

[a] BVs are from LANL 1998, 059730.

[b] na = Not available.

[c] — = Not detected or not detected above BV.

[d] NA = Not analyzed.

[e] Sediment sample results are compared to the appropriate Soil BV. For further explanation, see Appendix H, Section 2.0..

Table H-6.2-1
Organic Chemicals Detected in Fill, Sediment, Soil, and Tuff at SWMUs 16-026(j2) and 16-029(f)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Butanone[2-]	Chrysene	Di-n-butylphthalate	Dibenz(a,h)anthracene	Dibenzofuran	Dichloroethene[1,1-]	Ethylbenzene	Fluoranthene	Fluorene
0316-95-0253	16-01554	0.0–0.5	SED	—[a]	NA[b]	—	0.094(J)	0.11(J)	0.13(J)	0.074(J)	0.057(J)	—	NA	0.12(J)	—	—	—	NA	NA	0.25(J)	—
0316-95-0254	16-01555	0.0–0.5	SED	0.67(J)	NA	1	1.5	1.6	2	0.77	0.8	—	NA	1.8	—	0.2(J)	0.28(J)	NA	NA	3.3	0.62(J)
0316-95-0500	16-01555	0.0–0.5	SED	NA	—	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	—	—	NA	NA
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	0.013	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	0.21(J)	NA	0.27(J)	0.74	0.78	1	0.36(J)	0.44	0.18(J)	NA	0.81	—	0.085(J)	0.097(J)	NA	NA	1.8	0.17(J)
0316-95-0503	16-02166	5.0–7.0	QBT4	—	0.058	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	0.0342(J)	—	—	—	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	0.0237(J)	—	—	—	—	—	—	0.0253(J)	0.0587(J)	—	—	—	—	0.0418	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	6.09	—	10.7	18.4	15.8	22.7	7.28	9.12	—	—	18.1	—	—	3.83	0.0022	—	39.6	6.32
RE16-05-56050	16-23706	6.0–6.5	QBT4	3.65	—	6.18	9.51	7.82	9.06	5.63	3.63	—	—	9.08	—	—	2.19	—	—	19.6	3.71
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	—	0.00965(J)	—	0.0282(J)	0.0417	0.0179(J)	—	—	—	—	—	—	—	—	—	0.0593	—
RE16-05-56051	16-23708	4.0–4.5	FILL	0.806	0.0104(J)	1.55	2.31	2.09	2.45	1.03	1.28	—	—	2.42	—	—	0.496(J)	0.0013(J)	0.00037(J)	5.72	0.891
RE16-05-56052	16-23708	6.0–6.5	QBT4	1.55	0.008(J)	2.68	4.34	4.07	5.22	2.03	2.09	—	—	4.64	—	—	0.949(J)	—	—	10.2	1.68
RE16-05-56053	16-23710	2.0–2.5	FILL	0.0027	—	0.0053	—	0.0131	0.0204	0.0063	—	—	—	0.0141	—	—	—	—	—	0.0246	0.0028
RE16-05-56054	16-23710	5.0–5.5	QBT4	0.119(J-)	0.0263	0.222(J-)	0.577(J-)	0.572(J-)	0.757(J-)	0.372(J-)	0.274(J-)	—	—	0.599(J-)	—	0.143(J-)	—	—	—	1.27(J-)	0.11(J-)
RE16-05-56055	16-23712	2.0–2.5	FILL	0.356	—	0.384	0.758	0.694	1.1	0.27	—	—	—	0.841	—	—	0.215(J)	—	—	1.69	0.332
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	—	0.00037(J)	—	0.0011	0.0021	—	—	—	—	0.0015	—	—	—	—	—	0.0026	—
RE16-05-56056	16-23713	2.0–2.5	FILL	0.151(J-)	—	0.218(J-)	0.391(J-)	0.37(J-)	0.394(J-)	0.244(J-)	0.212(J-)	—	—	0.4(J-)	—	—	—	—	—	0.968(J-)	0.142(J-)
RE16-05-56058	16-23713	4.5–5.0	QBT4	0.0064	—	0.0081	0.017	0.0151(J)	0.0228(J)	0.0087(J)	—	—	—	0.0178	—	—	0.0037(J)	—	—	0.0286	0.0061
RE16-05-56059	16-23716	3.0–3.5	FILL	—	—	0.0113(J)	—	0.0403	0.0642	—	—	—	—	—	—	—	—	—	—	0.0751	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	0.0181	0.0119	0.0333	0.0595	0.0509	0.0786	0.0218	—	—	—	0.0625	—	—	—	—	—	0.114	0.02
RE16-05-56062	16-23718	4.5–5.0	QBT4	0.07	0.0057(J)	0.161	0.225	0.2	0.331	0.0813	—	—	—	0.242	—	—	0.0421(J)	—	—	0.437	0.0893
RE16-05-56063	16-23720	2.5–3.0	SED	0.0939	0.0042(J)	0.139	0.342	0.332	0.451	0.143(J)	0.166	—	—	0.364	—	—	—	—	—	0.914	0.0824
RE16-05-56064	16-23720	4.5–5.0	QBT4	—	—	0.0111(J)	—	0.0371	0.0632	0.023(J)	—	—	—	0.0407	—	—	—	—	—	0.0926	—
RE16-05-56065	16-23722	2.0–2.5	SED	0.0372(J)	0.286	0.0568	—	0.114	0.2	0.0595(J)	—	—	0.156	0.135	—	—	—	—	—	0.285	0.0301(J)
RE16-05-56066	16-23722	4.0–4.5	QBT4	0.17	0.0144	0.225	0.62	0.596	0.91	0.493	—	—	—	0.646	—	—	—	—	—	1.3	0.141(J)
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	—	—	—	0.0228(J)	0.0321(J)	0.0204(J)	—	—	—	—	—	—	—	—	—	0.0528	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	0.0222(J)	NA	—	—	—	0.0979	—	—	—	NA	—	—	—	—	NA	NA	0.0185(J)	—

Table H-6.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	HMX	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Phenol	Propylbenzene[1-]	Pyrene	RDX	TATB	Toluene	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,3-]+Xylene[1,4-]
0316-95-0253	16-01554	0.0–0.5	SED	—	0.078(J)	NA	NA	—	—	0.14(J)	—	NA	0.23(J)	—	—	NA	NA	NA	NA	NA
0316-95-0254	16-01555	0.0–0.5	SED	—	0.87	NA	NA	0.18(J)	0.47(J)	3.1	—	NA	4.6	—	—	NA	NA	NA	NA	NA
0316-95-0500	16-01555	0.0–0.5	SED	NA	NA	—	0.021	NA	NA	NA	NA	—	NA	NA	NA	—	—	—	—	NA
RE16-05-56044	16-01555	3.5–4.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
0316-95-0255	16-01556	0.0–0.5	SED	—	0.4(J)	NA	NA	0.069(J)	0.17(J)	1.2	—	NA	2.4	—	—	NA	NA	NA	NA	NA
0316-95-0503	16-02166	5.0–7.0	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	NA
RE16-05-56046	16-23701	2.5–3.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-05-56047	16-23702	0.0–0.5	SED	—	—	—	—	—	—	0.023(J)	—	—	0.0425	0.151(J)	NA	—	—	—	—	—
RE16-05-56048	16-23702	2.5–3.5	QBT4	—	—	—	—	—	—	—	0.0487(J)	—	—	—	NA	—	—	—	—	—
RE16-05-56049	16-23706	4.0–4.5	FILL	—	7.54	—	—	2.67	7.83	39.1	—	—	40.9	—	1.14(J-)	—	—	—	—	—
RE16-05-56050	16-23706	6.0–6.5	QBT4	—	5.38	—	—	1.6	5.22	19.4	—	—	17.4	—	0.298(J-)	—	—	—	—	—
RE16-08-12305	16-23706	12.5–13.6	QBT4	—	0.0162(J)	—	—	—	—	0.0394	—	—	0.051	—	—	—	—	—	—	—
RE16-05-56051	16-23708	4.0–4.5	FILL	—	1.04	—	—	0.248	0.712	5.22	—	0.00036(J)	4.7	—	—	—	—	0.0018	0.00059(J)	0.0009(J)
RE16-05-56052	16-23708	6.0–6.5	QBT4	0.786(J-)	2	—	—	0.579	1.7	9.31	—	—	8.92	—	—	0.0004(J)	—	0.0012(J)	0.0004(J)	—
RE16-05-56053	16-23710	2.0–2.5	FILL	—	0.0059	—	—	0.00071(J)	—	0.0203	—	—	0.0285	—	NA	—	—	—	—	—
RE16-05-56054	16-23710	5.0–5.5	QBT4	—	0.346(J-)	—	—	0.0286(J-)	0.0792(J-)	0.877(J-)	—	—	1.24(J-)	—	NA	0.0019	—	—	—	—
RE16-05-56055	16-23712	2.0–2.5	FILL	—	0.261	—	—	0.157	0.534	1.88	—	—	1.75	—	NA	—	—	—	—	—
RE16-05-56057	16-23712	4.5–5.0	QBT4	—	0.00055(J)	—	—	—	—	0.0023	—	—	0.0033	—	NA	—	—	—	—	—
RE16-05-56056	16-23713	2.0–2.5	FILL	—	0.242(J-)	—	—	0.0666(J-)	0.237(J-)	0.832(J-)	—	—	0.823(J-)	—	NA	—	—	—	—	—
RE16-05-56058	16-23713	4.5–5.0	QBT4	—	0.0075(J)	—	—	0.0025	0.0076	0.0377	—	—	0.043	—	NA	—	—	—	—	—
RE16-05-56059	16-23716	3.0–3.5	FILL	—	—	—	—	—	—	0.0487	—	—	0.0885	—	NA	—	—	—	—	—
RE16-05-56060	16-23716	5.0–5.5	QBT4	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	—	—
RE16-05-56061	16-23718	2.5–3.0	FILL	—	0.0194	0.0003(J)	—	0.0061(J)	0.0165	0.125	—	—	0.131	—	NA	—	—	0.00051(J)	—	0.00046(J)
RE16-05-56062	16-23718	4.5–5.0	QBT4	—	0.076	—	—	0.0153	0.0332	0.462	—	—	0.478	—	NA	—	—	0.00065(J)	—	—
RE16-05-56063	16-23720	2.5–3.0	SED	NA	0.084	—	—	0.0257(J)	0.0519	0.692	—	—	0.875	NA	NA	—	0.00034(J)	—	—	—
RE16-05-56064	16-23720	4.5–5.0	QBT4	NA	—	—	—	—	—	0.0625	—	—	0.0944	NA	NA	—	—	—	—	—
RE16-05-56065	16-23722	2.0–2.5	SED	NA	—	—	0.01	0.0147(J)	0.0459	0.222	—	—	0.293	NA	NA	—	—	—	—	—
RE16-05-56066	16-23722	4.0–4.5	QBT4	NA	0.525	—	0.0026	0.0454(J)	0.138(J)	1.15	—	—	1.52	NA	NA	—	0.0004(J)	—	—	—
RE16-08-12306	16-603404	12.5–14.0	QBT4	—	0.0169(J)	—	—	—	—	0.0328(J)	—	—	0.0429	—	—	—	—	—	—	—
RE16-08-12311	16-603405	0.0–0.5	SOIL	—	—	NA	NA	—	—	—	—	NA	0.0156(J)	—	—	NA	NA	NA	NA	NA

Note: Results are in mg/kg.

[a] — = Not detected.

[b] NA = Not analyzed.

Table H-7.1-1
Inorganic Chemicals Detected in Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Alkalinity-CO_3+HCO_3 (mg/L)	Aluminum (µg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Bromide (mg/L)	Cadmium (µg/L)	Calcium (mg/L)	Chloride (mg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Cyanide (Total) (mg/L)	Fluoride (mg/L)	Hardness (mg/L)	Iron (µg/L)	Lead (µg/L)	Magnesium (mg/L)
Surface Water																								
EU071000SFLS02	16-02654	n/a[a]	10/19/2007	UF[b]	57.716	—[c]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	n/a	4/3/2006	F[d]	—	3310	—	—	—	206	29.1	—	—	6.55	—	1.3	9.2	4.2	—	—	24.4	1890	1.3	1.96
GF070500SFLS01	16-02654	n/a	5/11/2007	F	23.1	1590	—	—	2.7	221	35.9	—	—	7.52	8.42	—	—	—	—	0.189	27.1	910	—	2.03
GF071000SFLS01	16-02654	n/a	10/19/2007	F	40.8	1210	—	—	—	238	40.9	—	0.14	9.54	4.99	—	1.5 (J-)	—	—	0.261	34.4	850	0.75	2.56
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	26.6	5870	—	—	352	—	30.3	0.088	—	7.97	2.68	2.6	1.3	5.8	—	—	29.6	3500	2.8	2.36
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	—	23200 (J)	—	5.2	633	1.2	41.3	—	0.22	10.3	—	12.6	3.8	7.8 (J-)	0.00452 (J-)	—	44.7	13400 (J+)	11.2	4.58
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	5730	—	—	487	—	38.4	—	0.51	11.2	—	8.7	1.8 (J-)	—	—	—	41.3	4130	13.8	3.26
GF0602FLCDV01	16-06121	n/a	4/10/2006	F	—	5070	—	—	—	177	36.8	—	—	9.01	—	—	4.1	—	—	—	32.2	2820	1.3	2.68
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	61.8	112000	—	25.8	6430	9.2	85.6	—	3.3	52.9	2.63	53.2	45.4	80.1	0.013	0.108	166	79400	83.9	18.2
Alluvial Groundwater																								
CAWA-08-11597	16-25278	1.6	4/10/2008	F	24.3	8830	—	0.58	—	315	24.7	—	—	7.33	2.43	3.6	—	4.3	—	0.14	28.7	4980	1.7	2.54
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	11000	—	—	349	—	24.5	—	0.14	7.38	—	4.9	—	5	0.00182	—	30.4	6550	2.6	2.9
EU071000FLC302	16-25278	1.6	10/22/2007	UF	107.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	77.4	94.2	—	—	—	618	27.7	0.114	—	17.9	2.4	—	7.9	—	—	0.236 (J+)	62.2	2520	—	4.22
GU071000FLC301	16-25278	1.6	10/22/2007	UF	—	221	—	2.1	644	—	26.7	—	—	18.5	—	1.5	8.2	—	0.00402 (J-)	—	64.1	3460	—	4.34
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	33100	—	—	299	1.4	28.4	—	0.15	7.5	—	3.2	8.7	10.2	—	—	37.6	18900	3.9	4.58
CAWA-08-11602	16-25279	2.7	4/10/2008	F	18	12100	0.035	—	—	184	25	—	0.18	5.95	3.03	5.9	8.2	4.3	—	0.116	24.9	7210	3.3	2.44
EU071000FLC202	16-25279	2.7	10/24/2007	UF	57.359	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	2.7	10/24/2007	F	41.3	4060	—	—	—	218 (J+)	44.2 (J+)	0.107	0.24	9.62	3.82	2.6	18	7.1 (J-)	—	0.204 (J+)	34.8	2770 (J+)	1.9	2.62
GU071000FLC201	16-25279	2.7	10/24/2007	UF	—	14200	—	—	355 (J+)	—	46.8 (J+)	—	0.28	10.3	—	8.7	13.1	10.8 (J-)	0.0021 (J-)	—	40.7	8840 (J+)	6.1	3.66
CAWA-08-11604	16-25280	2.6	4/3/2008	F	31.8	14000	—	—	—	462	34.7	—	0.13	7.65	3.39	10.2	5.7	7.3	—	0.213	30.3	7900	5.2	2.72
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	29900	0.64	—	708	1.3	36.8	—	0.35	8.83	—	17.4	2.1	12.7	—	—	40.3	16700	11.4	4.43

Table H-7.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Manganese (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	pH (SU)	Potassium (mg/L)	Silicon Dioxide (mg/L)	Silver (µg/L)	Sodium (mg/L)	Specific Conductance (uS/cm)	Strontium (µg/L)	Sulfate (mg/L)	Suspended Sediment Concentration (mg/L)	Thallium (µg/L)	Tin (µg/L)	Total Dissolved Solids (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Organic Carbon (mg/L)	Total Phosphate as Phosphorus (mg/L)	Total Suspended Solids (mg/L)	Uranium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
Surface Water																											
EU071000SFLS02	16-02654	n/a	10/19/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF06020SFLS01	16-02654	n/a	4/3/2006	F	222	—	2.7	3.8	—	3.72	—	—	7.07 (J)	—	39.9	—	—	—	—	70	—	—	—	—	—	4.2	13.3
GF070500SFLS01	16-02654	n/a	5/11/2007	F	299	—	—	2.1	7.17 (J)	3.43	35.1	—	8.99	105	49.9	6.13	—	—	—	177	1.41	—	0.282	—	0.07 (J-)	—	—
GF071000SFLS01	16-02654	n/a	10/19/2007	F	151	—	—	3	6.98 (J)	3.96 (J)	33.2	—	9.9	106	59.4	3.46	—	—	—	119	1.56	—	—	—	0.2 (J)	—	4
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	312	—	2.5	3.9	6.45 (J)	4.25	39.9	—	7.23 (J)	89.1	51.2	4.89	—	—	—	—	1.23	—	—	27.2	—	7.1	18.2
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	533	—	—	8.4	—	6.67	—	0.47	9.5	—	72.9	—	90	—	2.6	—	2.3	18.9	—	—	0.83	24.9	45.4 (J)
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	308	—	—	8.2	—	4.85 (J)	—	0.44	10.4	—	73.2	—	212	—	—	—	1.9	22.1	—	—	1.2 (J)	9.8 (J+)	15.9
GF0602FLCDV01	16-06121	n/a	4/10/2006	F	23.5	—	—	2.2	—	3.8	—	—	7.77	—	60.1	—	—	—	—	—	—	—	—	—	0.2	4.3	14.1
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	15500	0.58	—	48.2	6.86 (J)	19	170	0.96	9.67	125	447	8.87	2570	1.1	9.3	—	—	—	—	—	25.6	126	420
Alluvial Groundwater																											
CAWA-08-11597	16-25278	1.6	4/10/2008	F	105	—	0.65	2.2	6.74	3.63	53.5	0.29	6.07	74.2	47.8	4.01	—	—	—	142	—	—	0.087	—	0.22	9.5	19.4
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	118	—	0.74	2.9	—	3.86	—	0.35	6	—	49.1	NA	3.6	—	—	—	0.766	12.5	—	—	0.3	11.5	22.2
EU071000FLC302	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	1370	—	—	7 (J)	6.39 (J)	3.12	27.9	—	8.13	159	125	1.78	—	—	—	139	0.823	—	0.088 (J-)	—	0.18	2.1	3.7
GU071000FLC301	16-25278	1.6	10/22/2007	UF	1460	—	—	7.3 (J)	—	3.16	—	—	8.32	—	130	—	2.6	—	—	—	0.924	22.8	—	—	0.18	2.4	4.2
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	709	—	0.56	5	—	6.28	—	0.61	6.68	—	54.8	—	49.7	—	—	—	1.02	11.5	—	—	0.42	28.5	55.2
CAWA-08-11602	16-25279	2.7	4/10/2008	F	565	—	0.93	5.5	6.21	3.65	67.4	0.27	6.12	67	41.1	4.52	—	—	—	164	—	—	0.103	—	0.31	12.5	25.2
EU071000FLC202	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF071000FLC201	16-25279	2.7	10/24/2007	F	1030 (J+)	—	—	10 (J)	6.05 (J)	3.98	48.3 (J+)	—	9.95	109	66.7 (J+)	4.94	—	—	—	136	0.517	—	—	—	0.22 (J)	—	14.6
GU071000FLC201	16-25279	2.7	10/24/2007	UF	1100 (J+)	0.042 (J-)	—	13.3 (J)	—	5.69	—	0.37	10.3	—	76.2 (J+)	—	124	—	—	—	0.9	15	—	—	0.66 (J)	16.5	31.4
CAWA-08-11604	16-25280	2.6	4/3/2008	F	73.1	—	1.9	6.2	6.36	3.56	78.3	0.34	11.2	94.4	52.1	4.87	—	—	—	194	—	—	0.116	—	0.49	16.6	30.5
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	109	0.032	2.4	11.8	—	5.42	—	0.76	11.1	—	64.2	—	24	0.36	—	—	0.573	13.3	—	—	0.91	32	59.4

[a] n/a = Not applicable.

[b] UF = Unfiltered.

[c] — = Not detected or not analyzed.

[d] F = Filtered.

Table H-7.2-1
Organic Chemicals Detected in Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Field Prep	Acetone (µg/L)	cis-1,2-Dichloroethene (µg/L)	1,2,3,4,6,7,8-Heptachlorodibenzodioxin (µg/L)	Heptachlorodibenzodioxins (Total) (µg/L)	1,2,3,4,6,7,8-Heptachlorodibenzofuran (µg/L)	Heptachlorodibenzofurans (Total) (µg/L)	HMX (µg/L)	4-Isopropyltoluene (µg/L)	Methylene Chloride (µg/L)	1,2,3,4,6,7,8,9-Octachlorodibenzodioxin (µg/L)	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (µg/L)	RDX (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)
Surface Water																			
AU070500SFLS01	16-02654	n/a[a]	5/11/2007	UF[b]	—[c]	—	0.0000096 (J)	0.0000208 (J)	0.00000279 (J)	0.0000067 (J)	—	—	—	0.0000671 (J)	0.00000703 (J)	—	—	—	—
AU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	—	0.000012 (J)	0.0000315 (J)	—	—	—	—	—	0.000074 (J)		—	—	—	—
GU06020SFLS01	16-02654	n/a	4/3/2006	UF	17.2	—	—	—	—	—	3.71	—	—	—	—	—	—	0.281	—
GU070500SFLS01	16-02654	n/a	5/11/2007	UF	4.3 (J-)	—	—	—	—	—	10.2 (J+)	—	—	—	—	0.304 (J+)	—	—	—
GU071000SFLS01	16-02654	n/a	10/19/2007	UF	3.96 (J-)	—	—	—	—	—	11.1 (J+)	—	—	—	—	0.172 (J+)	—	—	—
GU0602FLCDV01	16-06121	n/a	4/10/2006	UF	—	—	—	—	—	—	2.7 (J+)	—	5.04	—	—	—	—	—	—
Alluvial Groundwater																			
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	—	—	—	—	—	3.79	—	—	—	—	0.256	—	—	—
GU071000FLC301	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	—	3.8 (J-)	0.93	—	—	—	—	—	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	—	—	—	—	—	4.75	—	—	—	—	0.146	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	—	9.86 (J-)	—	—	—	—	—	—	—	—
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	9.55	—	—	—	—	33.3	—	—	—	—	7.47	193	—	11.8
GU06020FLC101	16-25280	2.6	2/16/2006	UF	—	26.7	—	—	—	—	—	—	—	—	—	—	6.09	0.462	3.99

[a] n/a = Not applicable.

[b] UF = Unfiltered.

[c] — = Not detected or not analyzed.

Table H-7.3-1
Radionuclides Detected in Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date	Field Prep	Gross alpha (pCi/L)	Gross beta (pCi/L)	Radium-226 (pCi/L)	Radium-228 (pCi/L)	Strontium-90 (pCi/L)	Tritium (pCi/L)	Uranium-234 (pCi/L)	Uranium-235/236 (pCi/L)	Uranium-238 (pCi/L)
Surface Water													
GF071000SFLS01	16-02654	n/a[a]	10/19/2007	F[b]	—[c]	9.25	—	—	—	—	0.153	—	0.119
GU071000SFLS01	16-02654	n/a	10/19/2007	UF[d]	14.3	18.2	—	—	—	—	0.5	—	0.528
UU06020SFLS01	16-02654	n/a	4/3/2006	UF	—	—	—	—	—	127.0814	—	—	—
UU070500SFLS01	16-02654	n/a	5/11/2007	UF	—	—	—	—	—	87.1689	—	—	—
UU071000SFLS01	16-02654	n/a	10/19/2007	UF	—	—	—	—	—	47.2564	—	—	—
Alluvial Groundwater													
CAWA-08-11599	16-25278	1.6	4/10/2008	UF	—	—	0.652	—	—	—	—	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	F	—	3.1 (J)	—	—	—	—	0.0708 (J)	—	0.0494 (J)
GU071000FLC301	16-25278	1.6	10/22/2007	UF	2.36 (J)	5.51 (J)	0.879 (J)	0.957 (J)	—	—	—	—	0.0501 (J)
UU071000FLC301	16-25278	1.6	10/22/2007	UF	—	—	—	—	—	47.5757	—	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	UF	—	—	0.888	1.41	—	—	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	UF	9.29	10.1	2.56	0.919 (J)	—	—	0.225	—	0.184
UU071000FLC201	16-25279	2.7	10/24/2007	UF	—	—	—	—	—	50.7687	—	—	—
CAWA-08-11604	16-25280	2.6	4/3/2008	F	—	—	—	—	0.542	—	0.218	—	0.187
CAWA-08-11605	16-25280	2.6	4/3/2008	UF	—	—	—	0.863	—	—	0.42	0.0431	0.47

[a] n/a = Not applicable.

[b] F = Filtered.

[c] — = Not detected or not analyzed.

[d] UF = Unfiltered.

Appendix I

Risk Assessment

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Attachments

Attachment I-1	Ecological Scoping Checklist
Attachment I-2	ProUCL Files (on CD included with this document)

I-1.0 INTRODUCTION

This appendix presents results of the human health and ecological risk screening assessments performed in support of the investigations and remediation activities conducted at the Technical Area (TA) 16-340 Complex. The TA-16-340 Complex includes Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f) within TA-16 at Los Alamos National Laboratory (LANL or the Laboratory) (Figures 1.0-1 and 1.0-2 of the investigation report). These risk screening assessments supersede those presented in the original TA 16-340 Complex investigation report (LANL 2006, 091450). Data have been added and removed as a result of the 2008 investigation and remediation. This investigation was performed to fulfill additional data and corrective action requirements identified in the investigation report, the Laboratory's response to the New Mexico Environment Department (NMED) notice of deficiency (NOD) for the TA-16-340 Complex investigation report, and the final NMED acceptance with modifications letter for the TA-16-340 Complex investigation report (LANL 2006, 091450; LANL 2006, 094410; NMED 2006, 094381). The upper confidence level (UCL) calculation procedures have also been updated since the original report. Therefore, consolidated units and SWMUs with no new data have also been reevaluated. The chemicals of potential concern (COPCs) in soil and tuff at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f) are evaluated in these risk screening assessments.

I-2.0 SITE BACKGROUND

The TA-16-340 Complex operated from 1952 to 1999 and processed large quantities of high explosives (HE) for the production of plastic-bonded explosives by slurrying HE and solvents together with inert binders. The HE- and solvent-contaminated wash water was routed as waste to six sumps associated with former building 16-340 and the single sump and outfall associated with former building 16-342. Historically, discharges from the sumps at buildings 16-340 and 16-342 were routed to the outfalls at buildings 16-340 and 16-342, respectively.

During the 1970s, the U.S. Environmental Protection Agency (EPA) issued National Pollutant Discharge Elimination System (NPDES) permits for the operation of the building 16-340 outfall as EPA Outfall 05A054 and the building 16-342 outfall as EPA Outfall 05A062 (EPA 1990, 012454). The building 16-345 sump and outfall were never issued permits under NPDES. The latest NPDES-permitting effort for the building 16-340 outfall occurred in 1994. The building 16-340 outfall was deactivated on July 20, 1998, and the building 16-342 outfall was deactivated on July 31, 1996.

I-2.1 Site Description and Operational History

TA-16, located in the southwest corner of the Laboratory (Figure 1.0-1), covers 2410 acres or 3.8 mi^2 and is on a portion of land acquired in 1943 by the U.S. Department of the Army for the Manhattan Project. TA-16 is bordered by Bandelier National Monument along NM 4 to the south and by the Santa Fe National Forest along NM 501 to the west. To the north and east it is bordered by TA-08, TA-09, TA-11, TA-14, TA-15, TA-37, and TA-49. Cañon de Valle forms the northern boundary of TA-16. Water Canyon, a 200-ft-deep ravine with steep walls, separates NM 4 from active sites at TA-16. TA-16 is also surrounded by a security fence and "No Trespassing" signs are posted along the highways.

I-2.1.1 Consolidated Unit 13-003(a)-99

Consolidated Unit 13-003(a)-99 consists of SWMU 13-003(a) and Area of Concern (AOC) 13-003(b), both of which are components of an inactive septic system associated with activities at former TA-13 (LANL 1993, 020948, pp. 5-98–5-99). Former TA-13, built in 1944 to support the HE Project of the Manhattan Project, was located at the eastern end of the current TA-16 explosives manufacturing area. It was principally a site for counter x-ray diagnostics of HE lens configurations. Activities included the operation of counter x-ray equipment, the assembly of HE test devices, and research for the magnetic method program. Buildings and associated structures in the western half of the site were demolished in the early 1950s.

The septic tank was decommissioned and removed in 1951 and the area is now SWMU 13-003(a). The septic system had received liquid wastes from building 16-475 associated with implosion and initiator testing conducted during the early years of Laboratory operations. The building had a toilet, lavatory, and small darkroom next to the sewer hookup. The septic tank was in service from the 1940s until 1951, when the entire area was decommissioned to make room for the construction of building 16-340. Parts of building 16-340 were constructed on top of the original location of the septic tank. The types of liquid wastes discharged to the septic tank are not known. AOC 13-003(b) is the drain field associated with the septic tank. The drain field is located about 100 ft southwest of the former location of the septic tank. There are no records documenting the drain field was removed.

I-2.1.2 Consolidated Unit 16-003(n)-99

Consolidated Unit 16-003(n)-99 is the HE sump and drainline associated with building 16-342. It also includes the discharge area for the outfall. Building 16-342 was used for HE processes in which the constituents of plastic-bonded explosive formulations were mixed and blended (LANL 1993, 020948, pp. 5-35 to 5-36). The sump operated to remove suspended solids from process water before it was discharged to the outfall. The HE fines were collected in a cloth filter bag secured inside a metal filter basket. The baskets and filter bags were periodically removed and taken to the TA-16 basket-washing facility for cleaning. The HE fines too small to collect in the filter bags settled to the bottom of the sump. To help separate the suspended solids, the water flowed under an aluminum baffle and over a concrete weir before it discharged to the outfall. The HE in the bottom of the sump was periodically removed and burned. The sump discharged to the outfall, located to the northeast, and daylighted in a small tributary to Fishladder Canyon, which ultimately connected to Cañon de Valle.

Consolidated Unit 16-003(n)-99 wastes were transported in the washdown from cleaning activities (LANL 1993, 020948, pp. 5-35–5-36). The principal HE used at TA-16 were trinitrotoluene (TNT), cyclotrimethylenetrinitramine (RDX), and cyclotetramethylenetetranitramine (HMX) with barium nitrate. Three evaluations of chemical use in building 16-342 were completed during the early 1970s (Wilder 1970, 034564; Panowski and Salgado 1971, 015271; LASL 1979, 001808). They described use of HE in the building but did not identify any solvents. They also noted the use of natural uranium.

I-2.1.3 SWMU 16-003(o)

SWMU 16-003(o) consists of the six inactive HE sumps and the drainline associated with building 16-340 that received effluent from sink drains, floor drains, equipment drains, and roof drains (LANL 1993, 020948, p. 5-37). Building 16-340 was used for mixing and blending HE constituents of plastic-bonded explosive formulations (LANL 1993, 020948, pp. 5-37–5-38). The sumps discharged to an outfall east of building 16-340 and daylighted in a small tributary to Fishladder Canyon, which ultimately connected to Cañon de Valle. In the 1980s, an air stripper (the “fishladder”), designed to eliminate volatile organic compounds (VOCs), was added at the outfall. The air stripper discharged into Fishladder Canyon. Splashing caused by the air stripper may have resulted in the dispersal of outfall liquids over a larger area.

Wastes from building 16-340 consisted primarily of HE and solvents (LANL 1993, 020948 pp. 5-37–5-38) transported in the washdown from cleaning activities. Three evaluations of chemical use in the building completed during the early 1970s (Wilder 1970, 034564; Panowski and Salgado 1971, 015271; LASL 1979, 001808) described the use of HE, and solvents (acetone, ammonium sulfate, n-butyl-acetate, chloroform, 1,2-dichloroethane, ethyl acetate, isopropyl alcohol, methanol, methylene chloride, butanone[2-], and toluene) in building 16-340.

I-2.1.4 SWMU 16-026(j2) and SWMU 16-029(f)

SWMUs 16-026(j2) and 16-029(f) are associated with building 16-345. SWMU 16-029(f) is the inactive HE sump and SWMU 16-026(j2) is the drainline and outfall, including the soil associated with the outfall.

Building 16-345 served as a storage facility for building 16-340 (LANL 1993, 020948, p. 5-38). The sump discharged to an outfall located southeast of building 16-345. Wastes consisted primarily of HE (LANL 1993, 20948, p. 5-38) transported by washdown from cleaning activities. Two evaluations of chemical use in the building completed during the early 1970s (Wilder 1970, 034564; Panowski and Salgado 1971, 015271) noted that the probability of HE in the sump was “nil” and that effluents from the building were negligible.

I-2.2 Investigation Sampling

The data used to identify COPCs and to evaluate potential risks to human health and the environment for the TA-16-340 Complex consist of all qualified analytical results compiled from both historical sampling activities and the 2008 investigation. The 2008 sampling added two new samples for Consolidated Unit 16-003(a)-99, 86 new samples for Consolidated Unit 16-003(n)-99, and two new samples for SWMU 16-026(j2) for the interval of 0–10 ft below ground surface (bgs) used in the risk assessment. Historical samples collected from areas and depth intervals from which soil or tuff was removed [SWMU 16-003(o)] are not included in the data set for this site because these data no longer are representative of present conditions. Only data determined to be of sufficient quality, following the data quality assessment (Appendix F), is included in the data sets evaluated in Appendix H and in this risk appendix.

