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Investigation Report for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary

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May 2010

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EXECUTIVE SUMMARY

The Los Alamos National Laboratory Environmental Programs Directorate–Corrective Actions Program has investigated the Technical Area-49 (TA-49) sites inside the nuclear environmental site (NES) boundary. This investigation report presents the investigation activities at 10 solid waste management units (SWMUs) and areas of concern (AOCs). The SWMUs and AOCs are located in Area 1 [SWMU 49-001(a)]; Area 2, referred to as Material Disposal Area (MDA) AB [SWMUs 49-001(b, c, d, g)]; Area 3 [SWMU 49-001(e)]; Area 4 [SWMU 49-001(f)]; Area 11 [SWMU 49-003, AOC 49-008(c)]; and Area 12 [AOC 49-008(d)]. This investigation report also presents the sampling activities conducted in portions of Ancho and Water Canyons. AOC 49-009 has been approved for no further action by the U.S. Environmental Protection Agency and is not discussed in this report. Additionally, investigation of surface-soil contamination at AOC 49-008(c) is deferred per Table IV-2 of the Compliance Order on Consent; however, subsurface sampling was conducted at AOC 49-008(c) and the results are presented in this report.

A period of experimental activity at TA-49 took place from late 1959 to mid-1961. The hydronuclear and related experiments conducted at TA-49 deposited plutonium, uranium, lead, and beryllium in underground shafts. Areas 1, 2, 2A, 2B, 3, and 4 each contain subsurface test shafts used for underground hydronuclear safety, tracer, and containment experiments. Areas 2, 2A, and 2B are referred to as MDA AB. Area 11 is the site of a former radiochemistry laboratory, associated leach field, and subsurface test-shot area. Area 12 includes the former Bottle House and Cable Pull Test Facility.

Investigation activities were conducted between October 2009 and February 2010. The objective of the 2009–2010 investigation was to define the nature and extent of contamination at TA-49 sites inside the NES boundary, obtain general site characterization data for evaluation of remedial alternatives, and establish a long-term, site-specific monitoring network.

The 2009–2010 investigation activities included collection of 1778 surface and shallow subsurface soil samples from 889 locations for gross-alpha and -beta radiological screening. Of these screening samples, 852 samples from 465 locations were submitted for laboratory analysis. In addition to the surface sampling, 97 soil and tuff samples were collected from 30 boreholes with a maximum depth of 192 ft below ground surface. Data from the samples collected during the 2009–2010 investigation were combined with data collected from previous investigations completed between 1995 and 1998 that meet current Laboratory data quality requirements and are incorporated in this investigation report. Pore-gas samples were collected from at least one borehole at each area and analyzed for volatile organic compounds (VOCs) and tritium.

The extent of contamination has not been defined at Area 1 [SWMU 49-001(a)], MDA AB [SWMU 49-001(b, c, d, g)], Area 3 [SWMU 49-001(e)], Area 4 [SWMU 49-001(f)], Area 11 [SWMU 49-003, AOC 49-008(c)], and Area 12 [AOC 49-008(d)]. The data indicate that there are locally higher inorganic background concentrations for Quaternary unit 4 (Qbt 4) of the Tshirege Member of the Bandelier Tuff at TA-49. Additional sampling is necessary to define the lateral and vertical extent of one or more contaminants at each of the 10 sites and a Qbt 4 background dataset needs to be established for TA-49. The Laboratory will provide a Phase II investigation work plan to address the additional sampling and data analysis required to define extent at the sites identified in this report and to establish a Qbt 4 background dataset for TA-49. Once additional data are available and extent is defined, human health and ecological risk-screening assessments will be conducted to determine if the sites pose a potential unacceptable risk or dose to human health or the environment.

The VOC pore-gas data collected from TA-49 were compared with screening levels based on equilibrium partitioning of vapor with groundwater standards or screening levels to evaluate the potential for the

reported VOC concentrations to result in contamination of groundwater. Tritium pore-gas data were compared with the groundwater maximum contaminant level (MCL) for tritium. Pore-gas data indicate that VOCs in subsurface pore gas are not a potential source of groundwater contamination. Tritium activities in borehole 49-610481, located at Area 12, AOC 49-008(d), exceed the groundwater MCL for tritium and may represent a potential source of groundwater contamination. A vapor-monitoring well installation and sampling plan will be provided in the Phase II investigation work plan for TA-49.

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1.0 INTRODUCTION

This investigation report presents the 2009–2010 investigation of the Technical Area 49 (TA-49) sites inside the nuclear environmental site (NES) boundary at Los Alamos National Laboratory (LANL or the Laboratory) and presents a comprehensive assessment of current site conditions based on the results of this and previous investigations.

The Laboratory is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC. The Laboratory is located in north-central New Mexico, approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe (Figure 1.0-1). The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas that are separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 ft to 7800 ft above mean sea level (amsl). The eastern portion of the plateau stands 300 ft to 1000 ft above the Rio Grande.

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

This investigation report addresses SWMUs and AOCs inside the NES boundary within TA-49 at the Laboratory (Figure 1.0-1). These sites are potentially contaminated with hazardous chemicals and radionuclides. Corrective actions at the Laboratory are subject to the Compliance Order on Consent (the Consent Order). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with DOE policy.

1.1 General Site Information

The TA-49 sites inside the NES boundary consist of 11 SWMUs and AOCs, one of which has been approved for no further action (AOC 49-009) (Figure 1.1-1). The surface investigation at AOC 49-008(c) is deferred per Table IV-2 of the Consent Order; however, subsurface samples from boreholes were collected within AOC 49-008(c). Historical details of previous investigations and data for all 11 sites are provided in the historical investigation report (HIR) for the TA-49 sites inside the NES boundary (LANL 2007, 098492).

The remaining 10 SWMUs and AOCs were evaluated in the approved investigation work plan (LANL 2008, 102691). This investigation report presents the status and results from the 2009–2010 investigation activities conducted for the 10 sites, and recommendations for each site. The sites are subdivided into the following six areas according to their locations and operational histories:

- Area 1: SWMU 49-001(a), experimental shafts
- MDA AB:
    - Area 2: SWMU 49-001(b), experimental shafts
    - Area 2: SWMU 49-001(g), contaminated surface soil

    - Area 2A: SWMU 49-001(c), experimental shafts
    - Area 2B: SWMU 49-001(d), experimental shafts
- Area 3: SWMU 49-001(e), experimental shafts
- Area 4: SWMU 49-001(f), experimental shafts
- Area 11: SWMU 49-003 and AOC 49-008(c), leach field, associated drainlines, and an area of potential soil contamination
- Area 12: AOC 49-008(d), Bottle House, and Cable Pull Test Facility (CPTF)

Areas 2, 2A, and 2B are referred to as Material Disposal Area (MDA) AB. Table 1.1-1 lists the 11 TA-49 sites located inside the NES boundary, with a brief description, summary of previous investigations, and investigation activities conducted in the 2009–2010 investigation for each site.

1.2 Purpose of Investigation

The objectives of the investigation were to collect samples to define the nature and the lateral and vertical extent of surface and subsurface contamination for the sampled SWMUs and AOCs located at TA-49 inside the NES boundary, evaluate the potential for migration of contamination, obtain general site-characterization data for evaluation of remedial alternatives, and establish a long-term, site-specific monitoring network (LANL 2008, 102691).

1.3 Document Organization

This investigation report is organized in 16 sections with multiple supporting appendices. Section 1 includes an overview of the investigation and presents the document organization. Section 2 presents the scope of investigation activities, health and safety, waste management, and deviations from the 2008 investigation work plan. Section 3 presents the regulatory criteria. Section 4 presents a discussion of statistical data analysis and the local inorganic chemical background concentrations for Quaternary unit 4 (Qbt 4) of the Tshirege Member of the Bandelier Tuff. Section 5 presents an overview of the site characteristics and operational history of TA-49. Sections 6 through 12 present an overview of the site characteristics, operational history, results of previous investigations, field-investigation results, contamination based on the analytical results, and the nature and spatial distribution of contaminations. Section 13 presents conclusions based on applicable historical data as well as the 2009–2010 investigation data and summaries. Section 14 discusses recommendations for additional actions, if warranted. Section 15 presents a schedule for recommended activities. Section 16 includes a list of references cited in this report and the map data sources.

Appendices A through G present field documentation and associated information, the analytical data (on DVD), a quality assurance/quality control (QA/QC) review of analytical data, and supplemental reports. Appendix H presents box plots and results of statistical tests performed for inorganic chemicals. Appendix I presents a geochemical evaluation presented as scatter plots that assess the naturally higher inorganic chemical background concentrations of Qbt 4 at TA-49.

2.0 SCOPE OF ACTIVITIES

This section presents an overview of the field activities performed during the implementation of the TA-49 sites inside the NES boundary approved investigation work plan (LANL 2008, 102691). The field-investigation results and observations obtained from this investigation are presented in detail in sections 6 through 12 and in the supporting appendices.

2.1 Field Activities

The following subsections describe the scope of field activities for the 2009–2010 TA-49 investigation including geodetic surveys; field screening; surface and shallow-subsurface soil investigations; borehole drilling, sampling, and pore-gas sampling; health and safety monitoring; and waste management activities. Details regarding the field methods and procedures used to perform these field activities are presented in Appendix B.

2.1.1 Geodetic Survey

Before initiation of field activities, the locations of all subsurface shafts and structures were located and field verified. Surface expression of locations of disposal units and shafts were marked and a geodetic survey was performed. Geodetic surveys were also conducted before and upon completion of the drilling and surface-sampling campaigns to establish the spatial coordinates for all sampling locations and boreholes. Geodetic surveys were conducted using a Trimble 5700 differential global positioning system (DGPS). The survey data were collected by qualified personnel and conform to Laboratory Information Architecture project standards IA-CB02, "Geographical Information System, Horizontal Spatial Reference System," and IA-D802, "Geospatial Positioning Accuracy Standard for A/E/C and Facility Management." All coordinates are expressed as State Plane Coordinate System 83, New Mexico Central, U.S. ft coordinates and are presented in tables associated with each site and in Appendix C.

2.1.2 Field Screening

Core samples, drill cuttings, surface, shallow-subsurface, and sediment sample material were screened for gross-alpha and -beta radiation. Screening was performed using an Eberline E600 with either a 380AB or SHP360 probe (or equivalent) in accordance with the Laboratory's Standard Operating Procedure (SOP) 10.07, Field Monitoring for Surface and Volume Radioactivity Levels. The probe was held less than 1 in. away from the medium. Measurements were made by conducting a quick scan to find the location with the highest initial reading and then collecting a 1-min reading at that location to determine gross-alpha and -beta radiation levels. Soil and core material was sampled and logged only after radiological field-screening measurements were established so appropriate precautions could be taken, if necessary, before the sample was collected. Field personnel collected and recorded daily background measurements for gross-alpha and -beta radiation and recorded the measurements on borehole logs, sample collections logs, and in log books. Borehole logs are presented in Appendix D, and sample collection logs are presented in Appendix G.

All samples were submitted to the American Radiation Services, Inc. laboratory in White Rock, New Mexico and Port Allen, Louisiana for gross-alpha, -beta, and -gamma analyses prior to shipment by the Laboratory's Sample Management Office (SMO) to ensure compliance with U.S. Department of Transportation (DOT) requirements.

Surface samples from Areas 1, 3, 4, and 12, MDA AB, and the corridor locations were selected for off-site laboratory analysis based on the results of the gross-alpha and -beta results. Gross-alpha and -beta screening thresholds were established in the approved work plan (LANL 2008, 102691). If surface-sample results exceeded the screening thresholds for gross-alpha and/or -beta, samples were submitted for laboratory analyses. Details regarding the surface sampling and field screening process are presented in section 2.1.3 and in the approved work plan (LANL 2008, 102691).

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

Field-screening results were recorded on the borehole logs and/or corresponding sample collection logs, in the site safety offiicer's field notebook, and in the radiological control technician's (RCT's) field notes. Field-screening results, along with the physical characteristics of the core (e.g., contacts, elevated moisture, or staining), were considered when sampling intervals were selected and are presented on the borehole logs presented in Appendix D and sample collection logs in Appendix G.

2.1.3 Surface and Shallow-Subsurface Soil Investigation

A total of 1778 surface and shallow subsurface samples from 889 locations were collected for gross-alpha and -beta radiological screening in October, November, and December 2009 and January 2010 from Areas 1, 3, 4, and 12, MDA AB, the overland corridors, and sediment catchments within the western portion of Ancho and Water Canyons. This total includes 194 surface and shallow subsurface samples from 97 locations across Areas 1, 3, 4, and 12, MDA AB, and the corridor locations where stepout samples were collected. Of these screening samples, 852 samples from 465 locations were submitted for laboratory analysis. Surface and shallow-subsurface samples were collected in accordance with the approved investigation work plan (LANL 2008, 102691).

Extensive surface sampling was conducted at Areas 1, 3, 4, and 12 and MDA AB. The strategy for characterizing the nature and extent of surface contamination at these areas consisted of an iterative sampling approach that combined screening-level sampling with systematic and criteria-based biased laboratory analytical sampling. Surface samples were collected across a grid that extended a minimum of 100 ft from historical samples with detections of contaminants in excess of background values (BVs) or fallout values (FVs). Based on proximity to previously elevated concentrations, three categories of samples (Category I, II, and III) were established in each area. Category I samples are near the historical locations, Category II samples are located within 50 ft of the Category I samples, and Category III samples are located within 100 ft of the Category I samples. The locations of the 2009–2010 screening-level surface samples collected from Area 1, MDA AB (Areas 2, 2A, and 2B), and Areas 3, 4, and 12, and are presented in Figures 2.1-1 through 2.1-5, respectively. The sampling locations submitted for laboratory analyses and the analytical results are shown on plates in sections below.

All surface and shallow-subsurface samples were field screened for gross-alpha and -beta radiation and submitted for laboratory analysis as specified in the guidelines established in the approved work plan (LANL 2008, 102691). Laboratory samples were collected from pre-determined biased locations and at screening-level locations where either gross-alpha and/or -beta exceeded the established screening thresholds of 25 pCi/g or 50 pCi/g, respectively. If a Category III screening-level sample exceeded either screening threshold, additional stepout surface samples were collected until the field-screening results were below predefined thresholds.

Screening-level surface samples were placed in 1-gal. plastic bags and stored in a locked sample container pending analysis of field-screening results. All biased samples were immediately placed in appropriate sample containers and submitted for laboratory analysis of the following analytical suites:

radionuclides by gamma spectroscopy, americium-241, isotopic plutonium, isotopic uranium, and target analyte list (TAL) metals. For biased samples, if gross-beta exceeded 50 pCi/g, samples were also submitted for laboratory analysis of iodine-129, strontium-90, and technetium-99. For screening samples, if gross-alpha exceeded 25 pCi/g, samples were submitted for laboratory analysis by gamma spectroscopy, americium-241, isotopic plutonium, isotopic uranium, and TAL metals; if gross-beta exceeded 50 pCi/g, samples were also submitted for laboratory analysis of iodine-129, strontium-90, and technetium-99. The radiological-screening results that guided selection of samples for laboratory analyses are presented in Tables D-1 through D-42 in Appendix D.

Based on the gross-alpha and -beta radiation screening results, the following number of samples were submitted for laboratory analyses: 59 samples from 30 locations at Area 1; 44 samples from 22 locations at MDA AB; 77 samples from 47 locations at Area 3; 77 samples from 46 locations at Area 4; and 57 samples from 31 locations at Area 12. The locations of 2009–2010 screening-level surface samples collected at Area 1, MDA AB (Areas 2, 2A, and 2B), and Areas 3, 4, and 12 are presented in Figures 2.1-1 through 2.1-5, respectively. The sampling locations submitted for laboratory analyses are shown on plates in sections below. Surface and shallow-subsurface samples were collected from 0 to 0.5 ft and 0.5 to 1.5 ft below ground surface (bgs) at each location using the hand-auger method in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler.

A similar sampling strategy was used to sample the overland corridors that extend radially from Area 5 to Areas 1, 3, and 4 and MDA AB. The relationship of the overland corridors with the respective area and sampling locations is presented in Figure 1.1-1 and Figure 2.1-6. Before sampling, a walkover field survey was conducted and the corridors were mapped. A total of 147 sample locations were selected based on the results of the field survey. Discrete samples were collected from 0 to 0.5 ft and 0.5 to 1.5 ft bgs for gross-alpha and -beta screening and for submittal for laboratory analysis of radionuclides by gamma spectroscopy, americium-241, isotopic plutonium, isotopic uranium, and TAL metals. If gross-alpha or -beta results exceeded the screening thresholds, all adjacent 10-ft-grid locations were sampled. The grid was expanded based on screening results to ensure the complete characterization of the extent of contamination. The radiological-screening results that guided selection of samples for laboratory analyses are presented in Tables D-1 through D-42 in Appendix D. A total of 304 samples from 152 locations were collected from the overland corridors. Data from the samples collected in the overland corridors are presented with the associated SWMUs and AOCs at Areas 1, 3, and 4 and MDA AB. The sampling locations submitted for laboratory analyses and the analytical results are shown on plates in sections below.

Sediment from Ancho and Water Canyons was sampled to determine the nature and extent of contamination potentially transported from TA-49 SWMUs and AOCs into drainages and canyons downgradient of the sites within the NES boundary. To provide a snapshot of contaminant distribution within each drainage feature at TA-49, three samples were collected along a transect perpendicular to the direction of flow at each transect location. The sediment sampling locations in Ancho and Water Canyons are shown in Figure 2.1-7; the analytical results are shown on plates in sections below. A geomorphological survey of each drainage channel was conducted before sampling began to identify zones of sediment accumulation near each sampling location. Zones of fine-grained sediment were targeted. Discrete samples were collected from each location at depths of 0 to 0.5 ft and 0.5 to 1.5 ft bgs unless refusal was met atop tuff or boulders, and submitted for laboratory analysis of radionuclides by gamma spectroscopy, americium-241, isotopic plutonium, isotopic uranium, TAL metals, semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). All samples were collected using the hand-auger method in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler.

Standard QA/QC samples (field duplicates [FD] and rinsate samples) were collected in accordance with SOP-01.05, Field Quality Control Samples. All sample-collection activities were coordinated with the SMO. Upon collection, samples remained in the controlled custody of the field team until delivered to the SMO. Sample custody was then relinquished to the SMO for delivery to a preapproved off-site analytical laboratory.

A summary of the surface and shallow-subsurface screening and analytical samples collected as part of the 2009–2010 investigation of TA-49 sites inside the NES boundary and the requested analyses are presented in Table 2.1-1.

Specific details regarding the results of the field screening and subsequent sampling and laboratory analyses conducted at Areas 1 [SWMU 49-001(a)]; MDA AB [SWMU 49-001s(b, c, d, g)]; Area 3 [SWMU 49-001(e)]; Area 4 [SWMU 49-001(f)]; the associated overland corridors; Area 12 [AOC 49-008(d)]; and sediment samples collected from Ancho and Water Canyons are presented in sections 6 through 12.

2.1.4 Subsurface Investigation

The 2009–2010 subsurface investigation at TA-49 sites inside the NES boundary included the drilling and sampling of 30 boreholes. All boreholes were logged by a geologist to distinguish between geologic units, identifying surge beds, fractures, and/or moisture, if encountered. Following drilling, pore-gas samples were collected from several boreholes for analysis of VOCs and tritium. The details of these subsurface investigations are discussed below.

2.1.4.1 Borehole Drilling and Subsurface Sampling

A total of 97 samples were collected from 30 boreholes drilled to depths ranging from 10 to 192 ft bgs. Subsurface soil and rock samples were collected and analyzed to further characterize the extent of subsurface contamination at TA-49 sites inside the NES boundary. All boreholes were drilled using a Construction Mine Equipment 85 hollow-stem auger drill rig equipped with a split core barrel continuous core-sampling system. Four boreholes each were drilled at Areas 1, 3, and 4 and MDA AB; 12 boreholes were drilled at Area 11; and two boreholes were drilled at Area 12. The locations of boreholes drilled at Area 1, MDA AB (Areas 2, 2A, and 2B), and Areas 3, 4, and 12 are presented in Figures 2.1-1 through 2.1-5, respectively. The locations of boreholes drilled at Area 11 are presented in Figure 10.1-1. A summary of the boreholes drilled, samples collected, and requested laboratory analyses is presented in Table 2.1-2. The borehole logs are presented in Appendix D.

Samples were collected at target depth intervals based on criteria established in the approved work plan (LANL 2008, 102691). All sampled core material was placed in the appropriate sampling containers, labeled, documented, and preserved (as appropriate) for transport to the SMO. Samples were submitted for laboratory analysis of the following analytical suites: explosive compounds, perchlorate, TAL metals, cyanide, americium-241, isotopic plutonium, isotopic uranium, VOCs, and SVOCs.

Standard QA/QC samples (FDs and rinsate samples) were collected in accordance with SOP-01.05, Field Quality Control Samples. All sample-collection activities were coordinated with the SMO. Upon collection, samples remained in the controlled custody of the field team until delivered to the SMO. Sample custody was then relinquished to the SMO for delivery to a preapproved analytical laboratory.

2.1.4.2 Surge Beds and Fractures

The boreholes drilled during the 2009–2010 investigation encountered soil, fill, and units Qbt 4 and Qbt 3 of the Bandelier Tuff. The soil and/or fill ranged from a few in. to 3-ft thick. Qbt 4 and Qbt 3 lie beneath the soil and fill. Qbt 4 measures 60- to 80-ft thick at TA-49 and consists of poorly to moderately welded phenocryst-rich, ash-flow tuff characterized by the presence of relict pumice. Clay-filled fractures were encountered in the top of Qbt 4, rarely below 10 ft. The base of Qbt 4 is marked by a distinctive crystal-rich surge deposit. The surge bed that forms the base of Qbt 4 was recovered in many of the boreholes drilled during this investigation; however surge-bed material is loose, with a sand-like texture and is often not fully recovered using an open core barrel sampling system.

The surge bed consists of at least 50% phenocrysts in an ashy matrix and ranges in thickness between a few in. to approximately 2-ft thick. Surge-bed material was recorded in perimeter boreholes drilled at Areas 1, 3, 4, 11, and 12 and MDA AB. Surge-bed material was encountered at depths ranging from 61 to 65 ft bgs at Area 4 and 76 to 80 ft at the other areas. No moisture was noted in the surge-bed material recovered during this investigation. Underlying the surge bed is Qbt 3, which is characterized by partially welded ash-flow tuff with brown relict pumice in a matrix of ash, glass shards, and phenocrysts. Fractures were not encountered in Qbt 3. The results of the drilling indicate that fractures are relatively uncommon in tuff at TA-49 and are not likely to represent potential transport pathways for contamination. The surge bed beneath TA-49 is generally laterally continuous, but ranges in thickness across the site.

2.1.4.3 Pore-Gas Sampling

After completion of drilling and geologic logging, subsurface pore-gas samples were collected from analysis of VOCs and tritium in accordance with SOP-5074, Sampling for Sub-atmospheric Air. A total of 24 pore-gas samples were collected from discrete subsurface intervals using a single and/or double-packer assembly. A summary of the pore-gas samples collected and requested laboratory analyses is presented in Table 2.1-3.

The total depth (TD) pore-gas sample from each borehole was collected using a single inflatable packer. All subsequent pore-gas samples were collected using a straddle packer system that isolated a discrete 2-ft interval within the borehole. Prior to sampling, each interval was purged until measurements of carbon dioxide and oxygen were stable and representative of subsurface conditions. Subsurface pore-gas samples were collected in SUMMA canisters for VOC analysis and in silica gel samples for tritium analysis.

2.1.4.4 Neutron Logging of Borehole 49-02901

In lieu of drilling a 900-ft borehole in the center of MDA AB, subsurface moisture monitoring was conducted at borehole location 49-02901 (NMED 2009, 106420), located north of Area 2 and east of Area 12 (Figure 2.1-2). Borehole 49-02901 was drilled to a depth 700 ft bgs and remains open to 640 ft bgs. The moisture monitoring was conducted using a CPN 503 neutron probe attached to a winch line. Measurements were recorded bottom to top. A laptop was used to record the results as raw counts per second. The raw counts were converted to volumetric moisture (% moisture). Neutron-logging results presented as % moisture are shown in Figure 2.1-8.

2.1.4.5 Evaluation of Perched Groundwater Beneath MDA AB

In lieu of drilling a 900-ft borehole in the center of MDA AB, the presence of perched groundwater beneath MDA AB was evaluated using data collected during the drilling and installation of regional groundwater monitoring wells R-29 and R-30 (NMED 2009, 107002). Monitoring well R-29 is 1248 ft deep and located east of MDA AB in Area 10; monitoring well R-30 is 1196 ft deep and located south of MDA AB. Open-borehole video logging confirmed that perched groundwater is not present at monitoring wells R-29 or R-30. Based on the absence of perched groundwater at R-29 and R-30, it can be concluded that perched groundwater is not present beneath MDA AB or TA-49. Details regarding the drilling and installation of R-29 and R-30 will be presented in the well completion report for regional aquifer monitoring wells R-29 and R-30.

2.1.5 Borehole Abandonment

After NMED approval, boreholes will be abandoned in accordance with SOP-05.03, Monitoring Well and Borehole Abandonment. All boreholes will be abandoned with bentonite grout by filling upward from the bottom via tremie pipe to within 2 ft of the surface. After 24 to 48 h, the backfilled level will be checked for settling, and additional grout will be added as necessary. The remainder of each boring will be capped with Portland type I/II cement to surface grade. All boreholes that will not be utilized for moisture monitoring of vapor sampling will be abandoned.

2.1.6 Equipment Decontamination

Drilling and sampling equipment was decontaminated to minimize the potential for cross-contamination between sampling locations. Dry decontamination methods were used whenever possible and included using Fantastik paper towels, and brushes. Decontamination procedures followed SOP-1.08, Field Decontamination of Drilling and Sampling Equipment. All equipment, including survey equipment and heavy equipment such as backhoes, excavators, forklifts, drill rigs, etc., were screened by an RCT and released following DOT regulations before entering and exiting the site.

2.1.7 Health and Safety Measures

All 2009–2010 investigation activities were conducted in accordance with a site-specific health and safety plan, an integrated work document, and a radiological work permit that detailed work steps, potential hazards, hazard controls, and required training to conduct work. These health and safety measures included the use of level-D personal protective equipment (PPE) and field monitoring for VOCs and gross-alpha and -beta radiation.

A site-specific security plan was required by the facility operations oversight organization to work in TA-49. All field team members were trained to and adhered to the security requirements.

2.1.8 Waste Management

All investigation-derived waste (IDW) generated during the TA-49 investigation was managed in accordance with the IDW management plan in the approved work plan (LANL 2008, 102691) as well as applicable regulations and Laboratory SOPs. These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency (EPA) and NMED regulations. The SOP applicable to the characterization and management of IDW is SOP 5238, Characterization and Management of Environmental Project Waste.

The waste streams associated with the investigation included drill cuttings and core materials and contact IDW. Drill cuttings generated during drilling and sampling activities were placed in 1-yd^3 Wrangler Bags or 55-gal. drums and staged in an appropriate area for less-than-90-day waste storage. This waste stream was characterized in accordance with the approved waste characterization strategy form (WCSF). The drill cutting and discarded core waste stream are classified as non-hazardous. PPE and other contact waste were stored in a single 55- or 30-gal. drum. All drums were placed on pallets in appropriate less-than-90-day waste storage areas or satellite accumulation areas, pending characterization. As described in the WCSF, the contact IDW was characterized using knowledge of the waste-generating process and the levels of radioactive contamination encountered. Details regarding waste generated during the 2009–2010 investigation, including the WCSF and waste management and disposition, are presented in Appendix E.

2.2 Deviations

Deviations from the approved work plan (LANL 2008, 102691) occurred during the implementation of the TA-49 investigation.

Four samples from two locations within Area 2B [SWMU 49-001(d)] were not collected because of the presence of a wire-mesh biointrusion barrier that covers the surface.

Two surface-sampling locations within Area 12 [AOC 49-008(d)] were relocated approximately 10 ft north of their original location because they were within an archaeological site boundary. The samples were both Category III screening-level samples, did not exceed the screening-level thresholds, and were not submitted for laboratory analysis.

The approved work plan (LANL 2008, 102691) prescribed the drilling of one moisture-monitoring borehole in the center of Area 2 to a depth of 900 ft bgs. Per NMED's approval letter (NMED 2009, 107002), LANL performed a downhole video log of existing borehole 49-02901 (approximately 200 ft away from the proposed location) and determined that the existing borehole could be used for moisture-monitoring. Borehole 49-02901 was neutron logged and the results are presented in Figure 2.1-8.

The approved work plan (LANL 2008, 102691) prescribed the drilling of the 900 ft borehole to determine whether or not perched water was present at MDA AB. Per NMED's approval letter (NMED 2009, 107002), LANL used regional wells R-29 and R-30 to evaluate the presence of perched water.

3.0 REGULATORY CRITERIA

This section describes the criteria that will be used for screening chemicals of potential concern (COPCs) and for evaluating potential risk to ecological and human receptors when nature and extent are defined at the TA-49 sites. No COPCs were identified for the TA-49 sites inside the NES boundary because nature and extent of contamination are not defined for any of the sites. Regulatory criteria identified by medium in the Consent Order include cleanup standards, risk-based screening levels (SLs), and risk-based cleanup goals. The applicable soil-screening levels (SSLs) for inorganic and organic chemicals and screening action levels (SALs) for radionuclides at TA-49 sites inside the NES boundary are presented in the sample result tables.

The objective of the current investigation is to determine the nature and extent of contamination in soil, rock, and sediment at TA-49 and obtain general site characterization data for the evaluation of remedial alternatives. For each SWMU and AOC, the regulatory criteria and the data gathered during the investigation will be used to identify COPCs and their distribution in the environment and the resulting potential human and ecological risks when the nature and extent of contamination at the site are defined. The results of the data assessment as well as the risk-screening assessments confirm the physical location and extent of specific sites and determine if corrective actions at the site(s) are needed.

All analytical results obtained from samples collected during the 2009–2010 investigation, as well as relevant historical investigations, are reviewed for quality (Appendix F), and all data found to be validated to current standards for data usability are regarded as qualified data. Only qualified data are included in the final decision-level dataset used to characterize the nature and extent and evaluate potential risk associated with TA-49 SWMUs and AOCs inside the NES boundary.

3.1 Current and Future Land Use

The land use within TA-49 is currently industrial and is expected to remain industrial for the reasonably foreseeable future. The current institutional controls at TA-49 include a fence with a locked gate and security patrols of the area. These controls are expected to remain in effect throughout the institutional control period. When nature and extent are defined for the TA-49 sites and risk assessments are performed, a construction-worker scenario will be evaluated because maintenance or repair of underground utilities is a reasonable possibility in the foreseeable future. The residential scenario will also be evaluated per the Consent Order.

3.2 Human Health Screening Levels

Once nature and extent are defined for the TA-49 sites, human health risk-screening assessments will be conducted for the solid media at the TA-49 sites inside the NES boundary. The human health screening assessment will be performed on inorganic and organic COPCs using NMED SSLs (NMED 2006, 092513; NMED 2009, 108070) for the industrial, construction worker and residential scenarios. Radionuclides will be assessed using the Laboratory SALs (LANL 2005, 088493; LANL 2009, 107655). If an NMED SSL is not available for a COPC, the EPA regional SLs will be used and adjusted to a risk level of 10^{-5} for carcinogens (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm). If sufficient toxicity information is available and an SSL is not available, an SSL will be calculated. A surrogate SSL is used for some COPCs based on structural similarity or breakdown products. Applicable SSLs for inorganic and organic chemicals and SALs for radionuclides are presented in the data summary tables for each area.

3.3 Ecological Screening Levels

Once nature and extent are defined for the TA-49 sites, ecological risk-screening assessments will be conducted for the solid media at the TA-49 sites inside the NES boundary. The ecological screening levels (ESLs) are from the ECORISK Database, Version 2.4 (LANL 2009, 107524). The ESLs are based on similar species and are derived from experimentally determined no-observed-adverse-effect levels, lowest-observed-adverse-effect levels, or doses determined lethal to 50% of the test population. Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values are presented in the ECORISK Database, Version 2.4 (LANL 2009, 107524).

3.4 Cleanup Goals

The cleanup goals specified in the Consent Order are a target risk of 10^{-5} for carcinogens or a hazard index of 1 for noncarcinogens. The SLs described in section 3.2 are based on these cleanup goals, and per DOE, a dose of 15 mrem/yr for radionuclides (DOE 2000, 067489),. As specified in the Consent Order, the SLs will be used as cleanup levels unless determined to be impracticable or SSLs do not exist for current and reasonably foreseeable future land use.

3.5 Pore-Gas Screening Levels

The Consent Order does not identify any cleanup standards, risk-based SLs, risk-based cleanup goals, or other regulatory criteria for pore gas. For TA-49 pore-gas samples, a screening evaluation is provided comparing maximum concentrations of VOCs in pore gas with SLs. These SLs are based on equilibrium partitioning using the appropriate Henry's law constant with groundwater standards or SLs. This screening process evaluates the potential for the VOC concentrations to result in contamination of groundwater in excess of standards or SLs. There are no applicable standards or SLs for tritium in pore vapor, however the approved work plan (LANL 2008, 102691) prescribed comparison of tritium pore-gas data to the EPA groundwater maximum contaminant level (MCL) for tritium.

The analysis evaluated the groundwater concentration that would be in equilibrium with the maximum concentrations of VOCs detected at TA-49. The equilibrium relationship between air and water concentrations is described by the following equation.

$$C_{water} = C_{air} / H'$$ **Equation 3.5-1**

Where C_{water} = the volumetric concentration of contaminant in water,

C_{air} = the volumetric concentration of contaminant in air, and

H' = dimensionless form of Henry's law constant.

If the predicted concentration of a particular VOC in groundwater is less than the SL, then no potential exists for an exceedance of the groundwater standards or SLs at the contaminant/groundwater interface.

The screening evaluation is based on groundwater standards or tap water SLs and Henry's law constants that describe the equilibrium relationship between vapor and water concentrations. The source of the Henry's law constants is the NMED technical background document (NMED 2009, 106420) or the EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm). The following dimensionless form of Henry's law constant was used:

$$H' = \frac{C_{air}}{C_{water}}$$ **Equation 3.5-2**

Equation 3.5-2 can be used to calculate the screening value (SV):

$$SV = \frac{C_{air}}{1000 \times H' \times SL}$$ **Equation 3.5-3**

Where C_{air} = the concentration of a particular VOC in the pore-gas sample (μg/m^3),

H' = the dimensionless Henry's law constant,

SL = the screening level (μg/L), and

1000 is a conversion factor from L to m^3.

The SLs are the groundwater standards or tap water SLs. The groundwater standards are the EPA MCL or New Mexico Water Quality Control Commission (NMWQCC) groundwater standard, whichever is lower. If there is no MCL or NMWQCC standard, the NMED tap water SLs (NMED 2009, 108070) or the EPA regional tap water SLs, adjusted to 10^{-5} risk for carcinogens, are used (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm). The numerator in Equation 3.5-3 is the concentration of the VOC in pore gas, and the denominator represents the pore-gas concentration needed to exceed the SL. Therefore, if the SV is less than 1, the concentration of the VOC in pore gas does not exceed the SL, even if the VOC plume were to come in contact with groundwater. Table 3.5-1 presents the calculated concentrations of contaminants in pore gas corresponding to groundwater standards and tap water SLs.

Equation 3.5-3 was used to screen the maximum concentrations of VOCs detected in pore-gas samples from the investigation. Screening was performed for each of the VOCs detected in pore gas from samples collected at Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration (Table 3.5-2).

4.0 STATISTICAL METHODS OVERVIEW

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

4.1 Distributional Comparisons

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

The quantile test is better suited to assessing shifts of a subset of the data and determines whether more of the observations in the top 20% (chosen percentile) of the combined dataset come from the site dataset than would be expected by chance, given the relative sizes of the site and background datasets. If the relative proportion of the two populations being tested is different in the top 20% of the data than in the remainder of the data, the distributions may be partially shifted due to a subset of site data. This test is capable of detecting a statistical difference when only a small number of concentrations are elevated (Gilbert and Simpson 1992, 054952). The quantile test is the most useful distribution shift test, where samples from a release represent a small fraction of the overall data collected. The quantile test is applied at a prespecified quantile or threshold, usually the 80th percentile. The test cannot be performed if more than 80% (or, in general, more than the chosen percentile) of the combined data are nondetected values. It can be used when the frequency of nondetects is approximately the same as the quantile being tested. The quantile test is more powerful than the Gehan test for detecting differences when only a small percentage of the site concentrations are elevated.

The results (p-values) of the Gehan and quantile tests are used to evaluate if sample concentrations are similar or different from background levels. A sample will either pass (p-value greater than [>] 0.05) or fail (p-value less than [<] 0.05) the statistical tests. If the p-value is > 0.05, the site concentrations are not different from background levels, and if the p-value is < 0.05, the site concentrations are considered different from background levels.

Between the two tests (Gehan and quantile), most types of differences between distributions can be identified. Occasionally, if the differences between two distributions appear to occur far into the tails, the slippage test might be performed. This test evaluates the potential for some of the site data to be greater than the maximum concentration in the background dataset if, in fact, the site data and background data came from the same distribution. This test is based on the maximum observed concentration in the background dataset and the number (n) of site concentrations that exceed the maximum concentration in the background set (Gilbert and Simpson 1990, 055612, pp.5-8). The p-value of the slippage test is the probability that n site samples (or more) exceed the maximum background concentration by chance alone. The test accounts for the number of samples in each dataset (number of samples from the site and number of samples from background) and determines the probability of n (or more) exceedances if the two datasets came from identical distributions. This test is similar to the BV comparison in that it evaluates the largest site measurements, but is more useful than the BV comparison because it is based on a statistical hypothesis test, not simply on a statistic calculated from the background distribution.

4.1.1 Graphical Representation

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

The box plots produced in this report consist of a box, a line across the box, whiskers (lines extended beyond the box and terminated with a short perpendicular line), and points outside the whiskers. The box area of the plot is the region between the 25th percentile and the 75th percentile of the data, the interquartile range or middle half of the data. The horizontal line within the box represents the median (50th percentile) of the data. The whiskers extend to the most extreme point that is not considered an outlier, with a maximum whisker length of 1.5 times the interquartile range, outside of which data may be evaluated for their potential to be outliers. The concentrations are plotted as points overlying the box plot. When a dataset contains both detected concentrations and nondetected concentrations reported as DLs, the detected concentrations are plotted as an X, and the nondetected concentrations are plotted as an O. Box plots are presented in Appendix H.

4.2 TA-49 Qbt 4 Inorganic Chemical Background Values

The extensive surface-sampling investigation prescribed by the approved work plan (LANL 2008, 102691) produced a total of 47 surface (0.0 to 0.5 ft bgs) and shallow subsurface (0.5 to 1.5 ft bgs) samples from tuff, specifically Qbt 4. Typically, the media sampled and analyzed during a surface-sampling investigation at the Laboratory consists of soil/fill, and/or sediment with very few tuff samples. Qbt 4 crops out only in the western part of the Laboratory and a dataset of this magnitude consisting of Qbt 4 samples collected from the surface and shallow subsurface is unique to this investigation.

As described in detail in section 4.1 of this report, inorganic chemical data are compared with Laboratory BVs (LANL 1998, 059730) to determine if site data are elevated with respect to background as an indicator of possible site contamination. The Laboratory BVs used for comparison to Qbt 4 site data are the Qbt 2, Qbt 3, and Qbt 4 BVs (LANL 1998, 059730). Multiple inorganic chemicals are consistently elevated above BVs in Qbt 4 samples collected across TA-49 based on straight comparisons with the Qbt 2, Qbt 3, and Qbt 4 BVs. Specifically, 11 inorganic chemicals (aluminum, arsenic, barium, calcium, cobalt, copper, lead, manganese, nickel, selenium, and vanadium) typically exceed the respective Qbt 2, Qbt 3, and Qbt 4 BVs, and frequently exceed the maximum concentration in the background dataset.

The dataset used to calculate the Qbt 2, Qbt 3, and Qbt 4 BVs consisted of a total of 64 samples; however, only 3 of the 64 samples were collected from Qbt 4 (LANL 1998, 059730). Bulk rock chemical compositions of Qbt 4 (based on data from borehole 49-2-700-1 at TA-49) are significantly different from other units of the Tshirege Member of the Bandelier Tuff (Stimac et al. 2002, 073391). Further, the major element abundances in Qbt 4 are more variable compared to other units of the Otowi and Tshirege Members of the Bandelier Tuff (Stimac et al. 2002, 073391). Unit Qbt 4 is less quartz-rich than other Bandelier Tuff units and shows a significant decrease in the quartz-to-alkali feldspar ratios. Qbt 4 is also higher in barium, iron oxide, and titanium oxide. In addition, smectite is slightly more abundant at the top of Qbt 4 than in other units and may reflect post-Bandelier soil development (Stimac et al. 2002, 073391). A subset of chemical data collected from borehole 49-2-700-1 (Stimac et al. 2002, 073391) is presented in Figure I-1 of Appendix I.

Due to the underrepresentation of Qbt 4 in the BV dataset and Qbt 4's unique geochemistry, the Qbt 2, Qbt 3, and Qbt 4 BVs may not be suitable for comparison with TA-49 Qbt 4 investigation sample data. Comparison of site data with the Laboratory-wide Qbt 2, Qbt 3, and Qbt 4 BVs is unlikely to effectively distinguish between a naturally high Qbt 4 inorganic chemical concentration at TA-49 and site contamination, and such comparisons will tend to indicate possible contamination even at locations that have not been impacted by site operations.

In order to enhance the identification of possible site contamination at TA-49 and to account for the locally higher inorganic chemical BVs in Qbt 4, a simple geochemical evaluation was conducted. Scatter plots of Qbt 4 site data (including the 47 surface and shallow subsurface samples and the 46 subsurface samples collected from 1.5 to 80 ft bgs) using aluminum as the reference element were constructed for the 11 metals consistently detected above the Qbt 2, Qbt 3, and Qbt 4 BVs. Scatter plots are commonly used to evaluate the association between two variables (in this case inorganic chemicals) and provide a graphical display of the relationship between them. The relatively large dataset collected from Qbt 4 as part of the TA-49 investigation provided a unique opportunity to perform this type of analysis. As indicated above, 93 Qbt 4 samples were included in this evaluation; this is comparable in size to the entire Laboratory-wide BV dataset for Qbt 2, Qbt 3, and Qbt 4 (64 samples).

Geochemical evaluations of metals are based on known associations between trace elements and the major elements, such as aluminum and iron that are dominant in soil-forming minerals. Geochemical correlations of trace versus major elements are based on the behavior of the major and trace elements undergoing geochemical processes during rock formation and subsequent alteration in the environment. These natural elemental associations are used to distinguish between process-added versus naturally high background concentrations (Myers and Thorbjornsen 2004, 109472). Linear trends with positive slopes are expected for scatter plots of specific trace elements versus major elements in uncontaminated samples. Individual samples that may contain a component of contamination are identified by their positions off the trend (outliers) formed by uncontaminated samples.

The scatter plots for aluminum, arsenic, barium, calcium, cobalt, copper, lead, manganese, nickel, selenium, and vanadium detected in Qbt 4 samples from TA-49 are presented in Figures I-2, I-3, and I-4, in Appendix I. The Qbt 4 data collected from TA-49 are presented on the plots as blue diamonds. For comparison, the Qbt 2, Qbt 3, and Qbt 4 BVs and maximum background concentrations are presented as horizontal red lines. The scatter plots show that concentrations of barium, cobalt, nickel, and vanadium increase with increasing concentrations of aluminum in a linear trend with a positive slope. Similar correlations are apparent for the other inorganic chemicals including arsenic, calcium, copper, lead, and manganese. The scatter plot for selenium does not show a geochemical relationship with aluminum; however, the plot does show that detected concentrations of selenium are consistent across the site and outliers are not observed. Aluminum was plotted using iron as the reference metal.

The evident trends in the TA-49 data indicate a geochemical relationship between aluminum and the inorganic chemical of interest and not site contamination for most of the Qbt 4 samples collected during the 2009–2010 investigation. The scatter plots demonstrate that many of the TA-49 investigation sample results that are consistent with the linear trend are elevated above the Laboratory-wide Qbt 2, Qbt 3, and Qbt 4 BVs, indicating that the Qbt 2, Qbt 3, and Qbt 4 BVs are not suitable for comparison to site data. Although, the comparison of these 11 inorganic chemicals to the Qbt 2, Qbt 3, and Qbt 4 background dataset is retained in tables and on plates presented throughout the text, comparison of these 11 inorganic chemicals with the Qbt 2, Qbt 3, and Qbt 4 background dataset is not presented in the discussion of nature and extent. Instead, the scatter plots presented in Appendix I are used for identifying elevated concentrations of these inorganic chemicals in Qbt 4.

Inorganic chemical outliers in Qbt 4 are evident on the scatter plots. The outliers fall outside the linear trend and likely indicate concentrations that are elevated with respect to the local background, and are possible site contaminations. Sample analytical results that fall within the linear trend are consistent with local site background and an analysis of the spatial distribution of these inorganic chemicals are not presented at this time. The nature and extent of contamination for all inorganic chemical outliers in Qbt 4 are discussed in detail with the appropriate AOC or SWMU. Inorganic chemical outliers were observed in Qbt 4 samples collected from MDA AB, SWMU 49-001(e), SWMU 49-001(f), and AOC 49-003.

5.0 TA-49 BACKGROUND

This section provides a general description of TA-49, operational history, and the current surface and subsurface conditions at the site. Specific details including site descriptions and a summary of previous investigations for Area 1 [SWMU 49-001(a)], MDA AB [SWMUs 49-001(b, c, d, g)], Area 3 [SWMU 49-001(e)], Area 4 [SWMU 49-001(f)], the associated overland corridors; Area 11 [SWMU 49-003, AOC 49-008(c)] ; Area 12 [AOC 49-008(d)]; and the sediment sampling in Ancho Canyon and Water Canyon are presented in sections 6 through 12.

5.1 Site Description and Operational History

5.1.1 Description of TA-49

TA-49, also known as the Frijoles Mesa site, occupies approximately 1280 acres along the south-central boundary of the Laboratory (Figure 1.0-1). The mesa is centrally located on the Pajarito Plateau at an average elevation of approximately 7140 ft amsl. The plateau is roughly midway between the Jemez Mountains to the west and the White Rock Canyon of the Rio Grande to the east. TA-49 is located within the Ancho, North Ancho, and Water Canyon watersheds. The northern boundary of TA-49 is defined by the edge of the Frijoles Mesa, which overlooks Water Canyon, and forms the southern boundaries of TA-15 and TA-37. State highway, NM 4, forms the southwest boundary of TA-49 as well as the Laboratory’s boundary. The southeast boundary of TA-49 is formed by TA-39.

A period of experimental activity at TA-49 took place from late 1959 to mid-1961, during which hydronuclear and related experiments deposited plutonium, uranium, lead, and beryllium in underground shafts. These experiments were conducted in subsurface shafts located at MDA AB (Areas 2, 2A, and 2B) and Areas 1, 3, and 4. Thirty-five hydronuclear experiments and nine related calibration, equation-of-state, and criticality experiments, all involving some fissile material, were conducted in 3-ft- or 6-ft-diameter shafts at depths ranging from 31 ft bgs to 108 ft bgs (Purtymun and Stoker 1987, 006688, p. 2).

Areas 1, 3, and 4 and MDA AB each contain subsurface test shafts used from 1959 to 1961 for underground hydronuclear safety, tracer, and containment experiments. The test shafts drilled for hydronuclear safety experiments were 6 ft and 3 ft in diameter and from 31 ft bgs to 108 ft bgs. The shafts in Areas 1, 3, and 4 and MDA AB are located in a grid pattern with 25-ft spacing on center. The design of the experimental layout was based on preliminary tests that indicated that the explosive tests would not disperse radioactive material beyond a 15- to 20-ft radius centered on the shaft in the subsurface (LANL 2007, 098492).

The test shot was encased in lead and accounts for the largest mass of all the contaminants. Iron and steel cable, aluminum materials, and piping associated with the test shots are also in the shafts. Radioactive materials used in the downhole testing included plutonium, uranium-235, and uranium-238. Since 1961, the shafts have been inactive except for monitoring and maintenance activities associated with the concrete pads located over the shots (LANL 2007, 098492).

Area 11 is the site of a former radiochemistry laboratory, associated leach field, and subsurface test-shot area. Area 12 includes the former Bottle House and CPTF. Sporadic and noncontinuous areas of surface soil contaminated with hazardous and radioactive materials have historically been associated with each area.

The location of TA-49 is shown in Figure 1.0-1, and the location of each TA-49 SWMU and AOC including those outside the NES boundary is presented in Figure 1.1-1.

5.1.2 TA-49 Operational History

This section summarizes historical operations at TA-49.

Before 1959, the Laboratory recognized there were potential safety problems with nuclear weapons in the nation's stockpile. These problems were related to the possibility of a significant nuclear yield because of accidental detonation of the device's high explosive (HE) component. The possibility of detonation during the assembly stage or while the device was stored in the arsenal necessitated the design and implementation of underground experiments to assess this potential problem. Historical aspects of the decision to conduct the experiments are described in a Laboratory report (Thorn and Westervelt 1987, 006672, p. 1-3).

The favorable environmental setting of Frijoles Mesa, combined with its relatively remote location and the flat terrain that afforded desirable operational characteristics, led to selection of the Frijoles Mesa site for the experiments. In fall 1959, TA-49 was created on Frijoles Mesa and underground experiments were conducted through August 1961. The central portion of TA-49 was devoted to the site of the underground experiments conducted in Areas 1, 3, and 4 and MDA AB (Figure 1.1-1). These areas are described in the HIR and investigation work plan for the sites within the NES boundary (LANL 2007, 098492; LANL 2008, 102691).

Since the hydronuclear experiments ceased in summer 1961, TA-49 has been used lightly and sporadically (DOE 1987, 008663). In 1965, a Laboratory group studying atmospheric phenomena conducted lightning observation experiments using the photographic tower that remained in Area 5. The primary historical use of TA-49 as a buffer zone for activities at adjacent firing sites (TA-15 and TA-39) is expected to continue indefinitely according to the Laboratory's "Ten-Year Comprehensive Site Plan" (LANL 2001, 070210).

Currently, there are only a few small-scale, on-site uses of TA-49. The Laboratory's High-Power Microwave Group occasionally uses the day room in building 49-115 and its immediate vicinity for equipment development and the roadway between Areas 10 and 12 as a microwave test range. The Laboratory's Hazardous Devices Team (HDT) uses the HDT training facility, building 49-113 and the associated HE magazine building 49-114 for small-scale explosives training exercises.

Building 49-113 also houses the Laboratory's Alternate Emergency Operations Center. This facility is equipped with extensive communications systems and computers. The Laboratory conducts electrical grounding measurements in a small area immediately west of the HDT's training facility.

The Laboratory also maintains the Bandelier Meteorological Station in the southeast portion of TA-49 as part of its network of meteorological stations (LANL 1992, 007670, p. 3-12).

5.2 Site Conditions

5.2.1 Soil and Topography

Soil at Areas 1, 3, 4, 11, and 12 and MDA AB has been disturbed. The soil was originally composed of Hackroy Series and Eutroboralf soil. The soil is intermixed with patches of bedrock, which occurs predominantly near the edges of the mesa east of the TA-49 areas.

Hackroy soil is classified as Alfisols and is described in "Soil Survey of Los Alamos County, New Mexico" as follows: "The surface layer of the Hackroy soil is a brown sandy loam, or loam, about 10 cm thick. The subsoil is reddish brown clay, gravelly clay, or clay loam about 20 cm thick. The depth to tuff bedrock and effective rooting depth is 20 to 50 cm." (Nyhan et al. 1978, 005702).

The fine-loamy Typic Eutroboralf soil consists of deep, well-drained soil formed in material weathered from tuff on nearly level to gently-sloping mesa tops. The surface layer is a very dark, grayish-brown loam, sandy loam, or very fine sandy loam, about 5-cm thick. The subsoil is a brown loam over a clay loam about 55-cm thick. The substratum is a brown, gravelly clay loam over reddish clay that may or may not contain pumice. Permeability is considered moderately slow (Nyhan et al. 1978, 005702, p. 32).

The sites within the NES boundary are located in the center of TA-49 where the topography is quite flat; therefore, surface-water runoff and soil erosion are minimal. No perennial sources of water at or near the site exist. No established runoff channels exist and surface water is expected to occur as sheet flow during strong rainfall events or rapid snowmelt. Run-on control is provided by drainage ditches along the roads within TA-49 (LANL 2007, 098492).

5.2.2 Surface-Water Conditions

Most Los Alamos surface water occurs as ephemeral (flowing in response to precipitation), intermittent (flowing in response to availability of snowmelt or groundwater discharge), or interrupted (alternation of perennial, ephemeral, and intermittent stretches) streams in canyons cut into the Pajarito Plateau (Nylander et al. 2003, 076059.49, p. 4-1).

Runoff and infiltration are the critical components that influence the surface hydrology at TA-49. These mechanisms are the predominant pathways by which contaminants could be mobilized and transported from the site.

There is no current evidence of a hydraulic connection between the surface water and groundwater at TA-49. There are no perennial sources of water at TA-49 and there is no current evidence of a hydraulic connection between the surface-water and groundwater (Weir and Purtymun 1962, 011890; Purtymun and Ahlquist 1986, 014722).

5.2.2.1 Surface-Water Runoff

Surface-water runoff control is provided by drainage ditches along the roads within TA-49. Surface-water runoff potentially carries contaminants and drains off-site. The direction of surface-water runoff from Frijoles Mesa flows northward into Water Canyon, eastward into a tributary canyon to Ancho Canyon, or southward into Ancho Canyon (LANL 2007, 098492).

Runoff from summer storms on the Pajarito Plateau typically reaches a maximum discharge in less than 2 h and has duration of less than 24 h (Purtymun et al. 1980, 006048). When the discharge rate is high, runoff can carry large masses of suspended and bed-load sediment as far as the Rio Grande. Spring snowmelt occurs at a much less intense rate (e.g., over a period of several weeks to months). This lower flow rate also results in the movement of sediment, but with less surface erosion than during the summer storms. The Ancho Canyon and Water Canyon reaches that are downgradient of TA-49 experience ephemeral flow caused by runoff during the intense summer storms and snowmelt events.

5.2.2.2 Surface-Water Quality

Surface-water quality data have been collected for approximately 30 yr at the Beta borehole surface water station in Water Canyon (about 2000 ft north of MDA AB), in Water and Ancho Canyons at NM 4, and sporadically in drainages leading from MDA AB following intense rainfall events. No contamination of surface water at these locations by TA-49 contaminants has been identified in the 30 yr of monitoring (LANL 1992, 007670, p. 4-45; LANL 2006, 093925).

5.2.2.3 Surface-Water Infiltration

Surface-water infiltration provides a potential mechanism for contaminants to move into the subsurface (LANL 1992, 007670, p. 4-13). Surface-water infiltration studies conducted at Pajarito Canyon have indicated that infiltration through mesa-top soil into the tuff is not significant (LANL 2007, 098492). Surface-water infiltration pathways at TA-49 include native or disturbed soil, intact tuff, backfilled shafts, and fracture systems and boreholes.

Evapotranspiration (ET) processes limit the transfer of water to the Bandelier Tuff. The characteristics of the tuff (naturally low-moisture content and high porosity) provide a large storage capacity for infiltrating fluid and likely inhibit infiltrating liquid from penetrating the thick unsaturated zone at TA-49 (LANL 1992, 007670, p. 4-14).

5.3 Subsurface Conditions

This section provides a description of the geology and hydrogeology encountered at TA-49.

5.3.1 Geology

TA-49 lies on the east side of the Jemez Mountain's volcanic field and on the western perimeter of the Española Basin of the Rio Grande rift. The bedrock at or near the surface of the mesa top are composed entirely of the Bandelier Tuff (LANL 1992, 007670, p. 4-33).

The stratigraphy of TA-49 was originally mapped in 1959 using three deep-test wells (DT-5A, DT-9, and DT-10) and four core holes (CH-1, CH-2, CH-3, and CH-4). The Tshirege Member of the Bandelier Tuff is approximately 595- to 670-ft-thick beneath TA-49. Underlying the Tshirege Member is approximately 200 ft of the Otowi Member of the Bandelier Tuff.

In 1994, a 700-ft-deep borehole (location 49-02901) was drilled southeast of Area 2 to provide supplemental information to the geologic map of TA-49 (Stimac et al. 2002, 073391, p. 1). Geologic field observations confirm that the exposed bedrock at TA-49 is restricted to units of the Tshirege Member of the Bandelier Tuff. Below the Tshirege Member in descending order are the Tsankawi Pumice Bed, tephras and volcaniclastic sediment of the Cerro Toledo interval, and the Otowi Member of the Bandelier Tuff.

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

The Tshirege Member is the upper member of the Bandelier Tuff and is the most widely exposed bedrock unit of the Pajarito Plateau (Griggs and Hem 1964, 092516; Smith and Bailey 1966, 021584; Bailey et al. 1969, 021498; Smith et al. 1970, 009752). Emplacement of this unit occurred during eruptions of the Valles Caldera approximately 1.2 million yr ago (Izett and Obradovich 1994, 048817; Spell et al. 1996, 055542). The Tshirege Member is a multiple-flow, ash-and-pumice sheet that forms the prominent cliffs in most of the canyons on the Pajarito Plateau. Time breaks between the successive emplacements of flow units caused the tuff to cool as several distinct cooling units. For this reason, the Tshirege Member consists of at least four cooling subunits that display variable physical properties vertically and horizontally (Smith and Bailey 1966, 021584; Crowe et al. 1978, 005720; Broxton et al. 1995, 050121). From youngest to oldest the subunits are Qbt 4, Qbt 3, Qbt 2, Qbt 1v, and Qbt 1g. Qbt 4 is exposed on the surface or near surface at TA-49. The consolidation in this member is largely from compaction and welding at high temperatures after the tuff was emplaced. Its light brown, orange-brown, purplish, and white cliffs have numerous, mostly vertical fractures that may extend from several feet up to several tens of feet.

The Tshirege Member includes thin but distinctive layers of bedded, sand-sized particles called surge deposits that demark separate flow units within the tuff. Surge beds within the Bandelier Tuff are of particular interest with respect to the TA-49 subsurface hydrological conceptual model. A pyroclastic surge bed is found at a depth of about 60 ft bgs in core hole CH-2. Surge beds tend to have a higher permeability than the surrounding tuff and may act as a capillary barrier, inhibiting downward transport of contaminants and promoting lateral flow, and potentially acting as a perching layer. For that reason, boreholes drilled through this surge bed are particularly important when searching for perched water.

At least 21 boreholes and 30 test shafts penetrate the surge bed layer located at approximately 60 ft bgs between Qbt 4 and Qbt 3. No perched water was encountered at the surge bed layer within these boreholes and test shafts.

The Tshirege Member is underlain by the Otowi Member. It consists of moderately consolidated (indurated), porous, and nonwelded vitric tuff (ignimbrite) that forms gentle colluvium-covered slopes along the base of canyon walls. The Otowi ignimbrites contain light gray to orange pumice that is supported in a white to tan ash matrix (Broxton et al. 1995, 050121; Broxton et al. 1995, 050119; Goff 1995, 049682). The ash matrix consists of glass shards, broken pumice, and crystal fragments, and fragments of perlite.

Below the Otowi Member are interbedded Puye Formation conglomerates and basalts that sit atop the undivided siltstones and sandstones of the Santa Fe Group.

5.3.2 Groundwater Conditions

The subsurface hydrology at TA-49 is dominated by unsaturated conditions. The top of the regional saturated zone occurs approximately 1170 ft bgs near the center of MDA AB at deep test well DT-5A. The upper 800 ft of the unsaturated zone is within the Bandelier Tuff (LANL 1992, 007670, p. 4-18).

Relatively small volumes of water move beneath the mesa tops of the Pajarito Plateau under natural conditions, due to low rainfall, high evaporation, and efficient water use by vegetation. During wetter years, vegetal growth is enhanced and is capable of removing larger volumes of available moisture. Atmospheric evaporation may extend within the mesas, further inhibiting downward flow (Rogers and Gallaher 1995, 097569, p. 27). Water content in the unsaturated zone within the tuff has been measured monthly or bimonthly in the unsaturated zone since 2000. It tends to range between 5% and 10% by volume under natural conditions (LANL 2005, 092389, pp. A-1-A-6).

Water content measured at locations within the boundary of the ET cover and the former asphalt pad at MDA AB is slightly higher, ranging from 5% to 20% by volume (LANL 2005, 092389, pp. A-3–A-6). Continuous moisture monitoring of the near-surface cover material at Area 2 shows that seasonal impulses of water are readily removed in the spring and summer when ET is maximized (LANL 2007, 098492).

5.3.2.1 Alluvial Groundwater

Surface-water infiltration creates small, localized saturated zones in the alluvial fill of the canyon bottoms of Pajarito Plateau (LANL 1992, 007670, p. 4-21). Water infiltrates through the alluvium until it reaches less-permeable layers that slow or impede flow. The size of the perched water zones are affected by the rate of ET and the movement of water into underlying rock.

In 1990, three shallow monitoring wells were installed in Water Canyon downgradient of TA-49. No perched water zones were encountered during drilling activities. Springs and seeps are known to occur in the lower reaches of Water and Ancho Canyons, far downgradient of TA-49 (near the Rio Grande), but none have been identified within the boundaries of TA-49 (LANL 2007, 098492).

Lateral groundwater flow occurs between stratigraphic permeability barriers within the Bandelier Tuff. Lateral discharges from canyon walls or canyon bottoms could provide a potential for contaminant transport. However, this is not plausible, given the current average annual rainfall and infiltration quantities seen at TA-49 (LANL 1992, 007670, p. 4-21).

5.3.2.2 Perched Intermediate Groundwater

The three test wells (DT-5A, DT-9, DT-10) and other boreholes drilled within TA-49 have not indicated the presence of perched water in tuff or volcanics above the regional aquifer despite the presence of potential perching beds (Purtymun and Stoker 1987, 006688, p. 8). The absence of perched water indicates that no recharge to the regional aquifer occurs through the Pajarito Plateau in the vicinity of TA-49 (Purtymun and Stoker 1987, 006688, p. 8). Subsurface moisture monitoring conducted from 2000 through 2005 did not indicate the presence of perched groundwater beneath TA-49.

5.3.2.3 Regional Groundwater

Deep groundwater beneath TA-49 is part of the regional aquifer that serves all of the municipal and industrial water use in Los Alamos County (Purtymun 1984, 006513). Little to no recharge occurs through the mesa tops of the Pajarito Plateau to the regional aquifer (LANL 2007, 098492).

The potentiometric surface of the regional aquifer beneath TA-49 lies completely within the Puye Formation and the Cerros del Rio basalt. Groundwater moves eastward and discharges into the Rio Grande through seeps and springs (Purtymun et al. 1980, 006048). Aquifer tests performed in the three deep test wells at TA-49 found the average groundwater velocity to be 345 ft/yr in the upper 490 ft of the aquifer. The gradient on the upper surface of the aquifer is about 40 to 60 ft/mi beneath the western and central portion of the plateau within the volcanic sediment portion. It steepens to 80 to 120 ft/mi as the aquifer moves into less-permeable sediment of the Tesuque Formation (Purtymun and Ahlquist 1986, 014722).

Well DT-5A showed an approximate 4-ft water-level decline from 1960 to 1964. This decline was attributed to pumping of supply wells located to the north. Well DT-9 recorded a 3-ft water-level decline over a 21-yr period from 1960 to 1982. At well DT-10, water levels declined 0.5 ft/yr from 1960 to 1967. These declines in water levels reflect the normal, deep, groundwater-level trend for the region (Purtymun and Ahlquist 1986, 014722).

5.4 Exploratory Borings and Monitoring Wells

In 1959 and 1960, five deep test wells (DT-5, DT-5A, DT-5P, DT-9, and DT-10) were drilled through Frijoles Mesa. Three deep test wells (DT-5A, DT-9, and DT-10) were drilled into the regional aquifer and are currently used as groundwater monitoring wells. The boreholes were drilled to evaluate the hydrologic characteristics of the regional aquifer and to test for the presence of perched water. No perched water was encountered (LANL 2007, 098492).

During the initial site characterization in 1959 and 1960, four core holes (CH-1, CH-2, CH-3, and CH-4) were drilled beneath MDA AB and cased with 2-in. galvanized pipe. These core holes, which ranged in depth from about 300 ft bgs (CH-3 and CH-4) to 500 ft bgs (CH-1 and CH-2), were drilled in the centers of the four main experimental areas to detail the geologic and hydrologic characteristics of the underlying tuff. The surface geology of the area was mapped and correlated with subsurface geology as determined from logs of the test wells and other holes (LANL 2007, 098492).

In 1960, three additional boreholes (Alpha, Beta, and Gamma) were drilled for geologic information. Alpha was drilled just east of MDA AB, Beta was drilled into the floor of Water Canyon, and Gamma was drilled into the floor of Ancho Canyon (LANL 2007, 098492).

In 1980, a study was conducted to understand the observed accumulation of water in core hole CH-2. The study involved drilling five test holes (TH-1, TH-2, TH-3, TH-4, and TH-5) at locations adjacent to

Areas 2, 2A, and 2B. The boreholes were drilled to depths that would provide moisture monitoring of the tuff below the bottom of the shafts in Areas 2, 2A, and 2B. Cuttings from the test holes were logged, and moisture content was determined over 5-ft drilling intervals. Three additional test holes (2A-O, 2A-Y, and 2B-Y) were drilled in unused, backfilled shot shafts. The boreholes were drilled through the sand fill and into the underlying tuff. The boreholes were logged, and moisture content was determined in the sand and tuff. The test holes were cased with 2-in. polyvinyl chloride pipe to facilitate neutron logging. The casing depths vary, depending on how much cave-in occurred when the auger was pulled from the test hole (Purtymun and Ahlquist 1986, 014722, p. 16).

6.0 AREA 1: BACKGROUND AND FIELD INVESTIGATION RESULTS

This section presents the background, site description and operational history, and summary of previous investigations for Area 1. This section also presents the field-investigation results from Area 1 and the associated overland corridor locations and discusses the nature and extent of contamination of the sampled media.

6.1 Background of Area 1

Area 1 is one of the six areas within the NES at TA-49 that contains subsurface test shafts used from 1959 to 1961 for underground hydronuclear safety, tracer, and containment experiments. Review of aerial photographs revealed linear features that indicate potential overland corridors extending radially from Area 5 and Area 1 (Purtymun and Stoker 1987, 006688).

6.1.1 Historical Releases

There are no documented releases associated with activities at Area 1.

6.1.2 Relationship to Other SWMUs and AOCs

SWMU 49-001(a) is located within Area 1. SWMU 49-003 and AOC 49-008(c) are located within Area 11 directly southeast of Area 1. Area 11 is the site of a former radiochemistry laboratory, associated leach field, and subsurface test-shot area. SWMU 49-007(b) is located within the Laboratory's HDT area, which houses the HDT training facility building 49-113 and associated HE magazine building 49-114, used by the HDT team for small-scale explosives training exercises. SWMU 49-007(b), the septic system for the HDT area, was approved for no further action (NFA) in 2005. The HDT area is located directly southwest of SWMU 49-001(a) and is discussed in the investigation report (IR) for sites at TA-49 outside the NES boundary (LANL 2010, 109319).

The overland corridors associated with Area 1 extend from the southeast corner of Area 1 to the northwest corner of Area 5 (Figure 1.1-1 and Figure 2.1-6).

6.2 SWMU 49-001(a): Experimental Shafts

6.2.1 Site Description and Operational History

SWMU 49-001(a), known as Area 1, is an area consisting of experimental shafts located in the northwest corner of the TA-49 NES boundary (Figure 1.1-1). Area 1 is approximately 100 ft × 100 ft in area. A total of 22 shafts were drilled at Area 1 to depths ranging from 31 to 85 ft bgs (Figure 6.2-1). Ten of the 22 shafts were used for shot testing using radioactive materials, five of the shafts were used for containment testing using HE only, six of the shafts were not used and were backfilled, and one shaft was used as a gas-expansion hole. Substantial amounts of lead generally were present in the experimental packages, and small amounts of beryllium may have been used in some experiments (LANL 2007, 098492).

6.2.2 Summary of Previous Investigations

During the 1987 soil and vegetation radiological-screening survey, 34 surface samples were collected from points on a 25-ft grid centered over the Area 1 shafts, and 10 vegetation samples were collected within and around Area 1 (LANL 1992, 007670). Samples were analyzed for radionuclides and results showed radionuclide activities at or slightly above BVs/FVs (LANL 1992, 007670). During the 1995 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) conducted at Area 1, 20 surface samples (0 to 0.5 ft bgs) were collected on a 25-ft x 25-ft grid centered over the Area 1 shafts. Each sample was field screened for gross radiation; radiation was not detected above background. All 20 samples were submitted for analysis of gamma-emitting radionuclides; a subset of 10 of the samples were submitted for analysis of TAL metals and isotopic plutonium (LANL 2007, 098492). Inorganic chemicals detected above soil BVs included total uranium and zinc. Mercury and thallium were not detected above soil BVs but had detection limits above BVs. Plutonium-239/-240 was detected above FV in the 1995 RFI samples collected from SWMU 49-001(a) in one sample (LANL 1997, 056594, p. 77). Historical sample locations and detected concentrations are presented on plates, and in figures, and tables below.

Prior to this investigation, no sampling was conducted in the overland corridors.

6.2.3 Site Contamination

6.2.3.1 Soil and Rock Sampling

Additional samples were collected in the 2009–2010 investigation at SWMU 49-001(a) and the overland corridors associated with SWMU 49-001(a), per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected either by hand auger or by a drill rig equipped with a continuous core-barrel sampling system.

In the 2009–2010 investigation, surface samples were collected across the site and along the overland corridors to characterize of the nature and extent of surface contamination across SWMU 49-001(a) and the overland corridors that may have been used to transport equipment and cable during the testing period. Four boreholes were drilled around the perimeter of the experimental shaft area extending to a total depth of 135 ft bgs and samples collected to characterize the subsurface of contamination at SWMU 49-001(a). All samples were submitted through the SMO for analysis at off-site laboratories. All sample locations were surveyed by the Laboratory using a global positioning system (GPS) (Table 6.2-1). Sample collection and screening methods are described in Appendix B.

A total of 155 samples (135 soil and 20 tuff), plus 12 field duplicates, were collected in 2009–2010 from 74 locations at SWMU 49-001(a) and the overland corridors. Data from the samples collected in 2009–2010 were combined with decision-level data from previous investigations. The final decision-level dataset includes 175 samples (155 soil, and 20 tuff), plus 12 field duplicates, collected in 1995 and 2009–2010 from 90 locations at SWMU 49-001(a) and the overland corridors, with a maximum sample depth of 135 ft bgs. The sample locations for SWMU 49-001(a) are presented on Plate 1 and sample locations from the overland corridors associated with SWMU 49-001(a) are presented on Plate 5.

Table 6.2-2 lists the samples collected and the analyses requested.

6.2.3.2 Soil and Rock Sample Field-Screening Results

Organic vapors were not detected above ambient air during headspace (PID) screening of samples at SWMU 49-001(a). No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 6.2-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

One surface sample from SMWU 49-001(a) exceeded the gross-alpha screening threshold and an additional sample was collected and submitted for appropriate laboratory analysis. Eight additional stepout surface and shallow subsurface screening samples from four locations were collected and screened for gross-alpha and -beta analysis, but did not exceed screening thresholds and were not submitted for laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(a) are presented in Tables D-1 through D-6 in Appendix D.

Two surface samples collected from the SWMU 49-001(a) overland corridor exceeded the gross-alpha screening threshold; therefore an additional 14 corridor samples from 7 locations were collected and submitted for appropriate laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(a) overland corridors are presented in Tables D-34 through D-38 in Appendix D.

6.2.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV at SWMU 49-001(a) and the overland corridors. The sampling locations from SWMU 49-001(a) are presented on Plate 1; the overland corridor sample locations associated with SWMU 49-001(a) are presented on Plate 5. Table 6.2-4 presents inorganic chemicals detected above BVs, detected with no available BV, or with DLs above BVs.

Inorganic Chemicals in Soil

A total of 145 soil/fill samples were collected from SWMU 49-001(a) and analyzed for TAL metals. Ten samples were also analyzed for total uranium. Table 6.2-2 summarizes samples collected and the requested analyses for each sample.

Table 6.2-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no BV, or with DLs above BVs. Barium, calcium, chromium, cobalt, lead, manganese, mercury, selenium, sodium, thallium, total uranium, vanadium, and zinc were detected in soil above BVs or have DLs above BVs. The sampling locations with detected concentrations of inorganic chemicals above are presented on Plate 2 for SWMU 49-001(a) site locations and Plate 6 for SWMU 49-001(a) overland corridors locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

A total of 20 tuff samples were collected and analyzed for TAL metals, of which 16 samples were also analyzed for cyanide and perchlorate. Table 6.2-2 summarizes samples collected and the requested analyses for each sample.

Table 6.2-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no available BV, or with DLs above BVs. Aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, cyanide (total), iron, lead, magnesium, nickel, perchlorate, selenium, and vanadium were detected in tuff above BVs, have DLs above BVs, or were detected with no BV. The sampling locations with detected concentrations of inorganic chemicals above BVs and detected inorganic chemicals with no BV are presented on Plate 2 for SWMU 49-001(a) locations and Plate 6 for SWMU 49-001(a) overland corridors locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected at SWMU 49-001(a). The sampling locations from SWMU 49-001(a) are presented on Plate 1. Table 6.2-5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Soil samples collected from SWMU 49-001(a) and the overland corridors were not analyzed for organic chemicals.

Organic Chemicals in Tuff

A total of 16 tuff samples were collected and analyzed for organic chemicals. Each sample was analyzed for VOCs, SVOCs, and explosive compounds. Table 6.2-2 summarizes samples collected and the requested analyses.

Table 6.2-5 presents the concentrations of detected organic chemicals in tuff. Methylene chloride was detected in three tuff samples from borehole location 49-601948. The detected concentrations of organic chemicals are presented on Plate 3.

Radionuclides

Radionuclides were detected or detected above BVs/FVs at SWMU 49-001(a) and the overland corridors. The sampling locations from SWMU 49-001(a) are presented on Plate 1; the overland corridor sample locations associated with SWMU 49-001(a) are presented on Plate 5. Table 6.2-6 presents the radionuclide activities detected or detected above BVs/FVs.

Radionuclides in Soil

A total of 155 soil samples were collected and analyzed for radionuclides. Each sample was analyzed for radionuclides by gamma spectroscopy; 135 samples were analyzed for americium-241 and isotopic uranium; and 135 samples were analyzed for isotopic plutonium. Table 6.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 6.2-6 presents the radionuclide activities detected or detected above BVs/FVs. Cesium-134, cesium-137, plutonium-238, and plutonium-239/240 were detected above FVs in soil. The sampling locations with activities of radionuclides detected or detected above FVs are shown on Plate 4 for SWMU 49-001(a) locations and Plate 7 for SWMU 49-001(a) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

A total of 20 tuff samples were collected and analyzed for radionuclides. Each sample was analyzed for americium-241, isotopic plutonium and isotopic uranium; 4 samples were analyzed for radionuclides by gamma spectroscopy; and 16 samples were analyzed for tritium. Table 6.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 6.2-6 presents the radionuclide activities detected or detected above BVs/FVs. Tritium was detected in tuff. The sampling locations with activities of radionuclides detected or detected above FVs are shown on Plate 4 for SWMU 49-001(a) locations and Plate 7 for SWMU 49-001(a) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

6.2.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the surface and shallow subsurface investigation at SWMU 49-001(a) was to define the nature and extent of surface contamination, and the intent of the four perimeter boreholes was to characterize the vertical and lateral extent of contamination beneath SWMU 49-001(a) and define the lateral subsurface footprint of the area (LANL 2008, 102691, pp. 30 and 39).

The nature and extent of radionuclides at SWMU 49-001(a) are not defined, while the nature and extent of inorganic chemicals and organic chemicals at SWMU 49-001(a) are defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides in the surface and subsurface at SWMU 49-001(a).

Inorganic Chemicals

As part of the review of the nature and extent of contamination at SWMU 49-001(a), the site data for inorganic chemicals detected at concentrations above BVs were compared to the inorganic chemical and medium-specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (barium, beryllium, calcium, iron, magnesium, sodium, and zinc) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations of these inorganic chemicals are not different from background.

The following inorganic chemicals (cobalt, chromium, cyanide, lead, manganese, mercury, nickel, perchlorate, selenium, thallium, total uranium, and vanadium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4) and only outlier data points are interpreted as elevated with respect to TA-49 background. At SWMU 49-001(a), the concentrations of several inorganic chemicals in tuff, including aluminum, arsenic, barium, calcium, cobalt, copper, lead, nickel, selenium, and vanadium are above the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4. No outliers were observed for these inorganic chemicals; therefore, the extent of these inorganic chemicals in tuff is defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4.

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Aluminum was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of aluminum are defined.

Arsenic was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in one sample at site location 49-610227 at a concentration of 915 mg/kg. Statistical tests were performed to determine if barium in soil is different from background. The statistical test results are presented in Table H-1 and the box plot for barium in tuff is presented in Figure H-1. The results of both the Gehan and quantile tests indicate that barium in soil is not different from background. Barium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in one sample at corridor location 49-610121 at a concentration of 1.3 mg/kg. Statistical tests were performed to determine if beryllium in tuff is different from background. The statistical test results are presented in Table H-2 and the box plot for beryllium in tuff is presented in Figure H-3. The results of both the Gehan and quantile tests indicate that beryllium is not different from background. The lateral and vertical extent of beryllium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in two samples (one site location and one corridor location), with a maximum detected concentration of 8250 mg/kg at site location 49-610227. Statistical tests were performed to determine if calcium in soil is different from background. The statistical test results are presented in Table H-1 and the box plot for calcium in soil is presented in Figure H-1. The results of both the Gehan test and the quantile test indicate that calcium in soil is not different from background. Calcium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of calcium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one site-soil sample and above the tuff BV (7.14 mg/kg) in five tuff samples (four site locations and one corridor location). The maximum concentration of 25.4 mg/kg was in a soil sample collected from 0 to 0.5 ft bgs at site location 49-610224. Chromium concentrations decreased with depth at site location 49-610224 and borehole location 49-610948. Chromium concentrations increased with depth at corridor location 49-610121 and site locations 49-610232 and 49-610231. Chromium was not detected above BV in samples from the surrounding locations, including locations 49-610232, 49-610223, and 49-610496, nor at depth in neighboring borehole location 49-610496. Chromium was detected above the tuff BV in only one sample in the SWMU 49-001(a) corridor, at a concentration of 12.6 mg/kg. All chromium concentrations are below the maximum background concentration in tuff (13 mg/kg). The lateral and vertical extent of chromium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in 30 soil samples in site and corridor locations. The maximum concentration of 44.5 mg/kg was in a sample collected from 0.5 to 1.5 ft bgs at site location 49-610209. Cobalt concentrations decreased to the north (20.3 mg/kg) and the south (9.3 mg/kg) at locations 49-610212 and 49-610220. Cobalt was not detected above BV at sampling locations to the east and west (locations 49-01044 and 49-01052) nor at depth in neighboring borehole locations 49-610946 and 49-610949. Cobalt concentrations in all corridor locations consistently ranged from concentrations near the BV up to 3 times the BV. Cobalt was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of cobalt are defined.

Copper was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of copper are defined.

Cyanide was not detected above BVs in site samples, but had DLs (0.51 to 0.54 mg/kg) above BV (0.5 mg/kg) in 11 tuff samples. The DLs are only slightly above BV. The lateral and vertical extent of cyanide are defined.

Iron was detected above the tuff BV (14,500 mg/kg) in one sample from corridor location 49-610121 at a concentration of 14,900 mg/kg. Statistical tests were performed to determine if iron in tuff is different from background. The statistical test results are presented in Table H-2 and the box plot is presented in Figure H-3. The results of both the Gehan test and the quantile test indicate that iron in tuff is not different from background. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in eight samples, with a maximum detected concentration of 30.6 mg/kg at corridor location 49-610125. Lead concentrations decreased with depth at corridor locations 49-610104, 49-610113, and 49-610121 and increased with depth at corridor locations 49-610111, 49-610119, and 49-610125 and site locations 49-610209 and 49-610230. Lead was not detected above BV in any of the surrounding surface-sampling locations, including locations 49-610288, 49-610214, and 49-610226. Within the SWMU 49-001(a) corridor, lead was detected sporadically and only at concentrations near the BV (the maximum lead concentration in the SWMU 49-001(a) corridor is 30.6 mg/kg). Lead was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of lead are defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in four samples with a maximum detected concentration of 2400 mg/kg at corridor location 49-610121. Statistical tests were performed to determine if magnesium in tuff is different from background. The statistical test results are presented in Table H-2 and the box plot is presented in Figure H-4. The results of both the Gehan test and the quantile test indicate that magnesium in tuff is not different from background. The lateral and vertical extent of magnesium are defined.

Manganese was detected above the soil BV (671 mg/kg) in 12 samples (nine corridor locations and three site locations). The maximum detected concentration of 2430 mg/kg was at a sample collected from 0.5 to 1.5 ft bgs at site location 49-610209. Manganese concentrations decreased with depth in the surrounding locations, including locations 49-610212, 49-610220, 49-01044 and 49-01052, and with depth in neighboring borehole locations 49-610946 and 49-610949. Manganese is detected sporadically in all of the corridor areas at concentrations only slightly above BV. The maximum manganese concentration (1160 mg/kg) in the corridor was at location 49-610104 and is the only result above the maximum soil background concentration (1100 mg/kg). The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample. The maximum concentration of 0.103 mg/kg was in a sample collected from 0 to 0.5 ft bgs at site location 49-610217. Additionally, 3 DLs exceeded the BV (the maximum DL was 0.11 mg/kg). The lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample at a concentration of 31.7 mg/kg at location 49-610209. Nickel concentrations decreased in the surrounding locations, including locations 49-610212, 49-610220, 49-01044 and 49-01052, and with depth in neighboring borehole locations 49-610946 and 49-610949. Nickel was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of nickel are defined.

Perchlorate was detected in two tuff samples. The maximum detected concentration of 0.0036 mg/kg was in a sample collected from 2 to 3.8 ft bgs at borehole location 49-610949. The other perchlorate concentration was in a sample collected from 4 to 6 ft bgs in borehole location 49-610948. Perchlorate concentrations decreased with depth in these boreholes and in the surrounding locations. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in five samples (two corridor locations and three site locations). The maximum detected concentration of 2 mg/kg was at location 49-610227. In addition, the five DLs were above BV (the maximum DL was 2.1 mg/kg). Selenium concentrations within Area 1 and the associated corridor are consistent and without apparent trends in the spatial distribution. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). As depicted in the spatial plot for selenium (Figure I-3) selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Sodium was detected above the soil BV (915 mg/kg) in one sample at corridor location 49-610120 at a concentration of 1300 mg/kg. Statistical tests were performed to determine if sodium in soil is different from background. The statistical test results are presented in Table H-1 and the box plot is presented in Figure H-2. The results of both the Gehan and quantile tests indicate that sodium in soil is not different from background. The lateral and vertical extent of sodium are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in one sample at corridor location 49-610112. In addition, several DLs were above BV (the maximum DL was 1.4 mg/kg). Thallium was not detected above BV in SWMU 49-001(a). The lateral and vertical extent of thallium are defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in eight samples where only a single surface sample was collected. The maximum detected concentration of 9.3 mg/kg was at site location 49-01046. Uranium was not detected above BV in any of the surrounding locations, including locations 49-01045, 49-01042, and 49-01050. In addition, isotopic uranium was not detected above BVs in any of the four perimeter boreholes or in neighboring surface samples. The lateral and vertical extent of total uranium are defined.

Vanadium was detected above the soil BV (39.6 mg/kg) in three samples at corridor locations 49-610104, 49-610111, and 49-610113. The maximum detected concentration of 56.2 mg/kg was at corridor location 49-610111. Concentrations decreased with depth at locations 49-610104 and 49-610113, and increased with depth at location 49-610111. Vanadium was detected infrequently above BV in the Area 1 corridor and soil concentrations were less than the maximum background concentration (56.5 mg/kg). Vanadium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt (Figure I-4). The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at site location 49-01038 at a concentration of 51.2 mg/kg. Statistical tests were performed to determine if zinc in soil is different from background. The statistical test results are presented in Table H-1 and the box plot is presented in

Figure H-2. The results of both the Gehan and quantile tests indicate that zinc in soil is not different from background. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Methylene chloride was detected in three samples from borehole location 49-610948. The maximum concentration of 0.0033 mg/kg occurred in a sample collected from 85 to 87 ft bgs. Concentrations remained essentially the same with depth and methylene chloride was not detected in the other perimeter boreholes. All detected concentrations of methylene chloride are below the estimated quantitation limit (EQL) (0.0056 mg/kg). The lateral and vertical extent of methylene chloride are defined.

Radionuclides

Cesium-134 was detected in two soil samples and was not detected in tuff samples. The detected activities (0.586 pCi/g and 0.081 pCi/g) were at site locations 49-610212 and 49-610288. Cesium-134 activities decreased with depth at location 49-610212. Cesium-134 was not detected in samples collected from similar and deeper depths at surrounding locations. Sample location 49-610288 is located on the southwestern perimeter of SWMU 49-001(a) and cesium-134 was detected in the deepest sample. Samples were not collected laterally from location 49-610288, particularly to the south and west. The lateral and vertical extent of cesium-134 are not defined

Cesium-137 was detected above the FV (1.65 pCi/g) or at depths where the FV does not apply, in three soil samples. The maximum activity (0.186 pCi/g) was in the deepest sample collected from corridor location 49-610129. The other detected activities were in the deep samples collected from similar depth at locations 49-610120 and 49-610230 within SWMU 49-001(a). All activities are below the FV (1.65 pCi/g). The lateral and vertical extent of cesium-137 are defined.

Plutonium-238 was detected above the FV (0.023 pCi/g) in a single surface sample, at an activity of (0.057pCi/g) at corridor location 49-611038. Plutonium-238 was not detected at depth. The vertical extent of plutonium-238 is defined. The location is on the outer edge of a corridor sampling transect. In addition, the sample was collected because field-screening samples from the corridor transect were elevated above screening thresholds for gross alpha-beta radiation. Therefore, the lateral extent of Plutonium-238 is not defined.

Plutonium-239/240 was detected above the soil FV (0.054 pCi/g) at location 49-01054 where a single sample was collected. Plutonium-239/240 was not detected above FV in samples collected from similar and deeper depths surrounding location 49-01054, or in the corridors. The lateral and vertical extent of plutonium-239/240 are defined.

Tritium was detected at low concentrations (0.145-0.178 pCi/g) in boreholes 49-610946 and 49-610949. Tritium activity decreased with depth in both borehole locations and was not detected in borehole locations 49-610947 and 49-610948. The lateral and vertical extent of tritium are defined.

6.2.3.5 Subsurface Vapor Sampling

In 2010, three pore-gas samples were collected from borehole location 49-610946 and analyzed for VOCs and tritium. Table 6.2-7 presents the pore-gas samples collected and the analyses requested.

6.2.3.6 Subsurface Vapor Sample Analytical Results

Table 6.2-8 presents the VOCs detected in the pore gas at SWMU 49-001(a). The sampling location and detected concentrations are shown on Plate 3. The VOCs detected in pore gas are acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; xylene(total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-].

Table 6.2-9 presents the detected concentrations of tritium at SWMU 49-001(a). The sampling location and detected concentrations are shown on Plate 4.

6.2.3.7 Nature and Extent of Contamination in Subsurface Pore Gas

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from intervals corresponding to the base of formation Qbt 4, at TD of the closest experimental shaft, and from the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the groundwater MCL (20,000 pCi/L), the borehole would be completed as a vapor-monitoring well.

Acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; xylene(total); xylene[1,2-]; and xylene[1,3-]+Xylene[1,4-] were detected in at least one sample from borehole location 49-610946. Tritium was detected in one sample at location 49-610946.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2).

Tritium was detected in one sample at a concentration of 2494 pCi/g in a sample collected from 119 to 121 ft bgs at borehole location 49-610946. The detected tritium concentration is below the groundwater MCL (20,000 pCi/L); therefore tritium is not a potential source of groundwater contamination.

The extent of VOCs and tritium in pore gas are defined and the borehole at SWMU 49-001(a) was not completed as a vapor-monitoring well.

6.2.4 Summary of Human Health Risk Screening

A human health risk-screening assessment was not performed because the extent of contamination is not defined at SWMU 49-001(a).

6.2.5 Summary of Ecological Risk Screening

An ecological risk-screening assessment was not performed, because the extent of contamination is not defined at SWMU 49-001(a).

7.0 MDA AB BACKGROUND AND FIELD INVESTIGATION RESULTS

This section presents the background, site descriptions, operational history, and summary of previous investigations for MDA AB, which includes Area 2, SWMU 49-001(b), Area 2A, SWMU 49-001(c), Area 2B, SWMU 49-001(d), and SWMU 49-001(g). This section also presents the field investigation results from MDA AB and the associated overland corridor locations and discusses the nature and extent of contamination of the sampled media.

7.1 Background of MDA AB

In the approved work plan (LANL 2008, 102215), SWMUs 49-001(b), 49-001(c), 49-001(d), and 49-001(g) are referred to as MDA AB. With the exception of SWMU 49-001(g), all SWMUs are associated with hydronuclear and related experiments conducted at TA-49 from late 1959 to mid-1961. These experiments were conducted in underground shafts (typically 6 ft in diameter) drilled into the tuff at Areas 1, 2, 2A, 2B, 3, and 4 and involved the use of HE and radioactive materials such as special nuclear materials (SNM) (plutonium-239 and uranium-235). SWMU 49-001(g) is a site of contaminated surface soil associated with Area 2 activities (LANL 2007, 098492).

Before being used for hydronuclear experiments, some of the shafts were used to conduct containment shots using HE without radioactive materials (LANL 1992, 007670, pp. 7-18-7-19). The containment shots were designed to characterize tuff fracturing that resulted from the underground explosions and to provide data needed to assess whether releases of radioactivity would occur because of experiments. This included determining the required spacing between the experimental shafts so that contamination would not be encountered when a new shaft was drilled adjacent to an existing used shaft. In one incident at SWMU 49-001(b) (Area 2), contamination was encountered during drilling of a new shaft (LANL 2007, 098492).

Experimental packages that contained HE and radioactive materials were placed in the bottom of the shafts, which were backfilled with sand or crushed tuff to provide containment and prevent release of radioactivity (LANL 1992, 007670, pp. 7-19-7-20). Some experiments were configured to collect samples of radioactive particulates entrained in the explosion-generated gases. For these experiments, short, horizontal side drifts were installed at the bottom of the shafts, and pipes routed gases from the drifts to sealed, steel, sampling boxes near the surface. After exiting the sampling boxes, the gases were routed back underground through shafts known as gas-expansion holes. After an experiment, subsidence caused by the explosion was backfilled with sand or crushed tuff. Shafts used in SNM experiments were generally capped with concrete. If gas-sampling boxes were used, they generally were filled with concrete and left in place. Sample pipes were disposed of in smaller (3-ft-diameter) boreholes known as pipe-dump holes (LANL 2007, 098492).

In 1987, the A411 survey was performed to investigate soil contamination at MDA AB and Areas 1, 3, and 4 (Soholt 1990, 007510). Activities included collecting surface soil and vegetation samples from MDA AB and Areas 1, 3, and 4. Results from samples collected in Areas 2, 2A, and 2B showed elevated levels of plutonium and americium near the northeast corner of the asphalt pad at Area 2. Based on the contamination detected at Area 2 during the A411 survey, additional soil and vegetation samples and radiological surveys were conducted in September 1987 near the northeast corner of the asphalt pad. Results indicated contamination in a drainage channel flowing from Area 2.

Review of aerial photographs has revealed linear features that indicate potential overland corridors extending radially from Area 5 and MDA AB (Purtymun and Stoker 1987, 006688). Surface samples were collected to evaluate the nature and extent of contamination resulting from the use of these corridors during historical operations.

7.1.1 Historical Releases

An unexpected contamination incident occurred during the hydronuclear safety experiments at MDA AB in 1960 during the drilling and subsequent drifting of shaft 2-M (LANL 1992, 007670, p. 3-11). In November 1960, the horizontal drift for shaft 2-M was drilled toward the southwest and intercepted contamination from the southeast-trending horizontal drift from shaft 2-L (completed for shot 2-L). In December, contamination from shot 2-L was discovered around Area 2, found in Area 6, and traced to shops at TA-03. During cleanup, contaminated equipment and soil were placed into shaft 2-M (no shot was fired in shaft 2-M, but the shaft is filled with contaminated materials). In January 1961, the surface of Area 2 was capped with compacted clay and gravel after all the open shafts were filled with sand and crushed tuff. In September 1961, the cap was extended 12.5 ft beyond the outermost shafts and paved with 4 to 6 in. of asphalt to retard infiltration. The shaft 2-M contamination incident left near-surface radionuclide contamination beneath the Area 2 asphalt pad, later designated as SWMU 49-001(g). It is believed that this is the source of most or all of the above-background levels of radionuclides historically observed in surface soil and drainage areas around Area 2 (LANL 1992, 007670, pp. 7-26-7-27).

Other releases of radionuclides occurred in January 1960 at shaft 2-H, in March 1960 at shaft 2-S, and in March 1961 at shaft 2B-H (Weir and Purtymun 1962, 011890). In all three cases, contamination was controlled by covering contaminated soil with concrete pads (LANL 1998, 059166, pp. 6-7).

The second significant event at shaft 2-M occurred in March 1975 when it was discovered that the asphalt pad over the backfilled shaft had collapsed, leaving an opening approximately 6-ft × 3 ft-wide and 3-ft × 4-ft-deep in the asphalt and underlying fill. An inspection of core hole CH-2 indicated that the water level had risen to approximately 50 ft of standing water (approximately 450 ft bgs) since the previous inspection (LANL 1992, 007670, p. 7-28). The hole in the asphalt may have formed in late 1974 and collected snowmelt throughout the winter.

In September 1976, the opening over shaft 2-M was filled with crushed rock and clay, and the entire pad was repaved with another 4 to 6 in. of asphalt (Purtymun and Ahlquist 1986, 014722). Unfiltered samples of the water bailed from core hole CH-2 in October 1977 and August 1978 yielded concentrations of 1.7 to 3.1 pCi/L of plutonium-239. It was concluded that the opening in the asphalt pad allowed water to collect, penetrate the pad, and contact subsurface contamination (possibly contaminated backfill in shaft 2-M) (Purtymun and Stoker 1987, 006688, p. 14). The contaminated water presumably moved through fractures to core hole CH-2 and traveled down the annular spacing between the casing and the borehole (LANL 1992, 007670, p. 7-28). Another possibility is that the enhanced infiltration caused by the collapsed hole created saturated soil conditions that extended laterally to core hole CH-2 and traveled down the annular spacing between the casing and the core hole. In this case, the source of the contamination would be the soil rather than shaft 2-M. Core hole CH-2 was originally drilled to a diameter of 4 in. and reamed to a diameter of 6.5 in. to facilitate logging (Zia Company 1960-1962, 098490); the casing installed was 2-in. galvanized pipe (Weir and Purtymun 1962, 011890, p. 29). Because of the annular spacing between the casing and core hole, downward flow may have been likely given saturated soil conditions and the open space or loose backfill in the annular spacing.

Prior to this investigation, no sampling was conducted in the overland corridors.

7.1.2 Relationship to Other SWMUs and AOCs

MDA AB consists of SWMUs 49-001(b, c, d, and g). SWMU 49-001(b) is one of the six areas within the NES at TA-49 that contains subsurface test shafts used from 1959 to 1961 for underground hydronuclear safety, tracer, and containment experiments. SWMU 49-001(c) consists of a row of shafts known as Area 2A and is located adjacent to the west fence line of SWMU 49-001(b). SWMU 49-001(d) consists of an area of experimental shafts known as Area 2B and is located directly south of SWMU 49-001(b). SWMU 49-001(g) is an area consisting soil contamination located to the north of SWMUs 49-001(b) and 49-001(c), resulting from the transport of surface and near-surface radionuclide contamination associated with the release from shaft 2-M in Area 2 [SWMU 49-001(b)].

The overland corridors associated with MDA AB extend from the southwest corner of MDA AB to the northeast corner of Area 5 (Figure 1.1-1 and Figure 2.1-6).

7.2 Area 2: SWMU 49-001(b), Experimental Shafts

7.2.1 Site Description and Operational History

SWMU 49-001(b), known as Area 2, is an area consisting of experimental shafts located within the northeast corner of the MDA AB NES boundary (Figure 7.2-1). Area 2 is approximately 100 ft × 100 ft. This area was designed to contain a maximum of 25 shafts on a uniform 25-ft × 25-ft grid (25-ft shaft spacing). A total of 22 experimental shafts were drilled at Area 2. Four of these shafts, ranging from 52 to 68 ft deep, were used for containment shots or shots with small amounts of uranium tracer. Sixteen shafts were used for other experiments involving radioactive materials, of which 12 used plutonium, 1 used uranium-235, and 3 used uranium-238 as the principal radioactive materials. The experiments using plutonium also used uranium-238 and, in some cases, uranium-235. Similarly, the experiment using uranium-235 also used uranium-238. Most of the shafts used for shots with radioactive materials were 57 ft deep; one shaft was 78 ft deep. One 58-ft-deep shaft was backfilled without being used, and one 35-ft-deep shaft was used as a gas-expansion hole. Area 2 also contained five 3-ft-diameter × 30-ft-deep pipe dump holes where experimental equipment was placed after use. Some experiments conducted at Area 2 used downhole neutron sources that expended a total of a few curies of tritium; some experiments may have used liquid scintillation detectors containing organic chemicals, including p-terphenylene, toluene, polystyrene, and zinc stearate. These organic chemicals should have been consumed during the explosions. Substantial amounts of lead were typically present in the experimental packages, and small amounts of beryllium may have been used in some experiments. Large, portable, concrete radiation shields provided shielding during these experiments (LANL 2007, 098492).

In 1961, an asphalt pad was placed over Area 2 in response to the release of radioactive contamination during the drilling of shaft 2-M [SWMU 49-001(g)] (LANL 2007, 098492). In March 1975, the asphalt pad was discovered to have collapsed over shaft 2-M, creating an opening approximately 6 ft long × 3 ft wide × 3 ft to 4 ft deep in the asphalt and underlying fill. This opening allowed snowmelt to enter core hole CH-2, which is located approximately 10 ft from shaft 2-M. This infiltrating water apparently carried contamination from shaft 2-M into core hole CH-2; samples of water that accumulated in core hole CH-2 contained plutonium-239. In September 1976, the opening over shaft 2-M was filled with crushed rock and clay, and the entire pad covering Area 2 was repaved with another 4 to 6 in. of asphalt. Monitoring from 1980 to 1987 showed no standing water in core hole CH-2 (LANL 2007, 098492).

In May 1991, cracks were noted in the asphalt pad with vegetation growing through some of the cracks, and standing water was detected again in core hole CH-2 (LANL 1992, 007670, p. 7-34). In November 1991, these cracks were sealed with asphalt. Standing water continued to be detected in core hole CH-2 after the asphalt pad was repaired. The source of water in core hole CH-2 is believed to have originated from the following scenario: during RFI activities in 1994, the soil layer beneath the asphalt pad was observed to be saturated. The water was contaminated with plutonium-239 from shaft 2-M. Water flowed down the annular spacing between the core hole CH-2 casing and the borehole (the casing was 2 in. in diameter). The core hole was reamed to a diameter of 6.5 in. Downward flow in the annular spacing between the casing and core hole may have occurred given saturated soil conditions and the open space or loose backfill in the large annular spacing. Water entered the core hole CH-2 casing through the 20-ft slotted section at the bottom of the casing. The core hole CH-2 casing was removed and the core hole was grouted in 1998 (LANL 2007, 098492).

7.2.2 Summary of Previous Investigations

During the initial surface soil investigation at Area 2 in 1987, 45 samples were collected for radionuclide analyses (Soholt 1990, 007510). Results showed concentrations of radionuclides to the south and west of the former asphalt pad at or slightly above background. Several sampling locations immediately adjacent to the former Area 2 asphalt pad showed concentrations of plutonium-238, plutonium-239/240, and americium-241 above background. Later sampling, including the 1987 study and the 1991 sampling effort described below, confirmed elevated levels of these radionuclides above background near the northeast corner of the former asphalt pad. As part of the 1987 survey, 49 vegetation samples were collected from 20 locations around Area 2 (Soholt 1990, 007510); results indicated the presence of americium-241, plutonium-238, plutonium-239, cesium-137, total uranium, lead, and beryllium (LANL 1992, 007670, pp. 7-23-7-44). An additional 20 soil samples were collected from the area northeast of the former Area 2 asphalt pad in September 1987 (LANL 1992, 007670, p. 7-37). Radionuclide activities at concentrations above background in these samples included gross alpha activity and plutonium-239/240. Beryllium was also measured at a concentration above background in one sample.

In March 1991, 12 samples of pocket gopher soil diggings were collected from the northeast corner of the former Area 2 asphalt pad and analyzed for radionuclides. Plutonium-238, plutonium-239/240, and americium-241 were detected at concentrations of 24, 43, and 38 pCi/g, respectively. Gopher diggings were resampled at the same location in April 1991. Elevated gross alpha activity (1200 pCi/g) was noted; however, isotopic analyses did not correlate with the earlier March sampling event (LANL 1992, 007670). Additional analyses did not detect VOCs, SVOCs, or PCBs.

In general, the 1987 and 1991 studies indicated that the majority of the elevated radionuclide levels with respect to background in surface soil at Area 2 were concentrated in the northeast corner of the site. The available information also indicated that these radionuclides appeared to be associated with the excavation of contaminated soil beneath and adjacent to the asphalt pad because of gopher activity (LANL 1992, 007670, p. 7-40).

RFI activities were conducted at Area 2 [SWMU 49-001(b)] from 1993 to 1998. During the 1993 RFI, 34 surface samples (0 to 0.5 ft bgs) were collected around the asphalt pad and in the drainage northeast of Area 2, SWMU 49-001(b). To establish background concentrations for the area, another nine samples were collected from areas with known or possible contamination. Samples were submitted for analysis of TAL metals and radionuclides (LANL 1999, 070349, p. 9). Phase I RFI surface-sampling data are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Phase I RFI surface-sampling data showed cadmium and uranium detected above BVs and plutonium-239/240, radium-226, and thorium-232 concentrations were detected above BVs/FVs.

During the 1994 RFI, a radiological field screening of surface soil in Area 2, SWMU 49-001(b), was performed using a Violinist III field instrument for detection of low-energy radiation. Soil was screened for plutonium-238, americium-241, and cesium-137. Field-screening results were compared against site background concentrations (LANL 1999, 070349, p. 14). In 1994, seven RFI boreholes (four 10-ft boreholes, two 150-ft boreholes, and one 700-ft borehole) were drilled at locations within and near the asphalt pad at Area 2 (LANL 1999, 070349). Borehole location 49-02901 was drilled to a depth of 700 ft with a recovery to 692 ft. The primary objective of borehole location 49-02901 was to evaluate the potential contaminant pathways for the near-surface and the vadose zone to a depth of at least 700 ft (across the potential water-perching Tshirege Otowi contact) (LANL 2007, 098492). Phase I RFI subsurface-sampling data are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Phase I RFI subsurface-sampling data showed barium, beryllium, cadmium, chromium, and lead detected above BVs and showed americium-241, cesium-137, plutonium-238, plutonium-239, plutonium-240, and tritium detected in subsurface soil and rock samples. The majority of original 1994 sampling data for samples submitted for radiological analyses were rejected because of various laboratory analytical and reporting problems (LANL 1999, 070349, p. 17).

In 1998, the decision was made to reanalyze samples from seven of the original cores collected from borehole locations 49-02901, 49-02902, 49-02903, 49-02904, 49-02905, 49-02906, and 49-02907. The resampling included the collection of a sample as close as possible to each of the original sampling intervals. Each of the 50 samples collected from the 150-ft and 700-ft boreholes were analyzed for isotopic plutonium, uranium, and americium. The eight samples collected from the 10-ft boreholes were analyzed for one or more of the isotopic radionuclides. Four of the samples were also analyzed for inorganic chemicals. No inorganic chemicals were detected above BVs in the 1998 resampled core. Radionuclide activities detected above BVs/FVs, in the 1998 resampled (subsurface) core included americium-241, plutonium-238, and plutonium-239/240. Americium-241 was detected in two samples. Plutonium-239 was detected in five tuff samples. Plutonium-239/240 was detected in one fill sample and one tuff sample.

In 1998, a low-energy gamma detection probe was used to conduct a radiological field-screening survey of Area 2, SWMU 49-001(b); Area 12, AOC 49-008(d); and the drainage following the road to the south and stretching into the entrance of Water Canyon to the north. This survey was performed to determine potential release and/or redistribution of radionuclides within and around Area 2, SWMU 49-001(b) (LANL 2007, 098492). Results of this survey identified two locations of elevated gamma activity: one at the western side of the former Area 2 asphalt pad and one in the northeast drainage area (LANL 2007, 098492).

In March 1998, a shallow subsurface screening investigation was conducted beneath the asphalt pad at MDA AB (LANL 1999, 070349, p. 14). The investigation was undertaken in preparation for possible earth-moving activities associated with the removal of the asphalt. A total of 29 shallow borings were advanced beneath the asphalt pad. Based on radiological field-screening results, 20 soil samples were collected and analyzed from the 29 shallow borings. During the field investigation, the locations of the concrete caps (if present) covering the shot shafts were located beneath the asphalt pad to create a reference grid of the area (LANL 2007, 098492).

In May 1998, soil samples were collected beneath the Area 2 asphalt pad for a tritium screening analyses. A total of 28 samples were collected from locations above each shaft and at shallow borehole locations on the pad. In June 1998, three locations were sampled and field screened for HE around shaft 2B-H, directly beneath the cement cap. The samples were collected from 2 to 4 in. bgs depending on the thickness of the asphalt at the surface (LANL 2007, 098492).