I-2.3 Analytical Data—COPC Determination

The analytical data review and COPC determination for the TA-16-340 Complex are summarized in Appendix H. Table H-2.0-1 presents the COPCs evaluated in the risk screening assessments.

Tables I-2.3-1 to I-2.3-7 summarize the COPCs evaluated for human health risk for each of the four areas in the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99, SWMU 16-003(o), and SWMUs 16-026(j2) and 16-029(f)]. Table I-2.3-8 summarizes the chemicals of potential ecological concern (COPECs) for the TA-16-340 Complex as a whole. Only COPCs identified in Appendix H, which were detected above background (inorganic chemicals and radionuclides), had detection limits above background values (BVs) (inorganic chemicals), or were detected (organic chemicals and radionuclides) were retained.

The list of COPCs at each site was modified from the list in Appendix H based upon the receptors evaluated and the depth interval associated with the potential exposures. The industrial scenario and the ecological evaluation typically utilize data for samples collected from 0–1 ft bgs and 0–5 ft bgs, respectively. The residential scenario typically uses data for samples collected from 0–10 ft bgs. However, sampling depths may overlap the lower bounds; therefore, all samples with a starting depth above the lower bound of the interval for each scenario were included in the risk assessments (Tables I-2.3-1 to I-2.3-8). Some of the COPCs identified in Appendix H may not be evaluated for potential risk under one or more scenarios because they were only reported as above background (inorganic chemicals and radionuclides) or detected (organic chemicals) below the depth interval associated with a given scenario.

I-3.0 CONCEPTUAL SITE MODEL

The primary mechanisms of contaminant release for the sites at the TA-16-340 Complex are related to the historical operations and releases discussed in detail in the TA 16-340 Complex investigation report (LANL 2006, 091450). Surface and subsurface soil and tuff are the only media containing residual contamination at the site. Weathering of tuff is the only viable natural process that may result in the exposure of receptors to COPCs in tuff; because of the slow rate of weathering expected for tuff, exposure to COPCs in tuff is negligible, although it is included in the risk screening assessments.

The limited saturated conditions in the area may restrict the horizontal and vertical migration of contaminants. Saturated conditions in the vadose zone exist as saturated ribbons (see Figure 4.2-4 in the investigation report). No perched groundwater has been identified in the area beneath the TA-16-340 Complex. Deep perched groundwater is present in R-25, located approximately 1000 ft north of the TA-16-340 Complex, but not at CdV-16-3(i), located 1000 ft southwest of the TA-16-340 Complex. Alluvial groundwater occasionally discharges at Fishladder Seep, approximately 2000 ft east of the outfall discharge area for building 16-340. A complete pathway to groundwater, including the regional aquifer, which is located more than 1200 ft bgs from the mesa top, is probably intermittent. No permanent surface water exists within the TA-16-340 Complex. Occasional surface water runoff occurs as a result of brief but often intense seasonal thunderstorms, which can produce significant rainfall in short time periods. Runoff may be generated during the winter as a result of snow melt. Runoff from the narrow mesa top may contribute minor amounts of flow to surface runoff on the slope. Surface runoff on the TA-16-340 Complex slope is most likely to occur as channelized flow in moderately steep and incised drainage channels.

I-3.1 Receptors and Exposure Pathways

The conceptual site model for contaminant exposure to human receptors is shown in Figure I-3.0-1. TA-16 is entirely an industrial area and the industrial scenario is the current and reasonably foreseeable future land use. Therefore, all of the sites in the TA-16-340 Complex were evaluated according to the industrial scenario. The residential scenario was also evaluated for each site as required by the March 1, 2005, Compliance Order on Consent (the Consent Order). Primary exposure media for human receptors include surface soil and subsurface soil/tuff. The potential pathways for human exposure to surface soil and tuff are dermal contact, inhalation of vapors or fugitive dust, incidental soil ingestion, and external irradiation. Pathways from subsurface contamination to potential human receptors are complete only if contaminated soil or tuff were excavated and brought to the surface. The potential pathways are similar to those from surface soil (i.e., dermal contact, inhalation of vapors or fugitive dust, and incidental soil ingestion). The surface water and alluvial groundwater analytical data were compared to New Mexico Water Quality Control Commission (NMWQCC) and EPA water-quality standards (http://www.nmenv.state.nm.us/swqb/Standards/20.6.4NMAC.pdf) and EPA Region 6 (EPA 2007, 099314) and Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf) tap water screening levels (section I-6.0).

As stated in the original investigation report for the TA-16-340 Complex (LANL 2006, 091450), per the Laboratory's response to the NOD on the investigation work plan (LANL 2004, 087395, Comment 1), the Laboratory will also "evaluate the verification sampling data by using the construction worker SSLs for comparison purposes and provide contaminant and risk information to construction/D&D [decontamination and decommissioning] organizations that need to evaluate the potential for worker exposure at this site" (LANL 2004, 087345). This evaluation will occur before any construction work begins in the TA-16-340 Complex area.

The conceptual site model for contaminant exposure for ecological receptors is shown in Figure I-3.0-1 and the ecological scoping checklist (Attachment I-1). Exposure pathways to surface and subsurface soil and tuff that apply for ecological receptors include root uptake by plants, dermal contact, inhalation of vapors or dust, incidental ingestion of soil, and food web transport. Dietary exposures include soil ingestion and food-web transport and are the primary pathways for wildlife. Surface water is an unlikely exposure pathway for ecological receptors because of its ephemeral and transient occurrence.

For the human health risk evaluation, four unique exposure areas were evaluated: Consolidated Units 13-003(a)-99 and 16-003(n)-99, SWMU 16-003(o) and combined SWMUs 16-026(j2) and 16-029(f). A 0- to 1-ft-depth interval was used to assess human health risk under the industrial scenario (with the exception of Consolidated Unit 13-003(a)-99, which evaluated the horizon of 0 to 10 ft bgs for the industrial scenario because of the small number of samples in the depth interval of 0 to 1 ft bgs as a result of to the removal action). A 0- to 10-ft-depth interval was used to assess human health risk under a residential scenario, as required by the Consent Order. A 0- to 5-ft-depth interval was used to assess risk to terrestrial ecological receptors. All soil and tuff samples from these depth intervals were included in the assessments. The entire TA-16-340 Complex was evaluated as a single exposure area for ecological receptors.

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 through 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 (Appendix H). 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 migration 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, the lack of saturated conditions, and the depth to groundwater, the potential for contaminant migration to groundwater is low.

Guidance from NMED (2006, 092513) 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 TA-16-340 Complex where sampling has shown that contamination is vertically bounded near the surface and the distance from the surface to the water table is large. Therefore, 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. Releases at the TA-16-340 Complex occurred decades ago. The regional aquifer beneath the aggregate area is greater than 1000 ft bgs. 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 significant migration has not occurred, indicating a low potential for future contaminant migration to groundwater.

The 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 attenuation and bioremediation. The transport of VOCs occurs primarily in the vapor phase by diffusion or advection in subsurface air. The chemical and physical properties of the TA-16-340 Complex COPCs are presented in Tables I-3.2-1, I-3.2-2, and I-3.2-4.

The primary release and transport mechanisms, which may lead to the potential exposure of receptors in the TA-16-340 Complex, 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;
- bioperturbation and/or translocation of contaminants in subsurface contaminated media; and
- uptake of contaminants from soil by biota.

Contaminant distributions at the TA-16-340 Complex indicate that after the initial deposition of contaminants from operational activities and remediation efforts, elevated levels of contaminants in soil tend to remain concentrated in the vicinity of the original release points (Appendix H).

I-3.2.1 Inorganic Chemicals

In general, and particularly in a semiarid climate such as that found at the sites within the TA-16-340 Complex, 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 TA-16-340 Complex sites. Based on this criterion, aluminum, antimony, barium, cadmium, chromium, cobalt, fluoride, lead, manganese, mercury, nickel, thallium, uranium, vanadium, 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, perchlorate, 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 below. Information about the fate and transport properties of inorganic chemicals was obtained from individual chemical profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR 1997, 056531). Information for these inorganic chemicals is also available from the ATSDR website at http://www.atsdr.cdc.gov/toxpro2.html.

The soil and parent material at the TA-16-340 Complex is the same as other areas in the vicinity of the Laboratory. The average pH value reported for Pueblo Canyon was 7.2 (LANL 2008, 102408). Based on similarities of parent material and proximity it is expected that the soil pH within the TA-16-340 Complex is neutral.

- 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 present environmental conditions and its extent is defined.
- 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 soil pH is neutral, so leaching of copper is unlikely. In addition, the extent of copper is defined.
- 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. 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 sites has low moisture content, which inhibits the mobility of nitrate and perchlorate as well as most other inorganic chemicals.
- Selenium is not often found in the environment in its elemental form but is usually combined with sulfide minerals or with silver, copper, lead, and nickel minerals. In soil, pH and Eh are determining factors in the transport and partitioning of selenium. In soil with a pH of greater than 7.5, selenates, which have high solubility and a low tendency to adsorb onto soil particles, are the major selenium species and are very mobile. The soil pH is neutral at the sites, which indicates that selenium is not likely to migrate in this soil.
- 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 soils 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 TA-16-340 Complex. Physical and chemical properties of organic chemicals are important when evaluating their fate and transport. The following physical/chemical property information illustrates some aspects of the fate and transport tendencies of the TA-16-340 Complex 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, benzyl alchohol, butanone[2-], chloroform, dichloroethene[1,1-], dichloroethene[cis1,2-], diethylphthalate methyl-2-pentanone[4-], methylene chloride, nitrobenzene, trichloroethane[1,1,1-], 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, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, butylbenzene[n-], butylbenzylphthalate, chloronaphthalene[2-], chrysene, dibenz[a,h]anthracene, dibenzofuran, di-n-octylphthalate, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, methylnaphthalene[2-], phenanthrene, phenol, pyrene, and trinitrotoluene[*2,*4,6-].

Vapor pressure is a chemical characteristic used to evaluate the tendency of organic chemicals to volatilize. 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, benzyl alcohol, butanone[2-], butylbenzene[n-], chloroform, dichlorobenzene[1,2-], dichlorobenzene[1,3-], dichlorobenzene[1,4-], dichloroethene[1,1-], dibenzofuran, dichloroethene[cis-1,2-], diethylphthalate, ethylbenzene, isopropylbenzene, isopropyltoluene[4-], methyl-2-pentanone[4-], methylene chloride, methylnaphthalene[2-], naphthalene, nitrobenzene, phenol, propylbenzene[1-], triaminotrinitrobenzene (TATB), tetrachloroethene, toluene, trichloroethene, trichlorofluoromethane, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], trinitrotoluene[2,4,6-], xylene[1,2-], and xylene[1,3]+xylene[1,4-] have vapor pressures greater than 0.01 mm Hg.

Chemicals with vapor pressures less than 0.000001 mm Hg are less likely to volatilize and, therefore, tend to remain immobile. Anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, dibenz[a,h]anthracene, di-n-octylphthalate, fluoranthene, indeno[1,2,3-cd]pyrene, pyrene, cyclotrimethylenetrinitramine (RDX), and trinitrophenylmethylnitroamine (tetryl) 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, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2 ethylhexyl]phthalate, butylbenzene[n-], butylbenzylphthalate chloronaphthalene[2-], chrysene, dibenz[a,h]anthracene, dibenzofuran, dichlorobenzene[1,2-], dichlorobenzene[1,3-], dichlorobenzene[1,4-], di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, isopropylbenzene, isopropyltoluene[4-], methylnaphthalene[2-], naphthalene, phenanthrene,propylbenzene[1-], pyrene, tetrachloroethene, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3-]+ xylene[1,4-]. A K_{ow} of less than 500 indicates high water solubility, high mobility, little to no affinity for bioaccumulation, and degradability by microbes, plants, and animals. Acetone, benzoic acid, benzyl alcohol, butanone[2-], chloroform, dichloroethene[1,1-], dichloroethene[cis-1,2-], diethylphthalate, methyl-2-pentanone[4-], methylene chloride, nitrobenzene, phenol, tetryl, 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 2006, 092513). Acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, butylbenzylphthalate, chloronaphthalene[2-], chrysene, dibenz[a,h]anthracene, dibenzofuran, di-n-butylphthalate, di-n-octylphthalate, ethylbenzene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, isopropylbenzene, HMX, methylnaphthalene[2-], naphthalene, phenanthrene, propylbenzene[n-], pyrene, triaminotrinitrobenzene TATB, tetryl, trimethylbenzene[1,2,4-], and trimethylbenzene[1,3,5-] have K_{oc} values above 500 L/kg, indicating a very low potential to migrate toward groundwater. The COPCs with K_{oc} values less than 500 L/kg are acetone, benzoic acid, benzyl alcohol, bromobenzene, butanone[2-], chloroform, dichlorobenzene[1,2-], dichlorobenzene[1,3-], dichlorobenzene[1,4-], dichloroethene[1,1-], dichloroethene[cis-1,2], diethylphthalate, methyl-2-pentanone[4-], methylene chloride, nitrobenzene, phenol, RDX, tetrachloroethene, toluene, trichloroethane[1,1,1-], trichloroethene, trichlorofluoromethane, xylene[1,2-], and xylene[1,3-] + xylene[1,4-].

The COPCs that are least mobile and most likely to bioaccumulate include: acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, butylbenzylphthalate, chrysene, dibenz[a,h]anthrachene, dibenzofuran, di-n-butylphthalate, di-n-octylphthalate, fluoranthene, fluorene, HMX, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene. The more soluble and volatile COPCs, including acetone, benzoic acid, benzyl alcohol, butanone[2-], chloroform, dichlorobenzene[1,2-], dichlorobenzene[1,3-], dichlorobenzene[1,4-], dichloroethene[1,1-], dichloroethene[cis-1,2-], methyl-2-pentanone[4-], methylene chloride, nitrobenzene, tetrachloroethene, toluene, trichloroethane[1,1,1-], trichloroethene, trichlorofluoromethane, xylene[1,2-], and xylene[1,2-]+xylene[1,4-] are 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-3.2.2.1 Evaluation of VOC Pore Gas

The VOC results from pore-gas sampling were screened to evaluate whether concentrations in the subsurface pore gas are of concern as a potential source of groundwater contamination. Because no screening levels are available for pore gas that address the potential for groundwater contamination, the screening evaluation was based on groundwater cleanup levels contained in the Consent Order and Henry’s law constants that describe the equilibrium relationship between vapor and water concentrations. The source of the Henry’s law constants was the NMED technical background document (NMED 2006, 092513). If Henry’s law constants were not available from this source, they were obtained from the Pennsylvania Department of Environmental Protection chemical and physical properties database (http://www.dep.state.pa.us/physicalproperties/Default.htm). The following dimensionless form of Henry’s law constant was used:

$$H' = \frac{C_{air}}{C_{water}} \qquad \text{Equation 1}$$

where C_{air} is the volumetric concentration of contaminant in air and C_{water} is the volumetric concentration of contaminant in water. Equation 1 can be used to calculate the following screening value (SV):

$$SV = \frac{C_{air}}{1{,}000 \times H' \times SL} \qquad \text{Equation 2}$$

where C_{air} is the concentration of VOC in the pore-gas sample (µg/m^3), H’ is the dimensionless Henry’s law constant, SL is the screening level (µg/L) and 1000 is a conversion factor from L to m^3, and SV is the screening value. The SLs are groundwater cleanup levels specified in the Consent Order. These are the EPA maximum contaminant level (MCL) or NMWQCC groundwater standard, whichever is lower. If no MCL or NMWQCC standard is available, the EPA Region 6 screening level for tap water (EPA 2007, 099314) is used (adjusted to 10^{-5} risk for carcinogens). The numerator in Equation 2 is the measured concentration of VOC in pore gas, and the denominator represents the concentration in pore gas needed to exceed the SL. Therefore, if SV is less than 1, the concentration of VOC in pore gas is not sufficiently high to cause the water SL to be exceeded, even if the VOCs were in contact with groundwater.

Equation 2 was used to screen the maximum concentrations of VOCs detected in pore-gas samples from the investigation. As shown in Table I-3.2-3, 16 VOCs were detected that have MCLs, NMWQCC standards, and/or EPA Region 6 tap water screening levels. For each of these VOCs, screening was performed using the maximum detected concentration. These results show that the SV is below 1 in all cases. The results of this screening indicate that VOCs in subsurface pore gas are not a potential source of groundwater contamination.

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-3.2-4 gives physical and chemical properties of the radionuclide COPCs identified at the TA-16-340 Complex sites. Based on K_d values (greater than 40), uranium-234, uranium-235, and uranium-238 have a very low potential to migrate towards groundwater.

I-4.0 HUMAN HEALTH RISK SCREENING ASSESSMENT

Human health risk screening evaluations were conducted for Consolidated Units 13-003(a)-99 and 16-003(n)-99, SWMU 16-003(o), and the combined SWMUs 16-026(j2) and 16-029(f) within the TA-16-340 Complex to determine whether COPC concentrations in soil and tuff pose a potential unacceptable risk to human receptors. All sites were screened using the industrial scenario (0–1 ft bgs) and the residential scenario (0–10 ft bgs). Consolidated Unit 13-003(a)-99 was screened using the industrial scenario from 1–10 ft bgs because of the lack of surface data following soil removal actions (Table I-4.0-1). The human health risk screening assessments compare either the UCL of the mean concentration, the maximum detected concentration, or maximum detection limit of each COPC with SSLs for chemicals and screening action levels (SALs) for radionuclides.

I-4.1 Exposure Point Concentration Calculations

The exposure point concentrations (EPCs) represent upper bound concentrations of COPCs. For comparison to SSLs and SALs, the 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 ProUCL 4.00.02 software (EPA 2007, 096530), which is based on EPA guidance (EPA 2002, 085640). The ProUCL program calculates a data distribution and a variety of 95%, 97.5%, and 99% UCLs. The ProUCL software performs distributional tests on the data set for each COPC and recommends the most appropriate UCL based on the distribution of the data set (normal, lognormal, gamma approximate gamma, or nonparametric) and the decision criteria, as explained in the technical guidance for the software (EPA 2007, 096530). The ProUCL recommended UCL was used as the EPC when the number of detections in a data set was five or more and did not exceed the maximum concentration. Key aspects of the current version of ProUCL are that it tests data against an expanded range of distribution types, contains a larger suite of statistical tests, and performs analyses on datasets with nondetected values.

The ProUCL documentation strongly recommends against using the maximum detected concentration for the EPC. However, it also cautions against using statistical values calculated on less than four to six detected results in a large data set. Therefore, the maximum detected concentration was used to represent the EPC for COPCs with less than five detected values, because the resultant statistical estimate may not be reliable. In these cases, if the observations are highly skewed and result in significant risk due to use of the maximum detected concentration the COPC is further assessed in the uncertainty section of this document. 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-2.3-1 to I-2.3-8. Input and output data files for ProUCL calculations are presented in Attachment I-2 (provided electronically).

I-4.2 Soil Screening Levels

Human health risk screening assessments for chemical COPCs were conducted using SSLs for the industrial and residential scenarios obtained from NMED guidance (NMED 2006, 092513). The NMED SSLs are based on a target noncarcinogenic hazard quotient (HQ) of 1.0 and a target cancer risk of 1×10^{-5} (NMED 2006, 092513). If SSLs were not available from NMED guidance, EPA Region 6 guidance (EPA 2007, 099314) was used. The EPA SSLs for carcinogens were multiplied by 10 to adjust from a 10^{-6} cancer risk level to the NMED target cancer risk level of 10^{-5}. Exposure parameters used to calculate the industrial and residential SSLs are presented in Table I-4.2-1.

Surrogate chemicals were used for some COPCs without a SSL based on structural similarity or because the COPC is a breakdown product (NMED 2003, 081172). In addition, some VOCs have saturation limit (C_{sat}) SSLs rather than risk-based values in the NMED and EPA Region 6 tables (NMED 2006, 092513; EPA 2007, 099314). The screening assessments used risk-based values obtained from EPA Region 6 for outdoor worker and residential (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screenexpanded.xls), when possible. If no risk-based values were available, a “forward” risk calculation was performed to estimate potential health effects using the exposure factors used to derive the SSLs (NMED 2006, 092513; LANL 2007, 094496).

Radionuclide SALs are used for comparison with radionuclide COPC concentrations and were derived using the residual radioactive (RESRAD) model, Version 6.21 (LANL 2005, 088493). The SALs are based on a 15-mrem/yr dose per U.S. Department of Energy (DOE) guidance (DOE 2000, 067489). Exposure parameters used to calculate the industrial and residential SALs are presented in Tables I-4.2-2 and I-4.2-3.

I-4.3 Results of the Human Health Risk Screening Evaluations

Total excess cancer risks and a hazard indexes (HIs) are provided for each area evaluated. The ratio of each COPC exposure, calculated as the EPC, divided by the respective SSL, is the HQ for a noncarcinogenic COPC; the sum of all HQs is the HI for a site. The ratio of each COPC exposure, calculated as the EPC, divided by the respective SSL, is the cancer risk for a carcinogenic COPC; the risks for all carcinogenic COPCs are summed to estimate the total excess cancer risk for a site.

Consolidated Unit 13-003(a)-99

The EPCs for carcinogenic COPCs do not exceed their respective industrial SSLs (Table I-4.3-1). The total excess cancer risk for the consolidated unit is approximately 4×10^{-6}. The EPCs for the noncarcinogenic COPCs also do not exceed their respective industrial SSLs (Table I-4.3-2). The HI for this consolidated unit is 0.2. A forward risk calculation was performed for COPCs having an SSL equal to the C_{sat} value. For the forward risk calculation, the HI is 0.00002 (Table I-4.3-5) and does not substantially influence the site HI. The results of the screening assessment for the industrial scenario are below the NMED target levels of 1×10^{-5} for cancer risk and an HI of 1.0 (NMED 2006, 092513).

The EPCs for carcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-3), except for arsenic. The residential total excess cancer risk for the consolidated unit is approximately 2×10^{-5}. The EPC for arsenic is within the range of background concentrations for soil and tuff. The EPCs for the noncarcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-4). The HI for this consolidated unit is 0.9. A forward risk calculation was performed for COPCs having an SSL equal to the C_{sat} value. For the forward risk calculation, the HI is 0.000005 (Table I-4.3-5) and does not substantially influence the site HI. The results of the screening assessment for the residential scenario are slightly above the NMED target risk level of 1×10^{-5} for cancer risk and below the target HI of 1.0 (NMED 2006, 092513).

Consolidated Unit 16-003(n)-99

The EPCs for carcinogenic COPCs do not exceed their respective industrial SSLs (Table I-4.3-6). The total excess cancer risk for the consolidated unit is approximately 2×10^{-6}. The EPCs for the noncarcinogenic COPCs also do not exceed their respective industrial SSLs (Table I-4.3-7). The HI for this consolidated unit is 0.1. For the forward risk calculation, the HI is 0.0001 (Table I-4.3-10) and does not substantially influence the site HI. The results of the screening assessment for the industrial scenario are below the NMED target levels of 1×10^{-5} for cancer risk and an HI of 1.0 (NMED 2006, 092513).

The EPCs for carcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-3), except for arsenic. The total excess cancer risk for the consolidated unit is approximately 2×10^{-5} (Table I-4.3-8). The EPC for arsenic is within the range of background concentrations for soil and tuff. The EPCs for the noncarcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-9). The HI for this consolidated unit is 1.5, mainly because of aluminum, iron, manganese, and vanadium. The EPCs for aluminum, iron, manganese, and vanadium are all within the range of background concentrations. Without these inorganic chemicals the HI is approximately 0.4. For the forward risk calculation, the HI is 0.001 (Table I-4.3-10) and does not substantially influence the site HI. The results of the screening assessment for the residential scenario are slightly above the NMED target levels of 1×10^{-5} for cancer risk and an HI of 1.0 (NMED 2006, 092513).

SWMU 16-003(o)

For SWMU 16-003(o), arsenic and benzo(a)pyrene have EPCs above their respective industrial SSLs (Table I-4.3-11). The total cancer risk for this SWMU is approximately 3×10^{-5}. The EPC for arsenic is within the range of background for soil. The EPCs for the noncarcinogenic COPCs do not exceed their respective industrial SSLs (Table I-4.3-12). The HI for this SWMU is 0.3. For the forward risk calculation, the HI is 0.000004 (Table I-4.3-15) and does not substantially influence the site HI. The results of the screening assessment for the industrial scenario are slightly above the NMED target level of 1×10^{-5} for cancer risk and below the target HI of 1.0 (NMED 2006, 092513).

For SWMU 16-003(o), arsenic and benzo(a)pyrene have EPCs above their respective carcinogenic residential SSLs (Table I-4.3-13). The total excess cancer risk for the SWMU is approximately 4×10^{-5}. The EPC for arsenic is within the range of background for soil. The EPCs for the noncarcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-14). The HI for this SWMU is approximately 2, mainly because of aluminum, iron, uranium, and vanadium. The EPCs for aluminum, iron, uranium, and vanadium are all within the range of background concentrations. Without these inorganic chemicals the HI is approximately 0.4. The HI for the forward risk calculation is 0.001 (Table I-4.3-15) and does not substantially influence the site HI. The results of the screening assessment for the residential scenario are slightly above the NMED target level of 1×10^{-5} for cancer risk and the target HI of 1.0 (NMED 2006, 092513).

Three radionuclides were identified as COPCs: uranium-234, uranium-235, and uranium-238. The total dose is 0.21 mrem/yr for the industrial scenario (Table I-4.3-16), which is less than the DOE target dose of 15 mrem/yr (DOE 2000, 067489). The total dose is 0.75 mrem/yr for the residential scenario, which is also below the target dose of 15 mrem/yr.

SWMUs 16-026(j2) and 16-029(f)

The EPCs for carcinogenic COPCs do not exceed their respective industrial SSLs (Table I-4.3-17). The total excess cancer risk for the SWMUs is approximately 1×10^{-5}. The EPCs for the noncarcinogenic COPCs do not exceed their respective industrial SSLs (Table I-4.3-18). The HI for the SWMUs is 0.1. The forward risk calculation yielded an HI of 0.000004 (Table I-4.3-21) and does not substantially influence the HI. The results of the screening assessment for the industrial scenario are equivalent to or below the NMED target levels of 1×10^{-5} for cancer risk, respectively, and below the target HI of 1.0 (NMED 2006, 092513).

Only benzo(a)pyrene has an EPC above the residential SSL (Table I-4.3-19). The total excess cancer risk for the SWMUs is approximately 6×10^{-5}. The EPCs for the noncarcinogenic COPCs do not exceed their respective residential SSLs (Table I-4.3-20). The HI for this SWMU is 0.4. The HI for the forward risk calculation is 0.00004 (Table I-4.3-21) and does not substantially influence the site HI. The results of the screening assessment for the residential scenario are above the NMED target level of 1×10^{-5} for cancer risk and below the target HI of 1.0 (NMED 2006, 092513).

I-4.4 Uncertainty Analysis

The analyses presented in 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 assessment process and may affect the results.

I-4.4.1 Data Evaluation and COPC Identification Process

A primary uncertainty associated with the COPC identification process is the possibility that a chemical may be inappropriately identified as a COPC when it is actually not a COPC or that a chemical may not be identified as a COPC when it actually should be identified as a COPC. Inorganic chemicals are appropriately identified as COPCs because only those chemicals that are detected or that 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) encountered during sampling because such data are not included in the background data set. There are no established BVs for organic chemicals, and all detected organic chemicals are identified as COPCs and are retained for further analysis.

Other uncertainties may include errors in sampling, laboratory analysis, and data analysis. However, because concentrations used in the risk screening evaluations include those detected less than estimated quantitation limits and nondetects above BVs, data evaluation uncertainties are expected to have little effect on the risk screening results.

I-4.4.2 Exposure Assessment

The following exposure assessment uncertainties were identified for the risk assessment: (1) the applicability of the scenarios, (2) the assumptions underlying the exposure pathways, and (3) the depth over which SSLs were applied for a scenario and the derivation of the EPCs.

A worker may be subject to exposures in a different manner than the exposure assumptions used to derive the industrial SSLs. The assumptions for the SSLs are that the potentially exposed individual is outside on-site for a full work day, for 225 d/yr and 25 yr (NMED 2006, 092513). For the sites evaluated, workers might not be on-site now or in the future for that frequency and duration. This is particularly true of the hillslope area within SWMU 16-003(o) where elevated concentrations of some COPCs remain. As a result, the industrial scenario evaluated at these sites, especially SWMU 16-003(o), overestimates the exposure and risk/dose. The residential scenario is based on exposure of 24 h/d, 350 d/yr, and 30 yr and may overestimate the potential exposure and risk/dose.

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 2006, 092513; EPA 2007, 099314). When several upper-bound values (as are found in NMED 2006, 092513) 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 result in exposure in the same manner as if they were in soil overestimates the potential exposure and risk to receptors.

Uncertainty is introduced in the concentration aggregation of data for estimating the EPCs at a site. 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 the average exposure to a COPC across the entire site. Potential risk and exposure from a single location or area with relatively high COPC concentrations may be overestimated if a representative, sitewide value is used. The use of the maximum detected concentration for the EPC overestimates the exposure to contamination because receptors are not consistently exposed to the maximum detected concentration across the site.

One site within the TA-16-340 Complex [SWMU 16-003(o)] has potential risk for the industrial scenario that exceeds the NMED target level. This potential risk may be overestimated because of uncertainties associated with the EPCs for the COPCs at this site.

SWMU 16-003(o)

The total excess cancer risk for the industrial scenario of 3×10^{-5} is slightly above the target risk of 1×10^{-5}, mostly because of arsenic and benzo[a]pyrene. The arsenic EPC is 10.2 mg/kg, which is similar to the maximum soil background concentration ([9.3 mg/kg] LANL 1998, 059730). The benzo[a]pyrene EPC is 4.77 mg/kg and is the 97.5% UCL recommended by ProUCL (Attachment I-2). The data are highly skewed with only four of 53 samples (less than 8%) having concentrations higher than the EPC and 36% of the results are reported as not detected. The highest two concentrations of benzo(a)pyrene (21.4 mg/kg and 14 mg/kg) are located within a 10 ft^2 area on the steep hillslope. Without these two concentrations the EPC goes from 4.77 mg/kg to 2.55 mg/kg, which is slightly above the SSL.

If arsenic is eliminated as a COPC, based on similarity to background and the of EPC for benzo(a)pyrene is adjusted to the mean (1.49 mg/kg) because of the skewed distribution and low detection percentage above the EPC, the total excess cancer risk is approximately 1×10^{-5} (1.3×10^{-5}), which is equivalent to the NMED target risk level.

In addition as noted above, the exposure assumptions associated with the industrial scenario overestimate the exposure and risk associated with this SWMU. The area of contamination is primarily on the hillslope near the drainage but away from where a worker may be exposed to at a frequency and duration more in keeping with the scenario exposure assumptions. Industrial activities are not likely to occur on the hillslope because of the steep slope. Therefore, the 3×10^{-5} cancer risk calculated for this SWMU is likely to be overestimated.

The benzo(a)pyrene contamination appears to be at least in part, particularly that part associated with the hillslope, from the nearby asphalt road. During the investigation, storm water runoff was observed flowing from the asphalt road onto the hillslope and pieces of asphalt were observed in this area. As part of site restoration, a straw waddle check dam was installed to prevent additional runoff from the road to the hillslope.

I-4.4.3 Toxicity Assessment

The primary uncertainty associated with the screening values is related to the derivation of toxicity values used in their calculation. Toxicity values (slope factors [SFs] and reference doses [RfDs]) were used to derive the risk-based screening values used in the screening evaluation (NMED 2006, 092513). Uncertainties were identified in six areas with respect to the toxicity values: (1) extrapolation from other animals to humans, (2) extrapolation from one route of exposure to another route of exposure, (3) interindividual variability in the human population, (4) the derivation of RfDs and SFs, (5) the chemical form of the COPC, and (6) the use of surrogate chemicals.

Extrapolation from Animals to Humans: The SFs and RfDs are often determined by extrapolation from animal data to humans, which may result in uncertainties in toxicity values because differences exist between animals and humans in chemical absorption, metabolism, excretion, and toxic responses. Differences in body weight, surface area, and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated in each of these steps, resulting in the overestimation of potential risk.

Extrapolation from One Route of Exposure to Another Route of Exposure: The SFs and RfDs often contain extrapolations from one exposure route to another that result in additional conservatism in the risk calculations. The extrapolation from the oral route to the inhalation and/or the dermal route is used in the derivation of some screening values (NMED 2006, 092513). Differences between the two exposure pathways contribute to the uncertainty in the estimation of potential risk.

Individual Variability in the Human Population: For noncarcinogenic effects, the degree of variability in human physical characteristics is important both in determining the risks that can be expected at low exposures and in defining the no-observed-adverse-effect level (NOAEL). The NOAEL uncertainty factor approach incorporates a 10-fold factor to reflect individual variability within the human population that can contribute to uncertainty in the risk assessment. This factor of 10 is generally considered to result in a conservative estimate of risk to noncarcinogenic COPCs.

Derivation of RfDs and SFs: 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.

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.

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 provide SSLs for acenaphthylene, amino-2,6-dinitrotoluene[4-], amino-4,6-dinitrotoluene[2-], benzo[g,h,i]perylene, isopropyltoluene[4-], methylnaphthalene[2-], and TATB based on structural similarity. The overall impact of surrogates on the risk assessment is minimal because these COPCs were generally detected at low concentrations (less than 1 mg/kg).