In 1998, a stabilization plan was prepared for implementing interim measures (IMs) and best management practices at Areas 2, 2A, and 2B and SWMU 49-001(g) (LANL 1998, 059166). These activities were primarily designed to stabilize contamination beneath the asphalt cap and prevent further releases associated with moisture infiltration or biological intrusion. The IM activities were implemented from August 1998 to February 1999. IM activities included plugging and abandoning CH-2 and the two 150-ft RFI boreholes (locations 49-02906 and 49-02907), removing the existing asphalt cap, regrading the site with crushed tuff, placing a topsoil cover over the site, seeding the topsoil with shallow-rooting grasses, installing erosion controls and biological intrusion barriers, and replacing the security fence around the site (LANL 1999, 063919, p. 1). The removed asphalt was disposed of at the Laboratory's low-level radioactive waste disposal facility, MDA G, at TA-54 (LANL 1999, 063919, p. 6).

During the IM activities performed in 1998, 13 shallow boreholes were drilled into tuff along the western and southern perimeter of MDA AB to provide information on the subsurface stratigraphy. A total of 48 samples were collected from these 13 boreholes and submitted for laboratory analyses of inorganic chemicals, radionuclides, and percent moisture. The IM involved the removal of the asphalt pad within Area 2. Upon removal, composite samples of asphalt were collected from each of the four corners and from the center of the pad location, and were submitted for laboratory analyses of inorganic chemicals and radionuclides. Surface soil samples were collected from the soil immediately below the asphalt pad at each shaft location and from six additional locations for a total of 28 samples. These samples were analyzed for tritium and soil moisture (LANL 1999, 063918; LANL 1999, 063919; LANL 1999, 063920). Results of the screening analyses indicated the presence of tritium below the asphalt (LANL 2007, 098492).

Three locations were sampled around shaft 2B-H (LANL 1999, 070349, p. 17). HE spot tests were conducted at each location and showed no detectable HE. Soil samples were subsequently collected from between 2 and 4 in. bgs, depending on the thickness of the concrete at the surface, and submitted to a fixed laboratory for analyses. These sampling locations were selected based on the historical information discussed in the RFI work plan (LANL 1992, 007670) concerning the potential surficial release of HE (LANL 1999, 070349, p. 17). This activity was conducted specifically to support the IM but also contributed useful information about site conditions. HE was not detected (LANL 1999, 070349, p. 14).

7.2.2.1 Moisture Monitoring

Following the 1998 removal of the asphalt pad and installation of the ET cover at Area 2, a moisture-monitoring system was installed to evaluate moisture content and relative changes within and beneath the new cover material. In February 2000, three shallow neutron-logging access tubes were installed through the ET cover, each to a depth of 15 ft bgs. Four time-domain reflectometry (TDR) probes were also installed in the ET cover at two depths within two locations (0.5 and 6 ft bgs at one location and 0.5 and 10 ft bgs at the second location) (LANL 2005, 092389). The TDR probes collect measurements every 12 h to an automated data logger. The four neutron-logging access tubes were monitored monthly until 2003 when NMED approved bimonthly monitoring (LANL 2005, 092389). Additionally, eight neutron access holes surrounding Area 2 were monitored bimonthly (monthly until the first quarter of fiscal year [FY] 2002) for moisture content. Six additional access holes located across the TA-49 site, where bimonthly monitoring began in the fourth quarter of 2003, provided a more comprehensive dataset describing moisture trends across TA-49 (LANL 2005, 092389). Moisture monitoring at TA-49 was suspended after the last monitoring event in November 2005 to address NES operational requirements and has not resumed (LANL 2007, 098492). Details on the neutron access holes, TDR probes, the cover, and the gopher barrier boundary are provided in the HIR (LANL 2007, 098492).

7.3 Area 2A Experimental Shafts: SWMU 49-001(c)

7.3.1 Site Description and Operational History

SWMU 49-001(c), known as Area 2A, is a row of experimental shafts also located within the northeast corner of the MDA AB NES boundary (Figure 7.2-1). Area 2A is approximately 100 ft × 30 ft in area. Six experimental shafts were drilled in this area in a single row, spaced 25 ft apart, after Area 2 was closed in response to the contamination release at shaft 2-M [SWMU 49-001(g)]. Four shafts in Area 2A were used for experiments involving radioactive materials. Plutonium was used in three of these shafts and uranium-235 was used in one shaft. The shafts used for shots with radioactive materials were 57-ft and 58-ft-deep. Two shafts, both 58 ft deep, were backfilled without being used for shots. Lead typically was present in the experimental packages, and small amounts of beryllium may have been used in some experiments (LANL 2007, 098492).

7.3.2 Summary of Previous Investigations

During the 1994 RFI, six surface samples (0 to 0.5 ft bgs) were collected from SWMU 49-001(c) and submitted for analysis of gamma-emitting radionuclides, gross alpha, gross beta, isotopic plutonium, and TAL metals. Data from the 1994 Phase I RFI data are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Phase I RFI data showed uranium as the only inorganic chemical detected above the soil BV. Radionuclides detected, or detected above BVs/FVs in Phase I RFI samples, were plutonium-239/249, potassium-40, radium-226, and thorium-232.

7.4 Area 2B Experimental Shafts: SWMU 49-001(d)

7.4.1 Site Description and Operational History

SWMU 49-001(d), known as Area 2B, is an area consisting of experimental shafts also located in the northeast corner of the MDA AB NES boundary (Figure 7.2-1). Area 2B is approximately 200 ft ×100 ft in area. Shafts at Area 2B were aligned on a staggered grid with 11 shafts installed and another 15 proposed, but never drilled. Six shafts were used for experiments with radioactive materials. Plutonium was used as the principal material in five of these shafts, which ranged from 57-ft to 58-ft-deep, and uranium-235 was used in the other shaft, which was 78-ft-deep. One 60-ft-deep shaft was used as a gas-expansion hole, and four other shafts (three 58-ft-deep and one 78-ft-deep) were backfilled without being used. Two pipe dump holes were installed approximately 100 ft south of the shaft area. Substantial amounts of lead were typically present in the experimental packages, and small amounts of beryllium may have been used in some experiments (LANL 2007, 098492).

7.4.2 Summary of Previous Investigations

During the 1994 RFI, six surface samples (0 to 0.5 ft bgs) were collected from SWMU 49-001(d) and submitted for analysis of gamma-emitting radionuclides, gross alpha, gross beta, isotopic plutonium, and TAL metals. Data from the 1994 Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Phase I RFI data showed no inorganic chemicals detected above BVs. Radionuclides detected, or detected above BVs/FVs in Phase I RFI samples, were plutonium-239/249, radium-226, and thorium-232.

7.5 Area 2 Contaminated Surface Soil: SWMU 49-001(g)

7.5.1 Site Description and Operational History

SWMU 49-001(g) is an area consisting of soil contamination located to the north of SWMUs 49-001(b) and 49-001(c), resulting from the transport of surface and near-surface radionuclide contamination associated with the shaft 2-M incident at Area 2 discussed in section 2.2 of the HIR (LANL 2007, 098492) (Figure 7.2-1). SWMU 49-001(g) is the area of highest runoff and erosion potential, located on a slope that runs from the mesa top portion of the MDA AB NES north to the bottom of Water Canyon (LANL 2007, 098492).

7.5.2 Summary of Previous Investigations

During the 1994 RFI, 10 surface samples (0 to 0.5 ft bgs) were collected from SWMU 49-001(g) and submitted for analysis of gamma-emitting radionuclides, gross alpha, gross beta, isotopic plutonium, and TAL metals. Data from the 1994 Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Phase I RFI data showed cadmium and uranium were the only inorganic chemicals detected above BVs. Radionuclides detected, or detected above BVs/FVs in Phase I RFI samples, were cesium-137, plutonium-238, plutonium-239/249, potassium-40, radium-226, and thorium 232.

7.6 Site Contamination

7.6.1 Soil and Rock Sampling

Data collected from the sites associated with MDA AB [SWMUs 49-001(b, c, d, g)] are addressed together because of their geographic proximity and similar operational history. Additional samples were collected in 2009–2010 at MDA AB, and the overland corridors associated with MDA AB, per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected either by hand auger or by a drill rig equipped with a continuous core barrel sampling system.

In the 2009–2010 investigation, surface samples were collected across the site and along the overland corridors to characterize the nature and extent of surface contamination across MDA AB and the overland corridors that may have been used to transport equipment and cable during the testing period. Boreholes were drilled around the perimeter of the experimental shaft area extending to a total depth of 130 ft bgs, and samples collected to characterize the subsurface contamination at MDA AB. All required samples were submitted through the SMO for analysis at off-site laboratories. Sample locations were surveyed by the Laboratory using a GPS (Table 7.4-1). Sample collection and screening methods are described in Appendix B.

A total of 116 samples (104 soil/fill and 12 tuff), plus 15 field duplicates, were collected in 2009–2010 from 56 locations at MDA AB and the overland corridor. Data from the samples collected in 2009–2010 were combined with decision-level data from previous investigations. The final decision-level dataset includes 179 samples (119 soil/fill and 60 tuff), plus 18 field duplicates, collected in 1998 and 2009–2010 from 66 locations at MDA AB, with a maximum sample depth of 150 ft bgs. The sample locations from MDA AB are presented on Plate 8 and sample locations from the overland corridors are presented on Plate 5.

Table 7.4-2 presents the samples collected and the analyses requested.

7.6.2 Soil and Rock Field-Screening Results

Organic vapors were not detected above ambient air during headspace (PID) screening of samples at MDA AB. No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 7.4-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

Two surface samples from MDA AB exceeded the gross-alpha screening threshold and were collected and submitted for appropriate laboratory analyses. Eight additional stepout surface and shallow subsurface screening samples from four locations were collected and screened for gross-alpha and -beta analysis, but did not exceed screening thresholds and were not submitted for laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at MDA AB are presented in Tables D-7 through D-15 in Appendix D.

No samples collected from the overland corridors associated with MDA AB exceeded the gross-alpha or -beta screening thresholds. The gross-alpha and -beta screening results that guided additional sampling at MDA AB are presented in Tables D-34 through D-38 in Appendix D.

7.6.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV at MDA AB and the overland corridors. The sampling locations from MDA AB are presented on Plate 8; the overland corridor sample locations associated with MDA AB are presented on Plate 5. Table 7.4-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Soil

A total of 113 soil/fill samples were collected and analyzed for inorganic chemicals; 108 samples were analyzed for TAL metals and 5 samples were analyzed for stable isotopes. Table 7.4-2 summarizes samples collected and the requested analyses for each sample.

Table 7.4-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no BVs, or with DLs above BVs. Calcium, cobalt, copper, lead, manganese, selenium, thallium, vanadium, and zinc were detected above BVs or have DLs above BVs. The detected concentrations of inorganic chemicals above BVs are presented on Plate 9 for MDA AB site locations and Plate 6 for MDA AB overland corridors locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

A total of 14 tuff samples were collected and analyzed for inorganic chemicals; 12 samples were analyzed for TAL metals, cyanide, and perchlorates and 2 samples were analyzed for stable isotopes. Table 7.4-2 summarizes samples collected and the requested analyses for each sample.

Table 7.4-4 presents the inorganic chemicals above BVs and detected inorganic chemicals that have no BV. Arsenic, barium, cyanide (total), lead, manganese, selenium, and thallium were detected in tuff above BVs or have DLs above BVs. The detected concentrations of inorganic chemicals above BVs or with DLs above BVs are presented on Plate 9 for MDA AB site locations and Plate 6 for MDA AB overland corridors locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected at MDA AB. The sampling locations from MDA AB are presented on Plate 8. Table 7.4.5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Soil samples collected from MDA AB and the overland corridors were not analyzed for organic chemicals.

Organic Chemicals in Tuff

A total of 12 tuff samples were collected and analyzed for organic chemicals. Each sample was analyzed for VOCs, SVOCs, and explosive compounds. Table 7.4-2 summarizes samples collected and the requested analyses for each sample.

Table 7.4-5 presents the detected concentrations of organic chemicals in tuff. One organic chemical [bis(2-ethylhexyl)phthalate] was detected in three tuff samples. The detected concentrations of organic chemicals are presented on Plate 10.

Radionuclides

Radionuclides were detected or detected above BVs/FVs at MDA AB and the overland corridors. The sampling locations from MDA AB are presented on Plate 8; the overland corridor sample locations associated with MDA AB are presented on Plate 5. Table 7.4-6 presents the concentrations of radionuclides detected or detected above BVs/FVs.

Radionuclides in Soil

A total of 120 soil/fill samples were collected and analyzed for radionuclides; 114 samples were analyzed for isotopic uranium, 108 samples were analyzed for americium-241, 106 samples were analyzed for isotopic plutonium, 104 samples were analyzed for radionuclides by gamma spectroscopy, and 16 samples were analyzed for strontium-90. Table 7.4-2 summarizes the samples collected and the requested analyses for each sample.

Table 7.4-6 presents the radionuclides detected or detected above BVs/FVs. Americium-241, cesium-137, plutonium-238, plutonium-239/240, and uranium-238 were detected above BVs/FVs in soil. The sampling locations with activities of radionuclides detected, or detected above BVs/FVs, are shown on Plate 11 for MDA AB site locations and Plate 7 for MDA AB overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

A total of 58 tuff samples were collected and analyzed for radionuclides; 57 samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium and one sample was analyzed for isotopic uranium only. Table 7.4-2 summarizes the samples collected and the requested analyses for each sample.

Table 7.4-6 presents the radionuclides detected or detected above BVs/FVs. Americium-241, plutonium-238, plutonium-239/240, and tritium were detected in tuff. The sampling locations with radionuclides detected, or detected above FVs, are shown on Plate 11 for MDA AB site locations and Plate 7 for MDA AB overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

7.6.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the surface and shallow subsurface investigation at MDA AB was to define the nature and extent of surface contamination, and the intent of the four perimeter boreholes was to characterize the vertical and lateral extent of contamination beneath MDA AB and define the lateral subsurface footprint of the area (LANL 2008, 102691, pp. 30 and 39).

The nature and extent of inorganic chemicals and radionuclides at MDA AB are not defined, while the nature and extent of organic chemicals at MDA AB are defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides in the surface and subsurface at MDA AB.

Inorganic Chemicals

As part of the review of the nature and extent of contamination at MDA AB, the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously to the inorganic chemical and medium-specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (calcium and zinc) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations are not different from background.

The following inorganic chemicals (cobalt, copper, cyanide, lead, manganese, selenium, thallium, and vanadium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4) and only outlier data points are interpreted as elevated with respect to TA-49 background. At MDA AB, the concentrations of several inorganic chemicals in tuff, including arsenic and barium, are above the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum value in the background dataset), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4 . Therefore, the extent of arsenic and barium are defined. The scatter plots for these chemicals in Qbt 4 are presented in Appendix I in Figure I-2. At MDA AB, outlier data points are observed for lead and manganese and these inorganic chemicals are interpreted as exceeding the local inorganic chemical background for TA-49. The scatter plots for these chemicals in Qbt 4 are presented in Appendix I in Figures I-3 and I-4.

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Arsenic was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of arsenic are defined.

Barium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of barium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in three at site locations, at 49-610151 and corridor locations 49-610086, 49-610087. The maximum detected concentration of 10,300 mg/kg was detected in the deeper sample at location 49-610151. Statistical tests were performed to determine if calcium in soil is different from background. The statistical test results are presented in Table H-3 and the box plot for calcium in soil is presented in Figure H-4. The results of both the Gehan test and the quantile test indicate that calcium in soil is not different from background. The lateral and vertical extent of calcium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in seven samples (one site location and six corridor locations). Cobalt concentrations decreased with depth at corridor locations 49-610079 and 49-610091 and increased with depth at site location 49-610139 and corridor locations 49-610074, 49-610075, 49-610094, and 49-610095, with a maximum detected concentration of 14.1 mg/kg at location 49-610094. The corridor samples consist of a transect with three locations spaced 10 ft apart. Cobalt was not detected in all three locations at any of the transects. The lateral extent of cobalt in corridor locations 49-610074, 49-610075, 49-610094, and 49-610095 is defined. The lateral extent of cobalt at location 49-610139 is defined by corridor locations 49-610083–49-610085 where cobalt was not detected above BV. The vertical extent of cobalt at locations 49-610139, 49-610074, 49-610075, 49-610094, and 49-610095 is defined by the perimeter boreholes where cobalt was not detected above BV. Cobalt concentrations (8.8 to 14.1 mg/kg) detected in samples collected from MDA AB and the corridor associated with MDA AB are essentially the same across the site and do not change with depth. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at site locations 49-610133 and 49-610151, with a maximum detected concentration of 15.7 mg/kg at location 49-610133. The concentration of copper at both locations is below the maximum background concentration (16 mg/kg). Copper decreased with depth at location 49-610133, but increased with depth at location 49-610151. Copper was not detected above BV in nearby surface samples from similar depths located within 50 ft or in the corridor samples. Copper was not detected above BV in the perimeter boreholes. The lateral and vertical extent of copper are defined.

Cyanide was not detected in site samples, but had DLs (0.51 to 0.63 mg/kg) above BV (0.5 mg/kg) in five tuff samples. The lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at site location 49-610137 and corridor location 49-610094. Lead increased with depth at both locations, with a maximum concentration of 47.3 mg/kg at location 49-610137. Lead was not detected above BV in site-surface or subsurface samples collected from similar and deeper depths located within 25 ft of site location 49-610137, and was not detected above BV in the surface and deeper samples collected at the other two corridor locations located within 10 ft of location 49-610094. Lead was detected in Qbt 4 at concentrations ranging from 1.1 to 69 mg/kg (Figure I-3). One detected concentration of lead was observed in an outlier data point at a concentration of 69 mg/kg and is interpreted as exceeding local area background at borehole location 49-610943. Lead concentrations decrease with depth in borehole location 49-610943 and lead concentrations decrease or are not detected to the east, south, and west at perimeter borings 49-610942, 49-610944, and 49-610945. There is no borehole to the north of location 49-610943 and lead is a likely site contaminant. The vertical extent of lead is defined, but the lateral extent of lead is not defined.

Manganese was detected above the soil BV (671 mg/kg) in the deeper sample in two samples at site location 49-610139 and corridor location 49-610094. The manganese concentrations (704 to 1010 mg/kg) are below the maximum soil background concentration (1100 mg/kg). Manganese was detected in Qbt 4 at concentrations ranging from 91.7 to 487 mg/kg (Figure I-4). One detected concentration of manganese was observed in an outlier data point at a concentration of 487 mg/kg and is interpreted as slightly above the local area background at borehole location 49-610945. Manganese concentrations decrease with depth in borehole location 49-610945 and manganese concentrations decrease or are not detected to the east, north, and west at perimeter borings 49-610942, 49-610943, and 49-610944. There is no borehole to the south of location 49-610945. The concentration of manganese is only slightly above the local area background. The lateral and vertical extent of manganese are defined.

Selenium was not detected above the soil BV (1.52 mg/kg), but had DLs (1.7 mg/kg) above the soil BV in one sample. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3) selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Thallium was not detected above the soil BV (0.73 mg/kg), but had DLs (1 to 1.3 mg/kg) above BV in two samples. Thallium was not detected above the tuff BV (1.1 mg/kg), but had DLs (1.2 mg/kg) above BV in one tuff sample. The lateral and vertical extent of thallium are defined.

Vanadium was detected above the soil BV (39.6 mg/kg) in the deeper sample in one sample at corridor location 49-610094. The detected concentration (40.2 mg/kg) is below the maximum soil background concentration (56.5 mg/kg). Vanadium was not detected in the other two corridor locations from the same transect. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at locations 49-610131 and 49-610182, with a maximum detected concentration of 85.2 mg/kg at location 49-610131. Concentration decreased with depth at both locations. Statistical tests were performed to determine if the zinc in soil is different from background. The statistical test results are presented in Table H-3 and the box plot is presented in Figure H-5. The results of both the Gehan and quantile tests indicate that zinc in soil is not different from background. The lateral and vertical extent of zinc in soil are defined.

Organic Chemicals

Bis(2-ethylhexyl)phthalate was detected at borehole locations 49-610942, 49-610943, and 49-610945. The maximum detected concentration (0.28 mg/kg) was at location 49-610943. Bis(2-ethylhexyl)phthalate was not detected at depth at borehole locations 49-610942 and 49-610945. Bis(2-ethylhexyl)phthalate was detected in the deepest sample at borehole location 49-610945. All detected concentrations of bis(2-ethylhexyl)phthalate were below the EQL (0.34 mg/kg). The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Radionuclides

Americium-241 was detected above FV (0.013 pCi/g) or detected in 12 soil samples and five tuff samples, with a maximum detected concentration of 4.91 pCi/g in the deeper sample at location 49-610151. Americium-241 decreased with depth at borehole locations 49-02901, 49-02906, and 49-02907, and five site locations. Americium-241 increased with depth at site locations 49-610890, 49-610151, and 49-610894, and corridor location 49-610077. Amercium-241 was not detected in the other two corridor locations in the transect with 49-610077. The lateral and vertical extent of americium-241 are defined in the overland corridor samples. Americium-241 was not detected above FV in perimeter borehole locations 49-610942, 49-610943, 49-610944, and 49-610945. Detected concentrations of americium-241 decrease to the east and west of location 49-610890 and americium-241 was not detected to the north. Americium-241 decreased or was not detected above the FV to the east, west, and south of location 49-610151. The lateral extent of americium-241 is defined at location 49-610151, but the vertical extent is not defined.

Cesium-137 was detected above FV (1.65 PCi/g) in three soil samples at site locations 49-610133, 49-610134, and 49-610151. Cesium-137 was not detected in samples from the overland corridors. Cesium-137 increased with depth at all three locations. Cesium-137 concentrations decreased to the east and west of location 49-610151, and were not detected above FV in surface samples 49-610132, 49-610137, and 49-610138, located a maximum of 80 ft from locations 49-610133, 49-610134, and 49-610151. Cesium-137 was not detected above FV in perimeter boreholes 49-610942, 49-610943, 49-610944, and 49-610945. The lateral and vertical extent of cesium-137 are defined.

Plutonium-238 was detected above FV (0.023 pCi/g) or at depths where the FV does not apply in two soil samples and six tuff samples at borehole locations 49-02901 and 49-02906 and site locations 49-610151 and 49-610890. Plutonium-238 was not detected in samples collected from the overland corridors. Concentrations ranged from 0.038-1.41 pCi/g with the maximum detected concentration at the deep sample at location 49-610151. Plutonium-238 decreased with depth at borehole locations 49-02901 and 49-02906 and increased with depth at site locations 49-610151 and 49-610890. Plutonium-238 was not detected above FV in surface samples collected form similar depth located 25 to 80 ft from locations 49-610151 and 49-610890. Plutonium-238 was not detected above FV in perimeter borehole 49-610942, 49-610943, 49-610944, and 49-610945, and location 49-610485, located in Area 12, approximately 20 ft east of borehole location 49-02901.The lateral extent of plutonium-238 is defined, the vertical extent of plutonium-238 is not defined at location 49-610151.

Plutonium-239/240 was detected above FV (0.054 pCi/g), or at depths where FV does not apply, in 17 soil samples and one tuff sample across the site, with a maximum detected concentration at 73.5 pCi/g at site location 49-610151. Plutonium-239/240 increased with depth at site locations 49-610131, 49-610151, 49-610890, 49-610894, and corridor location 49-610077. Plutonium-239/240 was not detected above FV at the other two locations in the transect with corridor location 49-610077. Plutonium-239/240 concentration decreased to the east and west of location 49-610890 and was not detected above FV to the north. Plutonium-238/239 concentrations decreased to the west, south, and east of location 49-610151. There are no sample locations east of location 49-610131 to determine if concentration deceases to the east at the southern end of the site. The lateral extent of plutonium-238/239 is defined to the north, south and west. The lateral extent of plutonium-239/240 is not defined to the east. The vertical extent of plutonium-239/240 is not defined at location 49-610151.

Tritium was detected in four tuff samples at borehole locations 49-610944 and 49-610945. Concentrations decreased with depth at both borehole locations and were not detected in the other two borehole locations at this site. The lateral and vertical extent of tritium are defined.

Uranium-238 was detected above BV (2.29 pCi/g) in one soil sample at corridor surface location 49-610077. Concentrations decreased with depth and uranium-238 was not detected at the other two corridor locations within 10 ft of location 49-610077. The lateral and vertical extent of uranium-238 are defined.

7.6.5 Subsurface Vapor Sampling

In 2010, a total of nine pore-gas samples were collected from borehole locations 49-610942, 49-610943, 49-610944, and 49-610945 and analyzed for VOCs and tritium. Table 7.4-7 lists the pore-gas samples collected and the analyses requested.

7.6.5.1 Subsurface Vapor Sample Analytical Results

Table 7.4-8 presents the VOCs detected in the pore-gas samples collected from SWMU 49-001(b), SWMU 49-001(c), and SWMU 49-001(d). The sampling location and detected concentrations are shown on Plate 10. The VOCs detected in pore gas are acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-].

Table 7.4-9 presents the detected activities of tritium in pore-gas samples collected from SWMU 49-001(b), SWMU 49-001(c), and SWMU 49-001(d). The sampling location and detected concentrations are shown on Plate 11.

7.6.5.2 Nature and Extent of Contamination in Subsurface Pore Gas

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from the interval corresponding to the base of the formation Qbt 4, from the corresponding interval closest to the TD of the experimental shaft, and from the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the groundwater MCL, the borehole would be completed as a vapor-monitoring well.

Acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-] were detected in at least one sample collected from borehole locations 49-610942, 49-610943, 49-610944, and 49-610945. Tritium was detected in samples from borehole locations 49-610943, 49-610944, and 49-610945.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2).

Tritium was detected at a maximum concentration of 17,382 pCi/g in a sample collected from 79 to 81 ft bgs at borehole location 49-610945. Detected concentrations of tritium are below the groundwater MCL (20,000 pCi/L); therefore tritium is not a potential source of groundwater contamination.

The nature and extent of VOCs and tritium in pore gas are defined and the boreholes from MDA AB were not completed as vapor-monitoring wells.

7.6.6 Summary of Human Health Risk Screening

The extent of contamination is not defined at MDA AB [SWMUs 49-001(b), 49-001(c), 49-001(d), and 49-001(g)] and a human health risk-screening assessment was not performed.

7.6.7 Summary of Ecological Risk Screening

The extent of contamination is not defined at MDA AB [SWMUs 49-001(b), 49-001(c), 49-001(d), and 49-001(g)] and an ecological risk-screening assessment was not performed.

8.0 AREA 3: BACKGROUND AND FIELD-INVESTIGATION RESULTS

This section presents the background, site description and operational history, and summary of previous investigations for Area 3. This section also presents the field-investigation results from Area 3 and the associated overland corridor locations and discusses the nature and extent of contamination of the sampled media.

8.1 Background of Area 3

Area 3 is one of the six areas within the NES at TA-49 that contains subsurface test shafts used from 1959 to 1961 for underground hydronuclear safety, tracer, and containment experiments. Review of aerial photographs has revealed linear features that indicate potential overland corridors extending radially from Area 5 and Area 3 (Purtymun and Stoker 1987, 066688).

8.1.1 Historical Releases

There are no documented releases associated with activities at Area 3.

8.1.2 Relationship to Other SWMUs and AOCs

SWMU 49-001(e) is located within Area 3 . SWMU 49-006 and AOCs 49-005(b) and 49-008(a) within Area 5, the former Central Control Area, are located directly northeast of SWMU 49-001(e). Area 5 is located outside the TA-49 NES boundary and is discussed in the IR for sites at TA-49 outside the NES boundary (LANL 2010, 109318). SWMU 49-007(b) is located within the Laboratory's HDT area, which houses the HDT training facility building 49-113 and associated HE magazine building 49-114 used by the HDT team for small-scale explosives training exercises. SWMU 49-007(b), the septic system for the HDT area, was approved for NFA in 2005. The HDT area is located directly north of SWMU 49-001(e) and is discussed in the IR for sites at TA-49 outside the NES boundary (LANL 2010, 109318).

The overland corridors associated with Area 3 extend from the northeast corner of Area 3 to the southwest corner of Area 5 (Figure 1.1-1 and Figure 2.1-6).

8.2 SWMU 49-001(e): Experimental Shafts

8.2.1 Site Description and Operational History

SWMU 49-001(e), known as Area 3, is an area consisting of experimental shafts located in the southwest corner of the MDA AB NES boundary (Figure 8.2-1). Area 3 is approximately 100 ft × 100 ft in area. A total of 13 shafts, ranging between 57 and 142 ft deep, were drilled in a grid-like pattern. Seven of the shafts were shot with a tracer, four of the shafts were used for containment shots, and the remaining two shafts were not used and backfilled (LANL 2007, 098492). Area 3 was used exclusively to develop confinement and sample-recovery techniques used in the other experimental areas.

8.2.2 Summary of Previous Investigations

During the 1987 soil and vegetation radiological-screening survey, 40 surface samples were collected from points on a 25-ft grid centered over the Area 3 shafts; and 45 vegetation samples were collected within and around Area 3 (LANL 1992, 007670). Samples were analyzed for radionuclides and results showed radionuclide activities at or slightly above BVs/FVs (LANL 1992, 007670). During the 1995 RFI conducted at Area 3, SWMU 49-001(e), 20 surface samples (0 to 0.5 ft bgs) were collected on a 25-ft x 25-ft grid centered over the Area 3 shafts. Each sample was field screened for gross radiation; radiation was not detected above background. All 20 samples were submitted for analysis of gamma-emitting radionuclides; 10 were submitted for analysis of TAL metals and isotopic plutonium (LANL 2007, 098492). Inorganic chemicals detected above soil BVs included copper, lead, total uranium and zinc. Copper and lead were each detected above the soil BV in one sample. Total uranium was detected above the soil BVs in 10 samples. Zinc was detected above the soil BV in 1 sample. Antimony and cadmium were not detected above soil BVs but had DLs above BVs. No radionuclides were detected or detected above

BVs/FVs in the 1995 RFI samples collected from SWMU 49-001(e). Historical sample locations and detected concentrations are provided on plates and in figures and tables presented below.

Prior to this investigation, no sampling was conducted in the overland corridors.

8.2.3 Site Contamination

8.2.3.1 Soil and Rock Sampling

Additional samples were collected in 2009–2010 at SWMU 49-001(e) and the overland corridors associated with SWMU 49-001(e), per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected either by hand auger or by a drill rig equipped with a continuous core-barrel sampling system.

In the 2009–2010 investigation, surface samples were collected across the site and along the overland corridors to characterize the nature and extent of surface contamination across SWMU 49-001(e) and the overland corridors that may have been used to transport equipment and cable during the testing period. Boreholes were drilled around the perimeter of the experimental shaft area extending to a TD of 182 ft bgs and samples collected to characterize the subsurface of contamination beneath SWMU 49-001(e). All required samples were submitted through the SMO for analysis at off-site laboratories. All 2009–2010 sample locations were surveyed by the Laboratory using a GPS (Table 8.2-1). Sample collection and screening methods are described in Appendix B.

A total of 174 samples (122 soil/fill and 52 tuff), plus 20 field duplicates, were collected in 2009–2010 from 89 locations at SWMU 49-001(e) and the overland corridors. Data from the samples collected in 2009–2010 were combined with decision-level data from previous investigations. The final decision-level dataset includes 194 samples (142 soil/fill and 52 tuff), plus 21 field duplicates, collected in 1995 and 2009–2010 from 109 locations at SWMU 49-001(e), with a maximum sample depth of 192 ft bgs. The sample locations for SWMU 49-001(e) are presented on Plate 12 and samples locations from the overland corridors are presented on Plate 5.

Table 8.2-2 presents the samples collected and the analyses requested.

8.2.3.2 Soil and Rock Sample Field-Screening Results

Organic vapors were not detected at more than 1.7 ppm above ambient air during headspace (PID) screening of samples at SWMU 49-001(e) and the overland corridors. No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 8.2-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

A total of 22 surface and shallow subsurface samples at SWMU 49-001(e) exceeded the gross-alpha and/or -beta screening thresholds and additional samples were collected and submitted for appropriate laboratory analysis. Additionally, 56 stepout surface and shallow subsurface screening samples from 28 locations were collected and screened for gross-alpha and -beta analysis, but did not exceed screening thresholds and were not submitted for laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(e) are presented in Tables D-16 through D-21 in Appendix D.

One surface sample collected from the SWMU 49-001(e) corridor exceeded the gross-alpha screening threshold; therefore an additional 12 corridor samples from 6 locations were submitted for appropriate laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(e) are presented in Table D-36 in Appendix D.

8.2.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV at SWMU 49-001(e) and the overland corridors. The sampling locations from SWMU 49-001(e) are shown on Plate 12; the overland corridor sample locations associated with SWMU 49-001(e) are presented on Plate 5. Table 8.2-4 presents the concentrations of inorganic chemicals detected above BVs, detected with no BVs, or with DLs above BVs.

Inorganic Chemicals in Soil

A total of 126 soil/fill samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Table 8.2-2 summarizes samples collected and the requested analyses for each sample.

Table 8.2-4 presents the inorganic chemicals above BVs, with DLs above BVs, and detected with no BV. Antimony, barium, cadmium, calcium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, sodium, thallium, total uranium, vanadium, and zinc were detected in soil above BVs or have DLs above BVs. The detected concentrations of inorganic chemicals above BVs are presented on Plate 13 for SWMU 49-001(e) site locations and Plate 6 for SWMU 49-001(e) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

A total of 44 tuff samples were collected and analyzed for inorganic chemicals. All tuff samples collected from tuff were analyzed for TAL metals; 15 samples were also analyzed for cyanide and perchlorate. Table 8.2-2 summarizes samples collected and the requested analyses for each sample.

Table 8.2-4 presents the inorganic chemicals above BVs, with DLs above BVs, and detected with no BV. Aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, cyanide (total), iron, lead, magnesium, nickel, perchlorate, selenium, thallium, and vanadium were detected, detected above BVs, or have DLs above BVs. The detected concentrations of inorganic chemicals detected or detected above BVs are presented on Plate 13 for SWMU 49-001(e) site locations and Plate 6 for SWMU 49-001(e) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were not detected at SWMU 49-001(e). The sampling locations at SWMU 49-001(e) are presented on Plate 12.

Organic Chemicals in Soil

Soil samples collected from SWMU 49-001(e) and the overland corridors were not analyzed for organic chemicals.

Organic Chemicals in Tuff

A total of 15 tuff samples were collected and analyzed for organic chemicals. Each sample was analyzed for VOCs, SVOCs, and explosive compounds. The sampling locations are shown on Plate 12. No organic chemicals were detected in tuff samples at SWMU 49-001(e).

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, at SWMU 49-001(e). The sampling locations from SWMU 49-001(e) are shown on Plate 12; the overland corridor sample locations associated with SWMU 49-001(e) are presented on Plate 5. Table 8.2-5 presents the concentrations of radionuclide activities above BVs/FVs or detected with no BV/FV.

Radionuclides in Soil

A total of 142 soil/fill samples were collected and analyzed for radionuclides by gamma spectroscopy; 116 samples were also analyzed for americium-241 and isotopic uranium; 24 samples were analyzed for iodine-24; 7 samples were analyzed for strontium-90 and technetium-99; and 126 samples were analyzed for isotopic uranium. Table 8.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 8.2-5 presents the radionuclides detected or detected above BVs/FVs. Cesium-134 and cesium-137 were detected or detected above FV in soil. The radionuclides detected, or detected above FVs, are presented on Plate 14 for SWMU 49-001(e) site locations and Plate 7 for 49-001(e) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

A total of 52 tuff samples were collected and analyzed for radionuclides; 44 samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium; 37 samples were analyzed for radionuclides by gamma spectroscopy; 15 samples were analyzed for tritium; and 11 samples were also analyzed for iodine-129, strontium-90, and technetium-99. Table 8.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 8.2-5 presents the radionuclides detected or detected above BVs/FVs. Cesium-137 was detected or detected above FV in tuff. The sampling locations of radionuclides detected, or detected above BVs/FVs, are shown on Plate 14 for SWMU 49-001(e) site locations and Plate 7 for 49-001(e) overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

8.2.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the surface and shallow subsurface investigation at SWMU 49-001(e) was to define the nature and extent of surface contamination, and the intent of the four perimeter boreholes was to characterize the vertical and lateral extent of contamination beneath SWMU 49-001(e) and define the lateral subsurface footprint of the area (LANL 2008, 102691, p. 30 and p. 39).

The nature and extent of inorganic chemicals and radionuclides at SWMU 49-001(e) are not defined, while organic chemicals at SWMU 49-001(e) were not detected and have nature and extent defined. The following sections discuss the spatial distribution of inorganic chemicals and radionuclides at SWMU 49-001(e).

Inorganic Chemicals

As part of the review of the nature and extent of contamination at SWMU 49-001(e), the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously to the inorganic chemical and medium specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (calcium, sodium, and zinc) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations are not different from background.

The following inorganic chemicals (antimony, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, perchlorate, thallium, selenium, total uranium, and vanadium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4) and only outlier data points are interpreted as elevated with respect to TA-49 background. At SWMU 49-001(e), the concentrations of several inorganic chemicals in tuff, including aluminum, manganese, nickel and selenium are above the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4 . Therefore, the lateral and vertical extent of these inorganic chemicals in tuff are defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4. Outlier data points are observed for arsenic, barium, calcium, cobalt, copper, lead, and vanadium in Qbt 4 and the detected concentrations of these inorganic chemicals are interpreted as elevated with respect to local BV (Figures I-2, I-3, and I-4).

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Aluminum was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of aluminum are defined.

Antimony was not detected above the soil BV (0.83 mg/kg), but had DLs (0.85 to 5.7 mg/kg) above BV in 12 samples. Antimony was not detected above the tuff BV (0.5 mg/kg), but had DLs (0.5 to 0.68 mg/kg) above BV in 5 tuff samples. Antimony was not detected in soil or tuff; therefore, the lateral and vertical extent of antimony are defined.

Arsenic was detected in Qbt 4 at concentrations ranging from 0.46 to 10.3 mg/kg (Figure I-2). The detected concentrations of arsenic in outlier data points ranged from 5.6 to 10.3 mg/kg and are interpreted as exceeding local BV. Arsenic concentrations ranging from 5.6 to 10.3 mg/kg were detected at site locations 49-609308, 49-609311, 49-609313, 49-609317, 49-609322, 49-609326, 49-609332, 49-609983, 49-609984, and corridor location 49-610023. Concentrations decreased with depth at borehole locations 49-609983 and 49-609984 and increased with depth at all other locations. The vertical extent of arsenic at locations 49-609322, 49-609308, 49-609311, 49-609313, and 49-609326 are defined by borehole locations 49-609981 and 49-609983 where arsenic decreased with depth. Arsenic was not detected at similar concentrations in nearby surface samples collected from similar depths. Arsenic was detected at a concentration of 10.2 mg/kg in a sample collected from 0.5 to 1.5 ft bgs at location 49-609317, located southeast of the perimeter boreholes. The lateral extent of location 49-609317 is defined by locations 49-609407 and 49-609414 where arsenic is not detected. The vertical extent of arsenic at location 49-609317 is not defined.

Barium was detected above the soil BV (295 mg/kg) in six (two site locations and four corridor locations) samples. Concentrations decreased with depth at corridor location 49-61007 and increased with depth at corridor locations 49-610002, 49-610009, 49-610010 and site locations 49-609312 and 49-609314. The maximum concentration of barium (654 mg/kg) was detected at corridor location 49-610002. Barium was not detected above BV in nearby surface samples from similar depths at site and corridor locations. Barium concentration decreased with depth in perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609983. Barium was detected in Qbt 4 at concentrations ranging from 8 to 533 mg/kg (Figure I-2). The detected concentrations of barium in outlier data points ranged from 320 to 533 mg/kg and are interpreted as exceeding local BV. Concentrations of barium ranging from 320 to 533 mg/kg were detected at site locations 49-609308, 49-609311, and 49-609981, and corridor location 49-610031. The vertical extent of barium at locations 49-609308 and 49-609311 are defined by borehole locations 49-609981 and 49-609983 where barium decreased with depth. Barium is not detected at similar concentrations in nearby surface samples collected from similar depths at site and corridor locations. The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in seven (four site locations and three corridor locations) samples. The concentrations decreased with depth at borehole location 49-609982 and increased with depth at site locations 49-609311, 49-609308, 49-609313 and corridor locations 49-610017, 49-610021 and 49-610023. Concentration of beryllium exceeded the maximum background concentration (1.8 mg/kg) at site locations 49-609308 and 49-609313 with concentrations of 1.9 and 2.3 mg/kg, respectively. Beryllium was not detected above BV in nearby site or corridor surface samples. The lateral extent of beryllium is defined. The vertical extent of beryllium in site samples is defined by perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609983 where beryllium decreased with depth or was not detected above BV. Beryllium concentrations were less than the maximum background concentration (1.8 mg/kg) in the corridor locations. The vertical extent of beryllium is defined.

Cadmium was not detected above the soil BV (0.4 mg/kg), but had DLs (0.58 to 0.6 mg/kg) above BV in 10 samples. The lateral and vertical extent of cadmium are defined because cadmium was not detected in site samples.

Calcium was detected above the soil BV (6120 mg/kg) in five samples at site locations 49-609309 and 49-609314 and corridor locations 49-610002, 49-610010, and 49-610014. The maximum detected concentration of 14,800 mg/kg was detected in the deeper sample at location 49-609314. Statistical tests were performed to determine if calcium in soil is different from background. The statistical test results are presented in Table H-4 and the box plot for calcium in soil is presented in Figure H-5. The results of both the Gehan and quantile tests indicate that calcium in soil is not different from background. Calcium was detected in Qbt 4 at concentrations ranging from 224 to 14,000 mg/kg (Figure I-2). Only one outlier data point was observed for calcium. One detected concentration (14,000 mg/kg) at location 49-609308 was interpreted as above local BV. Calcium concentrations decreased with depth at borehole locations 49-609981 and 49-609983. Calcium was not detected above the Qbt 2, Qbt 3, and Qbt 4 BV in nearby surface samples collected from similar depths. The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in 28 (15 site locations and 13 corridor locations) samples. Concentrations decreased with depth at borehole locations 49-609982 and 49-609984. Concentrations increased with depth at 13 site locations and 12 corridor locations. Chromium exceeded the maximum background concentrations at only five surface locations, including site locations 49-609307, 49-609308, 49-609310, 49-609313, and corridor location 49-610023. The maximum detected concentration of 21.2 mg/kg was at site location 49-609308 in a sample collected from 0.5 to 1.5 ft bgs. Chromium was not detected above BV in nearby site or corridor surface samples. Chromium was not detected above BV at borehole locations 49-609981 and 49-609983. Chromium concentrations in the corridor locations are essentially the same and are below the maximum background concentrations. The lateral and vertical extent of chromium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in 13 (2 site locations and 11 corridor locations) samples. The concentrations of cobalt decreased with depth at site location 49-609323 and corridor locations 49-609997, 49-610001, 49-610007, 49-610010, 49-611028, and 49-611025. Cobalt increased with depth at site location 49-609333, but the detected concentration (8.8 mg/kg) is below the maximum background concentration (9.5 mg/kg) and cobalt decreased with depth or was not detected above BV in perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609984. Cobalt increased with depth at corridor locations 49-610000, 49-610005, 49-610006, 49-610009, and 49-610011. Cobalt concentrations at 3 of the 5 corridor locations (9.4 to 25.3 mg/kg) were above the maximum background concentration. Cobalt in the corridor locations decreased with depth within each transect and cobalt was not detected above BV in all 3 locations at any of the transects. Cobalt was detected in Qbt 4 at concentrations ranging from 0.36 to 7 mg/kg (Figure I-2). The detected concentrations of cobalt in outlier data points ranged from 5.9 to 7 mg/kg and are interpreted as exceeding local BV. Cobalt concentrations ranging from 5.9 to 7 mg/kg were detected at corridor locations 49-610025 and 49-610031. Cobalt concentrations were essentially the same, and did not change laterally or with depth in samples collected from the corridor locations. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples at site locations 49-03011, 49-609307, and 49-609322. Concentrations decreased with depth at locations 49-609307 and 49-609322. Copper was not detected above BV in surrounding surface samples from similar depths. Copper was detected in Qbt 4 at concentrations ranging from 0.61 to 17.3 mg/kg (Figure I-3). The detected concentrations of copper in outlier data points ranged from 8.1 to 17.3 mg/kg and are interpreted as exceeding local BV. Concentrations of copper ranging from 8.1 to 17.3 mg/kg were detected at site locations 49-609307, 49-609308, and 49-609982, and corridor locations 49-610026 and 49-610027. Copper decreases at depth at borehole location 49-609982. Copper concentrations decrease to the north, south, east and west of locations 49-609307, 49-609308 and copper decreased with depth in borehole locations 49-609981 and 49-609983. The lateral and vertical extent of copper are defined for site samples. The maximum detected concentration of copper was detected at corridor location 49-610026. Concentrations decrease to the north, but no samples were collected south of 49-610026. The lateral and vertical extent of copper at location 49-610026 are not defined.

Cyanide was not detected above BV (0.5 mg/kg) in site samples, but had DLs (0.5 to 0.58 mg/kg) above BV in 10 tuff samples. The lateral and vertical extent of cyanide are defined because it was not detected.

Iron was detected above the soil BV (21,500 mg/kg) in six samples from site locations and above the tuff BV (14,500 mg/kg) in nine (five site locations and four corridor locations) samples. Concentrations decreased with depth at location 49-609312 and borehole location 49-609982, and increased with depth at four site locations and four corridor locations. Iron concentrations exceeded the maximum background (19,500 mg/kg) at two site locations (49-609308 and 49-609313) and one corridor location (49-610017), with a maximum detected concentration of 23,500 mg/kg at location 49-609308. Iron was not detected above BV in surrounding surface samples collected from similar depths in the site and corridor locations. The lateral extent of iron is defined. The vertical extent of iron is defined by perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609984 where iron was not detected above BV or decreased with depth.

Lead was detected above the soil BV (22.3 mg/kg) in eight (four site locations and four corridor locations) samples. The maximum detected concentration of 27.2 mg/kg was at site location 49-609313 in a sample collected from 0 to 0.5 ft bgs. Lead decreased with depth at site location 49-609313 and increased with depth at site locations 49-609314 and 49-609317 and corridor locations 49-609997, 49-610000, 49-610001, and 49-610005. All detected concentrations of lead in soil are below the maximum background concentration (28 mg/kg). Lead was detected in Qbt 4 at concentrations ranging from 1.2 to 54.4 mg/kg (Figure I-3). The detected concentrations of lead in outlier data points ranged from 27.4 to 54.4 mg/kg and are interpreted as exceeding local BV. Lead concentrations of 27.4 mg/kg and 54.4 mg/kg were detected at site locations 49-609317 and 49-609329, respectively. Location 49-609310 is located on the southwestern edge of the site and location 49-609317 is located on the southeastern edge of the site. The lateral and vertical extent of lead are not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in 20 (10 site locations and 10 corridor locations) samples, with a maximum detected concentration of 4110 mg/kg. Concentrations decreased with depth at borehole locations 49-609981, 49-609982, and 49-609984 and increased with depth at the other 7 site locations and 10 corridor locations. The maximum detected concentration of 4110 mg/kg was at site location 49-609308. Magnesium concentrations were detected above the maximum background concentration (2820 mg/kg) at site locations 49-609308, 49-609311, 49-609313, and corridor location 49-610023. The vertical extent of magnesium in site samples is defined by borehole locations 49-609981 and 49-609983 where magnesium decreased with depth or was not detected above the BV. Magnesium concentrations in the corridor samples were essentially the same and do not change laterally or with depth. The lateral and vertical extent of magnesium are defined.

Manganese was detected above the soil BV (671 mg/kg) in 13 (1 site sample and 12 corridor samples) samples. Concentrations increased with depth at site location 49-609333 and corridor locations 49-610000, 49-610004, 49-610005, 49-610006, and 49-610009. The maximum detected concentration of 2060 mg/kg was at location 49-610005 in a sample collected from 0.5 to 1.5 ft bgs. The detected concentration of manganese at 49-610005 is sporadic. The manganese concentration (747 mg/kg) at site location 49-609333 is below the maximum background concentration (1100 mg/kg). Manganese was not detected in nearby corridor surface samples collected from similar depths. Manganese decreased with depth in one of the three corridor samples from each transect except at corridor location 49-610005. Manganese was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of manganese are defined.

Mercury was detected (0.218 mg/kg) above the soil BV (0.1 mg/kg) in one sample at location 49-609315. Mercury decreased with depth and was not detected above BV in nearby surface samples from similar depths. The vertical and lateral extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in three corridor samples. Concentrations increased with depth at all three locations. The maximum detected concentration (17.5 mg/kg) was at location 49-609997, but all site concentrations are below the maximum background concentration (29 mg/kg). Nickel was not detected above BV in nearby surface samples collected from similar depths. Nickel was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of nickel are defined.

Perchlorate was detected in two tuff samples. The maximum detected concentration of 0.0058 mg/kg was at location 49-609982 in a sample collected from 3.2 to 5 ft bgs. Concentrations decreased with depth at borehole locations 49-609982 and 49-609984. Perchlorate was not detected in borehole locations 49-609981 and 49-609983. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in 15 samples, with a maximum detected concentration of 2.1 mg/kg. Additionally, there were 15 DLs above BV with a maximum DL of 2.3 mg/kg. The maximum detected concentration of 2.1 mg/kg was at location 49-609327 in a sample collected from 0.5-1.5 ft bgs. Detected concentrations of selenium were essentially the same laterally and at depth. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3) selenium concentrations in Qbt 4 did not change and were consistent with depth and location. The lateral and vertical extent of selenium are defined.

Sodium was detected above the soil BV (915 mg/kg) in one sample. The maximum detected concentration of 1270 mg/kg was at location 49-610010 in a sample collected from 0.5 to 1.5 ft bgs. Statistical tests were performed to determine if sodium in soil is different from background. The statistical test results are presented in Table H-4 and the box plot is presented in Figure H-6. The results of both the Gehan and quantile tests indicate sodium in soil is not different from background. The lateral and vertical extent of sodium are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in eight (four site locations and four corridor locations) samples and above the tuff BV (1.1 mg/kg) in seven (five site locations and two corridor locations) tuff samples. Additionally, there were five DLs above BV with a maximum DL of 1.1 mg/kg. The maximum detected concentration of 5.3 mg/kg was at site location 49-609313 in a sample collected from 0.5 to 1.5 ft bgs. Thallium increased with depth at all locations except corridor location 49-610002. Thallium was not detected above BV in nearby site and corridor surface locations. Thallium concentrations decrease to the south, east, and west of location 49-609313 to below the maximum background concentration (1.7 mg/kg). All detected concentrations of thallium in the corridor locations are essentially the same (0.8 to 1.4 mg/kg). The lateral and vertical extent of thallium are defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in 10 samples collected from a single depth. The concentration of uranium in 9 samples was below the maximum background concentration (3.6 mg/kg). The maximum detected concentration (3.9 mg/kg) was at location 49-03002. No isotopic uranium was detected in collocated surface and shallow subsurface samples collected in 2010 (Plate 14). The lateral and vertical extent of total uranium are defined.

Vanadium was detected above the soil BV (39.6 mg/kg) in one sample at corridor location 49-610007. Vanadium concentrations decrease with depth and were not detected above BV in nearby corridor surface locations within the same transect. Vanadium was detected in Qbt 4 at concentrations ranging from 1.6 to 30.3 mg/kg (Figure I-4). Only two outlier data points were observed for vanadium. Vanadium was detected at a concentration of 30.3 at corridor location 49-610023 and 28.5 mg/kg at corridor location 49-610025. The concentration of vanadium in Qbt 4 is essentially the same for all samples collected from the corridor locations. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in eight samples across the site. The maximum detected concentration of 112 mg/kg was at location 49-03026 in a sample collected from 0 to 0.5 ft bgs. Statistical tests were performed to determine if zinc in soil is different from background. The statistical test results are presented in Table H-4 and the box plot is presented in Figure H-6. The results of both the Gehan and quantile tests indicate zinc in soil is not different from background. The lateral and vertical extent of zinc are defined.

Organic Chemicals

No organic chemicals were detected at SWMU 49-001(e).

Radionuclides

Cesium-134 was detected in two soil samples at site location 49-609336 and corridor location 49-610003. Concentration decreased with depth at corridor location 49-610003 and cesium-134 was not detected in samples from the other two locations in the transect with location 49-610003. Cesium-134 increased with depth at site location 49-609336. Cesium-134 was not detected in perimeter boreholes 49-609981, 49-609982, 49-609983, and 49-609984, however site location 49-609336 is west of the perimeter borehole. The lateral and vertical extent of cesium-134 are not defined.

Cesium-137 was detected above the FV (1.65 pCi/g) in one tuff sample and three soil/fill samples at site locations 49-609324, 49-609328, 49-609330, and corridor location 49-610013. The maximum detected concentration (0.214 pCi/g) was in the deeper sample at site location 49-609328. Concentrations increased with depth at all four locations. Cesium-137 was not detected above FV in surface samples located within 25 ft of site locations 49-609324, 49-609328 and within 10 ft of corridor location 49-610013. Cesium-137 was detected at a concentration of 0.097 pCi/g in a fill sample collected from location 49-609330. The lateral extent of cesium-137 is defined, but the vertical extent of cesium-137 is not defined.

8.2.3.5 Subsurface Vapor Sampling

In 2010, two pore-gas samples were collected from borehole location 49-609981 and analyzed for VOCs and tritium. Table 8.2-6 presents the pore-gas samples collected and the analyses requested.

8.2.3.6 Subsurface Vapor Sample Analytical Results

Table 8.2-7 presents the VOCs detected in the pore-gas sample collected at SWMU 49-001(e). The sampling location and detected concentrations are shown on Plate 14. The VOCs detected in pore gas from borehole location 49-609981 are acetone; benzene; butanone[2-]; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-].

Tritium was not detected in pore-gas samples collected from SWMU 49-001(e).

8.2.3.7 Nature and Extent of Contamination in Subsurface Pore Gas

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from intervals corresponding to the base of formation Qbt 4, TD of the closest experimental shaft, and from the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the groundwater MCL, the borehole would be completed as a vapor-monitoring well.

Acetone; benzene; butanone[2-]; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-] were detected in at least one sample from borehole 49-609981. Tritium was not detected in pore-gas samples collected from borehole location 49-609881.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2).

The nature and extent of VOCs and tritium in pore gas are defined and the borehole at SWMU 49-001(e) was not completed as a vapor-monitoring well.

8.2.4 Summary of Human Health Risk Screening

A human health risk-screening assessment was not performed because the extent of contamination is not defined at SWMU 49-001(e).

8.2.5 Summary of Ecological Risk Screening

An ecological risk-screening assessment was not performed because the extent of contamination is not defined at SWMU 49-001(e).

9.0 AREA 4: BACKGROUND AND FIELD-INVESTIGATION RESULTS

This section presents the background, operational history, and summary of previous investigations for Area 4. This section also presents the field-investigation results from Area 4 and the associated overland corridor locations and discusses the nature and extent of contamination of the sampled media. For AOCs and SWMUs for which nature and extent are defined, this section presents the COPC identification and a summary of the ecological and human health risk-screening assessments.

9.1 Background of Area 4

Area 4 is one of the six areas within the NES at TA-49 that contains subsurface test shafts used from 1959 to 1961 for underground hydronuclear safety, tracer, and containment experiments. Review of aerial photographs has revealed linear features that indicate potential overland corridors extending radially from Area 5 and Area 4 (Purtymun and Stoker 1987, 006688).

9.1.1 Historical Releases

There are no documented releases associated with activities at Area 4.

9.1.2 Relationship to Other SWMUs and AOCs

SWMU 49-001(f) is located within Area 4. SWMU 49-006 and AOCs 49-005(b) and 49-008(a) within Area 5, and the former Central Control Area are located directly north-northwest of SWMU 49-001(f).

The overland corridors associated with Area 4 extend from the northwestern corner of Area 4 to the southeastern corner of Area 5 (Figure 1.1-2 and Figure 2.1-6).

9.2 SWMU 49-001(f): Experimental Shafts

9.2.1 Site Description and Operational History

SWMU 49-001(f), known as Area 4 is an area consisting of experimental shafts located in the southeast corner of the MDA AB NES boundary (Figure 9.2-1). Area 4 is approximately 100 ft × 125 ft in area. Area 4 was designed to contain 26 shafts on a uniform grid, but only 21 were drilled. The 21 shafts drilled at Area 4 ranged between 58 and 108 ft deep. Thirteen of the shafts were shot with radioactive material, one shaft was used for containment testing, one shaft was used as a gas expansion hole, three shafts were used for disposal of debris, and the remaining three shafts were not used and backfilled (LANL 2007, 098492).

9.2.2 Summary of Previous Investigations

During the 1987 soil and vegetation radiological-screening survey, 36 surface samples were collected from points on a 25-ft grid centered over the Area 4 shafts, and 25 vegetation samples were collected within and around Area 4 (LANL 1992, 007670). Samples were analyzed for radionuclides and results showed several radionuclide activities at or above BVs/FVs (LANL 1992, 007670). During the 1995 RFI conducted at Area 4, SWMU 49-001(f), 20 surface samples (0 to 0.5 ft bgs) were collected on a 25-ft x 25-ft grid centered over the Area 4 shafts. Each sample was field screened for gross radiation; radiation was not detected above background. All 20 samples were submitted for analysis of gamma-emitting radionuclides; 10 samples were submitted for analysis of TAL metals and isotopic plutonium (LANL 2007, 098492). Inorganic chemicals detected above soil BVs included antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, magnesium, nickel, potassium, selenium, silver, thallium, total uranium, vanadium, and zinc. Radionuclides detected, or detected above BVs/FVs, included americium-241, plutonium-238, and plutonium-239/240.

Historical sample locations and detected concentrations are provided on plates and in figures and tables presented below.

Prior to this investigation, no sampling was conducted in the overland corridors.

9.2.3 Site Contamination

9.2.3.1 Soil and Rock Sampling

Additional samples were collected in 2009–2010 at SWMU 49-001(f) and the overland corridors associated with SWMU 49-001(f), per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected either by hand auger or by a drill rig equipped with a continuous core-barrel sampling system.

In 2009–2010, surface samples were collected across the site and along the overland corridors to characterize of the nature and extent of surface contamination across SWMU 49-001(f) and the overland corridors that may have been used to transport equipment and cable during the testing period. Boreholes were drilled around the perimeter of the experimental shaft area extending to a TD of 158 ft bgs and samples collected to characterize the subsurface of contamination beneath SWMU 49-001(f). All required samples were submitted through the SMO for analysis at off-site laboratories. Sample locations were surveyed using a GPS (Table 9.2-1). Sample collection and screening methods are described in Appendix B.

A total of 175 samples (139 soil and 36 tuff), plus 20 field duplicates, were collected in 2009–2010 from 91 locations at SWMU 49-001(f) and the overland corridors. Data from the samples collected in 2009–2010 were combined with decision-level data from previous investigations. The final decision-level dataset includes 195 samples (159 soil/fill and 36 tuff), plus 20 field duplicates, collected in 1995 and 2009–2010 from 111 locations at SWMU 49-001(f), with a maximum sample depth of 158 ft bgs. The sample locations from SWMU 49-001(f) are presented on Plate 16 and samples locations from the overland corridors are presented on Plate 5.

Table 9.2-2 lists the samples collected and the analyses requested.

9.2.3.2 Soil and Rock Sample Field-Screening Results

Organic vapors were not detected during headspace (PID) screening of samples at SWMU 49-001(f). No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 9.2-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

A total of 25 surface and shallow subsurface samples from SWMU 49-001(f) exceeded the gross-beta screening threshold and additional samples were collected and submitted for appropriate laboratory analyses. Additionally, 72 stepout surface and shallow subsurface screening samples from 36 locations were collected and screened for gross-alpha and -beta analysis, but these samples did not exceed screening thresholds and were not submitted for laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(f) are presented in Tables D-22 through D-27 in Appendix D.

One surface sample collected from the 49-001(f) corridor exceeded the gross-alpha screening threshold; therefore an additional 10 corridor samples from 5 locations were collected and submitted for appropriate laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at SWMU 49-001(f) are presented in Tables D-34 through D-38 in Appendix D

9.2.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BVs at SWMU 49-001(f) and the overland corridors. The sampling locations from SWMU 49-001(f) are shown on Plate 16; the overland corridor sample location associated with SWMU 49-001(f) are presented on Plate 5. Table 9.2-4 presents the concentrations of inorganic chemicals either detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Soil

A total of 135 soil/fill samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals; 10 samples were also analyzed for total uranium. Table 9.2-2 summarizes samples collected and the requested analyses for each sample.

Table 9.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Barium, cadmium, calcium, cobalt, copper, lead, manganese, mercury, nickel, selenium, thallium, total uranium, and zinc were detected in soil above BVs or have DLs above BVs. The detected concentrations of inorganic chemicals above BVs are presented on Plate 17 for SWMU 49-001(f) site locations and

Plate 6 for overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

A total of 31 tuff samples were collected and analyzed for TAL metals; 16 samples were analyzed for cyanide and perchlorate. Table 9.2-2 summarizes samples collected and the requested analyses for each sample.

Table 9.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, cyanide (total), iron, lead, magnesium, nickel, selenium, thallium, and vanadium were detected in tuff, detected above BVs, or have DLs above BVs. The detected concentrations of inorganic chemicals above BVs are presented on Plate 17 for SWMU 49-001(f) site locations and Plate 6 for the overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected in samples at SWMU 49-001(f). The sampling locations at SWMU 49-001(f) are presented on Plate 16. Table 9.2-5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Soil samples collected at SWMU 49-001(f) and the overland corridors were not analyzed for organic chemicals.

Organic Chemicals in Tuff

A total of 16 tuff samples were collected from borehole locations 49-610938, 49-610939, 49-610940, and 49-610941 and analyzed for organic chemicals. Each sample was analyzed for VOCs, SVOCs, and explosive compounds. Table 9.2-2 summarizes the samples collected and the requested analyses.

Two organic chemicals (acetone, and bis(2-ethylhexyl)phthalate) were detected in tuff samples. Acetone was detected in a total of three tuff samples from borehole locations 49-610938 and 49-610939 and bis(2-ethylhexyl)phthalate was detected in a total two tuff samples from borehole locations 49-610938 and 49-610941. The detected concentrations of organic chemicals are presented on Plate 18. Table 9.2-5 presents the concentrations of detected organic chemicals.

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, at SWMU 49-001(f). The sampling locations from SWMU 49-001(f) are presented on Plate 16; the overland corridor sample locations associated with SWMU 49-001(f) are presented on Plate 5. Table 9.2-6 presents the concentrations of radionuclides detected or detected above BVs/FVs.

Radionuclides in Soil

A total of 159 soil/fill samples were collected and analyzed for radionuclides. Each sample was analyzed for radionuclides by gamma spectroscopy; 135 samples were analyzed for isotopic plutonium;

125 samples were analyzed for americium-241 and isotopic uranium; and 18 samples were analyzed for iodine-129, strontium-90, and technetium-99. Table 9.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 9.2-6 presents the radionuclides detected or detected above BVs/FVs. Americium-241, cesium-134, cesium-137, plutonium-238, and plutonium-239/240 were detected or detected above FVs in soil. The sampling locations with radionuclides detected, or detected above BVs, are shown on Plate 19 for SMWU 49-001(f) for site locations and Plate 7 for overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

A total of 36 tuff samples were collected and analyzed for radionuclides; 31 samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium; 20 samples were analyzed for radionuclides by gamma spectroscopy; 16 samples were also analyzed for tritium and 7 samples were analyzed for iodine-129, strontium-90, and technetium-99. Table 9.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 9.2-6 presents the radionuclides detected or detected above BVs/FVs. Tritium was detected in tuff. The sampling locations with radionuclides detected, or detected above BVs, are shown on Plate 19 for SMWU 49-001(f) for site locations and Plate 7 for overland corridor locations. The identification of COPCs was not performed because extent of contamination is not defined for the site.

9.2.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the surface and shallow subsurface investigation at SWMU 49-001(f) was to define the nature and extent of surface contamination, and the intent of the four perimeter boreholes was to characterize the vertical and lateral extent of contamination beneath SWMU 49-001(f) and define the lateral subsurface footprint of the area (LANL 2008, 102691, p. 30 and p. 39).

The nature and extent of inorganic chemicals and radionuclides at SWMU 49-001(f) are not defined, while the nature and extent of organic chemicals at SWMU 49-001(f) are defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides in the surface and subsurface at SWMU 49-001(f).

Inorganic Chemicals

As part of the review of the nature and extent of contamination at SWMU 49-001(f), the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously to the inorganic chemical and medium-specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (beryllium, calcium, cobalt, and zinc) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations are not different from background.

The following inorganic chemicals (antimony, barium, cadmium, chromium, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, selenium, thallium, and total uranium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4) and only outlier data points are interpreted as elevated with respect to TA-49 background. At SWMU 49-001(a), the concentrations of several inorganic chemicals in tuff, including aluminum, arsenic, barium, calcium, copper, nickel, selenium and vanadium are different from the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4. Therefore, the lateral and vertical extent of these inorganic chemicals in tuff are defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4. Outlier data points are observed for cobalt and lead in Qbt 4 and the detected concentrations of these inorganic chemicals are interpreted as elevated with respect to local BV (Figures I-2 and I-3).

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Aluminum was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of aluminum are defined.

Antimony was not detected in tuff at SWMU 49-001(f), but had DLs (0.5 to 0.52 mg/kg) above BV (0.5 mg/kg) in two tuff samples. The lateral and vertical of antimony are defined because it was not detected in site samples.

Arsenic was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in four (two site locations and two corridor locations) samples. Concentrations decreased with depth at site location 49-609685 and corridor location 49-610050 and increased with depth at site location 49-609676 and corridor location 49-610035. The detected concentration of barium (365 mg/kg) in the deeper sample at corridor location 49-610035 was less than the maximum background concentration (410 mg/kg). The maximum detected concentration of barium (435 mg/kg) was detected at site location 49-609676. Barium was not detected above BV in nearby site or corridor surface samples. Barium concentrations decrease with depth at borehole location 49-610938. Barium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in two samples. The maximum detected concentration of 1.4 mg/kg were at locations 49-610040 and 49-610042 in samples collected from 0.5 to 1.5 ft bgs. Statistical tests were performed to determine if beryllium in tuff is different from background. The statistical test results are presented in Table H-6 and the box plot is presented in Figure H-8. The results of both the Gehan test and the quantile test indicate that beryllium in tuff is not different from background. The lateral and vertical extent of beryllium are defined.

Cadmium was detected (0.42 mg/kg) above the soil BV (0.4 mg/kg) in one sample at location 49-04016. Cadmium was not detected above BV in samples collected from similar and deeper depths at collocated sample 49-609657. Cadmium was not detected above BV in any surrounding surface or borehole locations. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in two samples. The maximum detected concentration of 9110 mg/kg was at location 49-610056 in a sample collected from 0.5 to 1.5 ft bgs.

Statistical tests were performed to determine if calcium in soil is different from background. The statistical test results are presented in Table H-5 and the box plot is presented in Figure H-7. The results of both the Gehan test and the quantile test indicated that calcium in soil is not different from background. Calcium was detected in tuff at concentrations above corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in 12 (6 site locations and 6 corridor locations) samples. Concentrations increased with depth at all 12 locations. The concentration of chromium in corridor locations 49-610033, 49-610036, 49-610037, 49-610040, 49-610042, and 49-610043 ranged from 9.1 to 12.5 mg/kg and are all below the maximum background concentration (13 mg/kg). Chromium was not detected above BV in nearby corridor surface samples collected from similar depths. The lateral and vertical extent of chromium in the corridor samples are defined. Chromium concentrations at site locations 49-609657, 49-609669, 49-606973, 49-609679, and 49-609673 ranged from 7.7 to 11.3 mg/kg and are below the maximum background concentration. The lateral and vertical extent of chromium at these locations is defined. The maximum detected concentration (20.1 mg/kg) was detected in the deep sample at location 49-609682 located along the northwestern edge of the site. The lateral and vertical extent of chromium are not defined at location 49-609682.

Cobalt was detected above the soil BV (8.64 mg/kg) in eight samples, with a maximum detected concentration of 18.1 mg/kg. The maximum detected concentration of 18.1 mg/kg was at location 49-610056 in a sample collected from 0 to 0.5 ft bgs. Statistical tests were performed to determine if cobalt in soil is different from background. The statistical test results are presented in Table H-5 and the box plot is presented in Figure H-7. The results of both the Gehan test and the quantile test indicated that cobalt in soil is not different from background. Cobalt was detected in Qbt 4 at concentrations ranging from 0.54 to 6.3 mg/kg (Figure I-2). The detected concentrations of cobalt in outlier data points ranged from 4.8 to 6.3 mg/kg and are interpreted as exceeding Qbt 4 BV. Cobalt concentrations ranging from 4.8 to 6.3 mg/kg were detected at corridor locations 49-610033, 49-610036, 49-610037, 49-610042, and 49-610043. Cobalt concentrations are essentially the same in samples collected from the corridor locations. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in four (two site locations and one corridor location) samples. Concentrations decreased with depth at corridor location 49-610062 and copper was not detected above BV in nearby corridor surface locations from similar depths. Copper was detected above BV at two site locations 49-04003 and 49-04016 where only a surface sample was collected. Copper was not detected above BV in the surface or shallow subsurface at locations 49-609664 and 49-609657. Copper was detected in tuff at concentrations above corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of copper are defined.

Cyanide was not detected in site samples, but had DLs (0.5 to 0.56 mg/kg) above BV (0.5 mg/kg) in 16 tuff samples. The lateral and vertical extent are of cyanide defined.

Iron was detected above the tuff BV (14,500 mg/kg) in one sample at site location 49-609673. Concentration increased with depth at this location, but the detected concentration (14,900 mg/kg) is below the maximum background concentration (19,500 mg/kg). Iron was not detected above BV in nearby surface samples or at borehole location 49-610941. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in five (four site locations and one corridor location) samples. Lead decreased with depth at corridor location 49-610062 and site locations 49-609657, 49-609663, and 49-609668. Lead was not detected above BV in nearby site or corridor locations. Lead was detected in Qbt 4 at concentrations ranging from 3.9 to 21.8 mg/kg (Figure I-3). One detected concentration of lead was observed in the outlier data points at a concentration of 21.8 mg/kg and is interpreted as exceeding Qbt 4 BV at location 49-609657. Lead decreased with depth at this location from 31.1 mg/kg in soil to 21.8 mg/kg in tuff. Lead concentrations decreased with depth at nearby borehole locations 49-610940 and 49-610941 and lead concentrations in neighboring surface samples decreased to the north, south, east, and west. The lateral and vertical extent of lead are defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in nine (three site locations and six corridor locations) samples. Concentrations decreased with depth at borehole location 49-610940 and increased with depth at the other two site locations and all six corridor locations. The maximum detected concentration of 2510 mg/kg was at location corridor 49-610042 in a sample collected from 0.5 to 1.5 ft bgs. All detected concentrations were below the maximum background concentration (2820 mg/kg) and magnesium was not detected about BVs in nearby site and corridor locations from similar depths. The lateral and vertical extent of magnesium in tuff are defined.

Manganese was detected above the soil BV (671 mg/kg) in four corridor samples. Concentrations decreased with depth at location 49-610056 and increased with depth at locations 49-610057, 49-610059, and 49-610032. The maximum detected concentration of 1390 mg/kg was at location 49-610056 in a sample collected from 0 to 0.5 ft bgs. All other detected concentrations were below the maximum background concentration (1100 mg/kg). Manganese was not detected in nearby corridor samples collected from similar depths. The lateral and vertical extent of manganese are defined.

Mercury was not detected above the soil BV (0.1 mg/kg), but had DLs (0.1 to 1.1 mg/kg) above BV in eight samples. Mercury was not detected in site samples; therefore the lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample. The detected concentration (23.4 mg/kg) was at location 49-04016 where only a surface sample was collected. Nickel was not detected above BV in surrounding samples collected from similar and deeper depths. Nickel was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of nickel are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in 14 (seven site locations and five corridor locations) samples. Selenium concentrations are essentially the sample across the site and at depth. Selenium concentrations ranged from 1.6 to 2.1 mg/kgs; the maximum detected concentration of 2.1 mg/kg was at location 49-610060. Additionally, there were six DLs above BV with a maximum DL of 1.8 mg/kg. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but are consistent the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3) selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in four (two site locations and two corridor locations) soil samples and above the tuff BV (1.1 mg/kg) in one sample. Concentrations increased with depth at corridor locations 49-610035 and 49-610063, but concentrations were below the maximum background concentration for soil (1 mg/kg). Thallium was detected in site locations 49-04006 and 49-04009 where only a surface sample was collected. Thallium was not detected above BV in nearby site locations 49-609660 and 49-609661 where surface and shallow subsurface samples were collected, and was not detected above BV in the perimeter boreholes. The lateral and vertical extent of thallium are defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in one sample at site location 49-04014 at a concentration of 1.85 mg/kg. The detected concentration of uranium is less than the maximum background (3.6 mg/kg). The lateral and vertical extent of total uranium are defined.

Vanadium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in four soil samples. The maximum detected concentration of 196 mg/kg was at location 49-609668 in a sample collected from 0 to 0.5 ft bgs. Statistical tests were performed to determine if zinc in soil is different from background. The statistical test results are presented in Table H-5 and the box plot is presented in Figure H-8. The results of both the Gehan test and the quantile test indicate that zinc in soil is not different from background. Therefore, the lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected at borehole locations 49-610938 and 49-610939. Concentrations decreased with depth at borehole locations 49-610938 and 49-610939. Concentrations at both borehole locations are less than the EQL of 0.02 mg/kg. The lateral and vertical extent of acetone is defined.

Bis(2-ethylhexyl)phthalate was detected in borehole locations 49-610938 and 49-610941. Bis(2-ethylhexl)phthalate was not detected in deeper samples from either of these borehole locations. The detected concentrations of bis(2-ethylhexyl)phthalate are less than the EQL (0.34 mg/kg). The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Radionuclides

Americium-241 was detected or detected above the FV (0.13 pCi/g) in three soil samples at site locations 49-04012 and 49-609672, with a maximum detected activity (0.5924 pCi/g) at location 49-04012 where a single sample was collected. Americium-241 was not detected at location 49-609663 located within 5 ft of location 49-04012. Americium-241 increased with depth at location 49-609672, but was not detected 40 ft away at borehole location 49-610939. Americum-241 was not detected in surrounding surface samples collected within 60 ft of location 49-609672. The lateral and vertical extent of americium-241 are defined.

Cesium-134 was detected in one soil sample at corridor location 49-610033. Concentrations decreased with depth and cesium-134 was not detected at any other locations. The lateral and vertical extent of cesium-134 are defined.

Cesium-137 was detected above the FV (1.65 pCi/g) in two soil samples at corridor locations 49-610039 and 49-610046, with a maximum detected concentration of 0.257 pCi/g at corridor location 49-610046. Concentrations increased with depth at both locations. Cesium-137 was not detected in samples along the same transects or at any other locations. The lateral and vertical extent of cesium-137 are defined.

Plutonium-238 was detected above the FV (0.023 pCi/g) in three soil samples at site locations 49-04003, 49-04014, and 49-04019, where only a single sample was collected. The maximum detected concentration of 0.06285 pCi/g was at location 49-04014. Plutonium-238 was not detected in surface and shallow subsurface samples collected from site locations 49-609681, 49-609659, and 49-609662, located within 5 ft of locations 49-04003, 49-04014, and 49-04019. The lateral and vertical extent of plutonium-238 are defined.

Plutonium-239/240 was detected or detected above the FV (0.054 pCi/g) in eight soil samples. Plutonium-239/240 decreased with depth at locations 49-609663, 49-609664, and 49-609675. A single sample was collected from locations 49-04006, 49-04007, 49-04014, 49-04019. Plutonium-239/240 was not detected in surface and shallow subsurface samples collected from site locations 49-609661, 49-609658, 49-609659, and 49-609662, located within 5 ft of locations 49-04006, 49-04007, 49-04014, and 49-04019. The lateral and vertical extent of plutonium-239/240 are defined.

Tritium was detected in eight tuff samples from borehole locations 49-610938, 49-610939, 49-610940, and 49-610941, with a maximum detected concentration of 8.39 pCi/g at borehole location 49-610941. Tritium decreased with depth at borehole locations 49-610938, 49-610939, and 49-610941. Tritium increased with depth at location 49-610940 and was detected at a concentration of 0.288 pCi/g in the TD sample. The lateral extent of tritium is defined, but the vertical extent of tritium is not defined at borehole location 49-610940.

9.2.3.5 Subsurface Vapor Sampling

In 2010, three pore-gas samples from borehole location 49-610939 were collected and analyzed for VOCs and tritium. Table 9.2-7 presents the pore-gas samples collected and the analyses requested.

9.2.3.6 Subsurface Vapor Sample Analytical Results

Table 9.2-8 presents the VOCs detected in the pore-gas samples collected from SWMU 49-001(f). The sampling location and detected concentrations are shown on Plate 18. The VOCs detected in pore gas are acetone; benzene; butanone[2-]; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-].

Table 9.2-9 presents the detected concentrations of tritium in pore-gas samples collected from SWMU 49-001(f). The sampling location and detected concentrations are shown on Plate 19.

9.2.3.7 Nature and Extent of Contamination in Subsurface Pore Gas

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from intervals corresponding to the base of formation Qbt 4, TD of the closest experimental shaft, and from the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the groundwater MCL, the borehole would be completed as a vapor-monitoring well.

Acetone; benzene; butanone[2-]; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-] were detected in samples collected from borehole location 49-610939. Tritium was detected in three samples at borehole location 49-610939.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2). The nature and extent of VOCs in pore gas are defined.

Tritium was detected at a maximum activity of 67,776 pCi/g in a sample collected from 62 to 64 ft bgs at borehole location 49-610939. Tritium concentrations decreased significantly with depth to a concentration of 5946 pCi/L. Detected tritium activity in the TD sample is well below the groundwater MCL (20,000 pCi/L); therefore the extent of tritium in pore gas is defined and borehole location 49-610939 was not completed as a vapor-monitoring well.

9.2.4 Summary of Human Health Risk Screening

The extent of contamination is not defined at SWMU 49-001(f) and a human health risk-screening assessment was not performed.

9.2.5 Summary of Ecological Risk Screening

The extent of contamination is not defined at SWMU 49-001(f) and an ecological risk-screening assessment was not performed.

10.0 AREA 11: BACKGROUND AND FIELD-INVESTIGATION RESULTS

This section presents the background, operational history, and summary of previous investigations for Area 11. This section also presents the field-investigation results from Area 11 and discusses the nature and extent of contamination of the sampled media.

10.1 Background of Area 11

Area 11 was used from 1959 to 1961 to support activities related to the hydronuclear program (LANL 1992, 007670). Activities conducted at Area 11 consisted of radiochemistry operations and small-scale containment experiments involving HE detonations in shallow shafts (Figure 10.1-1). The small-scale containment experiments were conducted in thirteen 10-in-diameter by 12-ft-deep vertical shafts cased in steel. Explosive charges were set off in the bottom of each shaft after the shafts were backfilled with sand. In some of these shots, irradiated uranium-238 tracer was used. Neptunium-239 has a half-life of 2.3 d and has decayed to negligible levels of plutonium-239. Some of the shot shafts also may have contained small quantities of lead. Some shafts were reportedly partially backfilled with concrete at the conclusion of the experiments (LANL 1992, 007670, p. 6.2-3). Radiochemistry operations were performed at Area 11 in former building 49-15. A drainline was installed from the southwest portion of the radiochemistry building leading to a leach field located approximately 20 to 25 ft east of the building. The drainage system from the radiochemistry building was most likely constructed of vitrified clay pipe laid in a gravel matrix (Eller 1991, 055331).

10.1.1 Historical Releases

There are no documented releases associated with activities at Area 11.

10.1.2 Relationship to Other SWMUs and AOCs

SWMU 49-003 and AOC 49-008(c) are located within Area 11. SWMU 49-003, an inactive leach field and drainlines, is located within the boundary of AOC 49-008(c), which consists of potential soil contamination from historical operations at Area 11. SWMU 49-001(a), also known as Area 11, is located directly northwest of SWMU 49-003. SWMU 49-007(b), located within the Laboratory's HDT area, is located southwest of SWMU 49-003. SWMU 49-007(b), the septic system for the HDT area, was approved for

NFA in 2005. SWMU 49-006 and AOCs 49-005(b) and 49-008(a) within Area 5, the former Central Control Area, are located directly northeast of SWMU 49-003. The HDT area and Area 5 are located outside the TA-49 NES and are discussed in the IR for sites at TA-49 outside the NES boundary (LANL 2010, 109318). MDA AB is located east of SWMU 49-003.

10.2 SWMU 49-003, Inactive Leach Field and Associated Drainlines

10.2.1 Site Description and Operational History

SWMU 49-003 is an inactive leach field and associated drainlines at Area 11 within the northern MDA AB NES boundary at TA-49 (Figure 10.1-1). The leach field is located approximately 20 to 25 ft east of the location of former building 49-15 and was connected to the former building by a drainline. The leach field is believed to be constructed of vitrified clay pipe installed in gravel bedding. Building 49-15 housed a radiochemistry laboratory and change house. The building 49-15 laboratory was used to analyze samples collected during the experiments conducted in the experimental shafts at Areas 2, 2A, 2B, and 4. The estimated total volume of wastewater discharged to the leach field was less than several hundred gallons and less than 50 gal. of organic chemicals. Former building 49-15 and related structures including latrines, a storage building, and propane and butane tanks in Area 11 were decontaminated, demolished, and removed in 1970 and 1971; the leach field and drainlines were left in place (LANL 1992, 007670, pp. 6-2-6-6; LANL 2007, 098492).

10.2.2 Summary of Previous Investigations

Soil and vegetation sampling locations at Area 11 for the 1987 environmental survey did not cover the location of the SWMU 49-003 leach field (LANL 1992, 007670, pp. 6-6- 6-10).

During the 1995 Phase I RFI, 12 shallow (less than 4.3 ft bgs) subsurface samples were collected from 12 locations within the leach field. All 12 samples were submitted for analysis of gamma-emitting radionuclides, and a subset of 6 samples was submitted for analysis of TAL metals and isotopic plutonium. (LANL 2007, 098492). Inorganic chemicals detected above soil and/or tuff BVs included aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, total uranium, and vanadium. Radionuclides detected, or detected above BVs/FVs, included americium-241, cesium-137, europium-152, plutonium-238, and plutonium-239/240. Historical sample locations and detected concentrations are provided on plates and in figures and tables presented below.

10.2.3 Site Contamination

10.2.3.1 Soil and Rock Sampling

Additional samples were collected in 2009–2010 at SWMU 49-003 per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected from boreholes using a drill rig equipped with a continuous core barrel sampling system.

Five boreholes were drilled to a total depth of 20 ft bgs and samples collected to characterize the lateral and vertical extent of contamination beneath the SWMU 49-003 leach field. All samples were submitted through the SMO for analysis at off-site laboratories. All 2009 borehole locations were surveyed by LANL using a GPS (Table 10.2-1). Sample collection and screening methods are described in Appendix B.

Fourteen samples (five soil and nine tuff), plus one field duplicate, were collected in 2009–2010 from five locations at SWMU 49-003. Data from the samples collected in 2009–2010 were combined with decision-level data from samples from previous investigations. The final decision-level dataset includes 26 samples (11 soil and 15 tuff), plus 2 field duplicates, collected in 1995 and 2009 from 17 locations at SWMU 49-003, with a maximum sample depth of 20 ft bgs. The borehole locations at SWMU 49-003 are shown on Plate 20.

Table 10.2-2 presents the samples collected and the analyses requested.

10.2.3.2 Soil and Rock Field-Screening Results

Organic vapors were not detected above 1.6 ppm during headspace (PID) screening of samples at SWMU 49-003. No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 10.2-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

10.2.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BVs at SWMU 49-003. The sampling locations at SWMU 49-003 are presented on Plate 20. Table 10.2-4 presents the concentrations of inorganic chemicals either detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Soil

Seven soil samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Five samples were also analyzed for cyanide and perchlorate. Two samples were analyzed for total uranium. Table 10.2-2 summarizes samples collected and the requested analyses for each sample.

Table 10.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Antimony, barium, calcium, cobalt, cyanide (total), manganese, nickel, perchlorate, selenium, and total uranium were detected in soil above BVs, with no BV, or have DLs above BVs. The sampling locations and detected concentrations of inorganic chemicals above BVs or with no BV are shown on Plate 21. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

Thirteen tuff samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Nine samples were also analyzed for cyanide and perchlorate. Four samples were also analyzed for total uranium. Table 10.2-2 summarizes samples collected and the requested analyses for each sample.

Table 10.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, cyanide (total), iron, lead, magnesium, manganese, nickel, perchlorate, selenium, and vanadium were detected in tuff above BVs, with no BV, or have DLs above BVs. The sampling locations and detected concentrations are shown on Plate 21. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected at SWMU 49-003. The sampling locations are presented on Plate 20. Table 10.2-5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Five samples were collected from soil and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 10.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.2-5 presents the detected concentrations of organic chemicals in soil. One organic chemical methylene chloride was detected in one sample. The detected concentrations of organic chemicals are presented on Plate 22.

Organic Chemicals in Tuff

Nine tuff samples were collected and analyzed for organic chemicals. All samples were analyzed for VOCs, SVOCs, and explosive compounds. Table 10.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.2-5 presents the detected concentrations of organic chemicals in tuff. Three organic chemicals [acetone, benzyl alcohol, and bis(2-ethylhexyl)phthalate] were detected in one tuff sample. The detected concentrations of organic chemicals are presented on Plate 22.

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, at SWMU 49-003. The sampling locations are presented on Plate 20. Table 10.2-6 presents the concentrations of radionuclides detected or detected above BVs/FVs.

Radionuclides in Soil

Eleven soil samples were collected and analyzed for radionuclides. Five samples were analyzed for americium-241, iodine-129, tritium, isotopic uranium, strontium-90, and technetium-99. Six samples were analyzed for radionuclides by gamma spectroscopy. Seven samples were also analyzed for isotopic plutonium. Table 10.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.2-6 presents the radionuclides detected or detected above FVs. Americium-241, cesium-137, europium-152, plutonium-238, and plutonium-239/240 were detected or detected above FVs. The sampling locations of radionuclides detected, or detected above FVs, are shown on Plate 23. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

A total of 15 samples were collected from tuff and analyzed for radionuclides; 9 tuff samples were analyzed for americium-241, iodine-129, tritium, isotopic uranium, strontium-90, and technetium-99; 6 samples were analyzed for radionuclides by gamma spectroscopy; 13 samples were also analyzed for isotopic plutonium. Table 10.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.2-6 presents the radionuclides detected or detected above BVs/FVs. Plutonium-238, plutonium-239/240, and tritium were detected above BVs/FVs. The sampling locations with activities of radionuclides detected, or detected above BVs/FVs, are shown on Plate 23. The identification of COPCs was not performed because extent of contamination is not defined for the site.

10.2.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the five boreholes was to characterize the vertical extent of contamination beneath the SWMU 49-003 leach field (LANL 2008, 102691, p. 40).

The nature and extent of inorganic chemicals and radionuclides at SWMU 49-003 are not defined, while the nature and extent of organic chemicals at SWMU 49-003 are defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides in the surface and subsurface at SWMU 49-003.

Inorganic Chemicals

As part of the review of the nature and extent of contamination at SWMU 49-003, the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously with the inorganic chemical and medium specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (beryllium and iron) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations are not different from background.

The following inorganic chemicals (antimony, barium, calcium, chromium, cobalt, cyanide, magnesium, manganese, nickel, perchlorate, selenium, and total uranium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs, and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, Qbt 4), and only outlier data points are interpreted as elevated with respect to TA-49 background. At SWMU 49-001(a), the concentrations of several inorganic chemicals in tuff, including aluminum, arsenic, barium, calcium, lead, manganese, nickel, selenium, and vanadium, are different from the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets) but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4; therefore, the lateral and vertical extent of these inorganic chemicals in tuff are defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4. Outlier data points are observed for cobalt and copper in Qbt 4 and the detected concentrations of these inorganic chemicals are interpreted as elevated with respect to Qbt 4 BV (Figures I-2 and I-3).

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Aluminum was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of aluminum are defined.

Antimony was detected above the soil BV (0.83 mg/kg) in one sample and above the tuff BV (0.5 mg/kg) in four samples. The maximum detected concentration of antimony (1 mg/kg) was at location 49-08040 at a depth of 3 to 4 ft. Antimony concentrations decrease to levels below BVs or DLs in samples collected from locations immediately surrounding 49-08040, including 49-08031, 49-08039, 49-08041, 49-610496, and 49-610493. In addition, antimony decreases to concentrations below the DL with depth in neighboring borehole 49-610496. The lateral and vertical extent of antimony are defined.

Arsenic was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in two samples, with a maximum concentration of 460 mg/kg collected at location 49-610497. Concentrations decreased with depth at location 49-610497. Barium concentrations decreased to lower levels, and in most cases to levels below the BV, in surrounding locations, 49-08033, 49-08037, and 49-08039. Barium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in two samples, with a maximum detected concentration of 1.7 mg/kg. Statistical tests were performed to determine if beryllium in tuff is different from background. The statistical test results are presented in Table H-7, and the box plot for beryllium in tuff is presented in Figure H-9. The results of both the Gehan and quantile tests indicate that beryllium in tuff is not different from background. The lateral and vertical extent of beryllium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in two samples with a maximum detected concentration of 6510 mg/kg at borehole location 49-610497. Calcium decreased with depth at borehole location 49-610497 and increased with depth at location 49-08040. Calcium was not detected above BV in samples collected from similar and deeper depths at borehole locations 49-08039, or 49-610496. Calcium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in three samples, with a maximum detected concentration of 11.8 mg/kg at location 49-08038. Concentrations increased with depth at borehole locations 49-08033, 49-08038, and 49-08031. Chromium was not detected above BV in samples collected from similar and deeper depths at neighboring locations 49-08040, 49-08039, 49-610496, and 49-610497. The lateral and vertical extent of chromium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in two samples, with a maximum detected concentration of 9.7 mg/kg at borehole location 49-610496. Concentrations decreased with depth at borehole locations 49-610496 and 49-610497. Cobalt was not detected above BV in samples collected from similar and deeper depths at borehole locations 49-08040, 49-610498, and 49-610500. Cobalt was detected in Qbt 4 at concentrations ranging from 0.65 to 12.2 mg/kg at SWMU 49-003 (Figure I-2). One detected concentration of cobalt (12.2 mg/kg) was identified as an outlier data point at location 49-08031 and is interpreted as exceeding Qbt 4 BV. Detected concentrations of cobalt decreased with depth at boreholes 49-610493, 49-610496, and 49-610500, located a maximum of 35 ft from location 49-08031. The lateral and vertical extent of cobalt are defined.

Copper was detected in Qbt 4 at concentrations ranging from 1.2 to 12.6 mg/kg at SWMU 49-003 (Figure I-3). One detected concentration of copper (12.6 mg/kg) was identified as an outlier data point at location 49-610497 and is interpreted as exceeding Qbt 4 BV. Detected concentrations of copper deceased with depth at borehole location 49-610497, and borehole locations 49-610496, 49-610498, and 49-610499, located a maximum of 50 ft from location 49-610497. The lateral and vertical extent of copper are defined.

Cyanide was not detected in soil or tuff samples collected from SWMU 49-003 but had DLs (0.51 to 0.59 mg/kg) above BV (0.5 mg/kg). Cyanide was not detected in site samples; therefore the lateral and vertical extent of cyanide are defined.

Iron was detected above the tuff BV (14500 mg/kg) in one sample at a concentration of 16600 mg/kg at location 49-08038. Statistical tests were performed to determine if iron in tuff is different from background. The statistical test results are presented in Table H-7, and the box plot for iron in tuff is presented in Figure H-9. The results of both the Gehan and quantile tests indicate that iron in tuff is not different from background. The lateral and vertical extent of iron are defined.

Lead was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of lead are defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in four samples, with a maximum detected concentration of 4250 mg/kg at location 49-08038. Concentrations increased with depth at borehole locations 49-08031, 49-08032, 49-08033, and 49-08038. Magnesium was not detected above BV in samples collected from similar and deeper depths at borehole locations 49-610493, 49-610496, 49-610498, or 49-610497. The lateral and vertical extent of magnesium are defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample at a concentration of 723 mg/kg at location 49-610497. Concentrations decreased with depth at borehole location 49-610497, and manganese was not detected above BV in samples collected from similar depths at borehole locations 49-08033, 49-610498, and 49-610499. Manganese was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-4). The lateral and vertical extent of manganese are defined.

Nickel was detected (15.6 mg/kg) above the soil BV (15.4 mg/kg) in one sample at borehole location 49-610497. Concentration decreased with depth and nickel was not detected above BV in samples collected from similar depths at borehole locations 49-08033, 49-610498, and 49-610499. Nickel was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-3). The lateral and vertical extent of nickel are defined.

Perchlorate was detected in three soil samples and in four tuff samples. The maximum detected concentration of 0.047 mg/kg was at borehole location 49-610500. Concentrations decreased with depth at borehole locations 49-610497 and 49-610500 and increased with depth at borehole locations 49-610496 and 49-610498. The lateral and vertical extent of perchlorate are not defined.

Selenium was detected above the soil BV (1.52 mg/kg) in three samples, with a maximum detected concentration of 1.8 mg/kg at borehole location 49-610500. Additionally, one sample had a DL (2 mg/kg) above the soil BV. Selenium concentrations decreased with depth at borehole locations 49-610498, 49-610499, and 49-610500. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3), selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in two samples with a maximum detected concentration of 2.42 mg/kg at location 49-08029. Isotopic uranium was not detected in samples collected from borehole locations 49-610496, 49-610497, 49-610498, 49-610499, and 49-610500. The lateral and vertical extent of uranium are defined.

Vanadium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt (Figure I-4). The lateral and vertical extent of vanadium are defined.

Organic Chemicals

Acetone was detected in the deepest sample at borehole location 49-610498. The detected concentration (0.009 mg/kg) is well below the EQL (0.024 mg/kg); therefore the lateral and vertical extent of acetone are defined.

Benzyl alcohol was detected in the deepest sample at borehole location 49-610496. The detected concentration (0.056 mg/kg) is well below the EQL (0.39 mg/kg); therefore the lateral and vertical extent of benzyl alcohol are defined.

Bis(2-ethylhexyl)phthalate was detected in the deepest sample at borehole location 49-610499 and in a sample from borehole location 49-610498. Bis(2-ethylhexyl)phthalate was not detected at depth at borehole location 49-610498, and the detected concentration (0.068 mg/kg) in the deep sample at location 49-610499 is below the EQL (0.34 mg/kg); therefore the lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Methylene chloride was detected in a soil sample at a concentration of 0.0028 mg/kg at borehole location 49-610497. Methylene chloride was not detected at depth; therefore the lateral and vertical extent of methylene chloride are defined.

Radionuclides

Americium-241 was detected above FV (0.013 pCi/g) or at depths where the FV does not apply in six soil samples, with a maximum detected activity of 0.653 pCi/g at borehole location 49-610496. Amercium-241 activities decreased with depth at borehole locations 49-08032, 49-08039, 49-08040, 49-610498, and 49-610496 and increased with depth at location 49-08029. Amercium-241 was not detected above FV in samples collected from similar and deeper depths at borehole locations 49-610500, 49-08028, 49-08031, 49-08041, 49-610493, 49-610497. Amercium-241 activities decreased to the east and north and was not detected above FV to the south and west. The lateral and vertical extent of americium-241 are defined.

Cesium-137 was detected above FV (1.65 PCi/g) or at depths where the FV does not apply in soil at an activity of 0.138 pCi/g at location 49-08029. Cesium-137 was not detected above FV in samples collected from similar and deeper depths at borehole locations 49-08028, 49-08031, and 49-08032. The lateral and vertical extent of cesium-137 are defined.

Europium-152 was detected in one soil sample at an activity of 0.234 pCi/g at location 49-08029. Europium-152 was not detected in samples collected from similar and deeper depths at borehole locations 49-08028, 49-08031, and 49-08032. The lateral and vertical extent of europium-152 are defined.

Plutonium-238 was detected above FV (0.023 pCi/g) or at depths where the FV does not apply in eight soil and tuff samples, with a maximum detected concentration of 0.088 pCi/g at borehole location 49-610496. Plutonium-238 decreased with depth at locations 49-08031, 49-08040, 49-610496, and 49-08039, and increased with depth at locations 49-08029, 49-08033, and 49-08038. Plutonium-238 was not detected above FV in samples collected from similar and deeper depths at borehole locations 49-610500, 49-610499, 49-610497, and 49-610498. The lateral and vertical extent of plutonium-238 are defined.

Plutonium-239/240 was detected above FV (0.054 pCi/g) or at depths where FV does not apply in 10 soil and tuff samples with a maximum detected activity of 4.87 pCi/g at location 49-610496. Plutonium-239/240 activity decreased with depth at borehole locations 49-08028, 49-610499, 49-08034, 49-610498, 49-08039, 49-08040, and 49-610496 and increased with depth at borehole locations 49-08029 and 49-08031. Plutonium-239/240 was detected at above FV in samples collected from similar and deeper depths at borehole locations 49-610493, 49-610500, and 49-610497. The lateral and vertical extent of plutonium-239/240 are defined.

Tritium was detected at an activity of 0.222 pCi/g in the bottom sample at borehole location 49-610496. Tritium was not detected in samples collected from boreholes located to the north and east. There is no borehole to the south of location 49-610496, and tritium activities increased to the west at borehole location 49-610493. The lateral and vertical extent of tritium are not defined.

10.2.3.5 Subsurface Vapor Sampling

Pore-gas samples were not prescribed for SWMU 49-003 per the approved work plan (LANL 2008, 102691).

10.2.4 Summary of Human Health Risk Screening

A human health risk screening assessment was not performed for SWMU 49-003 because the extent of contamination is not defined.

10.2.5 Summary of Ecological Risk Screening

An ecological risk screening assessment was not performed for SWMU 49-003 because the extent of contamination is not defined.

10.3 AOC 49-008(c): Area of Potential Soil Contamination

10.3.1 Site Description and Operational History

AOC 49-008(c) consists of an area of potentially contaminated soil from historical radiochemistry operations and small-scale containment experiments at Area 11 within the northern portion of the MDA AB NES boundary at TA-49 (Figure 10.1-1). Area 11 is an approximately 220-ft x 300-ft area. Activities conducted at Area 11 from 1959 to 1961 supported hydronuclear experiments conducted elsewhere at TA-49 (LANL 1992, 007670). Radiochemistry operations were conducted in a former laboratory and change house (former building 49-15) that was the main structure at Area 11. Other structures included a small storage building, latrines, and butane and propane tanks. The former building 49-15 laboratory was used to analyze samples collected during experiments in the experimental shafts at Areas 2, 2A, 2B, and 4. Laboratory processes included sample dissolution in acids (nitric, hydrochloric, hydrofluoric, sulfuric, and perchloric) and solvent extraction using methyl isobutyl ketone, ammonium hydroxide, and sodium hydroxide. Wastes generated during radiochemical operations were typically collected in containers and taken to radioactive waste disposal facilities elsewhere at LANL. Interim waste storage boxes were stored south of former building 49-15. Some liquid wastes reportedly discharged to a leach field (SWMU 49-003). Small-scale containment experiments were conducted in 13 underground shafts located on the west side of Area 11. These shafts were drilled to a depth of 12 ft and lined with 10-in.-diameter steel casing. HE was placed in the shafts, which were backfilled to contain the explosions. Small amounts of irradiated uranium-238 tracer were used in some experiments. The structures in Area 11 were decontaminated and removed in 1970 and 1971. Contamination was detected in sinks, ducts, and hoods in former building 49-15. Contaminated debris was removed and disposed of at TA-54 and uncontaminated debris (approximately 2160 cubic ft) was taken to the open-burning/landfill area at Area 6 (SWMU 49-004) (LANL 2007, 098492).

10.3.2 Summary of Previous Investigations

During the 1987 soil and vegetation radiological-screening survey, 22 surface samples were collected from points on a 25-ft grid within Area 11, and 20 vegetation samples were collected within and around Area 11 (LANL 1992, 007670). Samples were analyzed for radionuclides and results showed radionuclides at background levels for most sampling locations; however, elevated levels of isotopes of plutonium, americium, and uranium were present in a sample from a location adjacent to what would have been the east corner of former building 49-15, possibly where the sink drain was located (LANL 1992; 007670). Vegetation samples showed no elevated radioactivity.

During the 1995 Phase I RFI conducted at AOC 49-008(c), a total of 34 surface samples (0 to 0.5 ft bgs) were collected from 34 locations including 25 locations from a 25-ft x 25-ft grid over the potential leach-field location (SWMU 49-003), 2 locations from the potential former location of the interim storage container area, and 6 locations within the former small-scale shot area (LANL 1997, 056594). All 34 samples were submitted for analysis of gamma-emitting radionuclides, and a subset of 16 of the surface samples were submitted for analysis of TAL metals and isotopic plutonium. Additionally, one subsurface sample was collected at a depth of 0 to 3 ft bgs from the potential former location of the interim storage-container area, and two subsurface samples were collected from a depth of 7 to 12 ft bgs from two locations within the former small-scale shot area (LANL 1997, 056594). All three subsurface samples were submitted for analysis of gamma-emitting radionuclides, isotopic plutonium, TAL metals, and SVOCs. In addition, the two subsurface samples collected within the former small-scale shot area were submitted for analysis of HE.

Inorganic chemicals detected above BVs included antimony, cadmium, calcium cobalt, manganese, and uranium. Two SVOCs were detected in subsurface samples: bis(2-ethylhexyl)phthalate was detected in one soil and one tuff sample and di-n-octylphthalate was detected in one subsurface soil sample. Radionuclide activities detected above BVs/FVs included americium-241, plutonium-238, and plutonium-239/240. Historical sample locations and detected concentrations are provided on plates and in figures and tables presented below.

10.3.3 Site Contamination

10.3.3.1 Soil and Rock Sampling

Additional samples were collected in 2009–2010 at AOC 49-008(c), per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected using a drill rig equipped with a continuous core-barrel sampling system. Investigation of AOC 49-008(c) is deferred per Table IV-2 of the Consent Order (Table 1.1-1). Therefore, surface samples were not collected for SWMU 49-003 during the 2009–2010 investigation.

Two boreholes were drilled at the small-scale shot area. One borehole was advanced to a total depth of 80 ft bgs to characterize the surge bed at the base of Qbt 4. The other borehole was drilled to 35 ft bgs to characterize the vertical extent of the small-scale shot area. Five boreholes were drilled to 10 ft bgs within the footprint of the radiochemistry building to characterize the vertical extent of contamination associated with activities associated with the radiochemistry building. All samples were submitted through the SMO for analysis at off-site laboratories. Borehole locations were surveyed by LANL using a GPS (Table 10.3-1). Sample collection and screening methods are described in Appendix B.

A total of 16 samples (7 soil and 9 tuff) were collected in 2009–2010 from 7 locations at AOC 49-008(c). Data from the samples collected in 2009–2010 were combined with decision-level data from samples from previous investigations. The final decision-level dataset includes 32 samples (21 soil and 11 tuff), plus 3 field duplicates, collected in 1995 and 2009–2010 from 21 locations at AOC 49-008(c), with a maximum sample depth of 80 ft bgs. The borehole locations at AOC 49-008(c) are shown on Plate 20.

Table 10.3-2 lists the samples collected and the analyses requested.

10.3.3.2 Soil and Rock Field-Screening Results

Organic vapors were not detected above 1.1 ppm during headspace (PID) screening of samples at AOC 49-008(c). No radiological-screening results exceeded twice the daily site background levels. Field screening results are presented in Table 10.3-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

10.3.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV at AOC 49-008(c). The sampling locations from AOC 49-008(c) are shown on Plate 20. Table 10.3-4 presents the concentrations of inorganic chemicals either detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Soil

A total of 24 soil/fill samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals; 7 samples were also analyzed for perchlorate and cyanide; and 1 sample was analyzed for total uranium. Table 10.3-2 summarizes samples collected and the requested analyses for each sample.

Table 10.3-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Antimony, cadmium, cobalt, cyanide (total), manganese, perchlorate, selenium, and total uranium were detected, detected above BVs or have DLs above BVs. The sampling locations and detected concentrations of inorganic chemicals above BVs or detected with no BV are shown on Plate 21. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

Eleven tuff samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Nine samples were also analyzed for cyanide and perchlorate, and two were analyzed for total uranium. Table 10.3-2 summarizes samples collected and the requested analyses for each sample.

Table 10.3-4 presents the inorganic chemicals above BVs and detected inorganic chemicals that have no BV. Arsenic, barium, calcium, chromium, cyanide (total), magnesium, perchlorate, and selenium were detected, detected above BVs, or have DLs above BVs. The sampling locations and detected concentrations above BVs or with no BV are shown on Plate 21. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected in samples at AOC 49-008(c). The sampling locations are shown on Plate 20. Table 10.3-5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Eight soil samples were collected and analyzed for organic chemicals. Seven samples were analyzed for VOCs, SVOCs, and explosive compounds. One sample was analyzed for SVOCs only. Table 10.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.3-5 presents the detected concentrations of organic chemicals in soil. Five organic chemicals [benzyl alcohol; bis(2-ethylhexyl)phthalate; di-n-octylphthalate; isopropyltoluene(4-); and nitrotoluene(3-)] were detected in soil samples. The detected concentrations of organic chemicals are shown on Plate 22.

Organic Chemicals in Tuff

A total of 11 samples were collected from tuff and analyzed for organic chemicals. All samples were analyzed for SVOCs and explosive compounds; 9 samples were also analyzed for VOCs. Table 10.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.3-5 presents the detected concentrations of organic chemicals in tuff. Three organic chemicals [benzyl Alcohol; bis(2-ethylhexyl)phthalate; and nitroglycerin] were detected in at least one tuff sample. The detected concentrations of organic chemicals are shown on Plate 22.

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, at AOC 49-008(c). The sampling locations with concentrations detected or detected above BVs/FVs are shown on Plate 23. Table 10.3-6 presents the concentrations of radionuclides detected or detected above BVs/FVs.

Radionuclides in Soil

A total of 14 soil/fill samples were collected from soil and fill and analyzed for radionuclides; 7 samples were analyzed for americium-241, tritium, and isotopic uranium; 14 samples were analyzed for radionuclides by gamma spectroscopy; and 13 samples were analyzed for isotopic plutonium. Table 10.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.3-6 presents the radionuclides detected or detected above BVs/FVs. Americium-241, plutonium-238, and plutonium-239/240 were detected or detected above FVs. The sampling locations and detected activities are shown on Plate 23. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

Eleven tuff samples were collected and analyzed for radionuclides. All samples were analyzed for isotopic plutonium. Two samples were analyzed for radionuclides by gamma spectroscopy only. Nine samples were analyzed for americium-241, tritium, and isotopic uranium. Table 10.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 10.3-6 presents the radionuclides detected or detected above BVs/FVs. Plutonium-238, plutonium-239/240, and tritium were detected in tuff. Sampling locations and detected activities are shown on Plate 23. The identification of COPCs was not performed because extent of contamination is not defined for the site.

10.3.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the subsurface investigation at AOC 49-008(c) was to define the vertical extent of contamination associated with the small-scale shot area and to characterize the surge bed; and the intent of the five boreholes drilled within the footprint of the former radiochemistry building was to characterize the vertical and lateral extent of contamination beneath the former radiochemistry building (LANL 2008, 102691, p. 40).

The nature and extent of inorganic chemicals and radionuclides at AOC 49-008(c) are not defined, while the nature and extent of organic chemicals at AOC 49-008(c) are defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides in the subsurface at AOC 49-008(c).

As discussed above, AOC 49-008(c) is a deferred site; however, characterizing the extent of potential contamination in the subsurface of AOC 49-008(c) was prescribed per the approved work plan (LANL 2008, 102691, p. 40). If surface samples from AOC 49-008(c) are paired with deeper, subsurface samples located in the shot area or along the perimeter of the radiochemistry building, the data are shown on Plates and discussed below. If surface samples designated as AOC 49-008(c) are paired with subsurface samples designated as SWMU 49-003, the surface data are presented above with SMWU 49-003 and used to define vertical extent. Sample locations from 1995, where only a single sample was collected, are deferred and are not presented in text or shown on plates, but the data are retained in tables in accordance with the sampling designations for AOC 49-008(c) specified in the Inside the NES work plan.

Inorganic Chemicals

As part of the review of the nature and extent of contamination at AOC 49-008(c), the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously with the inorganic chemical and medium specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (chromium, cyanide, magnesium, perchlorate, selenium, and total uranium) were detected in soil and/or tuff above BVs, detected with no BV, or with DLs above BVs, and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4), and only outlier data points are interpreted as elevated with respect to TA-49 background. At AOC 49-008(c), the concentrations of several inorganic chemicals in tuff, including arsenic, barium, calcium, and selenium, are above the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets) but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4 . No outliers were observed for these inorganic chemicals, therefore, the extent of these inorganic chemicals in tuff is defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4.

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Arsenic was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of arsenic are defined.

Barium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of barium are defined.

Calcium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4 (Figure I-2). The lateral and vertical extent of calcium are defined.

Chromium was detected (8.5 mg/kg) above the tuff BV (7.14 mg/kg) in one sample at borehole location 49-610495 in a sample collected from 8 to 10 ft bgs. The single detected concentration of chromium is below the maximum background concentration (13 mg/kg). Chromium was not detected above the tuff BV in samples collected from similar depths at borehole locations 49-610491, 49-610492, 49-610493, and 49-610494. The lateral and vertical extent of chromium are defined.

Cyanide was not detected in soil or tuff but had DLs (0.51 to 0.56 mg/kg) above BV (0.5 mg/kg) in four soil samples and nine tuff samples. Cyanide was not detected in site samples; therefore, the nature and extent of cyanide are defined.

Magnesium was detected (1760 mg/kg) above the tuff BV (1690 mg/kg) in one sample at location 49-610495 in a sample collected from 8-10 ft bgs. The single detected concentration of magnesium is below the maximum background concentration (2820 mg/kg). Magnesium was not detected above the tuff BV in samples collected from similar depths at borehole locations 49-610491, 49-610492, 49-610493, and 49-610494. The lateral and vertical extent of magnesium are defined.

Perchlorate was detected in five soil samples and four tuff samples. The maximum detected concentration of 0.16 mg/kg was at location 49-610494 in a sample collected from 8-10 ft bgs. Perchlorate concentrations decreased with depth at borehole locations 49-610490 and 49-610495, and increased with depth at borehole locations 49-610491, 49-601492, 49-610493, and 49-610494. Perchlorate concentrations decreased to the north, east, and west. A sample was not collected south of borehole location 49-610494. The lateral and vertical extent of perchlorate are not defined.

Selenium was detected above the soil BV (1.52 mg/kg) in three samples, with a maximum detected concentration of 1.9 mg/kg at locations 49-610490 and 49-610491. Concentrations remained the same with depth at both locations. Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3), selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in six samples, with a maximum detected concentration of 3.63 mg/kg at location 49-08033. Total uranium concentration decreased with depth at all six locations and isotopic uranium was not detected in any sample collected from the boreholes drilled during this investigation. The lateral and vertical extent of total uranium are defined.

Organic Chemicals

Benzyl alcohol was detected in 16 samples, with a maximum detected concentration of 0.19 mg/kg at borehole location 49-610493. Concentrations decreased with depth or remained essentially the same at borehole locations 49-610489, 49-610490, 49-610491, 49-610492, 49-610493, 49-610494, and 49-610495. All detected concentrations of benzyl alcohol are less than the EQL of 1.4 mg/kg. The lateral and vertical extent of benzyl alcohol are defined.

Bis(2-ethylhexyl)phthalate was detected in four samples with a maximum detected concentration of 0.07 mg/kg at location 49-08049. Concentrations decreased slightly with depth at borehole location 49-610494 and increased with depth at borehole locations 49-08049 and 49-610493. Bis(2-ethylhexyl)phthalate was not detected in samples collected from similar or deeper depths at borehole locations 49-610490, 49-610491, 49-610492, and 49-610495. All detected concentrations of bis(2-ethylhexyl)phthalate are less than the EQL of 0.37 mg/kg. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Isopropyltoluene[4-] was detected in one sample at a concentration of 0.00029 mg/kg in a sample collected from borehole location 49-610490. Isopropyltoluene[4-] was not detected at depth and was not detected in samples collected from similar depths at locations 49-610489 and 49-08049. The detected concentration of isopropyltoluene[4-] is also below the EQL of 0.0057 mg/kg. The lateral and vertical extent of isopropyltoluene[4-] are defined.

Nitroglycerin was detected in one sample at a concentration of 0.053 mg/kg from borehole location 49-610493. Nitroglycerin was not detected in samples collected from similar depths at borehole locations 49-610496, 49-610492, and 49-610495. The detected concentration of nitroglycerin is below the EQL of 0.7 mg/kg, The lateral and vertical extent of nitroglycerin are defined.

Nitrotoluene[3-] was detected in one sample at a concentration of 0.56 mg/kg in a sample from borehole location 49-610491. Nitrotoluene[3-] was not detected at depth and was not detected in samples collected from similar depths at locations 49-610492, 49-610494, and 49-610495. The lateral and vertical extent of nitrotoluene[3-] are defined.

Radionuclides

Plutonium-238 was detected above FV (0.023 pCi/g) or at depths where the FV does not apply in one sample at an activity of 0.009 pCi/g from borehole location 49-08049. Plutonium-238 was not detected in samples collected from similar and deeper depths at borehole locations 49-610490, 49-610489, and 49-08051. The lateral and vertical extent of plutonium-238 are defined.

Plutonium-239/240 was detected above FV (0.054 pCi/g) or at depths where FV does not apply in six samples, with a maximum detected activity of 0.135 pCi/g at borehole location 49-610492. Plutonium-239/240 activity decreased with depth at borehole locations 49-610491, 49-610492, 49-610493, 49-610494, and 49-610495 and increased with depth at borehole location 49-08051. Plutonium-239/240 was not detected above FV at borehole locations 49-610489 and 49-610490. The lateral and vertical extent of plutonium-239/240 are defined.

Tritium was detected at activities ranging from 0.245 to 0.67 pCi/g at borehole locations 49-610489, 49-610490, and 49-610493. Tritium was not detected at depth at borehole location 49-610489 but was detected in the TD sample at borehole locations 49-610490 and 49-610493. The vertical extent of tritium in borehole location 49-610490 is defined from samples collected at deeper depths from borehole location 49-610489. Samples were not collected north of borehole location 49-610490. The vertical extent of tritium near the shot area is defined, but the lateral extent is not defined. Tritium was not detected or activities decreased north, south, west, and east of borehole location 49-610493. The lateral extent of tritium is defined, but the vertical extent of tritium is not defined around the radiochemistry building.

10.3.3.5 Subsurface Vapor Sampling

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from intervals corresponding to the base of formation Qbt 4, the TD of the closest experimental shaft, and the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the SLs based on groundwater cleanup level, the borehole would be completed as a vapor-monitoring well.

In 2009–2010, a total of five pore-gas samples were collected from borehole locations 49-610489 and 49-610490 and analyzed for VOCs and tritium. Table 10.3-7 presents the pore-gas samples collected and the analyses requested for each.

10.3.3.6 Subsurface Vapor-Sample Analytical Results

Table 10.3-8 presents the VOCs detected in the pore-gas samples collected from AOC 49-008(c). The sampling locations and detected concentrations are shown on Plate 22. The VOCs detected in pore-gas are acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethylbenzene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3]+xylene[1,4-].

Table 10.3-9 presents the detected activities of tritium in pore-gas samples collected from AOC 49-008(c). The sampling location and detected concentration is shown on Plate 23.

10.3.3.7 Nature and Extent of Contamination in Subsurface Pore Gas

Acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethylbenzene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3]+xylene[1,4-] were detected in one or more samples collected from borehole locations 49-610489 and 49-610490. Tritium was detected in one sample at location 49-610489.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2).

Tritium was detected at a maximum concentration of 1766 pCi/g in a sample collected from 29 to 31 ft bgs at borehole location 49-610481. Detected concentrations of tritium concentration are below the groundwater MCL (20,000 pCi/L); therefore tritium is not a potential source of groundwater contamination.

The nature and extent of VOCs and tritium in pore gas are defined and the boreholes from AOC 49-008(c) were not completed as vapor-monitoring wells.

10.3.4 Summary of Human Health Risk Screening

The nature and extent of contamination at AOC 49-008(c) is not defined, and a human health risk-screening assessment was not performed.

10.3.5 Summary of Ecological Risk Screening

The nature and extent of contamination at AOC 49-008(c) is not defined, and an ecological risk-screening assessment was not performed.

11.0 AREA 12: BACKGROUND AND FIELD-INVESTIGATION RESULTS

This section presents the background, site description and operational history, and summary of previous investigations for the Area 12. This section also presents the field-investigation results from Area 12 and discusses the nature and extent of contamination of the sampled media.

11.1 Background of Area 12

Area 12 was used for confinement experiments consisting of HE detonations in sealed metal bottles 5 ft in diameter and 16 ft in length conducted in a shaft beneath the Bottle House (former building 49-23). Area 12 was also the site of the CPTF, which was used to test the strength of cables used in other experiments (former building 49-121).

11.1.1 Historical Releases

There are no documented releases from activities conducted at Area 12.

11.1.2 Relationship to Other SWMUs and AOCs

AOC 49-008(d) is located within Area 12. SWMUs 49-001(b), 49-001(c), 49-001(d), and 49-001(g) collectively known as MDA AB, are located directly west of AOC 49-008(d). AOC 49-002 is an underground experimental calibration chamber and two associated shafts in Area 10, and SWMU 49-005(a) is an inactive landfill located east of Area 10. Area 10 is located east of Area 12.

11.2 AOC 49-008(d): Bottle House and Cable Pull Test Facility

11.2.1 Site Description and Operational History

AOC 49-008(d) is an area consisting of potential soil contamination located within Area 12 in the northeast corner of the MDA AB NES boundary at TA-49 (Figure 11.2-1). Area 12 was used in 1960 and 1961 to conduct confinement experiments related to the hydronuclear experiments conducted at MDA AB. These experiments involved HE detonations in sealed metal bottles. The bottles measured up to 5-ft diameter × 16-ft long and were placed in a 10-ft-diameter × 30-ft-deep underground shaft during the experiments. Former building 49-23 constructed over the shaft was known as the Bottle House. Approximately 26 confinement experiments were conducted at Area 12 (LANL 1992, 007670, p. 6.6-3). After the confinement experiments at Area 12 ceased, Area 12 was used to conduct tests to determine the strength of cables used in other experiments. The CPTF, former building 49-121, was constructed approximately 60 ft south of former building 49-23 in the early or mid-1960s to perform these tests (LANL 1992, 007670, p. 3-9). The shaft in former building 49-23 was backfilled with crushed tuff, and a hydraulic system was installed in the building. Underground hydraulic lines were run to former building 49-121. The total fluid capacity of the hydraulic system was estimated to have been less than 10 gal. (LANL 2007, 098492). The Bottle House and CPTF were removed in February 2006 (Beguin 2007, 098607); neither PCBs nor radioactivity above background levels were detected in any of the waste streams generated during D&D activities (Beguin 2007, 098607). The site is used occasionally to support microwave experiments that involve portable equipment (LANL 2007, 098492).

11.2.2 Summary of Previous Investigations

During the 1987 soil and vegetation radiological-screening survey, 12 surface samples were collected within Area 12, and 11 vegetation samples were collected within and around Area 12 (LANL 1992, 007670). Samples were analyzed for radionuclides and results showed radionuclides at background levels for most sampling locations; however, elevated levels of isotopes of plutonium and americium were present in a highly discontinuous distribution at several samples around the former Bottle House (LANL 1992; 007670). Several vegetation samples also showed slightly elevated radioactivity.

The 1995 Phase I RFI conducted at AOC 49-008(d) was directed at three specific areas: soil inside and around the former Bottle House (former building 49-23), soil around the former CPTF (former building 49-121), and a small area of stained soil approximately 80 ft south of former building 49-121. Radiation surveys were conducted at each of these areas, and radiation was not detected above background levels around the former CPTF or at the stained-soil site. However, four radiation survey points around the former Bottle House showed radiation levels above background levels (LANL 2007, 098492). A total of 22 surface-soil samples (0 to 0.5 ft bgs) were collected at the three areas of investigation described above. Additionally, three samples were collected from a depth of 0.5 to 1 ft bgs from three of the surface-sampling locations around the former Bottle House (locations 49-09007, 49-09032, and 49-09036). All samples were field screened for radioactivity and submitted for analyses of gamma-emitting radionuclides. Samples from nine of the surface locations and the three subsurface samples were submitted for analysis of TAL metals and isotopic plutonium. Both surface and shallow subsurface samples collected from sampling locations 49-09007, 49-09032, and 49-09036 were also submitted for analysis of isotopic uranium. Seven surface samples collected near the location of the hydraulic system in the former Bottle House and near the former CPTF were also submitted for analysis of SVOCs, and one surface sample was as submitted for analysis of pesticides and PCBs (LANL 2007, 098492).

Inorganic chemicals detected above BVs included cadmium, copper, lead, sodium, uranium, and zinc. Organic chemicals alpha–benzene hexachloride, alpha-chlordane, and gamma-chlordane were detected at trace concentrations in the same surface sample collected inside the former Bottle House (sampling location 49-09095). Radionuclides detected or detected above BVs/FVs included plutonium-238, uranium-234, uranium-235/236, and uranium-238. Based on these results, a voluntary corrective action (VCA) was proposed for soil around former building 49-23 (LANL 2007, 098492).

In 1997 and 1998, three VCAs were conducted at AOC 49-008(d). These VCAs consisted of radiological field screening in conjunction with soil sampling to remove isolated contamination (LANL 1997, 056923, p. 17). The initial VCA was conducted at AOC 49-008(d) in 1997 to remove soil contaminated with uranium-234, uranium-235, and/or uranium-238 above cleanup levels (LANL 1997, 056923, p. 17). Confirmation samples revealed contamination still present above cleanup levels (LANL 2007, 098492). A supplemental low-level gamma radiation survey of surface soil around the Bottle House was conducted in April 1998 (LANL 1998, 062405). Of 2000 measurements taken, eight measurements were above 9000 counts per min (cpm) (9140 to 32,200 cpm), which was considered above background. All of these detections were near areas where soil was removed during the 1997 VCA (LANL 2007, 098492). In November 1998, a remedial action was conducted to remove all brushy vegetation and a pre-excavation radiological survey was conducted on a 3-ft × 3-ft grid that included some of the locations covered in the April 1998 survey. Radiological-screening results were used to identify areas for additional soil removal, and soil was removed to a depth of 12 in. A postexcavation radiological survey was conducted in which three additional locations were identified that exceeded screening-action levels. Additional small amounts of soil were removed at these locations (LANL 1998, 062405). Additional confirmatory sampling was conducted from the areas of the highest radiological survey measurements and from randomly selected locations. Analyses were performed on these samples for isotopic uranium. One of these confirmatory samples exceeded cleanup level for uranium-238 (270 pCi/g) (LANL 2007, 098492). Following the confirmatory sampling, soil-removal areas were backfilled with clean crushed tuff, covered with a thin layer of topsoil, and seeded (Wilson 1999, 066470.426). Data from the 1997 and 1998 VCAs are screening-level data and are presented in Appendix B of the HIR (LANL 2007, 098492). Historical sample locations and detected concentrations are shown on plates and presented in figures and tables below.

11.2.3 Site Contamination

11.2.3.1 Soil and Rock Sampling

Additional samples were collected in 2009–2010 at AOC 49-008(d) per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416). Samples were collected either by hand auger or by core barrel sampling with a drill rig. All required samples were submitted through the SMO for analysis at off-site contract laboratories.

In the 2009–2010 investigation, surface samples were collected across the site to characterize the nature and extent of surface contamination. Two boreholes were drilled extending to a total depth of 120 ft bgs and samples collected to characterize the vertical extent of contamination beneath the Bottle House and CPTF and characterize the surge bed, if present, at the base of Qbt 4. All required samples were submitted through the SMO for analysis at off-site laboratories. Sample locations were surveyed by LANL using GPS (Table 11.2-1). Sample collection and screening methods are described in Appendix B.

A total of 65 (59 soil/fill and 6 tuff), plus 5 field duplicates, were collected in 2009–2010, from 33 locations at AOC 49-008(d). Data from the samples collected in 2009–2010 were combined with decision-level data from previous investigations. The final decision-level dataset includes 90 samples (84 soil/fill and 6 tuff), plus 6 field duplicates, collected in 1995 and 2009–2010 from 54 locations at AOC 49-008(d), with a maximum sample depth of 120 ft bgs. The sample locations are shown on Plate 24.

Table 11.2-2 presents the samples collected and the analyses requested.

11.2.3.2 Soil and Rock Sample Field-Screening Results

Organic vapors were not detected above 1.7 ppm during headspace (PID) screening of samples at AOC 49-008(d). No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 11.2-3. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

Eight surface and shallow subsurface samples from AOC 49-008(d) exceeded the gross-alpha and/or -beta screening thresholds, and additional samples were collected and submitted for appropriate laboratory analysis. Fourteen additional stepout-surface and shallow-subsurface screening samples from seven locations were collected and screened for gross-alpha and -beta analysis but did not exceed screening thresholds and were not submitted for laboratory analysis. The gross-alpha and -beta screening results that guided additional sampling at AOC 49-008(d) are presented in Tables D-16 through D-21 in Appendix D.

11.2.3.3 Soil and Rock Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV in one or more media at AOC 49-008(d). The sampling locations are shown on Plate 24. Table 11.2-4 presents the concentrations of inorganic chemicals either detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Soil

Sixty-five soil/tuff samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Two samples were also analyzed for perchlorate and cyanide. Table 11.2-2 summarizes samples collected and the requested analyses for each sample.

Table 11.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Antimony, barium, cadmium, calcium, chromium, cobalt, copper, cyanide (total), lead, manganese, nickel, sodium, thallium, total uranium, and zinc were detected in soil above BVs or have DLs above BVs. The detected concentrations of inorganic chemicals detected or detected above BVs are shown on Plate 25. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Inorganic Chemicals in Tuff

Six tuff samples were collected and analyzed for inorganic chemicals. All samples were analyzed for TAL metals, perchlorate, and cyanide. Table 11.2-2 summarizes samples collected and the requested analyses for each sample.

Table 11.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BV. Antimony, cyanide (total), and selenium were detected in tuff above BVs or have DLs above BVs. The sampling locations and detected concentrations are shown on Plate 25. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Organic Chemicals

Organic chemicals were detected at AOC 49-008(d). The sampling locations are shown on Plate 24. Table 11.2-5 presents the concentrations of detected organic chemicals.

Organic Chemicals in Soil

Sixty-six soil samples were collected and analyzed for organic chemicals. Each sample was analyzed for SVOCs. Fifty-nine samples were analyzed for VOCs. One sample was analyzed for only PCBs and pesticides. Fifty-seven samples were analyzed for PCBs. Four samples were analyzed for total petroleum hydrocarbons-diesel range organics (TPH-DRO) and total petroleum hydrocarbons-gasoline range organics (TPH-GRO). Table 11.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 11.2-5 presents the detected concentrations of organic chemicals in soil. Thirteen organic chemicals [acetone; Aroclor-1254; Aroclor-1260; benzo(g,h,i)perylene;, BHC[alpha-]; bis(2-ethylhexyl)phthalate; chlordane[alpha-]; chlordane[gamma-]; chlorobenzene; chloromethane;

dichlorobenzene[1,4-]; isopropyltoluene[4-]; and methylene chloride] were detected. The detected concentrations of organic chemicals are shown on Plate 26.

Organic Chemicals in Tuff

Six tuff samples were collected and analyzed for organic chemicals. Each sample was analyzed for VOCs, SVOCs, and explosive compounds. Three samples were also analyzed for TPH-DRO and TPH-GRO. Table 11.2-2 summarizes samples collected and the requested analyses for each sample.

Table 11.2-5 presents the detected concentrations of organic chemicals in tuff. One organic chemical [bis(2-ethylhexyl)phthalate] was detected in one sample. The detected concentrations of organic chemicals are shown on Plate 26.

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, at AOC 49-008(d). The sampling locations are shown on Plate 24. Table 11.2-6 presents the concentrations of radionuclides detected or detected above BVs/FVs.

Radionuclides in Soil

A total of 84 samples were collected from soil and fill and analyzed for radionuclides; 82 samples were analyzed for radionuclides by gamma spectroscopy; 56 samples were analyzed for americium-241; 65 samples were analyzed for isotopic plutonium; 4 samples were analyzed for strontium-90 and technetium-99; 2 samples were analyzed for tritium; and 62 samples were analyzed for isotopic uranium. Table 11.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 11.2-6 presents the radionuclides detected or detected above BVs/FVs. Americium-241, cesium-134, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238 were detected or detected above BV/FV. The sampling locations with radionuclides detected above BVs/FVs are shown on Plate 27. The identification of COPCs was not performed because extent of contamination is not defined for the site.

Radionuclides in Tuff

Six samples were collected from tuff and analyzed for americium-241, tritium, isotopic plutonium, and isotopic uranium. Table 11.2-2 summarizes the samples collected and the requested analyses for each sample.

Table 11.2-6 presents the radionuclides detected or detected above BVs/FVs. Tritium was detected in two tuff samples. The sampling locations with radionuclides detected or detected above BVs/FVs are shown on Plate 27.The identification of COPCs was not performed because extent of contamination is not defined for the site.

11.2.3.4 Nature and Extent of Soil and Rock Contamination

Per the approved work plan, the intent of the surface and shallow-subsurface investigation at AOC 49-008(d) was to define the nature and extent of surface contamination, and the intent of the two boreholes was to characterize the vertical extent of contamination beneath the former Bottle House (former structure 49-23) and the former CPTF (former structure 49-121) (LANL 2008, 102691, pp. 30 and 41).

The nature and extent of inorganic chemicals and radionuclides at SWMU 49-008(d) are not defined, while organic chemicals have nature and extent defined. The following sections discuss the spatial distribution of inorganic chemicals, organic chemicals, and radionuclides at AOC 49-008(d).

Inorganic Chemicals

As part of the review of the nature and extent of contamination at AOC 49-008(d), the site data for inorganic chemicals detected at concentrations above BVs were compared more rigorously with the inorganic chemical and medium specific background dataset following the methods described in section 4.1.2. The following inorganic chemicals (barium, calcium, chromium, cobalt, copper, lead, manganese, nickel, sodium, and zinc) were detected in soil or tuff above BVs, but statistical tests indicate that the detected concentrations are not different from background. Antimony and cyanide were not detected in site samples but had DLs above BVs. Antimony and cyanide are also discussed below.

The following inorganic chemicals (cadmium, cyanide, thallium and total uranium) were detected in soil above BVs, detected with no BV, or with DLs above BVs, and statistical tests indicate that the detected concentrations are different from background. The results of the statistical tests and presentation of box plots are not presented at this time, because COPCs are not identified for the site.

As discussed in detail in section 4.2, multiple inorganic chemicals are consistently elevated in Qbt 4 samples collected across TA-49 compared with the Laboratory BVs for tuff (Qbt 2, Qbt 3, and Qbt 4), and only outlier data points are interpreted as elevated with respect to TA-49 background. At AOC 49-008(d), selenium concentrations in tuff are different from the corresponding Laboratory-wide inorganic chemical background dataset for tuff (or are higher than the maximum concentrations in the background datasets), but are consistent with the TA-49 inorganic chemical background dataset for Qbt 4. No outliers were observed for the 11 inorganic chemicals; therefore, the extent of these inorganic chemicals in tuff is defined. The scatter plots for these inorganic chemicals in Qbt 4 are presented in Appendix I in Figures I-2, I-3, and I-4.

The lateral and vertical extent of the inorganic chemicals mentioned above are discussed below.

Antimony was detected in the soil above BV (0.83 mg/kg) in two samples and had three DLs (0.51 mg/kg) in tuff samples above BV (0.5 mg/kg). Concentrations increased slightly with depth at location 49-609903, with a maximum detected concentration of 2.1 mg/kg in the deeper sample. The vertical extent of antimony is not defined. Antimony was not detected above BV in nearby samples from similar depth. The lateral extent of antimony is defined.

Barium was detected above the soil BV (295 mg/kg) in three samples. The maximum detected concentration of 539 mg/kg was at location 49-609907 in a sample collected from 0.5 to 1.5 ft bgs. Statistical tests were performed to determine if barium in soil is different from background. The statistical test results are presented in Table H-8 and the box plot for barium is presented in Figure H-10. The results of both the Gehan test and the quantile test indicate barium in tuff is not different from background. The lateral and vertical extent of barium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in eight samples. The maximum detected concentration of 1.1 mg/kg was in the deeper sample at location 49-09036. Concentrations decreased with depth at locations 49-09007, 49-09032, 49-09035, and 49-09095 and increased with depth at 49-09036. Cadmium was not detected above BV in samples collected from surrounding boreholes at similar or deeper depths. The maximum detected concentration (1.1 mg/kg) is less than the maximum background concentration (2.6 mg/kg). The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in five samples. The maximum detected concentration of 9760 mg/kg was at location 49-609899. Statistical tests were performed to determine if calcium in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-10. The results of both the Gehan test and the quantile test indicate that calcium in soil is not different from background. The lateral and vertical extent of calcium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 21 mg/kg in the deeper sample at location 49-609901. Statistical tests were performed to determine if the chromium in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-11. The results of both the Gehan test and the quantile test indicate chromium in soil is not different from background. The lateral and vertical extent of chromium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in two samples. The maximum detected concentration of 15 mg/kg was at location 49-609907. Statistical tests were performed to determine if cobalt in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-11. The results of both the Gehan test and the quantile test indicate that the cobalt in soil is not different from background. The lateral and vertical extent cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in seven samples. The maximum detected concentration of 391 mg/kg was at location 49-609950 in the surface sample. Copper was not detected above BV in the deeper sample collected from the same location. Statistical tests were performed to determine if copper in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-12. The results of both the Gehan test and the quantile test indicate that copper in soil is not different from background. The lateral and vertical extent of copper are defined.

Cyanide was not detected in site samples, but had DLs (0.51 to 0.58 mg/kg) above BV (0.5 mg/kg) in two soil samples and six tuff samples. Cyanide was not detected; therefore, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in three samples. The maximum detected concentration of 38.2 mg/kg was in the surface sample at location 49-09007. Statistical tests were performed to determine if lead in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-12. The results of both the Gehan test and the quantile test indicate that lead in soils is not different from background. The lateral and vertical extent of lead are defined.

Manganese was detected (1020 mg/kg) above BV (671 mg/kg) in one sample at location 49-609907. Statistical tests were performed to determine if manganese in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-13. The results of both the Gehan test and the quantile test indicate that the manganese is not different from background. The lateral and vertical extent of manganese are defined.

Nickel was detected (16.1 mg/kg) above the soil BV (15.4 mg/kg) in one sample at location 49-609901. Statistical tests were performed to determine if nickel in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-13. The results of both the Gehan test and the quantile test indicate that nickel is not different from background. The lateral and vertical extent of nickel are defined.

Sodium was detected above the soil BV (915 mg/kg) in three samples. The maximum detected concentration of 5930 mg/kg was in the shallow sample at location 49-09095. Statistical tests were performed to determine if sodium in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-14. The results of both the Gehan test and the quantile test indicate that sodium in soil is not different from background. The lateral and vertical extent of sodium are defined.

Selenium was detected in tuff at concentrations above the corresponding Laboratory-wide background dataset for tuff, but consistent with the TA-49 background for Qbt 4. As depicted in the spatial plot for selenium (Figure I-3), selenium concentrations in Qbt 4 do not change and are consistent with depth and location. The lateral and vertical extent of selenium are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in three samples at locations 49-609889, 49-609909, and 49-609913. Additionally, there were 17 DLs in soil above BV. Concentrations decreased with depth at location 49-609889 and increased with depth at locations 49-609909 and 49-609913. Locations 49-609909 and 49-609913 are positioned along the perimeter of the site. The lateral and vertical extent of thallium are not defined.

Total uranium was detected above the soil BV (1.82 mg/kg) in nine samples collected during the 1995 investigation. The maximum detected concentration of 68.4 mg/kg was at location 49-09036 in a sample collected from 0 to 0.5 ft bgs. Concentrations decreased with depth at all locations except location 49-09095, where only a surface sample was collected. The vertical extent of total uranium is defined. The lateral extent of total uranium is defined by the isotopic uranium data collected from surrounding locations and borehole locations 49-610481 and 49-610485, where isotopic uranium was not detected above FV.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples. The maximum detected concentration of 171 mg/kg was in the shallow sample at location 49-609894. Statistical tests were performed to determine if zinc in soil is different from background. The statistical test results are presented in Table H-8 and the box plot is presented in Figure H-14. The results of both the Gehan test and the quantile test indicate that zinc in soil is not different from background. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone; chlorobenzene; chloromethane; dichlorobenzene[1,4-]; isopropyltoluene[4-]; and methylene chloride were detected inconsistently in sampling locations and two borehole locations at AOC 49-008(d). The VOC concentrations were detected below the EQL for all locations except at surface locations 49-609895 and 49-609898. Acetone was detected in surface location 49-609895 at a concentration of 0.026 mg/kg, which is near the EQL of 0.021 mg/kg. Acetone was not detected at depth and was not detected in surrounding surface-sampling locations. Acetone was detected at depth with a maximum detected concentration of 0.18 mg/kg at surface location 49-609898. Surface location 49-609898 is defined at depth by borehole location 49-610485; located 40 ft southeast of the surface location. The lateral and vertical extent of VOCs are defined.

Benzo(g,h,i)perylene was detected at locations 49-609896 and 49-609950. Concentrations decreased with depth at both locations and were below the EQL of 0.35 mg/kg. Bis(2-ethylhexyl)phthalate was detected at borehole locations 49-610481 and 49-610485 and surface-sample locations 49-609891, 49-609909, 49-609910, 49-609950, and 49-609955. Concentrations were below the EQL of 0.34 mg/kg for all locations. Bis(2-ethylhexyl)phthalate was not detected at deeper depths, except borehole location 49-610485. The lateral and vertical extent of SVOCs are defined.

Aroclor-1254 was detected at location 49-609903. Concentrations increased with depth, but were below the EQL (0.17 mg/kg). Aroclor-1254 was not detected in surrounding sample locations. Aroclor-1260 was detected at location 49-609894. Concentrations decreased with depth and were below the EQL (0.17 mg/kg). The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

BHC[alpha-], chlordane[alpha-], and chlordane[gamma-] were detected at location 49-09095, where only a surface sample was collected. Pesticides were not analyzed for in samples collected from 2009–2010. The lateral and vertical extent of pesticides are defined.

Radionuclides

Americium-241 was detected (0.086 pCi/g) above the FV (0.013 pCi/g) in one fill sample at location 49-609896. Americium-241 was not detected above FV in the deeper sample collected from this location. Amercium-241 was not detected above FV in borehole 49-610942, located 5 ft from location 49-609896. The lateral and vertical extent of americium-241 are defined.

Cesium-134 was detected (0.039 pCi/g) in one fill sample at location 49-609895. Cesium-134 was not detected in the deeper sample collected from this location. Cesium-134 was not detected in any other surface samples surrounding location 49-609895. The lateral and vertical extent of cesium-134 are defined.

Cesium-137 was detected in the deeper samples at locations 49-609889 and 49-609892. The maximum detected concentration of 0.187 pCi/g was detected at location 49-609895. Cesium-137 was not detected in surface samples collected from similar depths. Cesium-137 was not detected at borehole locations 49-02901 or 49-608981, located 10 ft from 49-609889 and 50 ft from 49-609892, respectively. The lateral and vertical extent of cesium-137 are defined.

Plutonium-239/240 was detected above the FV (0.054 pCi/g) in 16 soil or fill samples, with a maximum detected concentration of 0.483 pCi/g at location 49-09032. Concentrations decreased with depth at all locations except locations 49-609891 and 49-609903. Plutonium-239/240 was not detected above FV in surface samples surrounding the 13 locations where plutonium 239/240 was detected. The lateral extent of plutonium-239/240 is defined. Plutonium-239/240 was not detected above FV at borehole location 49-610481, located 40 ft from location 49-609891. The vertical extent of plutonium-239/240 at location 49-609891 is defined. There are no boreholes or deeper samples near location 49-609903. The vertical extent of plutonium 239/240 is not defined at location 49-609903.

Tritium was detected at borehole locations 49-610481 and 49-610485 at concentrations of 0.265 and 0.35 pCi/g, respectively. Tritium decreased with depth at borehole location 49-610485 and increased with depth at borehole location 49-610485. Tritium was not detected at borehole location 49-610942, located 60 ft from borehole location 49-610485. The lateral and vertical extent of tritium are defined.

Uranium-234 was above BV (2.59 pCi/g) in three soil samples at locations 49-09007, 49-09036, and 49-609890. Concentrations decreased with depth at locations 49-09007 and 49-09036 and increased with depth at location 49-609890. Uranium-234 was not detected above BV in surface samples from similar depths located 15 ft from locations 49-09007, 49-09036, and 49-609890. Uranium-234 was not detected above BV at borehole location 49-610481, located 15 ft from location 49-609890. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above BV (0.2 pCi/g) in two soil samples from locations 49-09007 and 49-09036. Concentrations decreased with depth at both surface locations. Uranium 235/236 was not detected above BV in surface samples collected from similar depths located 10 ft from locations 49-09007 and 49-09036. The lateral and vertical extent of uranium 235/236 are defined.

Uranium-238 was detected above BV (2.29 pCi/g) in seven soil samples, with a maximum detected concentration of 22.74 pCi/g at location 49-09036. Concentrations decreased with depth at locations 49-09007, 49-09032, and 49-09036, and increased with depth at location 49-609890. Uranium-238 was not detected above BV in surface samples from similar depths located 15 ft from locations 49-09007, 49-09032, and 49-09036. Uranium-238 was not detected above BV at borehole location 49-610481.The lateral and vertical extent of uranium-238 are defined.

11.2.3.5 Subsurface Vapor Sampling

In the 2009–2010 investigation, three pore-gas samples were collected from borehole location 49-610481 and analyzed for VOCs and tritium. Table 11.2-7 presents the pore-gas samples collected and the analyses requested for each. The sample locations are shown on Plate 25.

11.2.3.6 Subsurface Vapor Sample Analytical Results

Table 11.2-8 presents the VOCs detected in the pore-gas samples collected from AOC 49-008(d). The sampling location and detected concentrations are shown on Plate 26. The VOCs detected in pore-gas samples are acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-].

Table 11.2-9 presents the detected concentration of tritium in pore-gas samples collected from AOC 49-008(d). The sampling locations and detected concentrations are shown on Plate 27.

11.2.3.7 Nature and Extent of Contamination in Subsurface Pore Gas

The approved work plan (LANL 2008, 102691) prescribed the collection of pore-gas samples from intervals corresponding to the base of formation Qbt 4, the TD of the closest experimental shaft, and from the TD of each borehole. If VOCs were detected in the vapor-phase sample at concentrations greater than 10% of the SLs presented in section 3.5, or if tritium was detected in the vapor-phase sample at a concentration greater than the groundwater MCL, the borehole would be completed as a vapor-monitoring well.

Acetone; benzene; butanone[2-]; carbon disulfide; chloromethane; dichlorodifluoromethane; ethylbenzene; ethyltoluene[4-]; styrene; toluene; trimethylbenzene[1,2,4-]; trimethylbenzene[1,3,5-]; xylene (total); xylene[1,2-]; and xylene[1,3-]+xylene[1,4-] were detected in at least one sample collected from borehole 49-610481. Tritium was detected in three samples at borehole location 49-610481. Concentrations increased with depth and exceeded the groundwater MCL of 20,000 pCi/L in the deepest sample.

Screening was performed for each of the VOCs detected in pore-gas samples collected from Areas 1, 3, 4, 11, and 12 and MDA AB using the maximum detected concentration from all areas. These results show that the SVs are below 1 in all cases, indicating that VOCs in subsurface pore gas are not a potential source of groundwater contamination (Table 3.5-2). The nature and extent of VOCs in pore gas are defined.

Tritium was detected at a maximum activity of 20,140 pCi/g in a sample collected from 82 to 84 ft bgs at borehole location 49-610481. Detected activity of tritium concentration exceeds the groundwater MCL

(20,000 pCi/L); therefore tritium may be a potential source of groundwater contamination. Borehole location 49-610481 will therefore be completed as a moisture-monitoring well. The details of the monitoring well installation and sampling plan will be presented in the Phase II investigation work plan.

11.2.4 Summary of Human Health Risk Screening

A human health risk-screening assessment was not performed because the extent of contamination is not defined at AOC 49-008(d).

11.2.5 Summary of Ecological Risk Screening

An ecological risk-screening assessment was not performed, because the extent of contamination is not defined at AOC 49-008(d).

12.0 ANCHO CANYON AND WATER CANYON: BACKGROUND AND FIELD INVESTIGATION RESULTS

12.1 Background

Water Canyon and Ancho Canyon are located in the southern portion of the Laboratory. Water Canyon is located north of TA-49, and Ancho Canyon is located south of TA-49. The headwaters of Ancho Canyon and Water Canyon are along the eastern flank of the Jemez Mountains, near the western margin of the Pajarito Plateau. The discharge point of the watersheds is located at the Rio Grande on the eastern edge of the Pajarito Plateau. The watersheds also include numerous springs, ephemeral and perennial surface water, and alluvial groundwater.

Cañon de Valle, located on the western portion of the Pajarito Plateau, is the main tributary to Water Canyon. Tributaries that may contribute contamination to Water Canyon include Indio, Fence, and Potrillo Canyons, which join Water Canyon on the eastern side of the Laboratory. The TAs located within this watershed are TA-08, -09, -11, -14, -15, -16, -28, -36, -37, -39, -49, -68, -70, and -71. This region of the Laboratory was used for weapons testing, explosives testing, and explosives production and received effluent from outfalls containing explosive compounds, metals, and VOCs. Stormwater runoff from firing sites, open burn/open detonation units, surface disposal sites, and other SWMUs and AOCs may have contributed to the contamination detected within the watershed.

TA-49 is located on a mesa in the upper part of the Ancho Canyon drainage; part of the area also drains into Water Canyon. TA-39 is located on both the floor and mesa tops of middle Ancho Canyon, and it was used for open-air testing of explosive compounds. SWMUs and AOCs in this TA include five firing sites, a number of landfills, and several septic systems (LANL 1992, 007670).

12.2 Summary of Previous Investigations

No previous investigations have been conducted in the Water Canyon and Ancho Canyon watersheds to evaluate the nature and extent of contamination potentially transported from TA-49 SWMUs and AOCs.

12.3 Site Contamination

12.3.1 Sediment Sampling

Sediment samples were collected in 2009–2010 from Ancho and Water Canyons per the approved investigation work plan (LANL 2006, 092571.12; NMED 2006, 095416) to determine the nature and extent of contamination potentially transported from TA-49 into drainages and canyons downgradient of the sites within TA-49. All samples were collected using a hand auger. Samples were submitted through the SMO for analysis at off-site contract laboratories. All sample locations were surveyed using GPS (Table 12.3-1). Sample collection and screening methods are described in Appendix B.

In the 2009–2010 investigation, 118 sediment samples, plus 13 field duplicates, were collected in 2010 from 73 locations at Ancho Canyon; 116 sediment samples, plus 12 field duplicates, were collected in 2010 from 66 locations at Water Canyon. The sampling locations from Ancho Canyon and Water Canyon are shown on Plate 28.

Table 12.3-2 and Table 12.3-3 present the samples collected and the analyses requested for Ancho Canyon and Water Canyon, respectively.

12.3.2 Sediment Sample Field-Screening Results

No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 12.3-4. There were no changes to sampling or other activities as a result of health- and safety-based field-screening results.

12.3.3 Sediment Sample Analytical Results

Inorganic Chemicals

Inorganic chemicals were detected above BVs, had DLs above BVs, or were detected with no BV at Ancho Canyon and Water Canyon. The sampling locations in Ancho Canyon and Water Canyon are shown on Plate 28. Table 12.3-5 and Table 12.3-6 present the concentrations of inorganic chemicals detected above BVs, detected with no BV, or with DLs above BVs.

Inorganic Chemicals in Sediment

From Ancho Canyon, 115 sediment samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Table 12.3-2 summarizes samples collected and the requested analyses for each sample.

Table 12.3-5 lists the inorganic chemicals detected or detected above BVs. Arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, nickel, selenium, silver, thallium, and vanadium were detected in sediment above BVs. The sampling locations and detected concentrations are shown on Plate 29.

From Water Canyon, 116 sediment samples were collected and analyzed for inorganic chemicals. Each sample was analyzed for TAL metals. Table 12.3-3 summarizes samples collected and the requested analyses for each sample.

Table 12.3-6 lists the inorganic chemicals detected or detected above BVs. Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, thallium, and vanadium were detected or had DLs above BVs in sediment. The sampling locations and detected concentrations are shown on Plate 29.

The sediment data will be integrated with data collected by other Laboratory environmental sampling programs, including the South Canyons investigation work plan (LANL 2006, 093713).

Organic Chemicals

Organic chemicals were detected in Ancho Canyon and Water Canyon. The sampling locations from Ancho Canyon and Water Canyon are shown on Plate 28. Table 12.3-7 and Table 12.3-8 present the concentrations of detected organic chemicals.

Organic Chemicals in Sediment

From Ancho Canyon, 118 sediment samples were collected and analyzed for organic chemicals. Each sample was analyzed for SVOCs and PCBs. Table 12.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 12.3-7 presents the detected concentrations of organic chemicals in samples from Ancho Canyon. Five organic chemicals [benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butylphthalate, and pyrene] were detected in sediment samples from Ancho Canyon. The sampling locations and detected concentrations of organic chemicals are shown on Plate 30.

From Water Canyon, 116 sediment samples were collected and analyzed for organic chemicals. Each sample was analyzed for SVOCs and PCBs. Table 12.3-3 summarizes the samples collected and the requested analyses for each sample.

Table 12.3-8 presents the detected concentrations of organic chemicals in samples from Water Canyon. Nine organic chemicals [aniline; Aroclor-1260; benzyl alcohol; bis(2-ethylhexyl)phthalate; di-n-butylphthalate; fluoranthene; phenanthrene; phenol; and pyrene] were detected in sediment samples in Water Canyon. The sampling locations and detected concentrations of organic chemicals are shown on Plate 30.

The sediment data will be integrated with data collected by other Laboratory environmental sampling programs, including the South Canyons investigation work plan (LANL 20006, 093713).

Radionuclides

Radionuclides were detected, or detected above BVs/FVs, in Ancho Canyon and Water Canyon. The sampling locations with detected concentrations are shown on Plate 31. Table 12.3-9 and Table 12.3-10 present the radionuclides detected or detected above BVs/FVs or detected with no BV/FV in Ancho Canyon and Water Canyon.

Radionuclides in Sediment

From Ancho Canyon, 115 sediment samples were collected and analyzed for radionuclides. All samples were analyzed for radionuclides by gamma spectroscopy, americium-241, isotopic plutonium, and isotopic uranium. Table 12.3-2 summarizes the samples collected and the requested analyses for each sample.

Table 12.3-9 presents the radionuclides detected or detected above BVs/FVs. Americium-241, cesium-137, and plutonium-239/240 were detected or detected above FV in sediment. The activities of radionuclides detected or detected above BVs/FVs are shown on Plate 31.

From Water Canyon, 116 sediment samples were collected and analyzed for radionuclides. All samples were analyzed for radionuclides by gamma spectroscopy, americium-241, isotopic plutonium, and isotopic uranium. Table 12.3-3 summarizes the samples collected and the requested analyses for each sample.

Table 12.3-10 presents the radionuclides detected or detected above BVs/FVs. Americium-241, cesium-134, cesium-137, plutonium-238, plutonium-239/240, uranium-234, and uranium-238 were detected or detected above BVs/FVs in sediment. The activities of radionuclides detected or detected above BVs/FVs are shown on Plate 31.

The sediment data will be integrated with data collected by other Laboratory environmental sampling programs, including the South Canyons investigation work plan (LANL 20006, 093713).

12.3.4 Nature and Extent of Sediment Contamination

Sediment characterization and monitoring in the canyon systems are accomplished through the canyons investigations required by the Consent Order. Only a brief discussion of the extent of contamination in sediments potentially originating from TA-49 is provided in this report to determine the impact of TA-49 operations to Ancho and Water Canyons. Analysis of sediment data from Ancho and Water Canyon will be integrated with the Laboratory environmental sampling programs, including the South Canyons investigation (LANL 2006, 093713).

Inorganic Chemicals

The inorganic chemicals discussed below (beryllium, calcium, chromium, iron, and nickel in Ancho Canyon sediments, and beryllium, chromium, copper and potassium in Water Canyon sediments) were detected at concentrations above BVs, but statistical tests indicate that these chemicals are not different from background; therefore the nature and extent of these chemicals are defined. Statistical tables and box plots for these chemicals are presented in Table H-9 and Table H-10 and Figures H-15 through H-19. These inorganic chemicals were detected in only six or fewer samples from each watershed. The nature and extent of beryllium, calcium, chromium, iron, and nickel in Ancho Canyon and beryllium, chromium, copper and potassium in Water Canyon are defined.

The remaining inorganic chemicals are different from background but similar to the concentrations of inorganic chemicals detected at TA-49 and are likely naturally occurring levels. A brief discussion of the detected concentrations and spatial distribution of these inorganic chemicals is presented below.

Arsenic, copper, lead, and magnesium were detected above sediment BVs in four or fewer samples collected from Ancho Canyon.

Barium, cobalt, selenium, and vanadium were detected above sediment BVs in 14 to 66 samples collected from Ancho Canyon. All detected concentrations of each inorganic chemical were essentially the same across the canyon and at depth. Barium concentrations above BV ranged from 133 to 204 mg/kg; cobalt concentrations above BV ranged from 4.9 to 6.6 mg/kg. Selenium concentrations above BV ranged from 0.71 to 1.4 mg/kg, and vanadium concentrations above BV ranged from 19.9 to 40.1 mg/kg.

Antimony, calcium, nickel and silver were detected in only five or fewer sediment samples from Water Canyon. Antimony was detected above BV in one sample at a concentration of 17.9 mg/kg. Calcium was detected above BV in one sample at a concentration of 6620 mg/kg. Nickel concentrations above BV ranged from 9.4–10.2 mg/kg. Silver was detected above BV in one sample at a concentration of 1.1 mg/kg. All detected concentrations were less than twice the respective BV except antimony.

Aluminum, arsenic, iron, lead, magnesium, and manganese were detected above sediment BVs in 5 to 16 samples from Water Canyon. Aluminum concentrations above BV ranged from 16,400–29,100 mg/kg; arsenic concentrations above BV ranged from 4.0–9.3 mg/kg; iron concentrations above BV ranged from 13,900–21,200 mg/kg; lead concentrations above BV ranged from 20.3–27.9 mg/kg; magnesium concentrations above BV ranged from 2380–3280 mg/kg; and manganese concentrations above BV ranged from 554–2150 mg/kg. All detected concentrations were less than twice the respective BV except arsenic and manganese.

Barium, cobalt, selenium, and vanadium were detected in 44 to 76 sediment samples from Water Canyon. Barium concentrations above BV ranged from 129 to 777 mg/kg; cobalt concentrations above BV ranged from 4.8 to 7.8 mg/kg; selenium concentrations above BV ranged from 0.67–1.3 mg/kg; and vanadium concentrations above BV ranged from 20.6 to 53.6 mg/kg. All detected concentrations except cobalt were above twice the respective BV. Barium concentrations in Water Canyon were higher than those collected from Ancho Canyon. The maximum detected concentration of barium was detected in a sample downstream of the influence of Water Canyon and Canon de Valle and is likely associated with historical and ongoing activities at TA-16. Selenium concentrations were essentially the same across the canyon. Vanadium concentrations were similar to, although slightly more elevated than, samples collected from Ancho Canyon.

The inorganic chemical sediment data collected from Ancho Canyon and Water Canyon are consistent across the canyons. There is no evidence of contamination or apparent signature from TA-49 operations.

Organic Chemicals

Benzo(g,h,i) perylene; bis(2-ethylhexyl)phthalate; chrysene; di-n-butylphthalate; and pyrene were detected in sediment at 17 locations in Ancho Canyon. Concentrations decreased with depth at nine locations, were detected at depth (0.0 to 0.5 ft bgs) at five locations, and increased with depth at three locations. Concentrations of SVOCs were less than the EQL at all sediment locations except bis(2-ehtylhexyl)phthalate at locations 49-610400, 49-610420, 49-610428, and 49-610450.

Aniline; benzyl alcohol; bis(2-ethylhexyl)phthalate; di-n-butylphthalate; fluoranthene; phenanthrene; phenol; and pyrene were detected in sediment at 31 locations in Water Canyon. The concentrations of these SVOCs were below the EQL at all sediment locations.

Aroclor-1260 was detected in sediment at nine locations in Water Canyon. Aroclor-1260 concentrations were below the EQL (0.055 mg/kg) for all sampling locations except location 49-610367. Sampling location 49-610367 is the northern location of a sampling transect. Concentrations increased with depth and were slightly higher than the EQL. Aroclor-1260 was not detected in sampling locations to the north, west, or east and was not detected at similar depths along the same sampling transect.

These organic chemicals are likely from sources other than TA-49.

Radionuclides

Americium-241 was detected above the sediment FV (0.04 pCi/g) at locations 49-610392 and 49-610462 in Ancho Canyon. Concentrations ranged from 0.055 to 0.068 pCi/g. Americium-241 was not detected downstream at locations 49-610392 and 49-610462 and was not detected in additional sampling locations along the same sampling transects. Americium-241 was detected in sediment from locations 49-610345 and 49-610349 in Water Canyon at concentrations ranging from 0.316 to 0.976 pCi/g, Americium-241 was not detected in the immediate downstream of sampling location 49-610345, and concentrations decreased with depth. Americium-241 was not detected in additional sampling locations along the same sampling transect. Americium-241 concentrations decreased with depth at location 49-610345, but sediment samples were not collected downstream of this location.

Cesium-134 was not detected in Ancho Canyon. Cesium-134 was detected in sediment at sampling location 49-610319 in Water Canyon with a concentration of 0.052 pCi/g. Cesium-134 was detected at depth (0.5 to 1.5 ft bgs) and was not detected downstream from this sampling location. Cesium-134 was not detected at similar depths at sampling locations along the same transect, but this location (49-610319) is along the western perimeter of Water Canyon. Samples were not collected upgradient of this transect.

Cesium-137 was detected above the sediment FV (0.9 pCi/g) at six locations in Ancho Canyon. Concentrations ranged from 0.953 to 1.9 pCi/g. Concentrations decreased with depth at sampling location 49-610462, increased with depth at sampling locations 49-610391 and 49-610411, and were detected at depth at sampling locations 49-610421, 49-610422, and 49-610456. Cesium-137 was not detected at similar depths or deeper depths along the same sampling transect at location 49-610462. Sampling location 49-610456 is upstream of location 49-610462, but cesium-137 was not detected downstream of this location. Cesium-137 was detected in sediment at six sampling locations in Water Canyon. Concentrations ranged from 0.927 to 1.16 pCi/g. Concentrations decreased with depth at all sampling locations. Cesium-137 was not detected downgradient of location 49-610378 or upgradient of location 49-610323.

Plutonium-239/240 was detected above the sediment FV (0.068 pCi/g) at sampling locations 49-610421, 49-610422, and 49-610456 in Ancho Canyon. Plutonium-239/240 was not detected downstream of location 49-610456 and was not detected in surrounding sampling locations. Plutonium-239/240 was detected in sediment at eight sampling locations in Water Canyon. Concentrations ranged from 0.69 to 8.08 pCi/g, with the maximum detected concentration at sampling location 49-610349. Sampling location 49-610349 is downstream of TA-49 activities, but concentrations were not detected in the deeper sample along the sampling transect. Samples were not collected downgradient of location 49-610349. Concentrations decreased with depth at sampling locations 49-610333, 49-610345, 49-610349, 49-610367, and 49-610374. Concentrations increased with depth at locations 49-610341 and 49-610372, and were detected at depth at location 49-610366. Plutonium 239/240 was not detected at surrounding sampling locations along the same transect at similar depths. Plutonium-239/240 was detected downstream of TA-16, TA-37, and TA-15 at locations 49-610366, 49-610367, 49-610372, and 49-610374 with concentrations ranging from 0.69 to 0.89 mg/kg.

Uranium-234 was not detected in Ancho Canyon. Uranium-234 was detected in sediment at sampling location 49-610333 in Water Canyon at a concentration of 2.76 pCi/g. Uranium-234 was only slightly above the sediment BV of 2.59 pCi/g and decreased with depth. Uranium-234 was not detected in surrounding sampling locations.

Uranium-238 was not detected in Ancho Canyon. Uranium-238 was detected in sediment at sampling locations 49-610323, 49-610333, 49-610337, and 49-610339 in Water Canyon. Concentrations ranged from 2.37 to 3.2 pCi/g and were slightly above the sediment BV of 2.29 pCi/g. Concentrations decreased with depth at all sampling locations and were not detected in sampling locations beyond 49-610339.

The spatial distribution of radionuclides is defined. Radionuclide contamination from TA-49 activities is present in Ancho Canyon and the southern tributary of Water Canyon, but is not detected at locations upgradient or downgradient of the TA-49 sites. The main channel of Water Canyon is primarily influenced by historical and ongoing activities at TA-15, TA-16, and TA-37 and is not influenced by TA-49. The detected concentrations of plutonium 239/240 and cesium-137 in the main channel of Water Canyon are just slightly above sediment FVs.

12.3.5 Subsurface Vapor Sampling

No pore-gas samples were collected from Ancho Canyon or Water Canyon.

12.4 Summary of Human Health Risk Screening

Human health risk-screening assessments for sediments in Ancho and Water Canyons will be performed as part of the South Canyons investigation work plan (LANL 2006, 093713).

12.5 Summary of Ecological Risk Screening

Ecological risk-screening assessments for sediments in Ancho and Water Canyons will be performed as part of the South Canyons investigation work plan (LANL 2006, 093713).

13.0 CONCLUSIONS

The TA-49 sites inside the NES boundary that were part of the 2009–2010 investigation consist of 10 AOCs or SWMUs in Areas 1, 3, 4, 11, and 12 and MDA AB. Area 1 includes SWMU 49-001(a), Area 3 includes SWMU 49-001(e), Area 4 includes SWMU 49-001(f), Area 11 includes SWMU 49-003 and AOC 49-008(c), Area 12 includes AOC 49-008(d), and MDA AB includes SMWUs 49-001 (b, c, d, and g). The objective of the investigation was to collect samples to define the nature and the lateral and vertical extent of surface and subsurface contamination for the sampled SWMUs and AOCs located at TA-49 inside the NES boundary, evaluate the potential for migration of contamination, obtain general site characterization data for evaluation of remedial alternatives, and establish a long-term site-specific monitoring network.

Data from the samples collected during the 2009–2010 investigation were combined with decision-level data collected from previous investigations to provide an understanding of site contamination and to determine if nature and extent of contamination are defined for SWMUs and AOCs at TA-49 inside the NES boundary.

The sampling data presented in this report indicate that the extent of contamination has not been defined at Area 1 [SWMU 49-001(a)], MDA AB [SWMU 49-001(b, c, d, g)], Area 3 [SWMU 49-001(e)], Area 4 [SWMU 49-001(f)], Area 11 [SWMU 49-003, AOC 49-008(c)], and Area 12 [AOC 49-008(d)]. The data also indicate that there are locally higher inorganic background concentrations for Qbt 4 at TA-49. Additional sampling is necessary to define the lateral and vertical extent of one or more contaminants at each of the ten sites, and a Qbt 4 background dataset needs to be established for TA-49.

The VOC pore-gas data collected from TA-49 were compared with SLs based on equilibrium partitioning of vapor with groundwater standards or SLs to evaluate the potential for the reported VOC concentrations to result in contamination of groundwater. Tritium pore-gas data were compared with the groundwater MCL for tritium. Pore-gas data indicate that VOCs in subsurface pore gas are not a potential source of groundwater contamination. Tritium activities in borehole 49-610481, located at Area 12, AOC 49-008(d), exceeded the groundwater MCL for tritium and may represent a potential source of groundwater contamination.

13.1 Nature and Extent of Contamination

The extent of contamination is not defined for the ten SWMUs and AOCs investigated at TA-49 sites inside the NES boundary during the 2009–2010 investigation. Summaries of the nature and extent of contamination and remaining extent requirements are presented below.

- Area 1 [SWMU 49-001(a)]—lateral extent of plutonium-238; lateral and vertical extent of cesium-134;
- MDA AB, Areas 2, 2A, and 2B [SWMUs 49-001(b, c, d, g)]—lateral extent of lead; lateral and vertical extent of plutonium-239/240; vertical extent of americium-241 and plutonium-238;
- Area 3 [SWMU 49-001(e)]—vertical extent of arsenic and cesium-137; lateral and vertical extent of copper, lead, and cesium-134;
- Area 4 [SWMU 49-001(f)]—vertical extent of tritium; lateral and vertical extent of chromium;
- Area 11 [SWMU 49-003 and AOC 49-008(c)]—lateral and vertical extent of perchlorate and tritium;
- Area 12 [AOC 49-008(d)]—vertical extent of antimony and plutonium-239/240; lateral and vertical extent of thallium; extent of tritium in pore gas;
- Ancho and Water Canyon—Sediment sampling results indicate that other than radionuclides, specifically plutonium-239/240, there is no real signature evident from TA-49 in the canyon sediments. The extent of radionuclides is defined downgradient of TA-49. Additional sampling and analysis of the canyons will be performed as part of the South Canyons investigations.

13.2 Summary of Risk-Screening Assessments

Human health and ecological risk assessments were not performed at this time because the lateral and vertical extent of contamination are not defined for any of the TA-49 sites inside the NES boundary.

Human health and ecological risk assessments will be performed at each of the sites after additional sampling is complete and the extent of contamination is defined.

14.0 RECOMMENDATIONS

The determination of site status is based on the results of the risk-screening assessments and the determination of nature and extent. Depending upon the decision scenario used, the sites are recommended as corrective action complete, either with or without controls, or for additional action. The residential scenario is the only scenario under which corrective action complete without controls is applicable; that is, no additional corrective actions or conditions are necessary. The other decision scenarios (industrial and construction worker) result in corrective action complete with controls; that is, some type of institutional controls must be in place to ensure that the land use remains consistent with site cleanup levels. The current and reasonably foreseeable future land use for the TA-49 sites inside the NES boundary is industrial.

14.1 Additional Field-Characterization Activities

The extent of contamination has not been defined for ten SWMUs and AOCs investigated at TA-49 sites inside the NES boundary during the 2009–2010 investigation. Additional sampling is necessary to define the extent of contamination at Areas 1, 3, 4, 11, and 12 and MDA AB. Summaries of the remaining extent requirements are presented below.

- Area 1 [SWMU 49-001(a)]—lateral extent of plutonium-238; lateral and vertical extent of cesium-134;
- MDA AB, Areas 2, 2A, and 2B [SWMUs 49-001(b, c, d, g)]—lateral extent of lead; lateral and vertical extent of plutonium-239/240; vertical extent of americium-241 and plutonium-238;
- Area 3 [SWMU 49-001(e)]—vertical extent of arsenic and cesium-137; lateral and vertical extent of copper, lead and cesium-134;
- Area 4 [SWMU 49-001(f)]—vertical extent of tritium; lateral and vertical extent of chromium;
- Area 11 [SWMU 49-003 and AOC 49-008(c)]—lateral and vertical extent of perchlorate and tritium;
- Area 12 [AOC 49-008(d)]—vertical extent of antimony and plutonium-239/240; lateral and vertical extent of thallium; extent of tritium in pore gas;
- In addition, a vapor-monitoring well will be installed and vapor sampling for tritium will be conducted at borehole location 49-610481 in Area 12 [AOC 49-008(d)].

14.2 Recommendations for Corrective Action Complete

The extent of contamination is not defined for any of the sites investigated at TA-49 inside the NES boundary. No sites are recommended for corrective action complete.

15.0 SCHEDULE FOR RECOMMENDED ACTIVITIES

A Phase II investigation work plan will be developed and submitted to NMED within six months of approval of this investigation report. The work plan will provide details and a schedule for the implementation of sampling activities to complete the characterization of extent of these sites and submittal of a Phase II investigation report. A vapor monitoring well installation and sampling plan will be provided in the Phase II investigation work plan for TA-49.

16.0 REFERENCES AND MAP DATA SOURCES

16.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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16.2 Map Data Sources

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

LANL Technical Areas - Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.

NES and Facility boundaries at TA-49 - Revised boundary shape files: TA49_NES_20090812_arc and TA49_FACILITY_20090812_arc, provided by LANL Site Technical Representative, dated 12 August 2009.

Paved roads - Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Dirt roads - Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Drainages - WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.

LANL structures - Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

LANL fence lines - Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.

Former/other existing TA-49 structures - Description of: Geospatial Data Created for Maps Appearing in TA-49 HIRS and IWPS, K. Crowell, ERID-098702, October 2007

TA-49 2009/10 sample locations - TPMC field survey data, now found in: Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 12 April 2010.

LANL historical sample locations - Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 21 January 2010.

Contours - Hypsography, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

Former TA-49 structures - Description of: Geospatial Data Created for Maps Appearing in TA-49 HIRS and IWPS, K. Crowell, ERID-098702, October 2007

Experimental shaft /pipe dump hole locations - Description of: Geospatial Data Created for Maps Appearing in TA-49 HIRS and IWPS, K. Crowell, ERID-098702, October 2007

Landfills, regraded areas, and former asphalt pad location - Description of: Geospatial Data Created for Maps Appearing in TA-49 HIRS and IWPS, K. Crowell, ERID-098702, October 2007

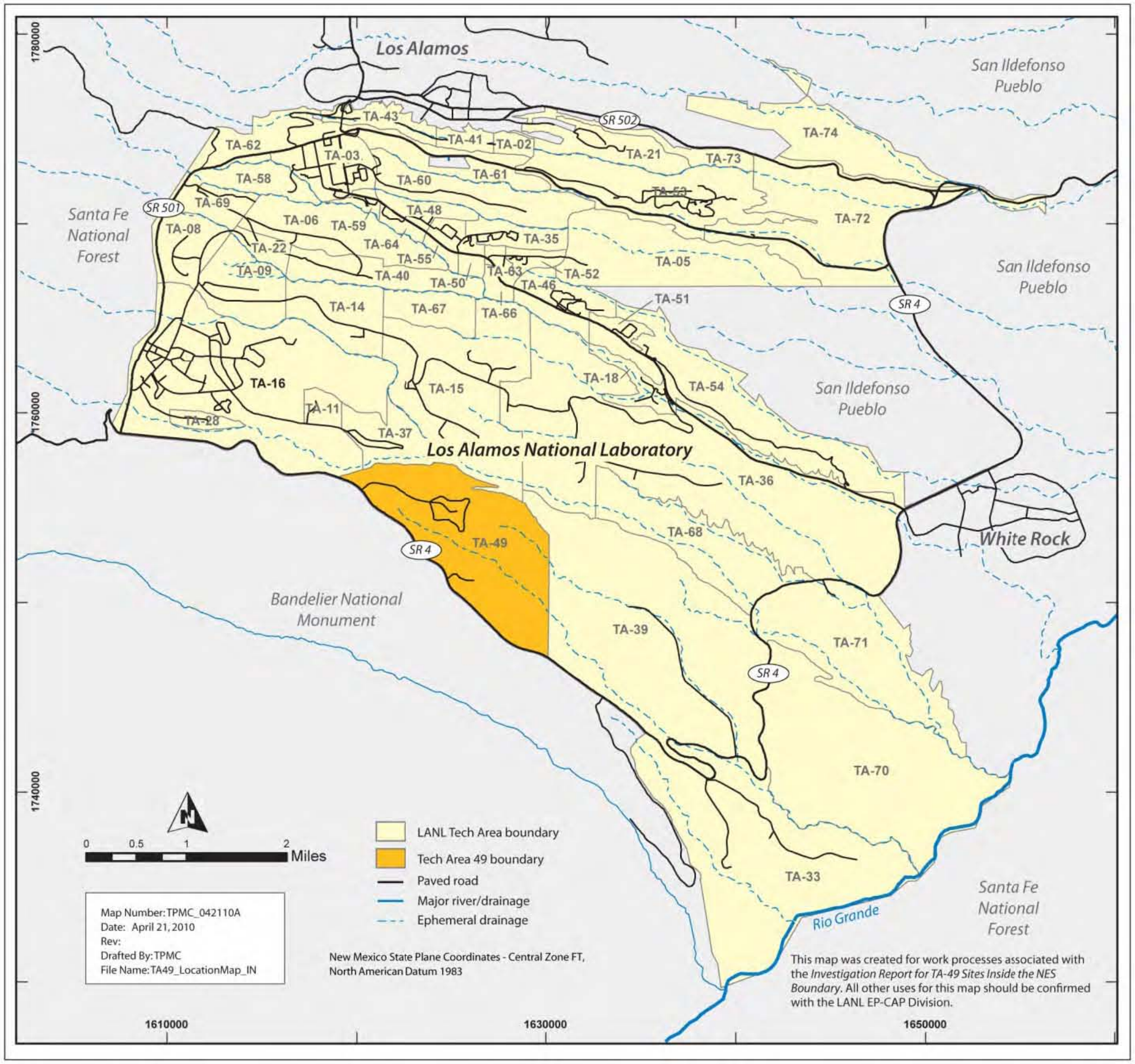

Figure 1.0-1 Location of TA-49 with respect to Laboratory technical areas and surrounding land holdings

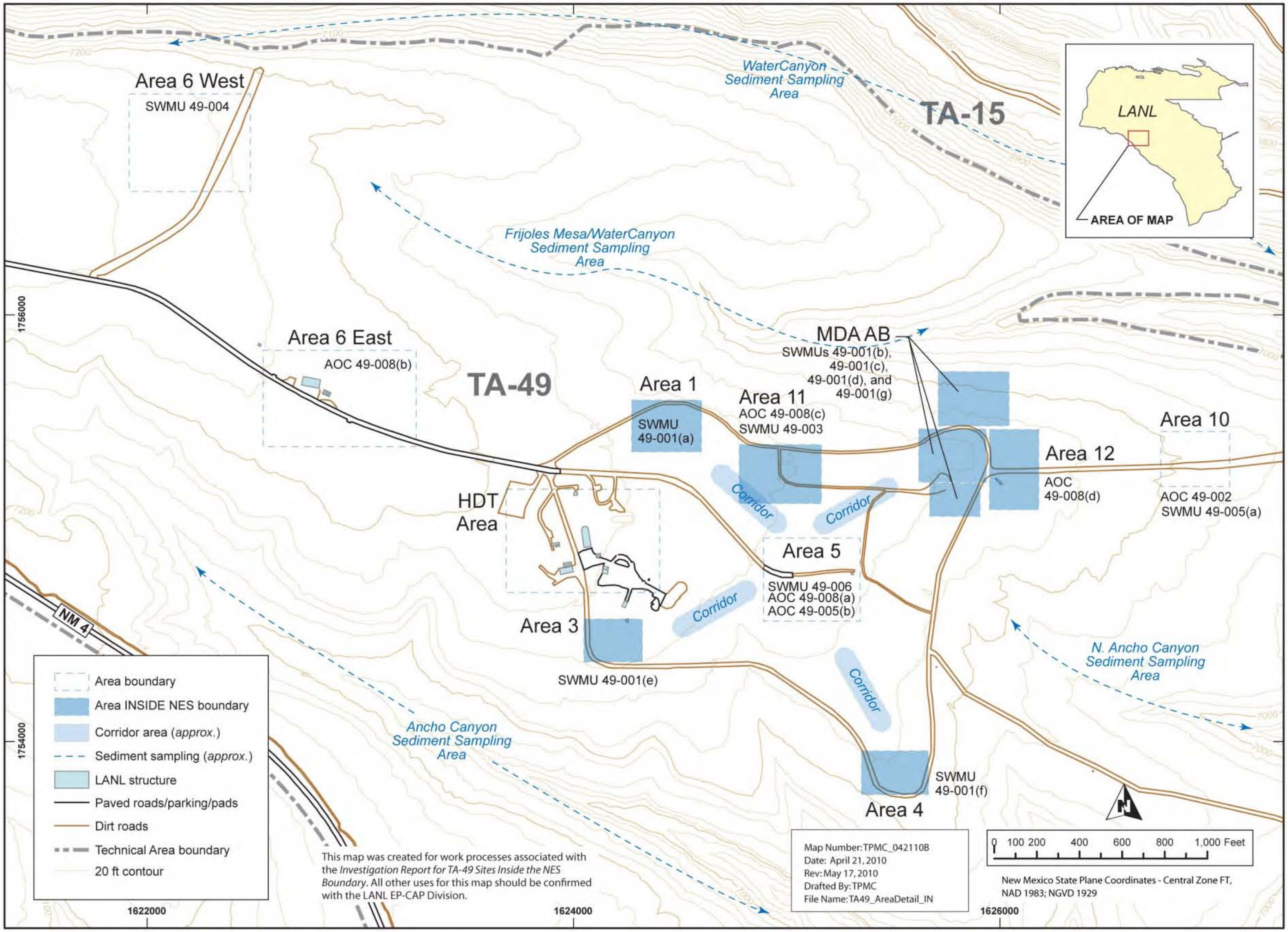

Figure 1.1-1 Location of TA-49 SWMUs and AOCs

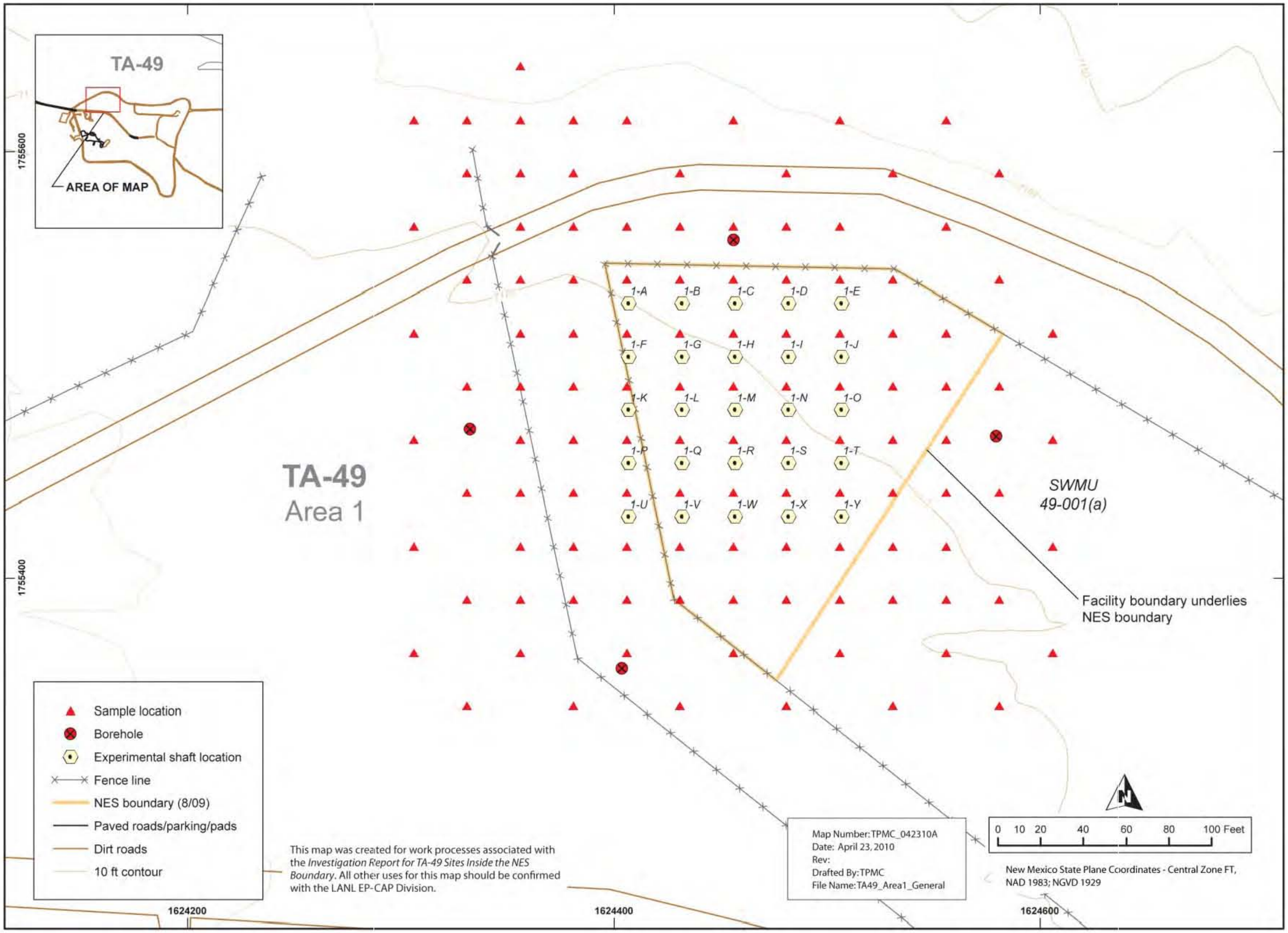

Figure 2.1-1 **The 2009–2010 radiological screening-level surface sampling locations and boreholes associated with Area 1, SWMU 49-001(a)**

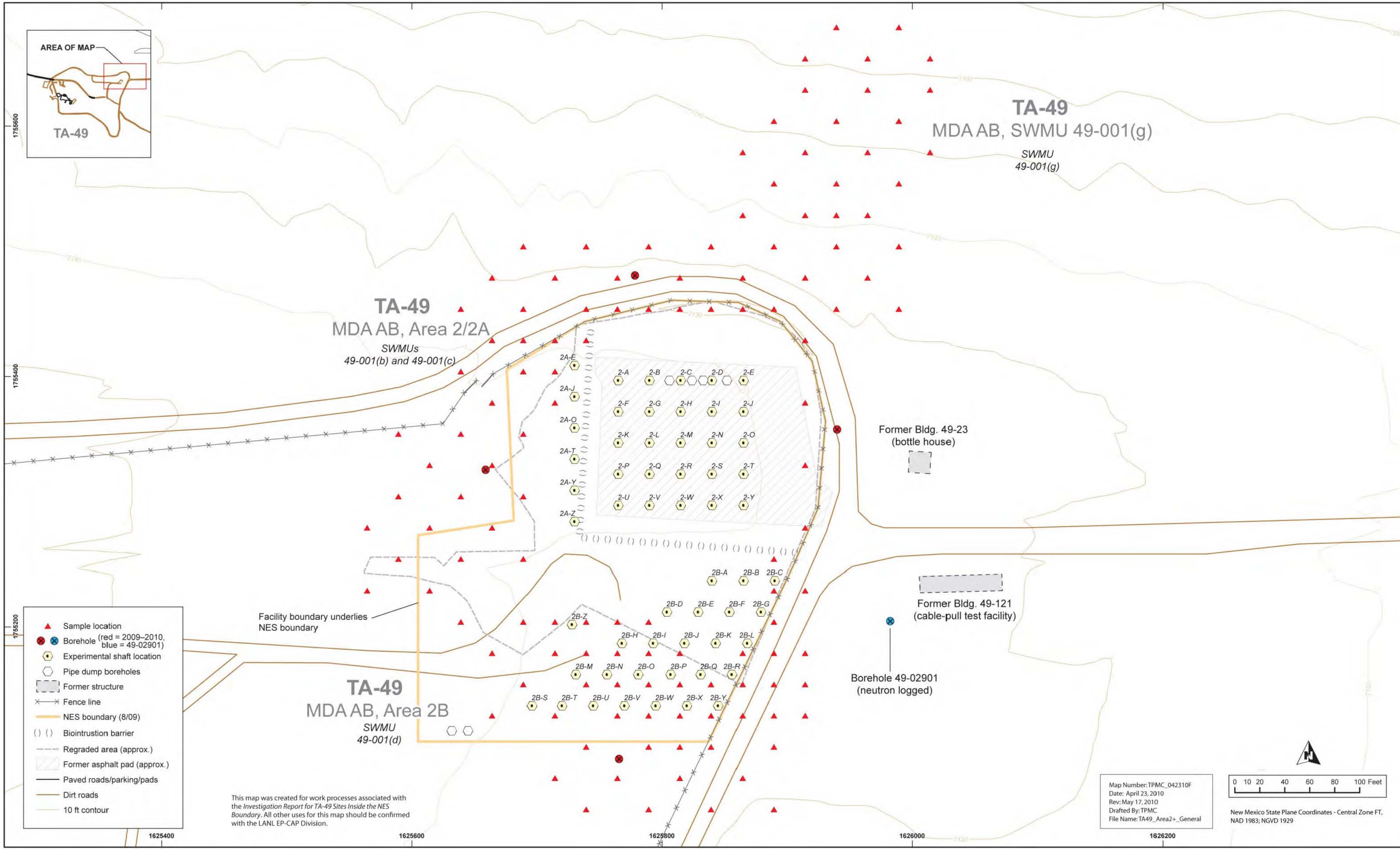

Figure 2.1-2 The 2009–2010 radiological screening-level sampling locations and boreholes associated with MDA AB

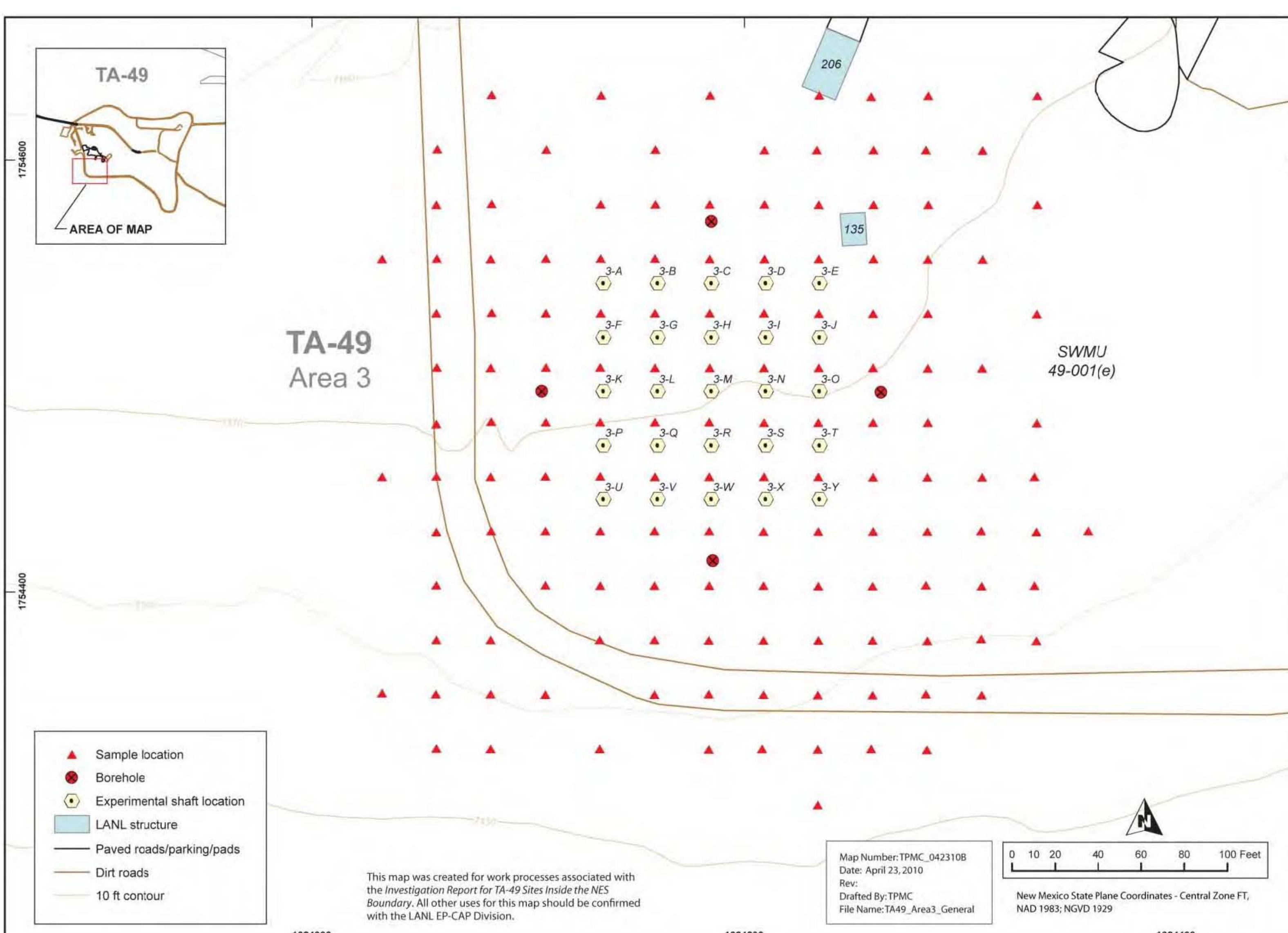

Figure 2.1-3 The 2009–2010 radiological screening-level surface sampling locations and boreholes associated with Area 3, SWMU 49-001(e)

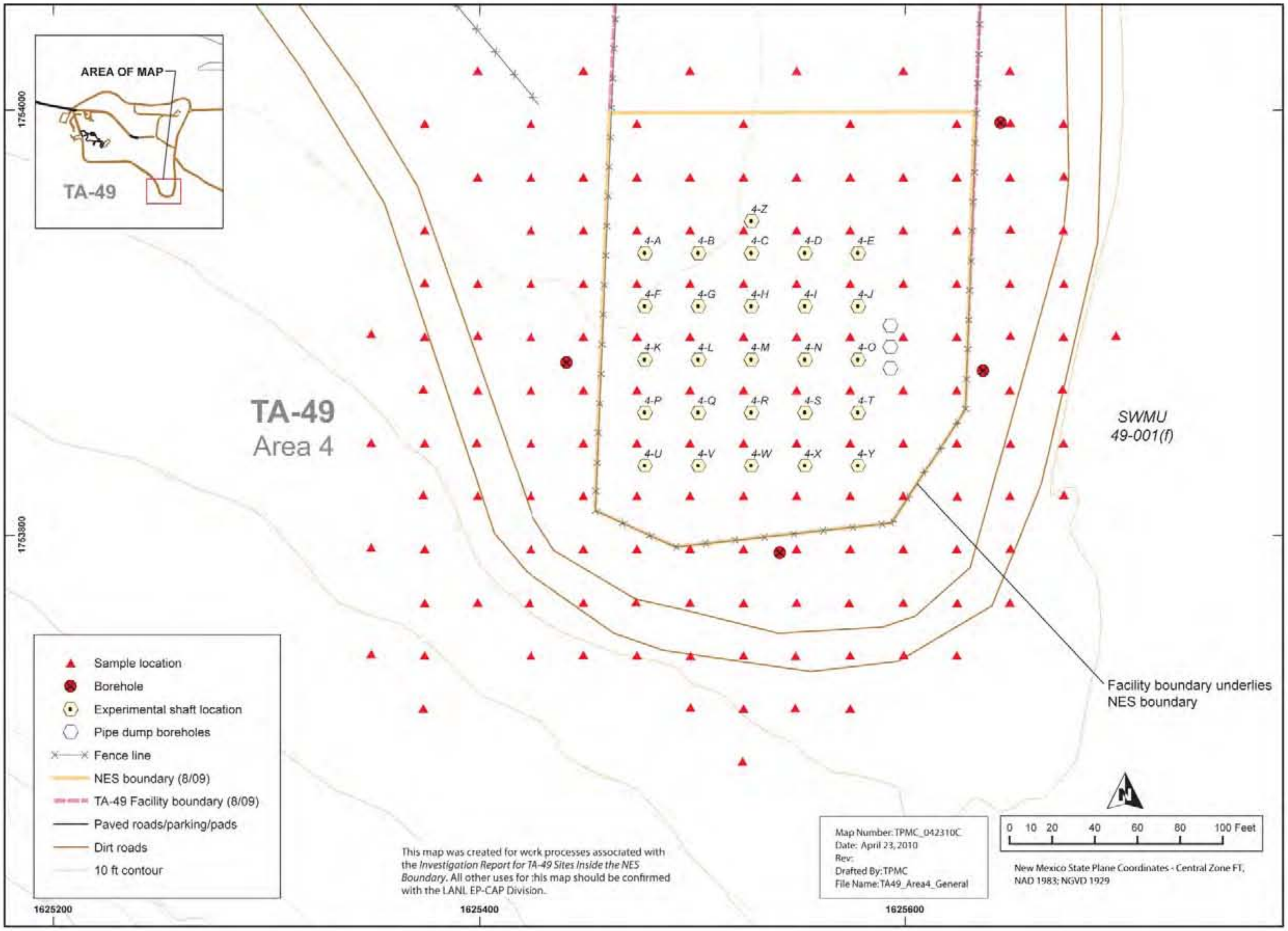

Figure 2.1-4 The 2009–2010 radiological screening-level surface sampling locations and boreholes associated with Area 4, SWMU 49-001(f)

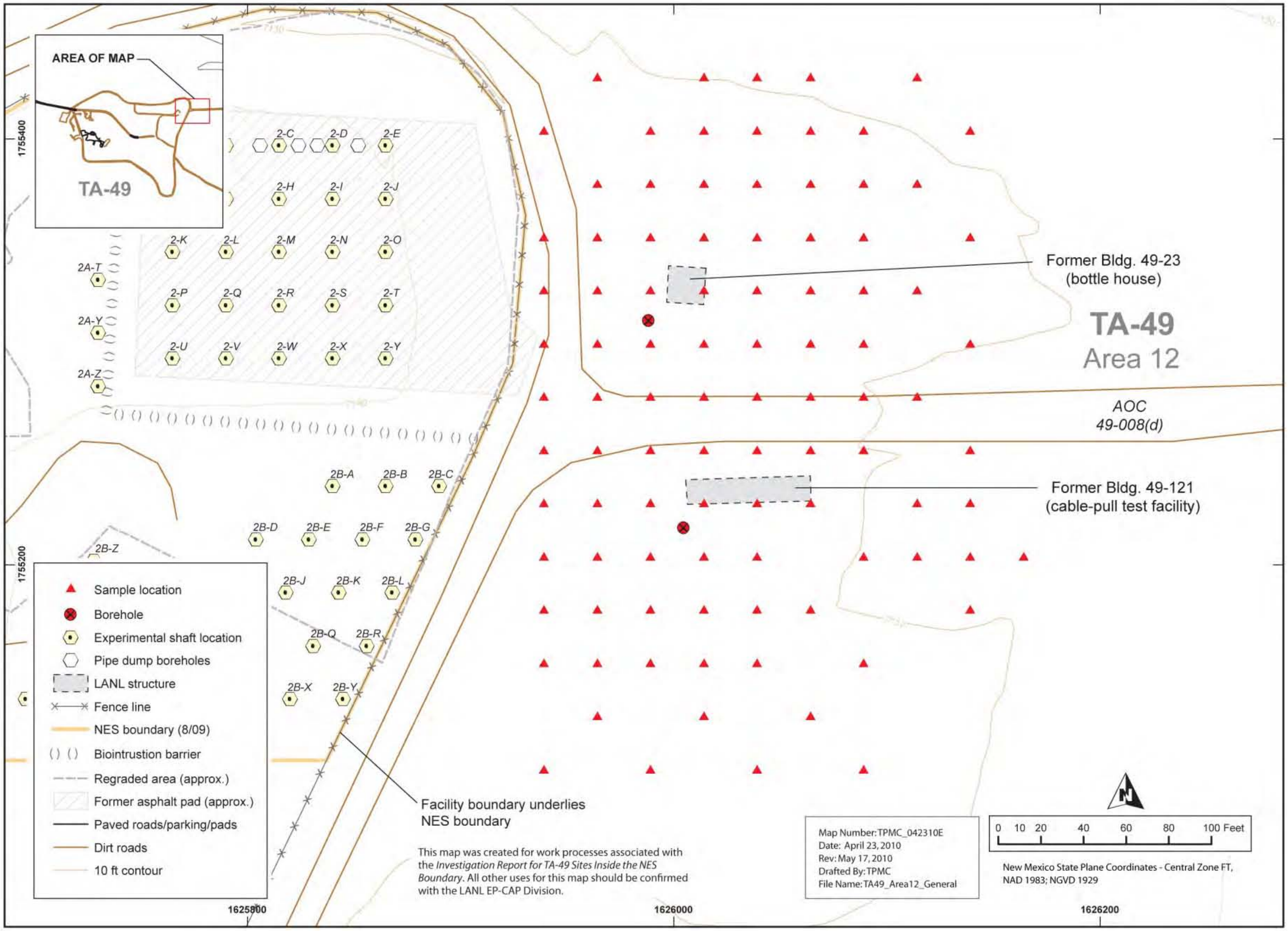

Figure 2.1-5 The 2009–2010 radiological screening-level surface sampling locations and boreholes associated with Area 12, AOC 49-008(d)

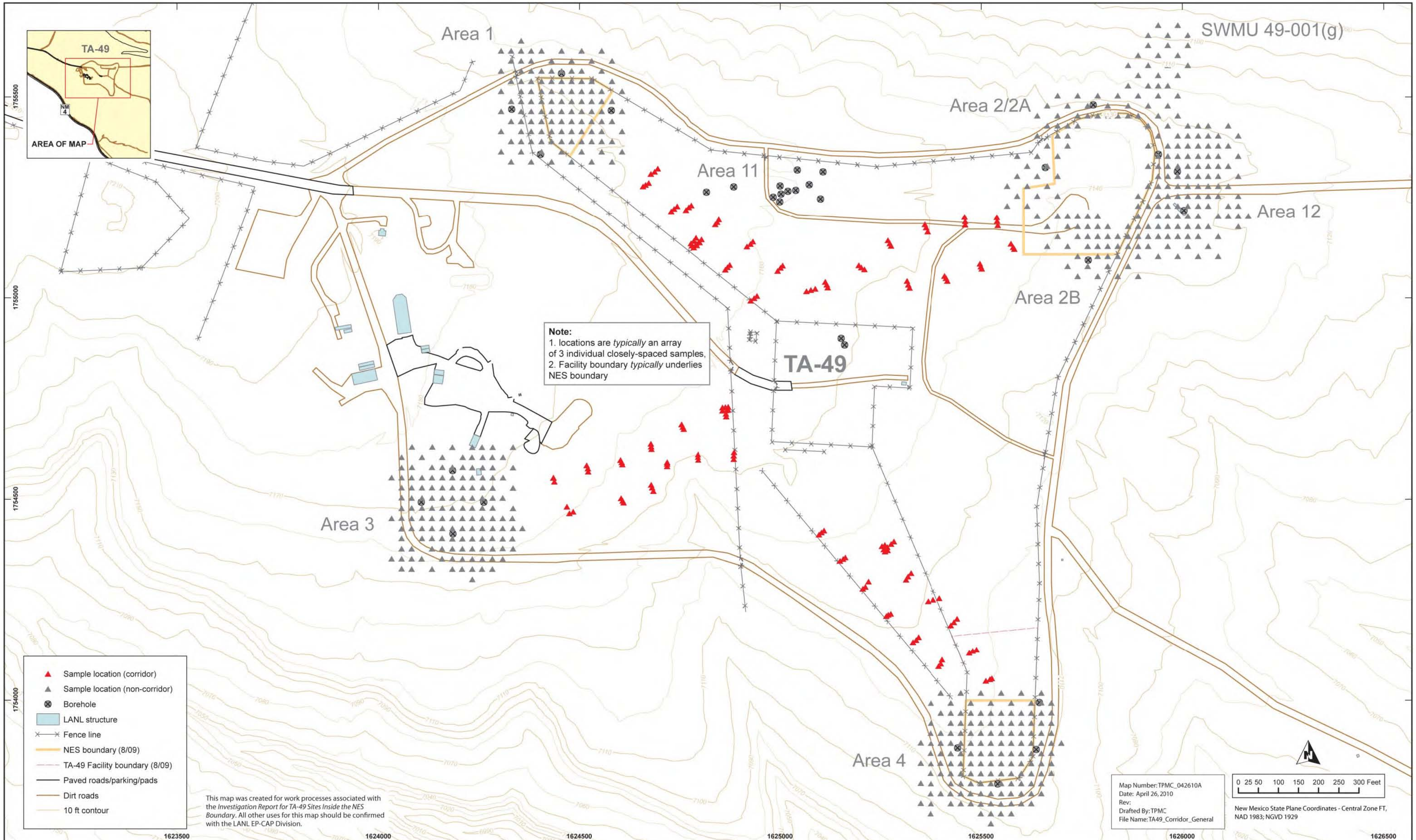

Figure 2.1-6 The 2009–2010 screening-level and decision-level surface-sampling locations associated with overland corridors

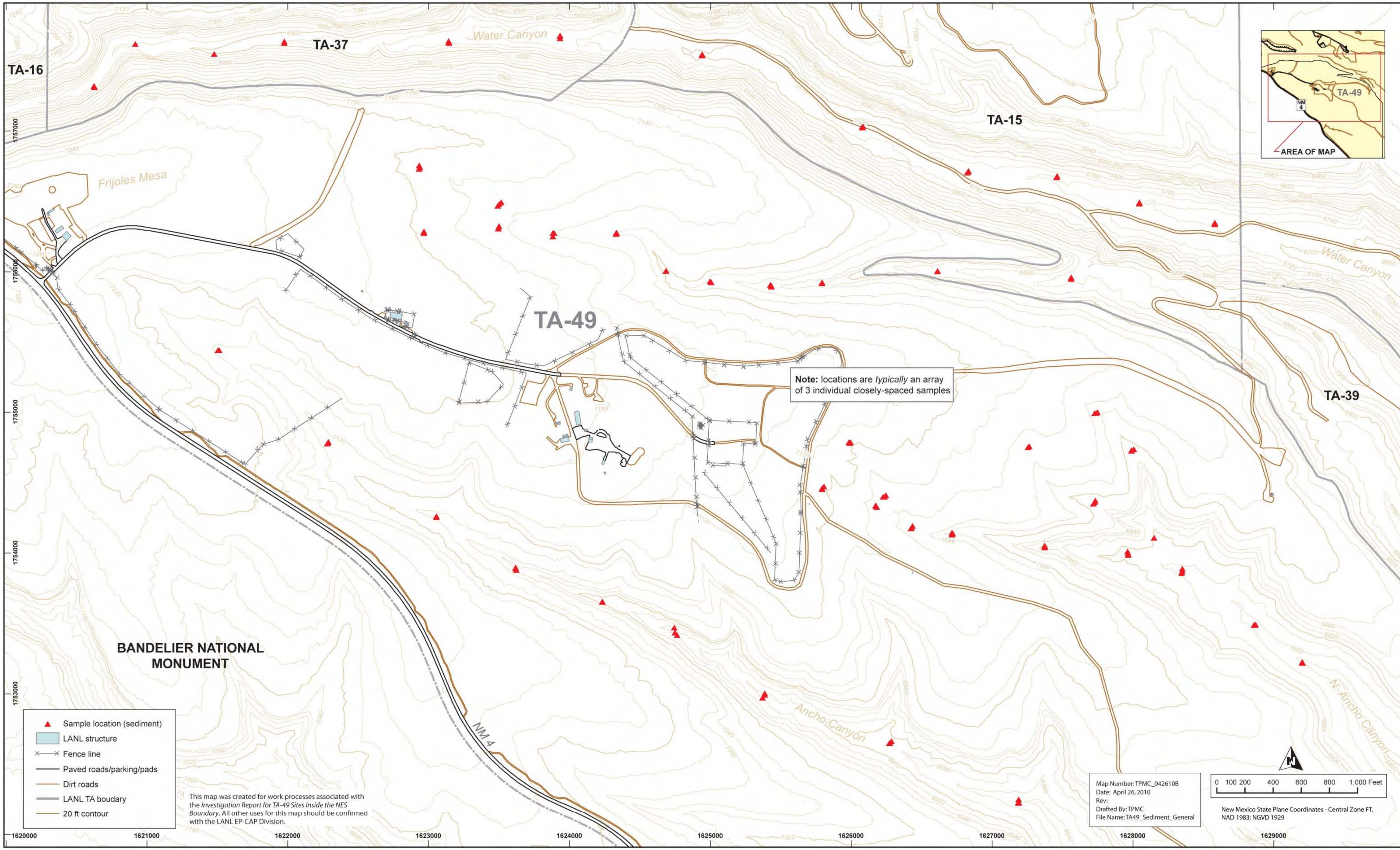

Figure 2.1-7 The 2009–2010 surface-sampling locations associated with Ancho and Water Canyons

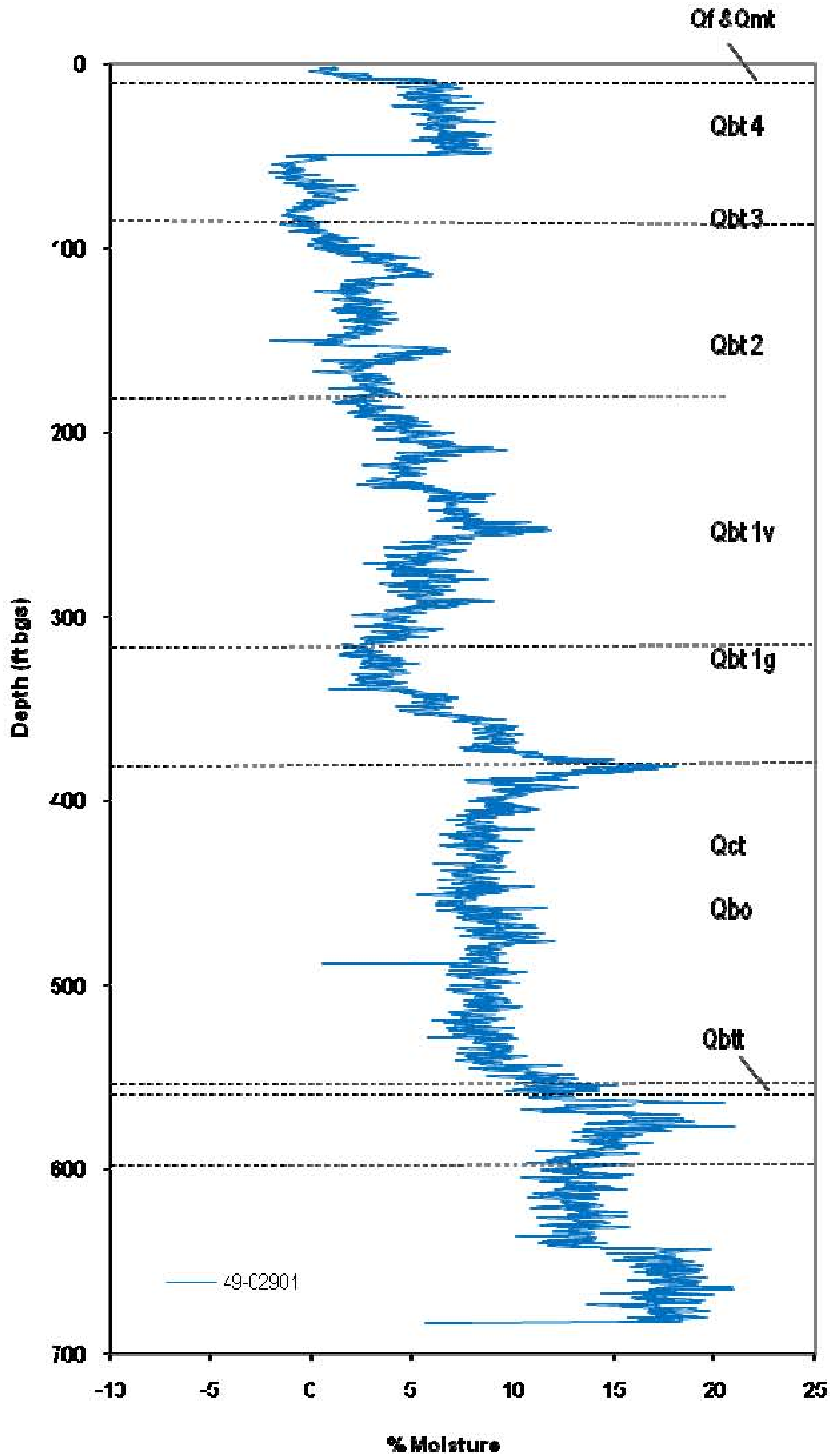

Figure 2.1-8 Water content (% moisture) profiles for borehole 49-02901

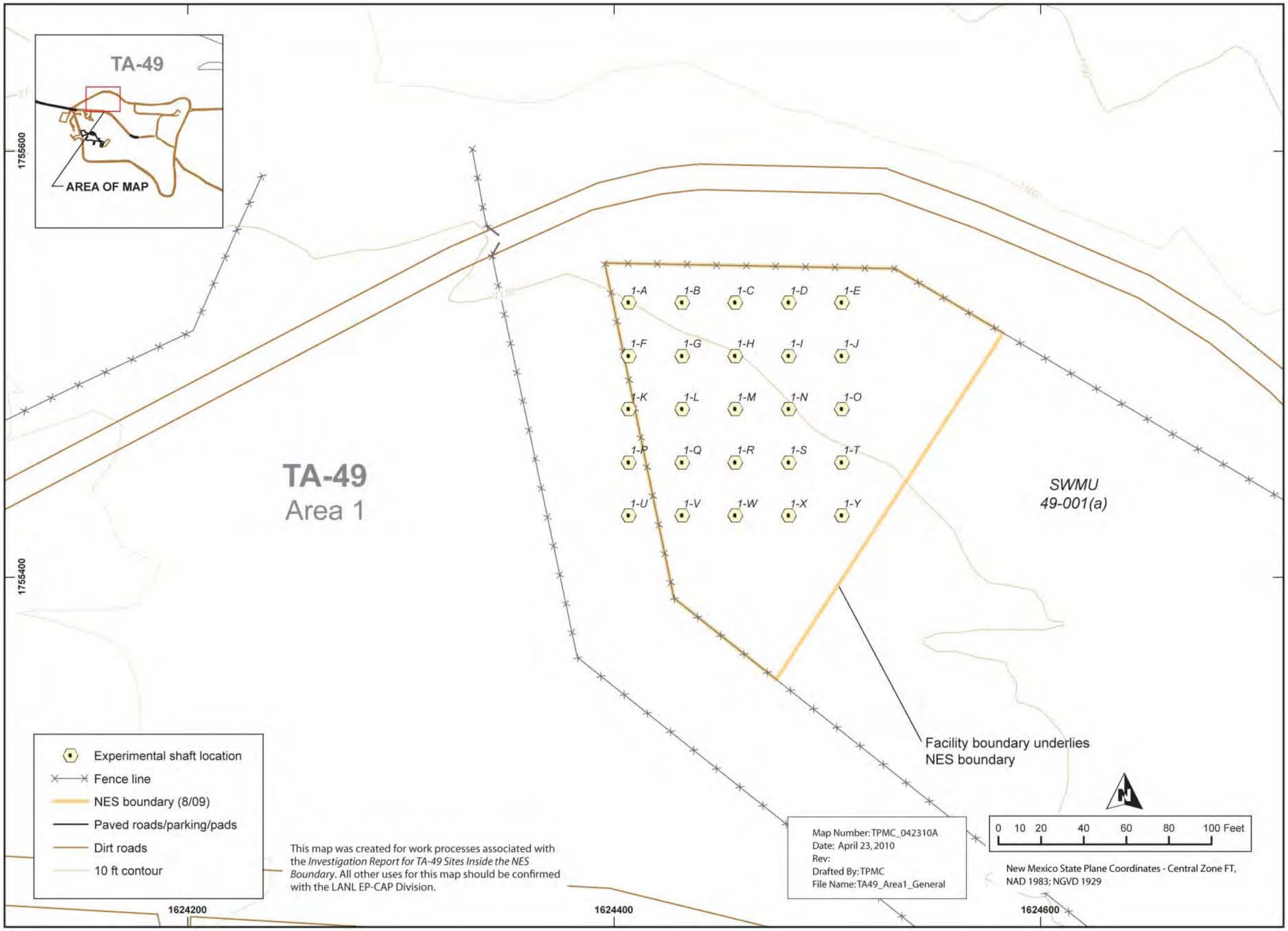

Figure 6.2-1 General site layout of Area 1, SWMU 49-001(a)