I-4.4.4 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-4.5 Interpretation of Human Health Risk Screening Assessments

The EPCs for carcinogenic COPCs were less than their respective industrial SSLs for all the sites, except SWMU 16-003(o). The total excess cancer risks range from approximately 5×10^{-6} to 1×10^{-5} for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and the combined SWMUs 16-026(j2) and 16-029(f). These cancer risk levels do not exceed the NMED target risk level of 1×10^{-5} (NMED 2006, 092513). For SWMU 16-003(o), the largest contributors to risk are arsenic and benzo(a)pyrene. Only benzo(a)pyrene had an EPC concentration above the industrial SSL. The total excess cancer risk for the SWMU is 3×10^{-5}, which is slightly above the NMED target risk level of 1×10^{-5} (NMED 2006, 092513). However, based on the uncertainty analysis, the total excess cancer risk for a worker at this site is overestimated. If arsenic is eliminated as a COPC, based on its similarity to background and the of EPC for benzo(a)pyrene is adjusted to the mean (1.49 mg/kg) because of the skewed distribution and low detection percentage above the EPC, the total excess cancer risk is approximately 1×10^{-5}, which is equivalent to the NMED target risk level.

The total excess cancer risks for the residential scenario ranged from approximately 2×10^{-5} for Consolidated Units 13-003(a)-99 and 16-003(n)-99 to 6×10^{-5} at the combined SWMUs 16-026(j2) and 16-029(f). These cancer risk levels exceed the NMED target risk level of 1×10^{-5} (NMED 2006, 092513). The largest contributors to the potential residential risk are arsenic and benzo(a)pyrene at all sites. The arsenic EPCs are within the range of background concentrations.

All HIs for the industrial scenario were less than 1.0 at each site, with a maximum HI of 0.3 at SWMU 16-003(o). Therefore, the HIs were less than the NMED target HI of 1.0 (NMED 2006, 092513) for the industrial scenario.

The HIs for the residential scenario ranged from 0.4 at Consolidated Unit 13-003(a)-99 to approximately 2 at SWMU 16-003(o). The HIs above 1 at Consolidated Unit 13-003(n)-99 and SWMU 16-003(o) are mainly because of aluminum, iron, manganese, uranium, and vanadium. The EPCs for aluminum, iron, manganese, uranium, and vanadium are all within the range of background concentrations. Eliminating these inorganic chemicals reduces the HIs to approximately 0.4 at both sites.

Only SWMU 16-003(o) had radionuclide COPCs. The total dose was 0.21 mrem/yr for the industrial scenario, which is less than the target dose of 15 mrem/yr (DOE 2000, 067489). This dose corresponds to a radiological risk of 3×10^{-6} based on EPA radionuclide preliminary remediation goals (PRGs) for outdoor workers (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

The total dose from radionuclides for the residential scenario at SMWU 16-003(o) is 0.75 mrem/yr, which is less than the target dose of 15 mrem/yr (DOE 2000, 067489). This dose corresponds to a radiological risk of 4×10^{-6} based on a comparison to EPA radionuclide PRGs for a resident (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

In conclusion, based on the results of the risk screening assessments and the uncertainty analyses, concentrations of COPCs in soil and tuff at the TA-16-340 Complex do not pose a potential unacceptable risk to human health under an industrial scenario.

I-5.0 ECOLOGICAL SCREENING ASSESSMENT

The approach used to evaluate ecological risk is described in “Screening Level Ecological Risk Assessment Methods, Revision 2” (LANL 2004, 087630). The assessment consists of 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 ecological screening assessment. The ecological checklist (Attachment I-1) organizes existing ecological information about the site for the scoping evaluation and forms the basis for the determination of key aspects of the conceptual site model—habitat type and quality, potential receptor exposure, and contaminant transport pathways.

The TA-16-340 Complex area is highly disturbed and consists primarily of bare soil and rock and/or roadways and regraded areas where demolition and removal actions have taken place. The dominant overstory vegetation type surrounding the area is ponderosa pine, with minor vegetation components of fir (white and Douglas) and piñon. The understory contains mostly native and nonnative grasses and ruderal species indicative of disturbance, with a few shrubs and forbs. Habitat fragmentation at the site is high. The general habitat quality in undisturbed areas is sufficient to support grazing and foraging by terrestrial receptors. No threatened and endangered (T&E) species habitat is present at the site. However, the area falls within the foraging range of the Mexican spotted owl nesting in Cañon de Valle.

Surface water runoff terminates to the north/northeast of the site in Fishladder Canyon. Consolidated Unit 16-003(n)-99 and SWMU 16-003(o) are partially located along the steep slope to, and within, the Fishladder Canyon. No potential for exposure to aquatic receptors exists because no persistent aquatic habitat or perennial source of water occurs in the canyon. Additionally, the depth of the regional aquifer (greater than 1000 ft bgs) and the semiarid climate at the Laboratory limit transport to groundwater. The potential exposure of terrestrial receptors to COPCs in surface soil and unconsolidated tuff is by root uptake, dust inhalation, soil ingestion, external irradiation, and food web transport (Figure I-3.0-1). Exposure pathways to receptors from COPCs in consolidated tuff are considered incomplete because COPCs in tuff are generally immobilized and become available to receptors only as a function of the slow rates of weathering of the tuff. Plant exposure to COPCs 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 assumed to be unavailable to the extent necessary to cause adverse population-level effects.

Potentially complete pathways for exposure of terrestrial receptors to COPCs exist at the site. The potential risk was evaluated quantitatively in this risk screening assessment for the following ecological receptors, representing several feeding guilds and trophic levels:

- plants
- soil-dwelling invertebrates (represented by the earthworm)
- mammalian omnivore (represented by deer mouse)
- mammalian insectivore (represented by montane shrew)
- mammalian herbivore (represented by desert cottontail)
- mammalian carnivore (represented by red fox)
- avian insectivore, omnivore, and herbivore (represented by American robin)
- avian insectivore and carnivore (represented by American kestrel); surrogate for avian T&E species

Of the terrestrial receptors evaluated, only the montane shrew is not expected to be present at the TA-16-340 Complex because it requires free water for survival—surface water does not exist at the site. However, because the shrew represents the insectivorous feeding guild for mammals, which is not specifically represented by any of the other terrestrial receptors, the shrew was evaluated in this risk screening assessment.

I-5.2 Assessment Endpoints

An assessment endpoint is an “explicit expression of the actual environmental value that is to be protected, operationally defined by an ecological entity and its attributes” (EPA 1998, 062809). Assessments should include ecologically relevant endpoints that help to sustain the natural structure, function, and biodiversity of an ecosystem or its components. In this screening assessment, the assessment endpoints are the populations and communities of the terrestrial receptors that may be adversely affected by exposure to hazardous wastes from past operations (EPA 1997, 059370), where 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 toxicity reference values (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 screening assessment identifies COPECs and is based on the comparison of EPCs (determined from samples collected between 0 and 5 ft bgs) with ecological screening levels (ESLs) in accordance with Laboratory guidance (LANL 2004, 087630). The EPCs used in this assessment are presented in Table I-2.3-8 and the calculations are summarized in section I-4.1. Data files for ProUCL calculations are provided electronically as Attachment I-2. The ESLs were obtained from the ECORISK Database, Version 2.2 (LANL 2005, 090032) and are presented in Table I-5.3-1 for all COPCs and receptors evaluated.

The risk screening assessment involves the calculation of HQs for all COPECs and all screening receptors (LANL 2004, 087630). The HQ is defined as the ratio of the EPC in the exposure medium being investigated to the concentration (ESL) that has been determined to be acceptable to a given ecological receptor. The EPCs consist of UCLs calculated using ProUCL 4.00.02 or the maximum detected concentration. 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.

Iron, nitrate, perchlorate, n-butylbenzene, 2-chloronaphthalene, ethylbenzene, isopropylbenzene, 4-isopropyltoluene, 4-methyl-2-pentanone, 4-methylphenol, 1-propylbenzene, trichlorofuoromethane, 3,5-dinitroanaline, TATB, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, xylene[1,2-], and xylene[1,3]+xylene[1,4-] do not have ESLs for any receptors (Table I-5.3-1). As a result, these analytes are retained as COPECs and discussed in the uncertainty section.

The results of the minimum ESL comparison are presented in Table I-5.3-2. Of the COPCs identified for evaluation of ecological risk at the TA-16-340 Complex, 31 COPCs were retained as COPECs for further evaluation because the minimum ESL analysis indicated that the HQ for at least one receptor was greater than 0.3. The 31 COPECs requiring further evaluation include 17 inorganic chemicals, nine SVOCs, and five HE compounds. The HIs for the terrestrial receptors range from 7 (red fox) to 1461 (plant), as presented in Table I-5.3-3.

Potential ecological risks associated with aluminum are based on soil pH. Aluminum is retained as a COPEC only in soil with a pH lower than 5.5, in accordance with EPA guidance (EPA 2003, 085645). No pH data is available for the TA-16-340 Complex. The soil and parent material is the same as other areas in the vicinity of the Laboratory. The average pH values reported for Pueblo Canyon was 7.2 (LANL 2008, 102408). Based on similarities of parent material and proximity, the soil pH within the TA-16-340 Complex is above 5.5. Therefore, aluminum was eliminated as a COPEC.

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 the site.

I-5.4.1 Chemical Form

The assumptions used in the ESL derivations are conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum body weight, and additive effects of multiple COPECs. These factors tend to result in conservative ESL estimates, which may lead to an overestimation of the potential risk. The assumption of additive effects for multiple COPECs may result in an over- or underestimation of the potential risk to receptors.

The chemical form of the individual COPCs was not determined as part of the investigation. Toxicological data are typically based on the most toxic and bioavailable chemical species, which are not typically found in the environment. Inorganic, radionuclide, and organic COPECs are generally not 100% bioavailable to receptors in the natural environment because of interference from other natural processes, such as the adsorption of chemical constituents to matrix surfaces (e.g., soil) or rapid oxidation or reduction changes that render harmful chemical forms unavailable to biotic processes. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2004, 087630), and the values are biased toward overestimating the potential risk to receptors.

I-5.4.2 Exposure Pathways

The area around the TA-16-340 Complex is an active industrial site and the TA-16-340 Complex has been substantially disturbed by the demolition and removal activities at the site. Thus, little of the area is available as habitat for ecological receptors. The assumptions made for the exposure to terrestrial receptors lead to an overestimation of potential risk.

I-5.4.3 Exposure Assumptions

The EPCs used in the calculations of HQs are the UCLs or the maximum detected concentrations in the soil/fill/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 TA-16-340 Complex are likely to overestimate potential ecological exposure and risk.

I-5.4.4 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 lowest-observed-adverse-effect level (LOAEL). The use of NOAELs leads to an overestimation of potential risk to ecological receptors. ESLs are based on laboratory studies requiring extrapolation to wildlife receptors. Laboratory studies are typically based on “artificial” and maintained populations with genetically similar individuals and are limited to single chemical exposures in isolated and controlled conditions using a single exposure pathway. Wild species are concomitantly exposed to a variety of chemical and environmental stressors, potentially rendering them more susceptible to chemical stress. On the other hand, wild populations are likely more genetically diverse than laboratory populations, making wild populations, as a whole, less sensitive to chemical exposure than laboratory populations. The uncertainties associated with the ESLs may result in an under- or overestimation of potential risk.

I-5.4.5 Comparison with Background Concentrations

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 of 15 inorganic COPECs are similar to or within the range of background concentrations for soil and tuff, indicating that exposure of receptors to these inorganic chemicals is similar to background (Table I-5.4-1). Antimony, arsenic, barium, cadmium, chromium, cyanide, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc are eliminated as COPECs because exposure is similar to background across the site. Cobalt and copper are retained as COPECs.

I-5.4.6 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 HI for the kestrel (top carnivore) is above 1.0. The site area is approximately 1.1 hectares (ha), and the HR for the Mexican spotted owl is 366 ha (Table I-5.4-2). Therefore, the AUF for the Mexican spotted owl is 0.003. Application of the AUF for the Mexican spotted owl to the HQs for the kestrel (top carnivore), minus the inorganic COPECs previously eliminated, results in an adjusted HI of 0.5. Therefore, there are no potential adverse impacts to the Mexican spotted owl at the TA-16-340 Complex.

I-5.4.6.1 Population Area Use Factors

With the exception of T&E species, EPA guidance is to manage the ecological risk to populations rather than to individuals, (EPA 1999, 070086). One approach to address the potential effects on populations is to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. The population area for each receptor is based on the individual receptor home range and its dispersal distance (Bowman et al. 2002, 073475). Bowman et al. (2002, 073475) estimate that the median dispersal distance for mammals is seven 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 ($R^2 = 0.91$). 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-5.4-2). The HQs and HIs are recalculated minus the inorganic COPECs eliminated based on similarity to background and adjusted by multiplying by the PAUFs. The HQs for the plant and earthworm are not adjusted by PAUFs because these receptors do not have HRs. The adjusted HQs and HIs are presented in Table I-5.4-3.

The adjusted HIs for the kestrel (intermediate and top carnivore), robin (herbivore), cottontail, and fox are less than 1 (Table I-5.4-3). The adjusted HIs for the remaining receptors range from 2 for the shrew to 26 for robin (insectivore). The HIs for the robin (insectivore and omnivore), the shrew, and the deer mouse are primarily from bis(2-ethylhexyl)phthalate, and for the deer mouse to a lesser extent from copper, naphthalene, and HMX. Bis(2-ethylhexyl)phthalate was detected in less than 25% of the samples and the UCL was influenced by elevated detection limits. As a result, the EPC is biased high and overestimates the potential risk to the receptors. If the mean concentration is used as the EPC the HQs for bis(2-ethylhexyl)phthalate are reduced by about 50%.

The HIs for the plant and earthworm are 16 and 10, respectively. The HIs for the plant and earthworm are due primarily to copper (both receptors), and cobalt and acenaphthene (plant only). Field observations made during the site visit and while conducting field activities found no indication of adverse impacts on the plant community (Attachment I-1).

The adjusted HIs are conservative because they assume the individual SWMUs within the TA-16-340 Complex are contiguous and represent a single area over which receptors forage and be exposed to COPCs. The area of the individual SWMUs and, just as importantly, the viable habitat within each SWMU is substantially smaller than the 1.1 ha calculated for the TA-16-340 Complex, indicating that the risk to receptors is overestimated even when considering receptor population area use.

Dourson and Stara (1983, 073474) conducted a study of uncertainty factors incorporated in calculating ESLs for ecological receptors. Based on their study, the LOAEL to NOAEL adjustment indicates that HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Therefore, the adjusted HI for the shrew does not indicate potential risk because it is approximately 2. The HIs for the robin (omnivore), deer mouse and earthworm also likely do not indicate potential risks because they are approximately 10 or less. The HI for the robin (insectivore) is 25 but is reduced to approximately 13 if the mean concentration of bis(2-ethylhexyl)phthalate is used as the EPC as described above. Therefore, based on the conservative nature of the HI and the relatively infrequent detection of bis(2-ethylhexyl)phthalate, it is unlikely that the HI represents a potential risk to this receptor.

I-5.4.7 Comparison with Results of Previous Field and Laboratory Studies

Biota investigations have been conducted in canyon reaches in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Cañon de Valle (LANL 2003, 077965), Field and laboratory studies included collection and analysis of soil, sediment, and water samples; cavity-nesting bird monitoring and analysis of eggs; small mammal trapping and analysis of whole organisms; earthworm bioaccumulation tests (measures of growth and survival, and analysis of whole organisms); laboratory testing of sensitive organisms; and seedling germination tests.

The field and laboratory results on small mammals, birds, earthworms, and plants included reaches with similar COPEC concentrations as detected at sites within the TA-16-340 Complex. The studies found no effects from exposure to COPECs in any of the canyon reaches further supporting the conclusion that there is no potential ecological risk at these sites.

I-5.4.8 COPECs without ESLs

Several COPECs do not have ESLs for any receptor. Without ESLs, these chemicals cannot be assessed quantitatively for potential ecological risk. The COPECs without ESLs include iron, nitrate, perchlorate, n-butylbenzene, 2-chloronaphthalene, ethylbenzene, isopropylbenzene, 4-isopropyltoluene, 4-methyl-2-pentanone, 4-methyphenol, 1-propylbenzene, trichlorofluoromethane, TATB, 3,5-dinitroaniline, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, xylene[1,2-], and xylene[1,3-]+xylene[1,4-]. These

COPECs were often infrequently detected across the site; the number of detected concentrations usually ranged from one to seven samples. Nitrate and perchlorate have no background data.

In the absence of a chemical-specific ESL, COPEC concentrations can be compared to a surrogate chemical or to residential human health SSLs. Comparison to a surrogate ESL 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. The comparison of COPEC concentrations to residential human health SSLs is a viable alternative for several reasons. The inference that humans and animals are similar, on average, in intrinsic susceptibility to chemicals and the fact that, in many cases, data from animals are used as surrogates for data from humans, 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). The 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 the sites overall.

The iron EPC of 12,582 mg/kg is similar to background (BVs are 21,500 mg/kg soil and 14,500 mg/kg tuff). In addition, the EPC is less than the NMED residential SSL of 23,500 mg/kg. Therefore, iron is eliminated as a COPEC.

Nitrate was detected in approximately 50% of the samples. A comparison of the nitrate EPC (2.26 mg/kg) to the NMED residential SSL of 100,000 mg/kg indicates that potential toxicity to nitrate is very low. In addition, nitrate is naturally occurring and the detected concentrations likely reflect natural levels. Because of the potentially low toxicity and naturally occurring concentrations, nitrate is eliminated as a COPEC.

Perchlorate was detected in four samples. A comparison of the maximum detected concentration of perchlorate (0.003 mg/kg) to the EPA Region 6 residential SSL of 55 mg/kg indicates that potential toxicity to perchlorate is low. Because of the potentially low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Butylbenzene[n-] was detected in one samples with a maximum detected concentration of 0.0003 mg/kg. The minimum ESL for a structurally similar compound, benzene, is 24 mg/kg for the deer mouse, resulting in a maximum HQ of 0.00001. The EPA Region 6 residential risk-based SSL for butylbenzene[n-] is 140 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, butylbenzene[n-] is eliminated as a COPEC.

Chloronaphthalene[4-] was detected in one sample with a maximum detected concentration of 0.04 mg/kg. The minimum ESL for a structurally similar compound, naphthalene, is 0.34 mg/kg for the deer mouse, resulting in a maximum HQ of 0.1. The NMED residential SSL for chloronaphthalene[4-] is 3990 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, chloronaphthalene[4-] is eliminated as a COPEC.

Diethylphthalate was detected in three samples with a maximum detected concentration of 0.26 mg/kg. The minimum ESL for a structurally similar compound, dimethylphthalate, is 10 mg/kg for the earthworm, resulting in a maximum HQ of 0.03. The NMED residential SSL for diethylphthalate is 48900 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, diethylphthalate is eliminated as a COPEC.

Ethylbenzene was detected in four samples with a maximum detected concentration of 0.0004 mg/kg. The minimum ESL for a structurally similar compound, benzene, is 24 mg/kg for the deer mouse, resulting in a maximum HQ of 0.00002. The NMED residential SSL for ethylbenzene is 128 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, ethylbenzene is eliminated as a COPEC.

Isopropylbenzene was detected in two samples with a maximum detected concentration of 0.0005 mg/kg. The minimum ESL for a structurally similar compound, benzene, is 24 mg/kg for the deer mouse, resulting in a maximum HQ of 0.00002. The NMED residential SSL for isopropylbenzene is 128 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, isopropylbenzene is eliminated as a COPEC.

Isopropyltoluene[4-] was detected in 13 samples with an EPC of 0.001 mg/kg. The minimum ESL for a structurally similar compound, toluene, is 23 mg/kg for the montane shrew, resulting in a maximum HQ of 0.00004. The NMED residential SSL for another structurally related compound, isopropylbenzene, is 271 mg/kg, indicating that potential toxicity to 4-isopropyltoluene is low. Because of the potentially low toxicity and the infrequent detection, 4-isopropyltoluene is eliminated as a COPEC.

Methyl-2-pentanone[4-] was detected in two samples with a maximum detected concentration of 0.004 mg/kg. The NMED residential SSL for methyl-2-pentanone[4-] (also referred to as methyl isobutyl ketone) is 5510 mg/kg, indicating that potential toxicity is very low. Because of the potentially very low toxicity and the infrequent detection, methyl-2-pentanone[4-] is eliminated as a COPEC.

Methylphenol[4-] was detected in one sample with a maximum detected concentration of 1 mg/kg. The minimum ESL for a structurally similar compound, phenol, is 0.79 mg/kg for the plant, resulting in a maximum HQ of 1.3. The EPA Region 6 residential SSL for methylphenol[4-] is 310 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, methylphenol[4-] is eliminated as a COPEC.

Propylbenzene [1-] was detected in one sample with a maximum detected concentration of 0.0004 mg/kg. The NMED residential SSL for n-propylbenzene is 62.1 mg/kg, which is a C_{sat} SSL, and indicates that potential toxicity is low. Because of the potentially low toxicity and the infrequent detection, 1-propylbenzene is eliminated as a COPEC.

Trichlorofluoromethane was detected in one sample with a maximum detected concentration of 0.005 mg/kg. The NMED residential SSL for trichlorofluoromethane is 588 mg/kg, indicating that potential toxicity is very low. Because of the potentially very low toxicity and the infrequent detection, trichlorofluoromethane is eliminated as a COPEC.

Dinitroaniline[3,5-] was detected in one sample with a maximum detected concentration of 0.338 mg/kg. The EPA Region 6 residential SSL for a structurally similar compound, 2-nitroaniline, is 180 mg/kg, indicating that potential toxicity is low. Because of the potentially low toxicity and the infrequent detection, 3,5-dinitroaniline is eliminated as a COPEC.

TATB was detected in 29 samples (approximately 45%) with an EPC of 3.94 mg/kg. The minimum ESL for a structurally similar compound, 1,3,5-trinitrobenzene, is 6.6 mg/kg for the deer mouse, resulting in a maximum HQ of 0.6. Because of the potentially low toxicity and the infrequent detection, TATB is eliminated as a COPEC.

Trimethylbenzene[1,2,4-] was detected in seven samples with an EPC of 0.0006 mg/kg. The minimum ESL for a structurally similar compound, benzene, is 24 mg/kg for the deer mouse, resulting in a maximum HQ of 0.00003. The NMED residential SSL is 58 mg/kg, indicating that potential toxicity to 1,2,4-trimethylbenzene is low. Because of the potentially low toxicity and the infrequent detection, 1,2,4-trimethylbenzene is eliminated as a COPEC.

Trimethylbenzene[1,3,5-] was detected in one sample with a maximum detected concentration of 0.0006 mg/kg. The minimum ESL for a structurally similar compound, benzene, is 24 mg/kg for the deer mouse, resulting in a maximum HQ of 0.00003. The NMED residential SSL is 24.8 mg/kg, indicating that potential toxicity to 1,3,5-trimethylbenzene is low. Because of the potentially low toxicity and the infrequent detection, 1,3,5-trimethylbenzene is eliminated as a COPEC.

Xylene[1,2-] and Xylene[1,3-]+Xylene[1,4-] were detected in five and 12 samples, respectively, with EPCs of 0.0005 mg/kg and 0.0006 mg/kg, respectively. The minimum ESL for a structurally similar compound, total xylene, is 1.4 mg/kg for the montane shrew, resulting in maximum HQs of 0.0004 for both. The EPA Region 6 residential risk-based SSL for xylene is 190 mg/kg, indicating that potential toxicity is very low. Because of the potentially low toxicity and the infrequent detection, xylene[1,2-] and xylene[1,3-]+xylene[1,4-] are eliminated as COPECs.

I-5.5 Interpretation of Ecological Screening Results

I-5.5.1 Receptor Lines of Evidence

Based on the ecological risk screening assessments, several COPECs (including COPECs without an ESL) were identified at the TA-16-340 Complex (Table I-5.3-2). 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), the relative toxicity of related compounds, infrequency of detection, and comparisons to previous field and laboratory canyon investigations.

I-5.5.1.1 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 greater than 1.0 for the robin (all feeding guilds). The HIs were adjusted by the PAUF, which is the ratio of the site area to the robin's population area. The adjusted HIs were 0.4 for the herbivore feeding guild, 25 for the insectivore guild, and 13 for the omnivore guild.
- The primary contributor to the adjusted HIs for the robin is bis(2-ethylhexyl)phthalate, which was detected in only 25% of the samples. As a result, the EPC is biased high and overestimates the potential risk to the receptors. If the mean concentration is used as the EPC the HQs for bis(2-ethylhexyl)phthalate are approximately 13 or less for the robin (insectivore and omnivore). The distribution of detections indicates that bis(2-ethylhexyl)phthalate is not likely to be a threat to the robin population.

- Based on Dourson and Stara (1983, 073474), HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Therefore, because the adjusted HIs for the robin (herbivore) is less than the 3 and for the robin (insectivore and omnivore) are approximately 10 or less, the HIs likely do not indicate potential risks.
- Field studies and laboratory analyses on birds in Los Alamos/Pueblo Canyon (LANL 2004, 087390) and Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the robin (all feeding guilds) exists at the TA-16-340 Complex.

I-5.5.1.2 Deer Mouse (Omnivore)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the deer mouse, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HI was greater than 1.0 for the deer mouse. The HI was adjusted by the PAUF, which is the ratio of the site area to the deer mouse's population area. The adjusted HI was 7.
- The main contributor to the adjusted HI for the deer mouse is bis(2-ethylhexyl)phthalate, which was detected in only 25% of the samples at the site, and to a lesser extent from copper, naphthalene, and HMX. The EPC for bis(2-ethylhexyl)phthalate is biased high and overestimates the potential risk. If the mean concentration is used as the EPC the HQ for bis(2-ethylhexyl)phthalate is approximately 4 for the deer mouse. The distribution of detections indicates that bis(2-ethylhexyl)phthalate is not likely to pose a risk to the deer mouse population.
- Deer mice were observed at SWMU 16-003(o) during the 2008 removal actions.
- Based on Dourson and Stara (1983, 073474), HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Therefore, because the adjusted HI for the deer mouse is less than 10, it is unlikely that the HI indicates potential risks.
- 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 Cañon de Valle (LANL 1993, 077965) included reaches with similar concentrations of COPECs and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the deer mouse exists at the TA-16-340 Complex.

I-5.5.1.3 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 main contributor to the earthworm HI of 10 is copper. The distribution of detections indicates that copper is not likely to pose a risk to the earthworm population.
- Based on Dourson and Stara (1983, 073474), HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Because the HI for the earthworm is 10, it is not likely to indicate potential risks.
- Laboratory studies on earthworms and/or other invertebrates in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Cañon de Valle (LANL 1993, 077965) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the earthworm exists at the TA-16-340 Complex.

I-5.5.1.4 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 plant communities were evaluated at all sites during site visits. No evidence of adverse impacts of contamination to the plant community based on field observations was found during site visits (Attachment I-1); the plant community is typical of the surrounding area and appears healthy.
- The main contributors to the HI (16) are cobalt, copper, and acenaphthene.
- Based on Dourson and Stara (1983, 073474), HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. The HI for the plant is slightly greater than 10 and does not indicate potential risks. A healthy plant population has been observed on the site.
- Field and laboratory studies on plants in Los Alamos/Pueblo Canyon (LANL 2004, 087390) and Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the plant exists at the TA-16-340 Complex.

I-5.5.1.5 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.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HI was greater than 1.0 for the cottontail. The HI was adjusted by the PAUF, which is the ratio of the site area to the cottontail's population area. The adjusted HI was less than 1.0 for the cottontail.

These lines of evidence support the conclusion that no potential ecological risk to the cottontail exists at the TA-16-340 Complex.

I-5.5.1.6 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 HI was greater than 1.0 for the shrew. The HI was adjusted by the PAUF, which is the ratio of the site area to the shrew's population area. The adjusted HI was approximately 2.
- Based on Dourson and Stara (1983, 073474), HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Therefore, because the adjusted HI for the shrew is less than 3, the HI likely does not indicate potential risks.
- 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 Cañon de Valle (LANL 1993, 077965) included reaches with similar concentrations of COPECs and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the montane shrew exists at the TA-16-340 Complex.

I-5.5.1.7 Red Fox (Carnivore)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the fox, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HI was greater than 1.0 for the fox. The HI was adjusted by the PAUF, which is the ratio of the site area to the fox's population area. The adjusted HI was less than 1.0 for the fox.

These lines of evidence support the conclusion that no potential ecological risk to the fox exists at the TA-16-340 Complex.

I-5.6 Ecological Pore-Gas Evaluation

Pore gas samples were collected from 50 ft bgs or deeper at the TA-16-340 Complex. The HI for the pore-gas concentrations is 0.09 and do not pose a risk to burrowing animals (Table I-5.7-1).

I-6.0 SURFACE AND GROUNDWATER COMPARISON

All detected surface water and groundwater chemicals that are not essential nutrients or general water chemistry indicators were screened against NMWQCC standards, EPA MCLs, and EPA Region 6 and 9 tap water risk screening levels. This comparison is summarized in Table I-6.0-1 for surface water and Table I-6.0-2 for groundwater. The maximum detected concentration in each media was used for comparison.

Surface Water

The following inorganic chemicals were present in one or more of the surface water samples (four filtered and four unfiltered) collected at concentrations exceeding one or more standards or screening levels.

- Aluminum exceeded the NMWQCC acute aquatic life, irrigation, and livestock watering surface water standards in four unfiltered samples.
- Aluminum exceeded the NMWQCC acute aquatic life surface water standard in four filtered samples.
- Aluminum exceeded the NMWQCC irrigation and livestock watering surface water standards in one filtered sample.
- Arsenic exceeded the EPA MCL in one unfiltered sample.
- Arsenic exceeded the EPA Region 6 and Region 9 tap water screening levels in two unfiltered samples.
- Arsenic exceeded the NMWQCC human health surface water standard in one unfiltered sample.
- Arsenic exceeded the EPA Region 6 and Region 9 tap water screening levels in one unfiltered sample.
- Barium exceeded the NMWQCC groundwater standard in one unfiltered sample.
- Beryllium exceeded the EPA MCL, EPA Region 9 tap water screening level, and the NMWQCC domestic water supply surface water standard in one unfiltered sample.
- Chromium exceeded the NMWQCC groundwater standard in one unfiltered sample.
- Cyanide exceeded the NMWQCC wildlife habitat surface water standard in one unfiltered sample.
- Iron exceeded the EPA Region 9 tap water screening level in two unfiltered samples.
- Lead exceeded the EPA Region 6 and Region 9 tap water screening levels and the NMWQCC groundwater standard in one unfiltered sample.
- Manganese exceeded the EPA Region 9 tap water screening level in one unfiltered sample.
- Uranium exceeded the EPA Region 9 tap water screening level in one unfiltered sample.
- Vanadium exceeded the EPA Region 9 tap water screening level, and the NMWQCC irrigation and livestock watering surface water standards in one unfiltered sample.

The following organic chemical was detected in the one or more of the surface water samples (four unfiltered) collected at concentrations exceeding one or more standards or screening levels:

- Methylene chloride exceeded the EPA MCL in one unfiltered sample.

The following inorganic chemicals were detected in surface water but have no published standards or screening levels: bromide, total phosphate, and silicon dioxide (Table I-6.0-4). No organic chemicals without published standards or screening levels were detected in surface water.

Groundwater

The following inorganic chemicals were detected in one or more of the groundwater samples (five filtered and five unfiltered) collected at concentrations exceeding one or more standards or screening levels.

- Aluminum exceeded the NMWQCC acute aquatic life, irrigation, and livestock watering surface water standards in four unfiltered samples.
- Aluminum exceeded the NMWQCC acute aquatic life surface water standard in four filtered samples.
- Aluminum exceeded the NMWQCC irrigation and livestock watering surface water standards in three filtered samples.
- Arsenic exceeded the EPA Region 6 and Region 9 tap water screening levels in one unfiltered sample.
- Arsenic exceeded the EPA Region 6 and Region 9 tap water screening levels in one filtered sample.
- Iron exceeded the EPA Region 9 tap water screening level in two unfiltered samples.
- Manganese exceeded the EPA Region 9 tap water screening level in two unfiltered sample.
- Manganese exceeded the EPA Region 6 and Region 9 tap water screening levels in two filtered samples.
- Manganese exceeded the EPA MCL in one filtered sample.

The following organic chemicals were detected in one or more of the groundwater samples (five unfiltered) collected at concentrations exceeding one or more standards or screening levels.

- RDX exceeded the EPA Region 6 and Region 9 tap water screening levels in one unfiltered sample.
- Tetrachloroethene exceeded the EPA MCL, EPA Region 6 and Region 9 tap water screening levels, and NMWQCC domestic water supply surface water standard in two unfiltered samples.
- Tetrachloroethene exceeded the NMWQCC human health surface water standard in one unfiltered samples.
- Trichloroethene exceeded the EPA Region 6 and Region 9 tap water screening levels in two unfiltered sample.
- Trichloroethene exceeded the EPA MCL in one unfiltered sample.

The following inorganic chemicals were detected in groundwater but have no published standards or screening levels: bromide, total phosphate and silicon dioxide (Table I-6.0-4). The following organic chemicals were only detected in alluvial groundwater samples but do not have a standard or screening level (Table I-6.0-4): heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; heptachlorodibenzodioxins (total); heptachlorodibenzofuran[1,2,3,4,6,7,8-]; heptachlorodibenzofurans (total); octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]; octachlorodibenzofuran[1,2,3,4,6,7,8,9-]; and isopropyltoluene[4-].

I-7.0 CONCLUSIONS

Human Health Risk

Concentrations of carcinogenic COPCs were less than their respective industrial SSLs for Consolidated Units 13-003(a)-99 and 16-003(n)-99 and combined SWMUs 16-026(j2) and 16-029(f). The total excess cancer risks for these sites ranged from approximately 5×10^{-6} to 1×10^{-5}. These risk levels do not exceed the NMED target risk level of 1×10^{-5} (NMED 2006, 092513).