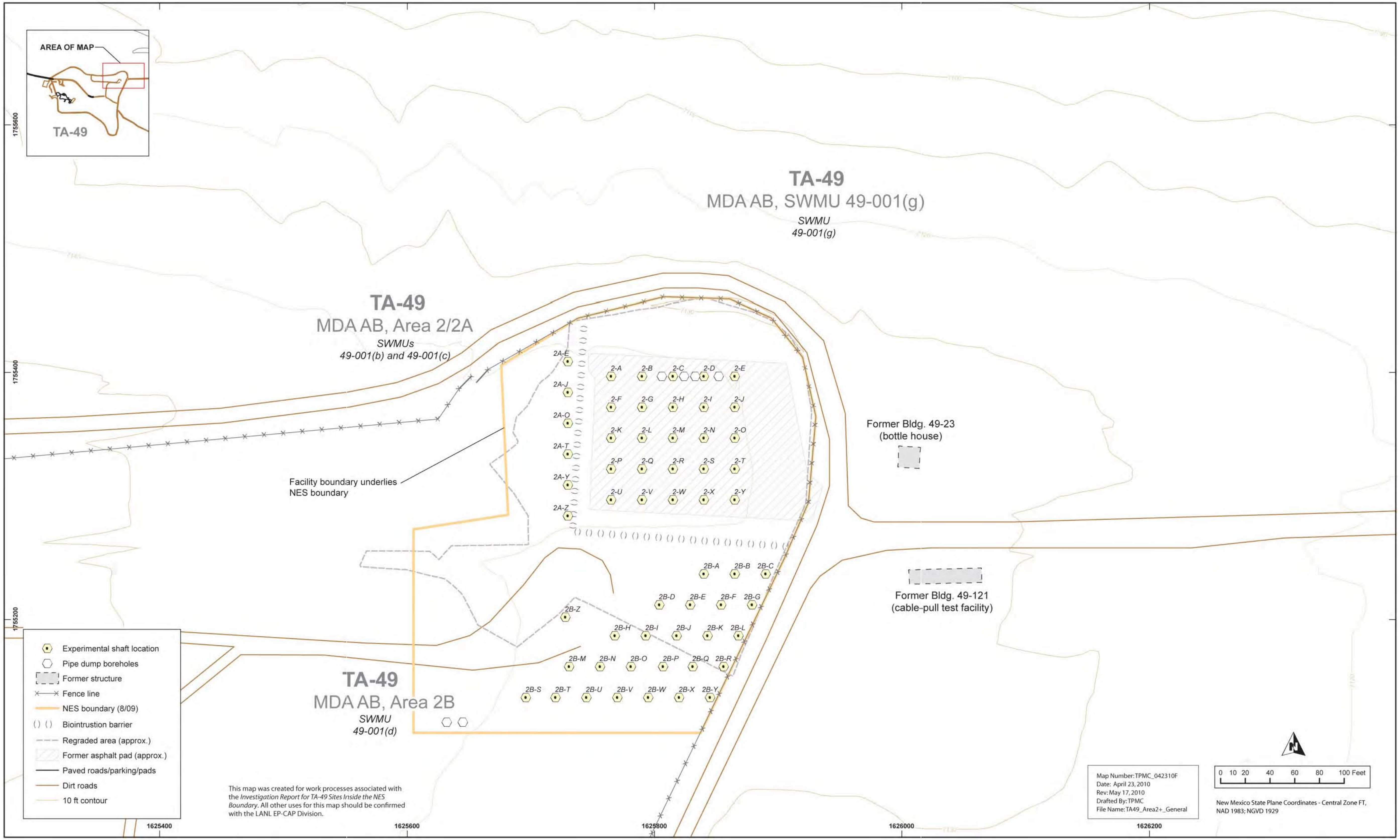

Figure 7.2-1 General site layout of MDA AB (Areas 2, 2A, and 2B)

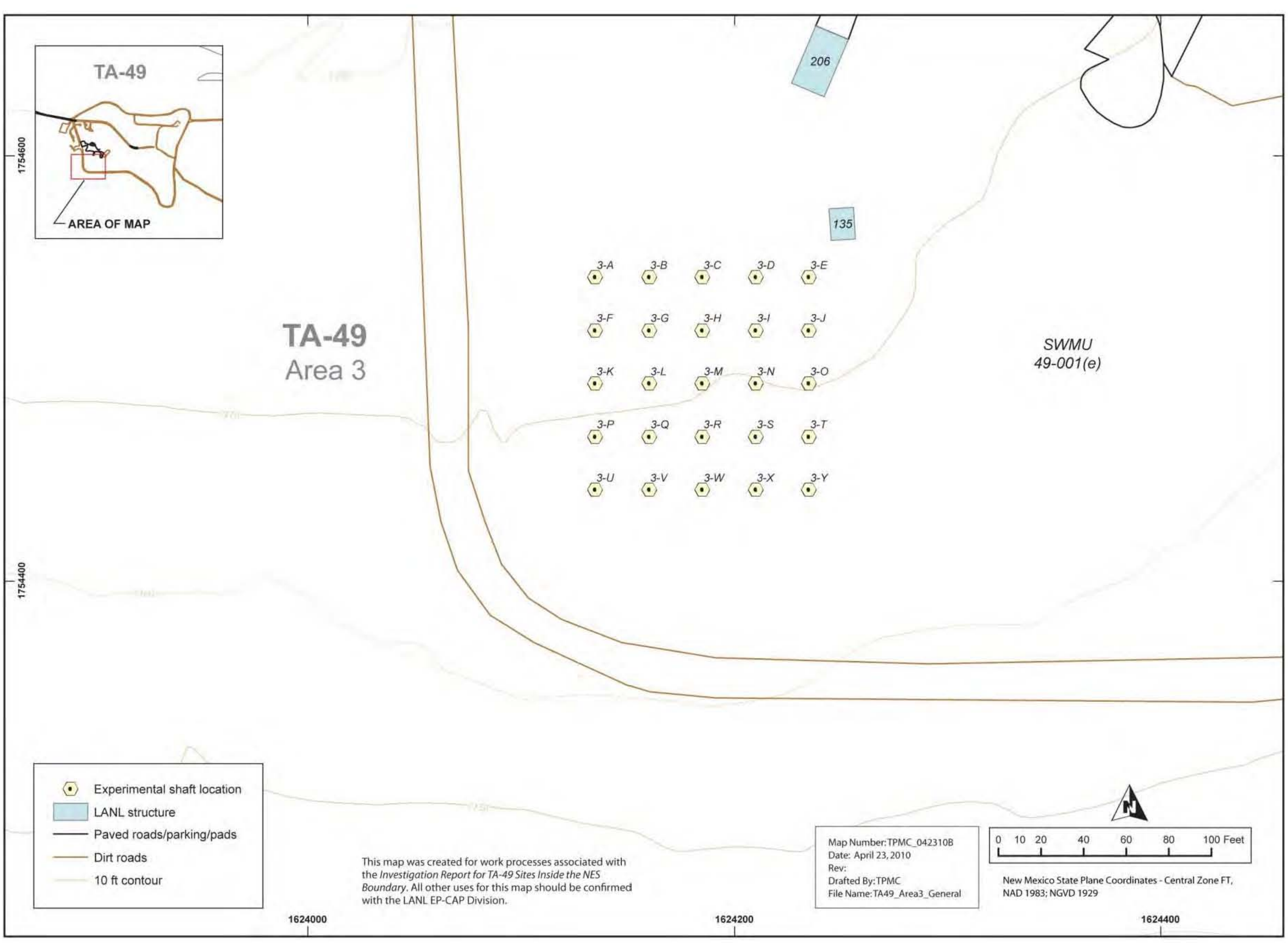

Figure 8.2-1 General site layout of Area 3, SWMU 49-001(e)

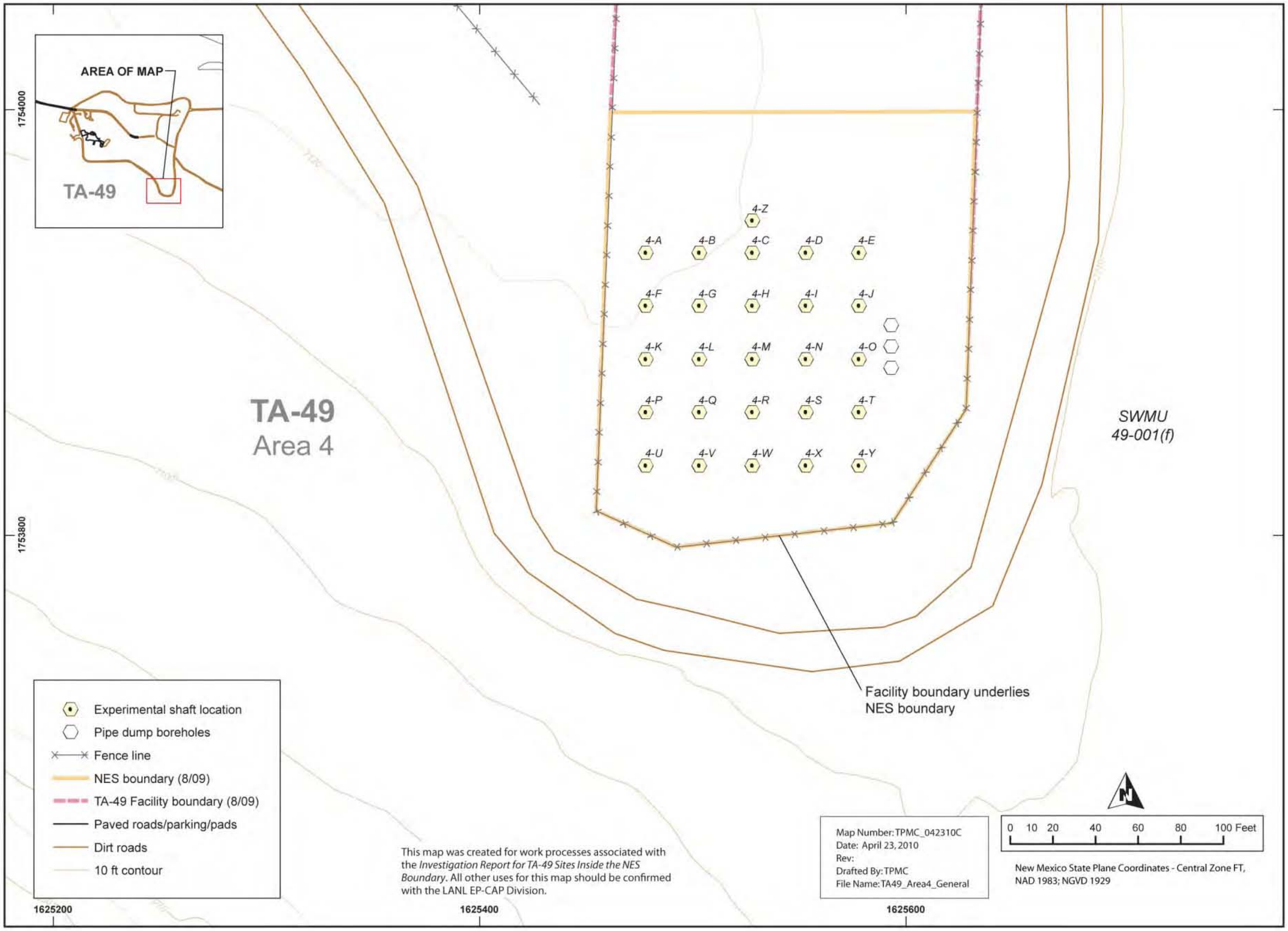

Figure 9.2-1 General site layout of Area 4, SWMU 49-001(f)

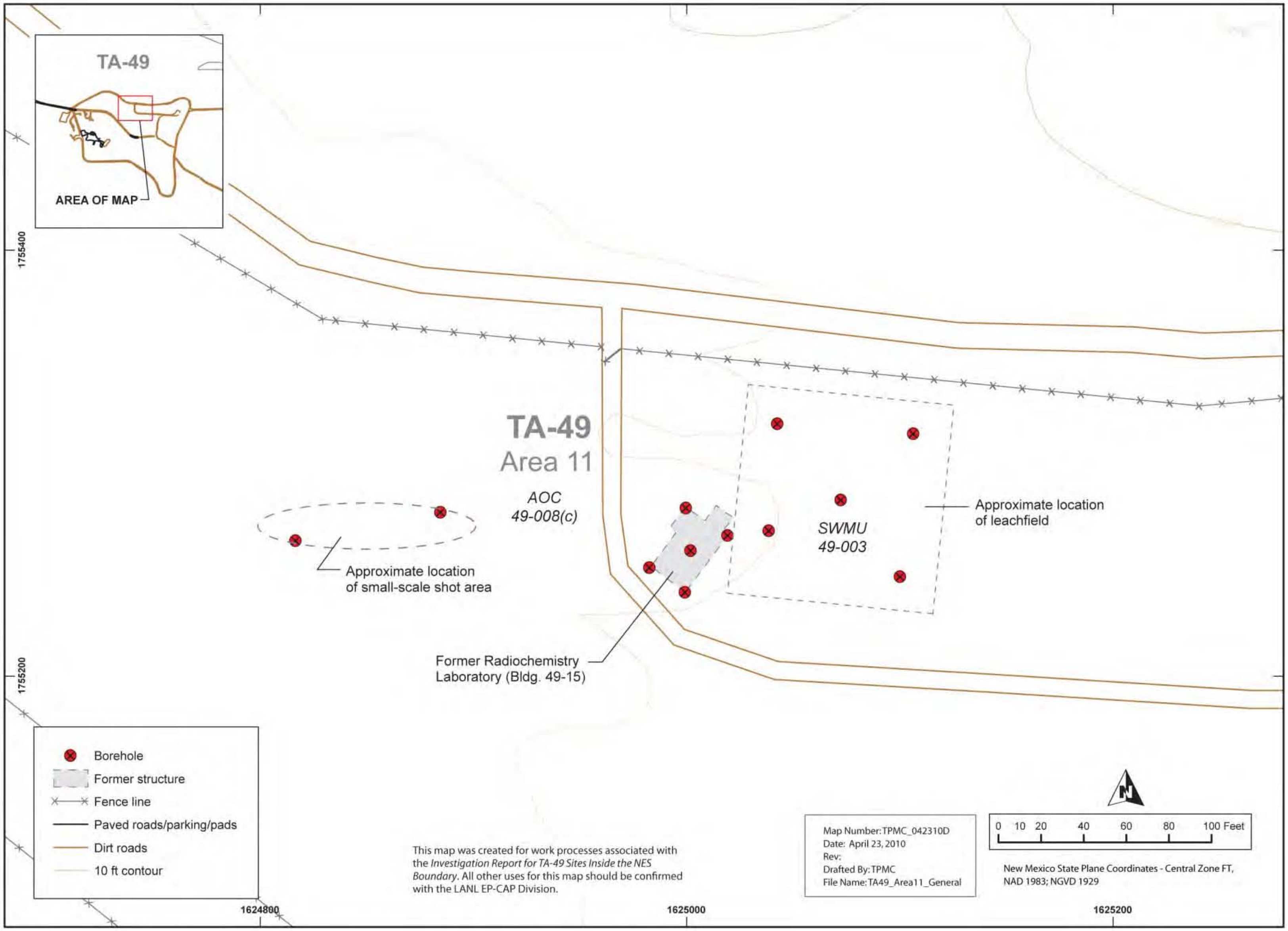

Figure 10.1-1 General site layout of Area 11, AOC 49-008(c) and SWMU 49-003

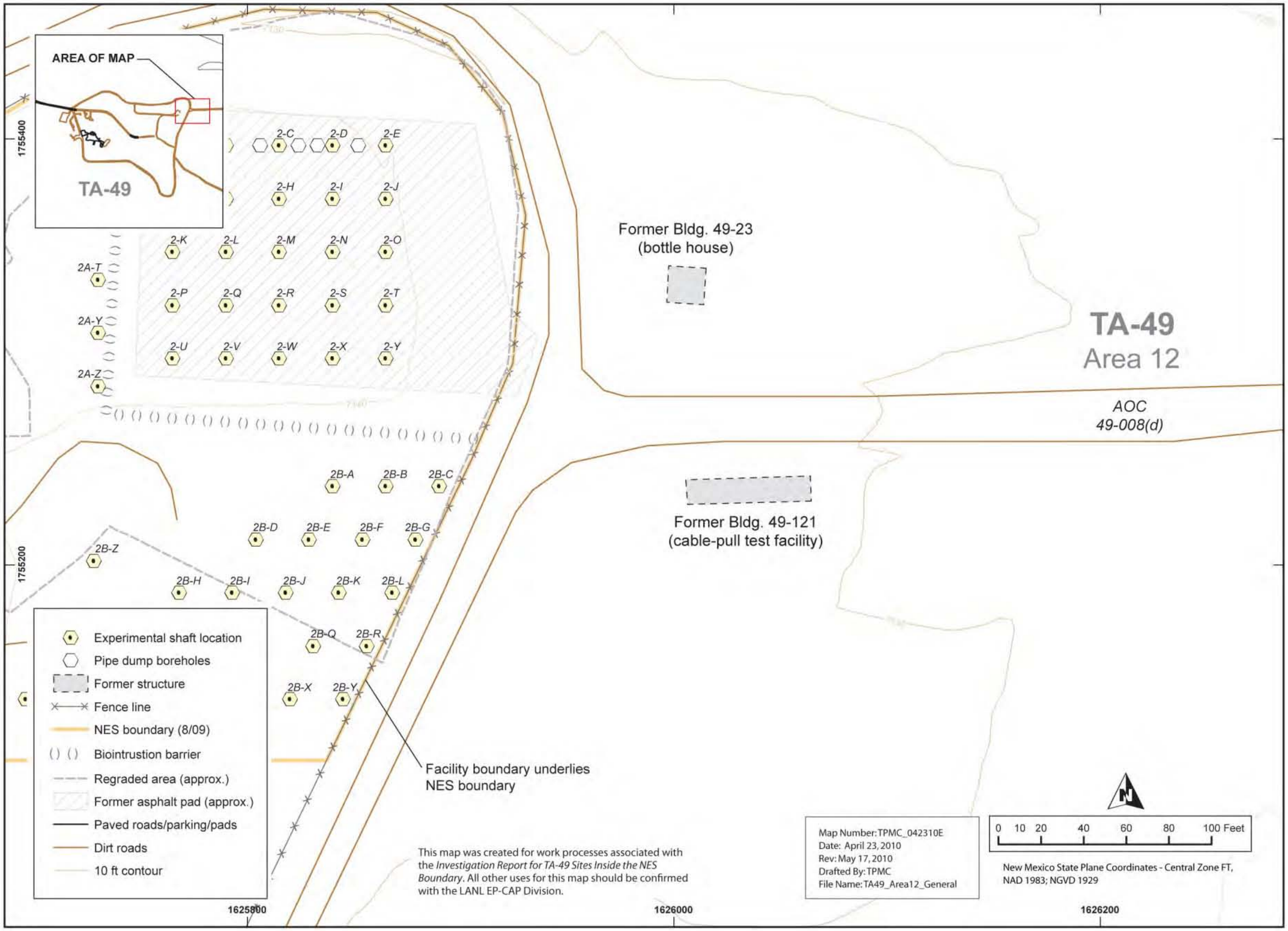

Figure 11.2-1 General site layout of Area 12, AOC 49-008(d)

Table 1.1-1
Status of SWMUs and AOCs Located Inside the NES Boundary at TA-49

Area	Site ID	Brief Description	Investigation(s) Prior to 2009	Investigation(s) Conducted in 2009–2010
1	SWMU 49-001(a)	Experimental shafts	1995 Surface RFI	Surface, subsurface, and pore-gas samples collected
Areas 2, 2A, 2B (MDA AB)	SWMU 49-001(b)	Experimental shafts	1993 Surface RFI 1994 Surface and Subsurface RFI 1998 Surface and Subsurface RFI	Surface, subsurface, and pore-gas samples collected
	SWMU 49-001(c)	Experimental shafts	1994 Surface RFI	Surface, subsurface, and pore-gas samples collected
	SWMU 49-001(d)	Experimental shafts	1994 Surface RFI	Surface, subsurface, and pore-gas samples collected
	SWMU 49-001(g)	Area of soil contamination	1994 Surface RFI	Surface samples collected
3	SWMU 49-001(e)	Experimental shafts	1995 Surface RFI	Surface, subsurface, and pore-gas samples collected
4	SWMU 49-001(f)	Experimental shafts	1995 Surface RFI	Surface, subsurface, and pore-gas samples collected
11	SWMU 49-003	Inactive leach field and associated drainlines	1995 Phase I RFI	Surface and subsurface samples collected
	AOC 49-008(c)	Area of soil contamination	1995 Surface and Subsurface RFI	Surface investigation deferred per Table IV-2 of the Consent Order Subsurface and pore-gas samples collected
	AOC 49-009	Suspected Underground Fuel Tank	NFA Approved, 01/21/05; EPA 2005, 088464	NFA Approved, 01/21/05; EPA 2005, 088464
12	AOC 49-008(d)	Bottle House and CPTF	1995 Phase I RFI 1997 VCAs 1998 VCAs	Surface, subsurface, and pore-gas samples collected; Neutron log of borehole 49-02901

Note: Shading denotes NFA approved.

Table 2.1-1
Summary of Surface and Shallow-Subsurface Samples Collected from TA-49 Sites Inside the NES Boundary

Sampling Locations	Number of Samples		Total Depth (ft)	Screening	Laboratory Analysis				
	Field Screening	Off-Site Analytical		Gross-Alpha and -Beta Radiation Screening	Isotopic Uranium, Plutonium, or Americium (HASL-300)	I-129, Sr-90, Tc-99 (HASL-300, EPA 905.0)	TAL Metals (EPA SW-846: 6010B/6020)	VOCs and SVOCs (EPA SW-846: 8260B and 8270C)	PCBs (EPA SW-846:8082)
Area 1	228	59	0.0–0.5 0.5–1.5	X[a]	X[b]	X[c]	X[b]	—[d]	—
Areas 2, 2A, 2B (MDA AB)	154	28	0.0–0.5 0.5–1.5	X	X[b]	X[c]	X[b]	—	—
SWMU 49-001(g)	94	16	0.0–0.5 0.5–1.5	X	X[b]	X[c]	X[b]	—	—
Area 3	278	77	0.0–0.5 0.5–1.5	X	X[b]	X[c]	X[b]	—	—
Area 4	294	77	0.0–0.5 0.5–1.5	X	X[b]	X[c]	X[b]	—	—
Area 12	192	57	0.0–0.5 0.5–1.5	X	X[b]	X[c]	X[b]	X	—
Overland Corridors	304	304	0.0–0.5 0.5–1.5	X	X	X[c]	X	—	—
Sediments	234	234	0.0–0.5 0.5–1.5	X	X	—	X	X	X

[a] X = Samples collected.

[b] Analysis for americium-241, isotopic plutonium, isotopic uranium, TAL metals, and gamma spectroscopy was performed if gross alpha >25 pCi/g.

[c] Analysis for iodine-129, strontium-90, and technetium-99 was performed if gross beta >50 pCi/g.

[d] — = Not requested.

Table 2.1-2
Summary of Boreholes Drilled and Subsurface Samples Collected from TA-49 Sites Inside the NES Boundary

				Screening		Laboratory Analysis						
Sampling Locations	Borehole ID	Number of Samples	Total Depth (ft)	Gross-Alpha and -Beta Radiation Screening	Organic Vapor Screening	Cyanide (EPA SW-846:9012A)	Uranium, Plutonium, or Americium (HASL-300)	TAL Metals (EPA SW-846:6010B/6020)	Explosives (EPA SW-846:8330B/8141A)	Perchlorate (EPA SW-846:6850)	VOCs and SVOCs (EPA SW-846: 8260B and 8270C)	Vapor-Phase Sampling VOCs (EPA TO-15), Tritium (EPA 906)
Area 1 SWMU 49-001(a)	49-610946	4	135	X*	X	X	X	X	X	X	X	X
	49-610948	4	135	X	X	X	X	X	X	X	X	X
	49-610947	4	135	X	X	X	X	X	X	X	X	X
	49-610949	4	135	X	X	X	X	X	X	X	X	X
Area 2, 2A, 2B (MDA AB)	49-610943	3	130	X	X	X	X	X	X	X	X	X
	49-610945	3	130	X	X	X	X	X	X	X	X	X
	49-610944	3	130	X	X	X	X	X	X	X	X	X
	49-610942	3	130	X	X	X	X	X	X	X	X	X
Area 3 SWMU 49-001(e)	49-609982	3	192	X	X	X	X	X	X	X	X	X
	49-609984	4	192	X	X	X	X	X	X	X	X	X
	49-609983	4	192	X	X	X	X	X	X	X	X	X
	49-609981	4	192	X	X	X	X	X	X	X	X	X
Area 4 SWMU 49-001(f)	49-610938	4	158	X	X	X	X	X	X	X	X	X
	49-610939	5	158	X	X	X	X	X	X	X	X	X
	49-610940	4	158	X	X	X	X	X	X	X	X	X
	49-610941	3	158	X	X	X	X	X	X	X	X	X

Table 2.1-2 (continued)

Sampling Locations	Borehole ID	Number of Samples	Total Depth (ft)	Screening		Laboratory Analysis						
				Gross-Alpha and -Beta Radiation Screening	VOC Screening	Cyanide (EPA SW-846:9012A)	Uranium, Plutonium, or Americium (HASL-300)	TAL Metals (EPA SW-846: 6010B/6020)	Explosives (EPA SW-846:8330B/8141A)	Perchlorate (EPA SW-846: 6850)	VOCs and SVOCs (EPA SW-846:8260B and 8270C)	Vapor-Phase Sampling VOCs (EPA TO-15) Tritium (EPA 906)
	49-610500	3	20	X	X	X	X	X	X	X	X	X
	49-610499	3	20	X	X	X	X	X	X	X	X	X
	49-610498	3	20	X	X	X	X	X	X	X	X	X
	49-610496	2	10	X	X	X	X	X	X	X	X	X
Area 11	49-610497	3	20	X	X	X	X	X	X	X	X	X
	49-610495	2	10	X	X	X	X	X	X	X	X	X
	49-610493	2	10	X	X	X	X	X	X	X	X	X
	49-610494	2	10	X	X	X	X	X	X	X	X	X
	49-610491	2	10	X	X	X	X	X	X	X	X	X
	49-610492	2	10	X	X	X	X	X	X	X	X	X
	49-610490	3	35	X	X	X	X	X	X	X	X	X
	49-610489	3	80	X	X	X	X	X	X	X	X	X
Area 12	49-610481	4	80	X	X	X	X	X	X	X	X	X
	49-610485	4	120	X	X	X	X	X	X	X	X	X

*X = Samples collected.

Table 2.1-3
Summary of Pore-Gas Samples Collected and Analyses Requested at TA-49 Sites Inside the NES Boundary

Sampling Locations	Location ID	Number of Samples	Total Depth (ft bgs)	Laboratory Analysis	
				Tritium	VOCs
Area 1 SWMU 49-001(a)	49-610946	3	71.0−73.0 84.0−86.0 119.0−121.0	X*	X
Area 2 MDA AB	49-610943	3	79.0−81.0 86.0−88.0 120.0−122.0	X	X
	49-610945	2	79.0−81.0 110.0−112.0	X	X
	49-610944	2	79.0−81.0 123.0−125.5	X	X
	49-610942	2	77.0−79.0 80.0−82.0	X	X
Area 3 SWMU 49-001(e)	49-609981	2	77.0−79.0 123.25−125.25	X	X
Area 4 SWMU 49-001(f)	49-610939	3	62.0−64.0 107.0−109.0 133.0−135.0	X	X
Area 11 SWMU 49-003 AOC 49-008(c)	49-610490	2	4.0−6.0 28.0−30.0	X	X
	49-610489	2	34.0−36.0 70.0−72.0	X	X
Area 12 AOC 49-008(d)	49-610481	3	29.0−31.0 77.0−79.0 82.0−84.0	X	X

*X = Samples collected.

Table 3.5-1
Henry's Law Constants, Groundwater SLs, and
Calculated Concentrations Corresponding to Groundwater SLs for Detected VOCs in Pore Gas

VOC	Henry's Law Constant[a] (dimensionless)	Groundwater Screening Level (µg/L)	Maximum Detected Concentration ($\mu g/m^3$)	Calculated Concentrations in Pore Gas Corresponding to Groundwater Standard[b] ($\mu g/m^3$)
Acetone	0.0016	21,800[c]	46	34880
Benzene	0.228	5[d]	60	1140
Butanone[2-]	0.0023	7060[c]	15	16238
Carbon Disulfide	0.59	1040[c]	98	615000
Chloromethane	0.360	17.8[c]	2.9	6408
Dichlorodifluoromethane	14.0	395[c]	3.2	5530000
Ethylbenzene	0.323	700[d]	17	22610
Ethyltoluene[4-]	na[e]	na	16	na
Styrene	0.110	100[d]	4.9	11000
Toluene	0.272	750[f]	100	20400
Trimethylbenzene[1,2,4-]	0.25[f]	15[g]	19	3750
Trimethylbenzene[1,3,5-]	0.36[f]	370[g]	9.1	133200
Xylene (Total)	0.270	620[f]	78	167400
Xylene[1,2-]	0.213	620[f]	19	132060
Xylene[1,3-]+Xylene[1,4-]	0.270	620[f]	58	167400

[a] NMED (2009, 108070, Appendix B) unless otherwise noted.
[b] Derived from denominator of Equation 3.5-3.
[c] Tap-water screening levels from NMED (2009, 108070).
[d] EPA maximum contaminant level (MCL) (40 Code of Federal Regulations 141.61).
[e] na = Not available.
[f] Henry's law constant from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[g] NMWQCC groundwater standard (20.6.2.3103 New Mexico Administrative Code).

Table 3.5-2
Results of Pore-Gas Screening Based on Maximum Detected Concentrations

Chemical	Maximum Detected Concentration ($\mu g/m^3$)	H'[a] (dimensionless)	Groundwater Screening Level[b] ($\mu g/L$)	Screening Value
Acetone	46	0.0016	21800[c]	0.0013
Benzene	60	0.228	5	0.0526
Butanone[2-]	15	0.0011	7060[c]	0.0019
Carbon Disulfide	98	0.59	1040[c]	0.0002
Chloromethane	2.9	0.36	17.8[c]	0.0005
Dichlorodifluoromethane	3.2	14	395[c]	0.0000006
Ethylbenzene	17	0.323	700	0.00008
Ethyltoluene[4-]	16	na[d]	na	na
Styrene	4.9	0.11	100	0.0089
Toluene	100	0.272	750[e]	0.0005
Trimethylbenzene[1,2,4-]	19	0.25	15[f]	0.0051
Trimethylbenzene[1,3,5-]	9.1	0.36	370[f]	0.00007
Xylene (Total)	78	0.3	620[e]	0.0004
Xylene[1,2-]	19	0.213	620[e]	0.0001
Xylene[1,3-]+Xylene[1,4-]	58	0.3	620[e]	0.0003

[a] Henry's law constant from NMED (2009 ,108070).

[b] EPA maximum contaminant level (MCL) (40 Code of Federal Regulations 141.61), unless otherwise noted.

[c] NMED tap-water screening level (NMED 2009, 108070).

[d] na = Not available.

[e] NMWQCC groundwater standard (20.6.2.3103 New Mexico Administrative Code).

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

Table 6.2-1
Surveyed Coordinates for
2009–2010 Locations at Area 1, SWMU 49-001(a)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 1 Drilling			
49-001(a)	49-610946	1624456.252	1755558.556
49-001(a)	49-610948	1624579.504	1755466.562
49-001(a)	49-610947	1624403.9	1755357.743
49-001(a)	49-610949	1624332.567	1755470.067
Area 1 Surface and Shallow Subsurface			
49-001(a)	49-610206	1624405.92	1755440.16
49-001(a)	49-610207	1624455.92	1755440.16
49-001(a)	49-610208	1624505.92	1755440.16
49-001(a)	49-610209	1624430.92	1755490.16
49-001(a)	49-610210	1624480.92	1755490.16
49-001(a)	49-610211	1624405.92	1755515.16
49-001(a)	49-610212	1624430.92	1755515.16
49-001(a)	49-610213	1624455.92	1755515.16
49-001(a)	49-610214	1624380.92	1755390.16
49-001(a)	49-610215	1624430.92	1755390.16
49-001(a)	49-610216	1624505.92	1755390.16
49-001(a)	49-610217	1624480.92	1755415.16
49-001(a)	49-610218	1624355.92	1755440.16
49-001(a)	49-610219	1624555.92	1755440.16
49-001(a)	49-610220	1624430.92	1755465.16
49-001(a)	49-610221	1624355.92	1755490.16
49-001(a)	49-610222	1624530.92	1755515.16
49-001(a)	49-610223	1624380.92	1755540.16
49-001(a)	49-610224	1624430.92	1755565.16
49-001(a)	49-610225	1624505.92	1755565.16
49-001(a)	49-610226	1624480.92	1755340.16
49-001(a)	49-610227	1624605.92	1755365.16
49-001(a)	49-610228	1624305.92	1755465.16
49-001(a)	49-610229	1624580.92	1755490.16
49-001(a)	49-610230	1624555.92	1755565.16
49-001(a)	49-610231	1624330.92	1755590.16
49-001(a)	49-610232	1624405.92	1755615.16
49-001(a)	49-610233	1624555.92	1755615.16
49-001(a)	49-610234	1624305.92	1755615.16
49-001(a)	49-610235	1624355.92	1755390.16
49-001(a)	49-610236	1624405.92	1755390.16
49-001(a)	49-610237	1624455.92	1755390.16

Table 6.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 1 Surface and Shallow Subsurface (continued)			
49-001(a)	49-610238	1624480.92	1755390.16
49-001(a)	49-610239	1624530.92	1755390.16
49-001(a)	49-610240	1624555.92	1755390.16
49-001(a)	49-610241	1624355.92	1755415.16
49-001(a)	49-610242	1624380.92	1755415.16
49-001(a)	49-610243	1624405.92	1755415.16
49-001(a)	49-610244	1624430.92	1755415.16
49-001(a)	49-610245	1624455.92	1755415.16
49-001(a)	49-610246	1624505.92	1755415.16
49-001(a)	49-610247	1624530.92	1755415.16
49-001(a)	49-610248	1624555.92	1755415.16
49-001(a)	49-610249	1624380.92	1755440.16
49-001(a)	49-610250	1624430.92	1755440.16
49-001(a)	49-610251	1624480.92	1755440.16
49-001(a)	49-610252	1624530.92	1755440.16
49-001(a)	49-610253	1624355.92	1755465.16
49-001(a)	49-610254	1624380.92	1755465.16
49-001(a)	49-610255	1624405.92	1755465.16
49-001(a)	49-610256	1624455.92	1755465.16
49-001(a)	49-610257	1624480.92	1755465.16
49-001(a)	49-610258	1624505.92	1755465.16
49-001(a)	49-610259	1624530.92	1755465.16
49-001(a)	49-610260	1624555.92	1755465.16
49-001(a)	49-610261	1624380.92	1755490.16
49-001(a)	49-610262	1624405.92	1755490.16
49-001(a)	49-610263	1624455.92	1755490.16
49-001(a)	49-610264	1624505.92	1755490.16
49-001(a)	49-610265	1624530.92	1755490.16
49-001(a)	49-610266	1624555.92	1755490.16
49-001(a)	49-610267	1624355.92	1755515.16
49-001(a)	49-610268	1624380.92	1755515.16
49-001(a)	49-610269	1624480.92	1755515.16
49-001(a)	49-610270	1624505.92	1755515.16
49-001(a)	49-610271	1624355.92	1755540.16
49-001(a)	49-610272	1624405.92	1755540.16
49-001(a)	49-610273	1624430.92	1755540.16
49-001(a)	49-610274	1624455.92	1755540.16
49-001(a)	49-610275	1624480.92	1755540.16
49-001(a)	49-610276	1624505.92	1755540.16

Table 6.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 1 Surface and Shallow Subsurface (continued)			
49-001(a)	49-610277	1624530.92	1755540.16
49-001(a)	49-610278	1624355.92	1755565.16
49-001(a)	49-610279	1624380.92	1755565.16
49-001(a)	49-610280	1624405.92	1755565.16
49-001(a)	49-610281	1624455.92	1755565.16
49-001(a)	49-610282	1624480.92	1755565.16
49-001(a)	49-610283	1624330.92	1755340.16
49-001(a)	49-610284	1624380.92	1755340.16
49-001(a)	49-610285	1624430.92	1755340.16
49-001(a)	49-610286	1624530.92	1755340.16
49-001(a)	49-610287	1624580.92	1755340.16
49-001(a)	49-610288	1624305.92	1755365.16
49-001(a)	49-610289	1624355.92	1755365.16
49-001(a)	49-610290	1624405.92	1755365.16
49-001(a)	49-610291	1624455.92	1755365.16
49-001(a)	49-610292	1624505.92	1755365.16
49-001(a)	49-610293	1624555.92	1755365.16
49-001(a)	49-610294	1624330.92	1755390.16
49-001(a)	49-610295	1624580.92	1755390.16
49-001(a)	49-610296	1624305.92	1755415.16
49-001(a)	49-610297	1624605.92	1755415.16
49-001(a)	49-610298	1624330.92	1755440.16
49-001(a)	49-610299	1624580.92	1755440.16
49-001(a)	49-610300	1624605.92	1755465.16
49-001(a)	49-610301	1624330.92	1755490.16
49-001(a)	49-610302	1624305.92	1755515.16
49-001(a)	49-610303	1624555.92	1755515.16
49-001(a)	49-610304	1624605.92	1755515.16
49-001(a)	49-610305	1624330.92	1755540.16
49-001(a)	49-610306	1624580.92	1755540.16
49-001(a)	49-610307	1624305.92	1755565.16
49-001(a)	49-610308	1624380.92	1755590.16
49-001(a)	49-610309	1624430.92	1755590.16
49-001(a)	49-610310	1624480.92	1755590.16
49-001(a)	49-610311	1624530.92	1755590.16
49-001(a)	49-610312	1624580.92	1755590.16
49-001(a)	49-610313	1624355.92	1755615.16
49-001(a)	49-610314	1624455.92	1755615.16
49-001(a)	49-610315	1624505.92	1755615.16

Table 6.2-2
Samples Collected and Analyses Requested at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
0549-95-0191	49-01035	0.0–0.5	Soil	—*	841	—	—	841	—	840	—	—	841	—	—
0549-95-0192	49-01036	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0193	49-01037	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0194	49-01038	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0195	49-01039	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0196	49-01040	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0197	49-01041	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0198	49-01042	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0199	49-01043	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0200	49-01044	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0201	49-01045	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0202	49-01046	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0203	49-01047	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0204	49-01048	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0205	49-01049	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0206	49-01050	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0207	49-01051	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0208	49-01052	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—
0549-95-0209	49-01053	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
0549-95-0210	49-01054	0.0–0.5	Soil	—	841	—	—	841	—	840	—	—	841	—	—
RE49-10-5823	49-610098	0.0–0.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5824	49-610098	0.5–1.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5825	49-610099	0.0–0.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5826	49-610099	0.5–1.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5827	49-610100	0.0–0.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5828	49-610100	0.5–1.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5829	49-610101	0.0–0.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5830	49-610101	0.5–1.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5831	49-610102	0.0–0.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—
RE49-10-5832	49-610102	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5833	49-610103	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5834	49-610103	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
RE49-10-5835	49-610104	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5836	49-610104	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5837	49-610105	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5838	49-610105	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5839	49-610106	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5840	49-610106	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5841	49-610107	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5842	49-610107	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5843	49-610108	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5844	49-610108	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5845	49-610109	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5846	49-610109	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5847	49-610110	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5848	49-610110	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5849	49-610111	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5850	49-610111	0.5–1.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5851	49-610112	0.0–0.5	Soil	10-719	10-719	—	—	10-719	10-719	10-719	—	—	—	—	—
RE49-10-5852	49-610112	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5853	49-610113	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5854	49-610113	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5855	49-610114	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5856	49-610114	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5857	49-610115	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5858	49-610115	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5859	49-610116	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5860	49-610116	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5861	49-610117	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5862	49-610117	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5863	49-610118	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5864	49-610118	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5865	49-610119	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5866	49-610119	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5867	49-610120	0.0–0. 5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5868	49-610120	0.5–1.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5869	49-610121	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5870	49-610121	0.5–1.5	Qbt4	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5871	49-610122	0.0–0.5	Soil	10-720	10-720	—	—	10-720	10-720	10-720	—	—	—	—	—
RE49-10-5872	49-610122	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
RE49-10-5873	49-610123	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5874	49-610123	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5875	49-610124	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5876	49-610124	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5877	49-610125	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5878	49-610125	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5879	49-610126	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5880	49-610126	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5881	49-610127	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5882	49-610127	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5883	49-610128	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5884	49-610128	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5885	49-610129	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5886	49-610129	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5887	49-610130	0.0–0.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-5888	49-610130	0.5–1.5	Soil	10-721	10-721	—	—	10-721	10-721	10-721	—	—	—	—	—
RE49-10-6109	49-610206	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6110	49-610206	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6111	49-610207	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6112	49-610207	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6113	49-610208	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6114	49-610208	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6115	49-610209	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6116	49-610209	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6117	49-610210	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6118	49-610210	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6119	49-610211	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6120	49-610211	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6121	49-610212	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6122	49-610212	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6123	49-610213	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6124	49-610213	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6125	49-610214	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6126	49-610214	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6127	49-610215	0.0–0.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6128	49-610215	0.5–1.5	Soil	10-1136	10-1136	—	—	10-1136	10-1136	10-1136	—	—	—	—	—
RE49-10-6129	49-610216	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6130	49-610216	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
RE49-10-6131	49-610217	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6132	49-610217	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6133	49-610218	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6134	49-610218	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6135	49-610219	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6136	49-610219	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6137	49-610220	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6138	49-610220	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6139	49-610221	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6140	49-610221	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6141	49-610222	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6142	49-610222	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6143	49-610223	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6144	49-610223	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6145	49-610224	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6146	49-610224	0.5–1.5	Qbt4	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6147	49-610225	0.0–0.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6148	49-610225	0.5–1.5	Soil	10-1138	10-1138	—	—	10-1138	10-1138	10-1138	—	—	—	—	—
RE49-10-6153	49-610226	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6154	49-610226	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6155	49-610227	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6156	49-610227	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6157	49-610228	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6158	49-610228	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6159	49-610229	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6160	49-610229	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6161	49-610230	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6162	49-610230	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6163	49-610231	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6164	49-610231	0.5–1.5	Qbt4	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6165	49-610232	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6166	49-610232	0.5–1.5	Qbt4	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6167	49-610233	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6168	49-610233	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6286	49-610288	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6287	49-610288	0.5–1.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-6336	49-610313	0.0–0.5	Soil	10-1139	10-1139	—	—	10-1139	10-1139	10-1139	—	—	—	—	—
RE49-10-9047	49-610946	1.7–3.7	Qbt4	10-1110	—	10-1110	10-1110	10-1110	10-1110	10-1111	10-1111	10-1110	—	10-1110	10-1111

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
RE49-10-9051	49-610946	72.0–74.0	Qbt3	10-1309	—	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	—	10-1309	10-1309
RE49-10-9052	49-610946	85.0–87.0	Qbt3	10-1309	—	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	—	10-1309	10-1309
RE49-10-9068	49-610946	133.0–135.0	Qbt3	10-1309	—	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	10-1309	—	10-1309	10-1309
RE49-10-9049	49-610947	2.5–4.2	Qbt4	10-1110	—	10-1110	10-1110	10-1110	10-1110	10-1111	10-1111	10-1110	—	10-1110	10-1111
RE49-10-9063	49-610947	76.7–77.7	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-9064	49-610947	85.0–87.0	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-9066	49-610947	133.0–135.0	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-9050	49-610948	4.0–6.0	Qbt4	10-1258	—	10-1258	10-1258	10-1258	10-1258	10-1258	10-1258	10-1258	—	10-1258	10-1258
RE49-10-9057	49-610948	77.0–81.0	Qbt3	10-1395	—	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	—	10-1395	10-1395
RE49-10-9058	49-610948	85.0–87.0	Qbt3	10-1395	—	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	—	10-1395	10-1395
RE49-10-9059	49-610948	133.0–135.0	Qbt3	10-1395	—	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	10-1395	—	10-1395	10-1395
RE49-10-9048	49-610949	2.0–3.8	Qbt4	10-1110	—	10-1110	10-1110	10-1110	10-1110	10-1111	10-1111	10-1110	—	10-1110	10-1111
RE49-10-9069	49-610949	76.0–78.0	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-9070	49-610949	85.0–87.0	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-9071	49-610949	133.0–135.0	Qbt3	10-1389	—	10-1389	10-1388	10-1389	10-1389	10-1389	10-1389	10-1388	—	10-1388	10-1389
RE49-10-10862	49-611035	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10863	49-611035	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10864	49-611036	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10865	49-611036	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10866	49-611037	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10867	49-611037	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10868	49-611038	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10869	49-611038	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10870	49-611039	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10871	49-611039	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10872	49-611040	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10873	49-611040	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10874	49-611041	0.0–0.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—
RE49-10-10875	49-611041	0.5–1.5	Soil	10-1525	10-1525	—	—	10-1525	10-1525	10-1525	—	—	—	—	—

*— = Not requested.

Table 6.2-3
Field-Screening Results for Samples Collected at Area 1, SWMU 49-001(a)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 1 Drilling Samples						
49-001(a)	49-610946	1.7–3.7	RE49-10-9047	0.0	104	2260
49-001(a)	49-610946	72.0–74.0	RE49-10-9051	0.0	42	2160
49-001(a)	49-610946	85.0–87.0	RE49-10-9052	0.0	9	2040
49-001(a)	49-610946	133.0–135.0	RE49-10-9068	0.0	28	1611
49-001(a)	49-610947	2.5–4.2	RE49-10-9049	0.0	98	2360
49-001(a)	49-610947	76.7–77.7	RE49-10-9063	0.0	9	1877
49-001(a)	49-610947	85.0–87.0	RE49-10-9064	0.0	28	1990
49-001(a)	49-610947	133.0–135.0	RE49-10-9066	0.0	37	1979
49-001(a)	49-610948	4.0–6.0	RE49-10-9050	0.0	81	2150
49-001(a)	49-610948	77.0–81.0	RE49-10-9057	0.0	18	2020
49-001(a)	49-610948	85.0–87.0	RE49-10-9058	0.0	23	2060
49-001(a)	49-610948	133.0–135.0	RE49-10-9059	0.0	4	2090
49-001(a)	49-610949	2.0–3.8	RE-49-10-9048	0.0	65	2560
49-001(a)	49-610949	76.0–78.0	RE49-10-9069	0.0	42	2000
49-001(a)	49-610949	85.0–87.0	RE49-10-9070	0.0	47	2200
49-001(a)	49-610949	133.0–135.0	RE49-10-9071	0.0	14	2260
Area 1 Surface and Shallow-Subsurface Samples						
49-001(a)	49-610206	0.0–0.5	RE49-10-6109	NA*	65	2510
49-001(a)	49-610206	0.5–1.5	RE49-10-6110	NA	23	1961
49-001(a)	49-610207	0.0–0.5	RE49-10-6111	NA	78	2490
49-001(a)	49-610207	0.5–1.5	RE49-10-6112	NA	28	1804
49-001(a)	49-610208	0.0–0.5	RE49-10-6113	NA	23	1509
49-001(a)	49-610208	0.5–1.5	RE49-10-6114	NA	85	2330
49-001(a)	49-610209	0.0–0.5	RE49-10-6115	NA	5	2008
49-001(a)	49-610209	0.5–1.5	RE49-10-6116	NA	35	2260
49-001(a)	49-610210	0.0–0.5	RE49-10-6117	NA	20	2190
49-001(a)	49-610210	0.5–1.5	RE49-10-6118	NA	10	2480
49-001(a)	49-610211	0.0–0.5	RE49-10-6119	NA	32	2570
49-001(a)	49-610211	0.5–1.5	RE49-10-6120	NA	35	2530
49-001(a)	49-610212	0.0–0.5	RE49-10-6121	NA	25	2160
49-001(a)	49-610212	0.5–1.5	RE49-10-6122	NA	15	2200
49-001(a)	49-610213	0.0–0.5	RE49-10-6123	NA	25	2430
49-001(a)	49-610213	0.5–1.5	RE49-10-6124	NA	30	2450
49-001(a)	49-610214	0.0–0.5	RE49-10-6125	NA	104	2590
49-001(a)	49-610214	0.5–1.5	RE49-10-6126	NA	78	2250
49-001(a)	49-610215	0.0–0.5	RE49-10-6127	NA	59	2270
49-001(a)	49-610215	0.5–1.5	RE49-10-6128	NA	52	2500

Table 6.2-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 1 Surface and Shallow-Subsurface Samples (continued)						
49-001(a)	49-610216	0.0–0.5	RE49-10-6129	NA	4	1821
49-001(a)	49-610216	0.5–1.5	RE49-10-6130	NA	14	1687
49-001(a)	49-610217	0.0–0.5	RE49-10-6131	NA	118	2640
49-001(a)	49-610217	0.5–1.5	RE49-10-6132	NA	33	1739
49-001(a)	49-610218	0.0–0.5	RE49-10-6133	NA	163	2720
49-001(a)	49-610218	0.5–1.5	RE49-10-6134	NA	33	1751
49-001(a)	49-610219	0.0–0.5	RE49-10-6135	NA	52	2530
49-001(a)	49-610219	0.5–1.5	RE49-10-6136	NA	14	1803
49-001(a)	49-610220	0.0–0.5	RE49-10-6137	NA	30	2006
49-001(a)	49-610220	0.5–1.5	RE49-10-6138	NA	30	2140
49-001(a)	49-610221	0.0–0.5	RE49-10-6139	NA	85	2500
49-001(a)	49-610221	0.5–1.5	RE49-10-6140	NA	14	1693
49-001(a)	49-610222	0.0–0.5	RE49-10-6141	NA	28	1987
49-001(a)	49-610222	0.5–1.5	RE49-10-6142	NA	30	2220
49-001(a)	49-610223	0.0–0.5	RE49-10-6143	NA	78	2400
49-001(a)	49-610223	0.5–1.5	RE49-10-6144	NA	37	1879
49-001(a)	49-610224	0.0–0.5	RE49-10-6145	NA	33	2030
49-001(a)	49-610224	0.5–1.5	RE49-10-6146	NA	28	2030
49-001(a)	49-610225	0.0–0.5	RE49-10-6147	NA	47	1980
49-001(a)	49-610225	0.5–1.5	RE49-10-6148	NA	42	2160
49-001(a)	49-610226	0.0–0.5	RE49-10-6153	NA	91	2420
49-001(a)	49-610226	0.5–1.5	RE49-10-6154	NA	18	1733
49-001(a)	49-610227	0.0–0.5	RE49-10-6155	NA	23	1792
49-001(a)	49-610227	0.5–1.5	RE49-10-6156	NA	98	2600
49-001(a)	49-610228	0.0–0.5	RE49-10-6157	NA	91	2750
49-001(a)	49-610228	0.5–1.5	RE49-10-6158	NA	118	2440
49-001(a)	49-610229	0.0–0.5	RE49-10-6159	NA	35	2300
49-001(a)	49-610229	0.5–1.5	RE49-10-6160	NA	25	2280
49-001(a)	49-610230	0.0–0.5	RE49-10-6161	NA	23	2030
49-001(a)	49-610230	0.5–1.5	RE49-10-6162	NA	18	2100
49-001(a)	49-610231	0.0–0.5	RE49-10-6163	NA	14	2070
49-001(a)	49-610231	0.5–1.5	RE49-10-6164	NA	18	1970
49-001(a)	49-610232	0.0–0.5	RE49-10-6165	NA	78	2300
49-001(a)	49-610232	0.5–1.5	RE49-10-6166	NA	124	2710
49-001(a)	49-610233	0.0–0.5	RE49-10-6167	NA	14	1891
49-001(a)	49-610233	0.5–1.5	RE49-10-6168	NA	28	1967
49-001(a)	49-610288	0.0–0.5	RE49-10-6286	NA	124	2440
49-001(a)	49-610288	0.5–1.5	RE49-10-6287	NA	37	1792
49-001(a)	49-610313	0.0–0.5	RE49-10-6336	NA	104	2930

*NA = Not analyzed.

Table 6.2-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**
Soil BV[a]				**29,200**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**
Residential SSL[b]				**7.81E+04**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**na**[c]	**2.19E+02**[d]	**2.3E+01**[e]	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**
Industrial SSL[b]				**1.13E+06**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03**[d]	**3.0E+02**[e]	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**
Construction Worker SSL[b]				**4.07E+04**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02**[d]	**3.46E+01**[f]	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**
0549-95-0191	49-01035	0.0–0.5	Soil	—[g]	—	—	—	—	—	—	—	NA[h]	—	—
0549-95-0194	49-01038	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0196	49-01040	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0199	49-01043	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0202	49-01046	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0203	49-01047	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0204	49-01048	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0207	49-01051	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0209	49-01053	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
0549-95-0210	49-01054	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5823	49-610098	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5824	49-610098	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5825	49-610099	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5826	49-610099	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5827	49-610100	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5828	49-610100	0.5–1.5	Soil	—	—	—	—	—	—	8.8	—	NA	—	—
RE49-10-5829	49-610101	0.0–0.5	Soil	—	—	—	—	—	—	9.3	—	NA	—	—
RE49-10-5830	49-610101	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5831	49-610102	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5834	49-610103	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5835	49-610104	0.0–0.5	Soil	—	—	—	—	—	—	13.2	—	NA	—	25.5 (J)
RE49-10-5839	49-610106	0.0–0.5	Soil	—	—	—	—	—	—	10.2	—	NA	—	—
RE49-10-5842	49-610107	0.5–1.5	Soil	—	—	—	—	—	—	10.5	—	NA	—	—
RE49-10-5844	49-610108	0.5–1.5	Soil	—	—	—	—	—	—	13.9	—	NA	—	—
RE49-10-5849	49-610111	0.0–0.5	Soil	—	—	—	—	—	—	10.7	—	NA	—	—
RE49-10-5850	49-610111	0.5–1.5	Soil	—	—	—	—	—	—	9.7	—	NA	—	24.9 (J)
RE49-10-5852	49-610112	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5853	49-610113	0.0–0.5	Soil	—	—	—	—	—	—	25.3	—	NA	—	27.6
RE49-10-5862	49-610117	0.5–1.5	Soil	—	—	—	—	—	—	9.1	—	NA	—	—
RE49-10-5866	49-610119	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	23.4
RE49-10-5868	49-610120	0.5–1.5	Soil	—	—	—	—	6450	—	—	—	NA	—	—

Table 6.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**
Soil BV[a]				**29,200**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**
Residential SSL[b]				**7.81E+04**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**
Industrial SSL[b]				**1.13E+06**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**
Construction Worker SSL[b]				**4.07E+04**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**
RE49-10-5869	49-610121	0.0–0.5	Soil	—	—	—	—	—	—	16.2	—	NA	—	24.8
RE49-10-5870	49-610121	0.5–1.5	Qbt4	16,100	3.1	246 (J-)	1.3	5350	12.6	4.1	5.7	NA	14,900	18.4
RE49-10-5871	49-610122	0.0–0.5	Soil	—	—	—	—	—	—	9.9	—	NA	—	—
RE49-10-5872	49-610122	0.5–1.5	Soil	—	—	—	—	—	—	10.2 (J)	—	NA	—	—
RE49-10-5873	49-610123	0.0–0.5	Soil	—	—	—	—	—	—	15.6 (J)	—	NA	—	—
RE49-10-5874	49-610123	0.5–1.5	Soil	—	—	—	—	—	—	11.8 (J)	—	NA	—	—
RE49-10-5878	49-610125	0.5–1.5	Soil	—	—	—	—	—	—	17.1 (J)	—	NA	—	30.6
RE49-10-5884	49-610128	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-5885	49-610129	0.0–0.5	Soil	—	—	—	—	—	—	9.5 (J)	—	NA	—	—
RE49-10-5886	49-610129	0.5–1.5	Soil	—	—	—	—	—	—	10.6 (J)	—	NA	—	—
RE49-10-6114	49-610208	0.5–1.5	Soil	—	—	—	—	—	—	9.3	—	NA	—	—
RE49-10-6116	49-610209	0.5–1.5	Soil	—	—	—	—	—	—	44.5	—	NA	—	27.8
RE49-10-6122	49-610212	0.5–1.5	Soil	—	—	—	—	—	—	20.3	—	NA	—	—
RE49-10-6128	49-610215	0.5–1.5	Soil	—	—	—	—	—	—	10	—	NA	—	—
RE49-10-6131	49-610217	0.0–0.5	Soil	—	—	—	—	—	—	—	—	NA	—	—
RE49-10-6135	49-610219	0.0–0.5	Soil	—	—	—	—	—	—	9.6	—	NA	—	—
RE49-10-6138	49-610220	0.5–1.5	Soil	—	—	—	—	—	—	9.3	—	NA	—	—
RE49-10-6140	49-610221	0.5–1.5	Soil	—	—	—	—	—	—	13.3	—	NA	—	—
RE49-10-6145	49-610224	0.0–0.5	Soil	—	—	—	—	—	25.4	—	—	NA	—	—
RE49-10-6146	49-610224	0.5–1.5	Qbt4	11,800	2.8	151 (J+)	—	—	13	—	5.8	NA	—	13
RE49-10-6154	49-610226	0.5–1.5	Soil	—	—	—	—	—	—	9.8	—	NA	—	—
RE49-10-6156	49-610227	0.5–1.5	Soil	—	—	915	—	8250	—	—	—	NA	—	—
RE49-10-6161	49-610230	0.0–0.5	Soil	—	—	—	—	—	—	10.5	—	NA	—	—
RE49-10-6162	49-610230	0.5–1.5	Soil	—	—	—	—	—	—	—	—	NA	—	22.4
RE49-10-6164	49-610231	0.5–1.5	Qbt4	—	—	80.1	—	—	7.9	3.6	—	NA	—	—
RE49-10-6166	49-610232	0.5–1.5	Qbt4	13,000	4.1	142	—	2910	11.1	4	7.6	NA	—	11.9
RE49-10-9047	49-610946	1.7–3.7	Qbt4	—	—	48.3	—	3590 (J)	—	—	—	0.53 (UJ)	—	—
RE49-10-9051	49-610946	72.0–74.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—
RE49-10-9052	49-610946	85.0–87.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—
RE49-10-9068	49-610946	133.0–135.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—
RE49-10-9049	49-610947	2.5–4.2	Qbt4	—	—	60.9	—	3930 (J)	—	—	—	0.53 (UJ)	—	—
RE49-10-9063	49-610947	76.7–77.7	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	77.4
RE49-10-9064	49-610947	85.0–87.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—

Table 6.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**	**11.2**
Soil BV[a]				**29,200**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**	**22.3**
Residential SSL[b]				**7.81E+04**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**	**4.00E+02**
Industrial SSL[b]				**1.13E+06**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**	**8.00E+02**
Construction Worker SSL[b]				**4.07E+04**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**	**8.00E+02**
RE49-10-9066	49-610947	133.0–135.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—
RE49-10-9050	49-610948	4.0–6.0	Qbt4	9430 (J+)	2.8	115	—	3030	7.2	—	5.3	—	—	—
RE49-10-9057	49-610948	77.0–81.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—
RE49-10-9058	49-610948	85.0–87.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—
RE49-10-9059	49-610948	133.0–135.0	Qbt3	—	—	—	—	—	—	—	—	0.52 (U)	—	—
RE49-10-9048	49-610949	2.0–3.8	Qbt4	8520	—	84.8	—	4400 (J)	—	—	—	0.54 (UJ)	—	—
RE49-10-9069	49-610949	76.0–78.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—
RE49-10-9070	49-610949	85.0–87.0	Qbt3	—	—	—	—	—	—	—	—	0.51 (U)	—	—
RE49-10-9071	49-610949	133.0–135.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—
RE49-10-10866	49-611037	0.0–0.5	Soil	—	—	—	—	—	—	11.4	—	NA	—	—
RE49-10-10869	49-611038	0.5–1.5	Soil	—	—	—	—	—	—	12	—	NA	—	—
RE49-10-10873	49-611040	0.5–1.5	Soil	—	—	—	—	—	—	17.5	—	NA	—	—

Table 6.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**na**	**1.07E+04**	**2.3E+01**[e]	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**na**	**1.45E+05**	**3.1E+02**[e]	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**na**	**4.63E+02**	**9.29E+01**[f]	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
0549-95-0191	49-01035	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.2 (U)	—	—	—
0549-95-0194	49-01038	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.3 (U)	8.21	—	51.2
0549-95-0196	49-01040	0.0–0.5	Soil	—	—	0.11 (U)	—	NA	—	—	1.4 (U)	3.07	—	—
0549-95-0199	49-01043	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.3 (U)	2.03	—	—
0549-95-0202	49-01046	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.3 (U)	9.3	—	—
0549-95-0203	49-01047	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.3 (U)	2.78	—	—
0549-95-0204	49-01048	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.3 (U)	3.56	—	—
0549-95-0207	49-01051	0.0–0.5	Soil	—	—	0.11 (U)	—	NA	—	—	1.4 (U)	1.95	—	—
0549-95-0209	49-01053	0.0–0.5	Soil	—	—	0.11 (U)	—	NA	—	—	1.3 (U)	—	—	—
0549-95-0210	49-01054	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.4 (U)	1.87	—	—
RE49-10-5823	49-610098	0.0–0.5	Soil	—	—	—	—	NA	1.6 (U)	—	1.1 (U)	NA	—	—
RE49-10-5824	49-610098	0.5–1.5	Soil	—	—	—	—	NA	1.9 (U)	—	1.2 (U)	NA	—	—
RE49-10-5825	49-610099	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.1 (U)	NA	—	—
RE49-10-5826	49-610099	0.5–1.5	Soil	—	—	—	—	NA	1.6 (U)	—	1.1 (U)	NA	—	—
RE49-10-5827	49-610100	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.1 (U)	NA	—	—
RE49-10-5828	49-610100	0.5–1.5	Soil	—	—	—	—	NA	—	—	1.1 (U)	NA	—	—
RE49-10-5829	49-610101	0.0–0.5	Soil	—	—	—	—	NA	1.7 (U)	—	1.1 (U)	NA	—	—
RE49-10-5830	49-610101	0.5–1.5	Soil	—	—	—	—	NA	2.1 (U)	—	1.2 (U)	NA	—	—
RE49-10-5831	49-610102	0.0–0.5	Soil	—	—	—	—	NA	—	—	1.1 (U)	NA	—	—
RE49-10-5834	49-610103	0.5–1.5	Soil	—	—	—	—	NA	1.6	—	—	NA	—	—
RE49-10-5835	49-610104	0.0–0.5	Soil	—	1160	—	—	NA	—	—	—	NA	40.1	—
RE49-10-5839	49-610106	0.0–0.5	Soil	—	761	—	—	NA	—	—	—	NA	—	—
RE49-10-5842	49-610107	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5844	49-610108	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5849	49-610111	0.0–0.5	Soil	—	721	—	—	NA	—	—	—	NA	—	—
RE49-10-5850	49-610111	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	56.2	—
RE49-10-5852	49-610112	0.5–1.5	Soil	—	—	—	—	NA	—	—	0.88	NA	—	—
RE49-10-5853	49-610113	0.0–0.5	Soil	—	1070	—	—	NA	—	—	—	NA	47.2	—
RE49-10-5862	49-610117	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5866	49-610119	0.5–1.5	Soil	—	—	—	—	NA	1.6	—	—	NA	—	—
RE49-10-5868	49-610120	0.5–1.5	Soil	—	—	—	—	NA	—	1300 (J-)	—	NA	—	—
RE49-10-5869	49-610121	0.0–0.5	Soil	—	913	—	—	NA	—	—	—	NA	—	—
RE49-10-5870	49-610121	0.5–1.5	Qbt4	2400	—	—	9.4	NA	1.3	—	—	NA	21.5	—
RE49-10-5871	49-610122	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—

Table 6.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**na**	**1.07E+04**	**2.3E+01**[e]	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**na**	**1.45E+05**	**3.1E+02**[e]	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**na**	**4.63E+02**	**9.29E+01**[f]	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-5872	49-610122	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5873	49-610123	0.0–0.5	Soil	—	909 (J-)	—	—	NA	—	—	—	NA	—	—
RE49-10-5874	49-610123	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5878	49-610125	0.5–1.5	Soil	—	895 (J-)	—	—	NA	—	—	—	NA	—	—
RE49-10-5884	49-610128	0.5–1.5	Soil	—	—	—	—	NA	—	—	0.86 (U)	NA	—	—
RE49-10-5885	49-610129	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5886	49-610129	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6114	49-610208	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6116	49-610209	0.5–1.5	Soil	—	2430 (J+)	—	31.7	NA	—	—	—	NA	—	—
RE49-10-6122	49-610212	0.5–1.5	Soil	—	—	—	—	NA	1.7	—	—	NA	—	—
RE49-10-6128	49-610215	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6131	49-610217	0.0–0.5	Soil	—	—	0.103 (J-)	—	NA	—	—	—	NA	—	—
RE49-10-6135	49-610219	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6138	49-610220	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6140	49-610221	0.5–1.5	Soil	—	731 (J+)	—	—	NA	—	—	—	NA	—	—
RE49-10-6145	49-610224	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6146	49-610224	0.5–1.5	Qbt4	1790 (J+)	—	—	8	NA	1.1	—	—	NA	—	—
RE49-10-6154	49-610226	0.5–1.5	Soil	—	713 (J+)	—	—	NA	—	—	—	NA	—	—
RE49-10-6156	49-610227	0.5–1.5	Soil	—	—	—	—	NA	2	—	—	NA	—	—
RE49-10-6161	49-610230	0.0–0.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-6162	49-610230	0.5–1.5	Soil	—	—	—	—	NA	1.8	—	—	NA	—	—
RE49-10-6164	49-610231	0.5–1.5	Qbt4	—	—	—	—	NA	0.79	—	—	NA	—	—
RE49-10-6166	49-610232	0.5–1.5	Qbt4	2110	—	—	8.7	NA	1.4	—	—	NA	21.2	—
RE49-10-9047	49-610946	1.7–3.7	Qbt4	—	—	—	—	—	0.91	—	—	NA	—	—
RE49-10-9051	49-610946	72.0–74.0	Qbt3	—	—	—	—	—	0.92	—	—	NA	—	—
RE49-10-9052	49-610946	85.0–87.0	Qbt3	—	—	—	—	—	1.1	—	—	NA	—	—
RE49-10-9068	49-610946	133.0–135.0	Qbt3	—	—	—	—	—	1.1	—	—	NA	—	—
RE49-10-9049	49-610947	2.5–4.2	Qbt4	—	—	—	—	—	1.3	—	—	NA	—	—
RE49-10-9063	49-610947	76.7–77.7	Qbt3	—	—	—	—	—	0.91	—	—	NA	—	—
RE49-10-9064	49-610947	85.0–87.0	Qbt3	—	—	—	—	—	0.84	—	—	NA	—	—
RE49-10-9066	49-610947	133.0–135.0	Qbt3	—	—	—	—	—	1	—	—	NA	—	—
RE49-10-9050	49-610948	4.0–6.0	Qbt4	2190	—	—	—	0.0027 (J)	0.89	—	—	NA	—	—
RE49-10-9057	49-610948	77.0–81.0	Qbt3	—	—	—	—	—	0.8	—	—	NA	—	—
RE49-10-9058	49-610948	85.0–87.0	Qbt3	—	—	—	—	—	1	—	—	NA	—	—

Table 6.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-9059	49-610948	133.0–135.0	Qbt3	—	—	—	—	—	0.88	—	—	NA	—	—
RE49-10-9048	49-610949	2.0–3.8	Qbt4	—	—	—	—	0.0036 (J)	0.86	—	—	NA	—	—
RE49-10-9069	49-610949	76.0–78.0	Qbt3	—	—	—	—	—	0.77	—	—	NA	—	—
RE49-10-9070	49-610949	85.0–87.0	Qbt3	—	—	—	—	—	0.89	—	—	NA	—	—
RE49-10-9071	49-610949	133.0–135.0	Qbt3	—	—	—	—	—	0.87	—	—	NA	—	—
RE49-10-10866	49-611037	0.0–0.5	Soil	—	676	—	—	NA	—	—	—	NA	—	—
RE49-10-10869	49-611038	0.5–1.5	Soil	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-10873	49-611040	0.5–1.5	Soil	—	1050	—	—	NA	—	—	—	NA	—	—

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

[a] BVs from LANL 1998, 059730.

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 6.2-5
Summary of Organic Chemicals Detected at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Methylene Chloride
Residential SSL*				**1.99E+02**
Industrial SSL*				**1.09E+03**
Construction Worker SSL*				**1.06E+04**
RE49-10-9057	49-610948	77.0–81.0	Qbt3	0.0028 (J)
RE49-10-9058	49-610948	85.0–87.0	Qbt3	0.0033 (J)
RE49-10-9059	49-610948	133.0–135.0	Qbt3	0.003 (J)

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED 2009, 108070.

Table 6.2-6
Summary of Radionuclides Detected or Detected above BVs/FVs at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Cesium-134	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na**[b]	**0.1**	**0.05**	**0.05**	**0.3**
Soil BV[a]				**na**	**1.65**	**0.023**	**0.054**	**0.76**
Residential SAL[c]				**2.4**	**5.6**	**37**	**33**	**750**
Industrial SAL[c]				**9.7**	**23**	**240**	**210**	**440000**
Construction Worker SAL[c]				**7.7**	**18**	**40**	**36**	**320000**
0549-95-0210	49-01054	0.0–0.5	Soil	NA[d]	—[e]	—	0.09152	NA
RE49-10-5868	49-610120	0.5–1.5	Soil	—	0.132	—	—	NA
RE49-10-5886	49-610129	0.5–1.5	Soil	—	0.186	—	—	NA
RE49-10-6121	49-610212	0.0–0.5	Soil	0.586	—	—	—	NA
RE49-10-6162	49-610230	0.5–1.5	Soil	—	0.172	—	—	NA
RE49-10-6287	49-610288	0.5–1.5	Soil	0.081	—	—	—	NA
RE49-10-9047	49-610946	1.7–3.7	Qbt4	NA	NA	—	—	0.145
RE49-10-9048	49-610949	2.0–3.8	Qbt4	NA	NA	—	—	0.178
RE49-10-10868	49-611038	0.0–0.5	Soil	—	—	0.057	—	NA

Note: All activities are in pCi/g.

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

[b] na = Not available.

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

[d] NA = Not analyzed.

[e] — = Not detected or not detected above BV/FV.

Table 6.2-7
Summary of Pore-Gas Samples Collected and Analyses Requested at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
MD49-10-12130	49-610946	71.0–73.0	Pore gas	10-2161	10-2160
MD49-10-12129	49-610946	84.0–86.0	Pore gas	10-2161	10-2160
MD49-10-12128	49-610946	119.0–121.0	Pore gas	10-2161	10-2160

Table 6.2-8
Summary of Organic Chemicals Detected in Pore Gas at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Carbon Disulfide	Chloromethane	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
MD49-10-12130	49-610946	71.0–73.0	Pore gas	6.2	21	—*	—	—	2.2	6.8	7.3	2.9	44	8.6	33	8.7	24
MD49-10-12129	49-610946	84.0–86.0	Pore gas	21	2.8	3	6.6	1.7 (J+)	2.8	3.3	6.2	—	6.3	7.3	13	3.6	9.8
MD49-10-12128	49-610946	119.0–121.0	Pore gas	11	—	—	—	1.8 (J+)	2.9	—	—	—	1.5	—	—	—	—

Notes: All concentrations are in µg/m^3. Data qualifiers are defined in Appendix A.

*— = Not detected.

Table 6.2-9
Summary of Tritium in
Pore-Gas Samples Detected at Area 1, SWMU 49-001(a)

Sample ID	Location ID	Depth (ft)	Media	Tritium
MD49-10-12128	49-610946	119.0–121.0	Pore gas	2494.03

Note: All activities are in pCi/L.

Table 7.4-1
Surveyed Coordinates for 2009–2010 Locations at MDA AB

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
MDA AB Drilling			
49-001(b)	49-610942	1625940.112	1755357.651
49-001(b)	49-610943	1625778.462	1755480.833
49-001(b)	49-610944	1625659.406	1755325.387
49-001(b)	49-610945	1625765.911	1755094.455
MDA AB Surface and Shallow Subsurface			
49-001(b), (c), (d)	49-610182	1625739.2	1755429.22
49-001(b), (c), (d)	49-610183	1625689.2	1755429.22
49-001(b), (c), (d)	49-610184	1625714.2	1755429.22
49-001(b), (c), (d)	49-610185	1625714.2	1755404.22
49-001(b), (c), (d)	49-610186	1625589.2	1755354.22
49-001(b), (c), (d)	49-610187	1625639.2	1755304.22
49-001(b), (c), (d)	49-610188	1625564.2	1755279.22
49-001(b), (c), (d)	49-610189	1625614.2	1755279.22
49-001(b), (c), (d)	49-610190	1625664.2	1755279.22
49-001(b), (c), (d)	49-610191	1625914.2	1755279.22
49-001(b), (c), (d)	49-610192	1625589.2	1755304.22
49-001(b), (c), (d)	49-610193	1625689.2	1755304.22
49-001(b), (c), (d)	49-610194	1625614.2	1755329.22
49-001(b), (c), (d)	49-610195	1625664.2	1755329.22
49-001(b), (c), (d)	49-610197	1625639.2	1755354.22
49-001(b), (c), (d)	49-610198	1625689.2	1755354.22
49-001(b), (c), (d)	49-610199	1625664.2	1755379.22
49-001(b), (c), (d)	49-610200	1625714.2	1755379.22
49-001(b), (c), (d)	49-610202	1625639.2	1755404.22
49-001(b), (c), (d)	49-610203	1625689.2	1755404.22
49-001(b), (c), (d)	49-610204	1625664.2	1755429.22
49-001(b), (c), (d)	49-610205	1625914.2	1755429.22
49-001(b), (c), (d)	49-610131	1625839.2	1755104.22
49-001(b), (c), (d)	49-610132	1625789.2	1755154.22

Table 7.4-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
MDA AB Surface and Shallow Subsurface (continued)			
49-001(b), (c), (d)	49-610133	1625739.2	1755179.22
49-001(b), (c), (d)	49-610134	1625814.2	1755179.22
49-001(b), (c), (d)	49-610135	1625839.2	1755054.22
49-001(b), (c), (d)	49-610136	1625714.2	1755079.22
49-001(b), (c), (d)	49-610137	1625714.2	1755129.22
49-001(b), (c), (d)	49-610138	1625664.2	1755179.22
49-001(b), (c), (d)	49-610139	1625564.2	1755229.22
49-001(b), (c), (d)	49-610140	1625914.2	1755229.22
49-001(b), (c), (d)	49-610141	1625789.2	1755104.22
49-001(b), (c), (d)	49-610142	1625814.2	1755104.22
49-001(b), (c), (d)	49-610143	1625764.2	1755129.22
49-001(b), (c), (d)	49-610144	1625789.2	1755129.22
49-001(b), (c), (d)	49-610145	1625814.2	1755129.22
49-001(b), (c), (d)	49-610146	1625839.2	1755129.22
49-001(b), (c), (d)	49-610147	1625764.2	1755154.22
49-001(b), (c), (d)	49-610148	1625814.2	1755154.22
49-001(b), (c), (d)	49-610149	1625839.2	1755154.22
49-001(b), (c), (d)	49-610150	1625714.2	1755179.22
49-001(b), (c), (d)	49-610151	1625764.2	1755179.22
49-001(b), (c), (d)	49-610152	1625789.2	1755179.22
49-001(b), (c), (d)	49-610153	1625714.2	1755204.22
49-001(b), (c), (d)	49-610154	1625739.2	1755204.22
49-001(b), (c), (d)	49-610155	1625764.2	1755204.22
49-001(b), (c), (d)	49-610156	1625889.2	1755229.22
49-001(b), (c), (d)	49-610157	1625739.2	1755054.22
49-001(b), (c), (d)	49-610158	1625789.2	1755054.22
49-001(b), (c), (d)	49-610159	1625889.2	1755054.22
49-001(b), (c), (d)	49-610160	1625764.2	1755079.22
49-001(b), (c), (d)	49-610161	1625814.2	1755079.22
49-001(b), (c), (d)	49-610162	1625864.2	1755079.22
49-001(b), (c), (d)	49-610163	1625739.2	1755104.22
49-001(b), (c), (d)	49-610164	1625889.2	1755104.22
49-001(b), (c), (d)	49-610165	1625664.2	1755129.22
49-001(b), (c), (d)	49-610166	1625864.2	1755129.22
49-001(b), (c), (d)	49-610167	1625914.2	1755129.22
49-001(b), (c), (d)	49-610168	1625689.2	1755154.22
49-001(b), (c), (d)	49-610169	1625889.2	1755154.22
49-001(b), (c), (d)	49-610170	1625864.2	1755179.22

Table 7.4-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
MDA AB Surface and Shallow Subsurface (continued)			
49-001(b), (c), (d)	49-610171	1625914.2	1755179.22
49-001(b), (c), (d)	49-610172	1625639.2	1755204.22
49-001(b), (c), (d)	49-610173	1625689.2	1755204.22
49-001(b), (c), (d)	49-610174	1625789.2	1755204.22
49-001(b), (c), (d)	49-610175	1625739.2	1755154.22
49-001(b), (c), (d)	49-610176	1625889.2	1755204.22
49-001(b), (c), (d)	49-610177	1625614.2	1755229.22
49-001(b), (c), (d)	49-610178	1625589.2	1755254.22
49-001(b), (c), (d)	49-610179	1625639.2	1755254.22
49-001(b), (c), (d)	49-610180	1625689.2	1755254.22
49-001(b), (c), (d)	49-610181	1625889.2	1755254.22
SWMU 49-001(g) Surface and Shallow Subsurface			
49-001(g)	49-610890	1625839.2	1755454.22
49-001(g)	49-610891	1625939.2	1755529.22
49-001(g)	49-610892	1625989.2	1755454.22
49-001(g)	49-610893	1625664.2	1755479.22
49-001(g)	49-610894	1625764.2	1755479.22
49-001(g)	49-610895	1625914.2	1755479.22
49-001(g)	49-610896	1625989.2	1755554.22
49-001(g)	49-610897	1625889.2	1755604.22
49-001(g)	49-610898	1625739.2	1755454.22
49-001(g)	49-610899	1625764.2	1755454.22
49-001(g)	49-610900	1625789.2	1755454.22
49-001(g)	49-610901	1625814.2	1755454.22
49-001(g)	49-610902	1625864.2	1755454.22
49-001(g)	49-610903	1625889.2	1755454.22
49-001(g)	49-610904	1625914.2	1755529.22
49-001(g)	49-610905	1625939.2	1755554.22
49-001(g)	49-610906	1625964.2	1755629.22
49-001(g)	49-610907	1625964.2	1755654.22
49-001(g)	49-610908	1625639.2	1755454.22
49-001(g)	49-610909	1625689.2	1755454.22
49-001(g)	49-610910	1625939.2	1755454.22
49-001(g)	49-610911	1625714.2	1755479.22
49-001(g)	49-610912	1625814.2	1755479.22
49-001(g)	49-610913	1625864.2	1755479.22
49-001(g)	49-610914	1625964.2	1755479.22
49-001(g)	49-610915	1625689.2	1755504.22

Table 7.4-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 49-001(g) Surface and Shallow Subsurface (continued)			
49-001(g)	49-610916	1625739.2	1755504.22
49-001(g)	49-610917	1625789.2	1755504.22
49-001(g)	49-610918	1625839.2	1755504.22
49-001(g)	49-610919	1625889.2	1755504.22
49-001(g)	49-610920	1625939.2	1755504.22
49-001(g)	49-610921	1625989.2	1755504.22
49-001(g)	49-610922	1625864.2	1755529.22
49-001(g)	49-610923	1625964.2	1755529.22
49-001(g)	49-610924	1625889.2	1755554.22
49-001(g)	49-610925	1625864.2	1755579.22
49-001(g)	49-610926	1625914.2	1755579.22
49-001(g)	49-610927	1625964.2	1755579.22
49-001(g)	49-610928	1626014.2	1755579.22
49-001(g)	49-610929	1625939.2	1755604.22
49-001(g)	49-610930	1625989.2	1755604.22
49-001(g)	49-610931	1625914.2	1755629.22
49-001(g)	49-610932	1626014.2	1755629.22
49-001(g)	49-610933	1625914.2	1755654.22
49-001(g)	49-610934	1626014.2	1755654.22
49-001(g)	49-610935	1625939.2	1755679.22
49-001(g)	49-610936	1625989.2	1755679.22

Table 7.4-2
Samples Collected and Analyses Requested at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMU 49-001(b)																
MD49-98-0101	49-02901	2.5–2.6	Qbt4	4258R	—*	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0102	49-02901	14.3–14.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0103	49-02901	24.0–24.2	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0104	49-02901	35.2–35.6	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0105	49-02901	45.6–46.0	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0107	49-02901	55.5–55.8	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0108	49-02901	65.0–65.2	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0109	49-02901	71.2–71.3	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0110	49-02901	76.4–76.6	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0111	49-02901	88.4–88.6	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0112	49-02901	94.4–94.6	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0113	49-02901	115.8–116.0	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0114	49-02901	133.2–133.5	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0115	49-02901	136.8–137.0	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0116	49-02901	150.0–150.2	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
0549-98-0000	49-02902	3.8–4.1	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0001	49-02902	4.4–4.8	Fill	4047R	—	—	—	4047R	4047R	4046R	—	—	—	—	—	—
0549-98-0002	49-02902	7.2–7.4	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0003	49-02903	1.5–2.0	Fill	4047R	—	—	—	—	4047R	4046R	—	—	—	—	—	—
0549-98-0004	49-02903	7.2–7.8	Fill	4047R	—	—	—	—	4047R	4046R	—	—	—	—	—	—
0549-98-0005	49-02904	1.9–2.1	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0006	49-02904	5.6–6.0	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0007	49-02905	3.1–3.3	Qbt3	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0008	49-02905	6.9–7.0	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
0549-98-0009	49-02906	4.7–4.8	Fill	—	—	—	—	—	4047R	—	—	—	—	—	—	—
MD49-98-0069	49-02906	5.7–6.0	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0070	49-02906	16.5–16.7	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0071	49-02906	28.6–29.0	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0072	49-02906	38.8–39.0	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0073	49-02906	40.3–40.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0074	49-02906	53.4–53.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0075	49-02906	67.2–67.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0076	49-02906	75.3–75.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0077	49-02906	85.0–86.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—

Table 7.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMU 49-001(b) (continued)																
MD49-98-0078	49-02906	91.5–91.8	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0079	49-02906	107.7–107.8	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0080	49-02906	117.0–117.3	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0081	49-02906	127.0–127.3	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0082	49-02906	134.5–134.7	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0083	49-02906	147.2–148.0	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
0549-98-0010	49-02907	3.7–4.6	Fill	4047R	—	—	—	4047R	4047R	4046R	—	—	—	—	—	—
MD49-98-0085	49-02907	5.5–5.7	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0086	49-02907	16.5–16.8	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0087	49-02907	25.0–25.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0088	49-02907	37.0–37.2	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0089	49-02907	47.5–47.7	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0090	49-02907	54.2–54.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0091	49-02907	65.4–65.6	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0092	49-02907	76.2–76.5	Qbt4	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0093	49-02907	84.5–84.7	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0094	49-02907	95.5–95.8	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0095	49-02907	106.5–106.7	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0096	49-02907	115.0–115.3	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0097	49-02907	126.5–126.6	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0098	49-02907	138.7–138.9	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-98-0099	49-02907	146.6–146.8	Qbt3	4258R	—	—	—	4258R	4258R	—	—	—	—	—	—	—
MD49-00-0058	49-10046	1.3–2.0	Qbog	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0052	49-10046	6.3–7.0	Soil	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0053	49-10046	9.2–9.8	Soil	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0054	49-10047	3.3–4.0	Soil	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0055	49-10047	5.3–6.0	Qbog	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0056	49-10048	3.7–4.3	Soil	—	—	—	—	—	—	—	—	—	6735R	—	—	—
MD49-00-0057	49-10048	11.0–11.7	Soil	—	—	—	—	—	—	—	—	—	6735R	—	—	—
SWMUs 49-001(b), 49-001(c), and 49-001(d)																
RE49-10-5751	49-610068	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5752	49-610068	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5753	49-610069	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5754	49-610069	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5755	49-610070	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5756	49-610070	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—

Table 7.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMUs 49-001(b), 49-001(c), and 49-001(d) (continued)																
RE49-10-5757	49-610071	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5758	49-610071	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5759	49-610072	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5760	49-610072	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5761	49-610073	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5762	49-610073	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5763	49-610074	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5764	49-610074	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5765	49-610075	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5766	49-610075	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5767	49-610076	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5768	49-610076	0.5–1.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5769	49-610077	0.0–0.5	Soil	10-715	10-715	—	—	10-715	10-715	10-715	—	—	—	—	—	—
RE49-10-5770	49-610077	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5771	49-610078	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5772	49-610078	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5773	49-610079	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5774	49-610079	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5775	49-610080	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5776	49-610080	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5777	49-610081	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5778	49-610081	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5779	49-610082	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5780	49-610082	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5781	49-610083	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5782	49-610083	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5783	49-610084	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5784	49-610084	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5785	49-610085	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5786	49-610085	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5787	49-610086	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5788	49-610086	0.5–1.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5789	49-610087	0.0–0.5	Soil	10-716	10-716	—	—	10-716	10-716	10-716	—	—	—	—	—	—
RE49-10-5790	49-610087	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5791	49-610088	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5792	49-610088	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—

Table 7.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMUs 49-001(b), 49-001(c), and 49-001(d) (continued)																
RE49-10-5793	49-610089	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5794	49-610089	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5795	49-610090	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5796	49-610090	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5797	49-610091	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5798	49-610091	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5799	49-610092	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5800	49-610092	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5801	49-610093	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5802	49-610093	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5803	49-610094	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5804	49-610094	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5805	49-610095	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5806	49-610095	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5807	49-610096	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5808	49-610096	0.5–1.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5809	49-610097	0.0–0.5	Soil	10-717	10-717	—	—	10-717	10-717	10-717	—	—	—	—	—	—
RE49-10-5810	49-610097	0.5–1.5	Soil	10-718	10-718	—	—	10-718	10-718	10-718	—	—	—	—	—	—
RE49-10-5889	49-610131	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5890	49-610131	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5891	49-610132	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5892	49-610132	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5893	49-610133	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5894	49-610133	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5895	49-610134	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5896	49-610134	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5898	49-610135	0.0–0.5	Fill	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5899	49-610135	0.5–1.5	Fill	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5900	49-610136	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5901	49-610136	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5902	49-610137	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5903	49-610137	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5904	49-610138	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5905	49-610138	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5906	49-610139	0.0–0.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5907	49-610139	0.5–1.5	Soil	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—

Table 7.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMUs 49-001(b), 49-001(c), and 49-001(d) (continued)																
RE49-10-5908	49-610140	0.0–0.5	Fill	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5909	49-610140	0.5–1.5	Fill	10-1142	10-1142	—	—	10-1142	10-1142	10-1142	—	—	—	—	—	—
RE49-10-5931	49-610151	0.5–1.5	Soil	10-1141	10-1141	—	—	10-1141	10-1141	10-1141	—	—	—	—	—	—
RE49-10-5966	49-610169	0.0–0.5	Fill	10-1141	10-1141	—	—	10-1141	10-1141	10-1141	—	—	—	—	—	—
RE49-10-6006	49-610182	0.0–0.5	Fill	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-6007	49-610182	0.5–1.5	Fill	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-6014	49-610186	0.0–0.5	Soil	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-6015	49-610186	0.5–1.5	Soil	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-6016	49-610187	0.0–0.5	Soil	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-6017	49-610187	0.5–1.5	Soil	10-1134	10-1134	—	—	10-1134	10-1134	10-1134	—	—	—	—	—	—
RE49-10-8999	49-610942	8.0–10.0	Qbt4	10-1109	—	10-1109	10-1109	10-1109	10-1109	10-1109	10-1109	—	—	10-1109	10-1109	10-1109
RE49-10-9000	49-610942	77.0–80.0	Qbt4	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
RE49-10-9001	49-610942	128.0–130.0	Qbt3	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
RE49-10-9009	49-610943	10.0–12.0	Qbt4	10-1246	—	10-1246	10-1244	10-1246	10-1246	10-1245	10-1245	—	—	10-1244	10-1244	10-1245
RE49-10-9010	49-610943	78.0–80.0	Qbt4	10-1246	—	10-1246	10-1244	10-1246	10-1246	10-1245	10-1245	—	—	10-1244	10-1244	10-1245
RE49-10-9011	49-610943	128.0–130.0	Qbt3	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
RE49-10-9019	49-610944	8.0–10.0	Qbt4	10-1246	—	10-1246	10-1244	10-1246	10-1246	10-1245	10-1245	—	—	10-1244	10-1244	10-1245
RE49-10-9020	49-610944	78.0–80.0	Qbt4	10-1246	—	10-1246	10-1244	10-1246	10-1246	10-1245	10-1245	—	—	10-1244	10-1244	10-1245
RE49-10-9021	49-610944	128.0–130.0	Qbt3	10-1246	—	10-1246	10-1244	10-1246	10-1246	10-1245	10-1245	—	—	10-1244	10-1244	10-1245
RE49-10-9029	49-610945	10.0–12.0	Qbt4	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
RE49-10-9030	49-610945	78.0–80.0	Qbt4	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
RE49-10-9031	49-610945	127.0–130.0	Qbt3	10-1261	—	10-1261	10-1259	10-1261	10-1261	10-1260	10-1260	—	—	10-1259	10-1259	10-1260
SWMU 49-001(g)																
RE49-10-8552	49-610890	0.0–0.5	Fill	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8553	49-610890	0.5–1.5	Fill	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8554	49-610891	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8555	49-610891	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8556	49-610892	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8557	49-610892	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8558	49-610893	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8559	49-610893	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8560	49-610894	0.0–0.5	Fill	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8561	49-610894	0.5–1.5	Fill	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8562	49-610895	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8563	49-610895	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8564	49-610896	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—

Table 7.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	Stable Isotopes	SVOCs	VOCs	Cyanide
SWMU 49-001(g) (continued)																
RE49-10-8565	49-610896	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8566	49-610897	0.0–0.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—
RE49-10-8567	49-610897	0.5–1.5	Soil	10-1135	10-1135	—	—	10-1135	10-1135	10-1135	—	10-1135	—	—	—	—

*— = Not requested.

Table 7.4-3
Field-Screening Results for Samples Collected at MDA AB

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
MDA AB Drilling Samples						
49-001(b), (c), (d)	49-610942	8.0–10.0	RE49-10-8999	0.0	78	2120
49-001(b), (c), (d)	49-610942	77.0–80.0	RE49-10-9000	0.0	91	2950
49-001(b), (c), (d)	49-610942	128.0–130.0	RE49-10-9001	0.0	42	2100
49-001(b), (c), (d)	49-610943	10.0–12.0	RE49-10-9009	0.0	28	1984
49-001(b), (c), (d)	49-610943	78.0–80.0	RE49-10-9010	0.0	14	1885
49-001(b), (c), (d)	49-610943	128.0–130.0	RE49-10-9011	0.0	28	1926
49-001(b), (c), (d)	49-610944	8.0–10.0	RE49-10-9019	0.0	33	1687
49-001(b), (c), (d)	49-610944	78.0–80.0	RE49-10-9020	0.0	28	1926
49-001(b), (c), (d)	49-610944	128.0–130.0	RE49-10-9021	0.0	23	1298
49-001(b), (c), (d)	49-610945	10.0–12.0	RE49-10-9029	0.0	91	2720
49-001(b), (c), (d)	49-610945	78.0–80.0	RE49-10-9030	0.0	98	2350
49-001(b), (c), (d)	49-610945	127.0–130.0	RE49-10-9031	0.0	85	2570
MDA AB Surface and Shallow-Subsurface Samples						
49-001(b), (c), (d)	49-610182	0.0–0.5	RE49-10-6006	NA*	14	1914
49-001(b), (c), (d)	49-610182	0.5–1.5	RE49-10-6007	NA	23	2050
49-001(b), (c), (d)	49-610186	0.0–0.5	RE49-10-6014	NA	14	1909
49-001(b), (c), (d)	49-610186	0.5–1.5	RE49-10-6015	NA	37	2020
49-001(b), (c), (d)	49-610187	0.0–0.5	RE49-10-6016	NA	23	1815
49-001(b), (c), (d)	49-610187	0.5–1.5	RE49-10-6017	NA	28	1833
49-001(b), (c), (d)	49-610131	0.0–0.5	RE49-10-5889	NA	131	2910
49-001(b), (c), (d)	49-610131	0.5–1.5	RE49-10-5890	NA	111	2510
49-001(b), (c), (d)	49-610132	0.0–0.5	RE49-10-5891	NA	131	2820
49-001(b), (c), (d)	49-610132	0.5–1.5	RE49-10-5892	NA	59	2610
49-001(b), (c), (d)	49-610133	0.0–0.5	RE49-10-5893	NA	18	1821
49-001(b), (c), (d)	49-610133	0.5–1.5	RE49-10-5894	NA	45	2520
49-001(b), (c), (d)	49-610134	0.0–0.5	RE49-10-5895	NA	33	2130
49-001(b), (c), (d)	49-610134	0.5–1.5	RE49-10-5896	NA	85	2600
49-001(b), (c), (d)	49-610135	0.0–0.5	RE49-10-5898	NA	78	2570
49-001(b), (c), (d)	49-610135	0.5–1.5	RE49-10-5899	NA	52	3000
49-001(b), (c), (d)	49-610136	0.0–0.5	RE49-10-5900	NA	72	2770
49-001(b), (c), (d)	49-610136	0.5–1.5	RE49-10-5901	NA	131	2630
49-001(b), (c), (d)	49-610137	0.0–0.5	RE49-10-5902	NA	78	2740
49-001(b), (c), (d)	49-610137	0.5–1.5	RE49-10-5903	NA	85	2320
49-001(b), (c), (d)	49-610138	0.0–0.5	RE49-10-5904	NA	65	2330
49-001(b), (c), (d)	49-610138	0.5–1.5	RE49-10-5905	NA	4	1745
49-001(b), (c), (d)	49-610139	0.0–0.5	RE49-10-5906	NA	14	1955

Table 7.4-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
MDA AB Surface and Shallow-Subsurface Samples (continued)						
49-001(b), (c), (d)	49-610139	0.5–1.5	RE49-10-5907	NA	98	2410
49-001(b), (c), (d)	49-610140	0.0–0.5	RE49-10-5908	NA	65	2460
49-001(b), (c), (d)	49-610140	0.5–1.5	RE49-10-5909	NA	91	2620
49-001(b), (c), (d)	49-610151	0.5–1.5	RE49-10-5931	NA	18	1932
49-001(b), (c), (d)	49-610169	0.0–0.5	RE49-10-5966	NA	91	2630
SWMU 49-001(g) Surface and Shallow-Subsurface Samples						
49-001(g)	49-610890	0.0–0.5	RE49-10-8552	NA	14	1874
49-001(g)	49-610890	0.5–1.5	RE49-10-8553	NA	33	2050
49-001(g)	49-610891	0.0–0.5	RE49-10-8554	NA	9	1879
49-001(g)	49-610891	0.5–1.5	RE49-10-8555	NA	18	1944
49-001(g)	49-610892	0.0–0.5	RE49-10-8556	NA	9	1955
49-001(g)	49-610892	0.5–1.5	RE49-10-8557	NA	9	2060
49-001(g)	49-610893	0.0–0.5	RE49-10-8558	NA	18	2010
49-001(g)	49-610893	0.5–1.5	RE49-10-8559	NA	9	2140
49-001(g)	49-610894	0.0–0.5	RE49-10-8560	NA	4	1681
49-001(g)	49-610894	0.5–1.5	RE49-10-8561	NA	18	2100
49-001(g)	49-610895	0.0–0.5	RE-49-10-8562	NA	4	1739
49-001(g)	49-610895	0.5–1.5	RE49-10-8563	NA	23	1938
49-001(g)	49-610896	0.0–0.5	RE49-10-8564	NA	52	1763
49-001(g)	49-610896	0.5–1.5	RE49-1-8565	NA	37	2140
49-001(g)	49-610897	0.0–0.5	RE49-10-8566	NA	4	1768
49-001(g)	49-610897	0.5–1.5	RE49-10-8567	NA	18	2100

*NA = Not analyzed.

Table 7.4-4
Summary of Inorganic Chemicals Detected or Detected above BVs at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Calcium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Selenium	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**2.79**	**46**	**2200**	**3.14**	**4.66**	**0.5**	**11.2**	**482**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**8.17**	**295**	**6120**	**8.64**	**14.7**	**0.5**	**22.3**	**671**	**1.52**	**0.73**	**39.6**	**48.8**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**na**[c]	**2.3E+01**[d]	**3.13E+03**	**1.56E+03**	**4.00E+02**	**1.07E+04**	**3.91E+02**	**5.16E+00**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**na**	**3.0E+02**[d]	**4.54E+04**	**2.27E+04**	**8.00E+02**	**1.45E+05**	**5.68E+03**	**7.49E+01**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**na**	**3.46E+01**[e]	**1.24E+04**	**6.19E+03**	**8.00E+02**	**4.63E+02**	**1.55E+03**	**2.04E+01**	**1.55E+03**	**9.29E+04**
RE49-10-5764	49-610074	0.5–1.5	Soil	—[f]	—	—	11	—	NA[g]	—	—	—	—	—	—
RE49-10-5766	49-610075	0.5–1.5	Soil	—	—	—	10	—	NA	—	—	—	—	—	—
RE49-10-5773	49-610079	0.0–0.5	Soil	—	—	—	9.4	—	NA	—	—	—	—	—	—
RE49-10-5779	49-610082	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	1 (U)	—	—
RE49-10-5788	49-610086	0.5–1.5	Soil	—	—	6260	—	—	NA	—	—	—	—	—	—
RE49-10-5790	49-610087	0.5–1.5	Soil	—	—	8100	—	—	NA	—	—	—	—	—	—
RE49-10-5797	49-610091	0.0–0.5	Soil	—	—	—	8.8 (J)	—	NA	—	—	—	—	—	—
RE49-10-5804	49-610094	0.5–1.5	Soil	—	—	—	14.1 (J)	—	NA	24 (J)	1010 (J)	—	—	40.2	—
RE49-10-5806	49-610095	0.5–1.5	Soil	—	—	—	10.4 (J)	—	NA	—	—	—	—	—	—
RE49-10-5810	49-610097	0.5–1.5	Soil	—	—	—	—	—	NA	—	—	1.7 (U)	1.3 (U)	—	—
RE49-10-5889	49-610131	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	—	—	85.2
RE49-10-5893	49-610133	0.0–0.5	Soil	—	—	—	—	15.7	NA	—	—	—	—	—	—
RE49-10-5903	49-610137	0.5–1.5	Soil	—	—	—	—	—	NA	47.3	—	—	—	—	—
RE49-10-5907	49-610139	0.5–1.5	Soil	—	—	—	10.5	—	NA	—	704	—	—	—	—
RE49-10-5931	49-610151	0.5–1.5	Soil	—	—	10,300	—	14.8	NA	—	—	—	—	—	—
RE49-10-6006	49-610182	0.0–0.5	Fill	—	—	—	—	—	NA	—	—	—	—	—	54.4
RE49-10-8999	49-610942	8.0–10.0	Qbt4	4.3	—	—	—	—	0.63 (U)	14.6 (J+)	—	1.8	—	—	—
RE49-10-9000	49-610942	77.0–80.0	Qbt4	—	—	—	—	—	0.52 (U)	—	—	0.81	—	—	—
RE49-10-9001	49-610942	128.0–130.0	Qbt3	—	—	—	—	—	0.53 (U)	—	—	1	—	—	—
RE49-10-9009	49-610943	10.0–12.0	Qbt4	—	—	—	—	—	—	69	—	1	—	—	—
RE49-10-9010	49-610943	78.0–80.0	Qbt4	—	—	—	—	—	—	—	—	0.9	—	—	—
RE49-10-9011	49-610943	128.0–130.0	Qbt3	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-9019	49-610944	8.0–10.0	Qbt4	—	—	—	—	—	0.52 (U)	—	—	0.8	—	—	—
RE49-10-9020	49-610944	78.0–80.0	Qbt4	—	—	—	—	—	—	—	—	0.92	—	—	—
RE49-10-9021	49-610944	128.0–130.0	Qbt3	—	—	—	—	—	—	—	—	0.87	—	—	—

Table 7.4-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Calcium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Selenium	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**2.79**	**46**	**2200**	**3.14**	**4.66**	**0.5**	**11.2**	**482**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**8.17**	**295**	**6120**	**8.64**	**14.7**	**0.5**	**22.3**	**671**	**1.52**	**0.73**	**39.6**	**48.8**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**na[c]**	**2.3E+01[d]**	**3.13E+03**	**1.56E+03**	**4.00E+02**	**1.07E+04**	**3.91E+02**	**5.16E+00**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**na**	**3.0E+02[d]**	**4.54E+04**	**2.27E+04**	**8.00E+02**	**1.45E+05**	**5.68E+03**	**7.49E+01**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**na**	**3.46E+01[e]**	**1.24E+04**	**6.19E+03**	**8.00E+02**	**4.63E+02**	**1.55E+03**	**2.04E+01**	**1.55E+03**	**9.29E+04**
RE49-10-9029	49-610945	10.0–12.0	Qbt4	—	86	—	—	—	—	—	487	1.1	1.2 (U)	—	—
RE49-10-9030	49-610945	78.0–80.0	Qbt4	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-9031	49-610945	127.0–130.0	Qbt3	—	—	—	—	—	0.51 (U)	—	—	1.1	—	—	—

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] na = Not available.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] — = Not detected or not detected above BV.
[g] NA = Not analyzed.

Table 7.4-5
Summary of Organic Chemicals Detected at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate
Residential SSL*				**3.47E+02**
Industrial SSL*				**1.37E+03**
Construction Worker SSL*				**4.76E+03**
RE49-10-8999	49-610942	8.0–10.0	Qbt4	0.069 (J)
RE49-10-9011	49-610943	128.0–130.0	Qbt3	0.28 (J)
RE49-10-9029	49-610945	10.0–12.0	Qbt4	0.076 (J-)
RE49-10-9030	49-610945	78.0–80.0	Qbt4	0.18 (J)

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED (2009, 108070).

Table 7.4-6
Summary of Radionuclides Detected or Detected above BVs/FVs at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**na**	**na**	**na**	**na**	**na**	**na**
Residential SAL[c]				**30**	**5.6**	**37**	**33**	**750**	**87**
Industrial SAL[c]				**180**	**23**	**240**	**210**	**440000**	**430**
Construction Worker SAL[c]				**34**	**18**	**40**	**36**	**320000**	**160**
SWMU 49-001(b)									
MD49-98-0102	49-02901	14.3–14.5	Qbt4	—[d]	NA[e]	0.038	—	NA	—
MD49-98-0103	49-02901	24.0–24.2	Qbt4	0.039	NA	—	—	NA	—
MD49-98-0111	49-02901	88.4–88.6	Qbt3	0.033	NA	—	—	NA	—
MD49-98-0115	49-02901	136.8–137.0	Qbt3	0.039	NA	—	—	NA	—
0549-98-0001	49-02902	4.4–4.8	Fill	—	NA	—	0.026	NA	—
MD49-98-0073	49-02906	40.3–40.5	Qbt4	—	NA	0.209	—	NA	—
MD49-98-0074	49-02906	53.4–53.5	Qbt4	—	NA	0.042	—	NA	—
MD49-98-0075	49-02906	67.2–67.5	Qbt4	0.042	NA	0.124	—	NA	—
MD49-98-0077	49-02906	85.0–86.5	Qbt4	—	NA	0.052	—	NA	—
MD49-98-0078	49-02906	91.5–91.8	Qbt3	—	NA	—	0.05	NA	—
MD49-98-0083	49-02906	147.2–148.0	Qbt3	—	NA	0.042	—	NA	—
MD49-98-0098	49-02907	138.7–138.9	Qbt3	0.034	NA	—	—	NA	—
SWMU 49-001(b, c, d)									
RE49-10-5769	49-610077	0.0–0.5	Soil	—	—	—	—	NA	4.98
RE49-10-5770	49-610077	0.5–1.5	Soil	0.079	—	—	0.099	NA	—

Table 7.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**	**2.29**
Residential SAL[c]				**30**	**5.6**	**37**	**33**	**750**	**87**
Industrial SAL[c]				**180**	**23**	**240**	**210**	**440000**	**430**
Construction Worker SAL[c]				**34**	**18**	**40**	**36**	**320000**	**160**
SWMU 49-001(b, c, d) (continued)									
RE49-10-5890	49-610131	0.5–1.5	Soil	—	—	—	0.064	NA	—
RE49-10-5893	49-610133	0.0–0.5	Soil	0.307	—	—	1.47	NA	—
RE49-10-5894	49-610133	0.5–1.5	Soil	0.091	0.164	—	0.326	NA	—
RE49-10-5896	49-610134	0.5–1.5	Soil	—	0.2	—	—	NA	—
RE49-10-5908	49-610140	0.0–0.5	Fill	—	—	—	0.101	NA	—
RE49-10-5909	49-610140	0.5–1.5	Fill	—	—	—	0.089	NA	—
RE49-10-5931	49-610151	0.5–1.5	Soil	4.91	0.203	1.41	73.5	NA	—
RE49-10-9020	49-610944	78.0–80.0	Qbt4	—	NA	—	—	0.36	—
RE49-10-9029	49-610945	10.0–12.0	Qbt4	—	NA	—	—	2.12	—
RE49-10-9030	49-610945	78.0–80.0	Qbt4	—	NA	—	—	0.46	—
RE49-10-9031	49-610945	127.0–130.0	Qbt3	—	NA	—	—	0.46	—
SWMU 49 49-001(g)									
RE49-10-8552	49-610890	0.0–0.5	Fill	0.433	—	—	2.16	NA	—
RE49-10-8553	49-610890	0.5–1.5	Fill	0.471	—	0.071	2.8	NA	—
RE49-10-8554	49-610891	0.0–0.5	Soil	0.081	—	—	0.401	NA	—
RE49-10-8556	49-610892	0.0–0.5	Soil	0.064	—	—	0.1	NA	—
RE49-10-8557	49-610892	0.5–1.5	Soil	—	—	—	0.043	NA	—

Table 7.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**	**2.29**
Residential SAL[c]				**30**	**5.6**	**37**	**33**	**750**	**87**
Industrial SAL[c]				**180**	**23**	**240**	**210**	**440000**	**430**
Construction Worker SAL[c]				**34**	**18**	**40**	**36**	**320000**	**160**
RE49-10-8561	49-610894	0.5–1.5	Fill	0.092	—	—	0.41	NA	—
RE49-10-8562	49-610895	0.0–0.5	Soil	0.435	—	—	1.6	NA	—
RE49-10-8563	49-610895	0.5–1.5	Soil	—	—	—	0.075	NA	—
RE49-10-8564	49-610896	0.0–0.5	Soil	0.065	—	—	0.058	NA	—
RE49-10-8566	49-610897	0.0–0.5	Soil	0.044	—	—	—	NA	—

Note: All activities are in pCi/g.

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

[b] na = Not available.

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

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

[e] NA = Not analyzed.

Table 7.4-7
Summary of Pore-Gas Samples Collected and Analyses Requested at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
SWMU 49-001 (b, c, d)					
MD49-10-12118	49-610942	77.0–79.0	Pore gas	10-1792	10-1791
MD49-10-12116	49-610942	80.0–82.0	Pore gas	10-1792	10-1791
MD49-10-12121	49-610943	79.0–81.0	Pore gas	10-1919	10-1918
MD49-10-12120	49-610943	86.0–88.0	Pore gas	10-1919	10-1918
MD49-10-12119	49-610943	120.0–122.0	Pore gas	10-1792	10-1791
MD49-10-12123	49-610944	79.0–81.0	Pore gas	10-2161	10-2160
MD49-10-12122	49-610944	123.0–125.5	Pore gas	10-2161	10-2160
MD49-10-12126	49-610945	79.0–81.0	Pore gas	10-2161	10-2160
MD49-10-12125	49-610945	110.0–112.0	Pore gas	10-2161	10-2160

Table 7.4-8
Summary of Organic Chemicals Detected in Pore-Gas Samples at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Carbon Disulfide	Chloromethane	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
SWMU 49-001(b, c, d)																		
MD49-10-12118	49-610942	77.0–79.0	Pore gas	14	2.1	—*	—	—	3	2.8	4	—	8.2	4.7	—	13	3.4	9.9
MD49-10-12116	49-610942	80.0–82.0	Pore gas	16	4.4	3.9	—	—	2.7	5.1	9.7	2	12	12	3.1	24	6.4	18
MD49-10-12121	49-610943	79.0–81.0	Pore gas	32	19	5.7	—	—	2.8	9.8	11	2.1	51	11	3.4	44	11	33
MD49-10-12120	49-610943	86.0–88.0	Pore gas	23	60	4.6	—	—	2.4	13	12	2.9	96	11	3.6	55	13	41
MD49-10-12119	49-610943	120.0–122.0	Pore gas	19 (J)	2.1	4.6	—	—	2.5	1.9	4.2	—	3.7	5.8	—	8.2	2.1	6
MD49-10-12123	49-610944	79.0–81.0	Pore gas	21	12	6.4	4.7	1.8 (J+)	2.8	6.2	8.9	1.8	28	11	3	28	7.4	20
MD49-10-12122	49-610944	123.0–125.5	Pore gas	11	13	4.4	—	1.9 (J+)	2.6	4	5.2	—	24	6.4	—	18	4.9	13
MD49-10-12126	49-610945	79.0–81.0	Pore gas	19 (J-)	18 (J-)	8.2 (J-)	20 (J-)	—	2.2 (J-)	7.9 (J-)	14 (J-)	2.4 (J-)	36 (J-)	19 (J-)	9.1 (J-)	48 (J-)	14 (J-)	33 (J-)
MD49-10-12125	49-610945	110.0–112.0	Pore gas	13 (J-)	5.7 (J-)	5.6 (J-)	5.7 (J-)	2 (J-)	2.6 (J-)	3.4 (J-)	5.5 (J-)	—	11 (J-)	6.8 (J-)	—	16 (J-)	4.3 (J-)	12 (J-)

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
*— = Not detected or not detected above BV.

Table 7.4-9
Summary of Tritium Detected in Pore-Gas Samples at MDA AB

Sample ID	Location ID	Depth (ft)	Media	Tritium pCi/L
SWMU 49-001(b, c, d)				
MD49-10-12121	49-610943	79.0–81.0	Pore gas	651.758
MD49-10-12120	49-610943	86.0–88.0	Pore gas	2036.39
MD49-10-12123	49-610944	79.0–81.0	Pore gas	4407.05
MD49-10-12122	49-610944	123.0–125.5	Pore gas	2299.7
MD49-10-12126	49-610945	79.0–81.0	Pore gas	17382.5
MD49-10-12125	49-610945	110.0–112.0	Pore gas	16689.4

Table 8.2-1
Surveyed Coordinates for
2009–2010 Locations at Area 3, SWMU 49-001(e)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 3 Drilling			
49-001(e)	49-609981	1624106.558	1754493.145
49-001(e)	49-609982	1624184.798	1754571.654
49-001(e)	49-609983	1624185.608	1754414.635
49-001(e)	49-609984	1624263.308	1754492.605
Area 3 Surface and Shallow Subsurface			
49-001(e)	49-609307	1624158.575	1754453.597
49-001(e)	49-609308	1624158.626	1754478.834
49-001(e)	49-609309	1624158.676	1754504.07
49-001(e)	49-609310	1624183.762	1754428.31
49-001(e)	49-609311	1624183.812	1754453.546
49-001(e)	49-609312	1624183.963	1754529.257
49-001(e)	49-609313	1624208.999	1754428.259
49-001(e)	49-609314	1624209.099	1754478.733
49-001(e)	49-609315	1624234.336	1754478.683
49-001(e)	49-609316	1624234.437	1754529.156
49-001(e)	49-609317	1624284.709	1754428.108
49-001(e)	49-609318	1624284.86	1754503.82
49-001(e)	49-609319	1624285.01	1754579.53
49-001(e)	49-609320	1624108.051	1754428.461
49-001(e)	49-609321	1624108.253	1754529.408
49-001(e)	49-609322	1624133.389	1754478.884
49-001(e)	49-609323	1624133.59	1754579.831
49-001(e)	49-609324	1624158.424	1754377.886
49-001(e)	49-609325	1624183.913	1754504.02
49-001(e)	49-609326	1624209.049	1754453.496
49-001(e)	49-609327	1624209.3	1754579.68
49-001(e)	49-609328	1624234.135	1754377.735
49-001(e)	49-609329	1624057.427	1754352.851
49-001(e)	49-609330	1624057.729	1754504.272
49-001(e)	49-609331	1624057.93	1754605.219
49-001(e)	49-609332	1624183.561	1754327.362
49-001(e)	49-609333	1624184.164	1754630.204
49-001(e)	49-609334	1624285.112	1754630.003
49-001(e)	49-609335	1624309.795	1754352.348
49-001(e)	49-609336	1624335.283	1754478.481
49-001(e)	49-609337	1624335.485	1754579.429
49-001(e)	49-609338	1624108.001	1754403.224

Table 8.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 3 Surface and Shallow Subsurface (continued)			
49-001(e)	49-609339	1624108.102	1754453.697
49-001(e)	49-609340	1624108.152	1754478.934
49-001(e)	49-609341	1624108.202	1754504.171
49-001(e)	49-609342	1624108.303	1754554.645
49-001(e)	49-609343	1624133.187	1754377.937
49-001(e)	49-609344	1624133.238	1754403.173
49-001(e)	49-609345	1624133.29	1754428.41
49-001(e)	49-609346	1624133.338	1754453.647
49-001(e)	49-609347	1624133.439	1754504.121
49-001(e)	49-609348	1624133.489	1754529.358
49-001(e)	49-609349	1624133.54	1754554.594
49-001(e)	49-609350	1624158.475	1754403.123
49-001(e)	49-609351	1624158.52	1754428.36
49-001(e)	49-609352	1624158.726	1754529.307
49-001(e)	49-609353	1624158.776	1754554.544
49-001(e)	49-609354	1624158.827	1754579.781
49-001(e)	49-609355	1624183.661	1754377.836
49-001(e)	49-609356	1624183.711	1754403.073
49-001(e)	49-609357	1624183.862	1754478.783
49-001(e)	49-609358	1624184.013	1754554.494
49-001(e)	49-609359	1624184.064	1754579.731
49-001(e)	49-609360	1624208.898	1754377.786
49-001(e)	49-609361	1624208.948	1754403.023
49-001(e)	49-609362	1624209.15	1754503.97
49-001(e)	49-609363	1624209.2	1754529.207
49-001(e)	49-609364	1624209.25	1754554.444
49-001(e)	49-609365	1624234.185	1754402.972
49-001(e)	49-609366	1624234.235	1754428.209
49-001(e)	49-609367	1624234.286	1754453.446
49-001(e)	49-609368	1624234.386	1754503.92
49-001(e)	49-609369	1624234.487	1754554.393
49-001(e)	49-609370	1624234.537	1754579.63
49-001(e)	49-609371	1624259.372	1754377.685
49-001(e)	49-609372	1624259.422	1754402.922
49-001(e)	49-609373	1624259.472	1754428.159
49-001(e)	49-609374	1624259.523	1754453.396
49-001(e)	49-609375	1624259.573	1754478.632
49-001(e)	49-609376	1624259.623	1754503.869

Table 8.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 3 Surface and Shallow Subsurface (continued)			
49-001(e)	49-609377	1624259.674	1754529.106
49-001(e)	49-609378	1624259.724	1754554.343
49-001(e)	49-609379	1624259.774	1754579.58
49-001(e)	49-609380	1624284.759	1754453.345
49-001(e)	49-609381	1624284.81	1754478.582
49-001(e)	49-609382	1624284.91	1754529.056
49-001(e)	49-609383	1624284.961	1754554.293
49-001(e)	49-609384	1624057.527	1754403.324
49-001(e)	49-609385	1624057.628	1754453.798
49-001(e)	49-609386	1624057.829	1754554.745
49-001(e)	49-609387	1624082.613	1754327.564
49-001(e)	49-609388	1624082.714	1754378.037
49-001(e)	49-609389	1624082.814	1754428.511
49-001(e)	49-609390	1624082.915	1754478.985
49-001(e)	49-609391	1624083.016	1754529.458
49-001(e)	49-609392	1624083.116	1754579.932
49-001(e)	49-609393	1624083.217	1754630.406
49-001(e)	49-609394	1624107.9	1754352.75
49-001(e)	49-609395	1624108.403	1754605.118
49-001(e)	49-609396	1624133.087	1754327.463
49-001(e)	49-609397	1624133.691	1754630.305
49-001(e)	49-609398	1624158.374	1754352.649
49-001(e)	49-609399	1624158.877	1754605.018
49-001(e)	49-609400	1624208.848	1754352.549
49-001(e)	49-609401	1624209.351	1754604.917
49-001(e)	49-609402	1624234.034	1754327.262
49-001(e)	49-609403	1624234.638	1754630.104
49-001(e)	49-609404	1624259.321	1754352.448
49-001(e)	49-609405	1624259.824	1754604.817
49-001(e)	49-609406	1624284.508	1754327.161
49-001(e)	49-609407	1624284.608	1754377.635
49-001(e)	49-609408	1624309.896	1754402.821
49-001(e)	49-609409	1624309.996	1754453.295
49-001(e)	49-609410	1624310.097	1754503.769
49-001(e)	49-609411	1624310.197	1754554.242
49-001(e)	49-609412	1624310.298	1754604.716
49-001(e)	49-609413	1624335.082	1754377.534
49-001(e)	49-609414	1624335.183	1754428.008

Table 8.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 3 Surface and Shallow Subsurface (continued)			
49-001(e)	49-609415	1624335.384	1754528.955
49-001(e)	49-609416	1624335.585	1754629.902

Table 8.2-2
Samples Collected and Analysis Requested at Area 3, SWMU 49-001(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
0549-95-0211	49-03000	0.0–0.5	Soil	—*	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0212	49-03001	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0213	49-03002	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0214	49-03003	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0215	49-03004	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0216	49-03005	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0217	49-03006	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0218	49-03007	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0219	49-03008	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0220	49-03009	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0221	49-03010	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0222	49-03011	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0223	49-03012	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0224	49-03013	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0225	49-03014	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0226	49-03022	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0227	49-03023	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0229	49-03024	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
0549-95-0230	49-03025	0.0–0.5	Soil	—	795	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0231	49-03026	0.0–0.5	Soil	—	795	—	—	—	795	—	794, 795	—	—	—	—	—	—
RE49-10-3254	49-609307	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3255	49-609307	0.5–1.5	Qbt4	10-842	10-842	10-842	—	—	10-842	10-842	10-842	—	10-842	—	10-842	—	—
RE49-10-3256	49-609308	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3257	49-609308	0.5–1.5	Qbt4	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3258	49-609309	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3259	49-609309	0.5–1.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3260	49-609310	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3261	49-609310	0.5–1.5	Qbt4	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3262	49-609311	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3263	49-609311	0.5–1.5	Qbt4	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3264	49-609312	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3265	49-609312	0.5–1.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—

Table 8.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
RE49-10-3266	49-609313	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3267	49-609313	0.5–1.5	Qbt4	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3268	49-609314	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3269	49-609314	0.5–1.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3270	49-609315	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3271	49-609315	0.5–1.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3272	49-609316	0.0–0.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3273	49-609316	0.5–1.5	Soil	10-842	10-842	—	—	—	10-842	10-842	10-842	—	—	—	—	—	—
RE49-10-3278	49-609317	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3279	49-609317	0.5–1.5	Qbt4	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3280	49-609318	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3281	49-609318	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3282	49-609319	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3283	49-609319	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3284	49-609320	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3285	49-609320	0.5–1.5	Qbt4	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3286	49-609321	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3287	49-609321	0.5–1.5	Qbt4	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3288	49-609322	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3289	49-609322	0.5–1.5	Qbt4	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3290	49-609323	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3291	49-609323	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3292	49-609324	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3293	49-609324	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3294	49-609325	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3295	49-609325	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3296	49-609326	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3297	49-609326	0.5–1.5	Qbt4	10-839	10-839	10-839	—	—	10-839	10-839	10-839	—	10-839	—	10-839	—	—
RE49-10-3298	49-609327	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3299	49-609327	0.5–1.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3300	49-609328	0.0–0.5	Soil	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3301	49-609328	0.5–1.5	Qbt3	10-839	10-839	—	—	—	10-839	10-839	10-839	—	—	—	—	—	—
RE49-10-3308	49-609329	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3309	49-609329	0.5–1.5	Qbt4	10-840	10-840	10-840	—	—	10-840	10-840	10-840	—	10-840	—	10-840	—	—
RE49-10-3310	49-609330	0.0–0.5	Fill	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3311	49-609330	0.5–1.5	Fill	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3312	49-609331	0.0–0.5	Fill	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3313	49-609331	0.5–1.5	Fill	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—

Table 8.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
RE49-10-3314	49-609332	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3315	49-609332	0.5–1.5	Qbt4	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3316	49-609333	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3317	49-609333	0.5–1.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3318	49-609334	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3319	49-609334	0.5–1.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3320	49-609335	0.0–0.5	Qbt4	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3321	49-609335	0.5–1.5	Qbt4	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3322	49-609336	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3323	49-609336	0.5–1.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3324	49-609337	0.0–0.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3325	49-609337	0.5–1.5	Soil	10-840	10-840	—	—	—	10-840	10-840	10-840	—	—	—	—	—	—
RE49-10-3343	49-609344	0.5–1.5	Qbt4	—	10-841	10-841	—	—	—	—	—	—	10-841	—	10-841	—	—
RE49-10-3360	49-609353	0.0–0.5	Soil	—	10-841	10-841	—	—	—	—	—	—	10-841	—	10-841	—	—
RE49-10-3365	49-609355	0.5–1.5	Qbt4	—	10-841	10-841	—	—	—	—	—	—	10-841	—	10-841	—	—
RE49-10-3375	49-609360	0.5–1.5	Qbt4	—	10-841	10-841	—	—	—	—	—	—	10-841	—	10-841	—	—
RE49-10-3442	49-609385	0.0–0.5	Fill	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3444	49-609386	0.0–0.5	Fill	10-838	10-838	10-838	—	—	10-838	10-838	10-838	—	10-838	—	10-838	—	—
RE49-10-3452	49-609390	0.0–0.5	Soil	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3472	49-609400	0.0–0.5	Fill	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3476	49-609402	0.0–0.5	Soil	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3477	49-609402	0.5–1.5	Qbt4	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3481	49-609404	0.5–1.5	Qbt4	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3482	49-609405	0.0–0.5	Soil	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3486	49-609407	0.0–0.5	Qbt4	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3487	49-609407	0.5–1.5	Qbt4	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-3501	49-609414	0.5–1.5	Qbt4	—	10-838	10-838	—	—	—	—	—	—	10-838	—	10-838	—	—
RE49-10-5367	49-609981	1.2–3.0	Qbt4	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5374	49-609981	78.0–80.0	Qbt3	10-592	—	—	10-592	10-591	10-592	10-592	10-592	10-592	—	10-591	—	10-591	10-592
RE49-10-5375	49-609981	140.0–143.0	Qbt3	10-592	—	—	10-592	10-591	10-592	10-592	10-592	10-592	—	10-591	—	10-591	10-592
RE49-10-5376	49-609981	190.0–192.0	Qbt3	10-592	—	—	10-592	10-591	10-592	10-592	10-592	10-592	—	10-591	—	10-591	10-592
RE49-10-5365	49-609982	3.2–5.0	Qbt4	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5372	49-609982	83.0–85.0	Qbt3	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5373	49-609982	190.0–192.0	Qbt4	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5364	49-609983	0.5–3.0	Qbt4	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5377	49-609983	80.0–82.0	Qbt3	10-592	—	—	10-592	10-591	10-592	10-592	10-592	10-592	—	10-591	—	10-591	10-592
RE49-10-5378	49-609983	140.0–142.0	Qbt3	10-679	—	—	10-679	10-677	10-679	10-679	10-678	10-678	—	10-677	—	10-677	10-678
RE49-10-5379	49-609983	190.0–192.0	Qbt3	10-679	—	—	10-679	10-677	10-679	10-679	10-678	10-678	—	10-677	—	10-677	10-678

Table 8.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
RE49-10-5366	49-609984	3.2–5.0	Qbt4	10-531	—	—	10-531	10-529	10-531	10-531	10-530	10-530	—	10-529	—	10-529	10-530
RE49-10-5380	49-609984	85.0–87.0	Qbt3	10-679	—	—	10-679	10-677	10-679	10-679	10-678	10-678	—	10-677	—	10-677	10-678
RE49-10-5381	49-609984	150.0–152.0	Qbt3	10-679	—	—	10-679	10-677	10-679	10-679	10-678	10-678	—	10-677	—	10-677	10-678
RE49-10-5382	49-609984	190.0–192.0	Qbt3	10-679	—	—	10-679	10-677	10-679	10-679	10-678	10-678	—	10-677	—	10-677	10-678
RE49-10-5547	49-609996	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5548	49-609996	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5549	49-609997	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5550	49-609997	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5551	49-609998	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5552	49-609998	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5553	49-609999	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5554	49-609999	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5555	49-610000	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5556	49-610000	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5557	49-610001	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5558	49-610001	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5559	49-610002	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5560	49-610002	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5561	49-610003	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5562	49-610003	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5563	49-610004	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5564	49-610004	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5565	49-610005	0.0–0.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5566	49-610005	0.5–1.5	Soil	10-708	10-708	—	—	—	10-708	10-708	10-708	—	—	—	—	—	—
RE49-10-5567	49-610006	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5568	49-610006	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5569	49-610007	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5570	49-610007	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5571	49-610008	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5572	49-610008	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5573	49-610009	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5574	49-610009	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5575	49-610010	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5576	49-610010	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5577	49-610011	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5578	49-610011	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5579	49-610012	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5580	49-610012	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—

Table 8.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
RE49-10-5581	49-610013	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5582	49-610013	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5583	49-610014	0.0–0.5	Fill	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5584	49-610014	0.5–1.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5585	49-610015	0.0–0.5	Soil	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5586	49-610015	0.5–1.5	Qbt4	10-709	10-709	—	—	—	10-709	10-709	10-709	—	—	—	—	—	—
RE49-10-5587	49-610016	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5588	49-610016	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5589	49-610017	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5590	49-610017	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5591	49-610018	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5592	49-610018	0.5–1.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5593	49-610019	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5594	49-610019	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5595	49-610020	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5596	49-610020	0.5–1.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5597	49-610021	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5598	49-610021	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5599	49-610022	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5600	49-610022	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5601	49-610023	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5602	49-610023	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5603	49-610024	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5604	49-610024	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5605	49-610025	0.0–0.5	Soil	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5606	49-610025	0.5–1.5	Qbt4	10-710	10-710	—	—	—	10-710	10-710	10-710	—	—	—	—	—	—
RE49-10-5607	49-610026	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5608	49-610026	0.5–1.5	Qbt4	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5609	49-610027	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5610	49-610027	0.5–1.5	Qbt4	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5611	49-610028	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5612	49-610028	0.5–1.5	Qbt4	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5613	49-610029	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5614	49-610029	0.5–1.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5615	49-610030	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5616	49-610030	0.5–1.5	Qbt4	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5617	49-610031	0.0–0.5	Soil	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—
RE49-10-5618	49-610031	0.5–1.5	Qbt4	10-711	10-711	—	—	—	10-711	10-711	10-711	—	—	—	—	—	—

Table 8.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	VOCs	Cyanide
RE49-10-10838	49-611025	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10839	49-611025	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10840	49-611026	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10841	49-611026	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10842	49-611027	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10843	49-611027	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10844	49-611028	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10845	49-611028	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10846	49-611029	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—
RE49-10-10847	49-611029	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—

*— = Not analyzed.

Table 8.2-3
Field-Screening Results for Samples Collected at Area 3, SWMU 49-001(e)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 3 Drilling Samples						
49-001(e)	49-609981	1.2–3.0	RE49-10-5367	0.0	59	1987
49-001(e)	49-609981	78.0–80.0	RE49-10-5374	1.3	45	2510
49-001(e)	49-609981	140.0–143.0	RE49-10-5375	0.3	45	2500
49-001(e)	49-609981	190.0–192.0	RE49-10-5376	0.4	98	2880
49-001(e)	49-609982	3.2–5.0	RE49-10-5365	0.0	32	2030
49-001(e)	49-609982	83.0–85.0	RE49-10-5372	0.0	72	2080
49-001(e)	49-609982	190.0–192.0	RE49-10-5373	0.0	78	2330
49-001(e)	49-609983	0.5–3.0	RE49-10-5364	0.0	39	2410
49-001(e)	49-609983	80.0–82.0	RE49-10-5377	0.5	78	2980
49-001(e)	49-609983	140.0–142.0	RE49-10-5378	0.8	85	2670
49-001(e)	49-609983	190.0–192.0	RE49-10-5379	0.0	121	3090
49-001(e)	49-609984	3.25–5.0	RE49-10-5366	1.7	111	2340
49-001(e)	49-609984	85.0–87.0	RE49-10-5380	0.5	52	2250
49-001(e)	49-609984	150.0–152.0	RE49-10-5381	0.1	59	2540
49-001(e)	49-609984	190.0–192.0	RE49-10-5382	0.0	45	2500
Area 3 Surface and Shallow-Subsurface Samples						
49-001(e)	49-609307	0.0–0.5	RE49-10-3254	NA*	98	2420
49-001(e)	49-609307	0.5–1.5	RE49-10-3255	NA	32	3440
49-001(e)	49-609308	0.0–0.5	RE49-10-3256	NA	54	1953
49-001(e)	49-609308	0.5–1.5	RE49-10-3257	NA	16	2360
49-001(e)	49-609309	0.0–0.5	RE49-10-3258	NA	85	2230
49-001(e)	49-609309	0.5–1.5	RE49-10-3259	NA	50	1948

Table 8.2-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 3 Surface and Shallow-Subsurface Samples (continued)						
49-001(e)	49-609310	0.0–0.5	RE49-10-3260	NA	98	2360
49-001(e)	49-609310	0.5–1.5	RE49-10-3261	NA	32	2180
49-001(e)	49-609311	0.0–0.5	RE49-10-3262	NA	45	2380
49-001(e)	49-609311	0.5–1.5	RE49-10-3263	NA	27	2410
49-001(e)	49-609329	0.0–0.5	RE49-10-3308	NA	48	1877
49-001(e)	49-609329	0.5–1.5	RE49-10-3309	NA	27	2500
49-001(e)	49-609330	0.0–0.5	RE49-10-3310	NA	38	2320
49-001(e)	49-609330	0.5–1.5	RE49-10-3311	NA	21	2090
49-001(e)	49-609331	0.0–0.5	RE49-10-3312	NA	32	2250
49-001(e)	49-609331	0.5–1.5	RE49-10-3313	NA	54	2050
49-001(e)	49-609332	0.0–0.5	RE49-10-3314	NA	38	2950
49-001(e)	49-609332	0.5–1.5	RE49-10-3315	NA	21	3750
49-001(e)	49-609333	0.0–0.5	RE49-10-3316	NA	16	2270
49-001(e)	49-609333	0.5–1.5	RE49-10-3317	NA	27	1943
49-001(e)	49-609334	0.0–0.5	RE49-10-3318	NA	38	2170
49-001(e)	49-609334	0.5–1.5	RE49-10-3319	NA	32	2350
49-001(e)	49-609335	0.0–0.5	RE49-10-3320	NA	72	2810
49-001(e)	49-609335	0.5–1.5	RE49-10-3321	NA	78	2500
49-001(e)	49-609336	0.0–0.5	RE49-10-3322	NA	85	2340
49-001(e)	49-609336	0.5–1.5	RE49-10-3323	NA	72	2540
49-001(e)	49-609337	0.0–0.5	RE49-10-3324	NA	94	2370
49-001(e)	49-609337	0.5–1.5	RE49-10-3325	NA	65	2180
49-001(e)	49-609344	0.5–1.5	RE49-10-3343	NA	27	2500
49-001(e)	49-609353	0.0–0.5	RE49-10-3360	NA	98	2610
49-001(e)	49-609355	0.5–1.5	RE49-10-3365	NA	118	2740
49-001(e)	49-609360	0.5–1.5	RE49-10-3375	NA	32	2960
49-001(e)	49-609385	0.0–0.5	RE49-10-3442	NA	92	2100
49-001(e)	49-609386	0.0–0.5	RE49-10-3444	NA	54	2200
49-001(e)	49-609402	0.5–1.5	RE49-10-3477	NA	38	3580
49-001(e)	49-609390	0.0–0.5	RE49-10-3452	NA	59	2260
49-001(e)	49-609400	0.0–0.5	RE49-10-3472	NA	43	2440
49-001(e)	49-609402	0.0–0.5	RE49-10-3476	NA	16	2430
49-001(e)	49-609404	0.5–1.5	RE49-10-3481	NA	27	3100
49-001(e)	49-609405	0.0–0.5	RE49-10-3482	NA	27	2550
49-001(e)	49-609407	0.0–0.5	RE49-10-3486	NA	98	2770
49-001(e)	49-609407	0.5–1.5	RE49-10-3487	NA	85	2460
49-001(e)	49-609414	0.5–1.5	RE49-10-3501	NA	78	2390

*NA = Not analyzed.

Table 8.2-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 3, SWMU 49-001(e)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**[c]	**2.19E+02**[d]	**2.3E+01**[e]	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.0E+02**[e]	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02**[d]	**3.46E+01**[f]	**1.24E+04**	**6.19E+03**	**2.17E+05**
0549-95-0211	49-03000	0.0–0.5	Soil	—[g]	5.5 (U)	—	—	—	0.59 (U)	—	—	—	—	NA[h]	—
0549-95-0213	49-03002	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.59 (U)	—	—	—	—	NA	—
0549-95-0216	49-03005	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.59 (U)	—	—	—	—	NA	—
0549-95-0219	49-03008	0.0–0.5	Soil	—	5.6 (U)	—	—	—	0.59 (U)	—	—	—	—	NA	—
0549-95-0220	49-03009	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.59 (U)	—	—	—	—	NA	—
0549-95-0222	49-03011	0.0–0.5	Soil	—	5.7 (U)	—	—	—	0.6 (U)	—	—	—	36.4	NA	—
0549-95-0223	49-03012	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.59 (U)	—	—	—	—	NA	—
0549-95-0224	49-03013	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.58 (U)	—	—	—	—	NA	—
0549-95-0229	49-03024	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.58 (U)	—	—	—	—	NA	—
0549-95-0231	49-03026	0.0–0.5	Soil	—	5.5 (U)	—	—	—	0.58 (U)	—	—	—	—	NA	—
RE49-10-3254	49-609307	0.0–0.5	Soil	—	0.85 (U)	—	—	—	—	—	—	—	18.5	NA	—
RE49-10-3255	49-609307	0.5–1.5	Qbt4	—	—	—	68.2	—	—	—	13.5	—	8.8	NA	—
RE49-10-3257	49-609308	0.5–1.5	Qbt4	18,700	0.68 (U)	10.3	521	1.9	—	14,000	21.2	3.6 (J)	8.8	NA	23,500
RE49-10-3258	49-609309	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3259	49-609309	0.5–1.5	Soil	—	—	—	—	—	—	11,300	—	—	—	NA	—
RE49-10-3260	49-609310	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3261	49-609310	0.5–1.5	Qbt4	10,100	—	4.7	84.2	—	—	2240	16.6	—	4.8	NA	—
RE49-10-3262	49-609311	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3263	49-609311	0.5–1.5	Qbt4	14,600	—	6.5	211	1.3	—	3020	12.3	—	6.1	NA	16,900
RE49-10-3264	49-609312	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	25,000
RE49-10-3265	49-609312	0.5–1.5	Soil	—	—	—	299	—	—	—	—	—	—	NA	—
RE49-10-3266	49-609313	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3267	49-609313	0.5–1.5	Qbt4	16,000	—	8.4	184	2.3	—	2900	17.9	3.3 (J)	5	NA	21,400
RE49-10-3268	49-609314	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3269	49-609314	0.5–1.5	Soil	—	—	—	391	—	—	14,800	—	—	—	NA	22,000
RE49-10-3270	49-609315	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3272	49-609316	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	21700 (J)
RE49-10-3273	49-609316	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	22900
RE49-10-3278	49-609317	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3279	49-609317	0.5–1.5	Qbt4	8970	—	10.2	88.9	—	—	—	8.4	—	—	NA	—
RE49-10-3280	49-609318	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**
RE49-10-3281	49-609318	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	23,200
RE49-10-3283	49-609319	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3285	49-609320	0.5–1.5	Qbt4	—	—	4.5	47	—	—	—	7.6	—	—	NA	—
RE49-10-3287	49-609321	0.5–1.5	Qbt4	8570	—	4.5	140	—	—	5690	7.5	—	—	NA	—
RE49-10-3288	49-609322	0.0–0.5	Soil	—	2.8 (U)	—	—	—	—	—	—	—	1780 (J)	NA	—
RE49-10-3289	49-609322	0.5–1.5	Qbt4	15,000	—	9.5	533	—	—	6250	12.1	—	7.1 (J)	NA	16,000
RE49-10-3290	49-609323	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10	—	NA	—
RE49-10-3291	49-609323	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	24,700
RE49-10-3292	49-609324	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3296	49-609326	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3297	49-609326	0.5–1.5	Qbt4	11,500	0.57 (U)	7.2	122	—	—	2580	9.6	—	—	NA	—
RE49-10-3298	49-609327	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3299	49-609327	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3301	49-609328	0.5–1.5	Qbt3	—	—	3.7	81.5	—	—	—	10.4	—	—	NA	—
RE49-10-3309	49-609329	0.5–1.5	Qbt4	—	—	3.7	—	—	—	—	—	—	—	NA	—
RE49-10-3312	49-609331	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3315	49-609332	0.5–1.5	Qbt4	—	—	5.6	—	—	—	—	8.4	—	—	NA	—
RE49-10-3317	49-609333	0.5–1.5	Soil	—	—	—	—	—	—	—	—	8.8	—	NA	—
RE49-10-3320	49-609335	0.0–0.5	Qbt4	—	—	3.7	56.5	—	—	—	—	—	7.6	NA	—
RE49-10-3321	49-609335	0.5–1.5	Qbt4	—	—	4.6	65.8	—	—	—	7.6	—	—	NA	—
RE49-10-3323	49-609336	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-3325	49-609337	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5367	49-609981	1.2–3.0	Qbt4	—	—	3.6	399 (J+)	—	—	6740	—	—	—	0.53 (U)	—
RE49-10-5374	49-609981	78.0–80.0	Qbt3	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5375	49-609981	140.0–143.0	Qbt3	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5376	49-609981	190.0–192.0	Qbt3	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5365	49-609982	3.2–5.0	Qbt4	17,300	—	5	223 (J+)	1.6	—	5250	14.5	3.3 (J)	8.1	0.58 (U)	17,100
RE49-10-5372	49-609982	83.0–85.0	Qbt3	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5373	49-609982	190.0–192.0	Qbt4	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-5364	49-609983	0.5–3.0	Qbt4	—	—	6.2	—	—	—	—	—	—	—	0.53 (U)	—
RE49-10-5377	49-609983	80.0–82.0	Qbt3	—	0.54 (U)	7.4	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5378	49-609983	140.0–142.0	Qbt3	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-5379	49-609983	190.0–192.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**[c]	**2.19E+02**[d]	**2.3E+01**[e]	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.0E+02**[e]	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02**[d]	**3.46E+01**[f]	**1.24E+04**	**6.19E+03**	**2.17E+05**
RE49-10-5366	49-609984	3.2–5.0	Qbt4	10,300	—	5.6	87.1 (J)	—	—	2710	9.4	—	4.8	0.56 (U)	—
RE49-10-5380	49-609984	85.0–87.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-5381	49-609984	150.0–152.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-5382	49-609984	190.0–192.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-5549	49-609997	0.0–0.5	Soil	—	—	—	—	—	—	—	—	11	—	NA	—
RE49-10-5550	49-609997	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5556	49-610000	0.5–1.5	Soil	—	—	—	—	—	—	—	—	16.4	—	NA	—
RE49-10-5557	49-610001	0.0–0.5	Soil	—	—	—	—	—	—	—	—	13	—	NA	—
RE49-10-5558	49-610001	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5559	49-610002	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5560	49-610002	0.5–1.5	Soil	—	—	—	654	—	—	7390 (J-)	—	—	—	NA	—
RE49-10-5564	49-610004	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5566	49-610005	0.5–1.5	Soil	—	—	—	—	—	—	—	—	25.3	—	NA	—
RE49-10-5568	49-610006	0.5–1.5	Soil	—	—	—	—	—	—	—	—	9.2	—	NA	—
RE49-10-5569	49-610007	0.0–0.5	Soil	—	—	—	301	—	—	—	—	26	—	NA	—
RE49-10-5572	49-610008	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5574	49-610009	0.5–1.5	Soil	—	—	—	377	—	—	—	—	9.4	—	NA	—
RE49-10-5575	49-610010	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10.1	—	NA	—
RE49-10-5576	49-610010	0.5–1.5	Soil	—	—	—	403	—	—	6470	—	—	—	NA	—
RE49-10-5578	49-610011	0.5–1.5	Soil	—	—	—	—	—	—	—	—	9.2	—	NA	—
RE49-10-5581	49-610013	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5584	49-610014	0.5–1.5	Soil	—	—	—	—	—	—	9630	—	—	—	NA	—
RE49-10-5586	49-610015	0.5–1.5	Qbt4	18,200	—	4.2	187	—	—	2520	8.8	—	—	NA	—
RE49-10-5588	49-610016	0.5–1.5	Qbt4	15,100	—	4	248	—	—	2950	10.2	3.7	6.5	NA	—
RE49-10-5590	49-610017	0.5–1.5	Qbt4	14,600	—	3.9	170	1.4	—	—	11.4	4.5	6.5	NA	19,700
RE49-10-5594	49-610019	0.5–1.5	Qbt4	13,500	—	3.6	179	—	—	3150	9.4	4.3	5.1	NA	15,100
RE49-10-5598	49-610021	0.5–1.5	Qbt4	16,300	—	5.1	174	1.4	—	2330	11.2	3.3	6.4	NA	—
RE49-10-5600	49-610022	0.5–1.5	Qbt4	12,200	—	3.7	136	—	—	—	10	5	5.6	NA	—
RE49-10-5601	49-610023	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5602	49-610023	0.5–1.5	Qbt4	24,400	—	5.7	170	1.7	—	4550	13.2	5.8	7.7	NA	18,600
RE49-10-5603	49-610024	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5604	49-610024	0.5–1.5	Qbt4	10,700	—	3.1	110	—	—	—	10.7	3.9	5.3	NA	—
RE49-10-5605	49-610025	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**
RE49-10-5606	49-610025	0.5–1.5	Qbt4	12,900	—	4.1	153	—	—	—	12.7	6	7.7	NA	15,200
RE49-10-5608	49-610026	0.5–1.5	Qbt4	7440	—	3.3	90.6 (J+)	—	—	—	7.5	3.3	17.3	NA	—
RE49-10-5610	49-610027	0.5–1.5	Qbt4	—	—	—	69.4 (J+)	—	—	—	—	—	10.5	NA	—
RE49-10-5612	49-610028	0.5–1.5	Qbt4	—	—	—	76.6 (J+)	—	—	—	8.7	3.9	5.3	NA	—
RE49-10-5615	49-610030	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5616	49-610030	0.5–1.5	Qbt4	13,300	—	2.9	210 (J+)	—	—	—	9.7	4.7	6	NA	—
RE49-10-5617	49-610031	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5618	49-610031	0.5–1.5	Qbt4	12,200	—	3	320 (J+)	—	—	3900	9.7	7	6.2	NA	—
RE49-10-10838	49-611025	0.0–0.5	Soil	—	—	—	—	—	—	—	—	16	—	NA	—
RE49-10-10844	49-611028	0.0–0.5	Soil	—	—	—	—	—	—	—	—	14.8	—	NA	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01**[e]	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02**[e]	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01**[f]	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
0549-95-0211	49-03000	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.5	—	—
0549-95-0213	49-03002	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.9	—	—
0549-95-0216	49-03005	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.4	—	—
0549-95-0219	49-03008	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.4	—	—
0549-95-0220	49-03009	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.2	—	—
0549-95-0222	49-03011	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.3	—	92.8 (J)
0549-95-0223	49-03012	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.7	—	51.9 (J)
0549-95-0224	49-03013	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3	—	63.3 (J)
0549-95-0229	49-03024	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	3.4	—	—
0549-95-0231	49-03026	0.0–0.5	Soil	22.8 (J-)	—	—	—	—	NA	—	—	—	3.6	—	112 (J)
RE49-10-3254	49-609307	0.0–0.5	Soil	—	—	—	—	—	NA	2.3 (U)	—	—	NA	—	68.8
RE49-10-3255	49-609307	0.5–1.5	Qbt4	—	—	—	—	6.8	NA	1.7 (U)	—	—	NA	—	—
RE49-10-3257	49-609308	0.5–1.5	Qbt4	20.5	4110	—	—	13.3	NA	1.7 (U)	—	—	NA	26.2	—
RE49-10-3258	49-609309	0.0–0.5	Soil	—	—	—	—	—	NA	2 (U)	—	—	NA	—	—
RE49-10-3259	49-609309	0.5–1.5	Soil	—	—	—	—	—	NA	2 (U)	—	1.4	NA	—	—
RE49-10-3260	49-609310	0.0–0.5	Soil	—	—	—	—	—	NA	2 (U)	—	0.88 (U)	NA	—	—
RE49-10-3261	49-609310	0.5–1.5	Qbt4	—	1800	—	—	6.8	NA	2.7 (U)	—	1.5	NA	—	—
RE49-10-3262	49-609311	0.0–0.5	Soil	—	—	—	—	—	NA	1.7 (U)	—	0.79 (U)	NA	—	—
RE49-10-3263	49-609311	0.5–1.5	Qbt4	20.3	2890	—	—	9.1	NA	2.3 (U)	—	1.5	NA	19.7	—
RE49-10-3264	49-609312	0.0–0.5	Soil	—	—	—	—	—	NA	1.9 (U)	—	—	NA	—	—
RE49-10-3265	49-609312	0.5–1.5	Soil	—	—	—	—	—	NA	2.3 (U)	—	—	NA	—	—
RE49-10-3266	49-609313	0.0–0.5	Soil	27.2	—	—	—	—	NA	2 (U)	—	2.8	NA	—	—
RE49-10-3267	49-609313	0.5–1.5	Qbt4	27.1	2880	—	—	11.2	NA	2.8 (U)	—	5.3	NA	22.8	—
RE49-10-3268	49-609314	0.0–0.5	Soil	—	—	—	—	—	NA	1.7 (U)	—	—	NA	—	—
RE49-10-3269	49-609314	0.5–1.5	Soil	26.1	—	—	—	—	NA	2 (U)	—	1.1 (U)	NA	—	—
RE49-10-3270	49-609315	0.0–0.5	Soil	—	—	—	0.218 (J—)	—	NA	2.1 (U)	—	—	NA	—	—
RE49-10-3272	49-609316	0.0–0.5	Soil	—	—	—	—	—	NA	1.7 (U)	—	0.84 (U)	NA	—	—
RE49-10-3273	49-609316	0.5–1.5	Soil	—	—	—	—	—	NA	1.7 (U)	—	—	NA	—	—
RE49-10-3278	49-609317	0.0–0.5	Soil	22.4	—	—	—	—	NA	1.9 (J-)	—	0.91 (J)	NA	—	—
RE49-10-3279	49-609317	0.5–1.5	Qbt4	27.4	1750 (J+)	—	—	7.9	NA	2.2 (J-)	—	1.5 (J)	NA	—	—
RE49-10-3280	49-609318	0.0–0.5	Soil	—	—	—	—	—	NA	1.9 (J-)	—	—	NA	—	52.7
RE49-10-3281	49-609318	0.5–1.5	Soil	—	—	—	—	—	NA	1.9 (J-)	—	—	NA	—	50.3
RE49-10-3283	49-609319	0.5–1.5	Soil	—	—	—	—	—	NA	1.6 (J)	—	—	NA	—	—
RE49-10-3285	49-609320	0.5–1.5	Qbt4	—	—	—	—	—	NA	2.1 (J-)	—	—	NA	—	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-3287	49-609321	0.5–1.5	Qbt4	15.1	—	—	—	—	NA	0.91 (J-)	—	—	NA	—	—
RE49-10-3288	49-609322	0.0–0.5	Soil	—	—	—	—	—	NA	1.6 (J-)	—	—	NA	—	—
RE49-10-3289	49-609322	0.5–1.5	Qbt4	15.2	2610 (J+)	—	—	10.1	NA	2.6 (J-)	—	—	NA	18.6	—
RE49-10-3290	49-609323	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-3291	49-609323	0.5–1.5	Soil	—	—	—	—	—	NA	1.8 (J-)	—	—	NA	—	—
RE49-10-3292	49-609324	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	—	NA	—	51.9
RE49-10-3296	49-609326	0.0–0.5	Soil	—	—	—	—	—	NA	1.9 (J-)	—	—	NA	—	—
RE49-10-3297	49-609326	0.5–1.5	Qbt4	16	1750 (J+)	—	—	—	NA	1.7 (J-)	—	—	NA	—	—
RE49-10-3298	49-609327	0.0–0.5	Soil	—	—	—	—	—	NA	1.6 (J-)	—	—	NA	—	—
RE49-10-3299	49-609327	0.5–1.5	Soil	—	—	—	—	—	NA	2.1 (J-)	—	0.87 (J)	NA	—	—
RE49-10-3301	49-609328	0.5–1.5	Qbt3	15.6	—	—	—	—	NA	1.1 (J-)	—	—	NA	—	—
RE49-10-3309	49-609329	0.5–1.5	Qbt4	54.4	—	—	—	—	NA	1.8 (J)	—	—	NA	—	—
RE49-10-3312	49-609331	0.0–0.5	Fill	—	—	—	—	—	NA	1.7 (J)	—	—	NA	—	—
RE49-10-3315	49-609332	0.5–1.5	Qbt4	—	—	—	—	—	NA	1.6 (J)	—	1.3	NA	—	—
RE49-10-3317	49-609333	0.5–1.5	Soil	—	—	747	—	—	NA	—	—	—	NA	—	—
RE49-10-3320	49-609335	0.0–0.5	Qbt4	14.1	—	—	—	—	NA	1.6 (J)	—	—	NA	—	—
RE49-10-3321	49-609335	0.5–1.5	Qbt4	15.2	—	—	—	—	NA	1.7 (J)	—	—	NA	—	—
RE49-10-3323	49-609336	0.5–1.5	Soil	—	—	—	—	—	NA	1.8 (J)	—	—	NA	—	—
RE49-10-3325	49-609337	0.5–1.5	Soil	—	—	—	—	—	NA	1.7 (J)	—	0.8 (U)	NA	—	—
RE49-10-5367	49-609981	1.2–3.0	Qbt4	—	1760	—	—	—	—	0.76	—	—	NA	—	—
RE49-10-5374	49-609981	78.0–80.0	Qbt3	—	—	—	—	—	—	0.89	—	—	NA	—	—
RE49-10-5375	49-609981	140.0–143.0	Qbt3	—	—	—	—	—	—	1.3	—	—	NA	—	—
RE49-10-5376	49-609981	190.0–192.0	Qbt3	—	—	—	—	—	—	1	—	—	NA	—	—
RE49-10-5365	49-609982	3.2–5.0	Qbt4	18.5	3030	—	—	12.1	0.0058	1	—	—	NA	25.1	—
RE49-10-5372	49-609982	83.0–85.0	Qbt3	—	—	—	—	—	—	0.91	—	—	NA	—	—
RE49-10-5373	49-609982	190.0–192.0	Qbt4	—	—	—	—	—	—	0.86	—	—	NA	—	—
RE49-10-5364	49-609983	0.5–3.0	Qbt4	—	—	—	—	—	—	1.6	—	—	NA	—	—
RE49-10-5377	49-609983	80.0–82.0	Qbt3	—	—	—	—	—	—	1	—	—	NA	—	—
RE49-10-5378	49-609983	140.0–142.0	Qbt3	—	—	—	—	—	—	1.1	—	—	NA	—	—
RE49-10-5379	49-609983	190.0–192.0	Qbt3	—	—	—	—	—	—	0.85	—	—	NA	—	—
RE49-10-5366	49-609984	3.2–5.0	Qbt4	14	2450	—	—	8	0.0044 (J)	1.2	—	—	NA	—	—
RE49-10-5380	49-609984	85.0–87.0	Qbt3	—	—	—	—	—	—	0.98	—	—	NA	—	—
RE49-10-5381	49-609984	150.0–152.0	Qbt3	—	—	—	—	—	—	1.1	—	—	NA	—	—
RE49-10-5382	49-609984	190.0–192.0	Qbt3	—	—	—	—	—	—	1.3	—	—	NA	—	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01**[e]	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02**[e]	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01**[f]	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-5549	49-609997	0.0–0.5	Soil	24.3	—	954	—	17.4	NA	—	—	—	NA	—	—
RE49-10-5550	49-609997	0.5–1.5	Soil	—	—	—	—	17.5	NA	—	—	—	NA	—	—
RE49-10-5556	49-610000	0.5–1.5	Soil	25.3	—	826	—	—	NA	—	—	—	NA	—	—
RE49-10-5557	49-610001	0.0–0.5	Soil	23.6	—	988	—	—	NA	—	—	—	NA	—	—
RE49-10-5558	49-610001	0.5–1.5	Soil	—	—	—	—	16.8	NA	—	—	—	NA	—	—
RE49-10-5559	49-610002	0.0–0.5	Soil	—	—	—	—	—	NA	—	—	0.88	NA	—	—
RE49-10-5560	49-610002	0.5–1.5	Soil	—	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5564	49-610004	0.5–1.5	Soil	—	—	677	—	—	NA	—	—	—	NA	—	—
RE49-10-5566	49-610005	0.5–1.5	Soil	24	—	2060	—	—	NA	—	—	—	NA	—	—
RE49-10-5568	49-610006	0.5–1.5	Soil	—	—	685	—	—	NA	—	—	0.92	NA	—	—
RE49-10-5569	49-610007	0.0–0.5	Soil	—	—	1780	—	—	NA	—	—	—	NA	42	—
RE49-10-5572	49-610008	0.5–1.5	Soil	—	—	—	—	—	NA	—	—	0.8	NA	—	—
RE49-10-5574	49-610009	0.5–1.5	Soil	—	—	765	—	—	NA	—	—	—	NA	—	—
RE49-10-5575	49-610010	0.0–0.5	Soil	—	—	857	—	—	NA	—	—	—	NA	—	—
RE49-10-5576	49-610010	0.5–1.5	Soil	—	—	—	—	—	NA	—	1270	—	NA	—	—
RE49-10-5578	49-610011	0.5–1.5	Soil	—	—	—	—	—	NA	—	—	—	NA	—	—
RE49-10-5581	49-610013	0.0–0.5	Soil	—	—	726	—	—	NA	—	—	—	NA	—	—
RE49-10-5584	49-610014	0.5–1.5	Soil	—	—	—	—	—	NA	—	—	1.1	NA	—	—
RE49-10-5586	49-610015	0.5–1.5	Qbt4	11.9	2680	—	—	—	NA	0.7	—	1.3	NA	—	—
RE49-10-5588	49-610016	0.5–1.5	Qbt4	—	2170	—	—	7.5	NA	1.5 (J-)	—	—	NA	18.4	—
RE49-10-5590	49-610017	0.5–1.5	Qbt4	13.3	2070	—	—	9.1	NA	1.8 (J-)	—	—	NA	21.2	—
RE49-10-5594	49-610019	0.5–1.5	Qbt4	13.1	2170	—	—	9.9	NA	1.4 (J-)	—	—	NA	—	—
RE49-10-5598	49-610021	0.5–1.5	Qbt4	20	2060	—	—	8.1	NA	1.6 (J-)	—	1.4	NA	21	—
RE49-10-5600	49-610022	0.5–1.5	Qbt4	12.6	1730	—	—	7.7	NA	1.6 (J-)	—	—	NA	22.4	—
RE49-10-5601	49-610023	0.0–0.5	Soil	—	—	—	—	—	NA	1.6 (J-)	—	—	NA	—	—
RE49-10-5602	49-610023	0.5–1.5	Qbt4	16.9	3690	—	—	10	NA	2.9	—	—	NA	30.3	—
RE49-10-5603	49-610024	0.0–0.5	Soil	—	—	—	—	—	NA	1.8 (J-)	—	—	NA	—	—
RE49-10-5604	49-610024	0.5–1.5	Qbt4	12.8	—	—	—	7.2	NA	1.7 (J-)	—	—	NA	19.2	—
RE49-10-5605	49-610025	0.0–0.5	Soil	—	—	—	—	—	NA	1.8 (J-)	—	—	NA	—	—
RE49-10-5606	49-610025	0.5–1.5	Qbt4	18.7	1900	—	—	8.6	NA	1.9 (J-)	—	—	NA	28.5	—
RE49-10-5608	49-610026	0.5–1.5	Qbt4	—	—	—	—	—	NA	1.2	—	—	NA	—	—
RE49-10-5610	49-610027	0.5–1.5	Qbt4	—	—	—	—	—	NA	1.3	—	—	NA	—	—
RE49-10-5612	49-610028	0.5–1.5	Qbt4	—	—	—	—	8.5	NA	1.3	—	—	NA	—	—
RE49-10-5615	49-610030	0.0–0.5	Soil	—	—	—	—	—	NA	1.8 (U)	—	—	NA	—	—

Table 8.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**5.48E+01**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**7.95E+02**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**2.17E+02**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-5616	49-610030	0.5–1.5	Qbt4	13.3	1920	—	—	8.3	NA	0.87	—	—	NA	19.4	—
RE49-10-5617	49-610031	0.0–0.5	Soil	—	—	—	—	—	NA	1.7 (U)	—	—	NA	—	—
RE49-10-5618	49-610031	0.5–1.5	Qbt4	14.5	2100	—	—	7.4	NA	0.84	—	—	NA	21.9	—
RE49-10-10838	49-611025	0.0–0.5	Soil	—	—	904 (J-)	—	—	NA	—	—	—	NA	—	—
RE49-10-10844	49-611028	0.0–0.5	Soil	—	—	726 (J-)	—	—	NA	—	—	—	NA	—	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 8.2-5
Summary of Radionuclides Detected or Detected above BVs/FVs at Area 3, SWMU 49-001(e)

Sample ID	Location ID	Depth (ft)	Media	Cesium-134	Cesium-137
Qbt 2,3,4 BV[a]				**na**[b]	**na**
Soil BV[a]				**na**	**1.65**
Residential SAL[c]				**2.4**	**5.6**
Industrial SAL[c]				**9.7**	**23**
Construction Worker SAL[c]				**7.7**	**18**
RE49-10-3293	49-609324	0.5–1.5	Soil	—[d]	0.171
RE49-10-3301	49-609328	0.5–1.5	Qbt3	—	0.214
RE49-10-3311	49-609330	0.5–1.5	Fill	—	0.097
RE49-10-3323	49-609336	0.5–1.5	Soil	0.054	—
RE49-10-5561	49-610003	0.0–0.5	Soil	0.082	—
RE49-10-5582	49-610013	0.5–1.5	Soil	—	0.166

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

Table 8.2-6
Summary of Pore-Gas Samples Collected and Analyses Requested at Area 3, SWMU 49-001(e)

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
MD49-10-12141	49-609981	77.0–79.0	Pore gas	10-2161	10-2160
MD49-10-12139	49-609981	123.25–125.25	Pore gas	10-2161	10-2160

Table 8.2-7
Summary of Organic Chemicals Detected in Pore Gas at Area 3, SWMU 49-001(e)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
MD49-10-12141	49-609981	77.0–79.0	Pore gas	29	4.9	—*	2.6	2.6	2.6	—	11	—	—	11	2.9	7.9
MD49-10-12139	49-609981	123.25–125.25	Pore gas	10	19	4.5	2.6	6.5	7.6	2.4	34	8.9	2.6	31	8.4	23

Note: All concentrations are in µg/m^3.
*— = Not detected or not detected above BV.

Table 9.2-1
Surveyed Coordinates for
2009–2010 Locations at Area 4, SWMU 49-001(f)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 4 Drilling			
49-001(f)	49-610938	1625644.768	1753994.297
49-001(f)	49-610939	1625636.55	1753877.81
49-001(f)	49-610940	1625541.246	1753792.037
49-001(f)	49-610941	1625441.279	1753881.535
Area 4 Surface and Shallow Subsurface			
49-001(f)	49-609657	1625474.19	1753843.71
49-001(f)	49-609658	1625549.19	1753843.71
49-001(f)	49-609659	1625499.19	1753868.71
49-001(f)	49-609660	1625524.19	1753868.71
49-001(f)	49-609661	1625549.19	1753868.71
49-001(f)	49-609662	1625474.19	1753918.71
49-001(f)	49-609663	1625499.19	1753918.71
49-001(f)	49-609664	1625574.19	1753918.71
49-001(f)	49-609665	1625424.19	1753793.71
49-001(f)	49-609666	1625524.19	1753793.71
49-001(f)	49-609667	1625599.19	1753793.71
49-001(f)	49-609668	1625499.19	1753843.71
49-001(f)	49-609669	1625424.19	1753868.71
49-001(f)	49-609670	1625599.19	1753868.71
49-001(f)	49-609671	1625524.19	1753893.71
49-001(f)	49-609672	1625624.19	1753918.71
49-001(f)	49-609673	1625424.19	1753943.71
49-001(f)	49-609674	1625474.19	1753968.71
49-001(f)	49-609675	1625549.19	1753968.71
49-001(f)	49-609676	1625599.19	1753968.71
49-001(f)	49-609677	1625474.19	1753743.71
49-001(f)	49-609678	1625624.19	1753743.71
49-001(f)	49-609679	1625374.19	1753793.71
49-001(f)	49-609680	1625674.19	1753843.71
49-001(f)	49-609681	1625374.19	1753893.71
49-001(f)	49-609682	1625374.19	1753993.71
49-001(f)	49-609683	1625674.19	1753993.71
49-001(f)	49-609684	1625449.19	1754018.71
49-001(f)	49-609685	1625599.19	1754018.71
49-001(f)	49-609686	1625449.19	1753793.71
49-001(f)	49-609687	1625474.19	1753793.71

Table 9.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 4 Surface and Shallow Subsurface (continued)			
49-001(f)	49-609688	1625499.19	1753793.71
49-001(f)	49-609689	1625549.19	1753793.71
49-001(f)	49-609690	1625574.19	1753793.71
49-001(f)	49-609691	1625424.19	1753818.71
49-001(f)	49-609692	1625449.19	1753818.71
49-001(f)	49-609693	1625474.19	1753818.71
49-001(f)	49-609694	1625499.19	1753818.71
49-001(f)	49-609695	1625524.19	1753818.71
49-001(f)	49-609696	1625549.19	1753818.71
49-001(f)	49-609697	1625574.19	1753818.71
49-001(f)	49-609698	1625599.19	1753818.71
49-001(f)	49-609699	1625424.19	1753843.71
49-001(f)	49-609700	1625449.19	1753843.71
49-001(f)	49-609701	1625524.19	1753843.71
49-001(f)	49-609702	1625574.19	1753843.71
49-001(f)	49-609703	1625599.19	1753843.71
49-001(f)	49-609704	1625449.19	1753868.71
49-001(f)	49-609705	1625474.19	1753868.71
49-001(f)	49-609706	1625574.19	1753868.71
49-001(f)	49-609707	1625624.19	1753868.71
49-001(f)	49-609708	1625424.19	1753893.71
49-001(f)	49-609709	1625449.19	1753893.71
49-001(f)	49-609710	1625474.19	1753893.71
49-001(f)	49-609711	1625499.19	1753893.71
49-001(f)	49-609712	1625549.19	1753893.71
49-001(f)	49-609713	1625574.19	1753893.71
49-001(f)	49-609714	1625599.19	1753893.71
49-001(f)	49-609715	1625624.19	1753893.71
49-001(f)	49-609716	1625424.19	1753918.71
49-001(f)	49-609717	1625449.19	1753918.71
49-001(f)	49-609718	1625524.19	1753918.71
49-001(f)	49-609719	1625549.19	1753918.71
49-001(f)	49-609720	1625599.19	1753918.71
49-001(f)	49-609721	1625449.19	1753943.71
49-001(f)	49-609722	1625474.19	1753943.71
49-001(f)	49-609723	1625499.19	1753943.71
49-001(f)	49-609724	1625524.19	1753943.71
49-001(f)	49-609725	1625549.19	1753943.71

Table 9.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 4 Surface and Shallow Subsurface (continued)			
49-001(f)	49-609726	1625574.19	1753943.71
49-001(f)	49-609727	1625599.19	1753943.71
49-001(f)	49-609728	1625624.19	1753943.71
49-001(f)	49-609729	1625424.19	1753968.71
49-001(f)	49-609730	1625449.19	1753968.71
49-001(f)	49-609731	1625499.19	1753968.71
49-001(f)	49-609732	1625524.19	1753968.71
49-001(f)	49-609733	1625574.19	1753968.71
49-001(f)	49-609734	1625624.19	1753968.71
49-001(f)	49-609735	1625374.19	1753743.71
49-001(f)	49-609736	1625424.19	1753743.71
49-001(f)	49-609737	1625524.19	1753743.71
49-001(f)	49-609738	1625574.19	1753743.71
49-001(f)	49-609739	1625399.19	1753768.71
49-001(f)	49-609740	1625449.19	1753768.71
49-001(f)	49-609741	1625499.19	1753768.71
49-001(f)	49-609742	1625549.19	1753768.71
49-001(f)	49-609743	1625599.19	1753768.71
49-001(f)	49-609744	1625649.19	1753768.71
49-001(f)	49-609745	1625624.19	1753793.71
49-001(f)	49-609746	1625399.19	1753818.71
49-001(f)	49-609747	1625649.19	1753818.71
49-001(f)	49-609748	1625374.19	1753843.71
49-001(f)	49-609749	1625624.19	1753843.71
49-001(f)	49-609750	1625399.19	1753868.71
49-001(f)	49-609751	1625649.19	1753868.71
49-001(f)	49-609752	1625399.19	1753918.71
49-001(f)	49-609753	1625674.19	1753893.71
49-001(f)	49-609754	1625649.19	1753918.71
49-001(f)	49-609755	1625374.19	1753943.71
49-001(f)	49-609756	1625674.19	1753943.71
49-001(f)	49-609757	1625399.19	1753968.71
49-001(f)	49-609758	1625649.19	1753968.71
49-001(f)	49-609759	1625424.19	1753993.71
49-001(f)	49-609760	1625474.19	1753993.71
49-001(f)	49-609761	1625524.19	1753993.71
49-001(f)	49-609762	1625574.19	1753993.71
49-001(f)	49-609763	1625624.19	1753993.71

Table 9.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 4 Surface and Shallow Subsurface (continued)			
49-001(f)	49-609764	1625399.19	1754018.71
49-001(f)	49-609765	1625499.19	1754018.71
49-001(f)	49-609766	1625549.19	1754018.71
49-001(f)	49-609767	1625649.19	1754018.71

Table 9.2-2
Samples Collected and Analyses Requested at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
0549-95-0232	49-04000	0.0–0.5	Soil	—*	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0233	49-04001	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0234	49-04002	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0235	49-04003	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0236	49-04004	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0237	49-04005	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0238	49-04006	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0239	49-04007	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0240	49-04008	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0241	49-04009	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0242	49-04010	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0243	49-04011	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0244	49-04012	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0245	49-04013	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0246	49-04014	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0247	49-04015	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0248	49-04016	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0249	49-04017	0.0–0.5	Soil	—	841	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0250	49-04018	0.0–0.5	Soil	—	841	—	—	—	841	—	840	—	—	—	—	841	—	—
0549-95-0251	49-04019	0.0–0.5	Soil	—	841	—	—	—	841	—	—	—	—	—	—	841	—	—
RE49-10-4287	49-609657	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4288	49-609657	0.5–1.5	Qbt4	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4289	49-609658	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4290	49-609658	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4291	49-609659	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4292	49-609659	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4293	49-609660	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4294	49-609660	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4295	49-609661	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4296	49-609661	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4297	49-609662	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4298	49-609662	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4299	49-609663	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4300	49-609663	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4301	49-609664	0.0–0.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4302	49-609664	0.5–1.5	Soil	10-1043	10-1043	—	—	—	10-1043	10-1043	10-1043	—	—	—	—	—	—	—
RE49-10-4307	49-609665	0.0–0.5	Soil	10-1040	10-1040	10-1040	—	—	10-1040	10-1040	10-1040	—	10-1040	—	10-1040	—	—	—

Table 9.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
RE49-10-4308	49-609665	0.5–1.5	Soil	10-1040	10-1040	10-1040	—	—	10-1040	10-1040	10-1040	—	10-1040	—	10-1040	—	—	—
RE49-10-4309	49-609666	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4310	49-609666	0.5–1.5	Qbt4	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4311	49-609667	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4312	49-609667	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4313	49-609668	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4314	49-609668	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4315	49-609669	0.0–0.5	Soil	10-1040	10-1040	10-1040	—	—	10-1040	10-1040	10-1040	—	10-1040	—	10-1040	—	—	—
RE49-10-4316	49-609669	0.5–1.5	Qbt4	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4317	49-609670	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4318	49-609670	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4319	49-609671	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4320	49-609671	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4321	49-609672	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4322	49-609672	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4323	49-609673	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4324	49-609673	0.5–1.5	Qbt4	10-1040	10-1040	10-1040	—	—	10-1040	10-1040	10-1040	—	10-1040	—	10-1040	—	—	—
RE49-10-4325	49-609674	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4326	49-609674	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4327	49-609675	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4328	49-609675	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4329	49-609676	0.0–0.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4330	49-609676	0.5–1.5	Soil	10-1040	10-1040	—	—	—	10-1040	10-1040	10-1040	—	—	—	—	—	—	—
RE49-10-4337	49-609677	0.0–0.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4338	49-609677	0.5–1.5	Qbt4	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4339	49-609678	0.0–0.5	Fill	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4340	49-609678	0.5–1.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4341	49-609679	0.0–0.5	Qbt4	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4342	49-609679	0.5–1.5	Qbt4	10-1039	10-1039	10-1039	—	—	10-1039	10-1039	10-1039	—	10-1039	—	10-1039	—	—	—
RE49-10-4343	49-609680	0.0–0.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4344	49-609680	0.5–1.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4345	49-609681	0.0–0.5	Soil	10-1039	10-1039	10-1039	—	—	10-1039	10-1039	10-1039	—	10-1039	—	10-1039	—	—	—
RE49-10-4346	49-609681	0.5–1.5	Qbt4	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4347	49-609682	0.0–0.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4348	49-609682	0.5–1.5	Qbt4	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4349	49-609683	0.0–0.5	Fill	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4350	49-609683	0.5–1.5	Fill	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4351	49-609684	0.0–0.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—

Table 9.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
RE49-10-4352	49-609684	0.5–1.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4353	49-609685	0.0–0.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4354	49-609685	0.5–1.5	Soil	10-1039	10-1039	—	—	—	10-1039	10-1039	10-1039	—	—	—	—	—	—	—
RE49-10-4361	49-609687	0.0–0.5	Soil	—	10-1042	10-1042	—	—	—	—	—	—	10-1042	—	10-1042	—	—	—
RE49-10-4363	49-609688	0.0–0.5	Soil	—	10-1042	10-1042	—	—	—	—	—	—	10-1042	—	10-1042	—	—	—
RE49-10-4421	49-609717	0.0–0.5	Soil	—	10-1042	10-1042	—	—	—	—	—	—	10-1042	—	10-1042	—	—	—
RE49-10-4477	49-609735	0.0–0.5	Soil	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4481	49-609737	0.0–0.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4483	49-609738	0.0–0.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4488	49-609740	0.5–1.5	Qbt4	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4491	49-609742	0.0–0.5	Soil	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4492	49-609742	0.5–1.5	Qbt4	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4493	49-609743	0.0–0.5	Soil	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4498	49-609745	0.5–1.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4499	49-609746	0.0–0.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4502	49-609747	0.5–1.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4503	49-609748	0.0–0.5	Soil	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4507	49-609750	0.0–0.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4508	49-609750	0.5–1.5	Qbt4	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4514	49-609753	0.5–1.5	Fill	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-4524	49-609758	0.5–1.5	Qbt4	—	10-1041	10-1041	—	—	—	—	—	—	10-1041	—	10-1041	—	—	—
RE49-10-5649	49-610032	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5650	49-610032	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5651	49-610033	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5652	49-610033	0.5–1.5	Qbt4	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5653	49-610034	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5654	49-610034	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5655	49-610035	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5656	49-610035	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5657	49-610036	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5658	49-610036	0.5–1.5	Qbt4	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5659	49-610037	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5660	49-610037	0.5–1.5	Qbt4	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5661	49-610038	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5662	49-610038	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5663	49-610039	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5664	49-610039	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5665	49-610040	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—

Table 9.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
RE49-10-5666	49-610040	0.5–1.5	Qbt4	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5667	49-610041	0.0–0.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5668	49-610041	0.5–1.5	Soil	10-712	10-712	—	—	—	10-712	10-712	10-712	—	—	—	—	—	—	—
RE49-10-5669	49-610042	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5670	49-610042	0.5–1.5	Qbt4	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5671	49-610043	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5672	49-610043	0.5–1.5	Qbt4	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5673	49-610044	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5674	49-610044	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5675	49-610045	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5676	49-610045	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5677	49-610046	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5678	49-610046	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5679	49-610047	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5680	49-610047	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5681	49-610048	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5682	49-610048	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5683	49-610049	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5684	49-610049	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5685	49-610050	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5686	49-610050	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5687	49-610051	0.0–0.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5688	49-610051	0.5–1.5	Soil	10-713	10-713	—	—	—	10-713	10-713	10-713	—	—	—	—	—	—	—
RE49-10-5689	49-610052	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5690	49-610052	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5691	49-610053	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5692	49-610053	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5693	49-610054	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5694	49-610054	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5695	49-610055	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5696	49-610055	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5697	49-610056	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5698	49-610056	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5699	49-610057	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5700	49-610057	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5701	49-610058	0.0–0.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5702	49-610058	0.5–1.5	Soil	10-714	10-714	—	—	—	10-714	10-714	10-714	—	—	—	—	—	—	—
RE49-10-5703	49-610059	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—

Table 9.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
RE49-10-5704	49-610059	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5705	49-610060	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5706	49-610060	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5707	49-610061	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5708	49-610061	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5709	49-610062	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5710	49-610062	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5711	49-610063	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5712	49-610063	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5713	49-610064	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5714	49-610064	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5715	49-610065	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5716	49-610065	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5717	49-610066	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5718	49-610066	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5719	49-610067	0.0–0.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-5720	49-610067	0.5–1.5	Soil	10-860	10-860	—	—	—	10-860	10-860	10-860	—	—	—	—	—	—	—
RE49-10-8964	49-610938	0.7–2.7	Qbt4	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8965	49-610938	63.5–65.5	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8966	49-610938	106.0–108.0	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8967	49-610938	156.0–158.0	Qbt3	10-1387	—	—	10-1387	10-1387	10-1387	10-1387	10-1387	10-1387	—	10-1387	—	—	10-1387	10-1387
RE49-10-8974	49-610939	2.0–3.5	Qbt4	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8975	49-610939	66.6–68.6	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8976	49-610939	106.0–108.0	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8977	49-610939	156.0–158.0	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8980	49-610940	0.7–2.7	Qbt4	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8981	49-610940	72.7–74.7	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8982	49-610940	110.0–113.0	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8983	49-610940	156.0–158.0	Qbt3	10-1312	—	—	10-1312	10-1310	10-1312	10-1312	10-1311	10-1311	—	10-1310	—	—	10-1310	10-1311
RE49-10-8986	49-610941	1.3–3.4	Qbt4	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8987	49-610941	70.0–72.0	Qbt3	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8988	49-610941	105.0–107.0	Qbt3	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-8989	49-610941	156.0–158.0	Qbt3	10-1107	—	—	10-1107	10-1106	10-1107	10-1107	10-1108	10-1108	—	10-1106	—	—	10-1106	10-1108
RE49-10-10850	49-611030	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10851	49-611030	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10852	49-611031	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10853	49-611031	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10854	49-611032	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—

Table 9.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
RE49-10-10855	49-611032	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10856	49-611033	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10857	49-611033	0.5–1.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10858	49-611034	0.0–0.5	Soil	10-1524	10-1524	—	—	—	10-1524	10-1524	10-1524	—	—	—	—	—	—	—
RE49-10-10859	49-611034	0.5–1.5	Soil	10-1525	10-1525	—	—	—	10-1525	10-1525	10-1525	—	—	—	—	—	—	—
RE49-10-10932	49-611066	0.0–0.5	Qbt4	—	10-1788	10-1788	—	—	—	—	—	—	10-1788	—	10-1788	—	—	—

*— = Not requested.

Table 9.2-3
Field-Screening Results for Samples Collected at Area 4, SWMU 49-001(f)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 4 Drilling Samples						
49-001(f)	49-610938	0.7–2.7	RE49-10-8964	0.0	18	1833
49-001(f)	49-610938	63.5–65.5	RE49-10-8965	0.0	23	1961
49-001(f)	49-610938	106.0–108.0	RE49-10-8966	0.0	42	1864
49-001(f)	49-610938	156.0–158.0	RE49-10-8967	0.0	37	1909
49-001(f)	49-610939	2.0–3.5	RE49-10-8974	0.0	18	1768
49-001(f)	49-610939	66.6–68.6	RE49-10-8975	0.0	28	1839
49-001(f)	49-610939	106.0–108.0	RE49-10-8976	0.0	28	2270
49-001(f)	49-610939	156.0–158.0	RE49-10-8977	0.0	27	1991
49-001(f)	49-610940	0.7–2.7	RE49-10-8980	0.0	23	1698
49-001(f)	49-610940	72.7–74.7	RE49-10-8981	0.0	37	2160
49-001(f)	49-610940	110.0–113.0	RE49-10-8982	0.0	19	2100
49-001(f)	49-610940	156.0–158.0	RE49-10-8983	0.0	14	2000
49-001(f)	49-610941	1.3–3.4	RE49-10-8986	0.0	18	1800
49-001(f)	49-610941	70.0–72.0	RE49-10-8987	0.0	85	2640
49-001(f)	49-610941	105.0–107.0	RE49-10-8988	0.0	65	2670
49-001(f)	49-610941	156.0–158.0	RE49-10-8989	0.0	78	2650
Area 4 Surface and Shallow Subsurface Samples						
49-001(f)	49-609657	0.0–0.5	RE49-10-4287	NA*	14	1897
49-001(f)	49-609657	0.5–1.5	RE49-10-4288	NA	28	2090
49-001(f)	49-609658	0.0–0.5	RE49-10-4289	NA	23	2200
49-001(f)	49-609658	0.5–1.5	RE49-10-4290	NA	9	2010
49-001(f)	49-609659	0.0–0.5	RE49-10-4291	NA	18	2350
49-001(f)	49-609659	0.5–1.5	RE49-10-4292	NA	42	2090
49-001(f)	49-609660	0.0–0.5	RE49-10-4293	NA	37	2110
49-001(f)	49-609660	0.5–1.5	RE49-10-4294	NA	28	1850

Table 9.2-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 4 Surface and Shallow Subsurface Samples (continued)						
49-001(f)	49-609661	0.0–0.5	RE49-10-4295	NA	47	2110
49-001(f)	49-609661	0.5–1.5	RE49-10-4296	NA	9	2200
49-001(f)	49-609662	0.0–0.5	RE49-10-4297	NA	23	2460
49-001(f)	49-609662	0.5–1.5	RE49-10-4298	NA	23	2090
49-001(f)	49-609663	0.0–0.5	RE49-10-4299	NA	9	2100
49-001(f)	49-609663	0.5–1.5	RE49-10-4300	NA	18	1990
49-001(f)	49-609664	0.0–0.5	RE49-10-4301	NA	57	2270
49-001(f)	49-609664	0.5–1.5	RE49-10-4302	NA	18	2070
49-001(f)	49-609665	0.0–0.5	RE49-10-4307	NA	79	2260
49-001(f)	49-609665	0.5–1.5	RE49-10-4308	NA	46	2440
49-001(f)	49-609666	0.0–0.5	RE49-10-4309	NA	13	2560
49-001(f)	49-609666	0.5–1.5	RE49-10-4310	NA	39	2440
49-001(f)	49-609667	0.0–0.5	RE49-10-4311	NA	66	2390
49-001(f)	49-609667	0.5–1.5	RE49-10-4312	NA	59	2160
49-001(f)	49-609668	0.0–0.5	RE49-10-4313	NA	28	2220
49-001(f)	49-609668	0.5–1.5	RE49-10-4314	NA	28	2200
49-001(f)	49-609669	0.0–0.5	RE49-10-4315	NA	33	2360
49-001(f)	49-609669	0.5–1.5	RE49-10-4316	NA	72	2560
49-001(f)	49-609670	0.0–0.5	RE49-10-4317	NA	23	2060
49-001(f)	49-609670	0.5–1.5	RE49-10-4318	NA	33	2140
49-001(f)	49-609671	0.0–0.5	RE49-10-4319	NA	37	2230
49-001(f)	49-609671	0.5–1.5	RE49-10-4320	NA	14	2200
49-001(f)	49-609672	0.0–0.5	RE49-10-4321	NA	14	2030
49-001(f)	49-609672	0.5–1.5	RE49-10-4322	NA	28	1990
49-001(f)	49-609673	0.0–0.5	RE49-10-4323	NA	33	2340
49-001(f)	49-609673	0.5–1.5	RE49-10-4324	NA	39	2450
49-001(f)	49-609674	0.0–0.5	RE49-10-4325	NA	23	2040
49-001(f)	49-609674	0.5–1.5	RE49-10-4326	NA	23	2020
49-001(f)	49-609675	0.0–0.5	RE49-10-4327	NA	9	1944
49-001(f)	49-609675	0.5–1.5	RE49-10-4328	NA	23	1786
49-001(f)	49-609676	0.0–0.5	RE49-10-4329	NA	42	1932
49-001(f)	49-609676	0.5–1.5	RE49-10-4330	NA	66	1961
49-001(f)	49-609677	0.0–0.5	RE49-10-4337	NA	59	2490
49-001(f)	49-609677	0.5–1.5	RE49-10-4338	NA	13	2490
49-001(f)	49-609678	0.0–0.5	RE49-10-4339	NA	26	2480
49-001(f)	49-609678	0.5–1.5	RE49-10-4340	NA	72	2310
49-001(f)	49-609679	0.0–0.5	RE49-10-4341	NA	66	2540
49-001(f)	49-609679	0.5–1.5	RE49-10-4342	NA	26	2400

Table 9.2-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 4 Surface and Shallow Subsurface Samples (continued)						
49-001(f)	49-609680	0.0–0.5	RE49-10-4343	NA	26	2220
49-001(f)	49-609680	0.5–1.5	RE49-10-4344	NA	39	2360
49-001(f)	49-609681	0.0–0.5	RE49-10-4345	NA	39	2360
49-001(f)	49-609681	0.5–1.5	RE49-10-4346	NA	19	2150
49-001(f)	49-609682	0.0–0.5	RE49-10-4347	NA	26	2150
49-001(f)	49-609682	0.5–1.5	RE49-10-4348	NA	59	2300
49-001(f)	49-609683	0.0–0.5	RE49-10-4349	NA	46	2510
49-001(f)	49-609683	0.5–1.5	RE49-10-4350	NA	39	2340
49-001(f)	49-609684	0.0–0.5	RE49-10-4351	NA	33	2130
49-001(f)	49-609684	0.5–1.5	RE49-10-4352	NA	9	1903
49-001(f)	49-609685	0.0–0.5	RE49-10-4353	NA	9	1891
49-001(f)	49-609685	0.5–1.5	RE49-10-4354	NA	18	1768
49-001(f)	49-609687	0.0–0.5	RE49-10-4361	NA	13	2530
49-001(f)	49-609688	0.0–0.5	RE49-10-4363	NA	46	2460
49-001(f)	49-609717	0.0–0.5	RE49-10-4421	NA	26	2440
49-001(f)	49-609735	0.0–0.5	RE49-10-4477	NA	46	2540
49-001(f)	49-609737	0.0–0.5	RE49-10-4481	NA	46	2500
49-001(f)	49-609738	0.0–0.5	RE49-10-4483	NA	39	2310
49-001(f)	49-609740	0.5–1.5	RE49-10-4488	NA	72	2590
49-001(f)	49-609742	0.0–0.5	RE49-10-4491	NA	72	2420
49-001(f)	49-609742	0.5–1.5	RE49-10-4492	NA	52	2450
49-001(f)	49-609743	0.0–0.5	RE49-10-4493	NA	39	2320
49-001(f)	49-609745	0.5–1.5	RE49-10-4498	NA	59	2330
49-001(f)	49-609746	0.0–0.5	RE49-10-4499	NA	26	2680
49-001(f)	49-609747	0.5–1.5	RE49-10-4502	NA	46	2500
49-001(f)	49-609748	0.0–0.5	RE49-10-4503	NA	33	2120
49-001(f)	49-609750	0.0–0.5	RE49-10-4507	NA	39	2330
49-001(f)	49-609750	0.5–1.5	RE49-10-4508	NA	26	2830
49-001(f)	49-609753	0.5–1.5	RE49-10-4514	NA	33	2240
49-001(f)	49-609758	0.5–1.5	RE49-10-4524	NA	66	2270
49-001(f)	49-611066	0.0–0.5	RE49-10-10932	NA	44	2430

*NA = Not analyzed.

Table 9.2-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**
0549-95-0235	49-04003	0.0–0.5	Soil	—[g]	—	—	—	—	—	—	—	—	28.4	NA[h]	—
0549-95-0237	49-04005	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0238	49-04006	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0239	49-04007	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0241	49-04009	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0245	49-04013	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0246	49-04014	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
0549-95-0248	49-04016	0.0–0.5	Soil	—	—	—	—	—	0.42 (J)	—	—	—	25.8 (J)	NA	—
0549-95-0250	49-04018	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4287	49-609657	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4288	49-609657	0.5–1.5	Qbt4	—	—	—	76.2	—	—	—	7.7	—	—	NA	—
RE49-10-4293	49-609660	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4294	49-609660	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4297	49-609662	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4299	49-609663	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4301	49-609664	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4310	49-609666	0.5–1.5	Qbt4	—	—	—	84.8	—	—	—	—	—	—	NA	—
RE49-10-4312	49-609667	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4313	49-609668	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4314	49-609668	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4316	49-609669	0.5–1.5	Qbt4	—	—	—	64.7	—	—	—	7.9 (J-)	—	—	NA	—
RE49-10-4317	49-609670	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4324	49-609673	0.5–1.5	Qbt4	10,500 (J+)	—	3.6	130	—	—	2930	11.3 (J-)	3.5	5.8	NA	14,900
RE49-10-4326	49-609674	0.5–1.5	Soil	—	—	—	—	—	—	7040	—	—	—	NA	—
RE49-10-4330	49-609676	0.5–1.5	Soil	—	—	—	435	—	—	—	—	—	—	NA	—
RE49-10-4338	49-609677	0.5–1.5	Qbt4	—	—	—	50	—	—	—	—	—	—	NA	—
RE49-10-4339	49-609678	0.0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4341	49-609679	0.0–0.5	Qbt4	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4342	49-609679	0.5–1.5	Qbt4	—	—	—	—	—	—	—	7.7	—	—	NA	—
RE49-10-4344	49-609680	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—

Table 9.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na**[c]	**2.19E+02**[d]	**2.3E+01**[e]	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03**[d]	**3.0E+02**[e]	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02**[d]	**3.46E+01**[f]	**1.24E+04**	**6.19E+03**	**2.17E+05**
RE49-10-4345	49-609681	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4346	49-609681	0.5–1.5	Qbt4	9650	—	4.6 (J)	103	—	—	—	8.9	3.6	5.4 (J)	NA	—
RE49-10-4348	49-609682	0.5–1.5	Qbt4	21,500	—	6.7	140	—	—	2350	20.1	3.3	5.1 (J)	NA	—
RE49-10-4350	49-609683	0.5–1.5	Fill	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4352	49-609684	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-4353	49-609685	0.0–0.5	Soil	—	—	—	305	—	—	—	—	—	—	NA	—
RE49-10-4354	49-609685	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5649	49-610032	0.0–0.5	Soil	—	—	—	—	—	—	—	—	10.3	—	NA	—
RE49-10-5650	49-610032	0.5–1.5	Soil	—	—	—	—	—	—	—	—	15.3	—	NA	—
RE49-10-5652	49-610033	0.5–1.5	Qbt4	13,300	—	—	176	—	—	3470 (J+)	10.2	6.3	6.2	NA	—
RE49-10-5654	49-610034	0.5–1.5	Soil	—	—	—	—	—	—	—	—	9.3	—	NA	—
RE49-10-5656	49-610035	0.5–1.5	Soil	—	—	—	365	—	—	—	—	—	—	NA	—
RE49-10-5657	49-610036	0.0–0.5	Soil	—	—	—	—	—	—	—	—	8.7	—	NA	—
RE49-10-5658	49-610036	0.5–1.5	Qbt4	14,700	—	3.4	242	—	—	3280 (J+)	11.2	5.9	6.9	NA	—
RE49-10-5660	49-610037	0.5–1.5	Qbt4	12,800	—	—	140	—	—	—	9.1	4.8	5.9	NA	—
RE49-10-5666	49-610040	0.5–1.5	Qbt4	21,800	—	4.9	311	1.4	—	2800 (J+)	12.5	4.9	7.2	NA	—
RE49-10-5670	49-610042	0.5–1.5	Qbt4	15,900	—	4.4	159 (J+)	1.4	—	3250	12	5 (J)	6.9	NA	—
RE49-10-5672	49-610043	0.5–1.5	Qbt4	13,800	—	3	90.4 (J+)	—	—	2480	11	5 (J)	4.9	NA	—
RE49-10-5675	49-610045	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5685	49-610050	0.0–0.5	Soil	—	—	—	328 (J+)	—	—	—	—	—	—	NA	—
RE49-10-5697	49-610056	0.0–0.5	Soil	—	—	—	—	—	—	—	—	18.1 (J)	—	NA	—
RE49-10-5698	49-610056	0.5–1.5	Soil	—	—	—	—	—	—	9110 (J+)	—	—	—	NA	—
RE49-10-5699	49-610057	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5700	49-610057	0.5–1.5	Soil	—	—	—	—	—	—	—	—	11.6	—	NA	—
RE49-10-5704	49-610059	0.5–1.5	Soil	—	—	—	—	—	—	—	—	15.8 (J)	—	NA	—
RE49-10-5705	49-610060	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5706	49-610060	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5709	49-610062	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	125	NA	—
RE49-10-5710	49-610062	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	22.1	NA	—
RE49-10-5711	49-610063	0.0–0.5	Soil	—	—	—	—	—	—	—	—	9.6 (J)	—	NA	—
RE49-10-5712	49-610063	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5713	49-610064	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5716	49-610065	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—

Table 9.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14,500**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21,500**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**5.48E+04**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**7.95E+05**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.17E+05**
RE49-10-5717	49-610066	0.0–0.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-5720	49-610067	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	NA	—
RE49-10-8964	49-610938	0.7–2.7	Qbt4	8730	—	3.3	163	—	—	3880 (J)	—	—	—	0.55 (UJ)	—
RE49-10-8965	49-610938	63.5–65.5	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8966	49-610938	106.0–108.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8967	49-610938	156.0–158.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8974	49-610939	2.0–3.5	Qbt4	—	—	—	118	—	—	5660 (J)	—	—	—	0.55 (UJ)	—
RE49-10-8975	49-610939	66.6–68.6	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8976	49-610939	106.0–108.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8977	49-610939	156.0–158.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8980	49-610940	0.7–2.7	Qbt4	13,500	—	2.9	291	—	—	6420 (J)	—	—	—	0.56 (UJ)	—
RE49-10-8981	49-610940	72.7–74.7	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8982	49-610940	110.0–113.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8983	49-610940	156.0–158.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8986	49-610941	1.3–3.4	Qbt4	—	0.52 (U)	—	—	—	—	—	—	—	—	0.52 (UJ)	—
RE49-10-8987	49-610941	70.0–72.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-8988	49-610941	105.0–107.0	Qbt3	—	0.51 (U)	—	—	—	—	—	—	—	—	0.51 (U)	—
RE49-10-8989	49-610941	156.0–158.0	Qbt3	—	—	—	—	—	—	—	—	—	—	—	—

Table 9.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**3.91E+02**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**5.68E+03**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**1.55E+03**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
0549-95-0235	49-04003	0.0–0.5	Soil	—	—	—	—	—	—	1.2 (U)	—	—	—
0549-95-0237	49-04005	0.0–0.5	Soil	—	—	—	—	—	—	1.4 (U)	—	—	—
0549-95-0238	49-04006	0.0–0.5	Soil	—	—	—	—	—	—	1.8 (J)	—	—	—
0549-95-0239	49-04007	0.0–0.5	Soil	—	—	—	—	—	—	1.4 (U)	—	—	—
0549-95-0241	49-04009	0.0–0.5	Soil	—	—	—	1.1 (U)	—	—	1.3 (J)	—	—	—
0549-95-0245	49-04013	0.0–0.5	Soil	—	—	—	0.11 (U)	—	—	1.3 (U)	—	—	—
0549-95-0246	49-04014	0.0–0.5	Soil	—	—	—	0.11 (U)	—	—	1.3 (U)	1.85	—	—
0549-95-0248	49-04016	0.0–0.5	Soil	51.5 (J+)	—	—	0.11 (U)	23.4	—	1.4 (U)	—	—	50.3
0549-95-0250	49-04018	0.0–0.5	Soil	—	—	—	—	—	—	1.3 (U)	—	—	—
RE49-10-4287	49-609657	0.0–0.5	Soil	31.1	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-4288	49-609657	0.5–1.5	Qbt4	21.8	—	—	—	—	1.3 (J-)	—	NA	—	—
RE49-10-4293	49-609660	0.0–0.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-4294	49-609660	0.5–1.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-4297	49-609662	0.0–0.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-4299	49-609663	0.0–0.5	Soil	43.4	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-4301	49-609664	0.0–0.5	Soil	—	—	—	—	—	2 (J-)	—	NA	—	—
RE49-10-4310	49-609666	0.5–1.5	Qbt4	—	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-4312	49-609667	0.5–1.5	Soil	—	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-4313	49-609668	0.0–0.5	Soil	36.3	—	—	—	—	—	—	NA	—	196
RE49-10-4314	49-609668	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	90.3 (J+)
RE49-10-4316	49-609669	0.5–1.5	Qbt4	—	—	—	—	—	0.92 (J-)	—	NA	—	—
RE49-10-4317	49-609670	0.0–0.5	Soil	—	—	—	—	—	—	1.1 (U)	NA	—	—
RE49-10-4324	49-609673	0.5–1.5	Qbt4	20.7	1990	—	—	9.4	1.3 (J-)	—	NA	19	—
RE49-10-4326	49-609674	0.5–1.5	Soil	—	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-4330	49-609676	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-4338	49-609677	0.5–1.5	Qbt4	—	—	—	—	—	1.8 (U)	—	NA	—	—
RE49-10-4339	49-609678	0.0–0.5	Fill	—	—	—	—	—	1.8 (U)	—	NA	—	—
RE49-10-4341	49-609679	0.0–0.5	Qbt4	—	—	—	—	—	1.6 (U)	—	NA	—	—
RE49-10-4342	49-609679	0.5–1.5	Qbt4	14.6	—	—	—	7.3	1.9 (U)	—	NA	—	—
RE49-10-4344	49-609680	0.5–1.5	Soil	—	—	—	—	—	1.7 (U)	—	NA	—	—
RE49-10-4345	49-609681	0.0–0.5	Soil	—	—	—	—	—	1.7 (U)	—	NA	—	—
RE49-10-4346	49-609681	0.5–1.5	Qbt4	14.8	—	—	—	8.7	1.6 (U)	1.5	NA	—	—
RE49-10-4348	49-609682	0.5–1.5	Qbt4	11.8	2280 (J+)	—	—	12.7	1.6 (U)	—	NA	17.2	—
RE49-10-4350	49-609683	0.5–1.5	Fill	—	—	—	—	—	1.7 (U)	—	NA	—	—

Table 9.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**3.91E+02**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**5.68E+03**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**1.55E+03**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-4352	49-609684	0.5–1.5	Soil	—	—	—	—	—	1.7 (U)	—	NA	—	—
RE49-10-4353	49-609685	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-4354	49-609685	0.5–1.5	Soil	—	—	—	—	—	1.8 (U)	—	NA	—	—
RE49-10-5649	49-610032	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5650	49-610032	0.5–1.5	Soil	—	—	887	—	—	—	—	NA	—	—
RE49-10-5652	49-610033	0.5–1.5	Qbt4	12.7	1890	—	—	7.6	1.1 (U)	—	NA	22.1	—
RE49-10-5654	49-610034	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5656	49-610035	0.5–1.5	Soil	—	—	—	—	—	—	0.74	NA	—	—
RE49-10-5657	49-610036	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5658	49-610036	0.5–1.5	Qbt4	12.4	2060	—	—	9.7	1.3 (U)	—	NA	23.7	—
RE49-10-5660	49-610037	0.5–1.5	Qbt4	11.4	1740	—	—	8.1	1.3 (U)	—	NA	19.1	—
RE49-10-5666	49-610040	0.5–1.5	Qbt4	15.3	2400	—	—	10.9	1.8 (U)	—	NA	26.4	—
RE49-10-5670	49-610042	0.5–1.5	Qbt4	17.3	2510 (J+)	—	—	10.5	1.4	—	NA	22.4	—
RE49-10-5672	49-610043	0.5–1.5	Qbt4	12.7	2260 (J+)	—	—	8.5	1.2	—	NA	19.2	—
RE49-10-5675	49-610045	0.0–0.5	Soil	—	—	—	—	—	—	1 (U)	NA	—	—
RE49-10-5685	49-610050	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5697	49-610056	0.0–0.5	Soil	—	—	1390 (J)	—	—	—	—	NA	—	—
RE49-10-5698	49-610056	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5699	49-610057	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	60.4
RE49-10-5700	49-610057	0.5–1.5	Soil	—	—	706	—	—	—	—	NA	—	—
RE49-10-5704	49-610059	0.5–1.5	Soil	—	—	723 (J)	—	—	—	—	NA	—	—
RE49-10-5705	49-610060	0.0–0.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-5706	49-610060	0.5–1.5	Soil	—	—	—	—	—	2.1 (J-)	—	NA	—	—
RE49-10-5709	49-610062	0.0–0.5	Soil	26.8	—	—	—	—	—	—	NA	—	—
RE49-10-5710	49-610062	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5711	49-610063	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—
RE49-10-5712	49-610063	0.5–1.5	Soil	—	—	—	—	—	—	0.82	NA	—	—
RE49-10-5713	49-610064	0.0–0.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-5716	49-610065	0.5–1.5	Soil	—	—	—	—	—	1.6 (J-)	—	NA	—	—
RE49-10-5717	49-610066	0.0–0.5	Soil	—	—	—	—	—	1.7 (J-)	—	NA	—	—
RE49-10-5720	49-610067	0.5–1.5	Soil	—	—	—	—	—	1.9 (J-)	—	NA	—	—
RE49-10-8964	49-610938	0.7–2.7	Qbt4	—	—	—	—	—	0.59	—	NA	—	—
RE49-10-8965	49-610938	63.5–65.5	Qbt3	—	—	—	—	—	0.93	—	NA	—	—
RE49-10-8966	49-610938	106.0–108.0	Qbt3	—	—	—	—	—	1.4	—	NA	—	—

Table 9.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Thallium	Uranium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**11.2**	**1690**	**482**	**0.1**	**6.58**	**0.3**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**22.3**	**4610**	**671**	**0.1**	**15.4**	**1.52**	**0.73**	**1.82**	**39.6**	**48.8**
Residential SSL[b]				**4.00E+02**	**na**	**1.07E+04**	**2.3E+01[e]**	**1.56E+03**	**3.91E+02**	**5.16E+00**	**2.35E+02**	**3.91E+02**	**2.35E+04**
Industrial SSL[b]				**8.00E+02**	**na**	**1.45E+05**	**3.1E+02[e]**	**2.27E+04**	**5.68E+03**	**7.49E+01**	**3.41E+03**	**5.68E+03**	**3.41E+05**
Construction Worker SSL[b]				**8.00E+02**	**na**	**4.63E+02**	**9.29E+01[f]**	**6.19E+03**	**1.55E+03**	**2.04E+01**	**9.29E+02**	**1.55E+03**	**9.29E+04**
RE49-10-8967	49-610938	156.0–158.0	Qbt3	—	—	—	—	—	0.74	—	NA	—	—
RE49-10-8974	49-610939	2.0–3.5	Qbt4	—	—	—	—	—	0.84	—	NA	—	—
RE49-10-8975	49-610939	66.6–68.6	Qbt3	—	—	—	—	—	0.99	—	NA	—	—
RE49-10-8976	49-610939	106.0–108.0	Qbt3	—	—	—	—	—	0.98	—	NA	—	—
RE49-10-8977	49-610939	156.0–158.0	Qbt3	—	—	—	—	—	0.91	—	NA	—	—
RE49-10-8980	49-610940	0.7–2.7	Qbt4	—	2110	—	—	—	0.57	—	NA	—	—
RE49-10-8981	49-610940	72.7–74.7	Qbt3	—	—	—	—	—	1.1	—	NA	—	—
RE49-10-8982	49-610940	110.0–113.0	Qbt3	—	—	—	—	—	1.1	—	NA	—	—
RE49-10-8983	49-610940	156.0–158.0	Qbt3	—	—	—	—	—	0.98	—	NA	—	—
RE49-10-8986	49-610941	1.3–3.4	Qbt4	—	—	—	—	—	0.55	—	NA	—	—
RE49-10-8987	49-610941	70.0–72.0	Qbt3	—	—	—	—	—	1	—	NA	—	—
RE49-10-8988	49-610941	105.0–107.0	Qbt3	—	—	—	—	—	1.2	—	NA	—	—
RE49-10-8989	49-610941	156.0–158.0	Qbt3	—	—	—	—	—	0.84	—	NA	—	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 9.2-5
Summary of Organic Chemicals Detected at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Bis(2-ethylhexyl)phthalate
Residential SSL[a]				**6.75E+04**	**3.47E+02**
Industrial SSL[a]				**8.51E+05**	**1.37E+03**
Construction Worker SSL[a]				**2.63E+05**	**4.76E+03**
RE49-10-8964	49-610938	0.7–2.7	Qbt4	—[b]	0.056 (J)
RE49-10-8966	49-610938	106.0–108.0	Qbt3	0.0076 (J)	—
RE49-10-8976	49-610939	106.0–108.0	Qbt3	0.01 (J)	—
RE49-10-8977	49-610939	156.0–158.0	Qbt3	0.0077 (J)	—
RE49-10-8986	49-610941	1.3–3.4	Qbt4	—	0.24 (J)

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

[a] SSLs from NMED (2009, 106420).

[b] — = Analyzed for but not detected.

Table 9.2-6
Summary of Radionuclides Detected or Detected above BVs/FVs at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-134	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**na**	**1.65**	**0.023**	**0.054**	**na**
Residential SAL[c]				**30**	**2.4**	**5.6**	**37**	**33**	**750**
Industrial SAL[c]				**180**	**9.7**	**23**	**240**	**210**	**440000**
Construction Worker SAL[c]				**34**	**7.7**	**18**	**40**	**36**	**320000**
0549-95-0235	49-04003	0.0–0.5	Soil	NA[d]	NA	—[e]	0.03432	—	NA
0549-95-0238	49-04006	0.0–0.5	Soil	NA	NA	—	—	0.05837	NA
0549-95-0239	49-04007	0.0–0.5	Soil	NA	NA	—	—	0.1008	NA
0549-95-0244	49-04012	0.0–0.5	Soil	0.5924	NA	—	NA	NA	NA
0549-95-0246	49-04014	0.0–0.5	Soil	NA	NA	NA	0.06285	0.08287	NA

Table 9.2-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-134	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**na**	**1.65**	**0.023**	**0.054**	**na**
Residential SAL[c]				**30**	**2.4**	**5.6**	**37**	**33**	**750**
Industrial SAL[c]				**180**	**9.7**	**23**	**240**	**210**	**440000**
Construction Worker SAL[c]				**34**	**7.7**	**18**	**40**	**36**	**320000**
0549-95-0251	49-04019	0.0–0.5	Soil	NA	NA	—	0.03798	0.2126	NA
RE49-10-4299	49-609663	0.0–0.5	Soil	—	—	—	—	0.112	NA
RE49-10-4301	49-609664	0.0–0.5	Soil	—	—	—	—	0.215	NA
RE49-10-4302	49-609664	0.5–1.5	Soil	—	—	—	—	0.055	NA
RE49-10-4321	49-609672	0.0–0.5	Soil	0.038	—	—	—	—	NA
RE49-10-4322	49-609672	0.5–1.5	Soil	0.058	—	—	—	—	NA
RE49-10-4327	49-609675	0.0–0.5	Soil	—	—	—	—	0.166	NA
RE49-10-5651	49-610033	0.0–0.5	Soil	—	0.062	—	—	—	NA
RE49-10-5664	49-610039	0.5–1.5	Soil	—	—	0.227	—	—	NA
RE49-10-5678	49-610046	0.5–1.5	Soil	—	—	0.257	—	—	NA
RE49-10-8964	49-610938	0.7–2.7	Qbt4	—	NA	NA	—	—	0.176
RE49-10-8965	49-610938	63.5–65.5	Qbt3	—	NA	NA	—	—	4.11
RE49-10-8975	49-610939	66.6–68.6	Qbt3	—	NA	NA	—	—	1.83
RE49-10-8982	49-610940	110.0–113.0	Qbt3	—	NA	NA	—	—	0.255
RE49-10-8983	49-610940	156.0–158.0	Qbt3	—	NA	NA	—	—	0.288
RE49-10-8986	49-610941	1.3–3.4	Qbt4	—	NA	NA	—	—	8.39
RE49-10-8987	49-610941	70.0–72.0	Qbt3	—	NA	NA	—	—	1.67
RE49-10-8988	49-610941	105.0–107.0	Qbt3	—	NA	NA	—	—	1.48

Note: All activities are in pCi/g.

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

[b] na = Not available.

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

[d] NA = Not analyzed.

[e] — = Not detected or not detected above BV/FV.

Table 9.2-7
Summary of Pore-Gas Samples Collected
and Analyses Requested at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
MD49-10-12146	49-610939	62.0–64.0	Pore gas	10-2161	10-2160
MD49-10-12145	49-610939	107.0–109.0	Pore gas	10-2161	10-2160
MD49-10-12142	49-610939	133.0–135.0	Pore gas	10-2161	10-2160

Table 9.2-8
Summary of Organic Chemicals Detected in Pore Gas at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Chloromethane	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
MD49-10-12146	49-610939	62.0–64.0	Pore gas	8.8	11	4	1.7 (J+)	2.8	6.9	11	2.8	30	14	4	34	9.4	25
MD49-10-12145	49-610939	107.0–109.0	Pore gas	14	37	6.3	1.7 (J+)	2.9	17	14	4.9	100	15	4.6	78	19	58
MD49-10-12142	49-610939	133.0–135.0	Pore gas	8.9	13	3.5	1.9 (J+)	2.8	6.9	8.5	2.5	34	9.9	3	33	8.6	24

Note: All concentrations are in µg/m^3.

Table 9.2-9
Summary of Tritium in Pore-Gas Samples at Area 4, SWMU 49-001(f)

Sample ID	Location ID	Depth (ft)	Media	Tritium pCi/L
MD49-10-12146	49-610939	62.0–64.0	Pore gas	67,776.4
MD49-10-12145	49-610939	107.0–109.0	Pore gas	10,444.4
MD49-10-12142	49-610939	133.0–135.0	Pore gas	5946.37

Table 10.2-1
Surveyed Coordinates for 2009–2010 Locations at Area 11, SWMU 49-003

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 11 Drilling			
49-003	49-610496	1625038.731	1755268
49-003	49-610497	1625072.338	1755283
49-003	49-610498	1625100.201	1755247
49-003	49-610499	1625106.376	1755314
49-003	49-610500	1625042.752	1755319

Table 10.2-2
Samples Collected and Analyses Requested at Area 11, SWMU 49-003

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	Strontium-90	SVOCs	Technetium-99	Uranium	VOCs	Cyanide
0549-95-0059	49-08027	1.0–1.5	Soil	—*	680	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0062	49-08028	2.5–3.5	Qbt4	—	680	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0065	49-08029	0.8–2.0	Soil	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0072	49-08031	3.3–4.3	Qbt4	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0075	49-08032	3.3–4.3	Qbt4	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0078	49-08033	3.0–3.5	Qbt4	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0081	49-08034	2.5–3.5	Qbt4	—	680	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0084	49-08037	2.5–3.5	Soil	—	680	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0087	49-08038	2.5–3.5	Qbt4	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0090	49-08039	2.8–3.8	Soil	—	680	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0093	49-08040	3.0–4.0	Soil	—	680	—	—	—	680	—	679	—	—	—	—	680	—	—
0549-95-0069	49-08041	2.3–3.3	Soil	—	680	—	—	—	—	—	—	—	—	—	—	—	—	—
RE49-10-7122	49-610496	0.0–2.0	Soil	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7123	49-610496	7.5–10.0	Qbt4	10-873	—	10-873	10-873	10-871	10-873	10-873	10-872	10-872	10-873	10-871	10-873	—	10-871	10-872
RE49-10-7109	49-610497	0.0–2.0	Soil	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7110	49-610497	13.0–15.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7111	49-610497	18.0–20.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7112	49-610498	0.0–2.0	Soil	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7113	49-610498	8.0–10.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7114	49-610498	18.0–20.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7115	49-610499	0.0–2.0	Soil	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7116	49-610499	13.0–15.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7117	49-610499	18.0–20.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7118	49-610500	0.0–2.0	Soil	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7119	49-610500	8.0–10.0	Qbt3	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986
RE49-10-7120	49-610500	18.0–20.0	Qbt4	10-985	—	10-985	10-985	10-984	10-985	10-985	10-986	10-986	10-985	10-984	10-985	—	10-984	10-986

*— = No sample collected.