The total excess cancer risk for SWMU 16-003(o) is 3×10^{-5}, which is slightly above the NMED target cancer risk level of 1×10^{-5} (NMED 2006, 092513).The largest contributors to the risk are arsenic and benzo(a)pyrene. The arsenic EPC is similar to background concentrations. Only benzo(a)pyrene had an EPC concentration above the industrial SSL. The total excess cancer risk is reduced to approximately 1×10^{-5} if arsenic is removed as a COPC and the EPC for benzo(a)pyrene is adjusted to the mean (based on the skewed distribution and low detection percentage [section I-4.4.3]). The highest two concentrations of benzo(a)pyrene are located within a 10 ft^2 area on the steep hillslope. The exposure assumptions associated with the industrial scenario overestimate the exposure and risk associated with this SWMU (section I-4.4-2). The area of contamination is primarily on the hillslope near the drainage but away from where a worker may be exposed to at a frequency and duration more in keeping with the scenario exposure assumptions. Industrial activities are not likely to occur on the hillslope because the slope is steep. Therefore, the 3×10^{-5} cancer risk calculated for this SWMU is overestimated.

The total excess cancer risk for the residential scenario was above 1×10^{-5} for all sites. The risks ranged from approximately 2×10^{-5} for Consolidated Units 13-003(a)-99 and 16-003(n)-99 to 6×10^{-5} at combined SWMUs 16-026(j2) and 16-029(f). The largest contributors to risk are arsenic and benzo(a)pyrene at all sites. The arsenic EPCs are within the range of background concentrations.

All HIs for the industrial scenario were less than 1.0, with a maximum HI of 0.3 at SWMU 16-003(o). Therefore, all of the HIs were less than the NMED target HI of 1.0 (NMED 2006, 092513) for the industrial scenario.

The HIs for the residential scenario are below 1.0 for Consolidated Units 13-003(a)-99 and SWMUs 16-026(j2) and 16-029(f). The HIs are approximately 2 at SWMU 16-003(o) and 1.5 at Consolidated Unit 16-003(n)-99. The slightly elevated HIs are mainly because of aluminum, iron, and vanadium. The EPCs for aluminum, iron, and vanadium are similar to background concentrations.

Only SWMU 16-003(o) had radionuclide COPCs. The total dose at this SWMU was 0.21 mrem/yr for the industrial scenario, which is less than the target dose of 15 mrem/yr (DOE 2000, 067489). The total dose for the residential scenario was 0.75 mrem/yr, which is less than the target dose of 15 mrem/yr (DOE 2000, 067489).

Ecological Risk

No potential ecological risks were found for any receptor based on minimum ESL comparisons, HI analyses, comparisons to background concentrations, potential effects to populations (individuals for T&E species), the relative toxicity of related compounds, and the infrequency of detection. In addition, field and laboratory studies conducted and reported as part of the ecological investigations in Los Alamos and Pueblo Canyons (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Cañon de Valle (LANL 1993, 077965) have found that similar concentrations of COPCs have not adversely impacted small mammal, bird, earthworm, and plant populations, and individual Mexican spotted owls. These lines of evidence, discussed above for each receptor, and the analysis of COPECs with no ESLs support the conclusion that no potential ecological risks exist at the TA-16-340 Complex.

Surface Water and Groundwater in Fishladder Canyon

Several chemicals were detected above one or more water quality standards and/or screening levels in groundwater and surface water. These included RDX, methylene chloride, tetrachloroethene, trichloroethene, aluminum, arsenic, barium, beryllium, chromium, cyanide, iron, lead, manganese, uranium, and vanadium. Most chemicals were detected sporadically.

I-8.0 REFERENCES

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Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; 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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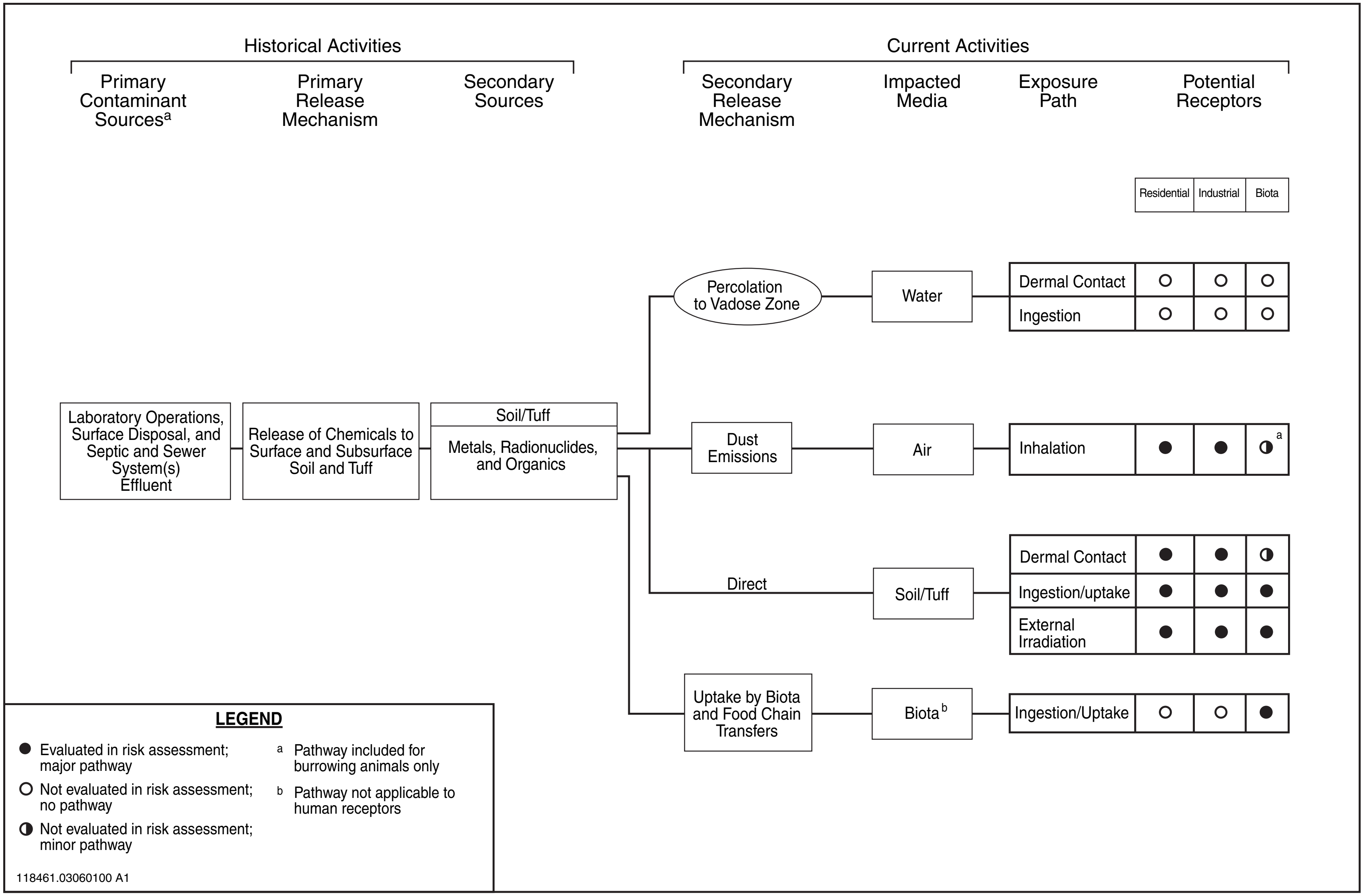


Impacted Media	Exposure Path	Residential	Industrial	Biota
Water	Dermal Contact	○	○	○
Water	Ingestion	○	○	○
Air	Inhalation	●	●	◑[a]
Soil/Tuff	Dermal Contact	●	●	◑
Soil/Tuff	Ingestion/uptake	●	●	●
Soil/Tuff	External Irradiation	●	●	●
Biota[b]	Ingestion/Uptake	○	○	●

Figure I-3.0-1 Conceptual site model for the TA-16-340 Complex

Table I-2.3-1
TA-16-340 Complex, Consolidated Unit 13-003(a)-99, Industrial and Residential COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Aluminum	10/10	2000	20200	11682	5409	14818	Normal	Student's-t
Antimony	10/0	0.418(U)	6.2(U)	1.61	n/a*	6.2(U)	n/a	Maximum detection limit
Arsenic	10/8	0.972(U)	7.49	3.5	2.32	4.86	Normal	95% KM (t)
Barium	10/10	36.3	228	118	59.2	152	Normal	Student's-t
Chromium	10/10	1.92	17.8	8.32	4.14	10.9	Normal	Student's-t
Cobalt	10/10	0.496	19.4	4.94	6.37	10.3	Gamma	95% Approximate Gamma
Copper	10/10	1.74	7.22	5.21	1.64	6.17	Normal	Student's-t
Cyanide (total)	8/3	0.18	1.3(U)	0.496	n/a	0.215	n/a	Maximum detected concentration
Fluoride	8/8	0.451	7.12	3.76	2.41	5.38	Normal	Student's-t
Manganese	10/10	146	1450	385.4	391	924	Nonparametric	99% Chebyshev (Mean, Sd)
Nitrate	8/3	0.537	1.63	1.1	n/a	1.63	n/a	Maximum detected concentration
Selenium	10/2	0.31(U)	1.82(U)	1.33	n/a	1.24	n/a	Maximum detected concentration
Silver	10/5	0.049	0.62(U)	0.227	0.221	0.078	Normal	95% KM (t)
Vanadium	10/10	4.79	25.3	16.1	7.38	20.3	Normal	95% Student's-t
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	10/2	0.18(U)	0.41(U)	0.108	n/a	0.033	n/a	Maximum detected concentration
Anthracene	10/1	0.18(U)	0.41(U)	0.115	n/a	0.685	n/a	Maximum detected concentration

Table I-2.3-1 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Benzo(a)anthracene	10/1	0.002(U)	0.41(U)	0.108	n/a	0.022	n/a	Maximum detected concentration
Benzo(a)pyrene	10/2	0.002(U)	0.41(U)	0.118	n/a	0.22	n/a	Maximum detected concentration
Benzo(b)fluoranthene	10/3	0.002(U)	0.41(U)	0.117	n/a	0.134	n/a	Maximum detected concentration
Benzo(g,h,i)perylene	10/2	0.002(U)	0.41(U)	0.112	n/a	0.088	n/a	Maximum detected concentration
Benzo(k)fluoranthene	10/1	0.0009(U)	0.41(U)	0.111	n/a	0.093	n/a	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	8/1	0.16	0.412(U)	0.371	n/a	0.16	n/a	Maximum detected concentration
Chrysene	10/4	0.002(U)	0.41(U)	0.117	n/a	0.151	n/a	Maximum detected concentration
Diethylphthalate	8/1	0.046	0.412(U)	0.357	n/a	0.046	n/a	Maximum detected concentration
Di-n-octylphthalate	8/1	0.13	0.412(U)	0.367	n/a	0.13	n/a	Maximum detected concentration
Fluoranthene	10/6	0.002(U)	0.41(U)	0.148	0.167	0.155	Gamma	95% KM (BCA)
Fluorene	10/1	0.018(U)	0.41(U)	0.108	n/a	0.035	n/a	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	10/1	0.002(U)	0.41(U)	0.112	n/a	0.101	n/a	Maximum detected concentration
Phenanthrene	10/3	0.019(U)	0.41(U)	0.136	n/a	0.229	n/a	Maximum detected concentration
Pyrene	10/3	0.002(U)	0.41(U)	0.149	n/a	0.323	n/a	Maximum detected concentration

Table I-2.3-1 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Volatile Organic Compounds (mg/kg)								
Butylbenzene[n-]	8/1	0.0003	0.006(U)	0.002	n/a	0.0003	n/a	Maximum detected concentration
Dichlorobenzene[1,2-]	8/1	0.0003	0.006(U)	0.002	n/a	0.0003	n/a	Maximum detected concentration
Dichlorobenzene[1,3-]	8/1	0.0003	0.006(U)	0.002	n/a	0.003	n/a	Maximum detected concentration
Dichlorobenzene[1,4-]	8/1	0.0004	0.006(U)	0.002	n/a	0.004	n/a	Maximum detected concentration
Styrene	8/1	0.0003	0.006(U)	0.002	n/a	0.0003	n/a	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	6/2	0.0004	0.003(U)	0.002	n/a	0.0005	n/a	Maximum detected concentration

* n/a = Not applicable.

Table I-2.3-2
TA-16-340 Complex, Consolidated Unit 16-003(n)-99, Industrial COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Antimony	10/1	0.079	7.7(U)	4.42	n/a*	0.079	n/a	Maximum detected concentration
Barium	10/10	68	5910	1015	1951	3704	Nonparametric	95% Chebyshev (Mean, Sd)
Copper	10/10	1.7	62.6	11.78	18.7	37.5	Nonparametric	95% Chebyshev (Mean, Sd)
Cyanide (total)	10/2	0.087	1.6(U)	0.928	n/a	0.229	n/a	Maximum detected concentration
Fluoride	3/2	0.847	1.16	1.04	n/a	1.16	n/a	Maximum detected concentration
Lead	10/10	9.15	46.3	18.5	11.5	26	Gamma	95% Approximate Gamma
Mercury	10/4	0.011	0.262	0.078	n/a	0.262	n/a	Maximum detected concentration
Nitrate	3/2	1.09	2.23	1.47	n/a	2.23	n/a	Maximum detected concentration
Selenium	10/0	0.27(U)	1.73(U)	0.502	n/a	1.73(U)	n/a	Maximum detection limit
Uranium	10/10	0.57	6.6	1.92	1.78	3.13	Gamma	95% Approximate Gamma
Zinc	10/10	19.8	229	54.9	65.8	146	Nonparametric	95% Chebyshev (Mean, Sd)
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	5/1	0.037(U)	0.39(U)	0.117	n/a	0.083	n/a	Maximum detected concentration
Anthracene	5/2	0.037(U)	0.11	0.055	n/a	0.11	n/a	Maximum detected concentration

Table I-2.3-2 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Mean Concentration (mg/kg)	Standard Deviation (mg/kg)	EPC (mg/kg)	Distribution Type	EPC Method
Benzo(a)anthracene	5/2	0.024(U)	0.33	0.114	n/a	0.33	n/a	Maximum detected concentration
Benzo(a)pyrene	5/4	0.023	0.43	0.14	n/a	0.43	n/a	Maximum detected concentration
Benzo(b)fluoranthene	5/4	0.03	0.61	0.199	n/a	0.61	n/a	Maximum detected concentration
Benzo(g,h,i)perylene	5/2	0.021(U)	0.19	0.074	n/a	0.19	n/a	Maximum detected concentration
Benzo(k)fluoranthene	5/3	0.021(U)	0.31	0.101	n/a	0.31	n/a	Maximum detected concentration
Benzoic acid	5/2	0.332(U)	1.2	0.809	n/a	1.2	n/a	Maximum detected concentration
Benzyl alcohol	5/1	0.25	1.5(U)	0.579	n/a	0.25	n/a	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	5/1	0.041	23(U)	4.93	n/a	0.041	n/a	Maximum detected concentration
Butylbenzylphthalate	5/1	0.368(U)	13	2.91	n/a	13	n/a	Maximum detected concentration
Chrysene	5/2	0.029	0.5	0.166	n/a	0.5	n/a	Maximum detected concentration
Dibenz(a,h)anthracene	5/1	0.037(U)	0.39(U)	0.113	n/a	0.062	n/a	Maximum detected concentration
Di-n-butylphthalate	5/1	0.18	0.39(U)	0.343	n/a	0.18	n/a	Maximum detected concentration
Di-n-octylphthalate	5/1	0.368(U)	4.5	1.21	n/a	4.5	n/a	Maximum detected concentration
Fluoranthene	5/5	0.027	0.63	0.219	0.261	0.468	Normal	95% Student's-t
Fluorene	5/1	0.037(U)	0.39(U)	0.115	n/a	0.069	n/a	Maximum detected concentration

Table I-2.3-2 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Mean Concentration (mg/kg)	Standard Deviation (mg/kg)	EPC (mg/kg)	Distribution Type	EPC Method
Indeno(1,2,3-cd)pyrene	5/3	0.023	0.22	0.081	n/a	0.22	n/a	Maximum detected concentration
Phenanthrene	5/4	0.027	0.59	0.183	n/a	0.59	n/a	Maximum detected concentration
Pyrene	5/5	0.036	1.4	0.378	0.586	1.24	Lognormal	95% Chebyshev (MVUE)
Volatile Organic Chemicals (mg/kg)								
Acetone	4/1	0.004	0.049	0.018	n/a	0.049	n/a	Maximum detected concentration
High Explosives (mg/kg)								
Amino-2,6-dinitrotoluene[4-]	10/1	0.091	0.446	0.214	n/a	0.446	n/a	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	10/1	0.075	0.714	0.194	n/a	0.714	n/a	Maximum detected concentration
Dinitrotoluene[2,4-]	10/2	0.054(U)	0.612	0.224	n/a	0.612	n/a	Maximum detected concentration
HMX	10/3	0.166(U)	624	62.91	n/a	624	n/a	Maximum detected concentration
Nitrobenzene	10/1	0.092(U)	0.375(U)	0.184	n/a	0.101	n/a	Maximum detected concentration
RDX	10/1	0.164(U)	4.44	0.619	n/a	4.44	n/a	Maximum detected concentration

* n/a = Not applicable.

Table I-2.3-3
TA-16-340 Complex, Consolidated Unit 16-003(n)-99, Residential COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Aluminum	31/31	1080	27600	9503	7056	12093	Gamma	95% Approximate Gamma
Antimony	31/1	0.079	7.7(U)	2.21	n/a*	0.079	n/a	Maximum detected concentration
Arsenic	31/31	0.9	12.8	3.76	2.38	4.51	Gamma	95% Approximate Gamma
Barium	31/31	17.7	5910	453	1151	675	Lognormal	95% H-UCL
Chromium	31/30	1.09	190	13	33.7	38.6	Nonparametric	95% KM (Chebyshev)
Cobalt	31/31	0.567	83.6	6.6	14.9	18.3	Nonparametric	95% Chebyshev (Mean, Sd)
Copper	31/31	1.7	62.6	8.19	11.1	16.9	Nonparametric	95% Chebyshev (Mean, Sd)
Cyanide (total)	31/4	0.087	1.6(U)	0.56	n/a	0.229	n/a	Maximum detected concentration
Fluoride	21/18	0.748	7.08	2.89	2.15	3.7	Gamma	95% KM (BCA)
Iron	31/31	2220	22800	10620	4830	12092	Normal	Student's-t
Lead	31/31	2.85	134	16.7	23.7	21.5	Lognormal	95% H-UCL
Manganese	31/31	83.6	2260	350	365	635	Nonparametric	95% Chebyshev (Mean, Sd)
Mercury	31/20	0.005	0.262	0.042	0.052	0.044	Nonparametric	97.5% KM (BCA)
Nickel	31/31	1.41	11.1	5.01	2.79	5.96	Gamma	95% Approximate Gamma
Nitrate	19/5	0.236	2.23	1.12	0.417	0.871	Normal	95% KM (t)
Perchlorate	21/1	0.0008	0.003(U)	0.002	n/a	0.0008	n/a	Maximum detected concentration

Table I-2.3-3 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Selenium	31/3	0.26(U)	8.71(U)	1.89	n/a	1.04	n/a	Maximum detected concentration
Uranium	31/31	0.267	6.6	1.17	1.17	1.47	Lognormal	95% H-UCL
Vanadium	31/31	2.5	47.5	16.8	10.3	19.9	Normal	95% Student's-t
Zinc	31/31	11.5	229	37.5	38.9	68	Nonparametric	95% Chebyshev (Mean, Sd)
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	26/3	0.023	16(U)	0.7	n/a	0.083	n/a	Maximum detected concentration
Anthracene	26/6	0.009	16(U)	0.688	3.12	0.036	Normal	95% KM (t)
Benzo(a)anthracene	26/2	0.024(U)	16(U)	0.702	n/a	0.33	n/a	Maximum detected concentration
Benzo(a)pyrene	26/9	0.023	16(U)	0.727	3.12	0.111	Normal	95% KM (t)
Benzo(b)fluoranthene	26/9	0.03	16(U)	0.748	3.11	0.148	Normal	95% KM (t)
Benzo(g,h,i)perylene	26/5	0.021(U)	16(U)	0.707	3.12	0.111	Normal	95% KM (t)
Benzo(k)fluoranthene	26/4	0.014	16(U)	0.697	n/a	0.31	n/a	Maximum detected concentration
Benzoic acid	26/3	0.332(U)	160(U)	0.7.27	n/a	1.2	n/a	Maximum detected concentration
Benzyl alcohol	26/1	0.25	65(U)	0.25	n/a	0.25	n/a	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	26/5	0.037	23(U)	1.77	5.32	0.086	Normal	95% KM (t)
Butylbenzylphthalate	26/1	0.35(U)	16(U)	1.553	n/a	13	n/a	Maximum detected concentration
Chrysene	26/8	0.019	16(U)	0.717	3.12	0.101	Gamma	95% KM (t)
Dibenz(a,h)anthracene	26/1	0.035(U)	16(U)	0.7	n/a	0.062	n/a	Maximum detected concentration

Table I-2.3-3 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Diethylphthalate	26/1	0.26	16(U)	1.062	n/a	0.26	n/a	Maximum detected concentration
Di-n-butylphthalate	26/1	0.18	16(U)	1.06	n/a	0.18	n/a	Maximum detected concentration
Di-n-octylphthalate	26/3	0.287(U)	16(U)	1.22	n/a	4.5	n/a	Maximum detected concentration
Fluoranthene	26/10	0.027	16(U)	0.739	3.12	0.142	Gamma	95% KM (t)
Fluorene	26/4	0.013	16(U)	0.698	n/a	0.069	n/a	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	26/8	0.023	16(U)	0.719	3.12	0.094	Normal	95% KM (t)
Methylnaphthalene[2-]	26/2	0.008	16(U)	0.708	n/a	0.012	n/a	Maximum detected concentration
Naphthalene	26/1	0.021	16(U)	0.709	n/a	0.021	n/a	Maximum detected concentration
Phenanthrene	26/9	0.024	16(U)	0.729	3.12	0.125	Gamma	95% KM (t)
Pyrene	26/10	0.026	16(U)	0.77	3.12	0.223	Gamma	95% KM (t)
Volatile Organic Chemicals (mg/kg)								
Acetone	24/5	0.003(U)	0.227	0.021	0.045	0.227	Gamma	95% KM (t)
Butanone[2-]	24/2	0.002	0.032(U)	0.008	n/a	0.003	n/a	Maximum detected concentration
Isopropyltoluene[4-]	24/1	0.0003	0.008(U)	0.002	n/a	0.0003	n/a	Maximum detected concentration
Methyl-2-pentanone[4-]	24/1	0.001	0.032(U)	0.002	n/a	0.001	n/a	Maximum detected concentration
Toluene	24/1	0.0004	0.008(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration

Table I-2.3-3 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
High Explosives (mg/kg)								
Amino-2,6-dinitrotoluene[4-]	31/1	0.091(U)	0.446	0.352	n/a	0.446	n/a	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	31/1	0.075(U)	0.714	0.328	n/a	0.714	n/a	Maximum detected concentration
Dinitrobenzene[1,3-]	31/1	0.068(U)	0.5(U)	0.305	n/a	0.077	n/a	Maximum detected concentration
Dinitrotoluene[2,4-]	31/3	0.054(U)	0.612	0.307	n/a	0.612	n/a	Maximum detected concentration
HMX	31/9	0.118	624	21.2	112	230	Lognormal	99% KM (Chebyshev)
Nitrobenzene	31/1	0.091(U)	0.5(U)	0.342	n/a	0.101	n/a	Maximum detected concentration
RDX	31/1	0.164(U)	4.44	0.475	n/a	4.44	n/a	Maximum detected concentration
TATB	19/6	0.252	14.3	2.36	5.8	3.32	Gamma	95% KM (t)
Trinitrotoluene[2,4,6-]	31/1	0.08(U)	0.5(U)	0.315	n/a	0.242	n/a	Maximum detected concentration

* n/a = Not applicable.

Table I-2.3-4
TA-16-340 Complex, SWMU 16-003(o), Industrial COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Antimony	50/3	0.077	20.7(U)	2.21	n/a*	0.077	n/a	Maximum detected concentration
Arsenic	50/34	0.679	68.3	8.6	11.2	10.2	Lognormal	95% KM (BCA)
Barium	50/50	27.4	1790	250	280	311	Lognormal	95% H-UCL
Beryllium	50/43	0.264	2.2	0.677	0.384	0.801	Lognormal	95% KM (Chebyshev)
Cadmium	50/43	0.057	3.7	0.622	0.694	0.943	Lognormal	95% KM (Chebyshev)
Chromium	50/49	0.657(U)	192	30.4	42.6	56.7	Lognormal	95% KM (Chebyshev)
Cobalt	50/49	0.361	94.2	5.51	13	13.5	Nonparametric	95% KM (Chebyshev)
Copper	50/50	1.11	1420	115	246	220	Lognormal	95% H-UCL
Cyanide (total)	24/12	0.084	4.17(U)	1.013	0.984	0.502	Gamma	95% KM (t)
Fluoride	16/14	0.887	8.76	2.959	2.315	4.02	Gamma	95% KM (BCA)
Iron	50/50	3370	54800	12400	8547	14426	Nonparametric	95% Student's-t
Lead	50/50	1.56	190	28.3	32.1	36.3	Lognormal	95% H-UCL
Manganese	50/50	28.5	814	254	151	293	Gamma	95% Approximate Gamma
Mercury	49/47	0.004	1.21	0.13	0.236	0.276	Lognormal	95% KM (Chebyshev)
Nickel	50/50	0.668	41.2	6.33	6.02	10	Nonparametric	95% Chebyshev (Mean, Sd)
Nitrate	15/10	0.831	1703	4.87	5.88	7.32	App. Gamma	95% KM (BCA)
Selenium	50/29	0.26	19.8	3.01	2.99	3.27	Gamma	95% KM (t)
Silver	50/41	0.043	4.1	0.417	0.682	0.666	Nonparametric	95% KM (Chebyshev)
Thallium	50/32	0.041	1(U)	0.221	0.16	0.17	Nonparametric	95% KM (t)
Uranium	51/51	0.314	16.3	4.54	4.3	6.46	Lognormal	95% H-UCL
Vanadium	50/50	2.19	193	44.6	38.8	54	Gamma	95% Approximate Gamma

Table I-2.3-4 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Zinc	50/50	17.7	967	130	168	228	Nonparametric	97.5% Chebyshev (Mean, Sd)
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	53/24	0.014	8.39	0.689	1.62	1.53	Lognormal	95% KM (Chebyshev)
Acenaphthylene	53/4	0.012	5.2(U)	0.396	n/a	0.147	n/a	Maximum detected concentration
Anthracene	53/25	0.007	9.93	0.918	2.17	1.29	Gamma	95% KM (t)
Benzo(a)anthracene	53/28	0.016	21.7	1.52	3.9	2.33	Gamma	95% KM (BCA)
Benzo(a)pyrene	53/34	0.024	21.4	1.49	3.84	4.77	Lognormal	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	53/35	0.028	26	2.01	4.92	6.23	Lognormal	97.5% KM (Chebyshev)
Benzo(g,h,i)perylene	53/28	0.034(U)	13.4	0.84	2.07	2.03	Lognormal	95% KM (Chebyshev)
Benzo(k)fluoranthene	53/37	0.031	7.3	0.503	1.43	0.781	Gamma	95% KM (t)
Benzoic acid	27/5	0.419	52(U)	7.19	14	1.2	Lognormal	95% KM (t)
Bis(2-ethylhexyl)phthalate	27/8	0.074(U)	64(U)	8.12	16.2	7.65	Gamma	95% KM (t)
Chloronaphthalene[2-]	53/1	0.034(U)	5.2(U)	0.395	n/a	0.007	n/a	Maximum detected concentration
Chrysene	53/33	0.012	21.5	1.544	4.14	5.09	Lognormal	97.5% KM (Chebyshev)
Dibenz(a,h)anthracene	53/5	0.034(U)	1.7	0.212	0.399	0.217	Normal	95% KM (t)
Dibenzofuran	27/3	0.119	5(U)	0.991	n/a	2.7	n/a	Maximum detected concentration
Di-n-butylphthalate	27/1	0.18	5.2(U)	1.05	n/a	0.18	n/a	Maximum detected concentration
Fluoranthene	53/38	0.017	44.7	3.13	8.35	14.6	Lognormal	95% KM (Chebyshev)
Fluorene	53/21	0.008(U)	7.04	0.649	1.5	0.859	Gamma	95% KM (t)
Indeno(1,2,3-cd)pyrene	53/28	0.031(U)	13.1	0.866	2.095	2.08	Lognormal	95% KM (Chebyshev)
Methylnaphthalene[2-]	53/18	0.01	5(U)	0.421	0.924	0.528	Lognormal	95% KM (Chebyshev)

Table I-2.3-4 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Methylphenol[4-]	27/1	0.34(U)	5.2(U)	1.08	n/a	1	n/a	Maximum detected concentration
Naphthalene	53/19	0.023	10.6	0.634	1.65	1.5	Lognormal	95% KM (Chebyshev)
Phenanthrene	53/37	0.011	42.1	2.8	7.76	13.44	Lognormal	95% KM (Chebyshev)
Pyrene	53/39	0.014	51.4	3.07	8.53	14.8	Lognormal	95% KM (Chebyshev)
Volatile Organic Chemicals (mg/kg)								
Acetone	19/5	0.005(U)	0.109	0.023	0.032	0.04	Normal	95% KM (% Bootstrap)
Butanone[2-]	19/1	0.007	0.083(U)	0.012	n/a	0.007	n/a	Maximum detected concentration
Dichloroethene[1,1-]	19/2	0.0007	0.021(U)	0.003	n/a	0.001	n/a	Maximum detected concentration
Dichloroethene[cis-1,2-]	19/1	0.001(U)	0.021(U)	0.003	n/a	0.002	n/a	
Ethylbenzene	19/2	0.0003	0.021(U)	0.003	n/a	0.0004	n/a	Maximum detected concentration
Isopropylbenzene	19/1	0.0005	0.021(U)	0.003	n/a	0.0005	n/a	Maximum detected concentration
Isopropyltoluene[4-]	19/1	0.0007	0.021(U)	0.001	n/a	0.0007	n/a	Maximum detected concentration
Tetrachloroethene	19/3	0.001(U)	0.313	0.02	n/a	0.313	n/a	Maximum detected concentration
Toluene	19/4	0.004	0.021(U)	0.003	n/a	0.001	n/a	Maximum detected concentration
Trichloroethene	19/3	0.001	0.021(U)	0.003	n/a	0.006	n/a	Maximum detected concentration
Trimethylbenzene[1,2,4-]	19/1	0.0007	0.021(U)	0.003	n/a	0.0007	n/a	Maximum detected concentration
Xylene[1,2-]	17/1	0.0004	0.003(U)	0.001	n/a	0.0004	n/a	Maximum detected concentration

Table I-2.3-4 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Xylene[1,3-] +Xylene[1,4-]	17/1	0.001	0.005(U)	0.003	n/a	0.001	n/a	Maximum detected concentration
High Explosives (mg/kg)								
Amino-2,6-dinitrotoluene[4-]	27/3	0.091(U)	1.07	0.328	n/a	1.07	n/a	Maximum detected concentration
Amino-4,6-dinitrotoluene[2-]	27/1	0.075(U)	0.5(U)	0.267	n/a	0.14	n/a	Maximum detected concentration
Dinitrotoluene[2,4-]	27/1	0.054(U)	0.679(U)	0.296	n/a	0.136	n/a	Maximum detected concentration
HMX	27/15	0.166(U)	34.1	4.53	9.13	7.84	Gamma	95% KM (BCA)
Nitrobenzene	27/1	0.098(U)	0.5(U)	0.295	n/a	0.215	n/a	Maximum detected concentration
RDX	27/12	0.164(U)	59.3	5.5	13.4	10.1	Gamma	95% KM (t)
TATB	11/5	1(U)	18.4	6.16	6.37	12.7	Normal	95% KM (% Bootstrap)
Tetryl	27/2	0.093(U)	3.04	0.539	n/a	3.04	n/a	Maximum detected concentration
Trinitrotoluene[2,4,6-]	27/4	0.08(U)	3.03	0.401	n/a	3.03	n/a	Maximum detected concentration
Radionuclides (pCi/g)								
Uranium-234	31/31	0.882	11.9	2.76	2.75	4.92	Nonparametric	95% Chebyshev (Mean, Sd)
Uranium-235/236	31/26	0.025(U)	0.582	0.167	0.144	0.28	Lognormal	95% KM (Chebyshev)
Uranium-238	31/31	0.547	8.02	2.02	1.68	3.33	Nonparametric	95% Chebyshev (Mean, Sd)

* n/a = Not applicable.