Table 10.2-3
Field-Screening Results for Samples Collected at Area 11, SWMU 49-003

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 11 Drilling Samples						
49-003	49-610497	0.0–2.0	RE49-10-7109	0.0	91	2050
49-003	49-610497	13.0–15.0	RE49-10-7110	0.0	85	2430
49-003	49-610497	18.0–20.0	RE49-10-7111	0.0	104	2320
49-003	49-610498	0.0–2.0	RE49-10-7112	0.0	65	2390
49-003	49-610498	8.0–10.0	RE49-10-7113	0.1	85	2640
49-003	49-610498	18.0–20.0	RE49-10-7114	0.0	39	2310
49-003	49-610499	0.0–2.0	RE49-10-7115	0.0	59	2220
49-003	49-610499	13.0–15.0	RE49-10-7116	0.0	98	2370
49-003	49-610499	18.0–20.0	RE49-10-7117	0.0	137	2565
49-003	49-610500	0.0–2.0	RE49-10-7118	0.0	78	2100
49-003	49-610500	8.0–10.0	RE49-10-7119	0.0	28	2520
49-003	49-610500	18.0–20.0	RE49-10-7120	0.0	59	2350
49-003	49-610496	0.0–2.0	RE49-10-7122	0.0	98	2260
49-003	49-610496	7.5–10.0	RE49-10-7123	0.0	59	2470
49-003	49-610489	0.0–2.0	RE49-10-7087	0.0	37	1733

Table 10.2-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 11, SWMU 49-003

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**
Soil BV[a]				**29,200**	**0.83**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**
0549-95-0065	49-08029	0.8–2.0	Soil	—[g]	—	—	—	—	—	—	—	—	NA[h]
0549-95-0072	49-08031	3.3–4.3	Qbt4	14,900	0.81 (J-)	3.6	175	—	4380	8	12.2	—	NA
0549-95-0075	49-08032	3.3–4.3	Qbt4	9060	0.61 (J-)	3.4	72.2	—	2980	—	—	—	NA
0549-95-0078	49-08033	3.0–3.5	Qbt4	14,200	0.91 (J-)	4.6	147	1.5	3510	9.3	3.3 (J)	6.8	NA
0549-95-0087	49-08038	2.5–3.5	Qbt4	23,100	0.94 (J-)	4.7	431	1.7	5950	11.8	3.9 (J)	7.5	NA
0549-95-0093	49-08040	3.0–4.0	Soil	—	1 (J-)	—	407	—	6330	—	—	—	NA
RE49-10-7122	49-610496	0.0–2.0	Soil	—	—	—	—	—	—	—	9.7	—	0.57 (U)
RE49-10-7123	49-610496	7.5–10.0	Qbt4	—	—	—	—	—	—	—	—	—	0.52 (UJ)
RE49-10-7109	49-610497	0.0–2.0	Soil	—	—	—	460	—	6510 (J+)	—	9.4	—	0.58 (U)
RE49-10-7110	49-610497	13.0–15.0	Qbt4	—	—	—	93.6	—	—	—	—	12.6	0.55 (U)
RE49-10-7111	49-610497	18.0–20.0	Qbt4	—	—	3.4	—	—	—	—	—	—	0.54 (U)
RE49-10-7112	49-610498	0.0–2.0	Soil	—	—	—	—	—	—	—	—	—	0.57 (U)
RE49-10-7113	49-610498	8.0–10.0	Qbt4	—	—	—	—	—	—	—	—	—	0.53 (U)
RE49-10-7114	49-610498	18.0–20.0	Qbt4	—	—	—	—	—	—	—	—	—	0.55 (U)
RE49-10-7115	49-610499	0.0–2.0	Soil	—	—	—	—	—	—	—	—	—	0.55 (U)
RE49-10-7116	49-610499	13.0–15.0	Qbt4	—	—	—	—	—	—	—	—	—	0.51 (U)
RE49-10-7117	49-610499	18.0–20.0	Qbt4	—	—	—	—	—	—	—	—	—	0.52 (U)
RE49-10-7118	49-610500	0.0–2.0	Soil	—	—	—	—	—	—	—	—	—	0.59 (U)
RE49-10-7119	49-610500	8.0–10.0	Qbt3	—	—	—	—	—	—	—	—	—	0.53 (U)
RE49-10-7120	49-610500	18.0–20.0	Qbt4	—	—	—	—	—	—	—	—	—	0.53 (U)

Table 10.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Iron	Lead	Magnesium	Manganese	Nickel	Perchlorate	Selenium	Uranium	Vanadium
Qbt 2,3,4 BV[a]				**14,500**	**11.2**	**1690**	**482**	**6.58**	**na**	**0.3**	**2.4**	**17**
Soil BV[a]				**21,500**	**22.3**	**4610**	**671**	**15.4**	**na**	**1.52**	**1.82**	**39.6**
Residential SSL[b]				**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**1.56E+03**	**5.48E+01**	**3.91E+02**	**2.35E+02**	**3.91E+02**
Industrial SSL[b]				**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**2.27E+04**	**7.95E+02**	**5.68E+03**	**3.41E+03**	**5.68E+03**
Construction Worker SSL[b]				**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**6.19E+03**	**2.17E+02**	**1.55E+03**	**9.29E+02**	**1.55E+03**
0549-95-0065	49-08029	0.8–2.0	Soil	—	—	—	—	—	NA	—	2.42	—
0549-95-0072	49-08031	3.3–4.3	Qbt4	—	22.6	2340	497 (J+)	7.8 (J)	NA	0.75 (J)	—	17.3
0549-95-0075	49-08032	3.3–4.3	Qbt4	—	—	2270	—	—	NA	0.46 (U)	—	—
0549-95-0078	49-08033	3.0–3.5	Qbt4	—	15.4	3260	—	10	NA	0.69 (J)	—	—
0549-95-0087	49-08038	2.5–3.5	Qbt4	16,600	23.5	4250	—	11.9	NA	0.54 (J)	—	20.7
0549-95-0093	49-08040	3.0–4.0	Soil	—	—	—	—	—	NA	—	1.85	—
RE49-10-7122	49-610496	0.0–2.0	Soil	—	—	—	—	—	0.0044 (J)	—	NA	—
RE49-10-7123	49-610496	7.5–10.0	Qbt4	—	—	—	—	—	0.0071	1.4 (J)	NA	—
RE49-10-7109	49-610497	0.0–2.0	Soil	—	—	—	723	15.6	0.026	2 (U)	NA	—
RE49-10-7110	49-610497	13.0–15.0	Qbt4	—	—	—	—	—	—	2 (J-)	NA	—
RE49-10-7111	49-610497	18.0–20.0	Qbt4	—	—	—	—	—	0.0023 (J)	1.7 (J-)	NA	—
RE49-10-7112	49-610498	0.0–2.0	Soil	—	—	—	—	—	—	1.6 (J-)	NA	—
RE49-10-7113	49-610498	8.0–10.0	Qbt4	—	—	—	—	—	—	1.9 (J-)	NA	—
RE49-10-7114	49-610498	18.0–20.0	Qbt4	—	—	—	—	—	0.0038 (J)	1.6 (J-)	NA	—
RE49-10-7115	49-610499	0.0–2.0	Soil	—	—	—	—	—	—	1.7 (J-)	NA	—
RE49-10-7116	49-610499	13.0–15.0	Qbt4	—	—	—	—	—	—	1.3 (J-)	NA	—
RE49-10-7117	49-610499	18.0–20.0	Qbt4	—	—	—	—	—	—	1.5 (J-)	NA	—
RE49-10-7118	49-610500	0.0–2.0	Soil	—	—	—	—	—	0.047	1.8 (J-)	NA	—
RE49-10-7119	49-610500	8.0–10.0	Qbt3	—	—	—	—	—	0.0031 (J)	1.3 (U)	NA	—
RE49-10-7120	49-610500	18.0–20.0	Qbt4	—	—	—	—	—	—	1.5 (J-)	NA	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 10.2-5
Summary of Organic Chemicals Detected at Area 11, SWMU 49-003

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Methylene Chloride
Residential SSL[a]				**6.75E+04**	**6.1E+03**[b]	**3.47E+02**	**1.99E+02**
Industrial SSL[a]				**8.51E+05**	**6.2E+04**[b]	**1.37E+03**	**1.09E+03**
Construction Worker SSL[a]				**2.63E+05**	**3.09E+04**[c]	**4.76E+03**	**1.06E+04**
RE49-10-7123	49-610496	7.5–10.0	Qbt4	—[d]	0.056 (J)	—	—
RE49-10-7109	49-610497	0.0–2.0	Soil	—	—	—	0.0028 (J)
RE49-10-7113	49-610498	8.0–10.0	Qbt4	—	—	0.051 (J)	—
RE49-10-7114	49-610498	18.0–20.0	Qbt4	0.009 (J)	—	—	—
RE49-10-7117	49-610499	18.0–20.0	Qbt4	—	—	0.068 (J)	—

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

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

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

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

[d] — = Not detected.

Table 10.2-6
Summary of Radionuclides Detected or Detected above BVs at Area 11, SWMU 49-003

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Europium-152	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**1.65**	**na**	**0.023**	**0.054**	**na**
Residential SAL[c]				**30**	**5.6**	**na**	**37**	**33**	**750**
Industrial SAL[c]				**180**	**23**	**na**	**240**	**210**	**440000**
Construction Worker SAL[c]				**34**	**18**	**na**	**40**	**36**	**320000**
0549-95-0065	49-08029	0.8–2.0	Soil	0.442	0.138	0.234	0.029	0.82	NA[d]
0549-95-0072	49-08031	3.3–4.3	Qbt4	—[e]	—	—	—	0.002	NA
0549-95-0078	49-08033	3.0–3.5	Qbt4	—	—	—	0.002	—	NA
0549-95-0087	49-08038	2.5–3.5	Qbt4	—	—	—	0.002	—	NA
0549-95-0093	49-08040	3.0–4.0	Soil	—	—	—	0.005	0.041	NA
RE49-10-7122	49-610496	0.0–2.0	Soil	0.653	NA	NA	0.088	4.87	—
RE49-10-7123	49-610496	7.5–10.0	Qbt4	—	NA	NA	—	—	0.222
RE49-10-7112	49-610498	0.0–2.0	Soil	0.043	NA	NA	—	0.13	—
RE49-10-7115	49-610499	0.0–2.0	Soil	—	NA	NA	—	0.09	—

Note: All activities are in pCi/g.

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

[b] na = Not available.

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

[d] NA = Not analyzed.

[e] — = Not detected or not detected above BV/FV.

Table 10.3-1
Surveyed Coordinates for 2009–2010 Locations at Area 11, AOC 49-008(c)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 11 Drilling			
49-008(c)	49-610489	1624816.692	1755264
49-008(c)	49-610490	1624884.769	1755277
49-008(c)	49-610491	1624982.575	1755251
49-008(c)	49-610492	1625001.964	1755259
49-008(c)	49-610493	1625019.342	1755266
49-008(c)	49-610494	1624999.235	1755240
49-008(c)	49-610495	1624999.666	1755279

Table 10.3-2
Samples Collected and Analyses Requested at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
0549-95-0024	49-08021	0.0–0.5	Soil	—*	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0025	49-08022	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0026	49-08023	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0027	49-08024	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0028	49-08025	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0029	49-08026	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0030	49-08027	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0031	49-08028	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0032	49-08029	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0033	49-08030	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0034	49-08031	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0035	49-08032	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0036	49-08033	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0037	49-08034	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0038	49-08035	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0039	49-08036	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0040	49-08037	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0041	49-08038	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0043	49-08039	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0044	49-08040	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0045	49-08041	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0046	49-08042	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0048	49-08043	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0049	49-08044	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—

Table 10.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	Perchlorate	SVOCs	Uranium	VOCs	Cyanide
0549-95-0050	49-08045	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0051	49-08046	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0052	49-08047	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0096	49-08047	0.0–3.0	Soil	—	680	—	—	680	—	679	—	678	680	—	—
0549-95-0053	49-08048	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0054	49-08049	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0099	49-08049	7.0–12.0	Qbt4	—	680	—	678	680	—	679	—	678	680	—	—
0549-95-0055	49-08050	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
0549-95-0056	49-08051	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0100	49-08051	7.0–12.0	Qbt4	—	680	—	678	680	—	679	—	678	680	—	—
0549-95-0057	49-08052	0.0–0.5	Soil	—	657	—	—	—	—	—	—	—	—	—	—
0549-95-0058	49-08053	0.0–0.5	Soil	—	657	—	—	657	—	656, 657	—	—	—	—	—
RE49-10-7087	49-610489	0.0–2.0	Soil	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7088	49-610489	63.0–65.0	Qbt4	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7089	49-610489	77.0–79.0	Qbt4	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7090	49-610490	0.0–2.0	Soil	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7091	49-610490	18.0–20.0	Qbt4	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7092	49-610490	33.0–35.0	Qbt4	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7093	49-610491	0.0–2.0	Soil	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7094	49-610491	8.0–10.0	Qbt4	10-859	—	10-859	10-858	10-859	10-859	10-859	10-859	10-858	—	10-858	10-859
RE49-10-7095	49-610492	0.0–2.0	Soil	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7096	49-610492	8.0–10.0	Qbt4	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7097	49-610493	0.0–2.5	Soil	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7098	49-610493	8.0–10.0	Qbt4	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7099	49-610494	0.0–2.0	Soil	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7100	49-610494	8.0–10.0	Qbt4	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7101	49-610495	0.0–2.0	Soil	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872
RE49-10-7102	49-610495	8.0–10.0	Qbt4	10-873	—	10-873	10-871	10-873	10-873	10-872	10-872	10-871	—	10-871	10-872

*— = No sample collected.

Table 10.3-3
Field-Screening Results for Samples Collected at Area 11, AOC 49-008(c)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 11 Drilling Samples						
49-008(c)	49-610489	63.0–65.0	RE49-10-7088	0.0	157	3040
49-008(c)	49-610489	77.0–79.0	RE49-10-7089	0.0	111	2800
49-008(c)	49-610490	0.0–2.0	RE49-10-7090	0.4	131	2250
49-008(c)	49-610490	18.0–20.0	RE49-10-7091	0.6	65	2650
49-008(c)	49-610490	33.0–35.0	RE49-10-7092	1.1	85	2740
49-008(c)	49-610491	0.0–2.0	RE49-10-7093	0.6	111	2170
49-008(c)	49-610491	8.0–10.0	RE49-10-7094	0.6	98	2340
49-008(c)	49-610492	0.0–2.0	RE49-10-7095	0.3	52	2210
49-008(c)	49-610492	8.0–10.0	RE49-10-7096	0.2	98	2500
49-008(c)	49-610493	0.0–2.5	RE49-10-7097	1.0	98	2260
49-008(c)	49-610493	8.0–10.0	RE49-10-7098	0.0	78	2560
49-008(c)	49-610494	0.0–2.0	RE49-10-7099	0.5	65	2360
49-008(c)	49-610494	8.0–10.0	RE49-10-7100	0.3	72	2410
49-008(c)	49-610495	0.0–2.0	RE49-10-7101	0.4	98	2170
49-008(c)	49-610495	8.0–10.0	RE49-10-7102	0.1	85	2115

Table 10.3-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Cyanide (Total)	Magnesium	Manganese	Perchlorate	Selenium	Uranium
Qbt 2,3,4 BV[a]				**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**0.5**	**1690**	**482**	**na**	**0.3**	**2.4**
Soil BV[a]				**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**0.5**	**4610**	**671**	**na**	**1.52**	**1.82**
Residential SSL[b]				**3.13E+01**	**3.90E+00**	**1.56E+04**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**1.56E+03**	**na**	**1.07E+04**	**5.48E+01**	**3.91E+02**	**2.35E+02**
Industrial SSL[b]				**4.54E+02**	**1.77E+01**	**2.24E+05**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**2.27E+04**	**na**	**1.45E+05**	**7.95E+02**	**5.68E+03**	**3.41E+03**
Construction Worker SSL[b]				**1.24E+02**	**6.54E+01**	**4.35E+03**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**6.19E+03**	**na**	**4.63E+02**	**2.17E+02**	**1.55E+03**	**9.29E+02**
0549-95-0024	49-08021	0.0–0.5	Soil	5.3 (U)	—[g]	—	0.975	—	—	—	NA[h]	—	—	NA	—	4.09
0549-95-0026	49-08023	0.0–0.5	Soil	5.2 (U)	—	—	0.52 (U)	—	—	—	NA	—	—	NA	—	3.14
0549-95-0029	49-08026	0.0–0.5	Soil	5.29 (U)	—	—	0.529 (U)	—	—	—	NA	—	—	NA	—	2.62
0549-95-0031	49-08028	0.0–0.5	Soil	5.19 (U)	—	—	0.519 (U)	—	—	—	NA	—	—	NA	—	2.63
0549-95-0034	49-08031	0.0–0.5	Soil	5.07 (U)	—	—	0.507 (U)	—	—	—	NA	—	—	NA	—	2.09
0549-95-0036	49-08033	0.0–0.5	Soil	5.21 (U)	—	—	0.521 (U)	—	—	—	NA	—	—	NA	—	3.63
0549-95-0037	49-08034	0.0–0.5	Soil	5.26 (U)	—	—	0.526 (U)	—	—	—	NA	—	—	NA	—	2.85
0549-95-0038	49-08035	0.0–0.5	Soil	5.26 (U)	—	—	0.526 (U)	—	—	—	NA	—	—	NA	—	8.36
0549-95-0043	49-08039	0.0–0.5	Soil	5.23 (U)	—	—	0.523 (U)	—	—	—	NA	—	—	NA	—	2.94
0549-95-0044	49-08040	0.0–0.5	Soil	5.16 (U)	—	—	0.516 (U)	—	—	—	NA	—	—	NA	—	2.62
0549-95-0046	49-08042	0.0–0.5	Soil	5.44 (U)	—	—	0.544 (U)	—	—	—	NA	—	—	NA	—	2.59
0549-95-0049	49-08044	0.0–0.5	Soil	5.18 (U)	—	—	0.518 (U)	—	—	—	NA	—	—	NA	—	2.44
0549-95-0050	49-08045	0.0–0.5	Soil	5.6 (U)	—	—	0.56 (U)	—	—	—	NA	—	—	NA	—	2.48
0549-95-0051	49-08046	0.0–0.5	Soil	5.48 (U)	—	—	0.548 (U)	—	—	—	NA	—	—	NA	—	2.92
0549-95-0096	49-08047	0.0–3.0	Soil	1.1 (J-)	—	—	—	—	—	—	NA	—	—	NA	—	2.47
0549-95-0099	49-08049	7.0–12.0	Qbt4	—	—	—	—	—	—	—	NA	—	—	NA	0.44 (U)	—
0549-95-0055	49-08050	0.0–0.5	Soil	5.11 (U)	—	—	0.511 (U)	—	—	—	NA	—	—	NA	—	2.56
0549-95-0100	49-08051	7.0–12.0	Qbt4	—	—	—	—	2720	—	—	NA	—	—	NA	0.44 (U)	—
0549-95-0058	49-08053	0.0–0.5	Soil	5.17 (U)	—	—	0.517 (U)	—	—	11.3	NA	—	828	NA	—	2.55
RE49-10-7088	49-610489	63.0–65.0	Qbt4	—	—	—	—	—	—	—	0.51 (U)	—	—	—	1.6 (J)	NA
RE49-10-7089	49-610489	77.0–79.0	Qbt4	—	—	—	—	—	—	—	0.51 (U)	—	—	—	1.4 (J)	NA
RE49-10-7090	49-610490	0.0–2.0	Soil	—	—	—	—	—	—	—	0.56 (U)	—	—	0.0055 (J)	1.9 (J)	NA
RE49-10-7091	49-610490	18.0–20.0	Qbt4	—	—	—	—	—	—	—	0.52 (U)	—	—	—	1.5 (J)	NA
RE49-10-7092	49-610490	33.0–35.0	Qbt4	—	—	—	—	—	—	—	—	—	—	—	1.6 (J)	NA
RE49-10-7093	49-610491	0.0–2.0	Soil	—	—	—	—	—	—	—	—	—	—	—	1.9 (J)	NA
RE49-10-7094	49-610491	8.0–10.0	Qbt4	—	—	—	—	—	—	—	0.54 (U)	—	—	0.0034 (J)	1.8 (J)	NA
RE49-10-7095	49-610492	0.0–2.0	Soil	—	—	—	—	—	—	—	0.55 (UJ)	—	—	0.0053 (J)	1.7 (J)	NA
RE49-10-7096	49-610492	8.0–10.0	Qbt4	—	—	—	—	—	—	—	0.54 (UJ)	—	—	0.059	1.8 (J)	NA
RE49-10-7097	49-610493	0.0–2.5	Soil	—	—	—	—	—	—	—	0.56 (UJ)	—	—	0.0032 (J)	—	NA
RE49-10-7098	49-610493	8.0–10.0	Qbt4	—	—	—	—	—	—	—	0.54 (UJ)	—	—	0.0039 (J)	1.7 (J)	NA
RE49-10-7099	49-610494	0.0–2.0	Soil	—	—	—	—	—	—	—	—	—	—	0.0088	—	NA

Table 10.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Cyanide (Total)	Magnesium	Manganese	Perchlorate	Selenium	Uranium
Qbt 2,3,4 BV[a]				**0.5**	**2.79**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**0.5**	**1690**	**482**	**na**	**0.3**	**2.4**
Soil BV[a]				**0.83**	**8.17**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**0.5**	**4610**	**671**	**na**	**1.52**	**1.82**
Residential SSL[b]				**3.13E+01**	**3.90E+00**	**1.56E+04**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**1.56E+03**	**na**	**1.07E+04**	**5.48E+01**	**3.91E+02**	**2.35E+02**
Industrial SSL[b]				**4.54E+02**	**1.77E+01**	**2.24E+05**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+02[e]**	**2.27E+04**	**na**	**1.45E+05**	**7.95E+02**	**5.68E+03**	**3.41E+03**
Construction Worker SSL[b]				**1.24E+02**	**6.54E+01**	**4.35E+03**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**6.19E+03**	**na**	**4.63E+02**	**2.17E+02**	**1.55E+03**	**9.29E+02**
RE49-10-7100	49-610494	8.0–10.0	Qbt4	—	3.4	—	—	—	—	—	0.54 (UJ)	—	—	0.16	2.5 (J)	NA
RE49-10-7101	49-610495	0.0–2.0	Soil	—	—	—	—	—	—	—	0.53 (UJ)	—	—	0.0042 (J)	—	NA
RE49-10-7102	49-610495	8.0–10.0	Qbt4	—	—	84.4	—	—	8.5	—	0.53 (UJ)	1760	—	—	1.9 (J)	NA

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 10.3-5
Summary of Organic Chemicals Detected at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-octylphthalate	Isopropyltoluene[4-]	Nitroglycerin	Nitrotoluene[3-]
Residential SSL[a]				**6.1E+03**[b]	**3.47E+02**	**6.1E+03**[c]	**3.21E+03**[d]	**6.11E+00**	**1.56E+03**
Industrial SSL[a]				**6.2E+04**[b]	**1.37E+03**	**6.84E+04**[c]	**1.49E+04**[d]	**6.84E+01**	**2.27E+04**
Construction Worker SSL[a]				**3.09E+04**[e]	**4.76E+03**	**4.76E+03**[f]	**1.03E+04**[d]	**2.38E+01**	**6.19E+03**
0549-95-0096	49-08047	0.0–3.0	Soil	—[g]	0.1 (J)	0.15 (J)	NA[h]	NA	NA
0549-95-0099	49-08049	7.0–12.0	Qbt4	—	0.07 (J)	—	NA	NA	—
RE49-10-7087	49-610489	0.0–2.0	Soil	0.069 (J)	—	—	—	—	—
RE49-10-7088	49-610489	63.0–65.0	Qbt4	0.036 (J)	—	—	—	—	—
RE49-10-7089	49-610489	77.0–79.0	Qbt4	0.037 (J)	—	—	—	—	—
RE49-10-7090	49-610490	0.0–2.0	Soil	0.078 (J)	—	—	0.00029 (J)	—	—
RE49-10-7091	49-610490	18.0–20.0	Qbt4	0.066 (J)	—	—	—	—	—
RE49-10-7092	49-610490	33.0–35.0	Qbt4	0.062 (J)	—	—	—	—	—
RE49-10-7093	49-610491	0.0–2.0	Soil	0.048 (J)	—	—	—	—	0.56 (J)
RE49-10-7094	49-610491	8.0–10.0	Qbt4	0.04 (J)	—	—	—	—	—
RE49-10-7095	49-610492	0.0–2.0	Soil	0.056 (J)	—	—	—	—	—
RE49-10-7096	49-610492	8.0–10.0	Qbt4	0.06 (J)	—	—	—	—	—
RE49-10-7097	49-610493	0.0–2.5	Soil	0.19 (J)	—	—	—	—	—
RE49-10-7098	49-610493	8.0–10.0	Qbt4	0.1 (J)	0.057 (J)	—	—	0.053 (J)	—
RE49-10-7099	49-610494	0.0–2.0	Soil	0.16 (J)	0.056 (J)	—	—	—	—
RE49-10-7100	49-610494	8.0–10.0	Qbt4	0.066 (J)	0.053 (J)	—	—	—	—

Table 10.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-octylphthalate	Isopropyltoluene[4-]	Nitroglycerin	Nitrotoluene[3-]
Residential SSL[a]				**6.1E+03**[b]	**3.47E+02**	**6.1E+03**[c]	**3.21E+03**[d]	**6.11E+00**	**1.56E+03**
Industrial SSL[a]				**6.2E+04**[b]	**1.37E+03**	**6.84E+04**[c]	**1.49E+04**[d]	**6.84E+01**	**2.27E+04**
Construction Worker SSL[a]				**3.09E+04**[e]	**4.76E+03**	**4.76E+03**[f]	**1.03E+04**[d]	**2.38E+01**	**6.19E+03**
RE49-10-7101	49-610495	0.0–2.0	Soil	0.084 (J)	—	—	—	—	—
RE49-10-7102	49-610495	8.0–10.0	Qbt4	0.09 (J)	—	—	—	—	—

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

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

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

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

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

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

[f] Calculated using bis(2-ethylhexyl)phthalate reference dose, parameters, and equation from NMED (2009, 108070).

[g] — = Not detected.

[h] NA= Not analyzed.

Table 10.3-6
Summary of Radionuclides Detected or Detected above BVs/FVs at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**
Soil BV[a]				**0.013**	**0.023**	**0.054**	**na**
Residential SAL[c]				**30**	**37**	**33**	**750**
Industrial SAL[c]				**180**	**240**	**210**	**440000**
Construction Worker SAL[c]				**34**	**40**	**36**	**320000**
0549-95-0024	49-08021	0.0–0.5	Soil	—[d]	—	0.2	NA[e]
0549-95-0026	49-08023	0.0–0.5	Soil	—	—	0.3	NA
0549-95-0029	49-08026	0.0–0.5	Soil	—	0.04	—	NA
0549-95-0031	49-08028	0.0–0.5	Soil	—	—	0.1	NA
0549-95-0034	49-08031	0.0–0.5	Soil	—	0.08	5.4	NA
0549-95-0035	49-08032	0.0–0.5	Soil	0.6131	NA	NA	NA
0549-95-0036	49-08033	0.0–0.5	Soil	—	—	0.8	NA
0549-95-0037	49-08034	0.0–0.5	Soil	—	—	0.3	NA
0549-95-0038	49-08035	0.0–0.5	Soil	—	—	0.3	NA
0549-95-0043	49-08039	0.0–0.5	Soil	1.742	0.09	5.1	NA
0549-95-0044	49-08040	0.0–0.5	Soil	9.303	1.1	66.1	NA
0549-95-0046	49-08042	0.0–0.5	Soil	—	—	8.5	NA
0549-95-0049	49-08044	0.0–0.5	Soil	—	0.04	2	NA
0549-95-0050	49-08045	0.0–0.5	Soil	—	—	0.7	NA
0549-95-0051	49-08046	0.0–0.5	Soil	—	—	0.2	NA
0549-95-0096	49-08047	0.0–3.0	Soil	—	0.002	0.077	NA
0549-95-0099	49-08049	7.0–12.0	Qbt4	—	0.009	—	NA
0549-95-0100	49-08051	7.0–12.0	Qbt4	—	—	0.005	NA
RE49-10-7088	49-610489	63.0–65.0	Qbt4	—	—	—	0.42 (J+)
RE49-10-7092	49-610490	33.0–35.0	Qbt4	—	—	—	0.67 (J+)
RE49-10-7093	49-610491	0.0–2.0	Soil	—	—	1.02	—

Table 10.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239/240	Tritium
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**
Soil BV[a]				**0.013**	**0.023**	**0.054**	**na**
Residential SAL[c]				**30**	**37**	**33**	**750**
Industrial SAL[c]				**180**	**240**	**210**	**440000**
Construction Worker SAL[c]				**34**	**40**	**36**	**320000**
RE49-10-7095	49-610492	0.0–2.0	Soil	—	—	0.135	—
RE49-10-7097	49-610493	0.0–2.5	Soil	—	—	0.126	—
RE49-10-7098	49-610493	8.0–10.0	Qbt4	—	—	—	0.245
RE49-10-7099	49-610494	0.0–2.0	Soil	—	—	0.24	—
RE49-10-7101	49-610495	0.0–2.0	Soil	—	—	0.127	—

Note: All activities are in pCi/g.

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

[b] na = Not available.

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

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

[e] NA = Not analyzed.

Table 10.3-7
Summary of Pore-Gas Samples Collected and Analyses Requested at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
MD49-10-12157	49-610489	34.0–36.0	Pore gas	10-1919	10-1918
MD49-10-12155	49-610489	70.0–72.0	Pore gas	10-1919	10-1918
MD49-10-12168	49-610490	4.0–6.0	Pore gas	10-1919	10-1918
MD49-10-12159	49-610490	28.0–30.0	Pore gas	10-1919	10-1918

Table 10.3-8
Summary of Organic Chemicals Detected in Pore-Gas Samples Collected at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Carbon Disulfide	Chloromethane	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
MD49-10-12157	49-610489	34.0–36.0	Pore gas	12	16	—*	—	2	3.1	5.7	5.1	—	26	4	—	23	5.7	17
MD49-10-12155	49-610489	70.0–72.0	Pore gas	12	22	3.3	6.2	—	3.2	6.5	7.3	1.8	42	9.3	2.6	28	7	21
MD49-10-12168	49-610490	4.0–6.0	Pore gas	12	4.4	3.1	—	—	3.2	5.3	7.2	—	11	7.3	—	22	5.8	16
MD49-10-12159	49-610490	28.0–30.0	Pore gas	13	11	4.3	—	—	3.1	10	16	4.9	32	16	5.1	53	15	39

Note: All concentrations are in $\mu g/m^3$.

*— = Analyzed for but not detected.

Table 10.3-9
Summary of Tritium in Pore Gas at Area 11, AOC 49-008(c)

Sample ID	Location ID	Depth (ft)	Media	Tritium pCi/L
MD49-10-12155	49-610489	70.0–72.0	Pore gas	1766.53

Table 11.2-1
Surveyed Coordinates for
2009–2010 Locations at Area 12, AOC 49-008(d)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 12 Drilling			
49-008(d)	49-610481	1625988.19	1755314.838
49-008(d)	49-610485	1626004.738	1755217.536
Area 12 Surface and Shallow Subsurface			
49-008(d)	49-609889	1625989.2	1755204.22
49-008(d)	49-609890	1625989.2	1755304.22
49-008(d)	49-609891	1626014.2	1755329.22
49-008(d)	49-609892	1626039.2	1755304.22
49-008(d)	49-609893	1626039.2	1755329.22
49-008(d)	49-609894	1625939.2	1755179.22
49-008(d)	49-609895	1625939.2	1755279.22
49-008(d)	49-609896	1625939.2	1755354.22
49-008(d)	49-609897	1625989.2	1755154.22
49-008(d)	49-609898	1625989.2	1755254.22
49-008(d)	49-609899	1625989.2	1755329.22
49-008(d)	49-609900	1626014.2	1755379.22
49-008(d)	49-609901	1626039.2	1755179.22
49-008(d)	49-609902	1626039.2	1755254.22
49-008(d)	49-609903	1626089.2	1755279.22
49-008(d)	49-609904	1626089.2	1755329.22
49-008(d)	49-609905	1626089.2	1755379.22
49-008(d)	49-609906	1625939.2	1755104.22
49-008(d)	49-609907	1626014.2	1755129.22
49-008(d)	49-609908	1626064.2	1755429.22
49-008(d)	49-609909	1626089.2	1755104.22
49-008(d)	49-609910	1626089.2	1755204.22
49-008(d)	49-609911	1626139.2	1755304.22
49-008(d)	49-609912	1626139.2	1755354.22
49-008(d)	49-609913	1626139.2	1755404.22
49-008(d)	49-609914	1625939.2	1755154.22
49-008(d)	49-609915	1625939.2	1755204.22
49-008(d)	49-609916	1625939.2	1755229.22
49-008(d)	49-609917	1625939.2	1755254.22
49-008(d)	49-609918	1625939.2	1755304.22
49-008(d)	49-609919	1625939.2	1755329.22
49-008(d)	49-609920	1625964.2	1755154.22
49-008(d)	49-609921	1625964.2	1755179.22

Table 11.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 12 Surface and Shallow Subsurface (continued)			
49-008(d)	49-609922	1625964.2	1755204.22
49-008(d)	49-609923	1625964.2	1755229.22
49-008(d)	49-609924	1625964.2	1755254.22
49-008(d)	49-609925	1625964.2	1755279.22
49-008(d)	49-609926	1625964.2	1755304.22
49-008(d)	49-609927	1625964.2	1755329.22
49-008(d)	49-609928	1625964.2	1755354.22
49-008(d)	49-609929	1625964.2	1755379.22
49-008(d)	49-609930	1625989.2	1755179.22
49-008(d)	49-609931	1625989.2	1755229.22
49-008(d)	49-609932	1625989.2	1755279.22
49-008(d)	49-609933	1625989.2	1755354.22
49-008(d)	49-609934	1625989.2	1755379.22
49-008(d)	49-609935	1626014.2	1755154.22
49-008(d)	49-609936	1626014.2	1755179.22
49-008(d)	49-609937	1626014.2	1755204.22
49-008(d)	49-609938	1626014.2	1755229.22
49-008(d)	49-609939	1626014.2	1755254.22
49-008(d)	49-609940	1626014.2	1755279.22
49-008(d)	49-609941	1626014.2	1755304.22
49-008(d)	49-609942	1626014.2	1755354.22
49-008(d)	49-609943	1626039.2	1755154.22
49-008(d)	49-609944	1626039.2	1755204.22
49-008(d)	49-609945	1626039.2	1755229.22
49-008(d)	49-609946	1626039.2	1755279.22
49-008(d)	49-609947	1626039.2	1755354.22
49-008(d)	49-609948	1626039.2	1755379.22
49-008(d)	49-609949	1626064.2	1755254.22
49-008(d)	49-609950	1626064.2	1755279.22
49-008(d)	49-609951	1626064.2	1755304.22
49-008(d)	49-609952	1626064.2	1755329.22
49-008(d)	49-609953	1626064.2	1755354.22
49-008(d)	49-609954	1626064.2	1755379.22
49-008(d)	49-609955	1626089.2	1755254.22
49-008(d)	49-609956	1626089.2	1755304.22
49-008(d)	49-609957	1626089.2	1755354.22
49-008(d)	49-609958	1625964.2	1755129.22
49-008(d)	49-609959	1625989.2	1755104.22

Table 11.2-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 12 Surface and Shallow Subsurface (continued)			
49-008(d)	49-609960	1626039.2	1755104.22
49-008(d)	49-609961	1625939.2	1755404.22
49-008(d)	49-609962	1625964.2	1755429.22
49-008(d)	49-609963	1625989.2	1755404.22
49-008(d)	49-609964	1626014.2	1755429.22
49-008(d)	49-609965	1626039.2	1755404.22
49-008(d)	49-609966	1626089.2	1755404.22
49-008(d)	49-609967	1626064.2	1755129.22
49-008(d)	49-609968	1626064.2	1755179.22
49-008(d)	49-609969	1626064.2	1755229.22
49-008(d)	49-609970	1626089.2	1755154.22
49-008(d)	49-609971	1626114.2	1755229.22
49-008(d)	49-609972	1626114.2	1755279.22
49-008(d)	49-609973	1626114.2	1755329.22
49-008(d)	49-609974	1626114.2	1755379.22
49-008(d)	49-609975	1626114.2	1755429.22
49-008(d)	49-609976	1626139.2	1755204.22
49-008(d)	49-609977	1626139.2	1755254.22

Table 11.2-2
Samples Collected and Analyses Requested at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Perchlorate	Pesticides/ PCBs	Strontium-90	SVOCs	Technetium-99	TPH – Diesel Range Organics	TPH – Gasoline Range Organics	VOCs	Cyanide
0549-95-0265	49-09007	0.0–0.5	Soil	—*	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0266	49-09007	0.5–1.0	Soil	—	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0267	49-09013	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0271	49-09026	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0272	49-09032	0.0–0.5	Soil	—	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0273	49-09032	0.5–1.0	Soil	—	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0274	49-09035	0.0–0.5	Soil	—	871	—	—	—	871	—	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0275	49-09035	0.0–0.5	Soil	—	871	—	—	—	871	—	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0276	49-09036	0.0–0.5	Soil	—	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0277	49-09036	0.5–1.0	Soil	—	871	—	—	—	871	871	870, 871	—	—	—	—	—	—	—	—	—	—
0549-95-0278	49-09040	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0279	49-09049	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0280	49-09052	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0281	49-09054	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0282	49-09055	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0283	49-09056	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0284	49-09057	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0285	49-09058	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0549-95-0286	49-09060	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0287	49-09062	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0288	49-09064	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0290	49-09066	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0292	49-09069	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0291	49-09070	0.0–0.5	Soil	—	871	—	—	—	—	—	—	—	—	—	—	869	—	—	—	—	—
0549-95-0015	49-09095	0.0–0.5	Soil	—	871	—	—	—	871	—	870, 871	—	—	869	—	869	—	—	—	—	—
RE49-10-5089	49-609889	0.0–0.5	Soil	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5090	49-609889	0.5–1.5	Soil	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5091	49-609890	0.0–0.5	Soil	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5092	49-609890	0.5–1.5	Soil	10-565	10-565	10-565	—	—	10-565	10-565	10-565	10-564	—	—	10-565	10-564	10-565	—	—	10-564	—
RE49-10-5093	49-609891	0.0–0.5	Fill	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5094	49-609891	0.5–1.5	Fill	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5095	49-609892	0.0–0.5	Fill	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5096	49-609892	0.5–1.5	Soil	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5097	49-609893	0.0–0.5	Fill	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—

Table 11.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Perchlorate	Pesticides/ PCBs	Strontium-90	SVOCs	Technetium-99	TPH – Diesel Range Organics	TPH – Gasoline Range Organics	VOCs	Cyanide
RE49-10-5098	49-609893	0.5–1.5	Soil	10-565	10-565	—	—	—	10-565	10-565	10-565	10-564	—	—	—	10-564	—	—	—	10-564	—
RE49-10-5102	49-609894	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5103	49-609894	0.5–1.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5104	49-609895	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5105	49-609895	0.5–1.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5106	49-609896	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5107	49-609896	0.5–1.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5108	49-609897	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5109	49-609897	0.5–1.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5110	49-609898	0.0–0.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5111	49-609898	0.5–1.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5112	49-609899	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5113	49-609899	0.5–1.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5114	49-609900	0.0–0.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5115	49-609900	0.5–1.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5116	49-609901	0.0–0.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5117	49-609901	0.5–1.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5118	49-609902	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5119	49-609902	0.5–1.5	Soil	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5120	49-609903	0.0–0.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5121	49-609903	0.5–1.5	Fill	10-569	10-569	—	—	—	10-569	10-569	10-569	10-568	—	—	—	10-568	—	—	—	10-568	—
RE49-10-5122	49-609904	0.0–0.5	Soil	10-571	10-571	—	—	—	10-571	10-571	10-571	10-570	—	—	—	10-570	—	—	—	10-570	—
RE49-10-5123	49-609904	0.5–1.5	Soil	10-571	10-571	—	—	—	10-571	10-571	10-571	10-570	—	—	—	10-570	—	—	—	10-570	—
RE49-10-5124	49-609905	0.0–0.5	Soil	10-571	10-571	—	—	—	10-571	10-571	10-571	10-570	—	—	—	10-570	—	—	—	10-570	—
RE49-10-5125	49-609905	0.5–1.5	Soil	10-571	10-571	—	—	—	10-571	10-571	10-571	10-570	—	—	—	10-570	—	—	—	10-570	—
RE49-10-5132	49-609906	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5133	49-609906	0.5–1.5	Fill	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5134	49-609907	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5135	49-609907	0.5–1.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5136	49-609908	0.0–0.5	Fill	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5137	49-609908	0.5–1.5	Fill	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5138	49-609909	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5139	49-609909	0.5–1.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5140	49-609910	0.0–0.5	Fill	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5141	49-609910	0.5–1.5	Fill	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—

Table 11.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Iodine-129	Tritium	Explosive Compounds	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	Perchlorate	Pesticides/ PCBs	Strontium-90	SVOCs	Technetium-99	TPH – Diesel Range Organics	TPH – Gasoline Range Organics	VOCs	Cyanide
RE49-10-5142	49-609911	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5143	49-609911	0.5–1.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5144	49-609912	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5145	49-609912	0.5–1.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5146	49-609913	0.0–0.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5147	49-609913	0.5–1.5	Soil	10-567	10-567	—	—	—	10-567	10-567	10-567	10-566	—	—	—	10-566	—	—	—	10-566	—
RE49-10-5176	49-609925	0.0–0.5	Fill	10-573	10-573	—	—	—	10-573	10-573	10-573	10-572	—	—	—	10-572	—	—	—	10-572	—
RE49-10-5177	49-609925	0.5–1.5	Fill	—	10-573	10-573	—	—	—	—	—	10-572	—	—	10-573	10-572	10-573	—	—	10-572	—
RE49-10-5226	49-609950	0.0–0.5	Soil	10-573	10-573	—	—	—	10-573	10-573	10-573	10-572	—	—	—	10-572	—	—	—	10-572	—
RE49-10-5236	49-609955	0.0–0.5	Fill	—	10-573	10-573	—	—	—	—	—	10-572	—	—	10-573	10-572	10-573	—	—	10-572	—
RE49-10-5239	49-609956	0.5–1.5	Soil	10-573	10-573	—	—	—	10-573	10-573	10-573	10-572	—	—	—	10-572	—	—	—	10-572	—
RE49-10-5284	49-609965	0.5–1.5	Fill	10-574	10-574	—	—	—	10-574	10-574	10-574	10-574	—	—	—	10-574	—	—	—	10-574	—
RE49-10-5305	49-609976	0.0–0.5	Soil	—	10-574	10-574	—	—	—	—	—	10-574	—	—	10-574	10-574	10-574	—	—	10-574	—
RE49-10-7045	49-610481	3.0–5.0	Soil	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	—	—	10-705	10-706
RE49-10-7046	49-610481	28.0–30.0	Qbt4	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	—	—	10-705	10-706
RE49-10-7047	49-610481	76.0–79.0	Qbt3	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	—	—	10-705	10-706
RE49-10-7044	49-610481	118.0–120.0	Qbt3	10-772	—	—	10-772	10-772	10-772	10-772	10-772	—	10-772	—	—	10-772	—	—	—	10-772	10-772
RE49-10-7048	49-610485	2.0–3.5	Soil	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	10-705	10-705	10-705	10-706
RE49-10-7049	49-610485	73.0–75.0	Qbt4	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	10-705	10-705	10-705	10-706
RE49-10-7050	49-610485	88.0–90.0	Qbt3	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	10-705	10-705	10-705	10-706
RE49-10-7051	49-610485	118.0–120.0	Qbt3	10-706	—	—	10-706	10-705	10-706	10-706	10-706	—	10-706	—	—	10-705	—	10-705	10-705	10-705	10-706

*— = No sample collected.

Table 11.2-3
Field-Screening Results for Samples Collected at Area 12, AOC 49-008(d)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 12 Drilling Samples						
49-008(d)	49-610481	3.0–5.0	RE49-10-7045	0.0	53	2200
49-008(d)	49-610481	28.0–30.0	RE49-10-7046	0.0	72	2110
49-008(d)	49-610481	76.0–79.0	RE49-10-7047	0.0	85	2540
49-008(d)	49-610481	118.0–120.0	RE49-10-7044	0.5	45	2690
49-008(d)	49-610485	2.0–3.5	RE49-10-7048	0.0	39	1830
49-008(d)	49-610485	73.0–75.0	RE49-10-7049	1.7	59	2540
49-008(d)	49-610485	88.0–90.0	RE49-10-7050	0.7	91	2580
49-008(d)	49-610485	118.0–120.0	RE49-10-7051	0.8	85	2550
49-008(d)	49-609889	0.0–0.5	RE49-10-5089	NA*	60	2330
49-008(d)	49-609889	0.5–1.5	RE49-10-5090	NA	19	2220
49-008(d)	49-609890	0.0–0.5	RE49-10-5091	NA	15	2310
49-008(d)	49-609890	0.5–1.5	RE49-10-5092	NA	52	2370
49-008(d)	49-609891	0.0–0.5	RE49-10-5093	NA	59	2380
49-008(d)	49-609891	0.5–1.5	RE49-10-5094	NA	46	2340
49-008(d)	49-609892	0.0–0.5	RE49-10-5095	NA	52	2510
49-008(d)	49-609892	0.5–1.5	RE49-10-5096	NA	46	2360
49-008(d)	49-609893	0.0–0.5	RE49-10-5097	NA	39	2460
49-008(d)	49-609893	0.5–1.5	RE49-10-5098	NA	72	2110
Area 12 Surface and Shallow-Subsurface Samples						
49-008(d)	49-609894	0.0–0.5	RE49-10-5102	NA	19	2490
49-008(d)	49-609894	0.5–1.5	RE49-10-5103	NA	46	2330
49-008(d)	49-609895	0.0–0.5	RE49-10-5104	NA	33	2380
49-008(d)	49-609895	0.5–1.5	RE49-10-5105	NA	52	2220
49-008(d)	49-609896	0.0–0.5	RE49-10-5106	NA	26	2680
49-008(d)	49-609896	0.5–1.5	RE49-10-5107	NA	26	2160
49-008(d)	49-609897	0.0–0.5	RE49-10-5108	NA	50	2890
49-008(d)	49-609897	0.5–1.5	RE49-10-5109	NA	33	3060
49-008(d)	49-609898	0.0–0.5	RE49-10-5110	NA	28	2670
49-008(d)	49-609898	0.5–1.5	RE49-10-5111	NA	28	2720
49-008(d)	49-609899	0.0–0.5	RE49-10-5112	NA	56	2860
49-008(d)	49-609899	0.5–1.5	RE49-10-5113	NA	45	2530
49-008(d)	49-609900	0.0–0.5	RE49-10-5114	NA	67	2740
49-008(d)	49-609900	0.5–1.5	RE49-10-5115	NA	56	2670
49-008(d)	49-609901	0.0–0.5	RE49-10-5116	NA	45	2980
49-008(d)	49-609901	0.5–1.5	RE49-10-5117	NA	73	2690
49-008(d)	49-609902	0.0–0.5	RE49-10-5118	NA	50	3160

Table 11.2-3 (continued)

SWMU or AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/Gamma (dpm)
Area 12 Surface and Shallow-Subsurface Samples (continued)						
49-008(d)	49-609902	0.5–1.5	RE49-10-5119	NA	73	3210
49-008(d)	49-609903	0.0–0.5	RE49-10-5120	NA	28	3160
49-008(d)	49-609903	0.5–1.5	RE49-10-5121	NA	56	2840
49-008(d)	49-609904	0.0–0.5	RE49-10-5122	NA	101	3040
49-008(d)	49-609904	0.5–1.5	RE49-10-5123	NA	45	2990
49-008(d)	49-609905	0.0–0.5	RE49-10-5124	NA	11	2790
49-008(d)	49-609905	0.5–1.5	RE49-10-5125	NA	50	2900
49-008(d)	49-609906	0.0–0.5	RE49-10-5132	NA	56	3190
49-008(d)	49-609906	0.5–1.5	RE49-10-5133	NA	67	3430
49-008(d)	49-609907	0.0–0.5	RE49-10-5134	NA	101	3060
49-008(d)	49-609907	0.5–1.5	RE49-10-5135	NA	107	3150
49-008(d)	49-609908	0.0–0.5	RE49-10-5136	NA	90	3090
49-008(d)	49-609908	0.5–1.5	RE49-10-5137	NA	90	3590
49-008(d)	49-609909	0.0–0.5	RE49-10-5138	NA	67	2950
49-008(d)	49-609909	0.5–1.5	RE49-10-5139	NA	45	2730
49-008(d)	49-609910	0.0–0.5	RE49-10-5140	NA	73	3060
49-008(d)	49-609910	0.5–1.5	RE49-10-5141	NA	56	3000
49-008(d)	49-609911	0.0–0.5	RE49-10-5142	NA	45	2640
49-008(d)	49-609911	0.5–1.5	RE49-10-5143	NA	90	2770
49-008(d)	49-609912	0.0–0.5	RE49-10-5144	NA	79	2500
49-008(d)	49-609912	0.5–1.5	RE49-10-5145	NA	28	2960
49-008(d)	49-609913	0.0–0.5	RE49-10-5146	NA	67	3260
49-008(d)	49-609913	0.5–1.5	RE49-10-5147	NA	113	3410
49-008(d)	49-609925	0.0–0.5	RE49-10-5176	NA	39	2290
49-008(d)	49-609925	0.5–1.5	RE49-10-5177	NA	52	2250
49-008(d)	49-609950	0.0–0.5	RE49-10-5226	NA	84	2820
49-008(d)	49-609955	0.0–0.5	RE49-10-5236	NA	39	2840
49-008(d)	49-609956	0.5–1.5	RE49-10-5239	NA	50	2640
49-008(d)	49-609965	0.5–1.5	RE49-10-5284	NA	73	3320
49-008(d)	49-609976	0.0–0.5	RE49-10-5305	NA	84	2800

*NA = Not analyzed.

Table 11.2-4
Summary of Inorganic Chemicals Detected or Detected above BVs at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Nickel	Selenium	Sodium	Thallium	Uranium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**11.2**	**482**	**6.58**	**0.3**	**2770**	**1.1**	**2.4**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**671**	**15.4**	**1.52**	**915**	**0.73**	**1.82**	**48.8**
Residential SSL[b]				**3.13E+01**	**1.56E+04**	**7.79E+01**	**na**[c]	**2.92E+03**[d]	**2.3E+01**[e]	**3.13E+03**	**1.56E+03**	**6.11E-03**	**1.07E+04**	**1.56E+03**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**2.35E+04**
Industrial SSL[b]				**4.54E+02**	**2.24E+05**	**1.12E+03**	**na**	**2.19E+02**[d]	**3.0E+02**[e]	**4.54E+04**	**2.27E+04**	**6.84E-02**	**1.45E+05**	**2.27E+04**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**3.41E+05**
Construction Worker SSL[b]				**1.24E+02**	**4.35E+03**	**3.09E+02**	**na**	**4.49E+02**[d]	**3.46E+01**[f]	**1.24E+04**	**6.19E+03**	**2.38E-02**	**4.63E+02**	**6.19E+03**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**9.29E+04**
0549-95-0265	49-09007	0.0–0.5	Soil	—[g]	—	0.65	—	—	—	14.9	NA[h]	38.2 (J+)	—	—	—	—	—	49.6	—
0549-95-0266	49-09007	0.5–1.0	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	23	—
0549-95-0272	49-09032	0.0–0.5	Soil	—	—	0.75	—	—	—	19.1	NA	—	—	—	—	—	—	16.8	110
0549-95-0273	49-09032	0.5–1.0	Soil	—	—	0.68	—	—	—	—	NA	—	—	—	—	—	—	13.7	—
0549-95-0274	49-09035	0.0–0.5	Soil	—	—	0.83	—	—	—	—	NA	—	—	—	—	—	—	18.1	52.1
0549-95-0275	49-09035	0.0–0.5	Soil	—	—	0.98	—	—	—	—	NA	—	—	—	—	—	—	6.1	—
0549-95-0276	49-09036	0.0–0.5	Soil	—	—	0.82	—	—	—	—	NA	—	—	—	—	—	—	68.4	—
0549-95-0277	49-09036	0.5–1.0	Soil	—	—	1.1	—	—	—	—	NA	—	—	—	—	—	—	8.6	—
0549-95-0015	49-09095	0.0–0.5	Soil	—	—	0.43 (J)	—	—	—	—	NA	27.5 (J+)	—	—	—	5930	—	4.4	—
RE49-10-5089	49-609889	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.5	NA	—
RE49-10-5094	49-609891	0.5–1.5	Fill	—	—	—	—	—	—	22.6	NA	—	—	—	—	—	—	NA	—
RE49-10-5102	49-609894	0.0–0.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	NA	171
RE49-10-5103	49-609894	0.5–1.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	—	NA	75.9
RE49-10-5112	49-609899	0.0–0.5	Fill	—	—	—	9760 (J-)	—	—	41	NA	—	—	—	—	—	—	NA	—
RE49-10-5113	49-609899	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	1020	—	NA	—
RE49-10-5115	49-609900	0.5–1.5	Soil	—	—	—	7450 (J-)	—	—	—	NA	—	—	—	—	—	—	NA	—
RE49-10-5117	49-609901	0.5–1.5	Soil	—	335	—	6200 (J-)	21	—	—	NA	—	—	16.1	—	—	—	NA	—
RE49-10-5119	49-609902	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	31.3	—	—	—	—	0.9 (U)	NA	—
RE49-10-5120	49-609903	0.0–0.5	Fill	1.5	—	—	—	—	—	31.4	NA	—	—	—	—	—	—	NA	—
RE49-10-5121	49-609903	0.5–1.5	Fill	2.1	—	—	6390 (J-)	—	—	20.8	NA	—	—	—	—	—	—	NA	—
RE49-10-5124	49-609905	0.0–0.5	Soil	—	—	—	—	—	11.4 (J)	—	NA	—	—	—	—	—	—	NA	—
RE49-10-5125	49-609905	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	0.9 (U)	NA	—
RE49-10-5132	49-609906	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.3 (U)	NA	—
RE49-10-5133	49-609906	0.5–1.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.2 (U)	NA	—
RE49-10-5134	49-609907	0.0–0.5	Soil	—	—	—	—	—	15	—	NA	—	1020	—	—	—	1.1 (U)	NA	—
RE49-10-5135	49-609907	0.5–1.5	Soil	—	539	—	7300 (J-)	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5136	49-609908	0.0–0.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.2 (U)	NA	—
RE49-10-5137	49-609908	0.5–1.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5138	49-609909	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5139	49-609909	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.7	NA	—
RE49-10-5140	49-609910	0.0–0.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.2 (U)	NA	—

Table 11.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Manganese	Nickel	Selenium	Sodium	Thallium	Uranium	Zinc
Qbt 2,3,4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**11.2**	**482**	**6.58**	**0.3**	**2770**	**1.1**	**2.4**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**671**	**15.4**	**1.52**	**915**	**0.73**	**1.82**	**48.8**
Residential SSL[b]				**3.13E+01**	**1.56E+04**	**7.79E+01**	**na[c]**	**2.92E+03[d]**	**2.3E+01[e]**	**3.13E+03**	**1.56E+03**	**6.11E-03**	**1.07E+04**	**1.56E+03**	**3.91E+02**	**na**	**5.16E+00**	**2.35E+02**	**2.35E+04**
Industrial SSL[b]				**4.54E+02**	**2.24E+05**	**1.12E+03**	**na**	**2.19E+02[d]**	**3.0E+02[e]**	**4.54E+04**	**2.27E+04**	**6.84E-02**	**1.45E+05**	**2.27E+04**	**5.68E+03**	**na**	**7.49E+01**	**3.41E+03**	**3.41E+05**
Construction Worker SSL[b]				**1.24E+02**	**4.35E+03**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**6.19E+03**	**2.38E-02**	**4.63E+02**	**6.19E+03**	**1.55E+03**	**na**	**2.04E+01**	**9.29E+02**	**9.29E+04**
RE49-10-5141	49-609910	0.5–1.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5142	49-609911	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5143	49-609911	0.5–1.5	Soil	—	439	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5144	49-609912	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.2 (U)	NA	—
RE49-10-5145	49-609912	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-5146	49-609913	0.0–0.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.3 (U)	NA	—
RE49-10-5147	49-609913	0.5–1.5	Soil	—	—	—	—	—	—	—	NA	—	—	—	—	—	0.95 (J)	NA	—
RE49-10-5226	49-609950	0.0–0.5	Soil	—	—	—	—	—	—	391 (J-)	NA	—	—	—	—	—	—	NA	—
RE49-10-5284	49-609965	0.5–1.5	Fill	—	—	—	—	—	—	—	NA	—	—	—	—	—	1.1 (U)	NA	—
RE49-10-7045	49-610481	3.0–5.0	Soil	—	—	—	—	—	—	—	0.58 (U)	—	—	—	—	2460 (J+)	—	NA	—
RE49-10-7046	49-610481	28.0–30.0	Qbt4	—	—	—	—	—	—	—	0.53 (U)	—	—	—	1.1	—	—	NA	—
RE49-10-7047	49-610481	76.0–79.0	Qbt3	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.75	—	—	NA	—
RE49-10-7044	49-610481	118.0–120.0	Qbt3	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.88 (J)	—	—	NA	—
RE49-10-7048	49-610485	2.0–3.5	Soil	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	NA	—
RE49-10-7049	49-610485	73.0–75.0	Qbt4	0.51 (U)	—	—	—	—	—	—	0.51 (U)	—	—	—	0.97	—	—	NA	—
RE49-10-7050	49-610485	88.0–90.0	Qbt3	0.51 (U)	—	—	—	—	—	—	0.51 (U)	—	—	—	1.1	—	—	NA	—
RE49-10-7051	49-610485	118.0–120.0	Qbt3	0.51 (U)	—	—	—	—	—	—	0.51 (U)	—	—	—	1.1	—	—	NA	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

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

[h] NA = Not analyzed.

Table 11.2-5
Summary of Organic Chemicals Detected at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1254	Aroclor-1260	Benzo(g,h,i)perylene	BHC[alpha-]	Bis(2-ethylhexyl)phthalate	Chlordane[alpha-]	Chlordane[gamma-]	Chlorobenzene	Chloromethane	Dichlorobenzene[1,4-]	Isopropyltoluene[4-]	Methylene Chloride
Residential SSL[a]				**6.75E+04**	**1.12E+00**	**2.22E+00**	**1.72E+03[b]**	**7.72E-01**	**3.47E+02**	**1.62E+01[c]**	**1.62E+01[c]**	**5.08E+02**	**3.56E+01**	**3.22E+01**	**3.21E+03[d]**	**1.99E+02**
Industrial SSL[a]				**8.51E+05**	**8.26E+00**	**8.26E+00**	**1.83E+04[b]**	**3.04E+00**	**1.37E+03**	**7.19E+01[c]**	**7.19E+01[c]**	**2.14E+03**	**1.98E+02**	**1.80E+02**	**1.49E+04[d]**	**1.09E+03**
Construction Worker SSL[a]				**2.63E+05**	**4.36E+00**	**7.58E+01**	**6.68E+03[b]**	**2.63E+01**	**4.76E+03**	**1.35E+01[c]**	**1.35E+01[c]**	**1.58E+03**	**1.13E+03**	**3.78E+03**	**1.03E+04[d]**	**1.06E+04**
0549-95-0015	49-09095	0.0–0.5	Soil	NA[e]	—[f]	—	—	0.0012 (J)	—	0.0029 (J)	0.0024 (J)	NA	NA	—	NA	NA
RE49-10-5093	49-609891	0.0–0.5	Fill	—	—	—	—	NA	0.08 (J)	NA	NA	—	0.00092 (J+)	—	0.00042 (J+)	—
RE49-10-5102	49-609894	0.0–0.5	Fill	—	—	0.046	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5103	49-609894	0.5–1.5	Fill	—	—	0.013 (J)	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5104	49-609895	0.0–0.5	Fill	0.026	—	—	—	NA	—	NA	NA	—	—	—	0.0023 (J)	—
RE49-10-5106	49-609896	0.0–0.5	Fill	—	—	—	0.049 (J)	NA	—	NA	NA	—	—	—	—	—
RE49-10-5107	49-609896	0.5–1.5	Fill	—	—	—	0.043 (J)	NA	—	NA	NA	—	—	—	—	—
RE49-10-5111	49-609898	0.5–1.5	Soil	0.18	—	—	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5117	49-609901	0.5–1.5	Soil	0.0091 (J)	—	—	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5120	49-609903	0.0–0.5	Fill	—	0.027 (J)	—	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5121	49-609903	0.5–1.5	Fill	—	0.055 (J)	—	—	NA	—	NA	NA	—	—	—	—	—
RE49-10-5136	49-609908	0.0–0.5	Fill	—	—	—	—	NA	—	NA	NA	0.00091 (J+)	—	0.00063 (J+)	—	—
RE49-10-5138	49-609909	0.0–0.5	Soil	—	—	—	—	NA	0.13 (J)	NA	NA	—	—	—	—	—
RE49-10-5140	49-609910	0.0–0.5	Fill	—	—	—	—	NA	0.12 (J)	NA	NA	—	—	—	—	—
RE49-10-5141	49-609910	0.5–1.5	Fill	—	—	—	—	NA	—	NA	NA	0.0011 (J)	—	—	—	—
RE49-10-5142	49-609911	0.0–0.5	Soil	—	—	—	—	NA	—	NA	NA	—	—	0.00044 (J)	—	—
RE49-10-5145	49-609912	0.5–1.5	Soil	—	—	—	—	NA	—	NA	NA	0.00065 (J)	—	—	—	—
RE49-10-5146	49-609913	0.0–0.5	Soil	—	—	—	—	NA	—	NA	NA	0.00093 (J)	—	0.00071 (J)	—	—
RE49-10-5226	49-609950	0.0–0.5	Soil	—	—	—	0.04 (J)	NA	0.099 (J)	NA	NA	—	—	—	—	—
RE49-10-5236	49-609955	0.0–0.5	Fill	—	—	—	—	NA	0.14 (J)	NA	NA	—	—	—	—	—
RE49-10-5284	49-609965	0.5–1.5	Fill	0.0084 (J)	—	—	—	NA	—	NA	NA	—	—	—	—	0.0033 (J)
RE49-10-7045	49-610481	3.0–5.0	Soil	—	NA	NA	—	NA	0.069 (J)	NA	NA	—	—	—	—	—
RE49-10-7051	49-610485	118.0–120.0	Qbt3	—	NA	NA	—	NA	0.072 (J)	NA	NA	—	—	—	—	—

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

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

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

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

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

[e] NA = Not analyzed.

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

Table 11.2-6
Summary of Radionuclides Detected or Detected above BVs/FVs at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-134	Cesium-137	Plutonium-239/240	Tritium	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**1.98**	**0.09**	**1.93**
Soil BV[a]				**0.013**	**0.4**	**1.65**	**0.054**	**na**	**2.59**	**0.2**	**2.29**
Residential SAL[c]				**30**	**2.4**	**5.6**	**33**	**750**	**170**	**17**	**87**
Industrial SAL[c]				**180**	**9.7**	**23**	**210**	**440000**	**1500**	**87**	**430**
Construction Worker SAL[c]				**34**	**7.7**	**18**	**36**	**320000**	**220**	**43**	**160**
0549-95-0265	49-09007	0.0–0.5	Soil	—[d]	—	—	0.077	NA[e]	3.84	0.42	17.97
0549-95-0266	49-09007	0.5–1.0	Soil	—	—	—	—	NA	—	—	7.71
0549-95-0272	49-09032	0.0–0.5	Soil	—	—	—	0.483	NA	—	—	6.5
0549-95-0273	49-09032	0.5–1.0	Soil	—	—	—	0.198	NA	—	—	3.36
0549-95-0274	49-09035	0.0–0.5	Soil	—	—	—	0.22	NA	NA	NA	NA
0549-95-0275	49-09035	0.0–0.5	Soil	—	—	—	0.079	NA	NA	NA	NA
0549-95-0276	49-09036	0.0–0.5	Soil	—	—	—	0.211	NA	2.85	0.4	22.74
0549-95-0277	49-09036	0.5–1.0	Soil	—	—	—	—	NA	—	—	3.23
RE49-10-5090	49-609889	0.5–1.5	Soil	—	—	0.115	—	NA	—	—	—
RE49-10-5091	49-609890	0.0–0.5	Soil	—	—	—	0.119	NA	—	—	—
RE49-10-5092	49-609890	0.5–1.5	Soil	—	—	—	—	NA	2.69	—	5.05
RE49-10-5094	49-609891	0.5–1.5	Fill	—	—	—	0.076	NA	—	—	—
RE49-10-5096	49-609892	0.5–1.5	Soil	—	—	0.187	—	NA	—	—	—
RE49-10-5097	49-609893	0.0–0.5	Fill	—	—	—	0.055	NA	—	—	—
RE49-10-5104	49-609895	0.0–0.5	Fill	—	0.039	—	—	NA	—	—	—
RE49-10-5106	49-609896	0.0–0.5	Fill	0.086	—	—	0.346	NA	—	—	—
RE49-10-5107	49-609896	0.5–1.5	Fill	—	—	—	0.062	NA	—	—	—

Table 11.2-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-134	Cesium-137	Plutonium-239/240	Tritium	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**1.98**	**0.09**	**1.93**
Soil BV[a]				**0.013**	**0.4**	**1.65**	**0.054**	**na**	**2.59**	**0.2**	**2.29**
Residential SAL[c]				**30**	**2.4**	**5.6**	**33**	**750**	**170**	**17**	**87**
Industrial SAL[c]				**180**	**9.7**	**23**	**210**	**440000**	**1500**	**87**	**430**
Construction Worker SAL[c]				**34**	**7.7**	**18**	**36**	**320000**	**220**	**43**	**160**
RE49-10-5108	49-609897	0.0–0.5	Fill	—	—	—	0.074	NA	—	—	—
RE49-10-5114	49-609900	0.0–0.5	Soil	—	—	—	0.058	NA	—	—	—
RE49-10-5121	49-609903	0.5–1.5	Fill	—	—	—	0.129	NA	—	—	—
RE49-10-5146	49-609913	0.0–0.5	Soil	—	—	—	0.1	NA	—	—	—
RE49-10-5226	49-609950	0.0–0.5	Soil	—	—	—	0.137	NA	—	—	—
RE49-10-7044	49-610481	118.0–120.0	Qbt3	—	NA	NA	—	0.35 (J+)	—	—	—
RE49-10-7050	49-610485	88.0–90.0	Qbt3	—	NA	NA	—	0.265 (J+)	—	—	—

Notes: All activities are in pCi/g. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

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

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

[e] NA = Not analyzed.

Table 11.2-7
Summary of Pore-Gas Samples Collected and Analyses Requested at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Tritium	VOCs
MD49-10-12183	49-610481	29.0–31.0	Pore gas	10-1792	10-1791
MD49-10-12181	49-610481	77.0–79.0	Pore gas	10-1792	10-1791
MD49-10-12179	49-610481	82.0–84.0	Pore gas	10-1581	10-1580

Table 11.2-8
Summary of Organic Chemicals Detected in Pore-Gas Samples Collected at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzene	Butanone[2-]	Carbon Disulfide	Chloromethane	Dichlorodifluoromethane	Ethylbenzene	Ethyltoluene[4-]	Styrene	Toluene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene (Total)	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
MD49-10-12183	49-610481	29.0–31.0	Pore gas	26 (J)	13	4.8	4.2	—*	2.8	5.4	4.5	—	30	4.7	—	23	5.5	17
MD49-10-12181	49-610481	77.0–79.0	Pore gas	46 (J)	29	15	98	—	3	13	16	—	52	17	4.7	51	13	38
MD49-10-12179	49-610481	82.0–84.0	Pore gas	24	8.9	9.4	—	2.9	3	7.9	13	2.9	16	15	4.3	31	8.1	23

Note: All concentrations are in $\mu g/m^3$.
*— = Not detected.

Table 11.2-9
Summary of Tritium in Pore-Gas Samples at Area 12, AOC 49-008(d)

Sample ID	Location ID	Depth (ft)	Media	Tritium
MD49-10-12183	49-610481	29.0–31.0	Pore gas	6777.46 (J)
MD49-10-12181	49-610481	77.0–79.0	Pore gas	9661.86 (J)
MD49-10-12179	49-610481	82.0–84.0	Pore gas	20,140

Notes: All activities are in pCi/L. Data qualifiers are defined in Appendix A.

Table 12.3-1
Surveyed Coordinates for
2009–2010 Locations at Ancho and Water Canyons

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Sediment Surface and Shallow Subsurface			
Ancho Canyon	49-610388	1621513.939	1755443.787
Ancho Canyon	49-610389	1621504.058	1755443.793
Ancho Canyon	49-610390	1621504.058	1755443.793
Ancho Canyon	49-610391	1622289.207	1754794.175
Ancho Canyon	49-610392	1622284.263	1754788.111
Ancho Canyon	49-610393	1622279.318	1754782.048
Ancho Canyon	49-610394	1623054.702	1754265.92
Ancho Canyon	49-610395	1623054.702	1754265.92
Ancho Canyon	49-610396	1623054.698	1754259.853
Ancho Canyon	49-610400	1623617.742	1753901.597
Ancho Canyon	49-610401	1623617.738	1753895.531
Ancho Canyon	49-610402	1623622.672	1753883.395
Ancho Canyon	49-610403	1624235.214	1753658.586
Ancho Canyon	49-610404	1624235.214	1753658.586
Ancho Canyon	49-610405	1624230.273	1753658.589
Ancho Canyon	49-610406	1624763.763	1753421.702
Ancho Canyon	49-610407	1624744.029	1753476.311
Ancho Canyon	49-610408	1624748.95	1753439.91
Ancho Canyon	49-610409	1625386.108	1753008.85
Ancho Canyon	49-610410	1625386.102	1752996.717
Ancho Canyon	49-610411	1625371.27	1752978.525
Ancho Canyon	49-610412	1626285.207	1752668.674
Ancho Canyon	49-610413	1626275.319	1752656.546
Ancho Canyon	49-610414	1626270.378	1752656.548
Ancho Canyon	49-610415	1627189.235	1752255.725
Ancho Canyon	49-610416	1627189.227	1752237.526
Ancho Canyon	49-610417	1627189.224	1752231.459
Ancho Canyon	49-610418	1625806.833	1754476.732
Ancho Canyon	49-610419	1625792.005	1754464.606
Ancho Canyon	49-610420	1625792.002	1754458.54
Ancho Canyon	49-610421	1625994.739	1754792.096
Ancho Canyon	49-610422	1625989.795	1754786.032
Ancho Canyon	49-610423	1625984.858	1754792.101
Ancho Canyon	49-610424	1626177.322	1754337.018
Ancho Canyon	49-610425	1626172.384	1754343.087
Ancho Canyon	49-610426	1626182.26	1754330.949

Table 12.3-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Sediment Surface and Shallow Subsurface (continued)			
Ancho Canyon	49-610427	1626246.532	1754415.848
Ancho Canyon	49-610428	1626236.644	1754403.72
Ancho Canyon	49-610429	1626226.763	1754403.725
Ancho Canyon	49-610430	1626434.176	1754197.363
Ancho Canyon	49-610431	1626429.229	1754185.232
Ancho Canyon	49-610432	1626424.285	1754179.168
Ancho Canyon	49-610433	1627264.487	1754761.161
Ancho Canyon	49-610434	1627264.487	1754761.161
Ancho Canyon	49-610435	1627254.603	1754755.099
Ancho Canyon	49-610436	1627748.783	1755003.606
Ancho Canyon	49-610437	1627738.899	1754997.544
Ancho Canyon	49-610438	1627729.018	1754997.548
Ancho Canyon	49-610439	1628005.587	1754742.635
Ancho Canyon	49-610440	1627990.762	1754736.575
Ancho Canyon	49-610441	1627990.759	1754730.508
Ancho Canyon	49-610442	1627733.688	1754378.761
Ancho Canyon	49-610443	1627728.742	1754366.63
Ancho Canyon	49-610444	1627718.855	1754354.502
Ancho Canyon	49-610446	1628151.273	1754112.247
Ancho Canyon	49-610448	1626715.779	1754148.697
Ancho Canyon	49-610449	1626720.717	1754142.628
Ancho Canyon	49-610450	1626715.773	1754136.563
Ancho Canyon	49-610451	1627372.867	1754057.396
Ancho Canyon	49-610452	1627377.805	1754051.327
Ancho Canyon	49-610453	1627372.861	1754045.263
Ancho Canyon	49-610454	1627960.808	1754014.672
Ancho Canyon	49-610455	1627965.744	1754002.537
Ancho Canyon	49-610456	1627965.738	1753990.404
Ancho Canyon	49-610457	1628351.084	1753893.177
Ancho Canyon	49-610458	1628351.076	1753874.978
Ancho Canyon	49-610459	1628346.13	1753862.847
Ancho Canyon	49-610460	1628869.717	1753498.643
Ancho Canyon	49-610461	1628864.774	1753492.578
Ancho Canyon	49-610462	1628859.833	1753492.58
Ancho Canyon	49-610397	1629200.656	1753231.587
Ancho Canyon	49-610398	1629205.595	1753225.518
Ancho Canyon	49-610399	1629200.654	1753225.52
Water Canyon	49-610316	1622932.684	1756759.332

Table 12.3-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Sediment Surface and Shallow Subsurface (continued)			
Water Canyon	49-610317	1622937.617	1756747.196
Water Canyon	49-610318	1622932.669	1756735.066
Water Canyon	49-610319	1622966.986	1756292.189
Water Canyon	49-610320	1622966.982	1756286.123
Water Canyon	49-610321	1622966.978	1756280.056
Water Canyon	49-610322	1623515.496	1756498.126
Water Canyon	49-610323	1623500.668	1756486.002
Water Canyon	49-610324	1623490.78	1756473.875
Water Canyon	49-610325	1623500.576	1756328.272
Water Canyon	49-610326	1623495.628	1756316.142
Water Canyon	49-610327	1623495.625	1756310.076
Water Canyon	49-610328	1623880.963	1756279.521
Water Canyon	49-610329	1623890.844	1756279.515
Water Canyon	49-610330	1623880.949	1756255.255
Water Canyon	49-610331	1624330.541	1756273.202
Water Canyon	49-610332	1624335.485	1756279.266
Water Canyon	49-610333	1624330.544	1756279.268
Water Canyon	49-610334	1624686.109	1756006.08
Water Canyon	49-610335	1624686.112	1756012.146
Water Canyon	49-610336	1624681.169	1756006.083
Water Canyon	49-610337	1624997.322	1755933.115
Water Canyon	49-610338	1625007.2	1755927.043
Water Canyon	49-610339	1625007.2	1755927.043
Water Canyon	49-610340	1625427.134	1755908.623
Water Canyon	49-610341	1625432.072	1755902.554
Water Canyon	49-610342	1625432.068	1755896.488
Water Canyon	49-610343	1625792.739	1755920.57
Water Canyon	49-610344	1625792.742	1755926.636
Water Canyon	49-610345	1625792.739	1755920.57
Water Canyon	49-610347	1626612.908	1756011.166
Water Canyon	49-610348	1626613.044	1756005.435
Water Canyon	49-610349	1627561.67	1755962.46
Water Canyon	49-610350	1627561.46	1755956.131
Water Canyon	49-610351	1627561.247	1755952.093
Water Canyon	49-610352	1620623.815	1757323.387
Water Canyon	49-610353	1620625.91	1757318.934
Water Canyon	49-610354	1620627.836	1757315.238
Water Canyon	49-610356	1620917.59	1757622.063

Table 12.3-1 (continued)

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Sediment Surface and Shallow Subsurface (continued)			
Water Canyon	49-610359	1621477.222	1757552.118
Water Canyon	49-610362	1621974.943	1757639.61
Water Canyon	49-610363	1621974.364	1757629.47
Water Canyon	49-610364	1623141.777	1757643.086
Water Canyon	49-610365	1623142.936	1757635.844
Water Canyon	49-610366	1623143.515	1757628.891
Water Canyon	49-610367	1623932.974	1757681.618
Water Canyon	49-610368	1623933.264	1757676.693
Water Canyon	49-610369	1623933.553	1757661.628
Water Canyon	49-610370	1624941.742	1757549.22
Water Canyon	49-610371	1624942.032	1757544.295
Water Canyon	49-610372	1624942.322	1757539.37
Water Canyon	49-610373	1626082.618	1757039.042
Water Canyon	49-610374	1626080.011	1757033.827
Water Canyon	49-610375	1626078.563	1757028.902
Water Canyon	49-610376	1626833.256	1756720.362
Water Canyon	49-610377	1626830.069	1756716.595
Water Canyon	49-610378	1626823.985	1756708.483
Water Canyon	49-610379	1627461.346	1756685.307
Water Canyon	49-610380	1627459.318	1756680.092
Water Canyon	49-610381	1627457.87	1756674.587
Water Canyon	49-610382	1628045.69	1756498.734
Water Canyon	49-610383	1628045.4	1756493.519
Water Canyon	49-610384	1628045.98	1756488.594
Water Canyon	49-610385	1628582.812	1756353.01
Water Canyon	49-610386	1628582.232	1756348.085
Water Canyon	49-610387	1628581.073	1756343.16

Table 12.3-2
Samples Collected and Analyses Requested at Ancho Canyon

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6535	49-610388	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6537	49-610389	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6539	49-610390	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6541	49-610391	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6542	49-610391	0.5–1.33	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6543	49-610392	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6544	49-610392	0.5–1.5	SED	—*	—	—	—	—	10-1313	10-1313
RE49-10-6545	49-610393	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6547	49-610394	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6549	49-610395	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6550	49-610395	0.5–1.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6551	49-610396	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6552	49-610396	0.5–1.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6553	49-610397	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6555	49-610398	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6556	49-610398	0.5–1.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6557	49-610399	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6558	49-610399	0.5–1.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6559	49-610400	0.0–0.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6560	49-610400	0.5–1.5	SED	10-1314	10-1314	10-1314	10-1314	10-1314	10-1313	10-1313
RE49-10-6561	49-610401	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6562	49-610401	0.5–1.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6563	49-610402	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6564	49-610402	0.5–1.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6565	49-610403	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6566	49-610403	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398

Table 12.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6567	49-610404	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6568	49-610404	0.5–0.83	SED	—	—	—	—	—	10-1398	10-1398
RE49-10-6569	49-610405	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6570	49-610405	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6571	49-610406	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6573	49-610407	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6574	49-610407	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6575	49-610408	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6577	49-610409	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6578	49-610409	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6579	49-610410	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6580	49-610410	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6581	49-610411	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6582	49-610411	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6583	49-610412	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6584	49-610412	0.5–1.25	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6585	49-610413	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6586	49-610413	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6587	49-610414	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6589	49-610415	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6590	49-610415	0.5–1.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6591	49-610416	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6592	49-610416	0.5–0.83	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6593	49-610417	0.0–0.5	SED	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399	10-1399
RE49-10-6595	49-610418	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6597	49-610419	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315

Table 12.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6599	49-610420	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6601	49-610421	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6603	49-610422	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6605	49-610423	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6606	49-610423	0.5–0.83	SED	—	—	—	—	—	10-1315	10-1315
RE49-10-6607	49-610424	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6608	49-610424	0.5–1.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6609	49-610425	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6611	49-610426	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6613	49-610427	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6614	49-610427	0.5–1.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6615	49-610428	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6616	49-610428	0.5–1.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6617	49-610429	0.0–0.5	SED	10-1316	10-1316	10-1316	10-1316	10-1316	10-1315	10-1315
RE49-10-6618	49-610429	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6619	49-610430	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6621	49-610431	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6622	49-610431	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6623	49-610432	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6624	49-610432	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6625	49-610433	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6627	49-610434	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6628	49-610434	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6629	49-610435	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6630	49-610435	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6631	49-610436	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317

Table 12.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6632	49-610436	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6633	49-610437	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6635	49-610438	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6636	49-610438	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6637	49-610439	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6639	49-610440	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6640	49-610440	0.5–1.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6641	49-610441	0.0–0.5	SED	10-1318	10-1318	10-1318	10-1318	10-1318	10-1317	10-1317
RE49-10-6642	49-610441	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6643	49-610442	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6645	49-610443	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6646	49-610443	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6647	49-610444	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6648	49-610444	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6651	49-610446	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6652	49-610446	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6655	49-610448	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6656	49-610448	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6657	49-610449	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6659	49-610450	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6660	49-610450	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6661	49-610451	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6662	49-610451	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6663	49-610452	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6665	49-610453	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6667	49-610454	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319

Table 12.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6668	49-610454	0.5–1.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6669	49-610455	0.0–0.5	SED	10-1320	10-1320	10-1320	10-1320	10-1320	10-1319	10-1319
RE49-10-6670	49-610455	0.5–1.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6671	49-610456	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6673	49-610457	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6674	49-610457	0.5–0.83	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6675	49-610458	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6677	49-610459	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6679	49-610460	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6680	49-610460	0.5–1.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6681	49-610461	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6682	49-610461	0.5–1.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6683	49-610462	0.0–0.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321
RE49-10-6684	49-610462	0.5–1.5	SED	10-1322	10-1322	10-1322	10-1322	10-1322	10-1321	10-1321

*— = Not requested

Table 12.3-3
Samples Collected and Analyses Requested at Water Canyon

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6391	49-610316	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6392	49-610316	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6393	49-610317	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6394	49-610317	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6395	49-610318	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6396	49-610318	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6397	49-610319	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6398	49-610319	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6399	49-610320	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6400	49-610320	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6401	49-610321	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6402	49-610321	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6403	49-610322	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6404	49-610322	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6405	49-610323	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6406	49-610323	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6407	49-610324	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6408	49-610324	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6409	49-610325	0.0–0.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6410	49-610325	0.5–1.5	SED	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396	10-1396
RE49-10-6411	49-610326	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6412	49-610326	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6413	49-610327	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6415	49-610328	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6417	49-610329	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6418	49-610329	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397

Table 12.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6419	49-610330	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6420	49-610330	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6421	49-610331	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6423	49-610332	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6425	49-610333	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6426	49-610333	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6427	49-610334	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6429	49-610335	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6430	49-610335	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6431	49-610336	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6433	49-610337	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6434	49-610337	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6435	49-610338	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6437	49-610339	0.0–0.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6438	49-610339	0.5–1.5	SED	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397	10-1397
RE49-10-6439	49-610340	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6440	49-610340	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6441	49-610341	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6442	49-610341	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6443	49-610342	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6444	49-610342	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6445	49-610343	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6446	49-610343	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6447	49-610344	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6448	49-610344	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6449	49-610345	0.0–0.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398

Table 12.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6450	49-610345	0.5–1.5	SED	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398	10-1398
RE49-10-6453	49-610347	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6454	49-610347	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6455	49-610348	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6456	49-610348	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6457	49-610349	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6458	49-610349	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6459	49-610350	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6461	49-610351	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6462	49-610351	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6463	49-610352	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6465	49-610353	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6466	49-610353	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6467	49-610354	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6468	49-610354	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6471	49-610356	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6472	49-610356	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6477	49-610359	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6478	49-610359	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6483	49-610362	0.0–0.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6484	49-610362	0.5–1.5	SED	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529	10-1529
RE49-10-6485	49-610363	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6487	49-610364	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6489	49-610365	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6490	49-610365	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6491	49-610366	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527

Table 12.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6493	49-610367	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6494	49-610367	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6495	49-610368	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6497	49-610369	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6499	49-610370	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6500	49-610370	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6501	49-610371	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6502	49-610371	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6503	49-610372	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6504	49-610372	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6505	49-610373	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6506	49-610373	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6507	49-610374	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6508	49-610374	0.5–1.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6509	49-610375	0.0–0.5	SED	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527	10-1527
RE49-10-6510	49-610375	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6511	49-610376	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6512	49-610376	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6513	49-610377	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6514	49-610377	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6515	49-610378	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6516	49-610378	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6517	49-610379	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6519	49-610380	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6520	49-610380	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6521	49-610381	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528

Table 12.3-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Gamma Spectroscopy	Isotopic Plutonium	Isotopic Uranium	Metals	PCBs	SVOCs
RE49-10-6522	49-610381	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6523	49-610382	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6524	49-610382	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6525	49-610383	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6526	49-610383	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6527	49-610384	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6528	49-610384	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6529	49-610385	0.0–0.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6530	49-610385	0.5–1.5	SED	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528	10-1528
RE49-10-6531	49-610386	0.0–0.5	SED	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526
RE49-10-6532	49-610386	0.5–1.5	SED	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526
RE49-10-6533	49-610387	0.0–0.5	SED	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526	10-1526

Table 12.3-4
Field-Screening Results for Samples Collected at Ancho and Water Canyons

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Ancho Canyon	49-610388	0.0–0.5	RE49-10-6535	65	2560
Ancho Canyon	49-610389	0.0–0.5	RE49-10-6537	65	2620
Ancho Canyon	49-610390	0.0–0.5	RE49-10-6539	59	2530
Ancho Canyon	49-610391	0.0–0.5	RE49-10-6541	43	2260
Ancho Canyon	49-610391	0.5–1.3	RE49-10-6542	54	2880
Ancho Canyon	49-610392	0.0–0.5	RE49-10-6543	65	2600
Ancho Canyon	49-610392	0.5–1.0	RE49-10-6544	54	2550
Ancho Canyon	49-610393	0.0–0.5	RE49-10-6545	65	2570
Ancho Canyon	49-610394	0.0–0.5	RE49-10-6547	43	2160
Ancho Canyon	49-610395	0.0–0.5	RE49-10-6549	43	2390
Ancho Canyon	49-610395	0.5–1.5	RE49-10-6550	43	2420
Ancho Canyon	49-610396	0.0–0.5	RE49-10-6551	54	2030
Ancho Canyon	49-610396	0.5–1.5	RE49-10-6552	27	2500
Ancho Canyon	49-610397	0.0–0.5	RE49-10-6553	554	2540
Ancho Canyon	49-610398	0.0–0.5	RE49-10-6555	86	2670
Ancho Canyon	49-610398	0.5–1.5	RE49-10-6556	54	2610
Ancho Canyon	49-610399	0.0–0.5	RE49-10-6557	59	2900
Ancho Canyon	49-610399	0.5–1.5	RE49-10-6558	75	2540
Ancho Canyon	49-610400	0.0–0.5	RE49-10-6559	76	2470
Ancho Canyon	49-610400	0.5–1.0	RE49-10-6560	59	2470
Ancho Canyon	49-610401	0.0–0.5	RE49-10-6561	55	2380
Ancho Canyon	49-610401	0.5–1.5	RE49-10-6562	86	2500
Ancho Canyon	49-610402	0.0–0.5	RE49-10-6563	43	2500
Ancho Canyon	49-610402	0.5–1.5	RE49-10-6564	32	2490
Ancho Canyon	49-610403	0.0–0.5	RE49-10-6565	37	2550
Ancho Canyon	49-610403	0.5–1.5	RE49-10-6566	39	2530
Ancho Canyon	49-610404	0.0–0.5	RE49-10-6567	22	2680
Ancho Canyon	49-610404	0.5–0.83	RE49-10-6568	41	2460
Ancho Canyon	49-610405	0.0–0.5	RE49-10-6569	54	2360
Ancho Canyon	49-610405	0.5–1.5	RE49-10-6570	55	2610
Ancho Canyon	49-610406	0.0–0.5	RE49-10-6571	37	2660
Ancho Canyon	49-610407	0.0–0.5	RE49-10-6573	43	2650
Ancho Canyon	49-610407	0.5–1.5	RE49-10-6574	59	2550
Ancho Canyon	49-610408	0.0–0.5	RE49-10-6575	66	2840
Ancho Canyon	49-610409	0.0–0.5	RE49-10-6577	21	2540
Ancho Canyon	49-610409	0.5–1.5	RE49-10-6578	48	2500
Ancho Canyon	49-610410	0.0–0.5	RE49-10-6579	43	2600

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Ancho Canyon	49-610410	0.5–1.5	RE49-10-6580	43	2560
Ancho Canyon	49-610411	0.0–0.5	RE49-10-6581	27	2420
Ancho Canyon	49-610411	0.5–1.5	RE49-10-6582	43	2324
Ancho Canyon	49-610412	0.0–0.5	RE49-10-6583	43	2530
Ancho Canyon	49-610412	0.5–1.25	RE49-10-6584	66	2660
Ancho Canyon	49-610413	0.0–0.5	RE49-10-6585	55	2880
Ancho Canyon	49-610413	0.5–1.5	RE49-10-6586	27	2420
Ancho Canyon	49-610414	0.0–0.5	RE49-10-6587	27	2280
Ancho Canyon	49-610415	0.0–0.5	RE49-10-6589	66	2610
Ancho Canyon	49-610415	0.5–1.5	RE49-10-6590	65	2770
Ancho Canyon	49-610416	0.0–0.5	RE49-10-6591	65	2830
Ancho Canyon	49-610416	0.5–0.83	RE49-10-6592	75	2840
Ancho Canyon	49-610417	0.0–0.5	RE49-10-6593	71	2640
Ancho Canyon	49-610418	0.0–0.5	RE49-10-6595	98	2690
Ancho Canyon	49-610419	0.0–0.5	RE49-10-6597	111	2850
Ancho Canyon	49-610420	0.0–0.5	RE49-10-6599	104	2550
Ancho Canyon	49-610421	0.0–0.5	RE49-10-6601	91	2680
Ancho Canyon	49-610422	0.0–0.5	RE49-10-6603	55	2670
Ancho Canyon	49-610423	0.0–0.5	RE49-10-6605	65	2800
Ancho Canyon	49-610423	0.5–0.83	RE49-10-6606	118	2550
Ancho Canyon	49-610424	0.0–0.5	RE49-10-6607	78	2750
Ancho Canyon	49-610424	0.5–1.5	RE49-10-6608	72	2660
Ancho Canyon	49-610425	0.0–0.5	RE49-10-6609	85	2630
Ancho Canyon	49-610426	0.0–0.5	RE49-10-6611	85	2650
Ancho Canyon	49-610427	0.0–0.5	RE49-10-6613	78	2790
Ancho Canyon	49-610427	0.5–1.5	RE49-10-6614	118	2700
Ancho Canyon	49-610428	0.0–0.5	RE49-10-6615	54	2640
Ancho Canyon	49-610428	0.5–1.5	RE49-10-6616	91	2940
Ancho Canyon	49-610429	0.0–0.5	RE49-10-6617	85	2780
Ancho Canyon	49-610429	0.5–1.5	RE49-10-6618	98	2650
Ancho Canyon	49-610430	0.0–0.5	RE49-10-6619	78	2880
Ancho Canyon	49-610431	0.0–0.5	RE49-10-6621	98	2520
Ancho Canyon	49-610431	0.5–1.5	RE49-10-6622	39	2710
Ancho Canyon	49-610432	0.0–0.5	RE49-10-6623	45	2570
Ancho Canyon	49-610432	0.5–1.5	RE49-10-6624	91	2680
Ancho Canyon	49-610433	0.0–0.5	RE49-10-6625	45	2160
Ancho Canyon	49-610434	0.0–0.5	RE49-10-6627	91	2670
Ancho Canyon	49-610434	0.5–1.5	RE49-10-6628	72	2630

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Ancho Canyon	49-610435	0.0–0.5	RE49-10-6629	65	2660
Ancho Canyon	49-610435	0.5–1.5	RE49-10-6630	72	2600
Ancho Canyon	49-610436	0.0–0.5	RE49-10-6631	85	2480
Ancho Canyon	49-610436	0.5–1.5	RE49-10-6632	104	2940
Ancho Canyon	49-610437	0.0–0.5	RE49-10-6633	85	2670
Ancho Canyon	49-610438	0.0–0.5	RE49-10-6635	65	3090
Ancho Canyon	49-610438	0.5–1.5	RE49-10-6636	85	2020
Ancho Canyon	49-610439	0.0–0.5	RE49-10-6637	59	2990
Ancho Canyon	49-610440	0.0–0.5	RE49-10-6639	111	2790
Ancho Canyon	49-610440	0.5–1.5	RE49-10-6640	65	2950
Ancho Canyon	49-610441	0.0–0.5	RE49-10-6641	111	2580
Ancho Canyon	49-610441	0.5–1.5	RE49-10-6642	104	2780
Ancho Canyon	49-610442	0.0–0.5	RE49-10-6643	78	2850
Ancho Canyon	49-610443	0.0–0.5	RE49-10-6645	85	2800
Ancho Canyon	49-610443	0.5–1.5	RE49-10-6646	78	2600
Ancho Canyon	49-610444	0.0–0.5	RE49-10-6647	72	2490
Ancho Canyon	49-610444	0.5–1.04	RE49-10-6648	98	3100
Ancho Canyon	49-610446	0.0–0.5	RE49-10-6651	65	2650
Ancho Canyon	49-610446	0.5–1.5	RE49-10-6652	75	2940
Ancho Canyon	49-610448	0.0–0.5	RE49-10-6655	55	2580
Ancho Canyon	49-610448	0.5–1.5	RE49-10-6656	111	2910
Ancho Canyon	49-610449	0.0–0.5	RE49-10-6657	91	2670
Ancho Canyon	49-610450	0.0–0.5	RE49-10-6659	117	2720
Ancho Canyon	49-610450	0.5–1.5	RE49-10-6660	72	2960
Ancho Canyon	49-610451	0.0–0.5	RE49-10-6661	104	3360
Ancho Canyon	49-610451	0.5–1.5	RE49-10-6662	170	3160
Ancho Canyon	49-610452	0.0–0.5	RE49-10-6663	98	2840
Ancho Canyon	49-610453	0.0–0.5	RE49-10-6665	78	2710
Ancho Canyon	49-610454	0.0–0.5	RE49-10-6667	48	2520
Ancho Canyon	49-610454	0.5–1.5	RE49-10-6668	59	2580
Ancho Canyon	49-610455	0.0–0.5	RE49-10-6669	70	2600
Ancho Canyon	49-610455	0.5–1.5	RE49-10-6670	54	2800
Ancho Canyon	49-610456	0.0–0.5	RE49-10-6671	59	2320
Ancho Canyon	49-610457	0.0–0.5	RE49-10-6673	65	2620
Ancho Canyon	49-610457	0.5–0.83	RE49-10-6674	86	2650
Ancho Canyon	49-610458	0.0–0.5	RE49-10-6675	32	2040
Ancho Canyon	49-610459	0.0–0.5	RE49-10-6677	48	2330
Ancho Canyon	49-610460	0.0–0.5	RE49-10-6679	59	2460

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Ancho Canyon	49-610460	0.5–1.5	RE49-10-6680	86	2480
Ancho Canyon	49-610461	0.0–0.5	RE49-10-6681	70	2530
Ancho Canyon	49-610461	0.5–1.5	RE49-10-6682	70	2450
Ancho Canyon	49-610462	0.0–0.5	RE49-10-6683	103	2290
Ancho Canyon	49-610462	0.5–1.5	RE49-10-6684	54	2380
Water Canyon	49-610316	0.0–0.5	RE49-10-6391	14	2000
Water Canyon	49-610316	0.5–1.5	RE49-10-6392	18	1938
Water Canyon	49-610317	0.0–0.5	RE49-10-6393	9	1879
Water Canyon	49-610317	0.5–1.5	RE49-10-6394	14	2240
Water Canyon	49-610318	0.0–0.5	RE49-10-6395	18	2020
Water Canyon	49-610318	0.5–1.5	RE49-10-6396	9	2040
Water Canyon	49-610319	0.0–0.5	RE49-10-6397	28	1938
Water Canyon	49-610319	0.5–1.5	RE49-10-6398	18	2220
Water Canyon	49-610320	0.0–0.5	RE49-10-6399	4	2060
Water Canyon	49-610320	0.5–1.5	RE49-10-6400	18	2050
Water Canyon	49-610321	0.0–0.5	RE49-10-6401	33	1920
Water Canyon	49-610321	0.5–1.5	RE49-10-6402	18	2230
Water Canyon	49-610322	0.0–0.5	RE49-10-6403	9	2070
Water Canyon	49-610322	0.5–1.5	RE49-10-6404	28	1961
Water Canyon	49-610323	0.0–0.5	RE49-10-6405	4	2180
Water Canyon	49-610323	0.5–1.5	RE49-10-6406	18	2160
Water Canyon	49-610324	0.0–0.5	RE49-10-6407	14	1850
Water Canyon	49-610324	0.5–1.5	RE49-10-6408	28	2200
Water Canyon	49-610325	0.0–0.5	RE49-10-6409	14	1990
Water Canyon	49-610325	0.5–1.5	RE49-10-6410	23	1955
Water Canyon	49-610326	0.0–0.5	RE49-10-6411	14	2110
Water Canyon	49-610326	0.5–1.5	RE49-10-6412	28	1961
Water Canyon	49-610327	0.0–0.5	RE49-10-6413	20	1909
Water Canyon	49-610328	0.0–0.5	RE49-10-6415	14	1973
Water Canyon	49-610329	0.0–0.5	RE49-10-6417	9	2160
Water Canyon	49-610329	0.5–1.5	RE49-10-6418	28	1961
Water Canyon	49-610330	0.0–0.5	RE49-10-6419	23	2100
Water Canyon	49-610330	0.5–1.5	RE49-10-6420	14	2460
Water Canyon	49-610331	0.0–0.5	RE49-10-6421	18	2160
Water Canyon	49-610332	0.0–0.5	RE49-10-6423	33	2280
Water Canyon	49-610333	0.0–0.5	RE49-10-6425	18	2460
Water Canyon	49-610333	0.5–1.5	RE49-10-6426	18	2350
Water Canyon	49-610334	0.0–0.5	RE49-10-6427	14	2140

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Water Canyon	49-610335	0.0–0.5	RE49-10-6429	14	2350
Water Canyon	49-610335	0.5–1.5	RE49-10-6430	18	2420
Water Canyon	49-610336	0.0–0.5	RE49-10-6431	28	2350
Water Canyon	49-610337	0.0–0.5	RE49-10-6433	23	2580
Water Canyon	49-610337	0.5–1.5	RE49-10-6434	33	2250
Water Canyon	49-610338	0.0–0.5	RE49-10-6435	28	2380
Water Canyon	49-610339	0.0–0.5	RE49-10-6437	18	2110
Water Canyon	49-610339	0.5–1.5	RE49-10-6438	23	2320
Water Canyon	49-610340	0.0–0.5	RE49-10-6439	43	2590
Water Canyon	49-610340	0.5–1.5	RE49-10-6440	47	2650
Water Canyon	49-610341	0.0–0.5	RE49-10-6441	43	2330
Water Canyon	49-610341	0.5–1.5	RE49-10-6442	51	2700
Water Canyon	49-610342	0.0–0.5	RE49-10-6443	65	2660
Water Canyon	49-610342	0.5–1.5	RE49-10-6444	48	2670
Water Canyon	49-610343	0.0–0.5	RE49-10-6445	74	2670
Water Canyon	49-610343	0.5–1.5	RE49-10-6446	27	2680
Water Canyon	49-610344	0.0–0.5	RE49-10-6447	37	2500
Water Canyon	49-610344	0.5–1.5	RE49-10-6448	68	2670
Water Canyon	49-610345	0.0–0.5	RE49-10-6449	54	2380
Water Canyon	49-610345	0.5–1.5	RE49-10-6450	54	2640
Water Canyon	49-610347	0.0–0.5	RE49-10-6453	65	2540
Water Canyon	49-610347	0.5–1.5	RE49-10-6454	59	2690
Water Canyon	49-610348	0.0–0.5	RE49-10-6455	70	2170
Water Canyon	49-610348	0.5–1.5	RE49-10-6456	54	2440
Water Canyon	49-610349	0.0–0.5	RE49-10-6457	32	2230
Water Canyon	49-610349	0.5–1.5	RE49-10-6458	59	2570
Water Canyon	49-610350	0.0–0.5	RE49-10-6459	37	2060
Water Canyon	49-610351	0.0–0.5	RE49-10-6461	65	2680
Water Canyon	49-610351	0.5–1.5	RE49-10-6462	54	2570
Water Canyon	49-610352	0.0–0.5	RE49-10-6463	65	2240
Water Canyon	49-610353	0.0–0.5	RE49-10-6465	54	2370
Water Canyon	49-610353	0.5–1.5	RE49-10-6466	27	2130
Water Canyon	49-610354	0.0–0.5	RE49-10-6467	27	2200
Water Canyon	49-610354	0.5–1.5	RE49-10-6468	Saturated	Saturated
Water Canyon	49-610356	0.0–0.5	RE49-10-6471	37	2100
Water Canyon	49-610356	0.5–1.5	RE49-10-6472	43	2110
Water Canyon	49-610359	0.0–0.5	RE49-10-6477	54	2220
Water Canyon	49-610359	0.5–1.5	RE49-10-6478	27	2340

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Water Canyon	49-610362	0.0–0.5	RE49-10-6483	55	2020
Water Canyon	49-610362	0.5–1.5	RE49-10-6484	43	2370
Water Canyon	49-610363	0.0–0.5	RE49-10-6485	33	1897
Water Canyon	49-610364	0.0–0.5	RE49-10-6487	48	2110
Water Canyon	49-610365	0.0–0.5	RE49-10-6489	65	1982
Water Canyon	49-610365	0.5–1.5	RE49-10-6490	54	2200
Water Canyon	49-610366	0.0–0.5	RE49-10-6491	48	2040
Water Canyon	49-610367	0.0–0.5	RE49-10-6493	65	2120
Water Canyon	49-610367	0.5–1.5	RE49-10-6494	48	2430
Water Canyon	49-610368	0.0–0.5	RE49-10-6495	24	2220
Water Canyon	49-610369	0.0–0.5	RE49-10-6497	43	2250
Water Canyon	49-610370	0.0–0.5	RE49-10-6499	70	2200
Water Canyon	49-610370	0.5–1.5	RE49-10-6500	65	2590
Water Canyon	49-610371	0.0–0.5	RE49-10-6501	48	2270
Water Canyon	49-610371	0.5–1.5	RE49-10-6502	59	2550
Water Canyon	49-610372	0.0–0.5	RE49-10-6503	54	2040
Water Canyon	49-610372	0.5–1.5	RE49-10-6504	65	2030
Water Canyon	49-610373	0.0–0.5	RE49-10-6505	75	2430
Water Canyon	49-610373	0.5–1.5	RE49-10-6506	48	2370
Water Canyon	49-610374	0.0–0.5	RE49-10-6507	70	2170
Water Canyon	49-610374	0.5–1.5	RE49-10-6508	27	2470
Water Canyon	49-610375	0.0–0.5	RE49-10-6509	59	2270
Water Canyon	49-610375	0.5–1.5	RE49-10-6510	32	2200
Water Canyon	49-610376	0.0–0.5	RE49-10-6511	59	2380
Water Canyon	49-610376	0.5–1.5	RE49-10-6512	43	2530
Water Canyon	49-610377	0.0–0.5	RE49-10-6513	54	2540
Water Canyon	49-610377	0.5–1.5	RE49-10-6514	65	2510
Water Canyon	49-610378	0.0–0.5	RE49-10-6515	43	2330
Water Canyon	49-610378	0.5–1.5	RE49-10-6516	Saturated	Saturated
Water Canyon	49-610379	0.0–0.5	RE49-10-6517	43	2350
Water Canyon	49-610380	0.0–0.5	RE49-10-6519	48	2420
Water Canyon	49-610380	0.5–1.5	RE49-10-6520	43	2250
Water Canyon	49-610381	0.0–0.5	RE49-10-6521	65	2470
Water Canyon	49-610381	0.5–1.5	RE49-10-6522	43	2520
Water Canyon	49-610382	0.0–0.5	RE49-10-6523	32	2200
Water Canyon	49-610382	0.5–1.5	RE49-10-6524	Saturated	Saturated
Water Canyon	49-610383	0.0–0.5	RE49-10-6525	43	2360
Water Canyon	49-610383	0.5–1.5	RE49-10-6526	37	2370

Table 12.3-4 (continued)

AOC or SWMU	Location ID	Depth (ft)	Sample ID	Alpha (dpm)	Beta/Gamma (dpm)
Water Canyon	49-610384	0.0–0.5	RE49-10-6527	37	2520
Water Canyon	49-610384	0.5–1.5	RE49-10-6528	Saturated	Saturated
Water Canyon	49-610385	0.0–0.5	RE49-10-6529	54	2420
Water Canyon	49-610385	0.5–1.5	RE49-10-6530	Saturated	Saturated
Water Canyon	49-610386	0.0–0.5	RE49-10-6531	Saturated	Saturated
Water Canyon	49-610386	0.5–1.5	RE49-10-6532	Saturated	Saturated
Water Canyon	49-610387	0.0–0.5	RE49-10-6533	48	2000

Table 12.3-5
Summary of Inorganic Chemicals Detected at Ancho Canyon

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Nickel	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**3.98**	**127**	**1.31**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**9.38**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.56E+03**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**2.27E+04**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**6.19E+03**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6535	49-610388	0.0–0.5	SED	—[g]	—	—	—	—	—	—	—	—	—	—	0.66 (UJ)	—	—	—
RE49-10-6537	49-610389	0.0–0.5	SED	—	—	—	—	—	4.9	—	—	—	—	—	0.64 (UJ)	—	—	—
RE49-10-6539	49-610390	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.68 (UJ)	—	—	—
RE49-10-6541	49-610391	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.69 (UJ)	—	—	—
RE49-10-6542	49-610391	0.5–1.33	SED	—	—	—	—	—	—	—	—	—	—	—	0.61 (UJ)	—	—	—
RE49-10-6543	49-610392	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.7 (UJ)	—	—	—
RE49-10-6545	49-610393	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.75 (UJ)	—	—	—
RE49-10-6547	49-610394	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.86 (UJ)	—	—	—
RE49-10-6549	49-610395	0.0–0.5	SED	—	—	—	—	—	—	—	—	27.7	—	—	0.65 (UJ)	—	—	—
RE49-10-6550	49-610395	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (UJ)	—	—	—
RE49-10-6551	49-610396	0.0–0.5	SED	—	—	—	4520	—	—	—	—	—	—	—	—	—	1 (U)	—
RE49-10-6552	49-610396	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.72 (UJ)	—	1.4 (U)	22.7
RE49-10-6553	49-610397	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.72 (UJ)	—	—	—
RE49-10-6555	49-610398	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.57 (UJ)	—	—	—
RE49-10-6556	49-610398	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.6 (UJ)	—	1.2 (U)	—
RE49-10-6557	49-610399	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.59 (UJ)	—	—	—
RE49-10-6559	49-610400	0.0–0.5	SED	—	138 (J)	—	—	—	5.1	—	—	—	—	—	0.71 (UJ)	—	1.4 (U)	31.1
RE49-10-6560	49-610400	0.5–1.5	SED	—	204 (J)	—	—	—	6.1	11.4	14,800	20.3	2650	9.8	0.64 (UJ)	—	1.3 (U)	35.8
RE49-10-6561	49-610401	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.66 (U)	—	—	—
RE49-10-6562	49-610401	0.5–1.5	SED	—	160 (J+)	—	—	—	5.8	—	15, 000 (J)	—	—	—	0.66 (U)	—	—	33.5
RE49-10-6563	49-610402	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.71 (U)	—	—	—
RE49-10-6564	49-610402	0.5–1.5	SED	—	191 (J+)	—	—	—	5.3	—	14,600 (J)	20.7	2450 (J+)	—	0.65 (U)	—	—	35.6
RE49-10-6565	49-610403	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6566	49-610403	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.2	—	—	—
RE49-10-6567	49-610404	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.86	—	—	—
RE49-10-6569	49-610405	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6570	49-610405	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.84	—	—	—
RE49-10-6571	49-610406	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.71	—	—	—
RE49-10-6573	49-610407	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.54 (UJ)	—	—	—
RE49-10-6574	49-610407	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.54 (UJ)	—	—	23.3 (J+)
RE49-10-6575	49-610408	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.59 (UJ)	1.2 (U)	1.2 (U)	33.1 (J+)
RE49-10-6577	49-610409	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.64 (UJ)	1.3 (U)	1.3 (U)	26.3 (J+)
RE49-10-6578	49-610409	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (UJ)	1.2 (U)	1.2 (U)	—
RE49-10-6579	49-610410	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.57 (UJ)	—	—	20.8 (J+)
RE49-10-6580	49-610410	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.54 (UJ)	—	—	—

Table 12.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Nickel	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**3.98**	**127**	**1.31**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**9.38**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.56E+03**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**2.27E+04**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**6.19E+03**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6581	49-610411	0.0–0.5	SED	—	—	—	—	—	—	—	—	22.4 (J+)	—	—	0.65 (UJ)	1.3 (U)	1.3 (U)	28 (J+)
RE49-10-6582	49-610411	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	1.1 (U)	1.1 (U)	30.4 (J+)
RE49-10-6583	49-610412	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.62 (UJ)	1.2 (U)	1.2 (U)	28.9 (J+)
RE49-10-6584	49-610412	0.5–1.25	SED	—	—	—	—	—	—	—	—	—	—	—	0.6 (UJ)	1.2 (U)	1.2 (U)	29.5 (J+)
RE49-10-6585	49-610413	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	1.3 (U)	1.6 (U)	19.8 (J+)
RE49-10-6586	49-610413	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.66 (UJ)	1.3 (U)	1.3 (U)	24.6 (J+)
RE49-10-6587	49-610414	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.64 (UJ)	1.3 (U)	1.3 (U)	40.1 (J+)
RE49-10-6589	49-610415	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.63 (UJ)	—	—	22.5 (J+)
RE49-10-6590	49-610415	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (UJ)	—	—	20.6 (J+)
RE49-10-6591	49-610416	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.63 (UJ)	—	—	—
RE49-10-6592	49-610416	0.5–0.83	SED	—	—	—	—	—	—	—	—	—	—	—	0.62 (UJ)	—	—	—
RE49-10-6593	49-610417	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.62 (UJ)	—	—	—
RE49-10-6595	49-610418	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—
RE49-10-6597	49-610419	0.0–0.5	SED	—	—	—	—	12.1	—	—	—	—	—	—	0.63 (U)	—	—	—
RE49-10-6599	49-610420	0.0–0.5	SED	—	—	1.5 (U)	—	31.6	—	—	—	—	—	18.4	0.62 (U)	—	—	20.5
RE49-10-6601	49-610421	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.64 (U)	—	—	—
RE49-10-6603	49-610422	0.0–0.5	SED	—	138 (J+)	—	—	12.8	—	—	—	—	—	—	0.78 (U)	—	—	—
RE49-10-6605	49-610423	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.64 (U)	—	—	—
RE49-10-6607	49-610424	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—
RE49-10-6608	49-610424	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	26.2
RE49-10-6609	49-610425	0.0–0.5	SED	—	129 (J+)	—	—	—	—	—	—	—	—	—	0.62 (U)	—	—	—
RE49-10-6611	49-610426	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—
RE49-10-6613	49-610427	0.0–0.5	SED	—	134 (J+)	—	—	—	—	—	—	—	—	—	0.65 (U)	—	—	—
RE49-10-6614	49-610427	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—
RE49-10-6615	49-610428	0.0–0.5	SED	—	128 (J+)	—	—	—	—	—	—	—	—	—	0.62 (U)	—	—	—
RE49-10-6616	49-610428	0.5–1.5	SED	—	129 (J+)	—	—	—	—	—	—	—	—	—	0.57 (U)	—	—	—
RE49-10-6617	49-610429	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.59 (U)	—	—	—
RE49-10-6618	49-610429	0.5–1.5	SED	6	335	—	—	11.1	5	—	15,200 (J+)	—	2670 (J+)	9.8	1.3	—	—	30.3
RE49-10-6619	49-610430	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.9	—	—	—
RE49-10-6621	49-610431	0.0–0.5	SED	—	—	—	—	21.1	5.3	—	—	—	—	12.5	1.1	—	—	19.9
RE49-10-6622	49-610431	0.5–1.5	SED	—	—	—	—	17.2	4.9	—	—	—	—	10.7	0.94	—	—	20.2
RE49-10-6623	49-610432	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.97	—	—	—
RE49-10-6624	49-610432	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	1	—	—	21.4
RE49-10-6625	49-610433	0.0–0.5	SED	—	189	—	—	—	5.2	—	—	—	—	—	0.84	—	—	—
RE49-10-6627	49-610434	0.0–0.5	SED	—	185	—	—	—	5.7	—	—	—	—	—	1.1	—	—	21.1
RE49-10-6628	49-610434	0.5–1.5	SED	—	155	—	—	—	5.2	—	—	—	—	—	0.77	—	—	—

Table 12.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Nickel	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**3.98**	**127**	**1.31**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**9.38**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.56E+03**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**2.27E+04**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**6.19E+03**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6629	49-610435	0.0–0.5	SED	—	165	—	—	—	5.2	—	—	—	—	—	0.78	—	—	—
RE49-10-6630	49-610435	0.5–1.5	SED	—	152	—	—	—	6.2	—	—	—	—	—	1	—	—	25.1
RE49-10-6631	49-610436	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6632	49-610436	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6633	49-610437	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6635	49-610438	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.81	—	—	—
RE49-10-6636	49-610438	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6637	49-610439	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.99	—	—	—
RE49-10-6639	49-610440	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.82	—	—	—
RE49-10-6640	49-610440	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6641	49-610441	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6642	49-610441	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—
RE49-10-6643	49-610442	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.6 (U)	—	—	—
RE49-10-6645	49-610443	0.0–0.5	SED	—	152	—	—	—	—	—	—	—	—	—	0.65 (U)	—	—	—
RE49-10-6646	49-610443	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—
RE49-10-6647	49-610444	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.65 (U)	—	—	—
RE49-10-6648	49-610444	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.63 (U)	—	—	—
RE49-10-6651	49-610446	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—
RE49-10-6652	49-610446	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.57 (U)	—	—	—
RE49-10-6655	49-610448	0.0–0.5	SED	—	133	—	—	—	—	—	—	—	—	—	0.62 (U)	—	—	—
RE49-10-6656	49-610448	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—
RE49-10-6657	49-610449	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.73 (U)	—	—	—
RE49-10-6659	49-610450	0.0–0.5	SED	—	140	—	—	—	—	—	—	—	—	—	0.67 (U)	—	—	—
RE49-10-6660	49-610450	0.5–1.5	SED	—	134	—	—	—	—	—	—	—	—	—	0.64 (U)	—	—	—
RE49-10-6661	49-610451	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—
RE49-10-6662	49-610451	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—
RE49-10-6663	49-610452	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.67 (U)	—	—	—
RE49-10-6665	49-610453	0.0–0.5	SED	—	139	—	—	—	—	—	—	—	—	—	0.78 (U)	—	—	—
RE49-10-6667	49-610454	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.57 (U)	—	—	—
RE49-10-6668	49-610454	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—
RE49-10-6669	49-610455	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—
RE49-10-6670	49-610455	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.56 (UJ)	—	—	—
RE49-10-6671	49-610456	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.66 (UJ)	—	—	—
RE49-10-6673	49-610457	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.57 (UJ)	—	—	—
RE49-10-6674	49-610457	0.5–0.83	SED	—	—	—	—	—	—	—	—	—	—	—	0.55 (UJ)	—	—	—
RE49-10-6675	49-610458	0.0–0.5	SED	—	—	—	—	—	6.6 (J-)	—	—	—	—	—	0.7 (UJ)	—	—	—

Table 12.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Nickel	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**3.98**	**127**	**1.31**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**9.38**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**3.90E+00**	**1.56E+04**	**1.56E+02**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.56E+03**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.77E+01**	**2.24E+05**	**2.26E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**2.27E+04**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**6.54E+01**	**4.35E+03**	**1.44E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**6.19E+03**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6677	49-610459	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.73 (UJ)	—	—	—
RE49-10-6679	49-610460	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.67 (UJ)	—	—	—
RE49-10-6680	49-610460	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.66 (UJ)	—	—	—
RE49-10-6681	49-610461	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.65 (UJ)	—	—	—
RE49-10-6682	49-610461	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.6 (UJ)	—	—	—
RE49-10-6683	49-610462	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.68 (UJ)	—	—	—
RE49-10-6684	49-610462	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	0.62 (UJ)	—	—	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

[g] — = Analyzed for but not detected.

Table 12.3-6
Summary of Inorganic Chemicals Detected or Detected above BVs at Water Canyon

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**	**9.38**	**2690**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**1.56E+03**	**na**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**2.27E+04**	**na**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**6.19E+03**	**na**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6391	49-610316	0.0–0.5	SED	—[g]	—	—	150	—	—	—	—	5.4	—	—	—	—	—	—	—	0.59 (UJ)	—	—	—
RE49-10-6392	49-610316	0.5–1.5	SED	—	—	—	176	—	—	—	—	6	—	—	—	—	—	—	—	0.58 (UJ)	—	1.2 (U)	29.9
RE49-10-6393	49-610317	0.0–0.5	SED	—	—	—	186 (J+)	—	—	—	—	9.4	—	—	21.2	—	654	9.5 (U)	—	0.7 (UJ)	—	1.4 (U)	34.5
RE49-10-6394	49-610317	0.5–1.5	SED	—	—	—	163 (J+)	—	—	—	—	10.2	—	—	—	—	—	—	—	0.61 (UJ)	—	1.2 (U)	31
RE49-10-6395	49-610318	0.0–0.5	SED	—	—	—	403	—	0.41 (U)	—	—	23.7	13.1 (U)	15,800	27.9	2690	2150	14.3 (U)	—	0.58 (UJ)	—	1.2 (U)	41.4
RE49-10-6396	49-610318	0.5–1.5	SED	—	—	—	164 (J+)	—	—	—	—	7.6	12.7 (U)	16,500	—	3090	—	10 (U)	—	0.57 (UJ)	—	1.1 (U)	36
RE49-10-6397	49-610319	0.0–0.5	SED	—	—	—	181	—	—	—	—	9.2	—	—	—	—	618	—	—	0.58 (UJ)	—	1.2 (U)	36.4
RE49-10-6398	49-610319	0.5–1.5	SED	—	—	—	194	—	—	—	—	7	—	—	—	—	—	—	—	0.55 (UJ)	—	1.1 (U)	37.4
RE49-10-6399	49-610320	0.0–0.5	SED	18,800	—	—	209	—	—	—	—	8.4	—	15,900	—	2480	—	11.8 (U)	—	0.59 (UJ)	—	1.2 (U)	42.8
RE49-10-6400	49-610320	0.5–1.5	SED	24,900	—	—	394	1.7	—	—	—	17.8	—	15,500	23.2	—	1560	13.3 (U)	—	0.58 (UJ)	—	1.2 (U)	38.1
RE49-10-6401	49-610321	0.0–0.5	SED	17,200	—	—	217	—	—	—	—	7	—	13,900	—	—	—	10.2 (U)	—	0.65 (UJ)	—	1.3 (U)	37.5
RE49-10-6402	49-610321	0.5–1.5	SED	29,100	—	—	294	1.6	—	—	—	—	—	—	—	—	—	12.7 (U)	—	0.59 (UJ)	—	1.5 (U)	23.8
RE49-10-6403	49-610322	0.0–0.5	SED	—	—	—	170 (J+)	—	—	—	—	7.4	—	—	—	—	—	—	—	—	—	1.5 (U)	32.9
RE49-10-6404	49-610322	0.5–1.5	SED	—	—	—	155 (J+)	—	—	—	—	7.6	—	—	—	—	—	—	—	0.55 (UJ)	—	1.1 (U)	34.4
RE49-10-6405	49-610323	0.0–0.5	SED	—	—	—	183	—	—	—	—	6.7	—	—	—	—	—	—	—	0.63 (UJ)	—	1.3 (U)	29.3
RE49-10-6406	49-610323	0.5–1.5	SED	—	—	—	220 (J+)	—	—	—	—	11.9	—	—	—	—	730	9.9 (U)	—	0.55 (UJ)	—	1.1 (U)	32.3
RE49-10-6407	49-610324	0.0–0.5	SED	—	—	—	180 (J+)	1.4	—	—	—	7.7	—	—	—	2380	—	9.4 (U)	—	0.58 (UJ)	—	1.2 (U)	33.2
RE49-10-6408	49-610324	0.5–1.5	SED	—	—	—	217	—	—	—	—	4.8	—	—	—	—	—	—	—	0.57 (UJ)	—	1.1 (U)	29.9
RE49-10-6409	49-610325	0.0–0.5	SED	—	—	9.3	153	1.6	—	—	12.3	6.5	—	17,300	—	—	—	—	—	0.6 (UJ)	—	1.2 (U)	70.8
RE49-10-6410	49-610325	0.5–1.5	SED	—	—	—	163	—	—	—	—	8.3	—	—	—	—	554	—	—	0.55 (UJ)	—	1.1 (U)	37.2
RE49-10-6411	49-610326	0.0–0.5	SED	—	—	—	192	—	—	—	—	10.3	—	—	—	—	707	—	—	0.63 (UJ)	1.3 (U)	1.3 (U)	46 (J+)
RE49-10-6412	49-610326	0.5–1.5	SED	—	—	—	155	—	—	—	—	8.1	—	—	—	—	—	—	—	0.61 (UJ)	1.2 (U)	1.2 (U)	46.7 (J+)
RE49-10-6413	49-610327	0.0–0.5	SED	22,300	—	4.5	177	—	—	—	11.1	10.4	—	18,400	26.3	3280 (J+)	—	—	—	0.62 (UJ)	1.2 (U)	1.2 (U)	52.2 (J+)
RE49-10-6415	49-610328	0.0–0.5	SED	16,900	—	—	140	1.4	—	—	—	7.5	—	15,100	—	2670 (J+)	—	9.4	—	0.66 (UJ)	—	—	35.4 (J+)
RE49-10-6417	49-610329	0.0–0.5	SED	—	—	4.7	181	—	—	—	—	14.8	—	15,000	27.4	—	979	—	—	0.65 (UJ)	1.3 (U)	1.3 (U)	53.6 (J+)
RE49-10-6418	49-610329	0.5–1.5	SED	—	—	—	132	—	—	—	—	6.8	—	—	—	—	—	—	—	0.64 (UJ)	1.3 (U)	1.8 (U)	47.1 (J+)
RE49-10-6419	49-610330	0.0–0.5	SED	—	—	—	—	—	—	—	—	4.9	—	—	—	—	—	—	—	0.59 (UJ)	1.2 (U)	1.2 (U)	33.9 (J+)
RE49-10-6420	49-610330	0.5–1.5	SED	16,400	—	—	—	—	—	—	—	5.2	—	15,200	—	—	—	—	—	0.57 (UJ)	1.1 (U)	1.1 (U)	35.4 (J+)
RE49-10-6421	49-610331	0.0–0.5	SED	—	—	—	141	—	—	—	—	5.5	—	—	—	—	—	—	—	0.58 (UJ)	1.2 (U)	1.2 (U)	37.6 (J+)
RE49-10-6423	49-610332	0.0–0.5	SED	—	—	—	—	—	—	—	—	10	—	—	—	—	575	—	—	0.55 (UJ)	1.1 (U)	1.1 (U)	42.1 (J+)
RE49-10-6425	49-610333	0.0–0.5	SED	—	—	—	—	—	—	—	—	5.4 (J)	—	—	—	—	—	—	—	1.1 (J)	—	—	—
RE49-10-6426	49-610333	0.5–1.5	SED	—	—	4	—	—	—	—	—	11.7	—	—	23.6	—	686	—	—	0.54 (UJ)	1.1 (U)	1.1 (U)	43.1 (J+)
RE49-10-6427	49-610334	0.0–0.5	SED	—	—	—	145	—	—	—	—	7.1	—	—	—	—	—	—	—	0.67 (UJ)	1.3 (U)	1.3 (U)	37.9 (J+)

Table 12.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**	**9.38**	**2690**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**1.56E+03**	**na**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**2.27E+04**	**na**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**6.19E+03**	**na**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6429	49-610335	0.0–0.5	SED	—	—	—	—	—	—	—	—	5.2	—	—	—	—	—	—	—	0.63 (UJ)	1.3 (U)	1.3 (U)	34.2 (J+)
RE49-10-6430	49-610335	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.61 (UJ)	1.2 (U)	1.2 (U)	29.8 (J+)
RE49-10-6431	49-610336	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	15,100	—	—	557	—	—	0.65 (UJ)	—	—	25.8 (J+)
RE49-10-6433	49-610337	0.0–0.5	SED	—	—	—	—	—	—	—	—	5.1	—	—	—	—	—	—	—	0.63 (UJ)	1.3 (U)	1.3 (U)	28.8 (J+)
RE49-10-6434	49-610337	0.5–1.5	SED	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	0.61 (UJ)	1.2 (U)	1.2 (U)	30.1 (J+)
RE49-10-6435	49-610338	0.0–0.5	SED	—	—	—	—	—	—	—	—	5.1	—	—	—	—	—	—	—	0.6 (UJ)	1.2 (U)	1.2 (U)	35.2 (J+)
RE49-10-6437	49-610339	0.0–0.5	SED	—	—	—	158	—	—	6220	—	8.1	—	15,400	20.3	2790 (J+)	663	10.4	2870 (J+)	0.83 (UJ)	—	—	37.8 (J+)
RE49-10-6438	49-610339	0.5–1.5	SED	16,400	—	4	138	—	—	—	12.5	9.6	—	21,200	—	3010 (J+)	629	12.2	—	0.65 (UJ)	—	—	51.6 (J+)
RE49-10-6439	49-610340	0.0–0.5	SED	—	—	—	139	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6440	49-610340	0.5–1.5	SED	—	—	—	—	—	—	—	—	5.9	—	—	—	—	—	—	—	0.75	—	—	—
RE49-10-6441	49-610341	0.0–0.5	SED	—	—	—	129	—	—	—	—	—	—	—	—	—	—	—	—	0.89	—	—	—
RE49-10-6442	49-610341	0.5–1.5	SED	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	0.91	—	—	—
RE49-10-6443	49-610342	0.0–0.5	SED	—	—	—	137 (J)	—	—	—	—	4.8 (J)	—	—	—	—	—	—	—	1.3 (J)	—	—	—
RE49-10-6444	49-610342	0.5–1.5	SED	—	—	—	—	—	—	—	—	6 (J)	—	—	—	—	—	—	—	1.3 (J)	—	—	—
RE49-10-6445	49-610343	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.94	—	—	—
RE49-10-6446	49-610343	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6447	49-610344	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.2	—	—	—
RE49-10-6448	49-610344	0.5–1.5	SED	—	—	4.2	165	—	—	—	—	16	—	—	—	—	1160 (J-)	—	—	1.1	—	—	27.9
RE49-10-6449	49-610345	0.0–0.5	SED	—	—	—	141	—	—	—	—	5.4	—	—	—	—	—	—	—	1	—	—	24
RE49-10-6450	49-610345	0.5–1.5	SED	—	—	—	149	—	—	—	—	5.9	—	—	—	—	—	—	—	1.1	—	—	24.4
RE49-10-6453	49-610347	0.0–0.5	SED	—	—	—	—	—	—	—	—	7.4 (J)	—	—	—	—	—	—	—	0.72	—	—	—
RE49-10-6454	49-610347	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.88	—	—	—
RE49-10-6455	49-610348	0.0–0.5	SED	—	—	—	141 (J-)	—	—	—	—	5.6 (J)	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6456	49-610348	0.5–1.5	SED	—	—	—	131 (J-)	—	—	—	—	5.4 (J)	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6457	49-610349	0.0–0.5	SED	—	—	—	136 (J-)	—	—	—	—	6.4 (J)	—	—	—	—	—	—	—	0.92	—	—	—
RE49-10-6458	49-610349	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6459	49-610350	0.0–0.5	SED	—	—	—	133 (J-)	—	—	—	—	5.9 (J)	—	—	—	—	—	—	—	1	—	—	20.6
RE49-10-6461	49-610351	0.0–0.5	SED	—	—	—	137 (J-)	—	—	—	—	5 (J)	—	—	—	—	—	—	—	0.96	—	—	—
RE49-10-6462	49-610351	0.5–1.5	SED	—	—	—	131 (J-)	—	—	—	—	7.8 (J)	—	—	—	—	—	—	—	0.85	—	—	—
RE49-10-6463	49-610352	0.0–0.5	SED	—	—	—	139 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6465	49-610353	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.47 (J)	—	—	—
RE49-10-6466	49-610353	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.69	—	—	—
RE49-10-6467	49-610354	0.0–0.5	SED	—	—	—	134 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	0.86	—	—	—

Table 12.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**	**9.38**	**2690**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**1.56E+03**	**na**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**2.27E+04**	**na**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**6.19E+03**	**na**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6468	49-610354	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6471	49-610356	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6472	49-610356	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.2	—	—	—
RE49-10-6477	49-610359	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.88	—	—	—
RE49-10-6478	49-610359	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.73	—	—	—
RE49-10-6483	49-610362	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.72	—	—	—
RE49-10-6484	49-610362	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.67	—	—	—
RE49-10-6485	49-610363	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.84	—	—	—
RE49-10-6487	49-610364	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6489	49-610365	0.0–0.5	SED	—	—	—	150 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6490	49-610365	0.5–1.5	SED	—	—	—	171 (J)	—	—	—	—	5.7 (J)	—	—	22.8	2410	629 (J)	—	—	0.89	—	—	—
RE49-10-6491	49-610366	0.0–0.5	SED	—	—	—	149 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6493	49-610367	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.74	—	—	—
RE49-10-6494	49-610367	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.75	—	—	—
RE49-10-6495	49-610368	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.2	—	—	—
RE49-10-6497	49-610369	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6499	49-610370	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.48 (J)	—	—	—
RE49-10-6500	49-610370	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.54 (J)	—	—	—
RE49-10-6501	49-610371	0.0–0.5	SED	—	—	—	139 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6502	49-610371	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.69	—	—	—
RE49-10-6503	49-610372	0.0–0.5	SED	—	—	—	275 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6504	49-610372	0.5–1.5	SED	—	—	—	777 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.2	1.1	—	—
RE49-10-6505	49-610373	0.0–0.5	SED	—	—	—	191 (J)	—	—	—	—	—	—	—	—	—	—	—	—	0.91	—	—	—
RE49-10-6506	49-610373	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.91	—	—	—
RE49-10-6507	49-610374	0.0–0.5	SED	—	—	—	397 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.5	—	—	—
RE49-10-6508	49-610374	0.5–1.5	SED	—	—	—	214 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6509	49-610375	0.0–0.5	SED	—	—	—	227 (J)	—	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6510	49-610375	0.5–1.5	SED	—	—	—	226 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	0.72	—	—	—
RE49-10-6511	49-610376	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.87	—	—	—
RE49-10-6512	49-610376	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.4	—	—	—
RE49-10-6513	49-610377	0.0–0.5	SED	—	—	—	193 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	0.81	—	—	—
RE49-10-6514	49-610377	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.83	—	—	—
RE49-10-6515	49-610378	0.0–0.5	SED	—	—	—	294 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6516	49-610378	0.5–1.5	SED	—	—	—	278 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—

Table 12.3-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel	Potassium	Selenium	Silver	Thallium	Vanadium
Sediment BV[a]				**15,400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13,800**	**19.7**	**2370**	**543**	**9.38**	**2690**	**0.3**	**1**	**0.73**	**19.7**
Residential SSL[b]				**7.81E+04**	**3.13E+01**	**3.90E+00**	**1.56E+04**	**1.56E+02**	**7.79E+01**	**na[c]**	**2.19E+02[d]**	**2.3E+01[e]**	**3.13E+03**	**5.48E+04**	**4.00E+02**	**na**	**1.07E+04**	**1.56E+03**	**na**	**3.91E+02**	**3.91E+02**	**5.16E+00**	**3.91E+02**
Industrial SSL[b]				**1.13E+06**	**4.54E+02**	**1.77E+01**	**2.24E+05**	**2.26E+03**	**1.12E+03**	**na**	**2.92E+03[d]**	**3.0E+01[e]**	**4.54E+04**	**7.95E+05**	**8.00E+02**	**na**	**1.45E+05**	**2.27E+04**	**na**	**5.68E+03**	**5.68E+03**	**7.49E+01**	**5.68E+03**
Construction Worker SSL[b]				**4.07E+04**	**1.24E+02**	**6.54E+01**	**4.35E+03**	**1.44E+02**	**3.09E+02**	**na**	**4.49E+02[d]**	**3.46E+01[f]**	**1.24E+04**	**2.17E+05**	**8.00E+02**	**na**	**4.63E+02**	**6.19E+03**	**na**	**1.55E+03**	**1.55E+03**	**2.04E+01**	**1.55E+03**
RE49-10-6517	49-610379	0.0–0.5	SED	—	—	—	471 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6519	49-610380	0.0–0.5	SED	—	—	—	139 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE49-10-6520	49-610380	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.69	—	—	—
RE49-10-6521	49-610381	0.0–0.5	SED	—	—	—	433 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.5	—	—	—
RE49-10-6522	49-610381	0.5–1.5	SED	—	—	—	491 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—	—
RE49-10-6523	49-610382	0.0–0.5	SED	—	—	—	218 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6524	49-610382	0.5–1.5	SED	—	—	—	130 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	0.89	—	—	—
RE49-10-6525	49-610383	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.87	—	—	—
RE49-10-6526	49-610383	0.5–1.5	SED	—	—	—	150 (J-)	—	—	—	—	6.4	—	—	—	—	1060	—	—	0.76	—	—	—
RE49-10-6527	49-610384	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.72	—	—	—
RE49-10-6528	49-610384	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.1	—	—	—
RE49-10-6529	49-610385	0.0–0.5	SED	—	17.4 (J)	—	191 (J-)	—	—	—	—	—	—	—	—	—	—	—	—	0.84	—	—	—
RE49-10-6530	49-610385	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.82	—	—	—
RE49-10-6531	49-610386	0.0–0.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.46 (J)	—	—	—
RE49-10-6532	49-610386	0.5–1.5	SED	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.72	—	—	—
RE49-10-6533	49-610387	0.0–0.5	SED	—	—	—	188	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—

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

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

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

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

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

[g] — = Analyzed for but not detected.

Table 12.3-7
Summary of Organic Chemicals Detected in Ancho Canyon

Sample ID	Location ID	Depth (ft)	Media	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Di-n-butylphthalate	Pyrene
Residential SSL[a]				**1.72E+03**[b]	**3.47E+02**	**6.21E+02**	**6.11E+03**	**1.72E+03**
Industrial SSL[a]				**1.83E+04**[b]	**1.37E+03**	**2.34E+03**	**6.84E+04**	**1.83E+04**
Construction Worker SSL[a]				**6.68E+03**[b]	**4.76E+03**	**2.06E+04**	**2.38E+04**	**6.68E+03**
RE49-10-6555	49-610398	0.0–0.5	SED	—[c]	0.12 (J)	—	—	—
RE49-10-6556	49-610398	0.5–1.5	SED	—	0.1 (J)	—	—	—
RE49-10-6559	49-610400	0.0–0.5	SED	—	0.74	—	—	—
RE49-10-6567	49-610404	0.0–0.5	SED	0.05 (J)	—	0.062 (J)	—	0.061 (J)
RE49-10-6582	49-610411	0.5–1.5	SED	—	—	—	0.058 (J)	—
RE49-10-6599	49-610420	0.0–0.5	SED	—	2.3	—	—	—
RE49-10-6601	49-610421	0.0–0.5	SED	—	0.33 (J)	—	—	—
RE49-10-6607	49-610424	0.0–0.5	SED	—	0.12 (J)	—	—	—
RE49-10-6609	49-610425	0.0–0.5	SED	—	0.24 (J)	—	—	—
RE49-10-6614	49-610427	0.5–1.5	SED	—	0.082 (J)	—	—	—
RE49-10-6616	49-610428	0.5–1.5	SED	—	1.3	—	—	—
RE49-10-6631	49-610436	0.0–0.5	SED	—	0.39 (J)	—	—	—
RE49-10-6637	49-610439	0.0–0.5	SED	—	0.35 (J)	—	—	—
RE49-10-6651	49-610446	0.0–0.5	SED	—	0.38 (J)	—	—	—
RE49-10-6657	49-610449	0.0–0.5	SED	—	0.45 (J)	—	—	—
RE49-10-6660	49-610450	0.5–1.5	SED	—	0.59 (J)	—	—	—

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

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

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

[c] — = Not detected.

Table 12.3-8
Summary of Organic Chemicals Detected in Water Canyon

Sample ID	Location ID	Depth (ft)	Media	Aniline	Aroclor-1260	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Fluoranthene	Phenanthrene	Phenol	Pyrene
Residential SSL[a]				**8.50E+02**[b]	**2.22E+00**	**6.1E+03**[b]	**3.47E+02**	**6.11E+03**	**2.29E+03**	**1.83E+03**	**1.83E+04**	**1.72E+03**
Industrial SSL[a]				**3.00E+03**[b]	**8.26E+00**	**6.2E+04**[b]	**1.37E+03**	**6.84E+04**	**2.44E+04**	**2.05E+04**	**2.05E+05**	**1.83E+04**
Construction Worker SSL[a]				**2.93E+04**[c]	**7.58E+01**	**3.09E+04**[c]	**4.76E+03**	**4.76E+03**[c]	**8.91E+03**	**7.15E+03**	**6.88E+04**	**6.68E+03**
RE49-10-6393	49-610317	0.0–0.5	SED	—[d]	0.0039 (J)	—	—	—	—	—	—	—
RE49-10-6395	49-610318	0.0–0.5	SED	—	—	—	0.11 (J)	—	—	—	—	—
RE49-10-6397	49-610319	0.0–0.5	SED	—	—	—	0.3 (J)	—	—	—	—	—
RE49-10-6398	49-610319	0.5–1.5	SED	—	—	—	0.1 (J)	—	—	—	—	—
RE49-10-6402	49-610321	0.5–1.5	SED	—	—	—	0.058 (J)	—	—	—	—	—
RE49-10-6409	49-610325	0.0–0.5	SED	—	—	—	0.24 (J)	—	—	—	—	—
RE49-10-6411	49-610326	0.0–0.5	SED	—	—	—	0.081 (J)	—	—	—	—	—
RE49-10-6412	49-610326	0.5–1.5	SED	—	—	—	0.17 (J)	—	—	—	—	—
RE49-10-6413	49-610327	0.0–0.5	SED	—	—	—	0.15 (J)	—	—	—	—	—
RE49-10-6427	49-610334	0.0–0.5	SED	—	—	—	0.18 (J)	—	—	—	—	—
RE49-10-6435	49-610338	0.0–0.5	SED	—	—	—	0.097 (J)	—	—	—	—	—
RE49-10-6453	49-610347	0.0–0.5	SED	—	—	0.05 (J)	—	—	—	—	—	—
RE49-10-6455	49-610348	0.0–0.5	SED	—	—	0.069 (J)	—	—	—	—	—	—
RE49-10-6457	49-610349	0.0–0.5	SED	—	—	0.094 (J)	—	—	—	—	—	—
RE49-10-6458	49-610349	0.5–1.5	SED	—	—	0.047 (J)	—	—	—	—	—	—
RE49-10-6467	49-610354	0.0–0.5	SED	—	—	0.086 (J)	—	—	—	—	—	—
RE49-10-6468	49-610354	0.5–1.5	SED	—	—	0.16 (J)	—	—	—	—	—	—

Table 12.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aniline	Aroclor-1260	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Fluoranthene	Phenanthrene	Phenol	Pyrene
Residential SSL[a]				**8.50E+02**[b]	**2.22E+00**	**6.1E+03**[b]	**3.47E+02**	**6.11E+03**	**2.29E+03**	**1.83E+03**	**1.83E+04**	**1.72E+03**
Industrial SSL[a]				**3.00E+03**[b]	**8.26E+00**	**6.2E+04**[b]	**1.37E+03**	**6.84E+04**	**2.44E+04**	**2.05E+04**	**2.05E+05**	**1.83E+04**
Construction Worker SSL[a]				**2.93E+04**[c]	**7.58E+01**	**3.09E+04**[c]	**4.76E+03**	**4.76E+03**[c]	**8.91E+03**	**7.15E+03**	**6.88E+04**	**6.68E+03**
RE49-10-6472	49-610356	0.5–1.5	SED	—	—	0.077 (J)	—	—	—	—	—	—
RE49-10-6478	49-610359	0.5–1.5	SED	—	—	0.076 (J)	—	—	—	—	—	—
RE49-10-6484	49-610362	0.5–1.5	SED	—	—	0.058 (J)	—	—	—	—	—	—
RE49-10-6490	49-610365	0.5–1.5	SED	—	—	—	—	—	0.051 (J)	0.067 (J)	—	0.047 (J)
RE49-10-6491	49-610366	0.0–0.5	SED	0.29 (J)	—	—	—	—	—	—	—	—
RE49-10-6494	49-610367	0.5–1.5	SED	—	0.069 (J+)	—	—	—	—	—	—	—
RE49-10-6500	49-610370	0.5–1.5	SED	—	—	—	0.078 (J)	—	—	—	—	—
RE49-10-6504	49-610372	0.5–1.5	SED	—	—	—	0.075 (J)	—	—	—	—	—
RE49-10-6506	49-610373	0.5–1.5	SED	—	—	—	0.083 (J)	—	—	—	—	—
RE49-10-6509	49-610375	0.0–0.5	SED	—	0.0075 (J+)	—	—	—	—	—	—	—
RE49-10-6510	49-610375	0.5–1.5	SED	—	—	0.094 (J)	—	—	—	—	0.084 (J)	—
RE49-10-6514	49-610377	0.5–1.5	SED	—	—	0.075 (J)	—	—	—	—	—	—
RE49-10-6515	49-610378	0.0–0.5	SED	—	0.012 (J)	0.082 (J)	—	—	—	—	—	—
RE49-10-6516	49-610378	0.5–1.5	SED	—	0.013 (J)	—	—	—	—	—	—	—
RE49-10-6517	49-610379	0.0–0.5	SED	—	0.02 (J)	—	—	—	—	—	—	—
RE49-10-6519	49-610380	0.0–0.5	SED	—	0.01 (J)	—	—	—	—	—	—	—
RE49-10-6520	49-610380	0.5–1.5	SED	—	—	0.06 (J)	—	—	—	—	—	—
RE49-10-6521	49-610381	0.0–0.5	SED	—	0.014 (J)	—	—	—	—	—	—	—

Table 12.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aniline	Aroclor-1260	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Fluoranthene	Phenanthrene	Phenol	Pyrene
Residential SSL[a]				**8.50E+02**[b]	**2.22E+00**	**6.1E+03**[b]	**3.47E+02**	**6.11E+03**	**2.29E+03**	**1.83E+03**	**1.83E+04**	**1.72E+03**
Industrial SSL[a]				**3.00E+03**[b]	**8.26E+00**	**6.2E+04**[b]	**1.37E+03**	**6.84E+04**	**2.44E+04**	**2.05E+04**	**2.05E+05**	**1.83E+04**
Construction Worker SSL[a]				**2.93E+04**[c]	**7.58E+01**	**3.09E+04**[c]	**4.76E+03**	**4.76E+03**[c]	**8.91E+03**	**7.15E+03**	**6.88E+04**	**6.68E+03**
RE49-10-6522	49-610381	0.5–1.5	SED	—	0.018 (J)	—	—	—	—	—	—	—
RE49-10-6523	49-610382	0.0–0.5	SED	—	—	0.086 (J)	—	—	—	—	—	—
RE49-10-6526	49-610383	0.5–1.5	SED	—	—	0.078 (J)	—	—	—	—	—	—
RE49-10-6527	49-610384	0.0–0.5	SED	—	0.0054 (J)	0.082 (J)	—	—	—	—	—	—
RE49-10-6530	49-610385	0.5–1.5	SED	—	0.0041 (J)	0.07 (J)	—	—	—	—	—	—
RE49-10-6532	49-610386	0.5–1.5	SED	—	—	0.044 (J)	—	—	—	—	—	—
RE49-10-6533	49-610387	0.0–0.5	SED	—	—	—	—	0.047 (J)	—	—	—	—

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

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

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

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

[d] — = Not detected.

Table 12.3-9
Summary of Radionuclides Detected or Detected above BVs/FVs in Ancho Canyon

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-239/240
Sediment BV[a]				**0.04**	**0.9**	**0.068**
Residential SSL[b]				**30**	**5.6**	**33**
Industrial SSL[b]				**180**	**23**	**210**
Construction Worker SSL[b]				**34**	**18**	**36**
RE49-10-6541	49-610391	0.0–0.5	SED	—[c]	1.51	—
RE49-10-6542	49-610391	0.5–1.33	SED	—	1.9	—
RE49-10-6543	49-610392	0.0–0.5	SED	0.068	—	—
RE49-10-6581	49-610411	0.0–0.5	SED	—	0.953	—
RE49-10-6582	49-610411	0.5–1.5	SED	—	1.1	—
RE49-10-6601	49-610421	0.0–0.5	SED	—	1.81	0.111
RE49-10-6603	49-610422	0.0–0.5	SED	—	1.26	0.104
RE49-10-6671	49-610456	0.0–0.5	SED	—	1.74	0.069
RE49-10-6683	49-610462	0.0–0.5	SED	0.055	1.22	—
RE49-10-6684	49-610462	0.5–1.5	SED	—	1.1	—

Note: All activities are in pCi/g.

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

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

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

Table 12.3-10
Summary of Radionuclides Detected or Detected above BVs/FVs in Water Canyon

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-134	Cesium-137	Plutonium-238	Plutonium-239/240	Uranium-234	Uranium-238
Sediment BV[a]				**0.04**	**na**[b]	**0.9**	**0.006**	**0.068**	**2.59**	**2.29**
Residential SAL[c]				**30**	**2.4**	**5.6**	**37**	**33**	**170**	**87**
Industrial SAL[c]				**180**	**9.7**	**23**	**240**	**210**	**1500**	**430**
Construction Worker SAL[c]				**34**	**7.7**	**18**	**40**	**36**	**220**	**160**
RE49-10-6398	49-610319	0.5–1.5	SED	—[d]	0.052	—	—	—	—	—
RE49-10-6405	49-610323	0.0–0.5	SED	—	—	0.937	—	—	—	2.55
RE49-10-6421	49-610331	0.0–0.5	SED	—	—	—	0.064	—	—	—
RE49-10-6425	49-610333	0.0–0.5	SED	—	—	—	—	0.091	2.76	3.2
RE49-10-6433	49-610337	0.0–0.5	SED	—	—	0.992	—	—	—	2.37
RE49-10-6437	49-610339	0.0–0.5	SED	—	—	0.927	—	—	—	2.49
RE49-10-6439	49-610340	0.0–0.5	SED	—	—	1.11	—	—	—	—
RE49-10-6440	49-610340	0.5–1.5	SED	—	—	0.981	—	—	—	—
RE49-10-6441	49-610341	0.0–0.5	SED	—	—	0.948	—	—	—	—
RE49-10-6442	49-610341	0.5–1.5	SED	—	—	—	—	0.069	—	—
RE49-10-6445	49-610343	0.0–0.5	SED	—	—	1.16	0.09	—	—	—
RE49-10-6449	49-610345	0.0–0.5	SED	0.316	—	—	—	1.66	—	—
RE49-10-6450	49-610345	0.5–1.5	SED	—	—	—	0.054	0.087	—	—
RE49-10-6457	49-610349	0.0–0.5	SED	0.976	—	—	0.085	8.08	—	—
RE49-10-6491	49-610366	0.0–0.5	SED	—	—	—	—	0.077	—	—
RE49-10-6493	49-610367	0.0–0.5	SED	—	—	—	—	0.073	—	—
RE49-10-6504	49-610372	0.5–1.5	SED	—	—	—	—	0.069	—	—
RE49-10-6507	49-610374	0.0–0.5	SED	—	—	—	—	0.089	—	—
RE49-10-6508	49-610374	0.5–1.5	SED	—	—	—	—	0.086	—	—
RE49-10-6515	49-610378	0.0–0.5	SED	—	—	1.07	—	—	—	—

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

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

$\%CO_2$	percent carbon dioxide
% moisture	volumetric moisture
$\%O_2$	percent oxygen
%R	percent recovery
AK	acceptable knowledge
amsl	above mean sea level
AOC	area of concern
bgs	below ground surface
BHC	benzene hexachloride
BV	background value
COC	chain of custody
Consent Order	Compliance Order on Consent
COPC	chemical of potential concern
cpm	counts per minute
CPTF	Cable Pull Test Facility
CVAA	cold vapor atomic absorption
CRDL	contract-required detection limit
DER	duplicate error ratio
DGPS	differential global-positioning system
DL	detection limit
DOE	Department of Energy (U.S.)
DOT	Department of Transportation (U.S.)
dpm	disintegrations per minute
EDL	estimated detection limit
EP	Environmental Programs (Directorate)
EPA	Environmental Protection Agency (U.S.)
EQL	estimated quantitation limit
ESL	ecological screening levels
ET	evapotranspiration
eV	electron volt(s)
FD	field duplicate
FV	fallout value
GC/MS	gas chromatography/mass spectrometry

GPS	global-positioning system
HDT	hazardous devices team
HE	high explosives
HIR	historical investigation report
ICS	interference-check sample
ICV	initial calibration verification
I.D.	inside diameter
IDW	investigation-derived waste
IM	interim measures
IR	investigation report
KPA	kinetic phosphorescence analysis
LAL	lower acceptance limit
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LLW	low-level waste
MCL	maximum contaminant level (EPA)
MDA	material disposal area
MDC	minimum detectable concentration
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NES	nuclear environmental site
NFA	no further action
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
O.D.	outside diameter
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician

RER	relative error ratio
RFI	RCRA facility investigation
RL	reporting limit
RPD	relative percent difference
RPF	Records Processing Facility
RRF	relative retention factor
SAL	screening action level
SCL	sample collection log
SL	screening level
SMO	Sample Management Office
SNM	special nuclear materials
SOP	standard operating procedure
SSL	soil screening level
SV	screening value
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list [EPA]
TD	total depth
TDR	time-domain reflectometry
TPH-DRO	total petroleum hydrocarbons-diesel range organics
TPH-GRO	total petroleum hydrocarbons-gasoline range organics
UAL	upper acceptance limit
UTL	upper tolerance limit
VCA	voluntary corrective action
VOC	volatile organic compound
WCSF	waste characterization strategy form

A-2.0 METRIC CONVERSION TABLE

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

A-3.0 DATA QUALIFIER DEFINITIONS

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

Appendix B

Field Methods

B-1.0 INTRODUCTION

This appendix summarizes field methods used during the 2009–2010 investigation at Technical Area 49 (TA-49). Table B-1.0-1 provides general method information, and the following sections provide additional details. All activities were conducted in accordance with the applicable standard operating procedures (SOPs) and quality procedures (QPs), which are adapted from Los Alamos National Laboratory (LANL) Environmental Programs Directorate SOPs (http://www.lanl.gov/environment/all/qa/adep.shtml).

B-2.0 EXPLORATORY DRILLING CHARACTERIZATION

All drilling for the 2009–2010 investigation was conducted for the purpose of collecting investigation samples; no exploratory drilling characterization was conducted.

B-3.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used during the 2009–2010 drilling and sampling activities at TA-49. The field-screening results are presented in Appendix G (on DVD) and in the main text under appropriate sections for each respective solid waste management unit or area of concern.

B-3.1 Field Screening for Radioactivity

Core, surface, shallow-subsurface, and sediment material was screened for gross-alpha and -beta radiation. Screening was conducted by a LANL radiation control technician (RCT) using an Eberline E600 with either a 380AB or SHP360 probe (or equivalent) and an ESP-1 rate meter with a 210 probe (or equivalent) in accordance with the SOP-10.07, Field Monitoring for Surface and Volume Radioactivity Levels. Measurements were made by conducting a quick scan to find the location with the highest initial reading and the probe was held less than 1 in. away from the medium. Following the quick scan, a 1-min reading was collected to determine gross-alpha and –beta radiation levels. After radiological field-screening measurements were established, soil and core material was sampled and/or logged. Field personnel recorded background measurements for gross-alpha and -beta radiation daily. The background measurements are recorded on sample collection logs (SCLs) in Appendix G (on DVD).

B-3.2 Field Screening for Organic Vapors

Organic-vapor monitoring of subsurface samples was performed using a MiniRAE 2000, Model PGM-7600 photoionization detector (PID) with an 11.7-electron-volt (eV) bulb. Screening was performed in accordance with the manufacturer's specifications and SOP-06.33, Headspace Vapor Screening with a Photoionization Detector. Samples were placed in a glass container and covered with aluminum foil. The container was sealed, shaken gently, and allowed to equilibrate for 5 min. The sample was screened by inserting the PID probe into the container and measuring and recording any detected vapors. The workers' breathing zone was also monitored using the MiniRAE 2000 PID. Field-screening measurements are presented on DVD in Appendix G.

B-3.3 Field Screening for Percent Oxygen and Percent Carbon Dioxide

Before each pore-gas sampling event, each sample port was purged and monitored with a LANDTEC GEM 2000 instrument (or equivalent), until the percent oxygen (%O_2) and percent carbon dioxide (%CO_2) levels stabilized at values representative of subsurface pore-gas conditions. Field-screening results were recorded on the appropriate SCL and/or in the field logbook. Field SCLs are provided in Appendix G (on DVD).

B-4.0 FIELD INSTRUMENT CALIBRATION

Instrument calibration and/or function check was completed daily. Calibration of the PID was conducted by the site safety officer. Calibration of the Eberline E-600 was conducted by the RCT. All calibrations were performed according to the manufacturer's specifications and requirements.

B-4.1 PID Calibration

The PID was calibrated both to ambient air and a standard reference gas (100 ppm isobutylene). The ambient-air calibration determined the zero point of the instrument sensor calibration curve in ambient air. Calibration with the standard reference gas determined a second point of the sensor calibration curve. Each calibration was within 3% of 100 ppm isobutylene, qualifying the instrument for use.

The following calibration information was recorded daily on operational calibration logs:

- instrument identification number
- final span settings
- date and time
- concentration and type of calibration gas used (isobutylene at 100 ppm)
- name of personnel performing calibration

All daily calibration procedures for the MiniRAE 2000 PID met the manufacturer's specifications for standard reference gas calibration.

B-4.2 Eberline E-600 Instrument Calibration

The Eberline E600 was calibrated daily by the RCT before local background levels for radioactivity were measured. The instrument was calibrated using plutonium-239 and chloride-36 sources for alpha and beta emissions, respectively. The following five checks were performed as part of the calibration procedures: calibration date, physical damage, battery, response to a source of radioactivity, and background. All calibrations performed for the Eberline E600 met the manufacturer's specifications and the applicable radiation detection instrument manual.

B-5.0 SURFACE, SHALLOW-SUBSURFACE, AND SUBSURFACE SAMPLING

This section summarizes the methods used for collecting samples for laboratory analysis, including surface soil, fill, sediments, tuff, and pore-gas samples. The samples were collected according to the approved investigation work plan (LANL 2008, 102691).

B-5.1 Surface and Shallow-Subsurface Soil-Sampling Methods

Surface and shallow-subsurface samples, including sediment samples, were collected within TA-49 in accordance with SOP 06-10, Hand Auger and Thin-Wall Tube Sampler. A hand auger with a stainless-steel bucket was used to collect material in approximately 6-in. intervals. Samples were transferred to sample-collection jars or bags for transport to the Sample Management Office (SMO), for shipment to analytical laboratories and American Radiation Services for a quick turnaround on radiological screening.

Samples were labeled, documented, and sealed with custody seals before to transportation in accordance with SOP-5057, Handling, Packaging, and Transporting Field Samples, and SOP-5058, Sample Control and Field Documentation.

All sample-collection tools were decontaminated immediately before collection of each sample in accordance with SOP-5061, Field Decontamination of Drilling and Sampling Equipment.

B-5.2 Borehole Drilling

For the 2009–2010 drilling investigation, 30 boreholes were drilled to depths ranging from 10 to 192 ft below ground surface. A Construction Mine Equipment 85 hollow-stem auger drill rig was employed for all drilling using 4.50-in.-inside–diameter (I.D.) and nominal 8.25-in.-outside-diameter (O.D.) augers. A hex-rod core retrieval system and 4-in.-O.D. stainless-steel core barrels were used for sampling. A nominal 8.50-in.-diameter drill bit was used for all borings. During drilling, continuous core was recovered using the stainless-steel core barrels through the center of the 4.50-in. drill string. Core was collected in 5-ft sample runs.

B-5.3 Borehole Logging

Borehole lithologic logs were completed for all borehole locations at TA-49 in 2009–2010. All boreholes were continuously cored and logged in 5.0-ft intervals in accordance with SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials. Information recorded on field-boring logs included footage and percent recovery, field-screening results for radioactivity and organic vapors, lithology, depth of samples collected, sample identification, and other relevant observations. The borehole logs are presented on CD in Appendix D.

B-5.4 Subsurface Soil- and Rock-Sampling Methods

The subsurface soil and rock samples were continuously cored from a stainless-steel split-spoon core-barrel sampler in accordance with SOP-6.24, Sample Collection from Split-Spoon Samplers and Shelby-Tube Samplers. The core was described for lithologic and structural features per SOP-9.10, Field Sampling of Core and Cuttings for Geological Analysis, and SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials. The borehole logs are provided in Appendix D (on CD).

Subsurface sampling intervals were selected based on data requirements in the approved work plan (LANL 2008, 102691) and/or

- the depth of the highest field-screening result, if applicable;
- the depth of geologically significant features;
- the discretion of the field geologist; and
- the total depth of the borehole.

Sample depth intervals and respective laboratory analysis for all samples collected are recorded on SCL and presented in Appendix G (on DVD).

B-5.5 Pore-Gas Sampling

Pore-gas samples were collected from discrete subsurface intervals in open boreholes using a single- and/or double-packer assembly. Required total-depth samples were collected with a single-packer system. Samples collected at other discrete depths in open boreholes were collected using a double-packer system. All pore-gas samples were collected in accordance with SOP-5074, Sampling for Sub-Atmospheric Air. Pore-gas samples were collected and analyzed for volatile organic compounds (VOCs) and tritium.

Before each sampling event, each isolated interval/sample port was purged and monitored with a LANDTEC GEM 2000 instrument (or equivalent), until $\%O_2$ and $\%CO_2$ levels stabilized at values representative of subsurface pore-gas conditions. In addition, the vapor-sample tubing was purged of stagnant air by drawing air from the sampling interval through the line. To ensure that the sample collected was representative of the subsurface air at depth, every sampling activity included a purge cycle.

B-5.6 Quality Assurance/Quality Control Samples

Quality assurance/quality control samples for soil, tuff and sediment were collected in accordance with SOP-5059, Field Quality Control Samples. Field-duplicate samples were collected at a frequency of at least 1 duplicate sample for every 10 samples. Field-rinsate samples were collected from sampling equipment at a frequency of at least 1 rinsate sample for every 10 samples. Field-trip blanks also were collected at a frequency of 1 per 10 samples for VOCs, if applicable.

B-5.7 Sample Documentation and Handling

Field personnel completed a SCL which included a chain-of-custody (COC) form for each sample set (presented in Appendix G, on DVD). Sample containers were sealed with COC seals and placed in coolers at approximately 4°C. Samples were packaged and preserved, as necessary, depending upon the analytical method to be used, packed, handled, and shipped in accordance with SOP-5057, Handling, Packaging, and Transporting Field Samples, and SOP-5056, Sample Containers and Preservation.

B-5.8 Borehole Abandonment

Per the approved work plan, borehole abandonment is currently on hold pending approval from the New Mexico Environmental Department. Upon approval, all boreholes will be abandoned in accordance with SOP-5034, Monitor Well and RFI Borehole Abandonment.

B-5.9 Decontamination of Sampling Equipment

Drilling and sampling equipment was decontaminated to minimize the potential for cross-contamination between sampling locations. Decontamination was completed using a dry decontamination method with disposable paper towels and over-the-counter cleaner, such as Fantastik or equivalent. All decontamination procedures followed SOP-1.08, Field Decontamination of Drilling and Sampling Equipment. All heavy equipment, such as backhoes, forklifts, drill rigs, etc., were screened by an RCT and released before entering and exiting TA-49.

B-6.0 GEODETIC SURVERYING

Geodetic surveys were conducted during the TA-49 investigation to establish and mark all sampling and borehole locations. The planned sampling locations were determined based on location and results of historical borehole and surface samples. Geodetic surveys were conducted at the completion of the sampling campaign to establish the spatial coordinates for all sampling locations. Geodetic surveys were conducted in accordance with SOP 5028, Coordinating and Evaluating Geodetic Surveys, using a Trimble 5700 differential global-positioning system (DPGS). All coordinates are expressed in New Mexico State Plane Coordinate System 1983, New Mexico Central. Surveyed coordinates for all sampling locations are presented in Appendix C and in tables in the main text under the respective sections for each SWMU or AOC.

B-7.0 INVESTIGATION-DERIVED WASTE STORAGE AND DISPOSAL

Management of investigation-derived waste (IDW) is described in Appendix E. All drill cuttings were stored in less-than-90-day hazardous-waste storage areas and sampled within 10 days. Currently, all drill cutting waste has been downgraded to non-hazardous and is pending land application. Contact waste from sediment samples is stored in two separate less-than-90-day hazardous-waste storage areas and is pending final waste determination based on due diligence. It is anticipated that all waste will be non-hazardous and either land applied (SOP 11.0, Land Application of Drill Cuttings) or disposed of at an appropriate off-site facility.

B-8.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), January 2008. "Investigation Work Plan for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1," Los Alamos National Laboratory document LA-UR-08-0447, Los Alamos, New Mexico. (LANL 2008, 102691)

Table B-1.0-1
Summary Description of Field Investigation Methods

Method	Summary
Hand-Auger Sampling	This method is typically used for sampling soil or sediment at depths of less than 10–15 ft but may in some cases be used for collecting samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in.- I.D.), creating a vertical hole that can be advanced to the desired sample depth. During the 2009–2010 investigation, when the desired depth was reached, the auger was decontaminated before advancing the hole through the sample depth. The sample material was transferred from the auger bucket to a stainless-steel sampling bowl before filling the various required sample containers.
Split-Spoon Core-Barrel Sampling	This method involved a stainless-steel core barrel (typically 4-in.-I.D., 2.5-ft-long) that was advanced using a powered drilling rig. The core barrel extracted a continuous length of soil and/or rock that could be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. Once the core sample was extracted, the section of core was screened for radioactivity and organic vapors, photographed, and described in a geologic log. A portion of the core was be collected as a discrete sample from the desired depth.
Headspace Vapor Screening	Individual soil, rock, or sediment samples were field screened for VOCs by placing a portion of the sample in a plastic sample bag or in a glass container with a foil-sealed cover. The container was sealed and gently shaken and allowed to equilibrate for 5 min. The sample was then screened by inserting a PID probe into the container and measuring and recording any detected vapors. PIDs must use lamps with voltage of 11.7 eV.
Handling, Packaging, and Shipping of Samples	Field team members sealed and labeled samples before packing and ensured that the sample containers and the containers used for transport were free of external contamination. Field team members packaged all samples to minimize the possibility of breakage during transportation. After all environmental samples were collected, packaged, and preserved, a field team member transported them to either the SMO or an SMO-approved radiation screening laboratory under COC. The SMO arranged for shipping of samples to analytical laboratories. The field team member informed the SMO and/or the radiation screening laboratory coordinator whenever levels of radioactivity were in the action-level or limited-quantity ranges.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented on standard forms generated by the SMO. These included SCLs which included the COC forms, and sample container labels. SCLs were completed at the time of sample collection and were signed by the sampler and a reviewer who verified the logs for completeness and accuracy. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around container lids or openings. The COC forms were completed and assigned to verify that the samples were not left unattended.
Field Quality-Control Samples	Field quality-control samples were collected as follows: *Field Duplicates*: at a frequency of 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: at a frequency of 10%; collected by rinsing sampling equipment with deionized water, which was collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: required for all field events and included collecting samples for VOC analysis. Trip blanks are containers of certified, clean sand that are opened and kept with the other sample containers during the sampling process.

Table B-1.0-1 (continued)

Method	Summary
Well and Borehole Abandonment	Shallower boreholes were abandoned by filling with bentonite chips or pellets, which were then hydrated. Boreholes with a total depth greater than 20 ft were abandoned with bentonite grout by filling upward from the bottom via tremie pipe to within 2 ft of the surface. The remainder was cemented/grouted to surface grade. After 24 hr, the backfilled level was checked for settlement and additional concrete/grout was added as needed.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination was the preferred method to minimize the generation of liquid waste. Dry decontamination may include the use of a wire brush or other tool for removing soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes. Dry decontamination may be followed by wet decontamination if necessary.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on U.S. Environmental Protection Agency guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample are printed on the sample collection logs provided by the SMO (size and type of container, e.g., glass, amber glass, and polyethylene). All samples were preserved by being placed in insulated containers with ice to maintain a temperature of 4°C. Other requirements, such as nitric acid or other preservatives, may apply to different media or analytical requests.
Coordination and Evaluation of Geodetic Surveys	Geodetic surveys focused on obtaining survey data of acceptable quality for use during project investigations. Geodetic surveys were conducted with a Trimble 5700 DGPS. The survey data conformed to Laboratory Information Architecture project standards IA-CB02, GIS Horizontal Spatial Reference System, and IA-D802, Geospatial Positioning Accuracy Standard for A/E/C/ and Facility Management. All coordinates are expressed in New Mexico State Plane Coordinate System 1983, NM Central, U.S. ft coordinates. All elevation data are reported relative to the National Geodetic Vertical Datum of 1983.
Management of Environmental Restoration Project Waste, Waste Characterization	IDW was managed, characterized, and stored in accordance with an approved waste characterization strategy form that documented site history, field activities, and the characterization approach for each waste stream managed. Waste characterization was adequate to comply with on-site or off-site waste acceptance criteria. All stored IDW was marked with appropriate signage and labels. Drummed IDW was stored on pallets to prevent deterioration of containers. Generators were required to reduce the volume of waste generated by as much as was technically and economically feasible. The means to store, control, and transport each potential waste type and its classification was determined before the start of field operations that generated waste. A waste storage area was established before waste was generated. Waste storage areas located in controlled areas of the Laboratory were controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container of waste generated was individually labeled with waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination. Management of IDW is presented in Appendix E.

Appendix C

Geodetic Survey Coordinates

Location Coordinates for 2009–2010 TA-49 Investigation

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 1, Drilling			
49-001 (a)	49-610946	1624456.252	1755558.556
49-001(a)	49-610948	1624579.504	1755466.562
49-001 (a)	49-610947	1624403.9	1755357.743
49-001 (a)	49-610949	1624332.567	1755470.067
Area 1, Surface and Shallow-Subsurface			
49-001 (a)	49-610206	1624405.92	1755440.16
49-001 (a)	49-610207	1624455.92	1755440.16
49-001 (a)	49-610208	1624505.92	1755440.16
49-001 (a)	49-610209	1624430.92	1755490.16
49-001 (a)	49-610210	1624480.92	1755490.16
49-001 (a)	49-610211	1624405.92	1755515.16
49-001 (a)	49-610212	1624430.92	1755515.16
49-001 (a)	49-610213	1624455.92	1755515.16
49-001 (a)	49-610214	1624380.92	1755390.16
49-001 (a)	49-610215	1624430.92	1755390.16
49-001 (a)	49-610216	1624505.92	1755390.16
49-001 (a)	49-610217	1624480.92	1755415.16
49-001 (a)	49-610218	1624355.92	1755440.16
49-001 (a)	49-610219	1624555.92	1755440.16
49-001 (a)	49-610220	1624430.92	1755465.16
49-001 (a)	49-610221	1624355.92	1755490.16
49-001 (a)	49-610222	1624530.92	1755515.16
49-001 (a)	49-610223	1624380.92	1755540.16
49-001 (a)	49-610224	1624430.92	1755565.16
49-001 (a)	49-610225	1624505.92	1755565.16
49-001 (a)	49-610226	1624480.92	1755340.16
49-001 (a)	49-610227	1624605.92	1755365.16
49-001 (a)	49-610228	1624305.92	1755465.16
49-001 (a)	49-610229	1624580.92	1755490.16
49-001 (a)	49-610230	1624555.92	1755565.16
49-001 (a)	49-610231	1624330.92	1755590.16
49-001 (a)	49-610232	1624405.92	1755615.16
49-001 (a)	49-610233	1624555.92	1755615.16
49-001 (a)	49-610234	1624305.92	1755615.16
49-001 (a)	49-610235	1624355.92	1755390.16
49-001 (a)	49-610236	1624405.92	1755390.16
49-001 (a)	49-610237	1624455.92	1755390.16
49-001 (a)	49-610238	1624480.92	1755390.16

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (a)	49-610239	1624530.92	1755390.16
49-001 (a)	49-610240	1624555.92	1755390.16
49-001 (a)	49-610241	1624355.92	1755415.16
49-001 (a)	49-610242	1624380.92	1755415.16
49-001 (a)	49-610243	1624405.92	1755415.16
49-001 (a)	49-610244	1624430.92	1755415.16
49-001 (a)	49-610245	1624455.92	1755415.16
49-001 (a)	49-610246	1624505.92	1755415.16
49-001 (a)	49-610247	1624530.92	1755415.16
49-001 (a)	49-610248	1624555.92	1755415.16
49-001 (a)	49-610249	1624380.92	1755440.16
49-001 (a)	49-610250	1624430.92	1755440.16
49-001 (a)	49-610251	1624480.92	1755440.16
49-001 (a)	49-610252	1624530.92	1755440.16
49-001 (a)	49-610253	1624355.92	1755465.16
49-001 (a)	49-610254	1624380.92	1755465.16
49-001 (a)	49-610255	1624405.92	1755465.16
49-001 (a)	49-610256	1624455.92	1755465.16
49-001 (a)	49-610257	1624480.92	1755465.16
49-001 (a)	49-610258	1624505.92	1755465.16
49-001 (a)	49-610259	1624530.92	1755465.16
49-001 (a)	49-610260	1624555.92	1755465.16
49-001 (a)	49-610261	1624380.92	1755490.16
49-001 (a)	49-610262	1624405.92	1755490.16
49-001 (a)	49-610263	1624455.92	1755490.16
49-001 (a)	49-610264	1624505.92	1755490.16
49-001 (a)	49-610265	1624530.92	1755490.16
49-001 (a)	49-610266	1624555.92	1755490.16
49-001 (a)	49-610267	1624355.92	1755515.16
49-001 (a)	49-610268	1624380.92	1755515.16
49-001 (a)	49-610269	1624480.92	1755515.16
49-001 (a)	49-610270	1624505.92	1755515.16
49-001 (a)	49-610271	1624355.92	1755540.16
49-001 (a)	49-610272	1624405.92	1755540.16
49-001 (a)	49-610273	1624430.92	1755540.16
49-001 (a)	49-610274	1624455.92	1755540.16
49-001 (a)	49-610275	1624480.92	1755540.16
49-001 (a)	49-610276	1624505.92	1755540.16
49-001 (a)	49-610277	1624530.92	1755540.16
49-001 (a)	49-610278	1624355.92	1755565.16

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (a)	49-610279	1624380.92	1755565.16
49-001 (a)	49-610280	1624405.92	1755565.16
49-001 (a)	49-610281	1624455.92	1755565.16
49-001 (a)	49-610282	1624480.92	1755565.16
49-001 (a)	49-610283	1624330.92	1755340.16
49-001 (a)	49-610284	1624380.92	1755340.16
49-001 (a)	49-610285	1624430.92	1755340.16
49-001 (a)	49-610286	1624530.92	1755340.16
49-001 (a)	49-610287	1624580.92	1755340.16
49-001 (a)	49-610288	1624305.92	1755365.16
49-001 (a)	49-610289	1624355.92	1755365.16
49-001 (a)	49-610290	1624405.92	1755365.16
49-001 (a)	49-610291	1624455.92	1755365.16
49-001 (a)	49-610292	1624505.92	1755365.16
49-001 (a)	49-610293	1624555.92	1755365.16
49-001 (a)	49-610294	1624330.92	1755390.16
49-001 (a)	49-610295	1624580.92	1755390.16
49-001 (a)	49-610296	1624305.92	1755415.16
49-001 (a)	49-610297	1624605.92	1755415.16
49-001 (a)	49-610298	1624330.92	1755440.16
49-001 (a)	49-610299	1624580.92	1755440.16
49-001 (a)	49-610300	1624605.92	1755465.16
49-001 (a)	49-610301	1624330.92	1755490.16
49-001 (a)	49-610302	1624305.92	1755515.16
49-001 (a)	49-610303	1624555.92	1755515.16
49-001 (a)	49-610304	1624605.92	1755515.16
49-001 (a)	49-610305	1624330.92	1755540.16
49-001 (a)	49-610306	1624580.92	1755540.16
49-001 (a)	49-610307	1624305.92	1755565.16
49-001 (a)	49-610308	1624380.92	1755590.16
49-001 (a)	49-610309	1624430.92	1755590.16
49-001 (a)	49-610310	1624480.92	1755590.16
49-001 (a)	49-610311	1624530.92	1755590.16
49-001 (a)	49-610312	1624580.92	1755590.16
49-001 (a)	49-610313	1624355.92	1755615.16
49-001 (a)	49-610314	1624455.92	1755615.16
49-001 (a)	49-610315	1624505.92	1755615.16

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area MDA AB, Drilling			
49-001 (b)	49-610942	1625940.112	1755357.651
49-001 (b)	49-610943	1625778.462	1755480.833
49-001 (b)	49-610944	1625659.406	1755325.387
49-001 (b)	49-610945	1625765.911	1755094.455
Area MDA AB, Surface and Shallow-Subsurface			
49-001 (b), (c), (d)	49-610182	1625739.2	1755429.22
49-001 (b), (c), (d)	49-610183	1625689.2	1755429.22
49-001 (b), (c), (d)	49-610184	1625714.2	1755429.22
49-001 (b), (c), (d)	49-610185	1625714.2	1755404.22
49-001 (b), (c), (d)	49-610186	1625589.2	1755354.22
49-001 (b), (c), (d)	49-610187	1625639.2	1755304.22
49-001 (b), (c), (d)	49-610188	1625564.2	1755279.22
49-001 (b), (c), (d)	49-610189	1625614.2	1755279.22
49-001 (b), (c), (d)	49-610190	1625664.2	1755279.22
49-001 (b), (c), (d)	49-610191	1625914.2	1755279.22
49-001 (b), (c), (d)	49-610192	1625589.2	1755304.22
49-001 (b), (c), (d)	49-610193	1625689.2	1755304.22
49-001 (b), (c), (d)	49-610194	1625614.2	1755329.22
49-001 (b), (c), (d)	49-610195	1625664.2	1755329.22
49-001 (b), (c), (d)	49-610197	1625639.2	1755354.22
49-001 (b), (c), (d)	49-610198	1625689.2	1755354.22
49-001 (b), (c), (d)	49-610199	1625664.2	1755379.22
49-001 (b), (c), (d)	49-610200	1625714.2	1755379.22
49-001 (b), (c), (d)	49-610202	1625639.2	1755404.22
49-001 (b), (c), (d)	49-610203	1625689.2	1755404.22
49-001 (b), (c), (d)	49-610204	1625664.2	1755429.22
49-001 (b), (c), (d)	49-610205	1625914.2	1755429.22
49-001 (b), (c), (d)	49-610131	1625839.2	1755104.22
49-001 (b), (c), (d)	49-610132	1625789.2	1755154.22
49-001 (b), (c), (d)	49-610133	1625739.2	1755179.22
49-001 (b), (c), (d)	49-610134	1625814.2	1755179.22
49-001 (b), (c), (d)	49-610135	1625839.2	1755054.22
49-001 (b), (c), (d)	49-610136	1625714.2	1755079.22
49-001 (b), (c), (d)	49-610137	1625714.2	1755129.22
49-001 (b), (c), (d)	49-610138	1625664.2	1755179.22
49-001 (b), (c), (d)	49-610139	1625564.2	1755229.22
49-001 (b), (c), (d)	49-610140	1625914.2	1755229.22
49-001 (b), (c), (d)	49-610141	1625789.2	1755104.22
49-001 (b), (c), (d)	49-610142	1625814.2	1755104.22

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (b), (c), (d)	49-610143	1625764.2	1755129.22
49-001 (b), (c), (d)	49-610144	1625789.2	1755129.22
49-001 (b), (c), (d)	49-610145	1625814.2	1755129.22
49-001 (b), (c), (d)	49-610146	1625839.2	1755129.22
49-001 (b), (c), (d)	49-610147	1625764.2	1755154.22
49-001 (b), (c), (d)	49-610148	1625814.2	1755154.22
49-001 (b), (c), (d)	49-610149	1625839.2	1755154.22
49-001 (b), (c), (d)	49-610150	1625714.2	1755179.22
49-001 (b), (c), (d)	49-610151	1625764.2	1755179.22
49-001 (b), (c), (d)	49-610152	1625789.2	1755179.22
49-001 (b), (c), (d)	49-610153	1625714.2	1755204.22
49-001 (b), (c), (d)	49-610154	1625739.2	1755204.22
49-001 (b), (c), (d)	49-610155	1625764.2	1755204.22
49-001 (b), (c), (d)	49-610156	1625889.2	1755229.22
49-001 (b), (c), (d)	49-610157	1625739.2	1755054.22
49-001 (b), (c), (d)	49-610158	1625789.2	1755054.22
49-001 (b), (c), (d)	49-610159	1625889.2	1755054.22
49-001 (b), (c), (d)	49-610160	1625764.2	1755079.22
49-001 (b), (c), (d)	49-610161	1625814.2	1755079.22
49-001 (b), (c), (d)	49-610162	1625864.2	1755079.22
49-001 (b), (c), (d)	49-610163	1625739.2	1755104.22
49-001 (b), (c), (d)	49-610164	1625889.2	1755104.22
49-001 (b), (c), (d)	49-610165	1625664.2	1755129.22
49-001 (b), (c), (d)	49-610166	1625864.2	1755129.22
49-001 (b), (c), (d)	49-610167	1625914.2	1755129.22
49-001 (b), (c), (d)	49-610168	1625689.2	1755154.22
49-001 (b), (c), (d)	49-610169	1625889.2	1755154.22
49-001 (b), (c), (d)	49-610170	1625864.2	1755179.22
49-001 (b), (c), (d)	49-610171	1625914.2	1755179.22
49-001 (b), (c), (d)	49-610172	1625639.2	1755204.22
49-001 (b), (c), (d)	49-610173	1625689.2	1755204.22
49-001 (b), (c), (d)	49-610174	1625789.2	1755204.22
49-001 (b), (c), (d)	49-610175	1625739.2	1755154.22
49-001 (b), (c), (d)	49-610176	1625889.2	1755204.22
49-001 (b), (c), (d)	49-610177	1625614.2	1755229.22
49-001 (b), (c), (d)	49-610178	1625589.2	1755254.22
49-001 (b), (c), (d)	49-610179	1625639.2	1755254.22
49-001 (b), (c), (d)	49-610180	1625689.2	1755254.22
49-001 (b), (c), (d)	49-610181	1625889.2	1755254.22
49-001 (g)	49-610890	1625839.2	1755454.22

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (g)	49-610891	1625939.2	1755529.22
49-001 (g)	49-610892	1625989.2	1755454.22
49-001 (g)	49-610893	1625664.2	1755479.22
49-001 (g)	49-610894	1625764.2	1755479.22
49-001 (g)	49-610895	1625914.2	1755479.22
49-001 (g)	49-610896	1625989.2	1755554.22
49-001 (g)	49-610897	1625889.2	1755604.22
49-001 (g)	49-610898	1625739.2	1755454.22
49-001 (g)	49-610899	1625764.2	1755454.22
49-001 (g)	49-610900	1625789.2	1755454.22
49-001 (g)	49-610901	1625814.2	1755454.22
49-001 (g)	49-610902	1625864.2	1755454.22
49-001 (g)	49-610903	1625889.2	1755454.22
49-001 (g)	49-610904	1625914.2	1755529.22
49-001 (g)	49-610905	1625939.2	1755554.22
49-001 (g)	49-610906	1625964.2	1755629.22
49-001 (g)	49-610907	1625964.2	1755654.22
49-001 (g)	49-610908	1625639.2	1755454.22
49-001 (g)	49-610909	1625689.2	1755454.22
49-001 (g)	49-610910	1625939.2	1755454.22
49-001 (g)	49-610911	1625714.2	1755479.22
49-001 (g)	49-610912	1625814.2	1755479.22
49-001 (g)	49-610913	1625864.2	1755479.22
49-001 (g)	49-610914	1625964.2	1755479.22
49-001 (g)	49-610915	1625689.2	1755504.22
49-001 (g)	49-610916	1625739.2	1755504.22
49-001 (g)	49-610917	1625789.2	1755504.22
49-001 (g)	49-610918	1625839.2	1755504.22
49-001 (g)	49-610919	1625889.2	1755504.22
49-001 (g)	49-610920	1625939.2	1755504.22
49-001 (g)	49-610921	1625989.2	1755504.22
49-001 (g)	49-610922	1625864.2	1755529.22
49-001 (g)	49-610923	1625964.2	1755529.22
49-001 (g)	49-610924	1625889.2	1755554.22
49-001 (g)	49-610925	1625864.2	1755579.22
49-001 (g)	49-610926	1625914.2	1755579.22
49-001 (g)	49-610927	1625964.2	1755579.22
49-001 (g)	49-610928	1626014.2	1755579.22
49-001 (g)	49-610929	1625939.2	1755604.22
49-001 (g)	49-610930	1625989.2	1755604.22

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (g)	49-610931	1625914.2	1755629.22
49-001 (g)	49-610932	1626014.2	1755629.22
49-001 (g)	49-610933	1625914.2	1755654.22
49-001 (g)	49-610934	1626014.2	1755654.22
49-001 (g)	49-610935	1625939.2	1755679.22
49-001 (g)	49-610936	1625989.2	1755679.22
Area 3, Drilling			
49-001 (e)	49-609981	1624106.558	1754493.145
49-001 (e)	49-609982	1624184.798	1754571.654
49-001 (e)	49-609983	1624185.608	1754414.635
49-001 (e)	49-609984	1624263.308	1754492.605
Area 3, Surface and Shallow-Subsurface			
49-001 (e)	49-609307	1624158.575	1754453.597
49-001 (e)	49-609308	1624158.626	1754478.834
49-001 (e)	49-609309	1624158.676	1754504.07
49-001 (e)	49-609310	1624183.762	1754428.31
49-001 (e)	49-609311	1624183.812	1754453.546
49-001 (e)	49-609312	1624183.963	1754529.257
49-001 (e)	49-609313	1624208.999	1754428.259
49-001 (e)	49-609314	1624209.099	1754478.733
49-001 (e)	49-609315	1624234.336	1754478.683
49-001 (e)	49-609316	1624234.437	1754529.156
49-001 (e)	49-609317	1624284.709	1754428.108
49-001 (e)	49-609318	1624284.86	1754503.82
49-001 (e)	49-609319	1624285.01	1754579.53
49-001 (e)	49-609320	1624108.051	1754428.461
49-001 (e)	49-609321	1624108.253	1754529.408
49-001 (e)	49-609322	1624133.389	1754478.884
49-001 (e)	49-609323	1624133.59	1754579.831
49-001 (e)	49-609324	1624158.424	1754377.886
49-001 (e)	49-609325	1624183.913	1754504.02
49-001 (e)	49-609326	1624209.049	1754453.496
49-001 (e)	49-609327	1624209.3	1754579.68
49-001 (e)	49-609328	1624234.135	1754377.735
49-001 (e)	49-609329	1624057.427	1754352.851
49-001 (e)	49-609330	1624057.729	1754504.272
49-001 (e)	49-609331	1624057.93	1754605.219
49-001 (e)	49-609332	1624183.561	1754327.362
49-001 (e)	49-609333	1624184.164	1754630.204
49-001 (e)	49-609334	1624285.112	1754630.003

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (e)	49-609335	1624309.795	1754352.348
49-001 (e)	49-609336	1624335.283	1754478.481
49-001 (e)	49-609337	1624335.485	1754579.429
49-001 (e)	49-609338	1624108.001	1754403.224
49-001 (e)	49-609339	1624108.102	1754453.697
49-001 (e)	49-609340	1624108.152	1754478.934
49-001 (e)	49-609341	1624108.202	1754504.171
49-001 (e)	49-609342	1624108.303	1754554.645
49-001 (e)	49-609343	1624133.187	1754377.937
49-001 (e)	49-609344	1624133.238	1754403.173
49-001 (e)	49-609345	1624133.29	1754428.41
49-001 (e)	49-609346	1624133.338	1754453.647
49-001 (e)	49-609347	1624133.439	1754504.121
49-001 (e)	49-609348	1624133.489	1754529.358
49-001 (e)	49-609349	1624133.54	1754554.594
49-001 (e)	49-609350	1624158.475	1754403.123
49-001 (e)	49-609351	1624158.52	1754428.36
49-001 (e)	49-609352	1624158.726	1754529.307
49-001 (e)	49-609353	1624158.776	1754554.544
49-001 (e)	49-609354	1624158.827	1754579.781
49-001 (e)	49-609355	1624183.661	1754377.836
49-001 (e)	49-609356	1624183.711	1754403.073
49-001 (e)	49-609357	1624183.862	1754478.783
49-001 (e)	49-609358	1624184.013	1754554.494
49-001 (e)	49-609359	1624184.064	1754579.731
49-001 (e)	49-609360	1624208.898	1754377.786
49-001 (e)	49-609361	1624208.948	1754403.023
49-001 (e)	49-609362	1624209.15	1754503.97
49-001 (e)	49-609363	1624209.2	1754529.207
49-001 (e)	49-609364	1624209.25	1754554.444
49-001 (e)	49-609365	1624234.185	1754402.972
49-001 (e)	49-609366	1624234.235	1754428.209
49-001 (e)	49-609367	1624234.286	1754453.446
49-001 (e)	49-609368	1624234.386	1754503.92
49-001 (e)	49-609369	1624234.487	1754554.393
49-001 (e)	49-609370	1624234.537	1754579.63
49-001 (e)	49-609371	1624259.372	1754377.685
49-001 (e)	49-609372	1624259.422	1754402.922
49-001 (e)	49-609373	1624259.472	1754428.159
49-001 (e)	49-609374	1624259.523	1754453.396

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (e)	49-609375	1624259.573	1754478.632
49-001 (e)	49-609376	1624259.623	1754503.869
49-001 (e)	49-609377	1624259.674	1754529.106
49-001 (e)	49-609378	1624259.724	1754554.343
49-001 (e)	49-609379	1624259.774	1754579.58
49-001 (e)	49-609380	1624284.759	1754453.345
49-001 (e)	49-609381	1624284.81	1754478.582
49-001 (e)	49-609382	1624284.91	1754529.056
49-001 (e)	49-609383	1624284.961	1754554.293
49-001 (e)	49-609384	1624057.527	1754403.324
49-001 (e)	49-609385	1624057.628	1754453.798
49-001 (e)	49-609386	1624057.829	1754554.745
49-001 (e)	49-609387	1624082.613	1754327.564
49-001 (e)	49-609388	1624082.714	1754378.037
49-001 (e)	49-609389	1624082.814	1754428.511
49-001 (e)	49-609390	1624082.915	1754478.985
49-001 (e)	49-609391	1624083.016	1754529.458
49-001 (e)	49-609392	1624083.116	1754579.932
49-001 (e)	49-609393	1624083.217	1754630.406
49-001 (e)	49-609394	1624107.9	1754352.75
49-001 (e)	49-609395	1624108.403	1754605.118
49-001 (e)	49-609396	1624133.087	1754327.463
49-001 (e)	49-609397	1624133.691	1754630.305
49-001 (e)	49-609398	1624158.374	1754352.649
49-001 (e)	49-609399	1624158.877	1754605.018
49-001 (e)	49-609400	1624208.848	1754352.549
49-001 (e)	49-609401	1624209.351	1754604.917
49-001 (e)	49-609402	1624234.034	1754327.262
49-001 (e)	49-609403	1624234.638	1754630.104
49-001 (e)	49-609404	1624259.321	1754352.448
49-001 (e)	49-609405	1624259.824	1754604.817
49-001 (e)	49-609406	1624284.508	1754327.161
49-001 (e)	49-609407	1624284.608	1754377.635
49-001 (e)	49-609408	1624309.896	1754402.821
49-001 (e)	49-609409	1624309.996	1754453.295
49-001 (e)	49-609410	1624310.097	1754503.769
49-001 (e)	49-609411	1624310.197	1754554.242
49-001 (e)	49-609412	1624310.298	1754604.716
49-001 (e)	49-609413	1624335.082	1754377.534
49-001 (e)	49-609414	1624335.183	1754428.008

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (e)	49-609415	1624335.384	1754528.955
49-001 (e)	49-609416	1624335.585	1754629.902
Area 4, Drilling			
49-001 (f)	49-610938	1625644.768	1753994.297
49-001 (f)	49-610939	1625636.55	1753877.81
49-001 (f)	49-610940	1625541.246	1753792.037
49-001 (f)	49-610941	1625441.279	1753881.535
Area 4, Surface and Shallow-Subsurface			
49-001 (f)	49-609657	1625474.19	1753843.71
49-001 (f)	49-609658	1625549.19	1753843.71
49-001 (f)	49-609659	1625499.19	1753868.71
49-001 (f)	49-609660	1625524.19	1753868.71
49-001 (f)	49-609661	1625549.19	1753868.71
49-001 (f)	49-609662	1625474.19	1753918.71
49-001 (f)	49-609663	1625499.19	1753918.71
49-001 (f)	49-609664	1625574.19	1753918.71
49-001 (f)	49-609665	1625424.19	1753793.71
49-001 (f)	49-609666	1625524.19	1753793.71
49-001 (f)	49-609667	1625599.19	1753793.71
49-001 (f)	49-609668	1625499.19	1753843.71
49-001 (f)	49-609669	1625424.19	1753868.71
49-001 (f)	49-609670	1625599.19	1753868.71
49-001 (f)	49-609671	1625524.19	1753893.71
49-001 (f)	49-609672	1625624.19	1753918.71
49-001 (f)	49-609673	1625424.19	1753943.71
49-001 (f)	49-609674	1625474.19	1753968.71
49-001 (f)	49-609675	1625549.19	1753968.71
49-001 (f)	49-609676	1625599.19	1753968.71
49-001 (f)	49-609677	1625474.19	1753743.71
49-001 (f)	49-609678	1625624.19	1753743.71
49-001 (f)	49-609679	1625374.19	1753793.71
49-001 (f)	49-609680	1625674.19	1753843.71
49-001 (f)	49-609681	1625374.19	1753893.71
49-001 (f)	49-609682	1625374.19	1753993.71
49-001 (f)	49-609683	1625674.19	1753993.71
49-001 (f)	49-609684	1625449.19	1754018.71
49-001 (f)	49-609685	1625599.19	1754018.71
49-001 (f)	49-609686	1625449.19	1753793.71
49-001 (f)	49-609687	1625474.19	1753793.71
49-001 (f)	49-609688	1625499.19	1753793.71

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (f)	49-609689	1625549.19	1753793.71
49-001 (f)	49-609690	1625574.19	1753793.71
49-001 (f)	49-609691	1625424.19	1753818.71
49-001 (f)	49-609692	1625449.19	1753818.71
49-001 (f)	49-609693	1625474.19	1753818.71
49-001 (f)	49-609694	1625499.19	1753818.71
49-001 (f)	49-609695	1625524.19	1753818.71
49-001 (f)	49-609696	1625549.19	1753818.71
49-001 (f)	49-609697	1625574.19	1753818.71
49-001 (f)	49-609698	1625599.19	1753818.71
49-001 (f)	49-609699	1625424.19	1753843.71
49-001 (f)	49-609700	1625449.19	1753843.71
49-001 (f)	49-609701	1625524.19	1753843.71
49-001 (f)	49-609702	1625574.19	1753843.71
49-001 (f)	49-609703	1625599.19	1753843.71
49-001 (f)	49-609704	1625449.19	1753868.71
49-001 (f)	49-609705	1625474.19	1753868.71
49-001 (f)	49-609706	1625574.19	1753868.71
49-001 (f)	49-609707	1625624.19	1753868.71
49-001 (f)	49-609708	1625424.19	1753893.71
49-001 (f)	49-609709	1625449.19	1753893.71
49-001 (f)	49-609710	1625474.19	1753893.71
49-001 (f)	49-609711	1625499.19	1753893.71
49-001 (f)	49-609712	1625549.19	1753893.71
49-001 (f)	49-609713	1625574.19	1753893.71
49-001 (f)	49-609714	1625599.19	1753893.71
49-001 (f)	49-609715	1625624.19	1753893.71
49-001 (f)	49-609716	1625424.19	1753918.71
49-001 (f)	49-609717	1625449.19	1753918.71
49-001 (f)	49-609718	1625524.19	1753918.71
49-001 (f)	49-609719	1625549.19	1753918.71
49-001 (f)	49-609720	1625599.19	1753918.71
49-001 (f)	49-609721	1625449.19	1753943.71
49-001 (f)	49-609722	1625474.19	1753943.71
49-001 (f)	49-609723	1625499.19	1753943.71
49-001 (f)	49-609724	1625524.19	1753943.71
49-001 (f)	49-609725	1625549.19	1753943.71
49-001 (f)	49-609726	1625574.19	1753943.71
49-001 (f)	49-609727	1625599.19	1753943.71
49-001 (f)	49-609728	1625624.19	1753943.71

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (f)	49-609729	1625424.19	1753968.71
49-001 (f)	49-609730	1625449.19	1753968.71
49-001 (f)	49-609731	1625499.19	1753968.71
49-001 (f)	49-609732	1625524.19	1753968.71
49-001 (f)	49-609733	1625574.19	1753968.71
49-001 (f)	49-609734	1625624.19	1753968.71
49-001 (f)	49-609735	1625374.19	1753743.71
49-001 (f)	49-609736	1625424.19	1753743.71
49-001 (f)	49-609737	1625524.19	1753743.71
49-001 (f)	49-609738	1625574.19	1753743.71
49-001 (f)	49-609739	1625399.19	1753768.71
49-001 (f)	49-609740	1625449.19	1753768.71
49-001 (f)	49-609741	1625499.19	1753768.71
49-001 (f)	49-609742	1625549.19	1753768.71
49-001 (f)	49-609743	1625599.19	1753768.71
49-001 (f)	49-609744	1625649.19	1753768.71
49-001 (f)	49-609745	1625624.19	1753793.71
49-001 (f)	49-609746	1625399.19	1753818.71
49-001 (f)	49-609747	1625649.19	1753818.71
49-001 (f)	49-609748	1625374.19	1753843.71
49-001 (f)	49-609749	1625624.19	1753843.71
49-001 (f)	49-609750	1625399.19	1753868.71
49-001 (f)	49-609751	1625649.19	1753868.71
49-001 (f)	49-609752	1625399.19	1753918.71
49-001 (f)	49-609753	1625674.19	1753893.71
49-001 (f)	49-609754	1625649.19	1753918.71
49-001 (f)	49-609755	1625374.19	1753943.71
49-001 (f)	49-609756	1625674.19	1753943.71
49-001 (f)	49-609757	1625399.19	1753968.71
49-001 (f)	49-609758	1625649.19	1753968.71
49-001 (f)	49-609759	1625424.19	1753993.71
49-001 (f)	49-609760	1625474.19	1753993.71
49-001 (f)	49-609761	1625524.19	1753993.71
49-001 (f)	49-609762	1625574.19	1753993.71
49-001 (f)	49-609763	1625624.19	1753993.71
49-001 (f)	49-609764	1625399.19	1754018.71
49-001 (f)	49-609765	1625499.19	1754018.71
49-001 (f)	49-609766	1625549.19	1754018.71
49-001 (f)	49-609767	1625649.19	1754018.71

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Area 11, Drilling			
49-003	49-610496	1625038.731	1755268
49-003	49-610497	1625072.338	1755283
49-003	49-610498	1625100.201	1755247
49-003	49-610499	1625106.376	1755314
49-003	49-610500	1625042.752	1755319
49-008 (c)	49-610489	1624816.692	1755264
49-008 (c)	49-610490	1624884.769	1755277
49-008 (c)	49-610491	1624982.575	1755251
49-008 (c)	49-610492	1625001.964	1755259
49-008 (c)	49-610493	1625019.342	1755266
49-008 (c)	49-610494	1624999.235	1755240
49-008 (c)	49-610495	1624999.666	1755279
Area 12, Drilling			
49-008 (d)	49-610481	1625988.19	1755314.838
49-008 (d)	49-610485	1626004.738	1755217.536
Area 12, Surface and Shallow-Subsurface			
49-008 (d)	49-609889	1625989.2	1755204.22
49-008 (d)	49-609890	1625989.2	1755304.22
49-008 (d)	49-609891	1626014.2	1755329.22
49-008 (d)	49-609892	1626039.2	1755304.22
49-008 (d)	49-609893	1626039.2	1755329.22
49-008 (d)	49-609894	1625939.2	1755179.22
49-008 (d)	49-609895	1625939.2	1755279.22
49-008 (d)	49-609896	1625939.2	1755354.22
49-008 (d)	49-609897	1625989.2	1755154.22
49-008 (d)	49-609898	1625989.2	1755254.22
49-008 (d)	49-609899	1625989.2	1755329.22
49-008 (d)	49-609900	1626014.2	1755379.22
49-008 (d)	49-609901	1626039.2	1755179.22
49-008 (d)	49-609902	1626039.2	1755254.22
49-008 (d)	49-609903	1626089.2	1755279.22
49-008 (d)	49-609904	1626089.2	1755329.22
49-008 (d)	49-609905	1626089.2	1755379.22
49-008 (d)	49-609906	1625939.2	1755104.22
49-008 (d)	49-609907	1626014.2	1755129.22
49-008 (d)	49-609908	1626064.2	1755429.22
49-008 (d)	49-609909	1626089.2	1755104.22
49-008 (d)	49-609910	1626089.2	1755204.22
49-008 (d)	49-609911	1626139.2	1755304.22

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-008 (d)	49-609912	1626139.2	1755354.22
49-008 (d)	49-609913	1626139.2	1755404.22
49-008 (d)	49-609914	1625939.2	1755154.22
49-008 (d)	49-609915	1625939.2	1755204.22
49-008 (d)	49-609916	1625939.2	1755229.22
49-008 (d)	49-609917	1625939.2	1755254.22
49-008 (d)	49-609918	1625939.2	1755304.22
49-008 (d)	49-609919	1625939.2	1755329.22
49-008 (d)	49-609920	1625964.2	1755154.22
49-008 (d)	49-609921	1625964.2	1755179.22
49-008 (d)	49-609922	1625964.2	1755204.22
49-008 (d)	49-609923	1625964.2	1755229.22
49-008 (d)	49-609924	1625964.2	1755254.22
49-008 (d)	49-609925	1625964.2	1755279.22
49-008 (d)	49-609926	1625964.2	1755304.22
49-008 (d)	49-609927	1625964.2	1755329.22
49-008 (d)	49-609928	1625964.2	1755354.22
49-008 (d)	49-609929	1625964.2	1755379.22
49-008 (d)	49-609930	1625989.2	1755179.22
49-008 (d)	49-609931	1625989.2	1755229.22
49-008 (d)	49-609932	1625989.2	1755279.22
49-008 (d)	49-609933	1625989.2	1755354.22
49-008 (d)	49-609934	1625989.2	1755379.22
49-008 (d)	49-609935	1626014.2	1755154.22
49-008 (d)	49-609936	1626014.2	1755179.22
49-008 (d)	49-609937	1626014.2	1755204.22
49-008 (d)	49-609938	1626014.2	1755229.22
49-008 (d)	49-609939	1626014.2	1755254.22
49-008 (d)	49-609940	1626014.2	1755279.22
49-008 (d)	49-609941	1626014.2	1755304.22
49-008 (d)	49-609942	1626014.2	1755354.22
49-008 (d)	49-609943	1626039.2	1755154.22
49-008 (d)	49-609944	1626039.2	1755204.22
49-008 (d)	49-609945	1626039.2	1755229.22
49-008 (d)	49-609946	1626039.2	1755279.22
49-008 (d)	49-609947	1626039.2	1755354.22
49-008 (d)	49-609948	1626039.2	1755379.22
49-008 (d)	49-609949	1626064.2	1755254.22
49-008 (d)	49-609950	1626064.2	1755279.22
49-008 (d)	49-609951	1626064.2	1755304.22

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-008 (d)	49-609952	1626064.2	1755329.22
49-008 (d)	49-609953	1626064.2	1755354.22
49-008 (d)	49-609954	1626064.2	1755379.22
49-008 (d)	49-609955	1626089.2	1755254.22
49-008 (d)	49-609956	1626089.2	1755304.22
49-008 (d)	49-609957	1626089.2	1755354.22
49-008 (d)	49-609958	1625964.2	1755129.22
49-008 (d)	49-609959	1625989.2	1755104.22
49-008 (d)	49-609960	1626039.2	1755104.22
49-008 (d)	49-609961	1625939.2	1755404.22
49-008 (d)	49-609962	1625964.2	1755429.22
49-008 (d)	49-609963	1625989.2	1755404.22
49-008 (d)	49-609964	1626014.2	1755429.22
49-008 (d)	49-609965	1626039.2	1755404.22
49-008 (d)	49-609966	1626089.2	1755404.22
49-008 (d)	49-609967	1626064.2	1755129.22
49-008 (d)	49-609968	1626064.2	1755179.22
49-008 (d)	49-609969	1626064.2	1755229.22
49-008 (d)	49-609970	1626089.2	1755154.22
49-008 (d)	49-609971	1626114.2	1755229.22
49-008 (d)	49-609972	1626114.2	1755279.22
49-008 (d)	49-609973	1626114.2	1755329.22
49-008 (d)	49-609974	1626114.2	1755379.22
49-008 (d)	49-609975	1626114.2	1755429.22
49-008 (d)	49-609976	1626139.2	1755204.22
49-008 (d)	49-609977	1626139.2	1755254.22
Corridor Surface and Shallow-Subsurface			
49-001 (a)	49-610100	1624694.955	1755322.663
49-001 (a)	49-610099	1624687.059	1755315.077
49-001 (a)	49-610098	1624677.792	1755309.595
49-001 (a)	49-610103	1624777.681	1755230.867
49-001 (a)	49-610102	1624771.467	1755226.238
49-001 (a)	49-610101	1624764.827	1755219.416
49-001 (a)	49-610104	1624838.582	1755183.424
49-001 (a)	49-610105	1624843.63	1755189.321
49-001 (a)	49-610106	1624847.438	1755196.23
49-001 (a)	49-610109	1624931.959	1755140.817
49-001 (a)	49-610108	1624925.408	1755134.663
49-001 (a)	49-610107	1624917.527	1755128.404
49-001 (a)	49-610112	1625005.813	1755080.668

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (a)	49-610111	1625000.601	1755075.354
49-001 (a)	49-610110	1624993.559	1755067.568
49-001 (a)	49-610113	1625065.174	1755017.245
49-001 (a)	49-610114	1625075.659	1755020.18
49-001 (a)	49-610115	1625086.455	1755023.458
49-001 (a)	49-610130	1624942.404	1755005.774
49-001 (a)	49-610129	1624935.442	1755000.191
49-001 (a)	49-610128	1624926.944	1754993.47
49-001 (a)	49-610125	1624863.428	1755070.495
49-001 (a)	49-610126	1624869.399	1755077.127
49-001 (a)	49-610127	1624874.318	1755082.481
49-001 (a)	49-610124	1624804.655	1755146.24
49-001 (a)	49-610123	1624797.118	1755140.604
49-001 (a)	49-610122	1624790.338	1755135.414
49-001 (a)	49-611040	1624784.054	1755142.253
49-001 (a)	49-611039	1624776.9	1755136.212
49-001 (a)	49-611041	1624779.585	1755130.487
49-001 (a)	49-611038	1624784.179	1755125.869
49-001 (a)	49-611037	1624792.98	1755131.146
49-001 (a)	49-611035	1624799.592	1755138.604
49-001 (a)	49-611036	1624789.404	1755150.198
49-001 (a)	49-610119	1624728.105	1755216.136
49-001 (a)	49-610120	1624734.907	1755222.794
49-001 (a)	49-610121	1624742.836	1755228.727
49-001 (a)	49-610118	1624672.265	1755286.828
49-001 (a)	49-610117	1624664.452	1755282.305
49-001 (a)	49-610116	1624658.461	1755278.382
49-001 (b), (c), (d)	49-610083	1625541.069	1755181.176
49-001 (b), (c), (d)	49-610084	1625539.788	1755192.366
49-001 (b), (c), (d)	49-610085	1625538.45	1755201.522
49-001 (b), (c), (d)	49-610082	1625458.368	1755202.046
49-001 (b), (c), (d)	49-610081	1625459.984	1755191.177
49-001 (b), (c), (d)	49-610080	1625460.326	1755182.529
49-001 (b), (c), (d)	49-610079	1625358.887	1755183.614
49-001 (b), (c), (d)	49-610078	1625362.311	1755175.68
49-001 (b), (c), (d)	49-610077	1625365.75	1755165.865
49-001 (b), (c), (d)	49-610074	1625275.194	1755129.637
49-001 (b), (c), (d)	49-610075	1625271.607	1755136.482
49-001 (b), (c), (d)	49-610076	1625267.05	1755143.579
49-001 (b), (c), (d)	49-610071	1625209.083	1755071.523

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (b), (c), (d)	49-610072	1625201.43	1755076.016
49-001 (b), (c), (d)	49-610073	1625194.753	1755081.658
49-001 (b), (c), (d)	49-610068	1625117.833	1755026.471
49-001 (b), (c), (d)	49-610069	1625115.278	1755033.375
49-001 (b), (c), (d)	49-610070	1625111.458	1755040.454
49-001 (b), (c), (d)	49-610086	1625320.706	1755025.511
49-001 (b), (c), (d)	49-610087	1625317.64	1755033.612
49-001 (b), (c), (d)	49-610088	1625314.867	1755042.452
49-001 (b), (c), (d)	49-610089	1625416.133	1755042.719
49-001 (b), (c), (d)	49-610091	1625408.505	1755055.131
49-001 (b), (c), (d)	49-610090	1625412.652	1755049.609
49-001 (b), (c), (d)	49-610092	1625501.354	1755073.444
49-001 (b), (c), (d)	49-610093	1625498.976	1755078.932
49-001 (b), (c), (d)	49-610094	1625496.651	1755085.624
49-001 (b), (c), (d)	49-610095	1625582.172	1755122.502
49-001 (b), (c), (d)	49-610096	1625579.178	1755126.978
49-001 (b), (c), (d)	49-610097	1625573.849	1755135.377
49-001 (e)	49-610015	1624484.777	1754469.413
49-001 (e)	49-610014	1624475.1	1754465.591
49-001 (e)	49-610016	1624469.56	1754482.138
49-001 (e)	49-610019	1624603.435	1754502.835
49-001 (e)	49-610018	1624607.396	1754497.03
49-001 (e)	49-610017	1624609.671	1754492.44
49-001 (e)	49-610022	1624678.206	1754536.369
49-001 (e)	49-610021	1624681.026	1754529.727
49-001 (e)	49-610020	1624683.596	1754520.951
49-001 (e)	49-610025	1624718.215	1754592.847
49-001 (e)	49-610024	1624717.785	1754588.61
49-001 (e)	49-610023	1624717.859	1754582.034
49-001 (e)	49-610026	1624795.708	1754598.599
49-001 (e)	49-610027	1624795.387	1754605.444
49-001 (e)	49-610028	1624794.758	1754611.82
49-001 (e)	49-610029	1624884.74	1754600.141
49-001 (e)	49-610030	1624884.238	1754608.705
49-001 (e)	49-610031	1624885.096	1754617.164
49-001 (e)	49-610011	1624865.98	1754706.077
49-001 (e)	49-610012	1624865.275	1754713.391
49-001 (e)	49-610013	1624866.506	1754721.615
49-001 (e)	49-610008	1624759.258	1754675.326
49-001 (e)	49-610009	1624756.981	1754680.494

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (e)	49-610010	1624754.258	1754686.867
49-001 (e)	49-610005	1624679.23	1754624.855
49-001 (e)	49-610006	1624678.146	1754631.464
49-001 (e)	49-610007	1624677.909	1754638.267
49-001 (e)	49-610002	1624607.051	1754587.118
49-001 (e)	49-610003	1624605.332	1754592.61
49-001 (e)	49-610004	1624602.417	1754598.079
49-001 (e)	49-609999	1624522.515	1754569.275
49-001 (e)	49-610000	1624521.147	1754576.921
49-001 (e)	49-610001	1624518.406	1754585.052
49-001 (e)	49-609996	1624438.423	1754544.526
49-001 (e)	49-609997	1624435.703	1754553.983
49-001 (e)	49-609998	1624435.86	1754554.082
49-001 (e)	49-611025	1624870.488	1754723.382
49-001 (e)	49-611026	1624870.844	1754730.176
49-001 (e)	49-611027	1624863.607	1754729.671
49-001 (e)	49-611028	1624856.368	1754728.558
49-001 (e)	49-611029	1624856.925	1754720.989
49-001 (f)	49-610056	1625395.306	1754254.681
49-001 (f)	49-610059	1625439.782	1754203.525
49-001 (f)	49-610060	1625432.195	1754195.398
49-001 (f)	49-610061	1625424.194	1754187.088
49-001 (f)	49-610062	1625488.207	1754126.759
49-001 (f)	49-610063	1625479.099	1754123.441
49-001 (f)	49-610064	1625469.994	1754118.502
49-001 (f)	49-610065	1625526.542	1754055.16
49-001 (f)	49-610066	1625521.462	1754053.012
49-001 (f)	49-610067	1625511.197	1754048.577
49-001 (f)	49-610049	1625393.934	1754085.018
49-001 (f)	49-610048	1625399.838	1754091.521
49-001 (f)	49-610047	1625402.817	1754101.904
49-001 (f)	49-610044	1625343.551	1754157.472
49-001 (f)	49-610045	1625337.529	1754150.776
49-001 (f)	49-610046	1625329.119	1754145.496
49-001 (f)	49-610041	1625274.466	1754216.141
49-001 (f)	49-610042	1625268.055	1754213.971
49-001 (f)	49-610043	1625263.582	1754210.333
49-001 (f)	49-610038	1625219.103	1754296.213
49-001 (f)	49-610039	1625211.509	1754282.563
49-001 (f)	49-610040	1625204.908	1754278.565

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
49-001 (f)	49-610035	1625161.608	1754356.06
49-001 (f)	49-610036	1625155.821	1754352.518
49-001 (f)	49-610037	1625147.872	1754347.724
49-001 (f)	49-610032	1625108.293	1754423.305
49-001 (f)	49-610033	1625102.177	1754418.281
49-001 (f)	49-610034	1625095.85	1754413.183
49-001 (f)	49-610050	1625282.09	1754395.643
49-001 (f)	49-610051	1625275.175	1754389.194
49-001 (f)	49-610052	1625265.414	1754382.105
49-001 (f)	49-611031	1625259.784	1754387.09
49-001 (f)	49-611032	1625252.563	1754384.381
49-001 (f)	49-611033	1625256.79	1754376.565
49-001 (f)	49-611034	1625259.907	1754371.024
49-001 (f)	49-611030	1625266.488	1754374.077
49-001 (f)	49-610053	1625324.778	1754316.935
49-001 (f)	49-610054	1625317.317	1754308.686
49-001 (f)	49-610055	1625312.265	1754300.587
49-001 (f)	49-610058	1625367.494	1754246.919
49-001 (f)	49-610057	1625380.173	1754250.759
Sediment Surface and Shallow-Subsurface			
Ancho Canyon	49-610388	1621513.939	1755443.787
Ancho Canyon	49-610389	1621504.058	1755443.793
Ancho Canyon	49-610390	1621504.058	1755443.793
Ancho Canyon	49-610391	1622289.207	1754794.175
Ancho Canyon	49-610392	1622284.263	1754788.111
Ancho Canyon	49-610393	1622279.318	1754782.048
Ancho Canyon	49-610394	1623054.702	1754265.92
Ancho Canyon	49-610395	1623054.702	1754265.92
Ancho Canyon	49-610396	1623054.698	1754259.853
Ancho Canyon	49-610400	1623617.742	1753901.597
Ancho Canyon	49-610401	1623617.738	1753895.531
Ancho Canyon	49-610402	1623622.672	1753883.395
Ancho Canyon	49-610403	1624235.214	1753658.586
Ancho Canyon	49-610404	1624235.214	1753658.586
Ancho Canyon	49-610405	1624230.273	1753658.589
Ancho Canyon	49-610406	1624763.763	1753421.702
Ancho Canyon	49-610407	1624744.029	1753476.311
Ancho Canyon	49-610408	1624748.95	1753439.91
Ancho Canyon	49-610409	1625386.108	1753008.85
Ancho Canyon	49-610410	1625386.102	1752996.717

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Ancho Canyon	49-610411	1625371.27	1752978.525
Ancho Canyon	49-610412	1626285.207	1752668.674
Ancho Canyon	49-610413	1626275.319	1752656.546
Ancho Canyon	49-610414	1626270.378	1752656.548
Ancho Canyon	49-610415	1627189.235	1752255.725
Ancho Canyon	49-610416	1627189.227	1752237.526
Ancho Canyon	49-610417	1627189.224	1752231.459
Ancho Canyon	49-610418	1625806.833	1754476.732
Ancho Canyon	49-610419	1625792.005	1754464.606
Ancho Canyon	49-610420	1625792.002	1754458.54
Ancho Canyon	49-610421	1625994.739	1754792.096
Ancho Canyon	49-610422	1625989.795	1754786.032
Ancho Canyon	49-610423	1625984.858	1754792.101
Ancho Canyon	49-610424	1626177.322	1754337.018
Ancho Canyon	49-610425	1626172.384	1754343.087
Ancho Canyon	49-610426	1626182.26	1754330.949
Ancho Canyon	49-610427	1626246.532	1754415.848
Ancho Canyon	49-610428	1626236.644	1754403.72
Ancho Canyon	49-610429	1626226.763	1754403.725
Ancho Canyon	49-610430	1626434.176	1754197.363
Ancho Canyon	49-610431	1626429.229	1754185.232
Ancho Canyon	49-610432	1626424.285	1754179.168
Ancho Canyon	49-610433	1627264.487	1754761.161
Ancho Canyon	49-610434	1627264.487	1754761.161
Ancho Canyon	49-610435	1627254.603	1754755.099
Ancho Canyon	49-610436	1627748.783	1755003.606
Ancho Canyon	49-610437	1627738.899	1754997.544
Ancho Canyon	49-610438	1627729.018	1754997.548
Ancho Canyon	49-610439	1628005.587	1754742.635
Ancho Canyon	49-610440	1627990.762	1754736.575
Ancho Canyon	49-610441	1627990.759	1754730.508
Ancho Canyon	49-610442	1627733.688	1754378.761
Ancho Canyon	49-610443	1627728.742	1754366.63
Ancho Canyon	49-610444	1627718.855	1754354.502
Ancho Canyon	49-610446	1628151.273	1754112.247
Ancho Canyon	49-610448	1626715.779	1754148.697
Ancho Canyon	49-610449	1626720.717	1754142.628
Ancho Canyon	49-610450	1626715.773	1754136.563
Ancho Canyon	49-610451	1627372.867	1754057.396
Ancho Canyon	49-610452	1627377.805	1754051.327

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Ancho Canyon	49-610453	1627372.861	1754045.263
Ancho Canyon	49-610454	1627960.808	1754014.672
Ancho Canyon	49-610455	1627965.744	1754002.537
Ancho Canyon	49-610456	1627965.738	1753990.404
Ancho Canyon	49-610457	1628351.084	1753893.177
Ancho Canyon	49-610458	1628351.076	1753874.978
Ancho Canyon	49-610459	1628346.13	1753862.847
Ancho Canyon	49-610460	1628869.717	1753498.643
Ancho Canyon	49-610461	1628864.774	1753492.578
Ancho Canyon	49-610462	1628859.833	1753492.58
Ancho Canyon	49-610397	1629200.656	1753231.587
Ancho Canyon	49-610398	1629205.595	1753225.518
Ancho Canyon	49-610399	1629200.654	1753225.52
Water Canyon	49-610316	1622932.684	1756759.332
Water Canyon	49-610317	1622937.617	1756747.196
Water Canyon	49-610318	1622932.669	1756735.066
Water Canyon	49-610319	1622966.986	1756292.189
Water Canyon	49-610320	1622966.982	1756286.123
Water Canyon	49-610321	1622966.978	1756280.056
Water Canyon	49-610322	1623515.496	1756498.126
Water Canyon	49-610323	1623500.668	1756486.002
Water Canyon	49-610324	1623490.78	1756473.875
Water Canyon	49-610325	1623500.576	1756328.272
Water Canyon	49-610326	1623495.628	1756316.142
Water Canyon	49-610327	1623495.625	1756310.076
Water Canyon	49-610328	1623880.963	1756279.521
Water Canyon	49-610329	1623890.844	1756279.515
Water Canyon	49-610330	1623880.949	1756255.255
Water Canyon	49-610331	1624330.541	1756273.202
Water Canyon	49-610332	1624335.485	1756279.266
Water Canyon	49-610333	1624330.544	1756279.268
Water Canyon	49-610334	1624686.109	1756006.08
Water Canyon	49-610335	1624686.112	1756012.146
Water Canyon	49-610336	1624681.169	1756006.083
Water Canyon	49-610337	1624997.322	1755933.115
Water Canyon	49-610338	1625007.2	1755927.043
Water Canyon	49-610339	1625007.2	1755927.043
Water Canyon	49-610340	1625427.134	1755908.623
Water Canyon	49-610341	1625432.072	1755902.554
Water Canyon	49-610342	1625432.068	1755896.488

SWMU or AOC	Location ID	Easting (ft)	Northing (ft)
Water Canyon	49-610343	1625792.739	1755920.57
Water Canyon	49-610344	1625792.742	1755926.636
Water Canyon	49-610345	1625792.739	1755920.57
Water Canyon	49-610347	1626612.908	1756011.166
Water Canyon	49-610348	1626613.044	1756005.435
Water Canyon	49-610349	1627561.67	1755962.46
Water Canyon	49-610350	1627561.46	1755956.131
Water Canyon	49-610351	1627561.247	1755952.093
Water Canyon	49-610352	1620623.815	1757323.387
Water Canyon	49-610353	1620625.91	1757318.934
Water Canyon	49-610354	1620627.836	1757315.238
Water Canyon	49-610356	1620917.59	1757622.063
Water Canyon	49-610359	1621477.222	1757552.118
Water Canyon	49-610362	1621974.943	1757639.61
Water Canyon	49-610363	1621974.364	1757629.47
Water Canyon	49-610364	1623141.777	1757643.086
Water Canyon	49-610365	1623142.936	1757635.844
Water Canyon	49-610366	1623143.515	1757628.891
Water Canyon	49-610367	1623932.974	1757681.618
Water Canyon	49-610368	1623933.264	1757676.693
Water Canyon	49-610369	1623933.553	1757661.628
Water Canyon	49-610370	1624941.742	1757549.22
Water Canyon	49-610371	1624942.032	1757544.295
Water Canyon	49-610372	1624942.322	1757539.37
Water Canyon	49-610373	1626082.618	1757039.042
Water Canyon	49-610374	1626080.011	1757033.827
Water Canyon	49-610375	1626078.563	1757028.902
Water Canyon	49-610376	1626833.256	1756720.362
Water Canyon	49-610377	1626830.069	1756716.595
Water Canyon	49-610378	1626823.985	1756708.483
Water Canyon	49-610379	1627461.346	1756685.307
Water Canyon	49-610380	1627459.318	1756680.092
Water Canyon	49-610381	1627457.87	1756674.587
Water Canyon	49-610382	1628045.69	1756498.734
Water Canyon	49-610383	1628045.4	1756493.519
Water Canyon	49-610384	1628045.98	1756488.594
Water Canyon	49-610385	1628582.812	1756353.01
Water Canyon	49-610386	1628582.232	1756348.085
Water Canyon	49-610387	1628581.073	1756343.16

Appendix D

Gross-Alpha and Gross-Beta
Radiological Screening Results and Borehole Logs
(on CD included with this document)

Appendix E

Investigation-Derived Waste Management

E-1.0 INTRODUCTION

This appendix contains the waste-management records for the investigation-derived waste (IDW) generated during the implementation of the 2009–2010 investigation work plan of the Technical Area 49 (TA-49) sites inside the nuclear environmental site (NES) Boundary at Los Alamos National Laboratory (LANL or the Laboratory).