Table I-2.3-5
TA-16-340 Complex, SWMU 16-003(o), Residential COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Aluminum	180/180	670	35800	10094	6937	10969	Gamma	95% Approx. Gamma
Antimony	162/12	0.077	20.7(U)	1.08	2.49	0.199	Nonparametric	95% KM (% Bootstrap)
Arsenic	180/127	0.679	68.3	5.901	7.14	5.49	Nonparametric	95% KM (BCA)
Barium	180/180	12.3	1790	164.5	186	225	Nonparametric	95% Chebyshev (Mean, Sd)
Beryllium	180/171	0.209	2.53	0.667	0.349	0.689	Gamma	95% KM (BCA)
Cadmium	180/106	0.057	3.7	0.505	0.441	0.418	Nonparametric	95% KM (% Bootstrap)
Chromium	173/172	0.657(U)	192	15.3	25.4	18.8	Nonparametric	95% KM (BCA)
Cobalt	180/179	0.253	275	6.832	23.8	14.6	Nonparametric	95% KM (Chebyshev)
Copper	180/180	1.11	1420	52.2	164	129	Nonparametric	95% Chebyshev (Mean, Sd)
Cyanide (total)	99/25	0.064	13.8(U)	0.613	1.464	0.238	Lognormal	95% KM (t)
Fluoride	99/86	0.558	34.4	3.9	4.4	4.67	Gamma	95% KM (BCA)
Iron	180/180	3370	54800	12356	5782	12897	Lognormal	95% H-UCL
Lead	180/174	1.56	190	17.59	23.02	20.8	Nonparametric	95% KM (BCA)
Manganese	180/180	28.5	1080	250	159	270	Lognormal	95% H-UCL
Mercury	177/168	0.002	1.21	0.061	0.15	0.11	Nonparametric	95% KM (Chebyshev)
Nickel	176/176	0.668	41.2	5.39	4.19	5.84	Gamma	95% Approx. Gamma
Nitrate	91/41	0.448	17.3	2.098	2.82	2.45	Nonparametric	95% KM (% Bootstrap)
Perchlorate	89/3	0.0006	0.149(U)	0.005	n/a*	0.0009	n/a	Maximum detected concentration
Selenium	180/96	0.249(U)	19.8	2.44	2	2.17	Gamma	95% KM (t)
Silver	180/159	0.043	4.39	0.248	0.524	0.263	Nonparametric	95% KM (BCA)

Table I-2.3-5 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Thallium	180/122	0.037	1.01	0.234	0.154	0.216	Lognormal	95% KM (BCA)
Uranium	181/181	0.226	49.2	2.32	4.59	4.45	Nonparametric	97.5% Chebyshev (Mean, Sd)
Vanadium	180/180	2.19	193	27.4	28	36.5	Nonparametric	95% Chebyshev (Mean, Sd)
Zinc	180/180	9.56	967	70.63	111	107	Nonparametric	97.5% Chebyshev (Mean, Sd)
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	183/65	0.001(U)	8.39	0.321	1.05	0.601	Lognormal	95% KM (Chebyshev)
Acenaphthylene	183/4	0.001(U)	5.2(U)	0.161	n/a	0.147	n/a	Maximum detected concentration
Anthracene	183/77	0.001(U)	10.7	0.436	1.477	0.856	Lognormal	95% KM (Chebyshev)
Benzo(a)anthracene	183/63	0.001(U)	21.7	0.703	2.565	1.48	Lognormal	95% KM (Chebyshev)
Benzo(a)pyrene	183/83	0.002	21.4	0.511	2.147	1.17	Nonparametric	95% KM (Chebyshev)
Benzo(b)fluoranthene	183/91	0.002	26	0.924	3.28	1.962	Lognormal	95% KM (Chebyshev)
Benzo(g,h,i)perylene	183/64	0.001(U)	13.4	0.351	1.25	0.48	Lognormal	95% KM (BCA)
Benzo(k)fluoranthene	183/39	0.001(U)	10.4	0.282	1.12	0.609	Lognormal	95% KM (Chebyshev)
Benzoic acid	111/6	0.02(U)	52(U)	2.86	7.4	0.483	Nonparametric	95% KM (t)
Bis(2-ethylhexyl)phthalate	111/32	0.01(U)	64(U)	3.93	11.2	8.15	Lognormal	97.5% KM (Chebyshev)
Chloronaphthalene[2-]	183/1	0.001(U)	5.2(U)	0.161	n/a	0.04	n/a	Maximum detected concentration
Chrysene	183/87	0.001(U)	21.5	0.716	2.69	1.56	Lognormal	95% KM (Chebyshev)
Dibenz(a,h)anthracene	183/8	0.001(U)	1.7	0.106	0.234	0.068	Normal	95% KM (t)
Dibenzofuran	111/20	0.01	5(U)	0.674	0.883	0.319	Lognormal	95% KM (BCA)
Diethylphthalate	111/1	0.01(U)	5.2(U)	0.783	n/a	0.23	n/a	Maximum detected concentration

Table I-2.3-5 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Di-n-butylphthalate	111/1	0.01(U)	5.2(U)	0.772	n/a	0.18	n/a	Maximum detected concentration
Di-n-octylphthalate	111/1	0.01(U)	5.2(U)	0.784	n/a	0.331	n/a	Maximum detected concentration
Fluoranthene	183/113	0.0008	44.7	1.424	0.051	3.87	Lognormal	97.5% KM (Chebyshev)
Fluorene	183/62	0.001(U)	7.40	0.311	1	0.576	Lognormal	95% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	183/69	0.001(U)	13.1	0.32	1.18	0.655	Nonparametric	95% KM (Chebyshev)
Methylnaphthalene[2-]	183/54	0.001(U)	5(U)	0.188	0.553	0.15	Lognormal	95% KM (BCA)
Methylphenol[4-]	111/1	0.01(U)	5.2(U)	0.781	n/a	1	n/a	Maximum detected concentration
Naphthalene	183/51	0.001(U)	10.6	0.282	0.963	0.524	Lognormal	95% KM (Chebyshev)
Phenanthrene	183/98	0.0003	42.1	1.34	5.03	3.66	Lognormal	95% KM (Chebyshev)
Pyrene	183/109	0.001	51.4	1.52	5.8	4.185	Lognormal	97.5% KM (Chebyshev)
Volatile Organic Chemicals (mg/kg)								
Acetone	102/37	0.003	0.212	0.016	0.026	0.017	Lognormal	95% KM (% Bootstrap)
Butanone[2-]	102/5	0.002(U)	0.083(U)	0.007	0.009	0.005	Normal	95% KM (t)
Chloroform	102/1	0.0008(U)	0.021(U)	0.002	n/a	0.001	n/a	Maximum detected concentration
Dichloroethene[1,1-]	102/5	0.0007	0.021(U)	0.002	0.002	0.0007	Normal	95% KM (t)
Dichloroethene[cis-1,2-]	102/2	0.0008(U)	0.021(U)	0.006	n/a	0.002	n/a	
Ethylbenzene	102/5	0.0002	0.021(U)	0.002	0.002	0.0004	Normal	95% KM (t)
Isopropylbenzene	102/1	0.0005	0.021(U)	0.0016	n/a	0.0005	n/a	Maximum detected concentration
Isopropyltoluene[4-]	102/16	0.0003	0.069	0.002	0.007	0.003	Nonparametric	95% KM (BCA)

Table I-2.3-5 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Methyl-2-pentanone[4-]	102/1	0.004	0.083(U)	0.008	n/a	0.004	n/a	Maximum detected concentration
Methylene chloride	102/3	0.002	0.021(U)	0.006	n/a	0.005	n/a	Maximum detected concentration
Tetrachloroethene	102/21	0.0003	0.313	0.007	0.033	0.021	Lognormal	95% KM (Chebyshev)
Toluene	102/25	0.0003	0.021(U)	0.002	0.002	0.0009	Gamma	95% KM (t)
Trichloroethane[1,1,1-]	102/2	0.0005	0.021(U)	0.002	n/a	0.003	n/a	Maximum detected concentration
Trichloroethene	102/6	0.0008(U)	0.021(U)	0.002	0.002	0.001	Normal	95% KM (t)
Trichlorofluoromethane	102/1	0.0008	0.021	0.002	n/a	0.005	n/a	Maximum detected concentration
Trimethylbenzene[1,2,4-]	102/6	0.0003(U)	0.021(U)	0.002	0.002	0.001	Gamma	95% KM (t)
Trimethylbenzene[1,3,5-]	102/2	0.0002	0.021(U)	0.002	n/a	0.0002	n/a	Maximum detected concentration
Xylene[1,2-]	97/6	0.0003	0.003(U)	0.001	0.0003	0.0005	Normal	95% KM (t)
Xylene[1,3-] +Xylene[1,4-]	97/13	0.0003	0.005(U)	0.002	0.0009	0.0006	Gamma	95% KM (t)
High Explosives (mg/kg)								
Amino-2,6-dinitrotoluene[4-]	109/5	0.091(U)	1.07	0.435	0.152	0.154	Nonparametric	95% KM (t)
Amino-4,6-dinitrotoluene[2-]	109/1	0.075(U)	0.5(U)	0.421	n/a	0.14	n/a	Maximum detected concentration
Dinitroaniline[3,5-]	77/1	0.338	1(U)	0.991	n/a	0.338	n/a	Maximum detected concentration
Dinitrotoluene[2,4-]	111/4	0.01(U)	1.54(U)	0.366	n/a	0.331	n/a	Maximum detected concentration
HMX	110/66	0.107	34.1	2.6	5.7	5.94	Lognormal	95% KM (Chebyshev)
Nitrobenzene	109/1	0.091(U)	0.5(U)	0.427	n/a	0.215	n/a	Maximum detected concentration

Table I-2.3-5 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
PETN	73/2	0.452	1.43	0.998	n/a	1.43	n/a	Maximum detected concentration
RDX	109/57	0.106	89.9	2.81	11	9.3	Nonparametric	95% KM (Chebyshev)
TATB	75/39	0.264	18.4	3.69	4.66	4.4	Gamma	95% KM (t)
Tetryl	109/2	0.093(U)	3.04	0.508	n/a	3.04	n/a	Maximum detected concentration
Trinitrotoluene[2,4,6-]	109/7	0.065	3.03	0.449	n/a	3.03	Gamma	95% KM (t)
Radionuclides (pCi/g)								
Uranium-234	86/86	0.307	11.9	1.72	2.05	2.68	Nonparametric	95% Chebyshev (Mean, Sd)
Uranium-235/236	86/59	0.009(U)	0.582	0.117	0.109	0.139	Nonparametric	95% KM (BCA)
Uranium-238	86/86	0.32	8.02	1.53	1.51	2.24	Nonparametric	95% Chebyshev (Mean, Sd)

* n/a = Not applicable.

Table I-2.3-6
TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f), Industrial COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Antimony	6/0	0.123(U)	6.29(U)	2.97	n/a*	6.29(U)	n/a	Maximum detection limit
Arsenic	7/6	1.08	14.9(U)	3.63	5.02	2.39	Normal	95% KM (t)
Chromium	7/7	1.63	27	8.13	8.69	17.9	Gamma	95% Approximate Gamma
Cyanide (total)	5/2	0.22	1.3(U)	0.806	n/a	0.31	n/a	Maximum detected concentration
Fluoride	3/2	1.2(U)	1.71	1.52	n/a	1.71	n/a	Maximum detected concentration
Lead	7/7	5.8	71.5	22.3	23.3	47.6	Gamma	95% Approximate Gamma
Mercury	7/5	0.015	0.12(U)	0.052	0.037	0.054	Normal	95% KM (t)
Nitrate	3/2	0.977	3.14	1.81	n/a	3.14	n/a	Maximum detected concentration
Selenium	6/1	0.278(U)	3.72	0.979	n/a	3.72	n/a	Maximum detected concentration
Silver	7/3	0.86	2.4(U)	0.633	n/a	0.139	n/a	Maximum detected concentration
Thallium	7/2	0.148(U)	1.5(U)	0.416	n/a	0.228	n/a	Maximum detected concentration
Zinc	7/7	11.3	224	54.9	75.6	137	Gamma	95% Approximate Gamma
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	7/3	0.22	0.67	0.25	n/a	0.67	n/a	Maximum detected concentration
Anthracene	7/2	0.034(U)	1	0.307	n/a	1	n/a	Maximum detected concentration
Benzo(a)anthracene	7/4	0.024	1.5	0.404	n/a	1.5	n/a	Maximum detected concentration

Table I-2.3-6 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Benzo(a)pyrene	7/3	0.034(U)	1.6	0.429	n/a	1.6	n/a	Maximum detected concentration
Benzo(b)fluoranthene	7/4	0.041(U)	2	0.529	n/a	2	n/a	Maximum detected concentration
Benzo(g,h,i)perylene	7/3	0.34(U)	0.77	0.245	n/a	0.77	n/a	Maximum detected concentration
Benzo(k)fluoranthene	7/3	0.34(U)	0.8	0.258	n/a	0.8	n/a	Maximum detected concentration
Benzoic acid	7/1	0.049(U)	7.6(U)	2.43	n/a	0.18	n/a	Maximum detected concentration
Chrysene	7/4	0.025	1.8	0.461	n/a	1.8	n/a	Maximum detected concentration
Dibenz(a,h)anthracene	7/2	0.034(U)	0.39(U)	0.167	n/a	0.2	n/a	Maximum detected concentration
Dibenzofuran	7/2	0.097	0.454(U)	0.335	n/a	0.28	n/a	Maximum detected concentration
Di-n-butylphthalate	7/1	0.059	0.76(U)	0.4	n/a	0.059	n/a	Maximum detected concentration
Fluoranthene	7/5	0.019	3.3	0.835	1.26	1.76	Normal	95% KM (t)
Fluorene	7/2	0.034(U)	0.62	0.239	n/a	0.62	n/a	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	7/3	0.034(U)	0.87	0.266	n/a	0.87	n/a	Maximum detected concentration
Methylnaphthalene[2-]	7/2	0.034(U)	0.39(U)	0.161	n/a	0.18	n/a	Maximum detected concentration
Naphthalene	7/2	0.034(U)	0.47	0.217	n/a	0.47	n/a	Maximum detected concentration
Phenanthrene	7/4	0.023	3.1	0.705	n/a	3.1	n/a	Maximum detected concentration

Table I-2.3-6 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Pyrene	7/5	0.016	4.6	1.1	1.76	2.42	Normal	95% KM (t)
High Explosives (mg/kg)								
RDX	7/1	0.151	0.5(U)	0.223	n/a	0.151	n/a	Maximum detected concentration

* n/a = Not applicable.

Table I-2.3-7
TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f), Residential COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Aluminum	32/32	1750	29800	10515	6874	13166	Gamma	95% Approximate Gamma
Antimony	19/2	0.123(U)	13(U)	1.87	n/a*	0.168	n/a	Maximum detected concentration
Arsenic	32/27	0.49	14.9(U)	2.847	2.65	2.55	Normal	95% KM (t)
Barium	32/31	19	393	107	81.2	130	Gamma	95% KM (BCA)
Chromium	32/32	1.41	260	17.9	46.1	99	Nonparametric	95% Chebyshev (Mean, Sd)
Cobalt	32/31	0.905	186	10.78	33.6	47.6	Nonparametric	97.5% KM (Chebyshev)
Copper	32/31	2.93	100	11.1	18.7	25.5	Nonparametric	97.5% KM (Chebyshev)
Cyanide (total)	27/4	0.154	1.3(U)	0.381	n/a	0.31	n/a	Maximum detected concentration
Fluoride	25/22	0.63	21.2	3.42	4.24	5.16	Gamma	95% KM (BCA)
Lead	32/29	1.2	71.5	12.2	13.2	22.3	Gamma	95% KM (Chebyshev)
Mercury	32/17	0.004	0.12(U)	0.037	0.034	0.025	Gamma	95% KM (t)
Nickel	32/31	2.05	21	7.24	4.05	8.3	Gamma	95% KM (BCA)
Nitrate	25/5	0.858	3.14	1.21	0.411	1.24	Nonparametric	95% KM (t)
Perchlorate	23/2	0.002(U)	0.003	0.002	n/a	0.003	n/a	Maximum detected concentration
Selenium	29/5	0.278(U)	3.72	1.38	0.753	1.19	Normal	95% KM (t)
Silver	32/24	0.0433	24.9	1.48	4.53	9.22	Nonparametric	99% KM (Chebyshev)
Thallium	32/22	0.03	2.2(U)	0.386	0.511	0.222	Gamma	95% KM (% Bootstrap)
Zinc	32/32	9	224	36	37.8	43.2	Lognormal	95% H-UCL
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	31/17	0.001(U)	6.09	0.506	1.25	0.895	Gamma	95% KM (BCA)
Anthracene	31/19	0.0004	10.7	0.822	2.19	1.53	Gamma	95% KM (BCA)

Table I-2.3-7 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Benzo(a)anthracene	31/16	0.001(U)	18.4	1.33	3.66	2.74	Gamma	95% KM (BCA)
Benzo(a)pyrene	31/20	0.001	15.8	1.18	3.13	2.26	Gamma	95% KM (BCA)
Benzo(b)fluoranthene	31/21	0.002	22.7	1.56	4.34	2.91	Gamma	95% KM (BCA)
Benzo(g,h,i)perylene	31/18	0.001(U)	7.28	0.651	1.62	1.12	Gamma	95% KM (BCA)
Benzo(k)fluoranthene	31/10	0.001(U)	9.12	0.634	1.74	1.18	Gamma	95% KM (t)
Benzoic acid	31/1	0.02(U)	7.6(U)	1.53	n/a	0.18	n/a	Maximum detected concentration
Chrysene	31/20	0.002	18.1	1.34	3.6	2.48	Gamma	95% KM (BCA)
Dibenz(a,h)anthracene	31/3	0.001(U)	1.85(U)	0.157	n/a	0.2	n/a	Maximum detected concentration
Dibenzofuran	31/9	0.0037	3.83	0.533	0.75	0.561	Gamma	95% KM (BCA)
Di-n-butylphthalate	31/2	0.01(U)	1.66(U)	0.512	n/a	0.059	n/a	Maximum detected concentration
Fluoranthene	27/22	0.0026	39.6	2.87	7.87	9.05	Gamma	95% KM (BCA)
Fluorene	31/16	0.001(U)	6.32	0.518	1.29	0.904	Gamma	95% KM (BCA)
Indeno(1,2,3-cd)pyrene	31/17	0.0006	7.54	0.652	1.63	1.15	Gamma	95% KM (BCA)
Methylnaphthalene[2-]	31/16	0.0007	2.67	0.239	0.544	0.385	Gamma	95% KM (BCA)
Naphthalene	31/15	0.001(U)	7.83	0.611	1.65	1.08	Gamma	95% KM (t)
Phenanthrene	31/21	0.002	39.1	2.75	0.18	5.56	Gamma	95% KM (BCA)
Phenol	31/1	0.01(U)	1.66(U)	0.513	n/a	0.049	n/a	Maximum detected concentration
Pyrene	31/22	0.003	40.9	2.83	7.89	9.02	Gamma	95% KM (Chebyshev)
Volatile Organic Compounds (mg/kg)								
Acetone	27/10	0.004	0.286	0.022	0.054	0.042	Lognormal	95% KM (BCA)
Butanone[2-]	27/1	0.0049(U)	0.156	0.014	n/a	0.156	n/a	Maximum detected concentration

Table I-2.3-7 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Dichloroethene[1,1-]	27/2	0.001(U)	0.006(U)	0.002	n/a	0.002	n/a	Maximum detected concentration
Ethylbenzene	27/1	0.003(U)	0.006(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration
Isopropylbenzene	27/1	0.003	0.006(U)	0.002	n/a	0.003	n/a	Maximum detected concentration
Isopropyltoluene[4-]	27/3	0.003	0.021	0.003	n/a	0.021	n/a	Maximum detected concentration
Propylbenzene[1-]	27/1	0.0004	0.006(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration
Toluene	27/2	0.004	0.006(U)	0.002	n/a	0.002	n/a	Maximum detected concentration
Trichloroethene	27/2	0.0003	0.006(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration
Trimethylbenzene[1,2,4-]	27/4	0.0004(U)	0.006(U)	0.002	n/a	0.002	n/a	Maximum detected concentration
Trimethylbenzene[1,3,5-]	27/2	0.004	0.006(U)	0.002	n/a	0.0006	n/a	Maximum detected concentration
Xylene[1,3-]+xylene[1,4-]	23/2	0.0005	0.003(U)	0.002	n/a	0.0009	n/a	Maximum detected concentration
High Explosives (mg/kg)								
HMX	27/1	0.162(U)	2.2(U)	0.465	n/a	0.786	n/a	Maximum detected concentration
RDX	27/1	0.151	1(U)	0.406	n/a	0.151	n/a	Maximum detected concentration
TATB	9/2	0.298	1.95(U)	1.25	n/a	1.14	n/a	Maximum detected concentration

* n/a = Not applicable.

Table I-2.3-8
TA-16-340 Complex Ecological COPC Statistics

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Inorganic Chemicals (mg/kg)								
Antimony	184/10	0.077	20.7(U)	1.44	2.01	0.187	Nonparametric	95% KM (BCA)
Arsenic	201/143	0.49	68.3	5.58	6.93	5.15	Nonparametric	95% KM (BCA)
Barium	201/201	12.3	5910	214	489	363.9	Nonparametric	95% Chebyshev (Mean, Sd)
Beryllium	201/183	0.209	2.53	0.701	0.351	0.716	Gamma	95% KM (BCA)
Cadmium	201/116	0.057	3.7	0.495	0.425	0.399	Nonparametric	95% KM (t)
Chromium	194/192	0.657(U)	192	15.43	27.2	19.1	Nonparametric	95% KM (BCA)
Cobalt	201/200	0.269	275	8.38	26.7	16.6	Nonparametric	95% KM (Chebyshev)
Copper	201/201	1.11	1420	47.3	155.8	116	Nonparametric	95% Chebyshev (Mean, Sd)
Cyanide (total)	115/28	0.064	4.17(U)	0.561	0.607	0.228	Lognormal	95% KM (t)
Fluoride	102/89	0.558	21.2	3.4	3.2	3.91	Gamma	95% KM (BCA)
Iron	201/201	2220	54800	11970	5757	12581	Gamma	95% Approximate Gamma
Lead	201/192	1.2	190	18	23.8	20.9	Nonparametric	95% KM (BCA)
Manganese	201/201	28.5	2260	264	210	280.5	Lognormal	95% H-UCL
Mercury	198/170	0.0021	1.21	0.062	0.143	0.102	Nonparametric	95% KM (Chebyshev)
Nickel	199/199	0.668	41.2	5.79	4.24	6.334	Gamma	95% Approximate Gamma
Nitrate	96/42	0.236	17.3	1.99	2.75	2.26	Nonparametric	95% KM (t)
Perchlorate	87/4	0.0006	0.149(U)	0.005	n/a*	0.003	n/a	Maximum detected concentration
Selenium	199/89	0.249(U)	19.8	2.34	2.15	1.92	Gamma	95% KM (t)
Silver	201/163	0.043	24.9	0.461	1.89	0.607	Nonparametric	95% KM (BCA)

Table I-2.3-8 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Thallium	201/134	0.03	1.5(U)	0.239	0.189	0.206	Lognormal	95% KM (BCA)
Uranium	197/197	0.165	49.2	2.28	4.42	4.25	Nonparametric	97.5% Chebyshev (Mean, Sd)
Vanadium	201/201	1.9	193	26.3	26.8	34.5	Nonparametric	95% Chebyshev (Mean, Sd)
Zinc	201/201	9.56	967	66.99	107	99.9	Nonparametric	95% Chebyshev (Mean, Sd)
Semivolatile Organic Chemicals (mg/kg)								
Acenaphthene	199/70	0.001(U)	16(U)	0.428	1.55	0.621	Lognormal	95% KM (Chebyshev)
Acenaphthylene	199/4	0.001(U)	16(U)	0.251	n/a	0.147	n/a	Maximum detected concentration
Anthracene	199/82	0.0004	16(U)	0.56	1.94	1.13	Lognormal	95% KM (Chebyshev)
Benzo(a)anthracene	199/70	0.001(U)	21.7	0.855	2.97	1.58	Lognormal	95% KM (Chebyshev)
Benzo(a)pyrene	199/94	0.001	21.4	0.67	2.57	1.28	Lognormal	95% KM (Chebyshev)
Benzo(b)fluoranthene	199/104	0.002	26	1.093	3.67	2.55	Lognormal	95% KM (Chebyshev)
Benzo(g,h,i)perylene	199/77	0.001(U)	16(U)	0.465	1.7	0.741	Lognormal	95% KM (Chebyshev)
Benzo(k)fluoranthene	199/44	0.0009(U)	16(U)	0.409	1.67	0.676	Lognormal	95% KM (Chebyshev)
Benzoic acid	126/10	0.02(U)	160(U)	4.07	15.6	0.506	Normal	95% KM (% Bootstrap)
Bis(2-ethylhexyl)phthalate	126/30	0.01(U)	64(U)	3.77	10.7	7.2	Lognormal	97.5% KM (Chebyshev)
Butylbenzylphthalate	126/1	0.01(U)	16(U)	0.952	n/a	13	n/a	Maximum detected concentration
Chloronaphthalene[2-]	199/1	0.001(U)	16(U)	0.251	n/a	0.04	n/a	Maximum detected concentration
Chrysene	199/93	0.002	21.5	0.871	3.06	1.65	Lognormal	95% KM (Chebyshev)
Dibenz(a,h)anthracene	199/10	0.001(U)	16(U)	0.195	1.15	0.088	Gamma	95% KM (t)
Dibenzofuran	126/21	0.004	16(U)	0.766	1.6	0.342	Gamma	95% KM (t)

Table I-2.3-8 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Diethylphthalate	126/3	0.01(U)	16(U)	0.846	n/a	0.26	n/a	Maximum detected concentration
Di-n-butylphthalate	126/4	0.01(U)	16(U)	0.833	n/a	0.18	n/a	Maximum detected concentration
Di-n-octylphthalate	126/3	0.01(U)	16(U)	0.881	n/a	4.5	n/a	Maximum detected concentration
Fluoranthene	199/120	0.003	44.7	1.66	5.88	4.13	Lognormal	97.5% KM (Chebyshev)
Fluorene	199/66	0.001(U)	16(U)	0.42	1.53	0.601	Lognormal	95% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	199/78	0.0006	16(U)	0.44	1.67	0.698	Nonparametric	95% KM (Chebyshev)
Methylnaphthalene[2-]	199/57	0.0007	16(U)	0.283	1.252	0.233	Lognormal	95% KM (Chebyshev)
Methylphenol[4-]	126/1	0.01(U)	16(U)	0.848	n/a	1	n/a	Maximum detected concentration
Naphthalene	199/51	0.001(U)	16(U)	0.393	n/a	0.57	Lognormal	95% KM (Chebyshev)
Phenanthrene	199/105	0.002	42.1	1.57	5.63	3.92	Lognormal	95% KM (Chebyshev)
Phenol	126/1	0.01(U)	16(U)	0.846	n/a	0.049	n/a	Maximum detected concentration
Pyrene	199/116	0.003	51.4	1.76	6.32	4.43	Lognormal	97.5% KM (Chebyshev)
Volatile Organic Chemicals (mg/kg)								
Acetone	112/34	0.003(U)	0.286	0.021	0.041	0.026	Nonparametric	95% KM (BCA)
Butanone[2-]	112/8	0.002	0.156	0.01	0.017	0.009	Nonparametric	95% KM (BCA)
Butylbenzene[n-]	112/1	0.0003	0.021(U)	0.002	n/a	0.0003	n/a	Maximum detected concentration
Chloroform	112/1	0.0008(U)	0.021(U)	0.002	n/a	0.001	n/a	Maximum detected concentration
Dichloroethene[1,1-]	112/5	0.0007	0.021(U)	0.002	0.002	0.0008	Normal	95% KM (t)
Dichloroethene[cis-1,2-]	112/2	0.0008(U)	0.021(U)	0.0021	n/a	0.002	n/a	Maximum detected concentration

Table I-2.3-8 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Ethylbenzene	112/4	0.0002	0.021(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration
Isopropylbenzene	112/2	0.0003	0.021(U)	0.002	n/a	0.0005	n/a	Maximum detected concentration
Isopropyltoluene[4-]	112/13	0.0003(U)	0.021(U)	0.002	0.003	0.001	Gamma	95% KM (t)
Methyl-2-pentanone[4-]	112/2	0.001	0.083(U)	0.009	n/a	0.004	n/a	Maximum detected concentration
Methylene chloride	112/2	0.002	0.021(U)	0.006	n/a	0.005	n/a	Maximum detected concentration
Propylbenzene[1-]	112/1	0.0004	0.021(U)	0.002	n/a	0.0004	n/a	Maximum detected concentration
Tetrachloroethene	112/13	0.0008(U)	0.313	0.007	0.032	0.019	Lognormal	95% KM (Chebyshev)
Toluene	111/19	0.0003	0.021(U)	0.002	0.003	0.0008	Nonparametric	95% KM (t)
Trichloroethane[1,1,1-]	112/2	0.0005	0.021(U)	0.002	n/a	0.003	n/a	Maximum detected concentration
Trichloroethene	112/8	0.0003	0.021(U)	0.002	0.003	0.0007	Normal	95% KM (t)
Trichlorofluoromethane	112/1	0.0008(U)	0.021(U)	0.002	n/a	0.005	n/a	Maximum detected concentration
Trimethylbenzene[1,2,4-]	112/7	0.0003(U)	0.021(U)	0.002	0.003	0.0006	Gamma	95% KM (t)
Trimethylbenzene[1,3,5-]	112/2	0.0002	0.021(U)	0.002	n/a	0.0006	n/a	Maximum detected concentration
Xylene[1,2-]	98/5	0.0003	0.003(U)	0.001	0.0003	0.0005	Normal	95% KM (t)
Xylene[1,3-] +Xylene[1,4-]	98/12	0.0003	0.005(U)	0.002	0.0009	0.0006	Normal	95% KM (t)
High Explosives (mg/kg)								
Amino-2,6-dinitrotoluene[4-]	126/6	0.085(U)	107	0.382	0.179	0.154	Lognormal	95% KM (t)
Amino-4,6-dinitrotoluene[2-]	126/2	0.075(U)	0.714	0.36	n/a	0.714	n/a	Maximum detected concentration

Table I-2.3-8 (continued)

COPC	Number of Analyses/ Number of Detects	Minimum Concentration	Maximum Concentration	Mean Concentration	Standard Deviation	EPC	Distribution Type	EPC Method
Dinitroaniline[3,5-]	58/1	0.338	1(U)	0.989	n/a	0.338	n/a	Maximum detected concentration
Dinitrobenzene[1,3-]	126/1	0.068(U)	0.5(U)	0.354	n/a	0.077	n/a	Maximum detected concentration
Dinitrotoluene[2,4-]	131/6	0.01(U)	1.53(U)	0.33	0.195	0.115	Normal	95% KM (t)
HMX	126/55	0.107	624	7.2	55.7	28.81	Lognormal	95% KM (Chebyshev)
Nitrobenzene	126/2	0.091(U)	0.5(U)	0.371	n/a	0.215	n/a	Maximum detected concentration
PETN	63/1	1(U)	11.3(U)	1.3	n/a	1.43	n/a	Maximum detected concentration
RDX	126/42	0.106	89.9	2.49	10.2	6.37	Nonparametric	95% KM (Chebyshev)
TATB	64/29	0.38	18.4	3.312	4.18	3.94	Gamma	95% KM (t)
Tetryl	126/2	0.093(U)	3.04	0.472	n/a	3.04	n/a	Maximum detected concentration
Trinitrotoluene[2,4,6-]	126/8	0.065	3.03	0.381	0.295	0.163	Gamma	95% KM (t)
Radionuclides (pCi/g)								
Uranium-234	87/87	0.307	11.9	1.71	2.04	2.66	Nonparametric	95% Chebyshev (Mean, Sd)
Uranium-235/236	90/61	0.009(U)	0.582	0.115	0.107	0.137	Nonparametric	95% KM (BCA)
Uranium-238	87/87	0.32	8.02	1.52	1.5	2.23	Nonparametric	95% Chebyshev (Mean, Sd)

* n/a = Not applicable.

Table I-3.2-1
Physical and Chemical Properties of Inorganic COPCs

COPC	K_d [a] (cm^3/g)	Water Solubility[a,b] (g/L)
Aluminum	1500	Insoluble
Antimony	45	Insoluble
Arsenic	29	Insoluble
Barium	41	Insoluble
Beryllium	790	Insoluble
Cadmium	75	Insoluble
Chromium	1800000[c]	Insoluble
Cobalt	45	Insoluble
Copper	35	Insoluble
Cyanide (total)	9.9	na[d]
Fluoride	150	na
Iron	25	Insoluble
Lead	900	Insoluble
Manganese	65	Insoluble
Mercury	52	Insoluble
Nickel	65	Insoluble
Nitrate	0.0356	Soluble
Perchlorate	0.00000028[b]	2.45E+05
Selenium	5	Insoluble
Silver	8.3	Insoluble
Thallium	71	Insoluble
Uranium	450	Insoluble
Vanadium	1000	Insoluble
Zinc	62	Insoluble

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=nrad.

[b] Denotes reference information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] Value for Chromium III used, because it is the predominant species in soil.

[d] na = Not available.

Table I-3.2-2
Physical and Chemical Properties of Organic COPCs

COPC	Organic Carbon Partition Coefficient, K_{oc}[a] (L/kg)	Log Octanol-Water Partition Coefficient, log 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]
Acenaphthylene	6.12E+03	3.94E+00	1.61E+01	9.12E-04
Acetone	1.98E+00	-2.40E-01 [b]	1.00E+06 [b]	2.31E+02 [b]
Amino-2,6-dinitrotoluene[4-]	na[c]	na	na	na
Amino-4,6-dinitrotoluene[2-]	na	na	na	na
Anthracene	2.04E+04	4.45E+00 [b]	4.34E-02 [b]	2.67E-06 [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]
Benzyl alcohol	1.57E+01	1.1E+00	4.29E+03	9.4E-02
Bis(2-ethylhexyl)phthalate	1.65E+05	7.60E+00 [b]	2.70E-01 [b]	1.42E-07 [b]
Butanone[2-]	3.83E+00	2.9E-01	2.23E+05	9.06E+01
Butylbenzene[n-]	na	4.38E+00[d]	1.01E+01[d]	1.06E+00[d]
Butylbenzylphthalate	9.36E+03	4.73E+00	2.69E+00	8.25E-06
Chloroform	3.5E+01	1.97E+00	7.95E+03	1.97E+02
Chloronaphthalene[2-]	2.98E+03	3.98E+00	11.7E+00	9.03E-03
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[1,2-]	4.43E+02	3.43E+00	8.00E+01	1.47E+00
Dichlorobenzene[1,3-]	4.34E+02	3.53E+00	1.25E+02	2.15E+00
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-]	4.38E+01	2.09E+00	3.5E+03	2.01E+02
Diethylphthalate	1.26E+02	2.42E+00	1.08E+03	2.10E+03
Di-n-butylphthalate	1.46E+03	4.50E+00	1.12E+01	0.00+00
Dinitroaniline[3,5-]	na	na	na	na
Dinitrotoluene[2,4-]	9.55E+01	na	2.70E+02	na
Di-n-octylphthalate	8.32E+07	8.1E+00	2.00E-02	2.6E-06
Ethylbenzene	5.18E+02	3.15E+00	1.69E+02	9.6E+00
Fluoranthene	7.09E+04[e]	5.16E+00[e]	2.60E-01[e]	9.22E-06[e]
Fluorene	1.13E+04	4.18E+00 [b]	1.89E+00 [b]	8.42E-03 [b]
Indeno(1,2,3-cd)pyrene	2.68E+06	6.70E+00 [b]	1.90E-04 [b]	1.25E-10 [b]

Table I-3.2-2 (continued)

COPC	Organic Carbon Partition Coefficient, K_{oc}[a] (L/kg)	Log Octanol-Water Partition Coefficient, K_{ow} [a]	Water Solubility (mg/L)[a]	Vapor Pressure[a] (mm Hg at 25°C)
Isopropylbenzene	8.17E+02	3.66E+00	6.13E+01	4.5E+00
Isopropyltoluene[4-]	na	4.10E+00 [b]	2.34E+01 [b]	1.64E+00 [b]
HMX	185E+03	na	256E+03	na
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
Methylphenol[4-]	na	na	na	na
Naphthalene	1.84E+03	3.3E+00	3.1E+01	8.5E-02
Nitrobenzene	1.91E+02	1.85E+00	2.1E+03	2.45E-01
PETN	na	na	na	na
Phenanthrene	2.08E+04	4.46E+00 [b]	1.15E+00 [b]	1.12E-04 [b]
Phenol	2.68E+02	2.43E+00	1.46E+00	3.5E-01
Propylbenzene[1-]	7.25E+02[d]	3.69E+00[d]	5.22E+01[d]	3.42E+00[d]
Pyrene	6.94E+04	4.88E+00 [b]	1.35E-01 [b]	4.50E-06 [b]
RDX	7.00E+01	8.69E-01	5.97E+01[b]	4.10E-09[b]
TATB	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
Tetryl	2.14E+03	1.64E+00	7.40E+01	1.17E-07
Toluene	2.68E+02	2.73E+00	5.26E+02	2.84E+01
Trichloroethane[1,1,1-]	1.10E+02	na	1.33E+03	na
Trichloroethene	9.40E+01	2.42E+00	1.10E+03	6.9E+01[a]
Trichlorofluoromethane	4.86E+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
Trimethylbenzene[1,3,5-]	7.03E+02	3.42E+00	4.82E+01	2.1E+00
Trinitrotoluene[2,4,6-]	1.80E+03	na	1.30E-02	na
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/tox/TOX_select?select=nrad, unless noted otherwise.

[b] Information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] na = Not available.

[d] Value from http://www.chemfinder.com.

[e] Information from NMED 2006, 092513.

Table I-3.2-3
Results of Pore Gas Screening Based on Maximum Detected Concentrations

Chemical	Maximum Detected Concentration (µg/m^3)	H' (dimensionless)	Groundwater Screening Level (µg/L)	Screening Value
Acetone	285	0.0016	5500[a]	0.03
Butanone[2-]	76.6	0.0011	7100[a]	0.01
Carbon disulfide	49.5	1.2	1000[a]	0.00004
Carbon tetrachloride	27	1.25	5[b]	0.004
Chloroform	200	0.15	100[c]	0.01
Dichloroethane[1,2-]	78	0.04	5[b]	0.39
Ethylbenzene	5.5	0.323	700[b]	0.00002
Hexane	5.3	5	420[a]	0.000002
Methylene chloride	4.5	0.09	5[b]	0.01
Heptane[n-]	4.9	5	420[a,d]	0.000002
Propylene	26	0.0035	52	0.14
Tetrachloroethene	140	0.754	5[b]	0.04
Toluene	339	0.272	750[c]	0.002
Trichloroethene	1200	0.422	5[b]	0.57
Xylene[1,2-]	5.6	0.213	620[c]	0.00004
Xylene[1,3-]+Xylene[1,4-]	12	0.3	620[c]	0.0001

[a] EPA Region 6 tap water screening level (EPA 2007, 099314).

[b] EPA MCL.

[c] WQCC groundwater standard.

[d] Hexane used as a surrogate, based on structural similarity.

Table I-3.2-4
Physical and Chemical Properties of Radionuclide COPCs

COPC	Soil-Water Partition Coefficient, K_d [a] (cm^3/g)	Water Solubility [b] (g/L)
Uranium-234	450	Insoluble
Uranium-235	450	Insoluble
Uranium-238	450	Insoluble

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=csf.

[b] Denotes reference information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

Table I-4.0-1
Risk Scenarios Evaluated for the TA-16-340 Complex Sites

	Depth Range for Exposure Point Concentration		
	0–1 ft	0–10 ft	0–5 ft
Site	Industrial	Residential	Ecological
Consolidated Unit 13-003(a)-99 [a]	X [b]	X	— [c]
Consolidated Unit 13-003(n)-99	X	X	—
SWMU 16-003(o)	X	X	—
SWMU 16-026(j2) and SWMU 029(f)	X	X	—
TA-16-340 Complex (Whole Site)	—	—	X

[a] The Consolidated Unit 13-003(a)-99 industrial assessment was performed on the 0-10 ft bgs data.

[b] X = Scenario evaluated.

[c] — = Scenario not evaluated.

Table I-4.2-1
Parameters Used to Calculate Chemical SSLs

Parameters	Residential Values	Industrial Values
Target HQ	1	1
Target cancer risk	10^{-5}	10^{-5}
Averaging time (carcinogen)	70 yr x 365 days	70 yr x 365 days
Averaging time (noncarcinogen)	ED x 365 days	ED x 365 days
Skin absorption factor	SVOC = 0.1; Chemical-specific	SVOC = 0.1; Chemical-specific
Adherence factor–child	0.2 mg/cm^2	n/a[a]
Body weight–child	15 kg (age: 0–6 years)	n/a
Cancer slope factor–oral (chemical-specific)	(mg/kg-day)$^{-1}$	(mg/kg-day)$^{-1}$
Cancer slope factor–inhalation (chemical-specific)	(mg/kg-day)$^{-1}$	(mg/kg-day)$^{-1}$
Exposure frequency	350 day/yr	225 day/yr
Exposure duration–child	6 yr	n/a
Age-adjusted ingestion factor	114 mg-yr/kg-day	n/a
Age-adjusted inhalation factor	11 m^3-yr/kg-day	n/a
Inhalation rate–child	10 m^3/day	n/a
Soil ingestion rate–child	200 mg/day	n/a
Particulate emission factor	6.61 x 10^9 m^3/kg	6.61 x 10^9 m^3/kg
RfD–oral (chemical-specific)	(mg/kg-day)	(mg/kg-day)
RfD–inhalation (chemical-specific)	(mg/kg-day)	(mg/kg-day)
Exposed surface area–child	2800 cm^2/day	n/a
Age-adjusted skin contact factor (carcinogens)	361 mg-yr/kg-day	n/a
VF for soil (chemical-specific)	(m^3/kg)	(m^3/kg)
Body weight–adult	70 kg	70 kg
Exposure duration[b]	30 yr	25 yr
Adherence factor–adult	0.07 mg/cm^2	0.2 mg/cm^2
Soil ingestion rate–adult	100 mg/day	100 mg/day
Exposed surface area–adult	5700 cm^2/day	3300 cm^2/day
Inhalation rate–adult	20 m^3/day	20 m^3/day

Note: Parameter values from NMED 2006, 092513.

[a] n/a = Not applicable.

[b] Exposure duration for lifetime resident is 30 yr. For carcinogens, the exposures are combined for child (6 yr) and adult (24 yr).

Table I-4.2-2
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/day x 350 day/yr] / [indoor + outdoor time fractions], where 10 m^3/day is the daily inhalation rate of a child (NMED 2006, 092513).

[b] Calculated as [20 m^3/day x 350 day/yr] / [indoor + outdoor time fractions], where 20 m^3/day is the daily inhalation rate of an adult (NMED 2006, 092513).

[c] Calculated as [1/ 6.6 x 10^{+9} m^3/kg) x 1000 g/kg, where 6.6 x 10^{+9} m^3/kg is the particulate emission factor (NMED 2006, 092513).

[d] Calculated as [5.6 hr/day x 350 day/yr] / 8766 hr/yr, where 5.6 hr/day 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 hr/day x 350 day/yr] / 8766 hr/yr, where 1.5 hr/day 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 hr/day x 350 day/yr] / 8766 hr/yr.

[g] Calculated as [(24–1.5 hr/day x 350 day/yr] / 8766 hr/yr.

[h] Calculated as [0.2 g/day x 350 day/yr] / [indoor + outdoor time fractions], where 0.2 g/day is the child soil-ingestion rate (NMED 2006, 092513).

[i] Calculated as [0.1 g/day x 350 day/yr] / [indoor + outdoor time fractions], where 0.1 g/day is the adult soil-ingestion rate (NMED 2006, 092513).

Table I-4.2-3
Parameters Used in the SAL Calculations for Radionuclides, Industrial Scenario

Parameters	Industrial, Adult
Inhalation rate (m^3/yr)	19,481[a]
Mass loading (g/m^3)	1.5×10^{-7} [b]
Outdoor time fraction	0.2053 [c]
Indoor time fraction	0
Soil ingestion (g/yr)	97.4 [d]

[a] Calculated as [20 m^3/day x 225 day/yr] / [indoor + outdoor time fractions], where 20 m^3/day is the daily inhalation rate of an adult and 225 days/yr is the exposure frequency (NMED 2006, 092513).

[b] Calculated as [1/ 6.6 x 10^{+9} m^3/kg] x 1000 g/kg, where 6.6 x 10^{+9} m^3/kg is the particulate emission factor (NMED 2006, 092513).

[c] Calculated as [8 hr/day x 225 day/yr] / 8766 hr/yr, where 8 hr/day is an estimate of the average length of the work day.

[d] Calculated as [0.1 g/day x 225 day/yr] / [indoor + outdoor time fractions], where 0.1 g/day is the adult soil ingestion rate (NMED 2006, 092513).

Table I-4.3-1
Industrial Carcinogenic Screening for TA-16-340 Complex, Consolidated Unit 13-003(a)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Arsenic	4.86	1.77E+01	2.75E-06
Chromium	10.9	5.00E+03[c]	2.18E-08
Benzo(a)anthracene	0.022[d]	2.34E+01	9.40E-09
Benzo(a)pyrene	0.22 [d]	2.34E+00	9.40E-07
Benzo(b)fluoranthene	0.134 [d]	2.34E+01	5.73E-08
Benzo(k)fluoranthene	0.093 [d]	2.34E+02	3.97E-09
Bis(2-ethylhexyl)phthalate	0.16 [d]	1.37E+03	1.17E-09
Chrysene	0.151 [d]	2.31E+03	6.54E-10
Indeno(1,2,3-c,d)pyrene	0.101 [d]	2.34E+01	4.32E-08
Dichlorobenzene[1,4-]	0.004 [d]	1.03E+02	3.88E-10
		Total Excess Cancer Risk	**4E-06**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314)

[d] Maximum detected concentration.

Table I-4.3-2
Industrial Noncarcinogenic Screening Evaluation for TA-13-340 Complex, Consolidated Unit 13-003(a)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQs
Aluminum	14818	1.00E+05	0.15
Antimony	6.2[c]	4.54E+02	0.01
Barium	152	1.00E+05	0.002
Cobalt	10.3	2.05E+04	0.0005
Copper	6.17	4.54E+04	0.0001
Cyanide (Total)	0.215 [d]	1.37E+04	0.00002
Flouride	5.38	4.10E+04	0.0001
Manganese	924	4.84E+04	0.02
Nitrate	1.63 [d]	1.00E+05	0.00002
Selenium	1.24 [d]	5.68E+03	0.0002
Silver	0.078	5.68E+03	0.00001
Vanadium	20.3	1.14E+03	0.02
Acenaphthene	0.033 [d]	3.35E+04	0.000001
Anthracene	0.685 [d]	1.00E+05	0.000007
Benzo(g,h,i)perylene	0.088 [d]	3.09E+04[e]	0.000003
Diethylphthalate	0.046 [d]	1.00E+05	0.0000005
Di-n-octylphthalate	0.13 [d]	2.50E+04[f]	0.000005
Fluoranthene	0.155	2.44E+04	0.000006
Fluorene	0.035 [d]	2.65E+04	0.000001
Phenanthrene	0.229 [d]	2.05E+04	0.00001
Pyrene	0.323 [d]	3.09E+04	0.00001
		HI	**0.2**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] SSL for pyrene used as a surrogate, based on structural similarity.

[f] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

Table I-4.3-3
Residential Carcinogenic Screening for TA-16-340 Complex, Consolidated Unit 13-003(a)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Arsenic	4.86	3.90E+00	1.25E-05
Chromium	10.9	2.10E+02[c]	5.19E-07
Benzo(a)anthracene	0.022[d]	6.21E+00	3.54E-08
Benzo(a)pyrene	0.22 [d]	6.21E-01	3.54E-06
Benzo(b)fluoranthene	0.134 [d]	6.21E+00	2.16E-07
Benzo(k)fluoranthene	0.093 [d]	6.21E+01	1.50E-08
Bis(2-ethylhexyl)phthalate	0.16 [d]	3.47E+02	4.61E-09
Chrysene	0.151 [d]	6.15E+02	2.46E-09
Indeno(1,2,3-c,d)pyrene	0.101 [d]	6.21E+00	1.63E-07
Dichlorobenzene[1,4-]	0.004 [d]	3.95E+01	1.01E-09
		Total Excess Cancer Risk	**2E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2008, 099314).

[d] Maximum detected concentration.

Table I-4.3-4
Residential Noncarcinogenic Screening Evaluation for TA-13-340 Complex, Consolidated Unit 13-003(a)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Aluminum	14818	7.78E+04	0.19
Antimony	6.2[c]	3.13E+01	0.20
Barium	152	1.56E+04	0.01
Cobalt	10.3	1.52E+03	0.007
Copper	6.17	3.13E+03	0.002
Cyanide (Total)	0.215 [d]	1.22E+03	0.0002
Flouride	5.38	3.67E+03	0.001
Manganese	924	3.59E+03	0.26
Nitrate	1.63 [d]	1.00E+05	0.00002
Selenium	1.24 [d]	3.91E+02	0.003
Silver	0.078	3.91E+02	0.0002
Vanadium	20.3	7.82E+01	0.26
Acenaphthene	0.033 [d]	3.73E+03	0.00001
Anthracene	0.685 [d]	2.20E+04	0.00003
Benzo(g,h,i)perylene	0.088 [d]	2.29E+03[e]	0.00004
Diethylphthalate	0.046 [d]	4.89E+04	0.000001
Di-n-octylphthalate	0.13 [d]	2.40E+03[f]	0.00005
Fluoranthene	0.155	2.29E+03	0.00007
Fluorene	0.035 [d]	2.66E+03	0.00001
Phenanthrene	0.229 [d]	1.83E+03	0.0001
Pyrene	0.323 [d]	2.29E+03	0.0001
		HI	**0.9**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] SSL for pyrene used as a surrogate, based on structural similarity.

[f] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

Table I-4.3-5
TA-16-340 Complex, Consolidated Unit 13-003(a)-99, C_{sat} COPC Forward Risk Evaluation

Analyte	Industrial Concentration (mg/kg)	Residential Concentration (mg/kg)	C_{sat} Concentration[a] (mg/kg)	RfD—Oral[a] (mg/kg-day)	RfD—Inhalation[a] (mg/kg-day)	VF[a] (m^3/kg)	HQ Industrial	HQ Residential
Butylbenzene[n-]	0.0003 [b]	0.0003 [b]	62.1	1.00E-02	1.00E-02	1.10E+04	5.07E-07	2.13E-06
Dichlorobenzene[1,2-]	0.0003 [b]	0.0003 [b]	37.4	9.00E-02	6.90E-03	1.20E+04	6.41E-07	2.36E-06
Dichlorobenzene[1,3-]	0.003 [b]	n/a [c]	37.4	3.00E-03	2.30E-03	1.20E+04	2.00E-05	n/a
Styrene	0.0003 [b]	0.0003 [b]	100	2.00E-01	2.90E-01	1.50E+04	1.35E-08	6.33E-08
Xylene[1,3-]+Xylene[1,4-] [d]	0.002 [b]	0.002 [b]	82	2.00E-01	2.90E-01	4.40E+03	7.27E-08	2.91E-07
						HI	**0.00002**	**0.000005**

[a] Values from NMED 2006, 092513.

[b] Maximum detected concentration used.

[c] Not applicable; SSL is risk-based.

[d] Values for total xylenes used.

Table I-4.3-6
Industrial Carcinogenic Screening for TA-16-340 Complex, Consolidated Unit 16-003(n)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Benzo(a)anthracene	0.33[c]	2.34E+01	1.20E-07
Benzo(a)pyrene	0.43 [c]	2.34E+00	1.41E-06
Benzo(b)fluoranthene	0.61 [c]	2.34E+01	2.61E-07
Benzo(k)fluoranthene	0.31 [c]	2.34E+02	1.32E-08
Bis(2-ethylhexyl)phthalate	13 [c]	1.37E+03	3.01E-10
Chrysene	0.5 [c]	2.31E+03	2.16E-09
Dibenz(a,h)anthracene	0.062 [c]	2.34E+00	2.65E-07
Indeno(1,2,3-c,d)pyrene	0.22 [c]	2.34E+01	9.40E-08
RDX	4.44	1.74E+02	2.55E-07
		Total Excess Cancer Risk	**2E-06**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] Maximum detected concentration.

Table I-4.3-7
Industrial Noncarcinogenic Screening Evaluation for TA-16-340 Complex, Consolidated Unit 16-003(n)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQs
Antimony	0.079	4.54E+02	0.0002
Barium	3704	1.00E+05	0.04
Copper	37.5	4.54E+04	0.0008
Cyanide (Total)	0.229	1.37E+04	0.00002
Flouride	1.16	4.10E+04	0.00003
Lead	26	8.00E+02	0.03
Mercury	0.262	3.40E+02 [c]	0.0008
Nitrate	2.23	1.00E+05	0.000022
Selenium	1.73[d]	5.68E+03	0.0003
Uranium	3.13	2.00E+02 [e]	0.02
Zinc	146	1.00E+05	0.001
Acenaphthene	0.083 [f]	3.35E+04	0.000002
Anthracene	0.11 [f]	1.00E+05	0.000001
Benzo(g,h,i)perylene	0.19 [f]	3.09E+04 [g]	0.00001
Benzoic acid	1.2 [f]	1.00E+05 [c]	0.00001
Benzyl alcohol	0.25 [f]	1.00E+05	0.000003
Di-n-butylphthalate	0.18 [f]	6.84E+04	0.000003
Di-n-octylphthalate	4.5 [f]	2.50E+04 [e]	0.0002
Fluoranthene	0.468	2.44E+04	0.00002
Fluorene	0.069 [f]	2.65E+04	0.000003
Phenanthrene	0.59 [f]	2.05E+04	0.00003
Pyrene	1.24	3.09E+04	0.00004
Acetone	0.049 [f]	1.00E+05	0.0000005
Amino-2,6-dinitrotoluene[4-]	0.446 [f]	2.00E+03 [h]	0.0002
Amino-4,6-dinitrotoluene[2-]	0.714 [f]	2.00E+03 [h]	0.0004
Dinitrotoluene[2,4-]	0.612 [f]	1.37E+03	0.0004
HMX	624 [f]	3.42E+04	0.02
Nitrobenzene	0.101 [f]	1.47E+02	0.0007
		HI	**0.1**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] SSL from EPA Region 6 (EPA 2007, 099314)

[d] Maximum detection limit.

[e] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

[f] Maximum detected concentration

[g] SSL for pyrene used as a surrogate, based on structural similarity.

[h] SSL for 2,6-dinitrotoluene used as a surrogate based on structural similarity from EPA Region 6 (EPA 2007, 099314).

Table I-4.3-8
Residential Carcinogenic Screening for TA-16-340 Complex, Consolidated Unit 16-003(n)-99

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Arsenic	4.51	3.90E+00	1.16E-05
Chromium	38.6	2.10E+03[c]	1.84E-07
Benzo(a)anthracene	0.33 [d]	6.21E+00	5.31E-07
Benzo(a)pyrene	0.111	6.21E-01	1.79E-06
Benzo(b)fluoranthene	0.148	6.21E+00	2.38E-07
Benzo(k)fluoranthene	0.3 [d]	6.21E+01	4.99E-08
Bis(2-ethylhexyl)phthalate	0.09[d]	3.47E+02	2.48E-09
Chrysene	0.1	6.15E+02	1.64E-09
Dibenz(a,h)anthracene	0.06 [d]	6.21E-01	9.98E-07
Indeno(1,2,3-c,d)pyrene	0.09	6.21E+00	1.51E-07
RDX	4.44 [d]	4.42E+01	1.00E-06
		Total Excess Cancer Risk	**2E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314).

[d] Maximum detected concentration.

Table I-4.3-9
Residential Noncarcinogenic Screening Evaluation for TA-16-340 Complex, Consolidated Unit 16-003(n)-99

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Aluminum	12093	7.78E+04	0.16
Antimony	0.079 [c]	3.13E+01	0.003
Barium	675	1.56E+04	0.04
Cobalt	18.3	1.52E+03	0.01
Copper	16.9	3.13E+03	0.01
Cyanide (Total)	0.229 [c]	1.22E+03	0.0002
Flouride	3.7	3.67E+03	0.001
Iron	12092	2.35E+04	0.51
Lead	21.5	4.00E+02	0.05
Manganese	635	3.59E+03	0.18
Mercury	0.044	2.30E+01 [c]	0.002
Nickel	5.96	1.56E+03	0.004
Nitrate	0.871	1.00E+05	0.00001
Perchlorate	0.0008 [d]	5.5E+01 [c]	0.00001
Selenium	1.04 [d]	3.91E+02	0.003
Uranium	1.47	1.60E+01 [e]	0.09
Vanadium	19.9	7.82E+01	0.25
Zinc	68	2.35E+04	0.003
Acenaphthene	0.083 [d]	3.73E+03	0.00002
Anthracene	0.036	2.20E+04	0.000002
Benzo(g,h,i)perylene	0.111	2.29E+03 [f]	0.00005
Benzoic acid	1.2 [d]	1.00E+05 [c]	0.00001
Benzyl alcohol	0.25 [d]	1.80E+04 [c]	0.00001
Diethylphthalate	0.26 [d]	4.89E+04	0.00001
Di-n-butylphthalate	0.18 [d]	6.11E+03	0.00003
Di-n-octylphthalate	4.5 [d]	2.40E+03 [e]	0.002
Fluoranthene	0.142	2.29E+03	0.0001
Fluorene	0.069 [d]	2.66E+03	0.00003
Methylnaphthalene[2-]	0.012 [d]	7.95E+01 [g]	0.0002
Naphthalene	0.021 [d]	7.95E+01	0.0003
Phenanthrene	0.125	1.83E+03	0.0001
Pyrene	0.223	2.29E+03	0.0001
Acetone	0.227	2.81E+04	0.00001
Butanone[2-]	0.003 [d]	3.18E+04	0.0000001
Isopropyltoluene[4-]	0.0003 [d]	2.71E+02 [h]	0.000001

Table I-4.3-9 (continued)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Methyl-2-pentanone[4-] (methy isobutyl ketone)	0.001 [d]	5.51E+03	0.0000002
Amino-2,6-dinitrotoluene[4-]	0.446 [d]	6.10E+01 [i]	0.007
Amino-4,6-dinitrotoluene[2-]	0.714 [d]	6.10E+01[i]	0.01
Dinitrobenzene[1,3-]2	0.077 [d]	6.10E+00	0.01
Dinitrotoluene[2,4-]	0.612 [d]	1.22E+02	0.005
HMX	230	3.06E+03	0.08
Nitrobenzene	0.101 [d]	2.28E+01	0.004
TATB	3.32 [d]	1.8E+03 [j]	0.002
Trinitrotoluene[2,4,6-]	0.242 [d]	3.06E+01	0.008
		HI	**1.5**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] SSL from EPA Region 6 (EPA 2007,099314).

[d] Maximum detected concentration.

[e] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

[f] SSL for pyrene used as a surrogate, based on structural similarity.

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

[h] Isopropylbenzene (cumene) used as surrogate based on structural similarity.

[i] SSL for 2,6-dinitrotoluene used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

[j] SSL for 1,3,5-trinitrobenzene is used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

Table I-4.3-10

TA-16-340 Complex, Consolidated Unit 16-003(n)-99, C_{sat} COPC Forward Risk Evaluation

Analyte	Industrial Concentration (mg/kg)	Residential Concentration (mg/kg)	C_{sat} Concentration[a] (mg/kg)	RfD—Oral[a] (mg/kg-day)	RfD—Inhalation[a] (mg/kg-day)	VF[a] (m^3/kg)	HQ Industrial	HQ Residential
Butylbenzylphthalate	13 [b]	13 [b]	240	2.00E-01	2.00E-01	3.60E+06	9.82E-05	1.08E-03
Toluene	n/a [c]	0.0004 [b]	252	8.00E-02	1.40E+00	5.45E+03	n/a	9.74E-08
						HI	**0.0001**	**0.001**

[a] Values from NMED 2006, 092513.

[b] Maximum detected concentration used.

[c] n/a = Not applicable; not a COPC for the industrial scenario.

Table I-4.3-11
Industrial Carcinogenic Screening for TA-16-340 Complex, SWMU 16-003(o)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Arsenic	10.2	1.77E+01	5.76E-06
Chromium	56.7	5.00E+03 [c]	1.13E-07
Benzo(a)anthracene	2.33	2.34E+01	9.96E-07
Benzo(a)pyrene	4.77	2.34E+00	2.04E-05
Benzo(b)fluoranthene	6.23	2.34E+01	2.66E-06
Benzo(k)fluoranthene	0.781	2.34E+02	3.33E-08
Bis(2-ethylhexyl)phthalate	7.65	1.37E+03	5.58E-08
Chrysene	5.09	2.31E+03	2.20E-08
Dibenz(a,h)anthracene	0.217	2.34E+00	9.27E-07
Indeno(1,2,3-c,d)pyrene	2.08	2.34E+01	8.89E-07
Tetrachloroethene	0.313 [d]	3.16E+01	9.91E-08
Trichloroethene	0.006 [d]	1.56E+00	3.85E-08
RDX	10.1	1.74E+02	5.80E-07
Total Excess Cancer Risk			**3E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314).

[d] Maximum detected concentration.

Table I-4.3-12
Industrial Noncarcinogenic Screening Evaluation for TA-16-340 Complex, SWMU 16-003(o)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQs
Antimony	0.077 [c]	4.54E+02	0.0002
Barium	311	1.00E+05	0.003
Beryllium	0.801	2.25E+03	0.0004
Cadmium	0.943	5.64E+02	0.002
Cobalt	13.5	2.05E+04	0.0007
Copper	220	4.54E+04	0.005
Cyanide (Total)	0.502	1.37E+04	0.00004
Flouride	4.02	4.10E+04	0.0001
Iron	14426	1.00E+05	0.14
Lead	36.3	8.00E+02	0.05
Manganese	293	4.84E+04	0.006
Mercury	0.276	3.40E+02 [d]	0.0008
Nickel	10	2.27E+04	0.0004
Nitrate	7.32	1.00E+05	0.0001
Selenium	3.27	5.68E+03	0.0006
Silver	0.666	5.68E+03	0.0001
Thallium	0.17	7.49E+01	0.002
Uranium	6.46	2.00E+02 [e]	0.03
Vanadium	53.95	1.14E+03	0.05
Zinc	228	1.00E+05	0.002
Acenaphthene	1.53	3.35E+04	0.00005
Acenaphthylene	0.147	3.09E+04 [f]	0.000005
Anthracene	1.29	1.00E+05	0.00001
Benzo(g,h,i)perylene	2.03	3.09E+04 [f]	0.0001
Benzoic acid	1.2	1.00E+05 [d]	0.00001
Chloronaphthalene[2-]	0.007	2.78E+04	0.0000003
Dibenzofuran	2.7	1.62E+03	0.002
Di-n-butylphthalate	0.18	6.84E+04	0.000003
Fluoranthene	14.6	2.44E+04	0.0006
Fluorene	0.859	2.65E+04	0.00003
Methylnaphthalene[2-]	0.528	3.00E+02 [g]	0.002
Methylphenol[4-]	1	3.40E+03 [d]	0.0003
Naphthalene	1.5	3.00E+02	0.005
Phenanthrene	13.44	2.05E+04	0.0007
Pyrene	14.8	3.09E+04	0.0005
Acetone	0.04	1.00E+05	0.0000004
Dichloroethene[1,1-]	0.001	7.77E+02	0.000001

Table I-4.3-12 (continued)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQs
Dichloroethene[cis-1,2-]	0.002	3.00E+02	0.00001
Amino-2,6-dinitrotoluene[4-]	1.07	1.37E+03 [h]	0.0008
Amino-4,6-dinitrotoluene[2-]	0.14	1.37E+03 [h]	0.0001
Dinitrotoluene[2,4-]	0.136	1.37E+03	0.0001
HMX	7.84	3.42E+04	0.0002
Nitrobenzene	0.215	1.47E+02	0.0015
TATB	12.7	6.10E+04 [i]	0.0002
Tetryl	3.04	8.20E+03	0.0004
Trimethylbenzene[1,2,4-]	0.0007	2.13E+02	0.000003
Trinitrotoluene[2,4,6-]	3.03	3.42E+02	0.0089
		HI	**0.3**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] Maximum detected concentration.

[d] SSL from EPA Region 6 (EPA 2007, 099314).

[e] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

[f] SSL for pyrene used as a surrogate, based on structural similarity.

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

[h] SSL for 2,6-dinitrotoluene used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

[i] SSL for 1,3,5-trinitrobenzene is used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

Table I-4.3-13
Residential Carcinogenic Screening for TA-16-340 Complex, SWMU 16-003(o)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Arsenic	5.49	3.90E+00	1.41E-05
Chromium	18.1	2.10E+03 [c]	8.95E-07
Benzo(a)anthracene	1.48	6.21E+00	2.38E-06
Benzo(a)pyrene	1.17	6.21E-01	1.88E-05
Benzo(b)fluoranthene	1.96	6.21E+00	3.16E-06
Benzo(k)fluoranthene	0.609	6.21E+01	9.80E-08
Bis(2-ethylhexyl)phthalate	8.15	3.47E+02	2.35E-07
Chrysene	1.56	6.15E+02	2.54E-08
Dibenz(a,h)anthracene	0.068	6.21E-01	1.10E-06
Indeno(1,2,3-c,d)pyrene	0.655	6.21E+00	1.05E-06
Chloroform	0.001 [d]	4.00E+00	2.50E-09
Methylene chloride	0.005 [d]	1.82E+02	2.75E-10
Tetrachloroethene	0.021	1.25E+01	1.68E-08
Trichloroethene	0.001	6.38E-01	1.57E-08
RDX	9.3	4.42E+01	2.10E-06
		Total Excess Cancer Risk	**4E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314).

[d] Maximum detected concentration.

Table I-4.3-14
Residential Noncarcinogenic Screening Evaluation for TA-16-340 Complex, SWMU 16-003(o)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Aluminum	10969	7.78E+04	0.14
Antimony	0.199	3.13E+01	0.006
Barium	225	1.56E+04	0.01
Beryllium	0.689	1.56E+02	0.004
Cadmium	0.418	3.90E+01	0.01
Cobalt	14.6	1.52E+03	0.01
Copper	129	3.13E+03	0.04
Cyanide (Total)	0.238	1.22E+03	0.0002
Flouride	4.67	3.67E+03	0.001
Iron	12897	2.35E+04	0.55
Lead	20.8	4.00E+02	0.05
Manganese	270	3.59E+03	0.08
Mercury	0.11	2.30E+01 [c]	0.005
Nickel	5.84	1.56E+03	0.004
Nitrate	2.45	1.00E+05	0.00002
Perchlorate	0.0009 [d]	5.50E+01 [c]	0.00002
Selenium	2.17	3.91E+02	0.006
Silver	0.263	3.91E+02	0.0007
Thallium	0.216	5.16E+00	0.04
Uranium	4.45	1.60+01 [e]	0.3
Vanadium	36.5	7.82E+01	0.47
Zinc	107	2.35E+04	0.005
Acenaphthene	0.601	3.73E+03	0.0002
Acenaphthylene	0.147 [d]	2.29E+03 [f]	0.0001
Anthracene	0.856	2.20E+04	0.00004
Benzo(g,h,i)perylene	0.48	2.29E+03 [f]	0.0002
Benzoic acid	0.483	1.00E+05 [c]	0.000005
Dibenzofuran	0.319	1.42E+02	0.002
Diethylphthalate	0.23 [d]	4.89E+04	0.000005
Di-n-butylphthalate	0.18 [d]	6.11E+03	0.00003
Di-n-octylphthalate	0.331 [d]	2.40E+03 [e]	0.0001
Fluoranthene	3.87	2.29E+03	0.002
Fluorene	0.576	2.66E+03	0.0002
Isopropylbenzene	0.0005 [d]	2.71E+02	0.000002
Methyl-2-pentanone[4-] (methyl isobutyl ketone)	0.004 [d]	5.51E+03	0.000001
Methylnaphthalene[2-]	0.15	7.95E+01 [g]	0.002
Methylphenol[4-]	1 [d]	3.10E+02 [c]	0.003

Table I-4.3-14 (continued)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Naphthalene	0.524	7.95E+01	0.007
Phenanthrene	3.66	1.83E+03	0.002
Pyrene	4.185	2.29E+03	0.002
Acetone	0.017	2.81E+04	0.000001
Butanone[2-]	0.005	3.18E+04	0.0000002
Dichloroethene[1,1-]	0.0007	2.8E+02	0.000002
Dichloroethene[cis-1,2-]	0.002	7.65E+01	0.00003
Isopropyltoluene[4-]	0.003	2.71E+02 [h]	0.00001
Trichlorofluoromethane	0.005 [d]	5.88E+02	0.00001
Amino-2,6-dinitrotoluene[4-]	0.154	6.10E+01[i]	0.003
Amino-4,6-dinitrotoluene[2-]	0.14 [d]	6.10E+01[i]	0.002
3,5-Dinitroaniline	0.338 [d]	1.80E+02[j]	0.002
Dinitrotoluene[2,4-]	0.331 [d]	1.22E+02	0.003
HMX	5.94	3.06E+03	0.002
TATB	4.4	1.80E+03 [k]	0.002
Tetryl	3.04 [d]	2.40E+02	0.01
Trimethylbenzene[1,2,4-]	0.001	5.80E+01	0.00002
Trinitrobenzene[1,3,5-]	0.0002 [d]	1.80E+03	0.0000001
Trinitrotoluene[2,4,6-]	3.03	3.06E+01	0.1
		HI	**1.9**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] SSL from EPA Region 6 (EPA 2007, 099314).

[d] Maximum detected concentration.

[e] SSL from EPA Region 9 (http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf).

[f] SSL for pyrene used as a surrogate, based on structural similarity.

[g] Naphthalene used as a surrogate, based on structural similarity

[h] Isopropylbenzene used, base on structural similarity.

[i] SSL for 2,6-dinitrotoluene used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

[j] SSL for 2-nitroaniline used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

[k] SSL for 1,3,5-trinitrobenzene is used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

Table I-4.3-15
TA-16-340 Complex, SWMU 16-003(o), C_{sat} COPC Forward Risk Evaluation

Analyte	Industrial Concentration (mg/kg)	Residential Concentration (mg/kg)	C_{sat} Concentration[a] (mg/kg)	RfD—Oral[a] (mg/kg-day)	RfD—Inhalation[a] (mg/kg-day)	VF[a] (m^3/kg)	HQ Industrial	HQ Residential
Butanone[2-]	0.007 [b]	n/a [c]	44800	6.00E-01	1.43E+00	4.41E+04	0.00000003	n/a
Ethylbenzene	0.0004 [b]	0.0004	128	1.00E-01	2.90E-01	4.20E+03	0.0000001	0.0000003
Isopropylbenzene	0.0005 [b]	n/a	389	1.00E-01	1.14E-01	1.57E+03	0.0000005	n/a
Isopropyltoluene[4-] [d]	0.00388 [b]	n/a	389	1.00E-01	1.14E-01	1.57E+03	0.0000039	n/a
PETN	n/a	1.43 [b]	na [e]	na	na	na	na	na
Toluene	0.001 [b]	0.0009	252	8.00E-02	1.40E+00	5.45E+03	0.00000003	0.0000002
Trichloroethane[1,1,1-]	n/a	0.003 [b]	563	2.80E-01	6.30E-01	3.35E+03	n/a	0.000001
Xylene[1,2]	0.0004 [b]	0.0005	99.5	2.00E+00	na	na	0.0000000002	0.000000001
Xylene[1,3-] +Xylene[1,4-][f]	n/a	0.0006	82	2.00E-01	2.90E-02	4.40E+03	n/a	0.0000031
						HI	**0.000004**	**0.001**

[a] Values from NMED 2006, 092513.

[b] Maximum detected concentration used.

[c] n/a = Not applicable; not a COPC for the scenario.

[d] Values for isopropylbenzene used.

[e] na = Not available.

[f] Values for total xylenes used.

Table I-4.3-16
Radionuclide Screening Evaluation for SWMU 16-003(o)

COPC	Industrial EPC[a] (pCi/g)	Industrial SAL[b] (pCi/g)	Industrial Dose (mrem/yr)	Residential EPC[a] (pCi/g)	Residential SAL[b] (pCi/g)	Residential Dose (mrem/yr)
Uranium-234	4.92	1500	0.049	2.68	170	0.24
Uranium-235	0.28	87	0.048	0.139	17	0.12
Uranium-238	3.33	430	0.116	2.24	86	0.39
		Total Dose	**0.21**		**Total Dose**	**0.75**

[a] UCL used as the EPC.

[b] SSLs from LANL 2005, 088493.

Table I-4.3-17
Industrial Carcinogenic Screening for TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Arsenic	2.39	1.77E+01	1.35E-06
Chromium	17.9	5.00E+03 [c]	3.58E-08
Benzo(a)anthracene	1.5 [d]	2.34E+01	6.41E-07
Benzo(a)pyrene	1.6 [d]	2.34E+00	6.84E-06
Benzo(b)fluoranthene	2 [d]	2.34E+01	8.55E-07
Benzo(k)fluoranthene	0.8 [d]	2.34E+02	3.41E-08
Chrysene	1.8 [d]	2.31E+03	7.79E-09
Dibenz(a,h)anthracene	0.2 [d]	2.34E+00	8.55E-07
Indeno(1,2,3-c,d)pyrene	0.87 [d]	2.34E+01	3.72E-07
RDX	0.151 [d]	1.74E+02	8.69E-09
		Total Excess Cancer Risk	**1E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314)

[d] Maximum detected concentration.

Table I-4.3-18
Industrial Noncarcinogenic Screening Evaluation for TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f)

COPC	EPC[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQs
Antimony	6.29 [c]	4.54E+02	0.01
Barium	3704	1.00E+05	0.04
Cyanide (Total)	0.31 [d]	1.37E+04	0.00002
Flouride	1.71 [d]	4.10E+04	0.00004
Lead	47.6	8.00E+02	0.06
Mercury	0.054	3.40E+02[e]	0.0002
Nitrate	3.14 [d]	1.00E+05	0.00003
Selenium	3.72 [d]	5.68E+03	0.0007
Silver	0.139 [d]	5.68E+03	0.00002
Thallium	0.228 [d]	7.49E+01	0.003
Zinc	137	1.00E+05	0.001
Acenaphthene	0.67 [d]	3.35E+04	0.00002
Anthracene	1 [d]	1.00E+05	0.00001
Benzo(g,h,i)perylene	0.77 [d]	3.09E+04 [f]	0.00002
Benzoic acid	0.18 [d]	1.00E+05 [e]	0.000002
Dibenzofuran	0.28 [d]	1.62E+03	0.0002
Di-n-butylphthalate	0.059 [d]	6.84E+04	0.000001
Fluoranthene	1.76	2.44E+04	0.0001
Fluorene	0.62 [d]	2.65E+04	0.00002
Methylnaphthalene[2-]	0.18 [d]	3.00E+02 [g]	0.0006
Naphthalene	0.47 [d]	3.00E+02	0.002
Phenanthrene	3.1 [d]	2.05E+04	0.0002
Pyrene	2.42	3.09E+04	0.0001
		HI	**0.1**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] Maximum detection limit.

[d] Maximum detected concentration.

[e] SSL from EPA Region 6 (EPA 2007, 099314).

[f] SSL for pyrene used as a surrogate, based on structural similarity.

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

Table I-4.3-19
Residential Carcinogenic Screening for
TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Arsenic	2.55	3.90E+00	6.54E-06
Chromium	99	2.10E+03 [c]	4.71E-07
Benzo(a)anthracene	2.74	6.21E+00	4.41E-06
Benzo(a)pyrene	2.26	6.21E-01	3.64E-05
Benzo(b)fluoranthene	2.91	6.21E+00	4.69E-06
Benzo(k)fluoranthene	1.18	6.21E+01	1.90E-07
Chrysene	2.48	6.15E+02	4.03E-08
Dibenz(a,h)anthracene	0.2 [d]	6.21E-01	3.22E-06
Indeno(1,2,3-c,d)pyrene	1.15	6.21E+00	1.85E-06
Trichloroethene	0.0004 [d]	6.38E-01	6.27E-09
RDX	0.051 [d]	4.42E+01	3.42E-08
		Total Excess Cancer Risk	**6E-05**

[a] UCL used as the EPC unless otherwise noted.

[b] SSLs from NMED 2006, 092513.

[c] EPA Region 6 SSL (times 10) for total chromium (EPA 2007, 099314).

[d] Maximum detected concentration.

Table I-4.3-20
Residential Noncarcinogenic Screening Evaluation for TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
Aluminum	13166	7.78E+04	0.14
Antimony	0.168 [c]	3.13E+01	0.006
Barium	130	1.56E+04	0.01
Cobalt	47.6	1.52E+03	0.01
Copper	25.5	3.13E+03	0.04
Cyanide (Total)	0.31 [c]	1.22E+03	0.0002
Flouride	5.16	3.67E+03	0.001
Lead	22.3	4.00E+02	0.05
Mercury	0.025	2.30E+01 [d]	0.001
Nickel	8.3	1.56E+03	0.004
Nitrate	21.24	1.00E+05	0.00002
Perchlorate	0.003 [c]	5.50E+01 [d]	0.00002
Selenium	1.19	3.91E+02	0.006
Silver	9.22	3.91E+02	0.0007
Thallium	0.222	5.16E+00	0.04
Zinc	43.2	2.35E+04	0.005
Acenaphthene	0.895	3.73E+03	0.0002
Anthracene	1.53	2.20E+04	0.0001
Benzo(g,h,i)perylene	1.12	2.29E+03 [e]	0.0005
Benzoic acid	0.18 [c]	1.00E+05 [d]	0.000002
Dibenzofuran	0.561	1.42E+02	0.004
Di-n-butylphthalate	0.059 [c]	6.11E+03	0.00001
Fluoranthene	9.05	2.29E+03	0.004
Fluorene	0.904	2.66E+03	0.0003
Isopropylbenzene	0.003 [c]	2.71E+02	0.00001
Methylnaphthalene[2-]	0.385	7.95E+01 [f]	0.005
Naphthalene	1.08	7.95E+01	0.01
Phenanthrene	5.56	1.83E+03	0.003
Phenol	0.049 [c]	1.83E+04	0.000003
Pyrene	9.02	2.29E+03	0.004
Acetone	0.017	2.81E+04	0.000001
Butanone[2-]	0.005 [c]	3.18E+04	0.0000002
Dichloroethene[1,1-]	0.0007 [c]	2.80E+02	0.000002
Isopropyltoluene[4-]	0.003 [c]	2.71E+02 [g]	0.00001
HMX	5.94 [c]	3.06E+03	0.002

Table I-4.3-20 (continued)

COPC	EPC[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQs
TATB	4.4 [c]	1.80E+03 [h]	0.002
Trimethylbenzene[1,2,4-]	0.001 [c]	5.80+01	0.00003
		HI	**0.4**

[a] UCL used unless otherwise noted.

[b] SSL from NMED 2006, 092513, unless noted otherwise.

[c] Maximum detected concentration.

[d] SSL from EPA Region 6 (EPA 2007, 099314).

[e] SSL for pyrene used as a surrogate, based on structural similarity.

[f] Naphthalene used as a surrogate, based on structural similarity.

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

[h] SSL for 1,3,5-trinitrobenzene is used as a surrogate, based on structural similarity from EPA Region 6 (EPA 2007, 099314).

Table I-4.3-21
TA-16-340 Complex, SWMU 16-026(j2) and SWMU 16-029(f), C_{sat} COPC Forward Risk Evaluation

Analyte	Industrial Concentration (mg/kg)	Residential Concentration (mg/kg)	C_{sat} Concentration[a] (mg/kg)	RfD—Oral[a] (mg/kg-day)	RfD—Inhalation[a] (mg/kg-day)	VF[a] (m^3/kg)	HQ Industrial	HQ Residential
Ethylbenzene	n/a[b]	0.0004 [c]	128	1.00E-01	2.90E-01	4.20E+03	n/a	0.000002
Propylbenzene[1-]	n/a	0.0004 [c]	62.1	1.00E+02	1.00E-02	1.10E+04	n/a	0.0000003
Toluene	n/a	0.002 [c]	252	8.00E-02	1.40E+00	5.45E+03	n/a	0.0000005
Trimethylbenzene[1,3,5-]	n/a	0.0006 [c]	1800	5.00E-02	1.70E-03	8.10E+03	n/a	0.00003
Xylene[1,3-] +Xylene[1,4-][d]	n/a	0.0009 [c]	82	2.00E-01	2.90E-02	4.40E+03	n/a	0.000005
						HI	**n/a**	**0.00004**

[a] Values from NMED 2005, 90802.

[b] n/a = Not applicable; not a COPC for the industrial scenario.

[c] Maximum detected concentration used.

[d] Values for total xylenes used.

Table I-5.3-1
Ecological Screening Levels for Terrestrial Receptors

COPCs	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	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	11000	37000	820	1000	930	1800	3300	330	110	1300	41000
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	37000	1900	830	1100	1900	13000	2.3	2.4	750	30000
Cobalt	930	3500	170	96	120	400	1800	na	13	160	5400
Copper	88	1200	28	11	16	59	250	13	10	34	3500
Cyanide (total)	0.61	1.4	0.1	0.1	0.1	340	740	na	na	310	5200
Iron	na	na	na	na	na	na	na	na	na	na	na
Lead	120	810	21	14	16	120	370	1700	120	72	3700
Manganese	110000	290000	4600	10000	6400	1200	1700	na	50	1300	35000
Mercury	0.082	0.28	0.07	0.013	0.022	3	22	0.05	34	1.7	46
Nickel	530	9500	530	70	120	530	12000	100	20	250	31000
Nitrate	na	na	na	na	na	na	na	na	na	na	na
Perchlorate	na	na	na	na	na	na	na	na	na	na	na
Selenium	8.5	140	1.5	1.1	1.3	1.1	3	7.7	0.1	0.92	110
Silver	52	2200	30	7.2	11	77	490	na	0.05	44	13000
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

Table I-5.3-1 (continued)

COPCs	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)
Vanadium	84	170	8.9	6.7	7.6	480	1500	na	0.025	140	3300
Zinc	180	1400	200	27	48	290	3000	190	10	160	10000
Semivolatile Organic Compounds											
Acenaphthene	na	na	na	na	na	na	160	490	0.25	120	6200
Acenaphthylene	na	na	na	na	na	160	500	na	na	120	5200
Anthracene	na	na	na	na	na	310	1100	na	na	210	5800
Benzo(a)anthracene	na	na	na	na	na	3.4	6.2	na	18	3	45
Benzo(a)pyrene	na	na	na	na	na	15	50	na	na	9.6	68
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
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
Chloronaphthalene[2-]	na	na	na	na	na	na	na	na	na	na	na
Chrysene	na	na	na	na	na	3.1	6.5	na	na	2.4	46
Dibenz(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
Diethylphthalate	na	na	na	na	na	na	na	na	na	na	na
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
Fluoranthene	na	na	na	na	na	38	260	38	na	22	360
Fluorene	na	na	na	na	na	340	1100	4.1	na	250	9300

Table I-5.3-1 (continued)

COPCs	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)
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	110	590	na	na	62	270
Methylnaphthalene[2-]	na	na	na	na	na	3.8	16	na	na	2.5	130
Naphthalene	1100	6300	37	170	61	0.34	0.45	na	1	0.96	42
Phenanthrene	na	na	na	na	na	15	59	34	na	10	290
Pyrene	na	na	na	na	na	32	110	18	na	22	360
Volatile Organic Compounds											
Acetone	1200	30000	7.5	170	14	1.2	1.4	na	na	15	2900
Butanone[2-]	na	na	na	na	na	360	420	na	na	2600	420000
Butylbenzene[n-]	na	na	na	na	na	na	na	na	na	na	na
Chloroform	na	na	na	na	na	8	17	na	na	8.2	4400
Dichloroethene[1,1-]	na	na	na	na	na	14	40	na	na	11	2900
Dichloroethene[cis-1,2-]	na	na	na	na	na	25	58	na	na	23	7100
Ethylbenzene	na	na	na	na	na	na	na	na	na	na	na
Isopropylbenzene	na	na	na	na	na	na	na	na	na	na	na
Isopropyltoluene[4-]	na	na	na	na	na	na	na	na	na	na	na
Methyl-2-pentanone[4-]	na	na	na	na	na	na	na	na	na	na	na
Methylene chloride	na	na	na	na	na	2.6	3.4	na	1600	9	1700
Propylbenzene[1-]	na	na	na	na	na	na	na	na	na	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
Trichloroethane[1,1,1-]	na	na	na	na	na	400	1800	na	na	260	50000
Trichloroethene	na	na	na	na	na	55	170	na	na	42	6400
Trichlorofluoromethane	na	na	na	na	na	na	na	na	na	na	na

Table I-5.3-1 (continued)

COPCs	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)
Trimethylbenzene[1,2,4-]	na	na	na	na	na	na	na	na	na	na	na
Trimethylbenzene[1,3,5-]	na	na	na	na	na	na	na	na	na	na	na
Xylene[1,2-]	na	na	na	na	na	na	na	na	na	na	na
Xylene[1,3-]+Xylene[1,4-]	na	na	na	na	na	na	na	na	na	na	na
High Explosives											
Amino-2,6-dinitrotoluene[4-]	na	na	na	na	na	0.73	1	na	80	1.5	330
Amino-4,6-dinitrotoluene[2-]	na	na	na	na	na	2.1	2.8	na	80	5.4	760
Dinitroaniline[3,5-]	na	na	na	na	na	na	na	na	na	na	na
Dinitrotoluene[2,4-]	na	na	na	na	na	0.52	0.62	na	na	2.7	150
Dinitrobenzene[1,3-]	12	62	0.079	1.7	0.15	0.073	0.83	na	na	0.84	32
HMX	na	na	na	na	na	27	29	140	2700	3100	29000
Nitrobenzene	na	na	na	na	na	5.8	7.2	2.2	na	24	2000
PETN	na	na	na	na	na	8600	9900	na	na	73000	640000
RDX	200	1100	12	22	16	130	210	7.5	100	150	6900
TATB	na	na	na	na	na	na	na	na	na	na	na
Tetryl	na	na	na	na	na	0.99	1.1	na	25	35	370
Trinitrotoluene[2,4,6-]	1400	2700	6.4	na	na	na	na	na	na	na	na
Radionuclides											
Uranium-234	120000	190000	48000	14000	14000	91000	96000	51	14000	94000	45000
Uranium-235	10000	10000	9000	6400	6400	5100	5100	55	4000	5100	4800
Uranium-238	4100	4200	3900	3400	3400	2100	2100	55	1800	2100	2000

Note: Units are mg/kg, except for radionuclides, which are pCi/g.

* na = Not available.

Table I-5.3-2
Minimum ESL Comparison for the TA-16-340 Complex

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	0.187	0.05	Plant	**4**
Arsenic	5.15	15	Earthworm	**0.76**
Barium	364	110	Plant	**3.3**
Beryllium	0.716	2.5	Plant	0.29
Cadmium	0.399	0.27	Montane shrew	**1.5**
Chromium	19.1	2.3	Earthworm	**8.3**
Cobalt	16.6	13	Plant	**1.3**
Copper	116	10	Plant	**11.6**
Cyanide (total)	0.228	0.1	American robin (all)	**2.3**
Fluoride	3.91	31	American robin insectivore	0.13
Iron	12581	na*	na	na
Lead	20.9	14	American robin insectivore	**1.5**
Manganese	281	50	Plant	**5.6**
Mercury	0.102	0.013	American robin insectivore	**7.8**
Nickel	6.3	20	Plant	**0.32**
Nitrate	2.26	na	na	na
Perchlorate	0.003	na	na	na
Selenium	1.92	0.1	Plant	**19**
Silver	0.607	0.05	Plant	**12**
Thallium	0.206	0.032	Montane shrew	**6**
Uranium	4.25	25	Plant	0.17
Vanadium	34.5	0.025	Plant	**1380**
Zinc	99.9	10	Plant	**10**
Semivolatile Organic Chemicals (mg/kg)				
Acenaphthene	0.621	0.25	Plant	**2.5**
Acenaphthylene	0.147	120	Montane shrew	0.001
Anthracene	1.13	120	Montane shrew	0.005
Benzo(a)anthracene	1.58	3	Montane shrew	**0.53**
Benzo(a)pyrene	1.28	9.6	Montane shrew	0.13
Benzo(b)fluoranthene	2.55	38	Montane shrew	0.07
Benzo(g,h,i)perylene	0.741	24	Montane shrew	0.03
Benzo(k)fluoranthene	0.676	62	Montane shrew	0.01
Benzoic acid	0.506	1	Montane shrew	**0.51**
Bis(2-ethylhexyl)phthalate	7.2	0.02	American robin insectivore	**360**
Butylbenzylphthalate	13	90	Montane shrew	0.14
Chloronaphthalene[2-]	0.04	na	na	na

Table I-5.3-2 (continued)

COPC	EPC	ESL	Receptor	HQ
Chrysene	1.65	2.4	Montane shrew	**0.69**
Dibenz(a,h)anthracene	0.088	12	Montane shrew	0.007
Dibenzofuran	0.342	6.1	Plant	0.06
Diethylphthalate	0.26	10	Deer mouse	0.01
Di-n-butylphthalate	0.18	0.011	American robin insectivore	**16**
Di-n-octylphthalate	4.5	1.1	Montane shrew	**4.1**
Fluoranthene	4.13	22	Montane shrew	0.19
Fluorene	0.601	4.1	Earthworm	0.15
Indeno(1,2,3-cd)pyrene	0.698	62	Montane shrew	0.01
Methylnaphthalene[2-]	0.233	2.5	Montane shrew	0.09
Methylphenol[4-]	1	na	na	na
Naphthalene	0.57	0.34	Deer mouse	**1.7**
Phenanthrene	3.92	10	Montane shrew	**0.39**
Phenol	0.049	0.79	Plant	0.06
Pyrene	4.43	18	Earthworm	0.25
Volatile Organic Chemicals (mg/kg)				
Acetone	0.026	1.2	Deer mouse	0.02
Butanone[2-]	0.009	360	Deer mouse	0.00003
Butylbenzene[n-]	0.0003	na	na	na
Chloroform	0.001	8	Deer mouse	0.0001
Dichloroethene[1,1-]	0.0008	11	Montane shrew	0.00007
Dichloroethene[cis-1,2-]	0.002	23	Montane shrew	0.00009
Ethylbenzene	0.0004	na	na	na
Isopropylbenzene	0.0005	na	na	na
Isopropyltoluene[4-]	0.001	na	na	na
Methyl-2-pentanone[4-]	0.004	na	na	na
Methylene chloride	0.005	2.6	Deer mouse	0.002
Propylbenzene[1-]	0.0004	na	na	na
Tetrachloroethene	0.019	0.18	Montane shrew	0.11
Toluene	0.0008	23	Montane shrew	0.00003
Trichloroethane[1,1,1-]	0.003	260	Montane shrew	0.00001
Trichloroethene	0.0007	42	Montane shrew	0.00002
Trichlorofluoromethane	0.005	na	na	na
Trimethylbenzene[1,2,4-]	0.0006	na	na	na
Trimethylbenzene[1,3,5-]	0.0006	na	na	na
Xylene[1,2-]	0.0005	na	na	na
Xylene[1,3-] +Xylene[1,4-]	0.0006	na	na	na

Table I-5.3-2 (continued)

COPC	EPC	ESL	Receptor	HQ
High Explosives (mg/kg)				
Amino-2,6-dinitrotoluene[4-]	0.154	1.5	Deer mouse	0.21
Amino-4,6-dinitrotoluene[2-]	0.714	5.4	Deer mouse	**0.34**
Dinitroaniline[3,5-]	0.338	na	na	na
Dinitrobenzene[1,3-]	0.077	0.083	Deer mouse	**1.1**
Dinitrotoluene[2,4-]	0.115	0.52	Deer mouse	0.22
HMX	28.81	27	Deer mouse	**1.1**
Nitrobenzene	0.215	2.2	Earthworm	0.10
PETN	1.43	8600	Deer mouse	0.0002
RDX	6.37	7.5	Earthworm	**0.85**
TATB	3.94	na	na	na
Tetryl	3.04	0.99	Deer mouse	**3.1**
Trinitrotoluene[2,4,6-]	0.163	6.4	American robin herbivore	0.03
Radionuclides (pCi/g)				
Uranium-234	2.66	51	Earthworm	0.05
Uranium-235	0.137	55	Earthworm	0.002
Uranium-238	2.23	55	Earthworm	0.04

Note: Bolded values indicate HQ greater than 0.3.

* na = Not available.

Table I-5.3-3
Hazard Index Analysis for the TA-16-340 Complex

COPEC	EPC (mg/kg)	American Kestrel (avian intermediate carnivore)	American Kestrel (avian top carnivore)	American Robin (avian herbivore)	American Robin (avian insectivore)	American Robin (avian omnivore)	Deer Mouse (mammalian omnivore)	Desert Cottontail (mammalian herbivore)	Earthworm (soil-dwelling invertebrate)	Plant (terrestrial autotroph - producer)	Montane Shrew (mammalian insectivore)	Red Fox (mammalian top carnivore)
Inorganic Chemicals												
Antimony	0.187	na*	na	na	na	na	**0.39**	0.06	0.00	**4**	1	0.004
Arsenic	5.15	0.03	0.005	0.1	0.29	0.20	0.2	0.03	**0.76**	0.29	**0.34**	0.01
Barium	363.9	0.03	0.01	**0.44**	**0.36**	**0.39**	0.2	0.11	**1.1**	**3.3**	0.28	0.009
Cadmium	0.399	0.20	0.001	0.09	**1.4**	**0.7**	**0.8**	0.04	0.003	0.01	**1.5**	0.001
Chromium	19.1	0.002	0.001	0.01	0.02	0.02	0.01	0.001	**8.3**	**8.0**	0.03	0.001
Cobalt	16.6	0.018	0.005	0.1	0.17	0.14	0.04	0.009	na	**1.3**	0.10	0.003
Copper	116	**1.3**	0.10	**4.1**	**10.5**	**7.3**	**2.0**	**0.46**	**8.9**	**11.6**	**3.4**	0.033
Cyanide (total)	0.228	**0.37**	0.16	**2.3**	**2.3**	**2.3**	0.001	0.0003	na	na	0.001	0.000
Lead	20.9	0.17	0.03	**1.0**	**1.5**	**1.3**	0.2	0.06	0.01	0.2	0.29	0.006
Manganese	280.5	0.003	0.001	0.06	0.03	0.04	0.23	0.17	na	**5.6**	0.22	0.01
Mercury	0.102	**1.2**	**0.36**	**1.5**	**7.8**	**4.6**	0.03	0.005	**2.0**	0.003	0.06	0.002
Nickel	6.334	0.01	0.001	0.01	0.09	0.05	0.01	0.0005	0.06	**0.32**	0.03	0.0002
Selenium	1.92	0.23	0.01	**1.3**	**1.7**	**1.5**	**1.7**	**0.64**	0.25	**19**	**2.1**	0.02
Silver	0.607	0.01	0.0003	0.02	0.1	0.06	0.01	0.001	na	**12**	0.01	0.00005
Thallium	0.206	0.03	0.003	0.02	0.23	0.13	**3**	0.07	na	**2**	**6**	0.07
Vanadium	34.5	0.41	0.20	**3.9**	**5.1**	**4.5**	0.07	0.02	na	**1380**	0.25	0.01
Zinc	99.9	**0.56**	0.07	**0.50**	**3.7**	**2.1**	0.3	0.03	**0.53**	**10.0**	**0.62**	0.01

Table I-5.3-3 (continued)

COPEC	EPC (mg/kg)	American Kestrel (avian intermediate carnivore)	American Kestrel (avian top carnivore)	American Robin (avian herbivore)	American Robin (avian insectivore)	American Robin (avian omnivore)	Deer Mouse (mammalian omnivore)	Desert Cottontail (mammalian herbivore)	Earthworm (soil-dwelling invertebrate)	Plant (terrestrial autotroph - producer)	Montane Shrew (mammalian insectivore)	Red Fox (mammalian top carnivore)
Semivolatile Organic Compounds												
Acenaphthene	0.62	na	na	na	na	na	0.004	0.001	na	**2.5**	0.005	0.0001
Benzo(a)anthracene	1.6	na	na	na	na	na	**0.46**	0.25	na	0.09	**0.53**	0.035
Benzoic acid	0.51	na	na	na	na	na	**0.39**	0.12	na	na	**0.51**	0.001
Bis(2-ethylhexyl)phthalate	7.2	**160**	**218**	**0.36**	**360**	**180**	**6.5**	0.003	na	na	**12.2**	**6.0**
Chrysene	1.7	na	na	na	na	na	**0.53**	0.25	na	na	**0.69**	0.04
Di-n-butylphthalate	0.18	**2.6**	**0.75**	**0.46**	**16**	**9**	0.0005	0.00001	na	0.001	0.001	0.00004
Di-n-octylphthalate	4.5	na	na	na	na	na	2.0	0.0003	na	na	**4.1**	0.28
Naphthalene	0.57	0.0005	0.00009	0.02	0.003	0.009	**1.7**	**1.3**	na	**0.57**	**0.59**	0.01
Phenanthrene	3.9	na	na	na	na	na	0.26	0.07	0.12	na	**0.39**	0.01
High Explosives												
Amino-4,6-dinitrotoluene[2-]	0.71	na	na	na	na	na	**0.34**	0.26	na	0.009	0.13	0.001
Dinitrobenzene[1,3-]	0.08	0.01	0.001	**0.97**	0.05	**0.51**	**1.1**	**0.93**	na	na	0.09	0.002
HMX	28.8	na	na	na	na	na	**1.1**	**0.99**	0.21	0.01	0.009	0.001
RDX	6.37	0.03	0.01	**0.53**	0.29	**0.40**	0.05	0.03	**0.85**	0.06	0.04	0.001
Tetryl	3.04	na	na	na	na	na	**3.1**	2.8	na	0.12	0.09	0.008
HI		**167**	**220**	**18**	**412**	**215**	**27**	**9**	**23**	**1461**	**36**	**7**

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-1
Comparison of UCLs to Background Concentrations for TA-16-340 Complex

COPEC	EPC (mg/kg)	Soil Background Concentrations (mg/kg)	Tuff Background Concentrations (mg/kg)
Antimony	0.187	0.1–1	0.05–0.4
Arsenic	5.15	0.3–9.3	0.25–5
Barium	363.9	21–410	1.4–51.6
Cadmium	0.399	0.2–2.6	0.1–1.5
Chromium	19.1	1.9–36.5	0.25–13
Cobalt	**16.6** [a]	1–9.5	3.14 [b]
Copper	**116**	0.25–16	0.25–6.2
Cyanide (Total)	0.228	0.5 [b]	0.5 [b]
Lead	20.9	2–28	1.6–15.5
Manganese	281	76–1100	22–752
Mercury	0.1	0.05–0.1	0.1 [b]
Nickel	6.334	1–29	0.5–7
Selenium	1.92	0.1–1.7	0.1–0.105
Silver	0.607	1.0 [b]	0.2–1.9
Thallium	0.206	0.063–1	0.05–1.7
Vanadium	34.5	4–56.5	0.25–21
Zinc	99.9	14–75.5	5.5–65.6

Note: From LANL 1998, 059730.

[a] Bold values denote EPCs outside the range of background data.

[b] No background data set; value is the BV.

Table I-5.4-2
PAUFs for Ecological Receptors

Receptor	Home Range[a] (ha)	Population Area[a] (ha)	PAUF[b] TA-16-340 Complex
American robin	0.42	16.8	0.07
American kestrel	106	4240	0.0003
Deer mouse	0.077	3.0	0.37
Desert cottontail	3.1	124	0.009
Montane shrew	0.39	15.6	0.07
Red fox	1038	41,520	0.00003
Mexican spotted owl [c]	366	n/a [d]	0.003

[a] Values from EPA 1993, 059384.

[b] PAUF is calculated as the area of the site (1.1 ha) divided by the population area. No PAUF is calculated for earthworms or plants.

[c] Value for Mexican spotted owl is the AUF based on individual HR.

[d] n/a = Not applicable.

Table I-5.4-3
Adjusted HQs and HIs for TA-16-340 Complex

COPEC	EPC (mg/kg)	American Kestrel (avian intermediate carnivore)	American Kestrel (avian top carnivore)	American Robin (avian herbivore)	American Robin (avian insectivore)	American Robin (avian omnivore)	Deer Mouse (mammalian omnivore)	Desert Cottontail (mammalian herbivore)	Earthworm (soil-dwelling invertebrate)	Plant (terrestrial autotroph - producer)	Montane Shrew (mammalian insectivore)	Red Fox (mammalian top carnivore)
Inorganic Chemicals												
Cobalt	16.6	<0.0001	<0.0001	0.006	0.01	0.009	0.015	0.0001	na*	**1.3**	0.007	<0.0001
Copper	116	0.0003	<0.0001	0.27	**0.69**	**0.47**	**0.72**	0.0041	**8.9**	**11.6**	0.24	<0.0001
Semivolatile Organic Compounds												
Acenaphthene	0.621	na	na	na	na	na	0.001	<0.0001	na	**2.5**	0.0004	<0.0001
Benzo(a)anthracene	1.58	na	na	na	na	na	0.17	0.002	na	0.1	0.04	<0.0001
Benzoic acid	0.506	na	na	na	na	na	0.14	0.001	na	na	0.04	<0.0001
Bis(2-ethylhexyl)phthalate	7.2	0.04	0.06	0.02	**23.5**	**11.8**	**2.4**	<0.0001	na	na	**0.9**	<0.0001
Chrysene	1.65	na	na	na	na	na	0.2	0.002	na	na	0.05	<0.0001
Di-n-butylphthalate	0.18	0.0007	0.0002	0.03	**1.1**	**0.56**	0.0005	0.00001	na	0.03	0.0001	<0.0001
Di-n-octylphthalate	4.5	na	na	na	na	na	**0.75**	0.0003	na	na	0.29	<0.0001
Naphthalene	0.57	<0.0001	<0.0001	0.001	0.0002	0.0006	**0.61**	0.01	na	**0.6**	0.04	<0.0001
Phenanthrene	3.92	na	na	na	na	na	0.1	0.0006	0.12	na	0.03	<0.0001
High Explosives												
Amino-4,6-dinitrotoluene[2-]	0.714	na	na	na	na	na	0.12	0.002	na	0.009	0.009	<0.0001
Dinitrobenzene[1,3-]	0.077	0.006	0.0012	0.064	0.003	0.034	**0.39**	0.0082	na	na	0.007	<0.0001
HMX	28.8	na	na	na	na	na	**0.39**	0.009	0.21	0.01	0.0007	<0.0001
RDX	6.37	<0.0001	<0.0001	0.03	0.02	0.026	0.02	0.0003	**0.85**	0.1	0.003	<0.0001
Tetryl	3.04	na	na	na	na	na	**1.1**	0.02	na	0.1	0.006	<0.0001
Adjusted HI		0.04	0.06	0.4	**25**	**13**	**7**	0.07	**10**	**16**	**2**	0.0002

Note: Bolded values indicate HQs greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.7-1
HI Analysis for Pore-Gas Samples

COPECs	Maximum Detected Concentration (µg/m^3)	Inhalation ESLs (µg/m^3)	HQs
Acetone	285	530,000	0.0005
Carbon tetrachloride	27	5700	0.005
Chloroform	200	20000	0.01
Dichloroethane[1,2-]	78	41000	0.002
Methylene chloride	4.5	1300000	0.000003
Tetrachloroethene	140	73000	0.002
Toluene	339	60000	0.006
Trichloroethene	1200	19000	0.06
Xylene[1,2-]	5.6	87000*	0.00006
Xylene[1,3-]+Xylene[1,4-]	12	87000*	0.0001
		HI	**0.09**

Note: ESLs obtained from ECORISK Database, Version 2.2 (EPA 2005, 090032).

* Total xylene used as a surrogate.

Table I-6.0-1
Inorganic Chemicals above Standards and Screening Levels in Unfiltered Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Aluminum (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Chromium (µg/L)	Cyanide (Total) (mg/L)	Iron (µg/L)	Lead (µg/L)	Manganese (µg/L)	Uranium (µg/L)	Vanadium (µg/L)
NMWQCC Groundwater Standard (µg/L)[a]				**na[b]**	**100**	***1000***	**na**	***50***	**0.2[c]**	**na**	**50**	**na**	**5000**	**na**
EPA MCL (µg/L)[d]				**na**	**10**	**2000**	***4***	**100**	**na**	**na**	***15***	**na**	**30**	**na**
Region 6 Tap Water Screening Level (µg/L)[e]				**37000**	***0.045***	**7300**	**73**	**55000**	**0.062[c]**	**26000**	***15***	**1700**	**na**	**180**
Region 9 Tap Water PRG (µg/L)[f]				**36000**	***0.045***	**2600**	***4***	**55000**	**0.73[c]**	***11000***	**na**	***880***	***7.3***	***36***
NMWQCC Domestic Water Supply SW Standard (µg/L)[g]				**na**	**50**	**2000**	***4***	**100**	**0.2[c]**	**na**	**50**	**na**	**5000**	**na**
NMWQCC Irrigation SW Standard (µg/L)[g]				**5000**	**100**	**na**	**na**	**100**	**na**	**na**	**5000**	**na**	**na**	**100**
NMWQCC Livestock Watering SW Standard (µg/L)[g]				**5000**	**200**	**na**	**na**	**1000**	**na**	**na**	**100**	**na**	**na**	**100**
NMWQCC Wildlife Habitat SW Standard (µg/L)[g]				**na**	**na**	**na**	**na**	**na**	***0.0052*[c]**	**na**	**na**	**na**	**na**	**na**
NMWQCC Aquatic Life (Acute) SW Standard (µg/L)[g]				***750***	**340**	**na**	**130**	**na**	**0.022[c]**	**na**	**3444**	**na**	**na**	**na**
NMWQCC Human Health SW Standard (µg/L)[g]				**na**	**24.2**	**na**	**na**	**na**	**220[c]**	**na**	**na**	**na**	**na**	**na**
Surface Water														
GU06020SFLS01	16-02654	n/a[h]	4/3/2006	5870	—[i]	—	—	—	—	—	—	—	—	—
GU070500SFLS01	16-02654	n/a	5/11/2007	23200 (J)	5.2	—	—	—	—	13400 (J+)	—	—	—	—
GU071000SFLS01	16-02654	n/a	10/19/2007	5730	—	—	—	—	—	—	—	—	—	—
GU0602FLCDV01	16-06121	n/a	4/10/2006	112000	25.8	6430	9.2	53.2	0.013	79400	83.9	15500	25.6	126

Table I-6.0-1 (continued)

Sample ID	Location ID	Depth (ft)	Date Collected	Aluminum (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Chromium (µg/L)	Cyanide (Total) (mg/L)	Iron (µg/L)	Lead (µg/L)	Manganese (µg/L)	Uranium (µg/L)	Vanadium (µg/L)
NMWQCC Groundwater Standard (µg/L)[a]				**na[b]**	**100**	***1000***	**na**	***50***	**0.2[c]**	**na**	**50**	**na**	**5000**	**na**
EPA MCL (µg/L)[d]				**na**	**10**	**2000**	***4***	**100**	**na**		***15***	**na**	**30**	**na**
Region 6 Tap Water Screening Level (µg/L)[e]				**37000**	***0.045***	**7300**	**73**	**55000**	**0.062[c]**	**26000**	***15***	**1700**	**na**	**180**
Region 9 Tap Water PRG (µg/L)[f]				**36000**	***0.045***	**2600**	***4***	**55000**	**0.73[c]**	***11000***	**na**	***880***	***7.3***	***36***
NMWQCC Domestic Water Supply SW Standard (µg/L)[g]				**na**	**50**	**2000**	***4***	**100**	**0.2[c]**	**na**	**50**	**na**	**5000**	**na**
NMWQCC Irrigation SW Standard (µg/L)[g]				**5000**	**100**	**na**	**na**	**100**	**na**	**na**	**5000**	**na**	**na**	**100**
NMWQCC Livestock Watering SW Standard (µg/L)[g]				**5000**	**200**	**na**	**na**	**1000**	**na**	**na**	**100**	**na**	**na**	**100**
NMWQCC Wildlife Habitat SW Standard (µg/L)[g]				**na**	**na**	**na**	**na**	**na**	***0.0052*[c]**	**na**	**na**	**na**	**na**	**na**
NMWQCC Aquatic Life (Acute) SW Standard (µg/L)[g]				***750***	**340**	**na**	**130**	**na**	**0.022[c]**	**na**	**3444**	**na**	**na**	**na**
NMWQCC Human Health SW Standard (µg/L)[g]				**na**	**24.2**	**na**	**na**	**na**	**220[c]**	**na**	**na**	**na**	**na**	**na**
Alluvial Groundwater														
CAWA-08-11599	16-25278	1.6	4/10/2008	11000	—	—	—	—	—	—	—	—	—	—
GU071000FLC301	16-25278	1.6	10/22/2007	—	2.1	—	—	—	—	—	—	1460	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	33100	—	—	—	—	—	18900	—	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	14200	—	—	—	—	—	—	—	1100 (J+)	—	—
CAWA-08-11605	16-25280	2.6	4/3/2008	29900	—	—	—	—	—	16700	—	—	—	—

Note: Results are compared to the most conservative standard available (*underlined and italicized*).

[a] http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0002.htm.

[b] na = Not available.

[c] Values are reported as mg/L.

[d] http://www.epa.gov/OGWDW/mcl.html.

[e] EPA Region 6 screening level (EPA 2007, 099314).

[f] http://www.epa.gov/region09/waste/sfund/prg/index.html. Standards reported for carcinogenic chemicals adjusted to 10^{-5}.

[g] http://www.nmenv.state.nm.us/NMED_regs/swqb/20_6_4_nmac.html#11.

[h] n/a = Not applicable.

[i] — = Not detected or not detected above standards or screening levels.

Table I-6.0-2
Inorganic Chemicals above Standards and Screening Levels in Filtered Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Aluminum (µg/L)	Arsenic (µg/L)	Manganese (µg/L)
NMWQCC Groundwater Standard (µg/L)[a]				**na[b]**	**100**	**na**
EPA MCL (µg/L)[c]				**na**	**10**	**na**
Region 6 Tap Water Screening Level (µg/L)[d]				**37000**	***0.045***	**1700**
Region 9 Tap Water PRG (µg/L)[e]				**36000**	***0.045***	***880***
NMWQCC Domestic Water Supply SW Standard (µg/L)[f]				**na**	**50**	**na**
NMWQCC Irrigation SW Standard (µg/L)[f]				**5000**	**100**	**na**
NMWQCC Livestock Watering SW Standard (µg/L)[f]				**5000**	**200**	**na**
NMWQCC Wildlife Habitat SW Standard (µg/L)[f]				**na**	**na**	**na**
NMWQCC Aquatic Life (Acute) SW Standard (µg/L)[f]				***750***	**340**	**na**
NMWQCC Human Health SW Standard (µg/L)[f]				**na**	**24.2**	**na**
Surface Water						
GF06020SFLS01	16-02654	n/a[g]	4/3/2006	3310	—[h]	—
GF070500SFLS01	16-02654	n/a	5/11/2007	1590	2.7(J)	—
GF071000SFLS01	16-02654	n/a	10/19/2007	1210	—	—
GF0602FLCDV01	16-06121	n/a	4/10/2006	5070	—	—
Alluvial Groundwater						
CAWA-08-11597	16-25278	1.6	4/10/2008	8830	—	—
GF071000FLC301	16-25278	1.6	10/22/2007	—	—	1370
CAWA-08-11602	16-25279	2.7	4/10/2008	12100	—	—
GF071000FLC201	16-25279	2.7	10/24/2007	4060	—	1030 (J+)
CAWA-08-11604	16-25280	2.6	4/3/2008	14000	—	—

Note: Results are compared to the most conservative standard available (*underlined and italicized*).

[a] http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0002.htm.

[b] na = Not available.

[c] http://www.epa.gov/OGWDW/mcl.html.

[d] EPA Region 6 screening level (EPA 2007, 099314).

[e] http://www.epa.gov/region09/waste/sfund/prg/index.html. Standards reported for carcinogenic chemicals adjusted to 10^{-5}.

[f] http://www.nmenv.state.nm.us/NMED_regs/swqb/20_6_4_nmac.html#11.

[g] n/a = Not applicable.

[h] — = Not detected or not detected above standards or screening levels.

Table I-6.0-3
Organic Chemicals above Standards and Screening Levels in Unfiltered Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008)

Sample ID	Location ID	Depth (ft)	Date Collected	Methylene Chloride (µg/L)	RDX (µg/L)	Tetrachloroethene (µg/L)	Trichloroethene (µg/L)
NMWQCC Groundwater Standards (µg/L)[a]				**100**	**na[b]**	**na**	**na**
EPA MCL (µg/L)[c]				**5**	**na**	**5**	**5**
Region 6 Tap Water Screening Level (µg/L)[d]				**89**	***0.61***	***1.24***	***0.028***
Region 9 Tap Water PRG (µg/L)[d]				**89**	***0.61***	***1.24***	***0.028***
NMWQCC Domestic Water Supply SW Standard (µg/L)[e]				**na**	**na**	**6.9**	**25**
NMWQCC Irrigation SW Standard (µg/L)[e]				**na**	**na**	**na**	**na**
NMWQCC Livestock Watering SW Standard (µg/L)[e]				**na**	**na**	**na**	**na**
NMWQCC Wildlife Habitat SW Standard (µg/L)[e]				**na**	**na**	**na**	**na**
NMWQCC Aquatic Life (Acute) SW Standard (µg/L)[e]				**na**	**na**	**na**	**na**
NMWQCC Human Health SW Standard (µg/L)[e]				**5900**	**na**	**33**	**300**
Surface Water							
GU06020SFLS01	16-02654	n/a[f]	4/3/2006	—[g]	—	—	—
GU070500SFLS01	16-02654	n/a	5/11/2007	—	—	—	—
GU071000SFLS01	16-02654	n/a	10/19/2007	—	—	—	—
GU0602FLCDV01	16-06121	n/a	4/10/2006	5.04	—	—	—
Alluvial Groundwater							
CAWA-08-11599	16-25278	1.6	4/10/2008	—	—	—	—
GU071000FLC301	16-25278	1.6	10/22/2007	—	—	—	—
CAWA-08-11601	16-25279	2.7	4/10/2008	—	—	—	—
GU071000FLC201	16-25279	2.7	10/24/2007	—	—	—	—
CAWA-08-11605	16-25280	2.6	4/3/2008	—	7.47	193	11.8
GU06020FLC101	16-25280	2.6	2/16/2006	—	—	6.09	3.99

Note: Results are compared to the most conservative standard available (*underlined and italicized*).

[a] http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0002.htm.

[b] na = Not available.

[c] http://www.epa.gov/OGWDW/mcl.html.

[d] http://www.epa.gov/region09/waste/sfund/prg/index.html. Standards reported for carcinogenic chemicals adjusted to 10^{-5}.

[e] http://www.nmenv.state.nm.us/NMED_regs/swqb/20_6_4_nmac.html#11.

[f] n/a = Not applicable.

[g] — = Not detected or not detected above standards or screening levels.

Table I-6.0-4
Chemicals Detected in Surface Water and Alluvial Groundwater Samples Collected in Fishladder Canyon (2006–2008) for which No Standards and Screening Levels are Available

Analyte	Field Prep	Minimum Result	Maximum Result	Number of Detections
Inorganic Chemicals (mg/L)				
Bromide	F[a]	0.107(J)	0.114(J)	2
	UF[b]	0.088(J)	0.88(J)	1
Total Phosphate as phosphorus	F	0.087	0.282	6
Silicon Dioxide	F	27.9	78.3	7
	UF	39.9	170	2
Organic Chemicals (µg/L)				
Dioxins/Furans				
Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	UF	0.0000096(J)	0.000012(J)	2
Heptachlorodibenzodioxins (Total)	UF	0.0000208	0.0000315	2
Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	UF	0.00000279(J)	0.00000279(J)	1
Heptachlorodibenzofurans (Total)	UF	0.0000067	0.0000067	1
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	UF	0.0000671	0.000074	2
Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	UF	0.00000703(J)	0.00000703(J)	1
Volatile Organic Compounds				
Isopropyltoluene[4-]	UF	0.93(J)	0.93(J)	10

[a] F = Filtered

[b] UF = Unfiltered.

Attachment I-1

Ecological Scoping Checklist

Part A—Scoping Meeting Documentation

Site ID	**TA-16-340 Complex**
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	The TA-16-340 Complex operated from 1952 to 1999 and processed large quantities of high explosives (HE) for the production of plastic-bonded explosives. Plastic-bonded explosives were produced by slurrying HE and solvents together with inert binders. HE- and solvent-contaminated wash water were routed as waste to six sumps associated with former building 16-340 and the single sump and outfall associated with former building 16-342. Historically, discharges from the building 16-340 and 16-342 sumps were routed to the building 16-340 and 16-342 outfalls, respectively. Locations of the individual sites within the TA-16-340 are shown on Figure 1.0-2 in the investigation report. The TA-16-340 Complex is itself an aggregate of Consolidated Units 13-003(a)-99 and 16-003(n)-99, and solid waste management units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f).
List of Primary Impacted Media **(Indicate all that apply.)**	Soil/tuff; Surface water; Groundwater
FIMAD vegetation class based on Arcview vegetation coverage **(Indicate all that apply.)**	Bare Ground/Unvegetated; Spruce/fir/aspen/mixed conifer; Ponderosa pine; Piñon-juniper/juniper savannah; Grassland/shrubland; Developed; Burned The TA-16-340 Complex, in general, is highly disturbed and consists primarily of bare soil and rock and/or roadways and regraded areas where removal actions have taken place. The dominant overstory vegetation type surrounding the complex is ponderosa pine, with minor vegetation components of fir (white and Douglas) and piñon. The understory contains mostly grasses and ruderal species indicative of disturbance, with a few shrubs and forbs.
Is T&E Habitat Present? **If applicable, list species known or suspected to use the site for breeding or foraging.**	There is no T&E habitat present at the site, per communication with LANL's Ecology Group (07/13/04) prior to the initiation of removal actions and sampling activities in 2005.
Provide list of Neighboring/ Contiguous/ Up-gradient sites, include a brief summary of COPCs and form of releases for relevant sites and reference map as appropriate. **(Use information to evaluate need to aggregate sites for screening.)**	Several sites near the TA-16-340 Complex have the potential to influence the TA-16-340 Complex. These sites are associated with World War II–era facilities and include the TA-16 Burning Ground and Material Disposal Area (MDA) P, the P-Site (TA-13) Firing Site, and the TA-16 Sanitary Wastewater Treatment Plant (Figure 2.1-1 in the investigation report).
Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water runon sources.**	Surface water assessments were conducted for the sites associated with the TA-16-340 Complex. Consolidated Unit 16-003(n)-99 received a score of 25, SWMU 16-003(o) received a score of 27.3, SWMUs 16-029(f) and 16-026(j2) received a score of 15.8, and Consolidated Unit 13-003(a)-99 received a score of 8.8. Low to moderate runoff is expected for those sites with erosion potential scores less than 16. For the two areas with high runoff potential [Consolidated Unit 16-003(n)-99 and SWMU 16-003(o)], the terminal point of runoff is in Fishladder Canyon to the north/northeast of the TA-16-340 Complex. Both Consolidated Unit 16-003(n)-99 and SWMU 16-003(o) are partially located along the steep slope into, and within, the Fishladder Canyon.

Part B—Site Visit Documentation

Site ID	**TA-16-340 Complex**
Date of Site Visit	**August 2008**
Site Visit Conducted by	**Kevin Reid**

Receptor Information:

Estimate cover	Relative vegetative cover (high, medium, low, none) **= low to medium** Relative wetland cover (high, medium, low, none) **= none** Relative structures/asphalt, etc., cover (high, medium, low, none) **= medium to high**
Field notes on the FIMAD vegetation class to assist in ground-truthing the Arcview information	The TA-16-340 Complex, in general, is highly disturbed and consists primarily of bare soil and rock and/or roadways and regraded areas where removal actions have taken place. The dominant overstory vegetation type surrounding the complex is ponderosa pine, with minor vegetation components of fir (white and Douglas) and piñon. The understory contains mostly grasses and ruderal species indicative of disturbance, with a few shrubs and forbs.
Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	Highly disturbed ecosystem. T&E habitat unlikely per LANL Ecology Group.
Are ecological receptors present at the site? **(yes/no/uncertain)** **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Yes. The vegetation at the site is mature and the habitat quality appears sufficient for supporting foraging and nesting by terrestrial receptors. The mesa top has large areas with exposed tuff outcrops, which indicates generally shallow soil across the mesa top, which would limit habitation by burrowing animals. The slopes to Fishladder Canyon have a greater percentage of successional/transitional plants than is found on the mesa top, indicating that disturbance events (probably erosion or runoff related to severe thunderstorms) impact the slopes. While vegetation does occur on the slopes, the habitat quality appears to be of lesser quality than the mesa top. Habitat quality was further impacted by removal action in 2008. The areas where removal activities have occurred are bare, though they were reseeded. Large mammals (elk and mule deer), small mammals (rabbits and mice), and birds were observed during field activities

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is low because of the relatively flat terrain (<10% slope). Surface water transport and erosion potential is considerably higher on the steep slopes. Runoff from the road was observed to discharge on the slope. Straw wattles were installed to control the flow. The terminal point of surface water transport is in Fishladder Canyon to the north/northeast 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. **Groundwater**: No. Depth to groundwater at the site (~1200 ft) precludes this transport pathway.
Interim action needed to limit off-site transport? **(yes/no/uncertain)** **Provide explanation/ recommendation to project lead for IA SMDP.**	Straw wattles were installed to limit movement and erosion potential of surface water. No other action recommended at the present time.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	Major disturbance from decontamination and demolition activities at the TA-16-340 Complex is primarily limited to the mesa top. Further disturbance was created on the hillslope during the 2008 removal action.
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 and recent removal activities at the site has impacted the habitat quality at the site. Though the area was reseeded after removal activities, new growth in the reseeded areas has not yet emerged. Where operations or removal activities did not appear to impact habitat quality, the vegetation at the site is mature and the habitat quality appears sufficient for supporting limited foraging and nesting by terrestrial receptors.
Interim action needed to limit apparent ecological effects? **(yes/no/uncertain)** **Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.**	Straw wattles were installed to limit movement and erosion potential of surface water. No additional removal actions are necessary.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include likelihood that future construction activities could make contamination more available for exposure or transport.

Not applicable.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature, rate and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. The previous (2005) and current (2008) sampling have defined the nature and extent of contamination at the TA-16-340 Complex.
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. The 2005 and 2008 investigations were designed to identify contamination from the TA-16-340 Complex via erosion or surface water transport at downgradient locations.

Part C—Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors via vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10^{-5} atm-me/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely.

Provide explanation:

VOCs were detected at trace levels.

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 from potential surface contamination is minimal at the TA-16-340 Complex. Dust exposure to burrowing animals is unlikely, however, because of the shallow soil on the mesa top (too shallow for significant burrowing activities to occur) and the highly disturbed, erosion-prone steep slopes at the remainder of the site (too unstable for burrows to be maintained).

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each PRS included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* Note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from the 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 via groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).**
- **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 groundwater is unlikely due to the depth of groundwater beneath the site (~1200) ft. Exposure to alluvial groundwater is possible at an intermittent seep, present down gradient in Fishladder Canyon. However, exposures are insignificant due to the intermittent nature of the seep.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **Suspected ability of contaminants to migrate to groundwater.**
- **The potential for contaminants to migrate via groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).**
- **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 groundwater is unlikely due to depth of groundwater beneath the site (~1200) ft. Surface discharge of deep groundwater does not occur at the site, although an intermittent seep is located downgradient in Fishladder Canyon.

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 the TA-16-340 Complex is limited to the near-surface soil and tuff and, thus, mass wasting does not contribute to the 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 respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of inhalation of vapors for burrowing animals.**
- **Foliar uptake of organic vapors is typically not a significant exposure pathway.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 1

Terrestrial Animals: 1

Provide explanation: VOCs are only present at trace levels the TA-16-340 Complex. Also, the shallow soil on the mesa top and the highly disturbed soil on the steep slopes limit burrowing activities and subsequent exposure to burrowing animals.

Question H:

Could airborne contaminants interact with plants through deposition of particulates or with animals through inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure via 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. Dust exposure to burrowing animals is unlikely because the shallow soil on the mesa top and highly disturbed soil on the steep slopes limit burrowing activities and subsequent exposure to burrowing animals. Exposure to contaminants in tuff is unlikely 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. Additionally, rain splash from surface soil could be deposited on the aboveground portions of plants.

Question J:

Could contaminants interact with receptors through food web transport from surficial soils?

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 3

Provide explanation: Bioaccumulating chemicals (as defined by the EPA's Persistent Bioaccumulative and Toxic Chemical Program) were detected in samples from the TA-16-340 Complex.

Question K:

Could contaminants interact with receptors via incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Foraging and grooming activities may result in exposure via incidental ingestion.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure via dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 1

Provide explanation: Exposure via dermal contact is possible for animals, but is unlikely because of the minimal amount of burrowing expected at the site and because organic chemicals detected in soil and tuff at the site are not considered 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: 0

Terrestrial Animals: 0

Provide explanation: COPCs are not gamma-emitting radionuclides.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 1

Provide explanation: No perennial surface water or sediment is present at the TA-16-340 Complex, although surface water is intermittently present downgradient in Fishladder Canyon.

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: 1

Provide explanation: No perennial surface water or sediment is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

Question P:

Could contaminants interact with receptors via 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: 1

Provide explanation: No perennial surface water or sediment is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

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: 1

Provide explanation: No perennial surface water or sediment is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

Question R:

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: COPCs are not gamma-emitting radionuclides.

Question S:

Could contaminants bioconcentrate in free floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: No perennial surface water is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

Question T:

Could contaminants bioconcentrate in sedimentary or water column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: No perennial surface water is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

Question U:

Could contaminants bioaccumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: No surface water is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma emitting radionuclides.**
- **The water column acts to absorb radiation, thus external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

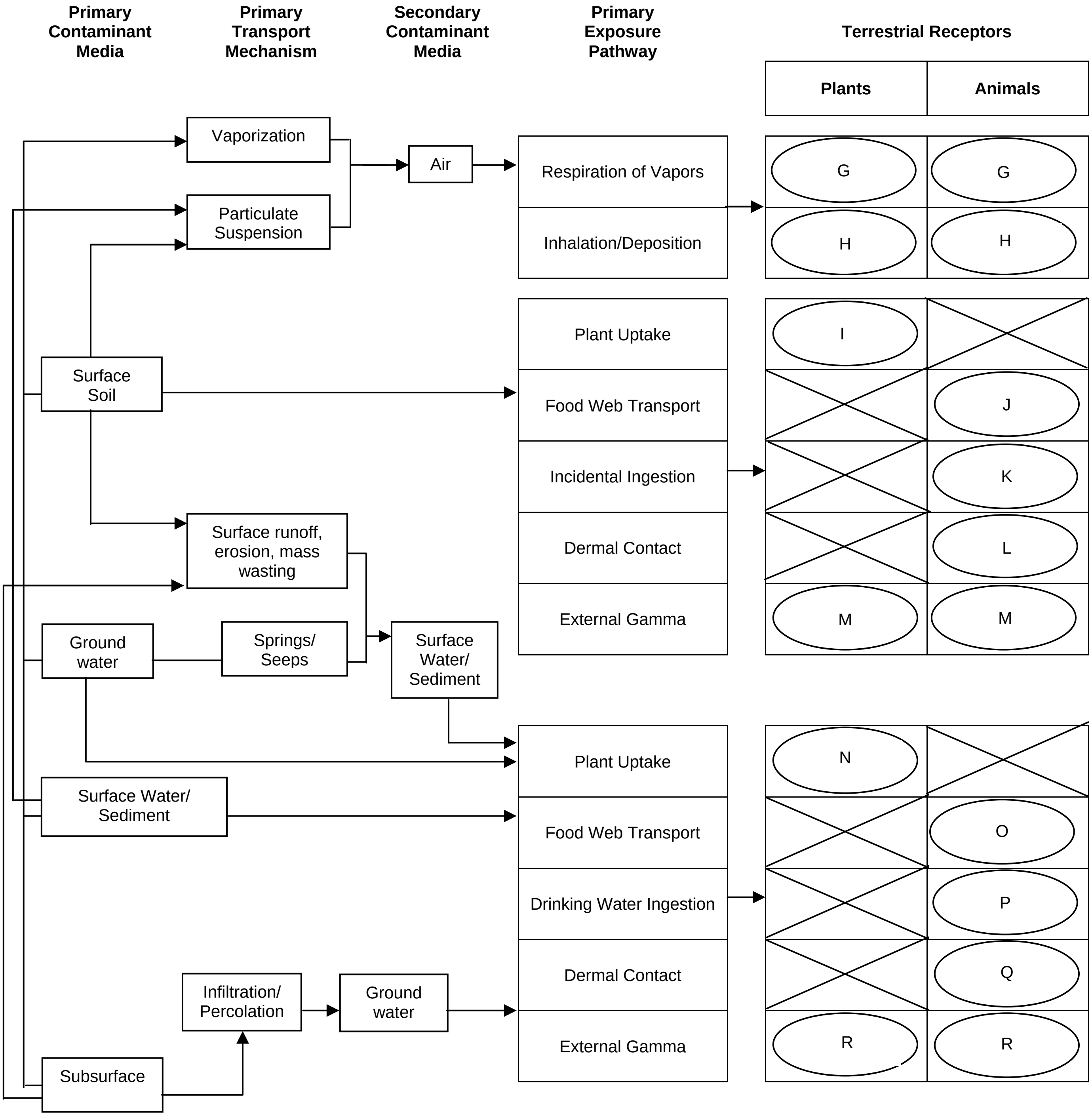
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: No surface water is present at the TA-16-340 Complex, although intermittent surface water is present downgradient in Fishladder Canyon.

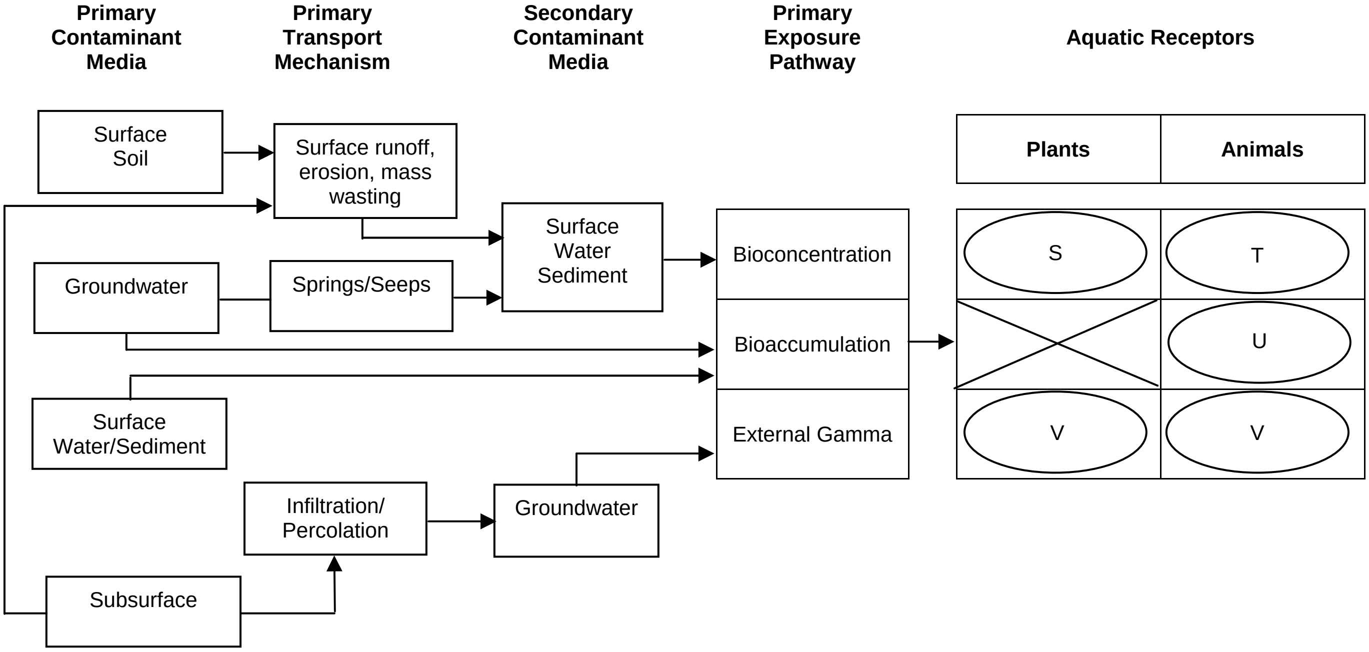
NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model



NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Kevin Reid
Name (signature): for KR.
Organization: TerranearPMC
Phone number: 505 412-3996
Date Completed: September 16, 2008

Verification by a member of EP Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): Richard Mirenda
Name (signature): Richard Mirenda
Organization: WES-EDA
Phone number: 505 665-6953

Attachment I-2

ProUCL Files
(on CD included with this document)

Appendix J

Waste Management

This appendix contains the waste management and disposal records for waste streams generated during the 2008 investigation of Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units (SWMUs) 16-003(o), 16-026(j2), and 16-029(f) at Technical Area 16 of Los Alamos National Laboratory. The waste characterization strategy form was prepared to address characterization approaches, on-site waste management, and final disposition options. A copy of the waste characterization strategy form and a copy of the New Mexico Environment Department (NMED) letter approving no longer contained in status are included as Attachment J-1. The waste profile forms are in progress, pending review and approval.

The types of waste generated, classification, and disposal dates from Consolidated Units 13-003(a)-99 and 16-003(n)-99 and SWMUs 16-003(o), 16-026(j2), and 16-029(f) during the 2008 investigation activities are outlined in Table J-1. Based on the waste characterization results, all waste was initially classified as nonhazardous, nonradioactive with the exception of (1) one rolloff container with excavated soil from SWMU 16-003(o); (2) four 1 yd^3 waste wrangler bags containing drill cuttings from SWMU 16-003(o); and (3) associated investigation-derived waste from excavation and drilling. These three waste streams were initially classified as hazardous waste based on trace concentrations of toluene. Following NMED approval of a contained-in request, the three waste streams were classified as nonhazardous waste because the waste was not a characteristic hazardous waste. In summary all solid media waste generated was nonhazardous nonradioactive. The only hazardous waste generated was a small volume (<1 L) of residual acetone waste from the high explosives (HE) field-screening analyses. All waste will be disposed of at an approved disposal facility following approval of the waste profile forms.

Table J-1
Waste Information

Container Barcode ID Number	Approx Weight (lb)	Approx Volume (yd^3)	Profile No.	Description	Classification	Date Disposed	Disposal Facility
10090937	34000	16	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive	Pending	Pending
10090939	34000	16	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive	Pending	Pending
10090940	34000	16	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10090938	34000	16	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive	Pending	Pending
10090935	34000	16	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive	Pending	Pending
10090936	17000	8	Pending	Excavated soil and tuff with residual HE	Nonhazardous/ nonradioactive	Pending	Pending
10054614	2500	1	Pending	Drill cuttings with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10054603	2500	1	Pending	Drill cuttings with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10054606	2500	1	Pending	Drill cuttings with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10054615	2500	1	Pending	Drill cuttings/contact waste with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10011947	50	0.02	Pending	Contact waste with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10054611	10	0.01	Pending	Contact waste with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10054684	10	0.01	Pending	Contact waste with residual HE	Nonhazardous/ nonradioactive contained in determination	Pending	Pending
10011955	2	0.01	Pending	Hazardous D-Tech RDX test kits with acetone	Hazardous—in a satellite storage area	Pending	Pending
Total	**197072**	**92.05**					

Attachment J-1

Waste Characterization Strategy Form and Approval Letter
(on CD included with this document)