All IDW generated during the TA-49 investigation was managed in accordance with the IDW management plan in the approved work plan (LANL 2008, 102691) and standard operating procedure (SOP) 5238, Characterization and Management of Environmental Program Waste. SOP 5238 incorporates the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department (NMED) waste regulations, U.S. Department of Energy orders, and other Laboratory procedures.

Consistent with SOP-5238, a waste characterization strategy form (WCSF) was prepared prior to IDW generation to address characterization approaches, on-site management, and final disposition options for wastes. Analytical data and information on wastes generated during previous investigations and/or acceptable knowledge (AK) were used to complete the WCSF. A copy of the approved WCSF is included in this appendix as Attachment E-1 (on CD). Waste has not yet been dispositioned so waste profile forms and manifests are not available.

Wastes were staged in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements were based on the type of IDW and its classification. Container and storage requirements were detailed in the WCSF and approved before waste was generated.

Investigation activities were conducted in a manner that minimized the generation of waste. Waste minimization was accomplished by implementing the most recent version of the Los Alamos National Laboratory Hazardous Waste Minimization Plan (LANL 2009, 109324).

E-2.0 WASTE STREAMS

The IDW streams generated and managed during the 2009–2010 investigation of TA-49 are described below and summarized in Table E-2.0-1.

The waste numbers correspond with those identified in the WCSF which is included in this appendix as Attachment E-1. Waste types 3 (decontamination fluids), 5 (New Mexico special waste), and 6 (returned or excess samples) were not generated and, therefore; are not listed below.

- Waste #1: Drill Cuttings (IDW) – This waste stream includes soil and rock cuttings generated from boreholes. Approximately 75 yd^3 of cuttings were generated and stored in Wrangler Bags or 55-gal. drums. All containers were directly sampled. The cuttings will be land applied if they meet criteria of the NMED-approved Notice of Intent Decision Tree, Land Application of IDW Solids from Construction of Wells and Boreholes and the LANL radiological decision tree. Cuttings that cannot be land applied are expected to be low-level waste (LLW) or industrial waste that will be disposed of at an authorized off-site disposal facility.
- WCSF Waste #2: Contact Waste – This waste stream includes personal protective equipment, contaminated sampling supplies, and dry decontamination waste that may have come in contact with contaminated environmental media and cannot be decontaminated. These wastes were

containerized at the point of generation and were characterized based on AK of the waste materials, the methods of generation, and analytical data for the media with which they came into contact. These wastes are expected to be LLW, Green-is-Clean, or industrial wastes.

- WCSF Waste #4: Municipal Solid Waste (MSW) – This waste stream consists of noncontact trash and debris. All MSW was stored in plastic trash bags and disposed of at the Los Alamos County transfer station.

E-3.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not include.

LANL (Los Alamos National Laboratory), January 2008. "Investigation Work Plan for Sites at Technical Area 49 Inside the Nuclear Environmental Site Boundary, Revision 1," Los Alamos National Laboratory document LA-UR-08-0447, Los Alamos, New Mexico. (LANL 2008, 102691)

LANL (Los Alamos National Laboratory), November 2009. "Los Alamos National Security, LLC, Hazardous Waste Minimization Plan," Los Alamos National Laboratory document LA-UR-09-07682, Los Alamos, New Mexico. (LANL 2009, 109324)

Table E-2.0-1
Summary of IDW Generation and Management

Waste Stream	Waste Type	Volume	Characterization Method	On-Site Management	Disposition
Drill Cuttings	LLW, industrial	75 yd^3	Direct sampling	Wrangler Bags or 55-gal. drums	Land application or authorized off-site disposal facility
Contact Waste	LLW, Green-is-Clean, industrial	<2 yd^3	AK and analytical results of site characterization	30- or 55-gal. drums	Green-is-Clean TA-54 or authorized off-site disposal facility
Municipal Solid Waste	MSW	<5 yd^3	AK	Plastic trash bags	Off-site municipal landfill

Attachment E-1

Waste Characterization Strategy Form
(on CD included with this document)

Appendix F

Analytical Program

F-1.0 INTRODUCTION

This appendix discusses the analytical methods and data quality assessment for samples collected during investigations at Technical Area 49 (TA-49) [Solid Waste Management Units (SWMUs) 49-001(a), 49-001(e), 49-001(f), and 49-003; Areas of Concern (AOCs) 49-008(c) and 49-008(d); Material Disposal Area (MDA) AB SWMUs 49-001(b,c,d,g), Ancho Canyon and Water Canyon] inside the nuclear environmental site (NES) boundary. Additionally, this appendix summarizes the effects of data-quality issues on the acceptability of the analytical data.

Quality assurance (QA), quality control (QC), and data validation procedures were implemented in accordance with the Quality Assurance Project Plan Requirements for Sampling and Analysis (LANL 1996, 054609), and 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-5168, Routine Validation of LC/MS/MS High Explosive Analytical Data

Routine data validation was performed for each data package (also referred to as request numbers), and analytical data were reviewed and evaluated based on U.S. Environmental Protection Agency (EPA) National Functional Guidelines, where applicable (EPA 1994, 048639; EPA 1999, 066649). As a result of the data validation and assessment efforts, qualifiers are assigned to the analytical records as appropriate. The data-qualifier definitions are provided in Appendix A.

F-2.0 ANALYTICAL DATA ORGANIZATION

The investigation of the TA-49 sites inside the NES boundary consisted of Areas 1, 2, 2A, 2B 3, 4, 11, 12, Ancho Canyon, and Water Canyon. For purposes of analytical data presentation and review, the TA-49 inside NES boundary analytical data are included in Appendix G (provided on DVD) as 10 separate databases corresponding to the 10 main areas investigated: Area 1: SWMU 49-001(a); Areas 2, 2A, 2B:

MDA AB SWMUs 49-001(b, c, d, g); Area 3: SWMU 49-001(e); Area 4: SWMU 49-001(f); Area 11: AOC 49-008(c) and SWMU 49-003; Area 12: AOC 49-008(d); Ancho Canyon; and Water Canyon.

All historical investigation samples were submitted to and analyzed by approved off-site laboratories. These data are determined to be of sufficient quality for decision-making purposes and have been reviewed and revalidated to current QA standards.

F-3.0 INORGANIC CHEMICAL ANALYSES

The analytical methods used for inorganic chemical analyses are summarized in Table F-3.0-1.

Area 1

At SWMU 49-001(a), a total of 165 samples (145 soil and 20 tuff), plus 12 field duplicates, were collected during historical and 2009–2010 investigations. All 165 samples were analyzed for target analyte list (TAL) metals; 16 samples each were analyzed for perchlorate and cyanide; and 10 samples were analyzed for uranium.

Area 2, 2A, and 2B

At MDA AB SWMUs 49-001(b, c, d, g), a total of 120 samples (108 soil/fill and 12 tuff), plus 15 field duplicates, were collected during historical and 2009–2010 investigations. All 120 samples were analyzed for TAL metals; and 12 samples each were analyzed for perchlorate and cyanide.

Area 3

At SWMU 49-001(e), a total of 170 samples (126 soil/fill and 44 tuff), plus 15 field duplicates, were collected during historical and 2009–2010 investigations. All 170 samples were analyzed for TAL metals; and 15 samples were analyzed for perchlorate and cyanide.

Area 4

At SWMU 49-001(f), a total of 166 samples (135 soil/fill and 31 tuff), plus 18 field duplicates, were collected during historical and 2009–2010 investigations. All 166 samples were analyzed for TAL metals; 16 samples each were analyzed for perchlorate and cyanide; and 10 samples were analyzed for uranium.

Area 11

At AOC 49-008(c), a total of 16 samples (7 soil and 9 tuff), plus 1 field duplicate and 4 pore-gas samples were collected during historical and 2009 investigations. All 35 samples were analyzed for TAL metals; 16 samples were analyzed for perchlorate and cyanide; and 3 samples were analyzed for uranium.

At SWMU 49-003, a total of 14 samples (5 soil and 9 tuff), plus 1 field duplicate were collected during historical and 2009 investigations. All 20 samples were analyzed for TAL metals; 14 samples were analyzed for perchlorate and cyanide; and 6 samples were analyzed for uranium.

Area 12

At AOC 49-008(d), a total of 71 samples (65 soil/fill and 6 tuff), plus 3 field duplicates, were collected during historical and 2009 investigations. All 71 samples were analyzed for TAL metals; and 8 samples were analyzed for perchlorate and cyanide.

Ancho Canyon

A total of 115 sediment samples, plus 13 field duplicates, were collected during the 2010 investigation. All 115 samples were analyzed for TAL metals.

Water Canyon

A total of 116 sediment samples, plus 12 field duplicates, were collected during the 2010 investigation. Analyses included TAL metals for all 116 samples.

Tables presented in the main text of the investigation report summarize all samples collected and the analyses requested for the investigation of the TA-49 sites inside the NES boundary. All analyses collected at TA-49 investigation are presented in Appendix G (provided on DVD).

F-3.1 Inorganic Chemical QA/QC Samples

The use of QA/QC samples is designed to produce quantitative measures of the reliability of specific parts of an analytical procedure. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. To assess the accuracy and precision of inorganic chemical analyses LCSs, preparation blanks, MSs, laboratory duplicate samples, interference check samples (ICSs), and serial dilution samples were analyzed as part of the investigations at TA-49 for sites inside of the NES boundary. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and is described in the sections below. For some of the analyses performed before the 1995 SOW was implemented, slightly different QA/QC procedures may have been followed.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals, LCS percent recoveries (%R) should fall within the control limits of 75%–125% (LANL 1995, 049738; LANL 2000, 071233).

The preparation blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is extracted and analyzed in the same manner as the corresponding environmental samples. Preparation blanks are used to measure bias and potential cross-contamination. All inorganic chemical results should be below the method detection limit (MDL).

The MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125%, inclusive, for all spiked analytes (LANL 1995, 049738; LANL 2000, 071233).

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

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

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

Details regarding the quality of the inorganic chemical analytical data included in the dataset are summarized in the following subsections.

F-3.2 Data Quality Results for Inorganic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

F-3.2.1 Chain of Custody

Sample collection log/chain-of-custody forms (SCL/COC forms) were maintained properly for all samples analyzed for inorganic chemicals (see Appendix G provided on DVD).

F-3.2.2 Sample Documentation

All samples analyzed for inorganic chemicals were properly documented on SCL/COC forms in the field (see Appendix G on DVD).

F-3.2.3 Sample Dilutions

Some samples were diluted for inorganic chemical analyses. No qualifiers were applied to any inorganic chemical sample results because of dilutions.

F-3.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.5 Holding Times

F-3.2.5.1 Area 2, 2A, 2B, Area 11, and Area 12

Holding-time criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.5.2 Area 1

Three cyanide results and 10 TAL metals results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

One TAL metals result was qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

A total of 14 TAL metals results were qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by greater than 2 times the published method for holding times.

F-3.2.5.3 Area 3

A total of 14 TAL metals results were qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

A total of 32 TAL metals results were qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by greater than 2 times the published method for holding times.

F-3.2.5.4 Area 4

Three TAL metals results and four cyanide results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

A total of 19 TAL metals results were qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

A total of 13 TAL metals results were qualified as estimated and biased low (J-) because the extraction/analytical holding time was exceeded by greater than 2 times the published method for holding times.

F-3.2.5.5 Ancho Canyon

Six TAL metals results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-3.2.5.6 Water Canyon

Six TAL metals results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-3.2.6 Initial and Continuing Calibration Verifications

F-3.2.6.1 Area 1, Area 2, 2A, 2B, Area 4, Area 11, Area 12

Initial and continuing calibration verification criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.6.2 Area 3

One TAL metals result was qualified as estimated (J) because the ICV and/or CCV was recovered outside the method-specific limits.

F-3.2.6.3 Ancho Canyon

Four TAL metals results were qualified as estimated (J) because the ICVs and/or CCVs were recovered outside the method-specific limits.

F-3.2.6.4 Water Canyon

A total of 48 TAL metals results were qualified as estimated (J) because the ICVs and/or CCVs were not analyzed at the appropriate method frequency.

F-3.2.7 Interference Check Sample and/or Serial Dilutions

F-3.2.7.1 Area 2, 2A, 2B, Area 3, Area 11, Area 12, Ancho Canyon, and Water Canyon

Interference check sample and serial dilution criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.7.2 Area 1

A total of 10 TAL metals results were qualified as estimated and biased low (J-) because the associated ICSs were recovered below the lower warning limit but greater than or equal to the lower acceptable limit.

F-3.2.7.3 Area 4

A total of 10 TAL metals results were qualified as estimated and biased low (J-) because the associated ICSs were recovered below the lower warning limit but greater than or equal to the lower acceptable limit.

F-3.2.8 Laboratory Duplicate Samples

F-3.2.8.1 Area 1

A total of 79 TAL metals results were qualified as estimated (J) because both the sample and the duplicate sample results were greater than or equal to 5 times the reporting limit (RL) and the duplicate RPD was greater than 35%.

F-3.2.8.2 Area 2, 2A, 2B

A total of 63 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.3 Area 3

One TAL metals result was qualified as estimated not detected (UJ) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

A total of 89 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.4 Area 4

A total of 119 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.5 Area 11

Laboratory duplicate sample precision criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.8.6 Area 12

A total of 14 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.7 Ancho Canyon

A total of 38 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.8 Water Canyon

A total of 160 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL and the duplicate RPD was greater than 35% for soil samples.

F-3.2.9 Preparation Blanks

F-3.2.9.1 Area 1

Five cyanide results and 56 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 99 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 85 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

A total of 12 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.2 Area 2, 2A, 2B

Seven cyanide results and 42 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 103 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

Two TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

A total of 20 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.3 Area 3

A total of 120 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 10 TAL metals results were qualified as not detected (U) because the sample results were less than 5 times the concentration of the related analytes in the associated preparation blank.

A total of 123 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 23 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.4 Area 4

A total of 112 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

One TAL metal result was qualified as not detected (U) because the sample results were less than 5 times the concentration of the related analytes in the associated preparation blank.

A total of 166 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 61 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.5 Area 11

Four cyanide results and 21 TAL metal results were qualified as not detected (U because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 18 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 14 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.6 Area 12

A total of 19 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 12 TAL metals results were qualified as not detected (U) because the sample results were less than 5 times the concentration of the related analytes in the associated preparation blank.

A total of 28 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 20 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate.

One TAL metal result was qualified as estimated (J) because this analyte was identified in the method blank but was greater than 5 times the concentration of the related analytes in the associated preparation blank.

F-3.2.9.7 Ancho Canyon

A total of 38 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 187 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 87 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

F-3.2.9.8 Water Canyon

A total of 39 TAL metal results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank, which indicates the reported detection is indistinguishable from contamination in the blank.

A total of 41 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

A total of 63 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 243 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, equipment blank, or rinsate blank.

F-3.2.10 Matrix Spike Samples

F-3.2.10.1 Area 1

Three TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R less than [<] 75%) was observed for these analytes in the associated spike sample.

A total of 169 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 273 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R greater than [>] 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.2 Area 2, 2A, 2B

A total of 14 TAL metals results were qualified as estimated not detected (UJ) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

A total of 32 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 264 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.3 Area 3

Seven TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

Three TAL metals results were qualified as estimated not detected (UJ) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

A total of 153 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 250 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.4 Area 4

A total of 27 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 128 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 265 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.5 Area 11

A total of 18 TAL metals results and eight total cyanide results were qualified as estimated not detected (UJ) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 39 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 86 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.6 Area 12

A total of seven cyanide results were qualified as estimated not detected (UJ) because a low recovery (10% < %R < 75%) was observed for these analytes in the associated spike sample.

A total of 69 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (10% < %R < 75%) was observed for these analytes in the associated spike sample.

A total of 87 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.7 Ancho Canyon

A total of 61 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 315 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 250 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.10.8 Water Canyon

A total of 39 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of four TAL metals results were qualified as estimated not detected (UJ) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

A total of 106 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R < 75%) was observed for these analytes in the associated spike sample.

A total of 205 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated spike sample.

F-3.2.11 Laboratory Control Sample Recoveries

The LCS recovery criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.12 Detection Limits

F-3.2.12.1 Area 1

A total of 79 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the estimated detection limit (EDL) and the MDL.

A total of 327 TAL metals results and two perchlorate results were qualified as estimated (J) because the sample result was reported as detected between the practical quantitation limit (PQL) and the MDL.

F-3.2.12.2 Area 2, 2A, 2B

A total of 13 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 256 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.3 Area 3

A total of 48 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 308 TAL metals results, one perchlorate result, and one cyanide result were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.4 Area 4

A total of 79 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 325 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.5 Area 11

A total of 87 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 83 TAL metals results and 10 perchlorate results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.6 Area 12

A total of 29 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 137 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.7 Ancho Canyon

A total of 168 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.12.8 Water Canyon

A total of 154 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.13 Rejected Results

F-3.2.13.1 Area 2, 2A, 2B, Area 11 and Ancho Canyon

Sample results for inorganic chemical analyses were not qualified as rejected.

F-3.2.13.2 Area 1

A total of 19 mercury results were qualified as rejected (R) because a recovery of less than 10% was observed in the associated matrix spike analysis.

A total of 20 mercury results were qualified as rejected (R) because the extraction/analytical holding times were exceeded by greater than two times the published method for holding times.

F-3.2.13.3 Area 3

A total of two mercury results were qualified as rejected (R) because the extraction/analytical holding times were exceeded by greater than two times the published method for holding times.

F-3.2.13.4 Area 4

A total of 20 TAL metals results (manganese) were qualified as rejected (R) because a recovery of less than 10% was observed in the associated matrix spike analysis.

A total of three mercury results were qualified as rejected (R) because the extraction/analytical holding time were exceeded by greater than two times the published method for holding times.

F-3.2.13.5 Area 12

A total of 14 TAL metals results (manganese) were qualified as rejected (R) because a recovery of less than 10% was observed in the associated matrix spike analysis.

A total of 9 TAL metals results (antimony) were qualified as rejected (R) because a recovery of less than 10% was observed in the associated matrix spike analysis.

F-3.2.13.6 Water Canyon

A total of 39 TAL metals results (19 antimony and 20 manganese) were qualified as rejected (R) because a recovery of less than 10% was observed in the associated matrix spike analysis.

The rejected data were not used to characterize the nature and extent of contamination. However, sufficient data of good quality are available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-4.0 ORGANIC CHEMICAL ANALYSES

Complex soil samples, tuff samples, and pore-gas samples collected during historical and 2009 investigations were analyzed for one or more of the following analytical suites: explosive compounds, semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), and polychlorinated biphenyl (PCB) compounds. Samples were analyzed using SW-846 Methods 8260B (VOCs), 8270C (SVOCs), 8321A (high explosives [HE]), and 8082 (PCBs).

Area 1

At SWMU 49-001(a), a total of 16 tuff samples, plus 2 field duplicates, and 3 pore-gas samples were collected during 2009–2010 investigations. All 16 samples were analyzed for explosive compounds, SVOCs, and VOCs. Pore-gas samples were analyzed for VOCs only.

Area 2, 2A, 2B

At MDA AB, SWMUs 49-001(b, c, d, g), a total of 12 tuff samples, plus 2 field duplicates, and 9 pore-gas samples were collected during 2009–2010 investigations. All 12 samples were analyzed for explosive compounds, SVOCs, and VOCs. Pore-gas samples were analyzed for VOCs only.

Area 3

At SWMU 49-001(e), a total of 15 tuff samples, plus 1 field duplicate, and 2 pore-gas samples were collected during 2009–2010 investigations. All 15 samples were analyzed for explosive compounds, SVOCs, and VOCs. Pore-gas samples were analyzed for VOCs only.

Area 4

At SWMU 49-001(f), a total of 16 tuff samples, plus 1 field duplicate, and 3 pore-gas samples were collected during 2009–2010 investigations. All 16 samples were analyzed for explosive compounds, SVOCs, and VOCs. Pore-gas samples were analyzed for VOCs only.

Area 11

At AOC 49-008(c), a total of 16 samples (7 soil and 9 tuff), plus 1 field duplicate, and 4 pore-gas samples were collected during historical and 2009 investigations. A total of 18 samples were analyzed for explosive compounds; 19 samples were analyzed for SVOCs; and 16 samples were analyzed for VOCs. Pore-gas samples were analyzed for VOCs only.

At SWMU 49-003 a total of 14 samples (5 soil and 9 tuff), plus 1 field duplicate were collected during historical and 2009 investigations. All 14 samples were analyzed for explosive compounds, SVOCs, and VOCs.

Area 12

At AOC 49-008(d), a total of 72 samples (66 soil/fill and 6 tuff), plus 6 field duplicates, and 3 pore-gas samples were collected during historical and 2009 investigations. A total of 8 samples were analyzed for explosive compounds; and 58 samples were analyzed for PCBs. All 72 samples were analyzed for SVOCs; and 65 samples were analyzed for VOCs. Pore-gas samples were analyzed for VOCs only.

Ancho Canyon

A total of 118 soil samples, plus 13 field duplicates, were collected during 2010 investigations. All 118 samples were analyzed for PCBs and SVOCs.

Water Canyon

A total of 116 sediment samples, plus 12 field duplicates, were collected during 2010 investigations. All 116 samples were analyzed for PCBs and SVOCs.

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.

All organic chemical results are included in Appendix G (provided on DVD).

F-4.1 Organic Chemical QA/QC Samples

The use of QA/QC samples is designed to produce quantitative measures of the reliability of specific parts of an analytical procedure. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. Calibration verifications, LCSs, method blanks, MSs, surrogates, and 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 SOW (LANL 2000, 071233) and described briefly below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical procedure and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the accuracy of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration ensures that the initial calibration is still holding and correct as the instrument is used to process samples. The continuing calibration also serves to determine that analyte identification criteria such as retention times and spectral matching are being met.

The LCS is a sample of a known matrix that has been spiked with compounds that are representative of the target analytes, and it serves as a monitor of overall performance. The LCS is the primary demonstration, on a daily basis, of the ability to analyze samples with good qualitative and quantitative accuracy. The LCS recoveries should be within the method-specific acceptance criteria.

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is extracted and analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during extraction and analysis. All target analytes should be below the contract-required detection limit in the method blank (LANL 2000, 071233).

The MS samples are used to measure the ability to recover prescribed analytes from a native sample matrix and consist of aliquots of the submitted samples spiked with a known concentration of the target analyte(s). Spiking typically occurs before sample preparation and analysis. The spike sample recoveries should be between the lower acceptance limit (LAL) and upper acceptance limit (UAL).

A surrogate compound (surrogate) is an organic compound used in the analyses of target analytes that is similar in composition and behavior to the target analytes but 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 (ISs) are chemical compounds added to every blank, sample, and standard extract at a known concentration. They are used to compensate for (1) analyte concentration changes that might occur during storage of the extract, and (2) quantitation variations that can occur during analysis. The ISs are used as the basis for quantitation of target analytes. The %R for ISs should be within the range of 50%–200%.

Details regarding the quality of the organic chemical analytical data included in the dataset are summarized in the following subsections.

F-4.2 Data Quality Results for Organic Chemicals

The majority of the analytical results were qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data did not have any quality issues associated with the values presented.

In Water Canyon, two SVOC results were qualified as not detected (U) because the mass spectra of the affected analytes did not meet specifications.

F-4.2.1 Maintenance of Chain of Custody

The COC forms were maintained properly for all samples analyzed for organic chemicals.

F-4.2.2 Sample Documentation

All samples analyzed for organic chemicals were properly documented on the SCLs in the field (see Appendix G provided on DVD).

F-4.2.3 Sample Dilutions

Some samples were diluted for organic chemical analyses. No qualifiers were applied to any organic chemical sample results because of dilutions.

F-4.2.3.2 Area 1

A total of 68 SVOC results were qualified as estimated not detected (UJ) because of duplicates, dilutions, or reanalyses.

F-4.2.3.3 Area 2, 2A, 2B

A total of 408 SVOC results were qualified as estimated not detected (UJ) because of duplicates, dilutions, or reanalyses.

F-4.2.3.4 Area 3

A total of 16 HE results and one VOC result were qualified as estimated not detected (UJ) because of duplicates, dilutions, or reanalyses.

F-4.2.3.5 Area 4

A total of nine HE results were qualified as estimated not detected (UJ) because of duplicates, dilutions, or reanalyses.

F-4.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for organic chemicals.

F-4.2.5 Holding Times

F-4.2.5.1 Area 2, 2A, 2B, Area 4, Area 11, Area 12, and Water Canyon

Holding-time criteria were met for all samples analyzed for organic chemicals.

F-4.2.5.2 Area 1

A total of 136 SVOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-4.2.5.3 Area 3

A total of 30 HE results and 68 SVOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-4.2.5.4 Ancho Canyon

A total of 816 SVOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding time was exceeded by less than 2 times the published method for holding times.

F-4.2.5.5 Pore Gas

A total of 450 VOC results were qualified as estimated not detected (UJ) because the extraction/analytical holding time for 2 samples was exceeded by less than 2 times the published method for holding times.

A total of 162 VOC results were qualified as estimated and biased low (J-) because the extraction/analytical holding time for two samples was exceeded by less than 2 times the published method for holding times.

F-4.2.6 Initial and Continuing Calibration Verifications

F-4.2.6.1 Area 1

A total of 22 explosives compound results, 20 SVOC results, and 23 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 51 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a relative retention factor (RRF) of < 0.05 in the initial calibrations and/or CCVs.

F-4.2.6.2 Area 2, 2A, 2B

A total of 9 explosives compound results, 24 SVOC results, and 26 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 33 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of < 0.05 in the initial calibrations and/or CCVs.

One SVOC result was qualified as estimated (J) because the ICV and/or CCV was recovered outside the method-specific limits.

F-4.2.6.3 Area 3

A total of 18 explosives compound results, 37 SVOC results, and 4 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 48 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of < 0.05 in the initial calibrations and/or CCVs.

F-4.2.6.4 Area 4

A total of 30 explosives compound results, 21 SVOC results, and 21 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 55 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of < 0.05 in the initial calibrations and/or CCVs.

Two SVOC results and three VOC results were qualified as estimated (J) because the ICVs and/or CCVs were recovered outside the method-specific limits.

F-4.2.6.5 Area 11

A total of 85 explosives compound results, 62 SVOC results, and 28 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 151 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of < 0.05 in the ICVs and/or CCVs.

Two SVOC results and one VOC result were qualified as estimated (J) because the ICVs and/or CCVs were recovered outside the method-specific limits.

Two explosives compound results were qualified as estimated (J) because the affected analytes were analyzed with a RRF of < 0.05 in the initial calibrations and/or CCVs.

F-4.2.6.6 Area 12

A total of 9 explosive compound results, 174 SVOC results, and 53 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 26 explosives compound results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of < 0.05 in the initial calibrations and/or CCVs.

Two PCB results were qualified as estimated (J) because the multi-component standard was not analyzed within 72 h of the initial analysis.

F-4.2.6.7 Ancho Canyon

A total of 20 PCB and 188 SVOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

Three SVOC results were qualified as estimated (J) because the ICVs and/or CCVs were recovered outside the method-specific limits.

F-4.2.6.8 Water Canyon

A total of 235 SVOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

One SVOC result was qualified as estimated (J) because the ICV and/or CCV was recovered outside the method-specific limits.

F-4.2.6.9 Pore Gas

A total of 52 VOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with an initial calibration curve that exceeded the percent relative standard deviation criteria and/or the associated multipoint calibration correlation coefficient is < 0.995.

A total of 144 VOC results were qualified as estimated not detected (UJ) because the ICVs and/or CCVs were recovered outside the method-specific limits.

A total of 10 VOC results were qualified as estimated (J) because the ICVs and/or CCVs were recovered outside the method-specific limits.

F-4.2.7 Surrogate Recoveries

F-4.2.7.1 Area 3, Area 4, Area 11, Ancho Canyon, Water Canyon, and Pore Gas

Surrogate recovery criteria were met for all samples analyzed for organic chemicals.

F-4.2.7.2 Area 1

A total of 67 SVOC results were qualified as estimated not detected (UJ) because the surrogate recovery was less than the LAL but were greater than or equal to 10%.

F-4.2.7.3 Area 2, 2A, 2B

A total of 131 SVOC results were qualified as estimated not detected (UJ) because the surrogate recovery was less than the LAL but was greater than or equal to 10%.

One SVOC result was qualified as estimated and biased low (J-) because the surrogate recovery was less than the LAL but was greater than or equal to 10%.

F-4.2.7.4 Area 12

A total of 59 VOC results were qualified as estimated not detected (UJ) because the surrogate recovery was less than the LAL but was greater than or equal to 10%.

A total of four VOC results were qualified as estimated and biased high (J+) because the surrogate %R was greater than the UAL, which indicated a potential for a high bias in the results and a potential for false positive results.

F-4.2.8 Internal Standard Responses

Internal standard response criteria were met for all samples analyzed for organic compounds.

F-4.2.9 Method Blanks

F-4.2.9.1 Area 2, 2A, 2B

Three VOC results were qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.2 Area 3

One VOC result was qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

Five VOC results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.

F-4.2.9.3 Area 4

One VOC result was qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.4 Area 12

Six SVOC results were qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.5 Ancho Canyon

One SVOC result was qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.6 Water Canyon

One SVOC result was qualified as not detected (U) because the sample result was less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the method blank.

F-4.2.9.7 Area 1, Area 11, and Pore Gas

Results for samples analyzed for organic compounds were not qualified because of blank contamination.

F-4.2.10 Matrix Spike Samples

F-4.2.10.1 Area 1

Three HE results were qualified as estimated not detected (UJ) because the MS and/or matrix spike duplicate (MSD) RPD was greater than 30%.

F-4.2.10.2 Area 2, 2A, 2B

One HE result was qualified as estimated not detected (UJ) because the MS/MSD RPD was greater than 30%.

F-4.2.10.3 Area 4

Fourteen HE results were qualified as estimated not detected (UJ) because the MS/MSD RPD was greater than 30%.

F-4.2.10.4 Area 11

A total of 30 HE results were qualified as estimated not detected (UJ) because the MS/MSD RPD was greater than 30%.

F-4.2.11 Laboratory Duplicate Samples

Laboratory duplicates collected for organic chemical analyses indicated acceptable precision for all samples.

F-4.2.12 Laboratory Control Sample Recoveries

F-4.2.12.1 Area 1, Area 3, Area 4, Area 11, and Ancho Canyon

LCS recovery criteria were met for all samples analyzed for organic chemicals.

F-4.2.12.2 Area 2, 2A, 2B

A total of 18 SVOC results were qualified as estimated not detected (UJ) because the LCS %R was less than LAL but greater than 10%.

F-4.2.12.3 Area 12

A total of 27 VOC results were qualified as estimated not detected (UJ) because the LCS %R was less than the LAL but greater than 10%.

F-4.2.12.4 Water Canyon

Two PCB results were qualified as estimated and biased high (J+) because the LCS %R was greater than the UAL.

F-4.2.12.5 Pore Gas

A total of 26 VOC results were qualified as estimated not detected (UJ) because the LCS %R was less than the LAL but greater than 10%.

A total of 22 VOC results were qualified as estimated and biased high (J+) because the LCS %R was greater than the UAL.

F-4.2.13 Quantitation and Method Detection Limits

F-4.2.13.1 Area 3, Area 4, and Pore Gas

Results for samples analyzed for organic chemicals were not qualified because of quantitation limits and MDLs.

F-4.2.13.2 Area 1

Three VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.3 Area 2, 2A, 2B

Two SVOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.4 Area 11

A total of 23 SVOC results and 2 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.5 Area 12

Three PCB results, 10 SVOC results, and 9 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.6 Ancho Canyon

A total of 12 SVOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.13.7 Water Canyon

A total of 9 PCB results and 36 VOC results were qualified as estimated (J) because the results were between the PQL and the MDL.

F-4.2.14 Rejected Data

F-4.2.14.1 Area 12

A total of 18 explosives compound results were qualified as rejected (R) because these analytes were not detected in the samples and the analyte retention time shifted by more than 0.05 minutes from the mid-level standard of the initial calibrations.

F-4.2.14.2 Area 1, Area 2, Area 3, Area 4, Area 11, Ancho Canyon, Water Canyon, and Pore Gas

Sample results for organic chemical analysis were not qualified as rejected (R).

The rejected data were not used to characterize the nature and extent of contamination. However, sufficient data of good quality were available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-5.0 RADIONUCLIDE ANALYSES

Soil, sediments, and tuff samples were analyzed for radionuclides, tritium, strontium-90, (also iodine-129 and technetium-99 if a screening threshold was exceeded) by gamma spectroscopy using EPA Method 901.1; and for americium-241, isotopic plutonium, and isotopic uranium by alpha spectroscopy (HASL-300 Methods). Pore-gas samples were collected and analyzed for tritium using EPA Method 906.0. All QC procedures were followed as required by the analytical laboratories SOW (LANL 2000, 071233). The methods used for analyzing radionuclides are listed in Table F-3.0-1.

Area 1

At SWMU 49-001(a), a total of 174 samples (154 soil and 20 tuff), plus 12 field duplicates, and 3 pore-gas samples were collected during historical and 2009–2010 investigations. Sample analyses included 157 analyzed by gamma spectroscopy; 155 analyzed for americium-241 and isotopic uranium; 16 analyzed for tritium; and 165 analyzed for isotopic plutonium. The pore-gas samples were analyzed for tritium only.

Area 2, 2A, 2B

At MDA AB, SWMUs 49-001(b, c, d, g), a total of 172 samples (114 soil/fill and 58 tuff), plus 18 field duplicates, and 9 pore-gas samples were collected during historical and 2009–2010 investigations. Sample analyses included 104 analyzed by gamma spectroscopy; 165 analyzed for americium-241; 172 analyzed for isotopic uranium; 12 analyzed for tritium; 163 analyzed for isotopic plutonium; and 16 analyzed for strontium-90. The pore-gas samples were analyzed for tritium only.

Area 3

At SWMU 49-001(e), a total of 194 samples (142 soil/fill and 52 tuff), plus 21 field duplicates, and 2 pore-gas samples were collected during historical and 2009–2010 investigations. Sample analyses included 179 analyzed by gamma spectroscopy; 160 analyzed for americium-241 and isotopic uranium; 15 analyzed for tritium; 170 analyzed for isotopic plutonium; and 18 analyzed for strontium-90 and technetium-99. The pore-gas samples were analyzed for tritium only.

Area 4

At SWMU 49-001(f), a total of 195 samples (159 soil/fill and 36 tuff), plus 20 field duplicates, and 3 pore-gas samples were collected during historical and 2009–2010 investigations. Sample analyses included 179 analyzed by gamma spectroscopy; 156 analyzed for americium-241 and isotopic uranium; 16 analyzed for tritium; 166 analyzed for isotopic plutonium; and 25 samples each analyzed for strontium-90 and technetium-99. The pore-gas samples were analyzed for tritium only.

Area 11

At AOC 49-008(c), a total of 52 samples (41 soil and 11 tuff), plus 3 field duplicates, and 4 pore-gas samples were collected during historical and 2009 investigations. Sample analyses included 36 analyzed by gamma spectroscopy; 16 analyzed for americium-241, tritium, and isotopic uranium; and 34 analyzed for isotopic plutonium. The pore-gas samples were analyzed for tritium only.

At SWMU 49-003, a total of 26 samples (11 soil and 15 tuff), plus 2 field duplicates, were collected during historical and 2009 investigations. Sample analyses included 26 analyzed by gamma spectroscopy; 14 analyzed for americium-241, tritium, isotopic uranium, strontium-90, and technetium-99; and 20 analyzed for isotopic plutonium.

Area 12

At AOC 49-008(d), a total of 90 samples (84 soil/fill and 6 tuff), plus 6 field duplicates, and 3 pore-gas samples were collected during historical and 2009 investigations. Sample analyses included 82 analyzed by gamma spectroscopy; 62 analyzed for americium-241; 8 analyzed for tritium; 68 analyzed for isotopic uranium; four analyzed for strontium-90 and technetium-99; and 71 analyzed for isotopic plutonium. The pore-gas samples were analyzed for tritium only.

Ancho Canyon

A total of 118 soil samples, plus 13 field duplicates, were collected during the 2010 investigation. All samples were analyzed by gamma spectroscopy, all 118 were analyzed for americium-241 and isotopic plutonium, and 115 were analyzed for isotopic uranium.

Water Canyon

A total of 116 sediment samples, plus 12 field duplicates, were collected during the 2010 investigation. All 116 samples were analyzed by gamma spectroscopy, and analyzed for americium-241, isotopic plutonium, and isotopic uranium.

F-5.1 Radionuclide QA/QC Samples

All procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to the minimum detectable concentration (MDC). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to 3 times the total propagated uncertainty. This data qualification was related to detection status only not to data quality issues.

To assess the accuracy and precision of radionuclide analyses, LCSs, method blanks, MS samples, laboratory duplicate samples, and tracers were analyzed as part of the investigations. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233) and is described below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For radionuclides in soil and/or tuff, LCS %R should fall between the control limits of 80%–120%.

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during analysis. All radionuclide results should be below the MDC.

MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125%.

Tracers are radioisotopes added to a sample for the purposes of monitoring losses of the target analyte. The tracer is assumed to behave in the same manner as the target analytes. The tracer recoveries should fall between the LAL and UAL.

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

Details regarding the quality of the radionuclide analytical data included in the dataset are summarized in the following subsections.

F-5.2 Data Quality Results for Radionuclides

F-5.2.1 Chain of Custody

COC forms were maintained properly for all samples.

F-5.2.2 Sample Documentation

All samples were properly documented on the SCLs in the field.

F-5.2.3 Sample Dilutions

Some samples were diluted for radionuclide analyses. No qualifiers were applied to any radionuclide sample results because of dilutions.

F-5.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for radionuclides.

F-5.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for radionuclides.

F-5.2.6 Method Blanks

F-5.2.6.1 Area 1, Area 2, 2A, 2B, Area 11, Area 12

Results for samples analyzed for radionuclides were not qualified because of blank contamination.

F-5.2.6.2 Area 3

Five isotopic uranium results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the method blank.

F-5.2.6.3 Area 4

A total of 20 isotopic uranium results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-5.2.6.4 Ancho Canyon

Nine isotopic uranium results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-5.2.6.5 Water Canyon

A total of 20 isotopic plutonium results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the method blank.

F-5.2.6.6 Pore Gas

Six tritium results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analyte in the method blank.

Two tritium results were qualified as estimated (J) because this analyte was identified in the method blank but was greater than 5 times.

F-5.2.7 Matrix Spike Samples

F-5.2.7.1 Area 1, Area 2, 2A, 2B, Area 4, Ancho Canyon, Water Canyon, and Pore Gas

Matrix spike criteria were met for all samples analyzed for radionuclides.

F-5.2.7.2 Area 3

Four strontium-90 results and 15 tritium results were qualified as estimated not detected (UJ) because the associated matrix spike recovery was greater than 125%.

F-5.2.7.3 Area 11

A total of 19 tritium results were qualified as estimated not detected (UJ) because the associated matrix spike recovery was greater than 125%.

Two tritium results were qualified as estimated and biased high (J+) because the associated matrix spike recovery was greater than 125%.

F-5.2.7.4 Area 12

Six tritium results were qualified as estimated not detected (UJ) because the associated matrix spike recovery was greater than 125%.

Two tritium results were qualified as estimated and biased high (J+) because the associated matrix spike recovery was greater than 125%.

F-5.2.8 Tracer Recoveries

Tracer recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.9 Laboratory Control Sample Recoveries

LCS recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.10 Laboratory Duplicate Samples Recoveries

F-5.2.10.1 Area 2, 2A, 2B, Area 11, Area 12, Ancho Canyon, and Pore Gas

Laboratory duplicate sample recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.10.2 Area 1

Nine radionuclide results were qualified as estimated not detected (UJ) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

Six radionuclide results were qualified as estimated (J) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

F-5.2.10.3 Area 3

Three radionuclide results were qualified as estimated not detected (UJ) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

F-5.2.10.4 Area 4

A total of 20 radionuclide results were qualified as estimated (J) because the associated duplicate sample had a duplicate error ratio (DER) or relative error ratio (RER) that was greater than the analytical laboratory's acceptance limits.

F-5.2.10.5 Water Canyon

A total of 40 isotopic uranium results were qualified as estimated (J) because the associated duplicate sample had a DER or RER that was greater than the analytical laboratory's acceptance limits.

Three radionuclide results were qualified as estimated not detected (UJ) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

Two isotopic uranium results were qualified as estimated (J) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

F-5.2.11 Rejected Data

F-5.2.11.1 Area 1, Area 2, 2A, 2B, Area 4, Area 12, Ancho Canyon, Water Canyon, and Pore Gas

No radionuclide sample results were qualified as rejected (R).

F-5.2.11.2 Area 3

One gamma spectroscopy result (iodine-129) was qualified as rejected (R) because spectral interferences prevented positive identification.

F-5.2.11.3 Area 11

Five radionuclide results (4 plutonium-238 and 1 plutonium-239) were qualified as rejected (R) because the MDC documentation was missing.

The rejected data were not used to characterize the nature and extent of contamination. However, sufficient data of good quality were available to characterize the site(s). The results of other qualified data were used as reported and did not affect the usability of the sampling results.

F-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), February 1994. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA-540/R-94/013, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1994, 048639)

EPA (U.S. Environmental Protection Agency), October 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," EPA540/R-99/008, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1999, 066649)

LANL (Los Alamos National Laboratory), July 1995. “Statement of Work (Formerly Called "Requirements Document") - Analytical Support, (RFP number 9-XS1-Q4257), (Revision 2 - July, 1995),” Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1995, 049738)

LANL (Los Alamos National Laboratory), March 1996. “Quality Assurance Project Plan Requirements for Sampling and Analysis,” Los Alamos National Laboratory document LA-UR-96-441, Los Alamos, New Mexico. (LANL 1996, 054609)

LANL (Los Alamos National Laboratory), December 2000. “University of California, Los Alamos National Laboratory (LANL), I8980SOW0-8S, Statement of Work for Analytical Laboratories,” Rev. 1, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2000, 071233)

Table F-3.0-1
Inorganic Chemical, Organic Chemical, and Radionuclide Analytical Methods for Samples Collected from TA-49

Analytical Method	Analytical Description	Analytical Suite
EPA 300.0	Ion chromatography	Nitrate
EPA 905.0	Gas flow proportional counting	Strontium-90
EPA 906.0	Distillation and liquid scintillation	Tritium
EPA SW-846: 6010/6010B	Inductively coupled plasma emission spectroscopy—atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846:6020	Inductively coupled plasma mass spectrometry	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc (TAL metals)
EPA SW-846: 9012A	Automated colorimetric/off-line distillation	Total cyanide
EPA SW-846:6850	Liquid chromatography-mass spectrometry/mass spectrometry	Perchlorate
EPA SW-846:7470A	Cold vapor atomic absorption (CVAA)	Mercury
EPA SW-846:7471	CVAA	Mercury
EPA SW-846:7471A	CVAA	Mercury
EPA SW-846: 8082	Gas chromatography	PCBs
EPA SW-846: 8260 and 8260B	Gas chromatography-mass spectrometry (GC/MS)	VOCs
EPA TO-15	GC/MS	VOCs (pore-gas samples)
EPA SW-846: 8270 and 8270C	GC/MS	SVOCs
EPA SW-846: 8321A	High-performance liquid chromatography	Explosive compounds and high-explosive compounds
Generic: gamma spectroscopy	Gamma spectroscopy	Americium-241, cesium-134, cesium-137, cobalt-60, europium-152, ruthenium-106, sodium-22, uranium-235
Generic: kinetic phosphorescence analysis (KPA)	KPA	Uranium
HASL Method 300	Chemical separation alpha spectrometry	Isotopic uranium, isotopic plutonium, americium-241, technetium-99

Appendix G

Analytical Suites and Results and Analytical Reports
(on DVD included with this document)

Appendix H

Box Plots and Statistical Results

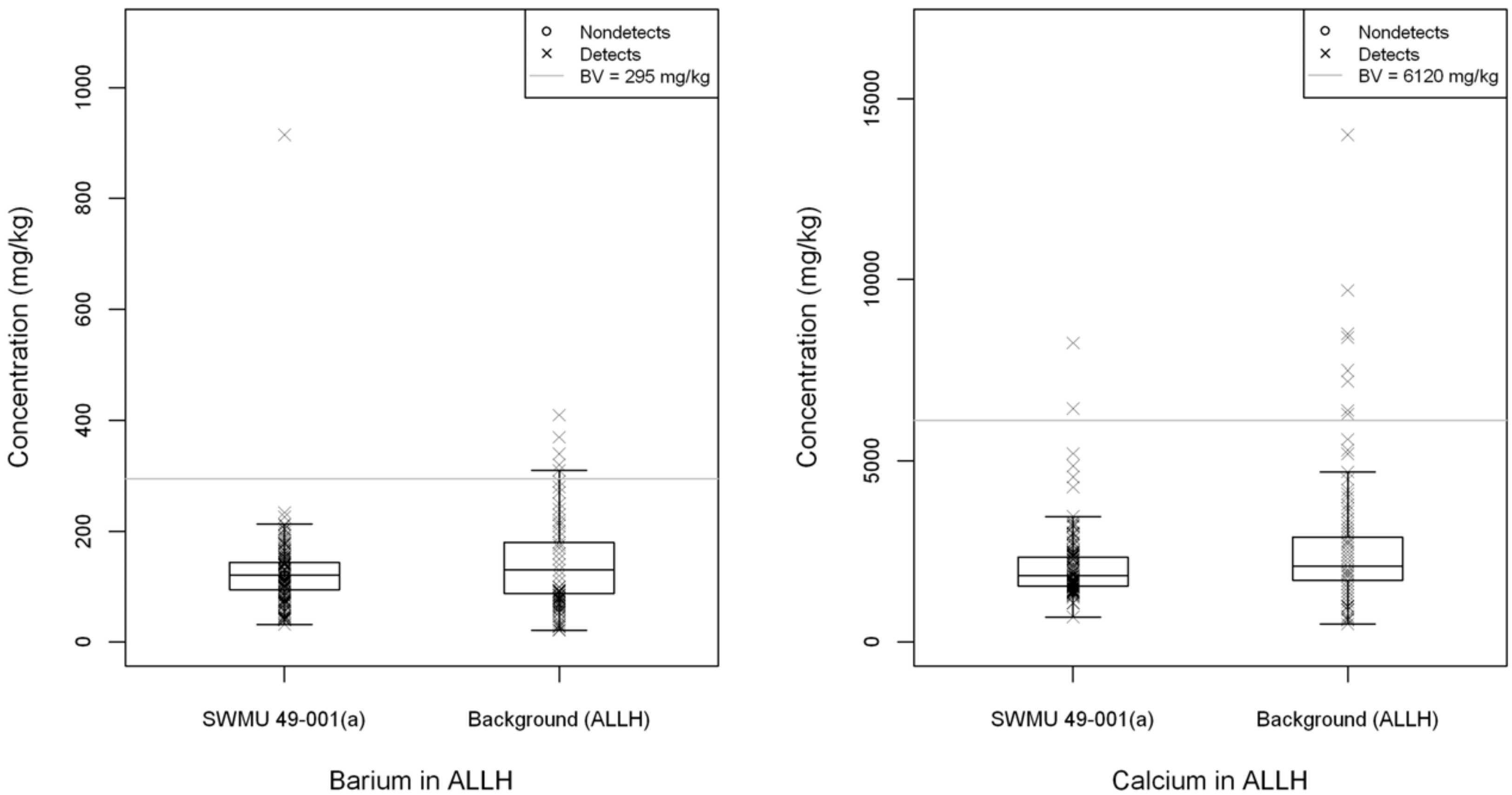

Figure H-1 Box plots for barium and calcium in soil in Area 1, SWMU 49-001(a)

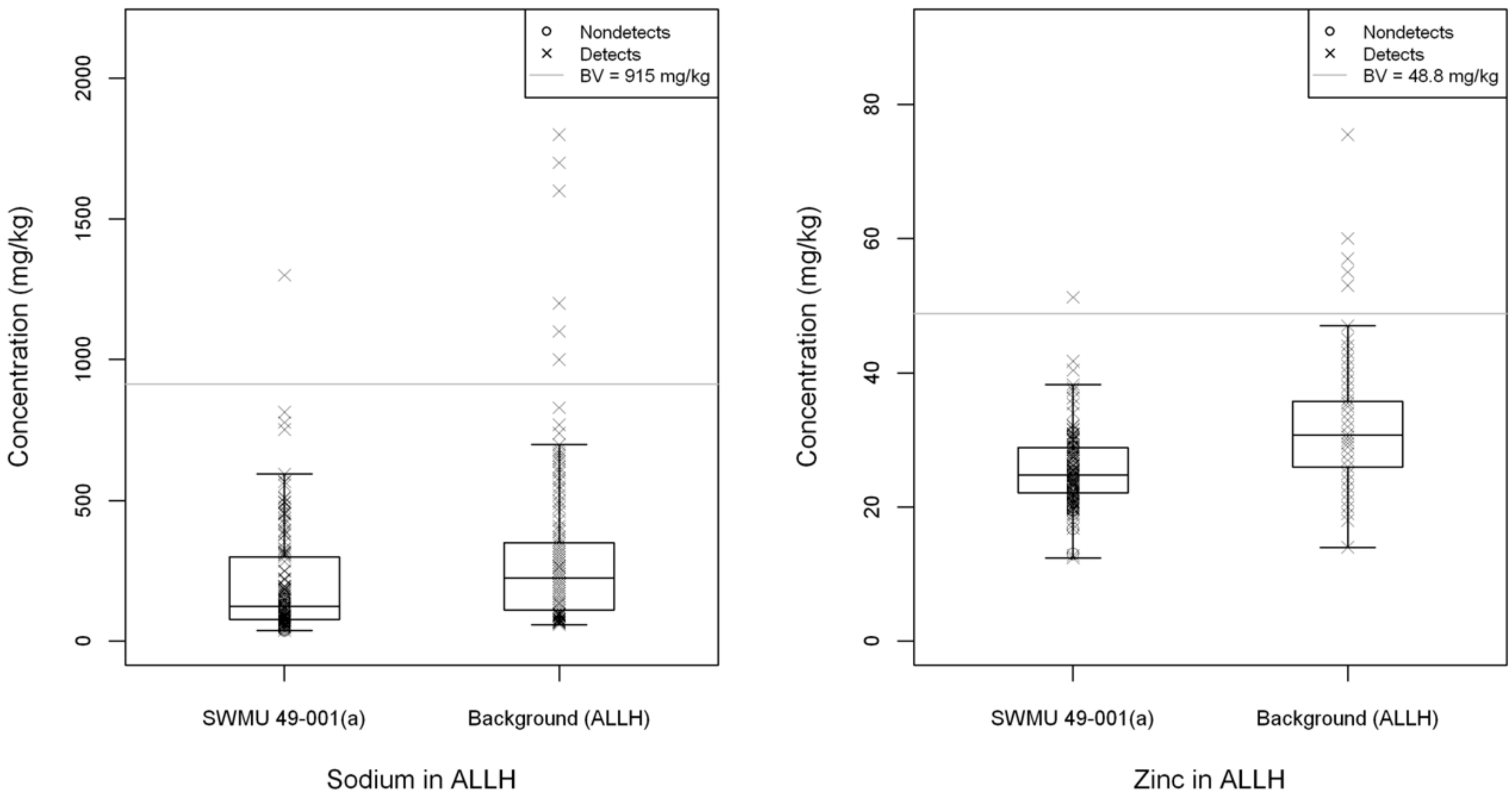

Figure H-2 Box plots for sodium and zinc in soil in Area 1, SWMU 49-001(a)

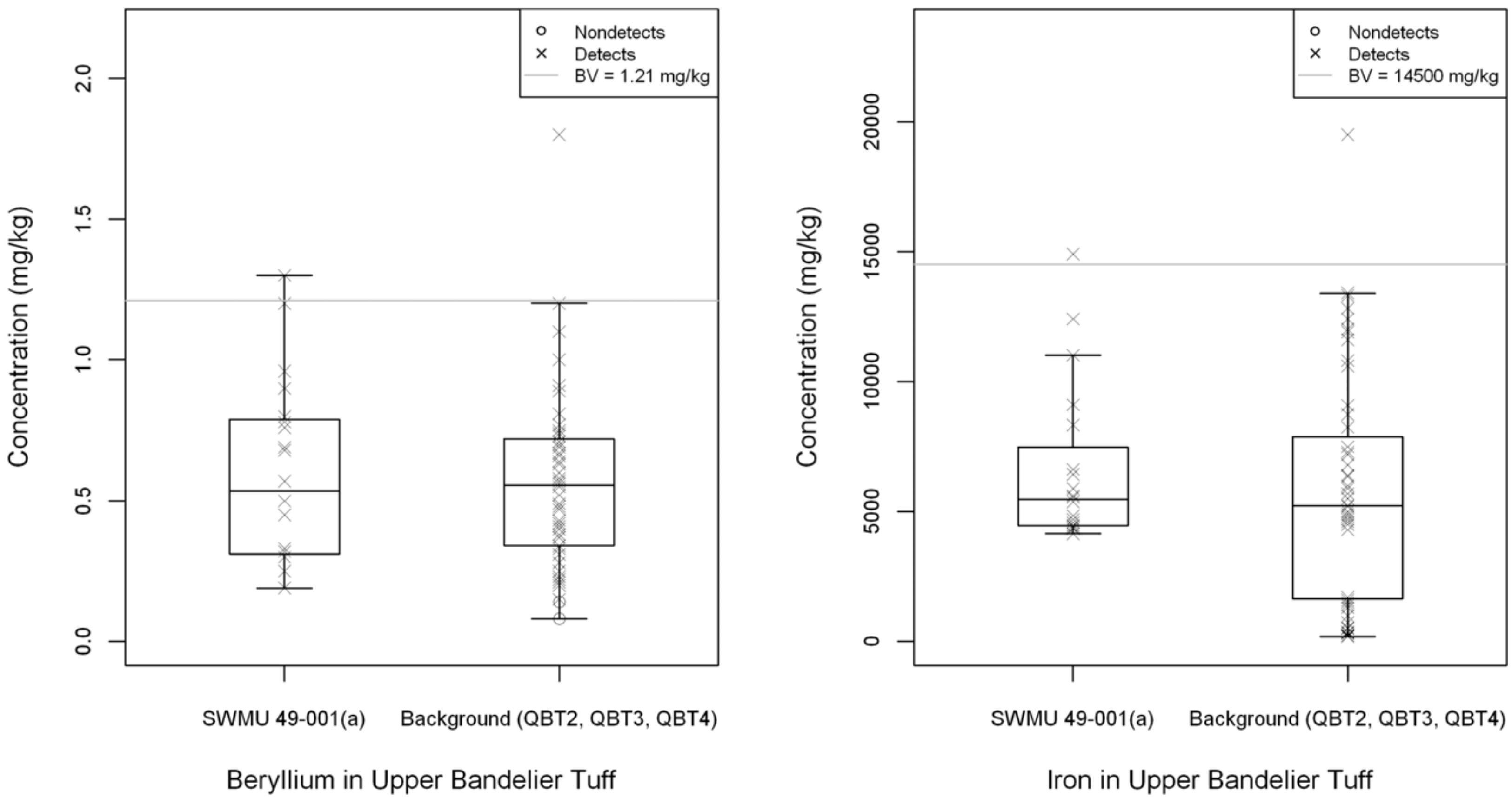

Figure H-3 Box plots for beryllium and iron in tuff in Area 1, SWMU 49-001(a)

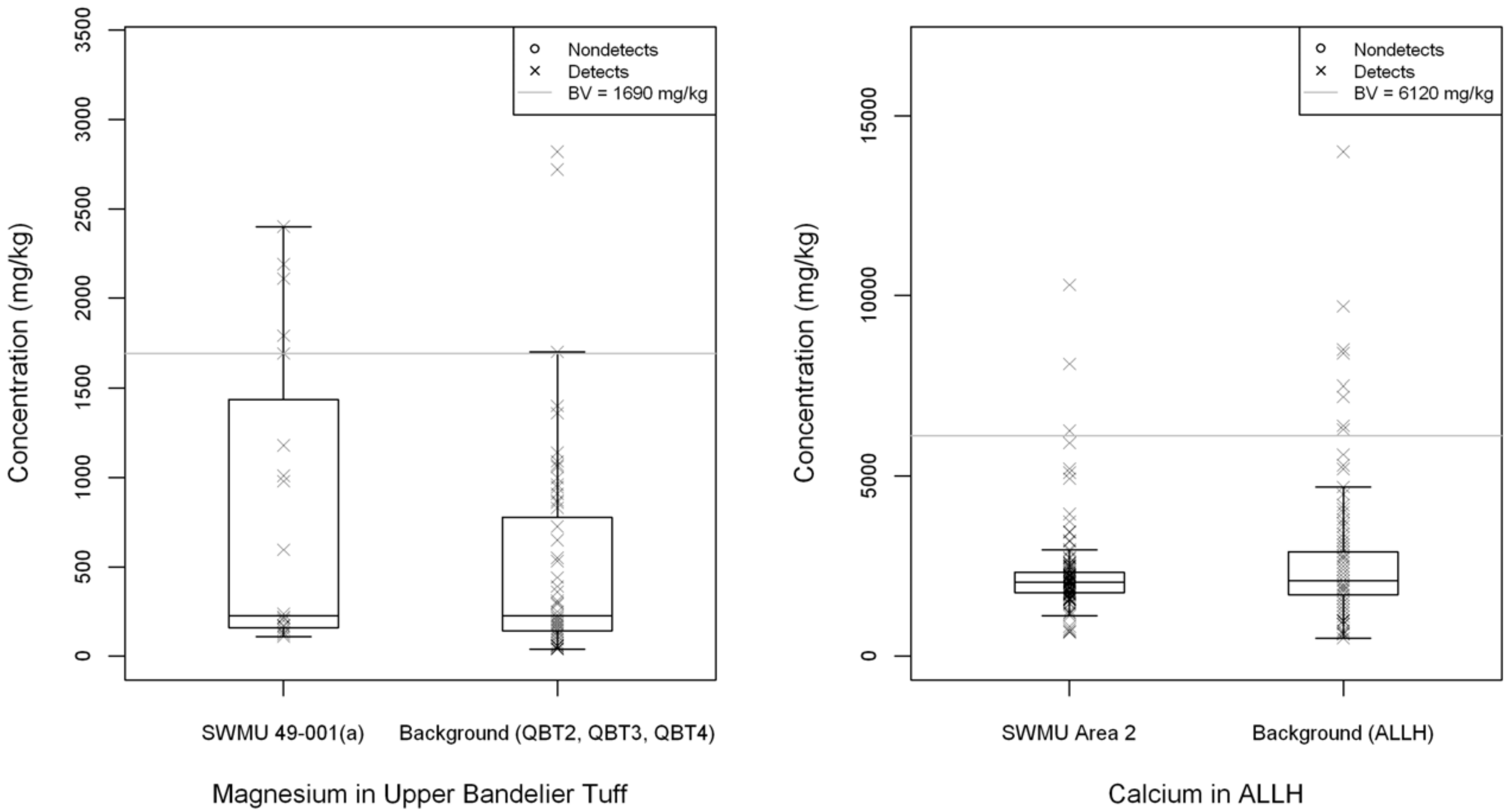

Figure H-4 Box plots for magnesium in tuff in Area 1, SWMU 49-001(a), and calcium in soil in Area 2, MDA AB

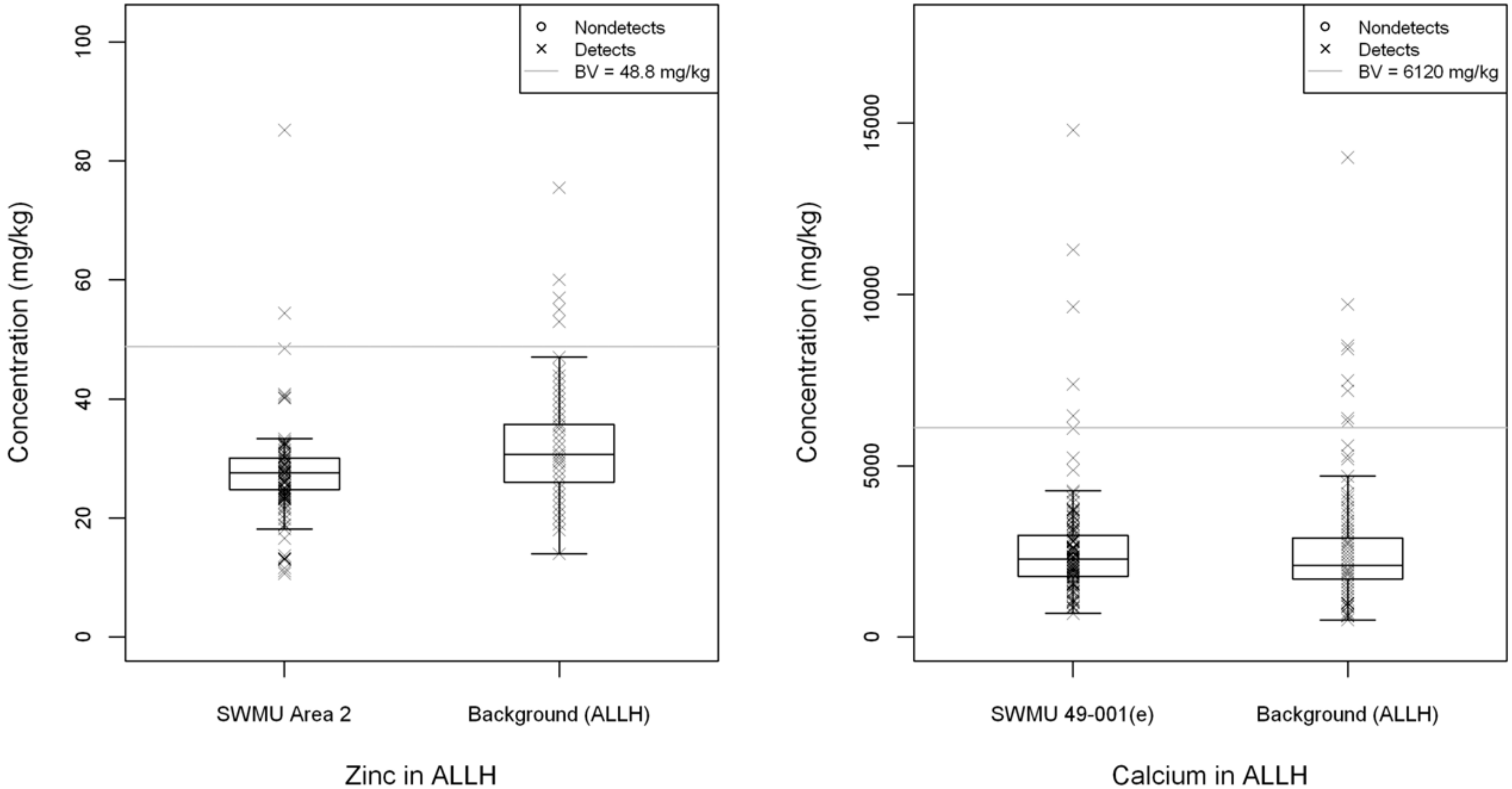

Figure H-5 Box plots for zinc in soil in Area 2, MDA AB, and calcium in soil in Area 3, SWMU 49-001(e)

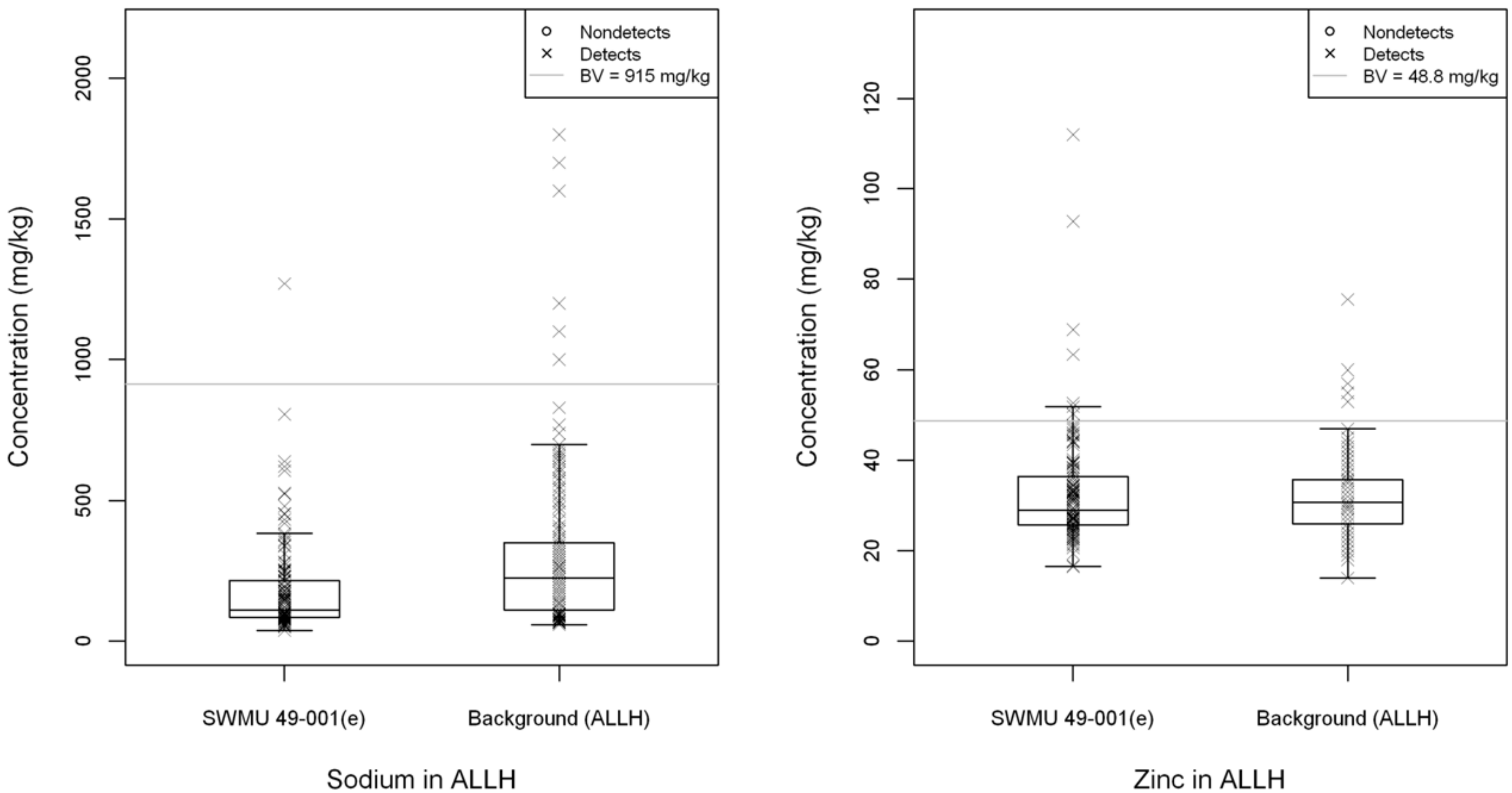

Figure H-6 Box plots for sodium and zinc in soil in Area 3, SWMU 49-001(e)

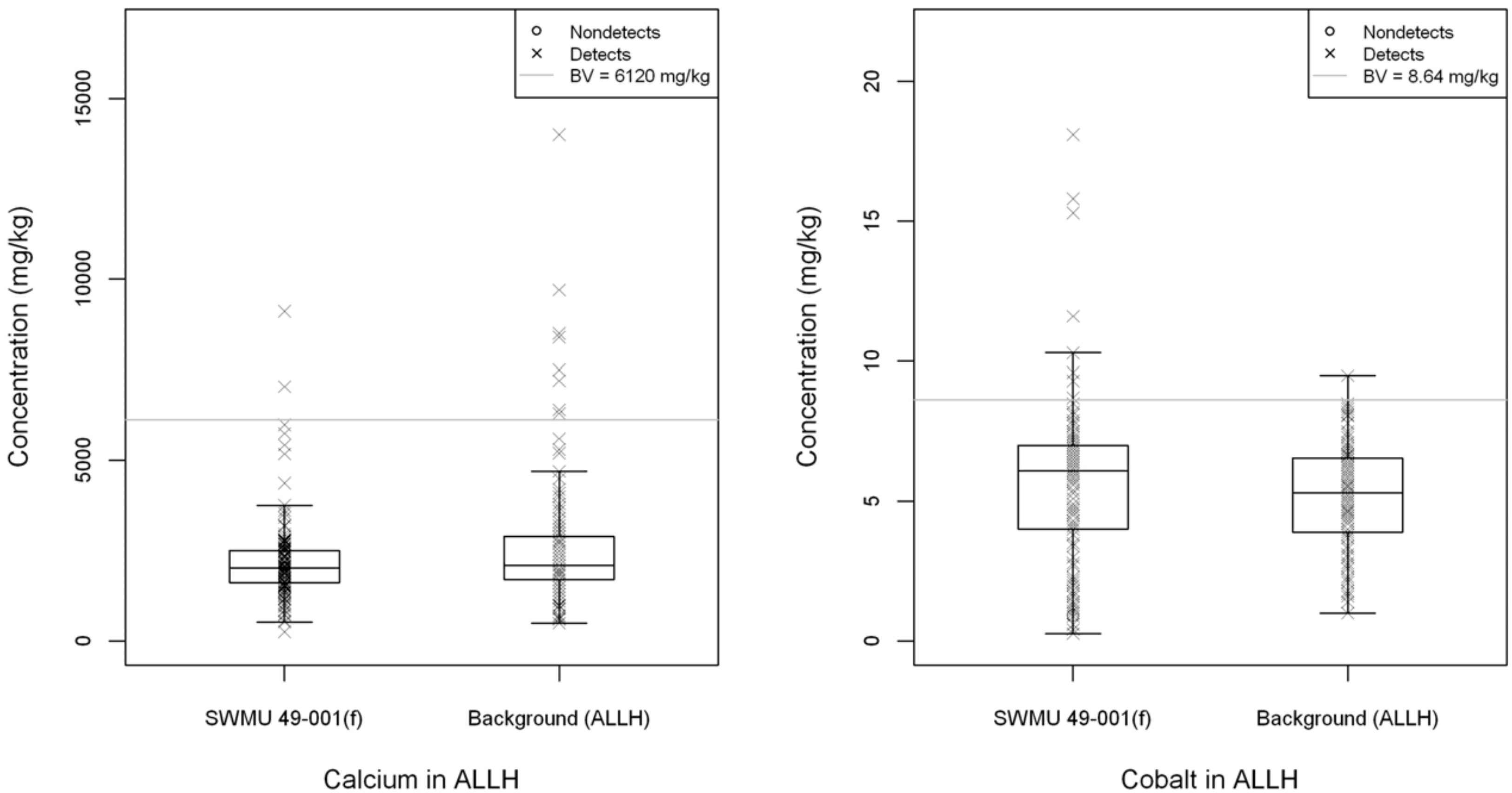

Figure H-7 Box plots for calcium and cobalt in soil in Area 4, SWMU 49-001(f)

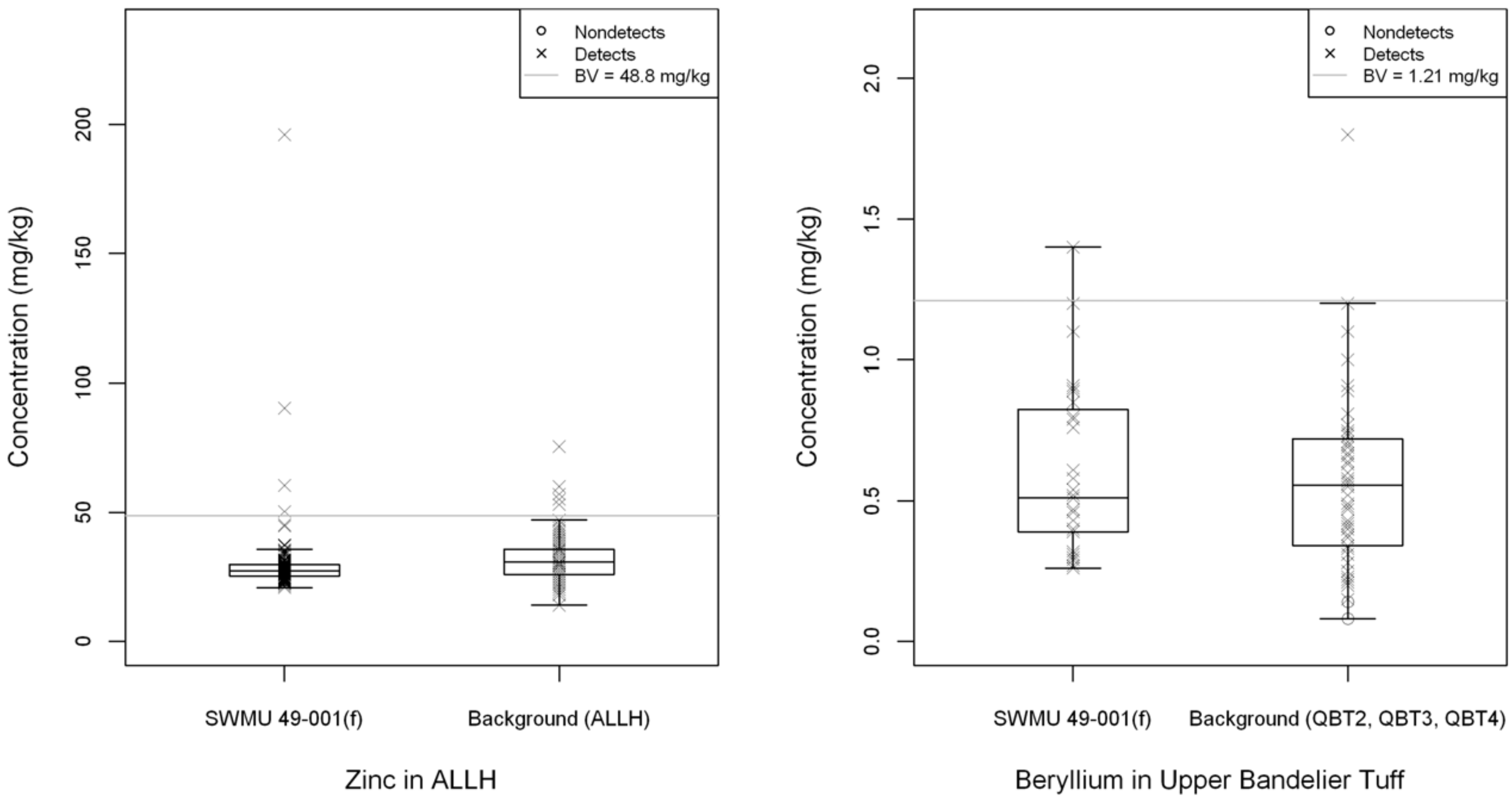

Figure H-8 Box plots for zinc in soil and beryllium in tuff in Area 4, SWMU 49-001(f)

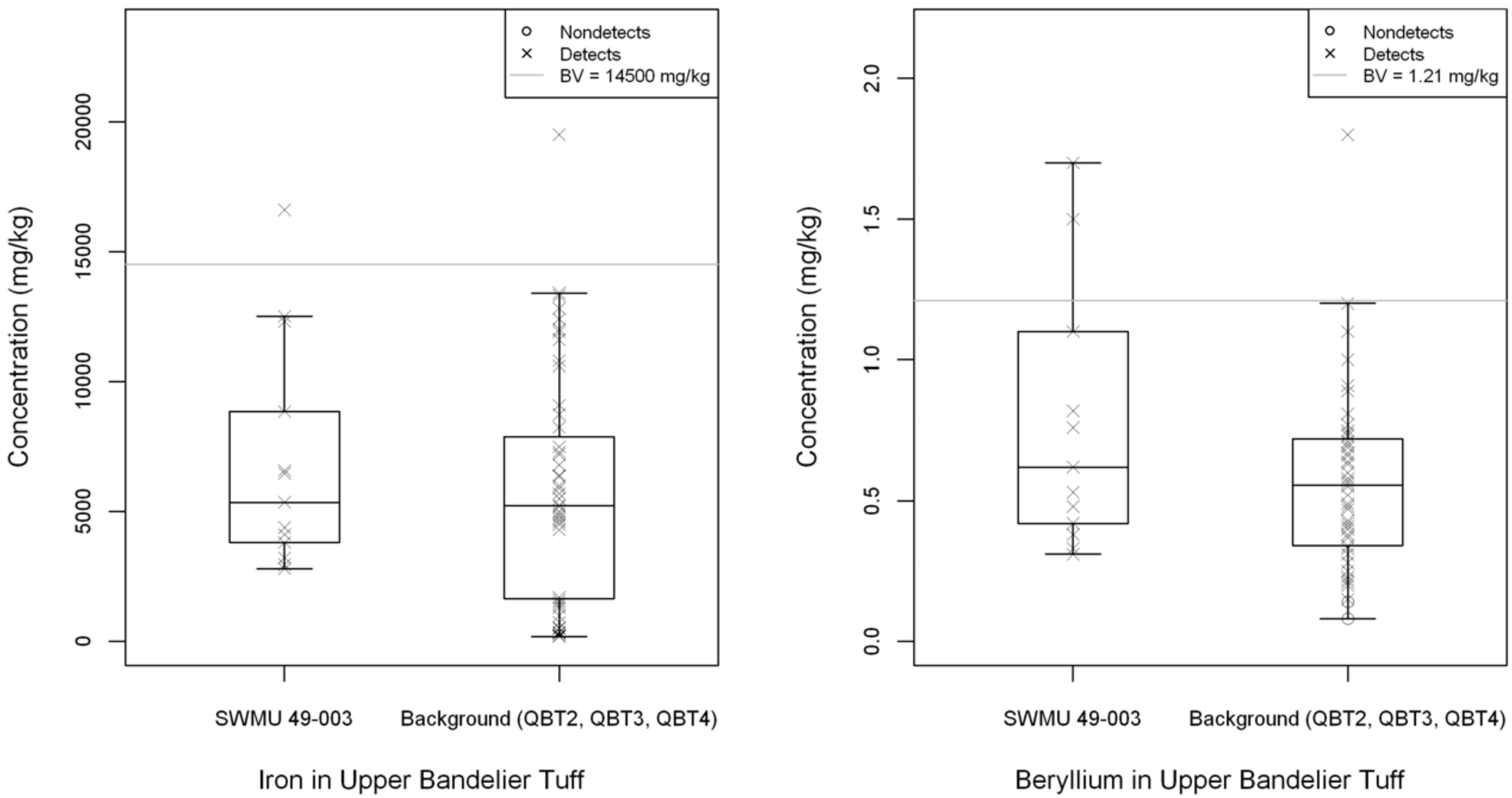

Figure H-9 Box plots for iron and beryllium in tuff in Area 11, SWMU 49-003

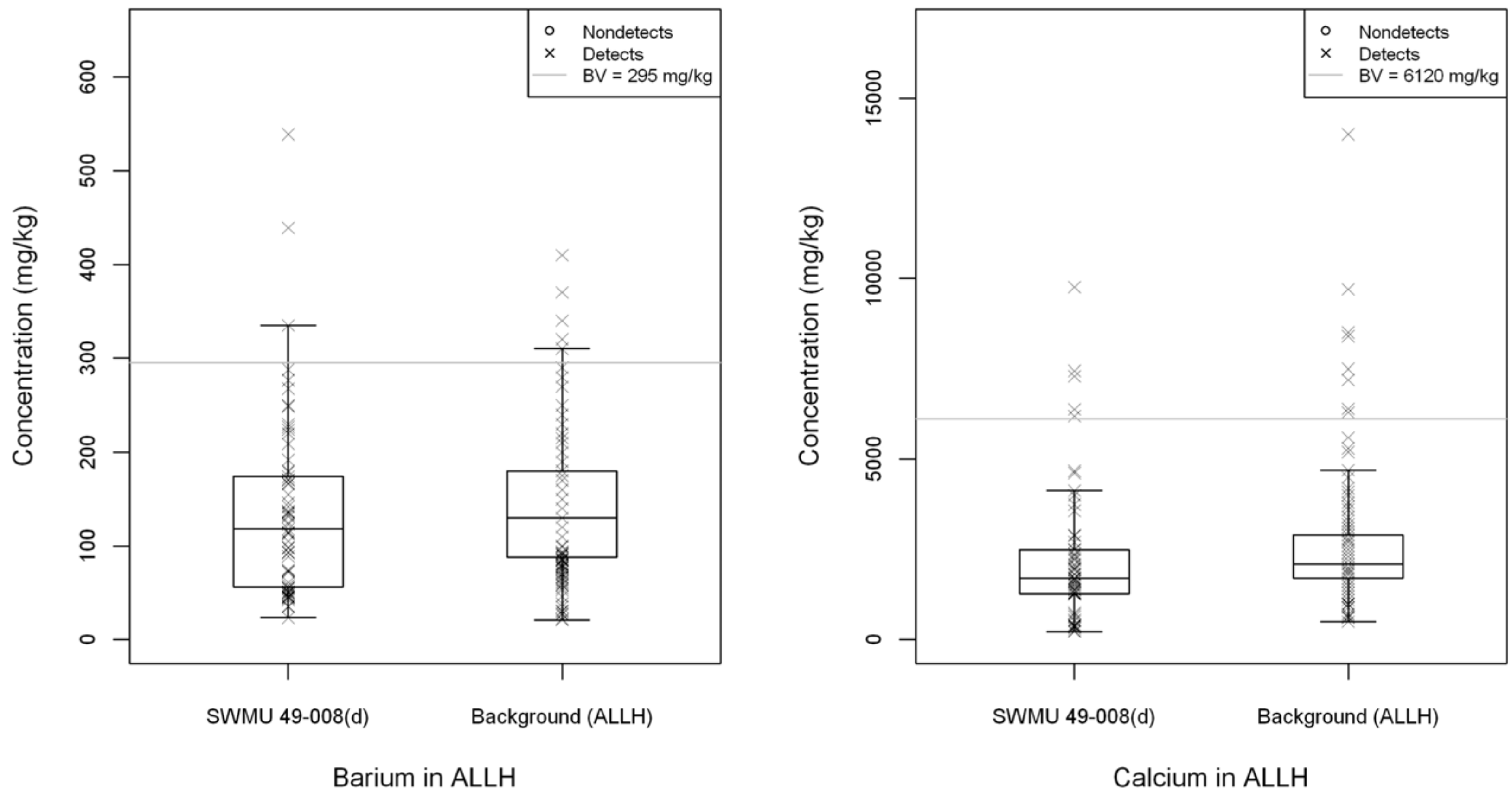

Figure H-10 Box plots for barium and calcium in soil in Area 12, SWMU 49-008(d)

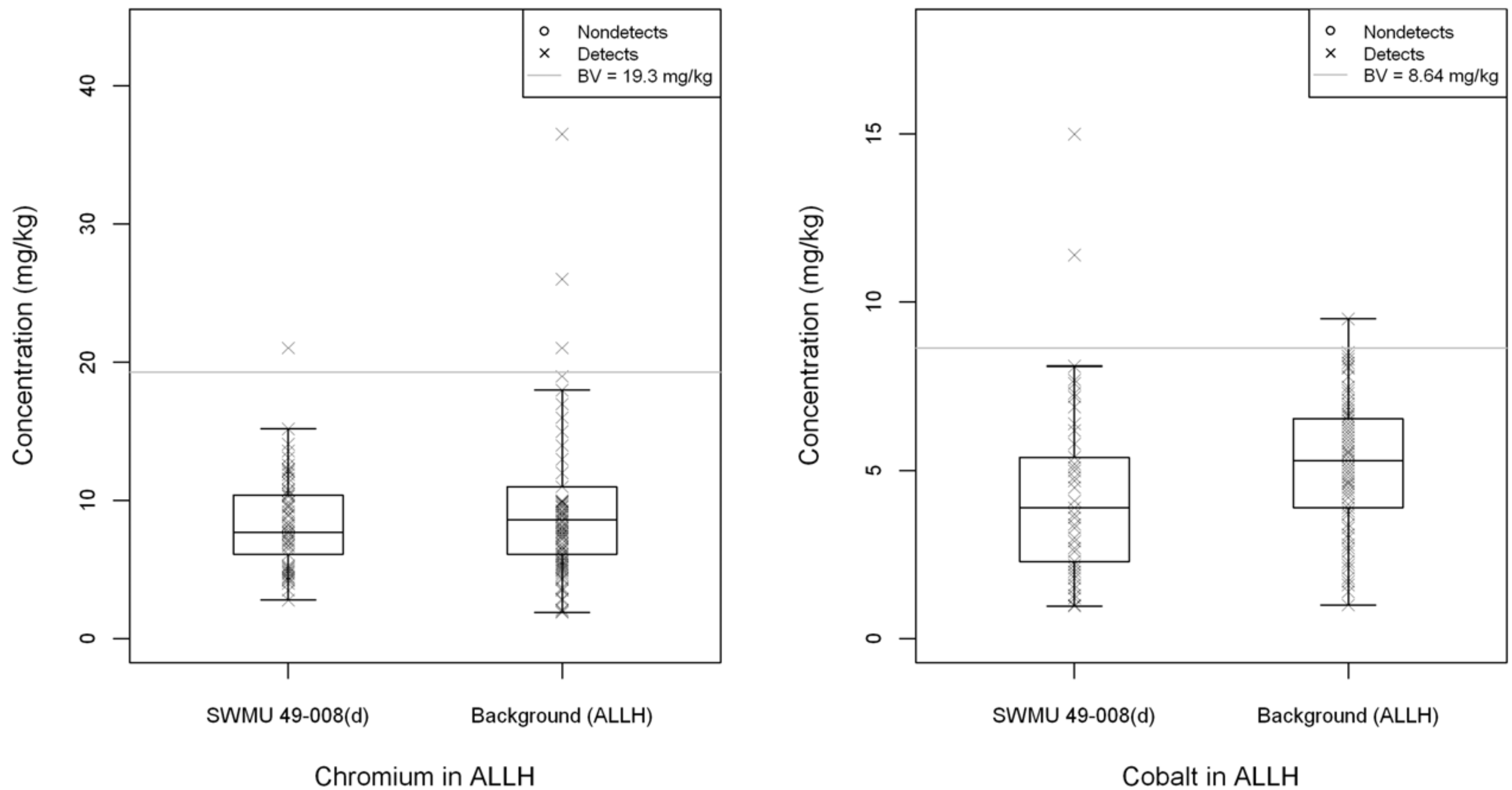

Figure H-11 Box plots for chromium and cobalt in soil in Area 12, SWMU 49-008(d)

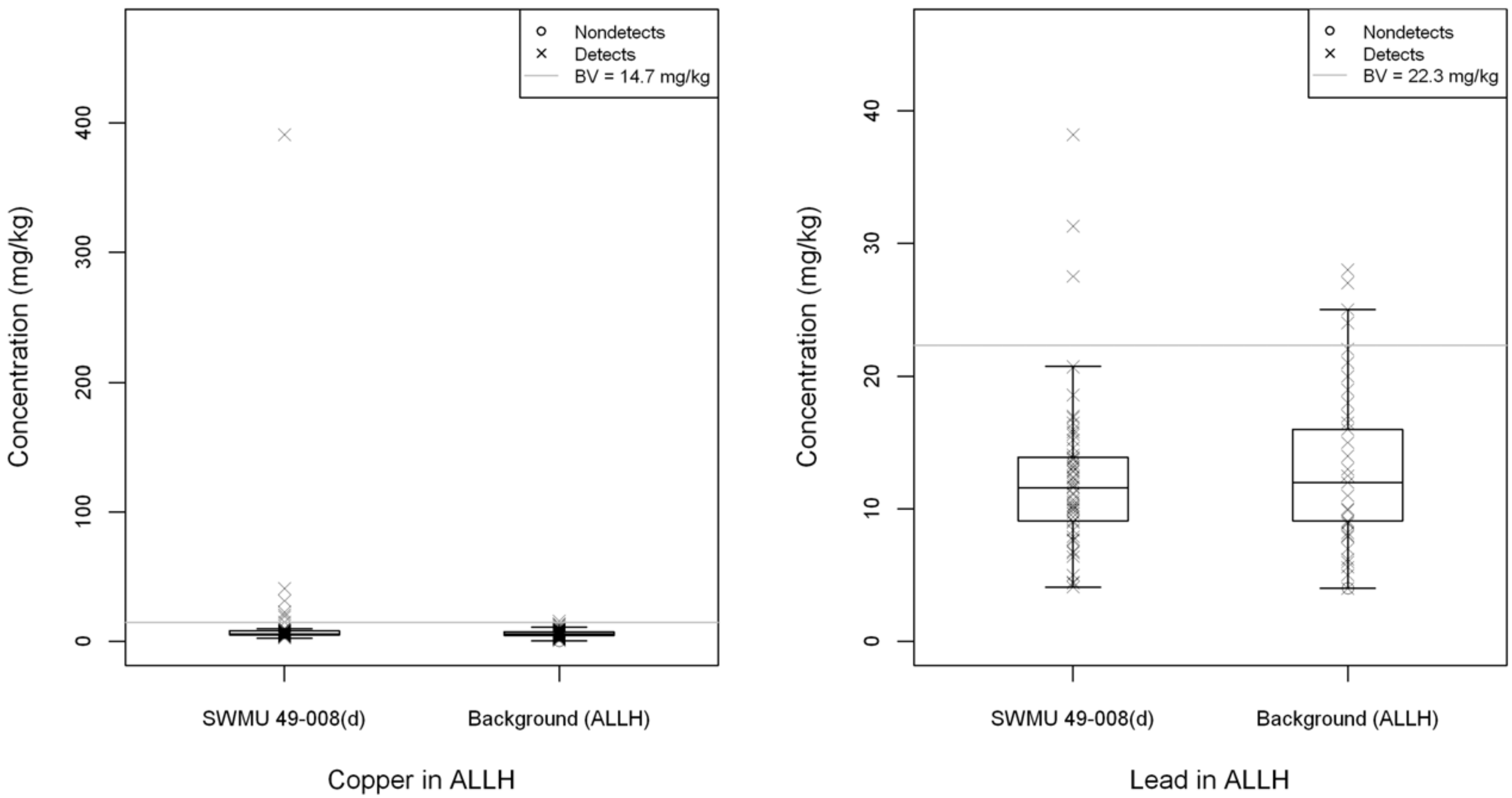

Figure H-12 Box plots for copper and lead in soil in Area 12, SWMU 49-008(d)

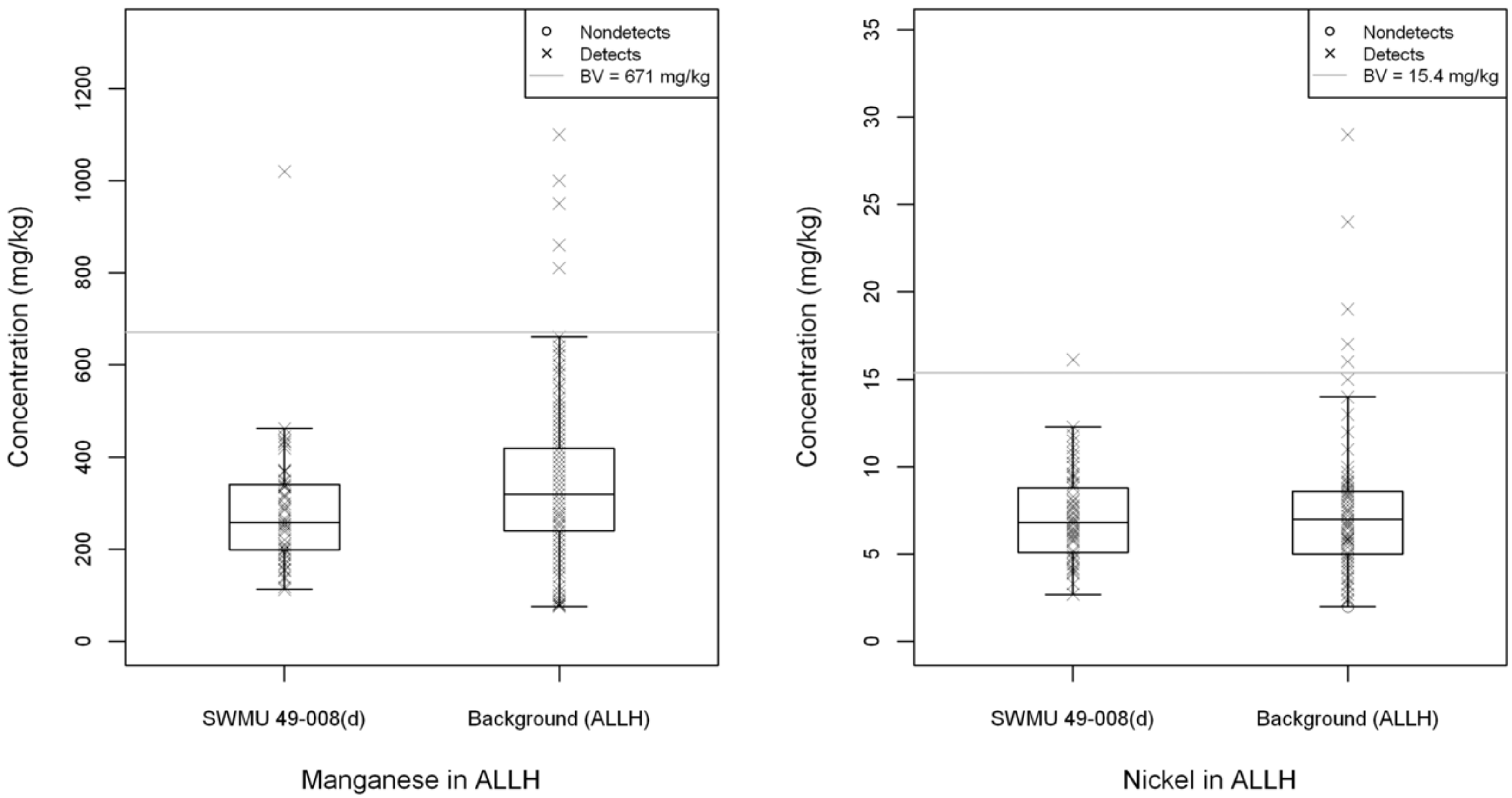

Figure H-13 Box plots for manganese and nickel in soil in Area 12, SWMU 49-008(d)

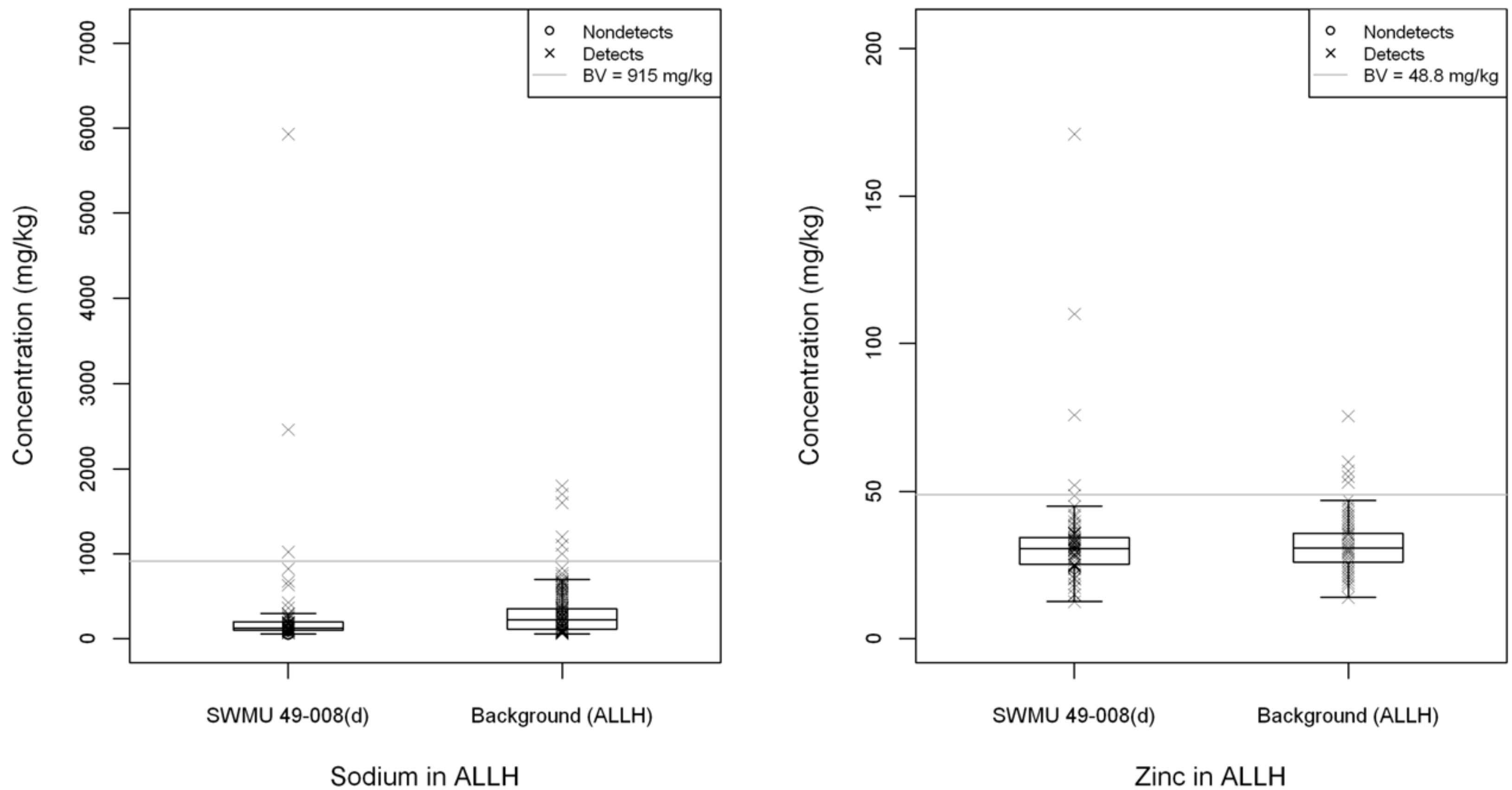

Figure H-14 Box plots for sodium and zinc in soil in Area 12, SWMU 49-008(d)

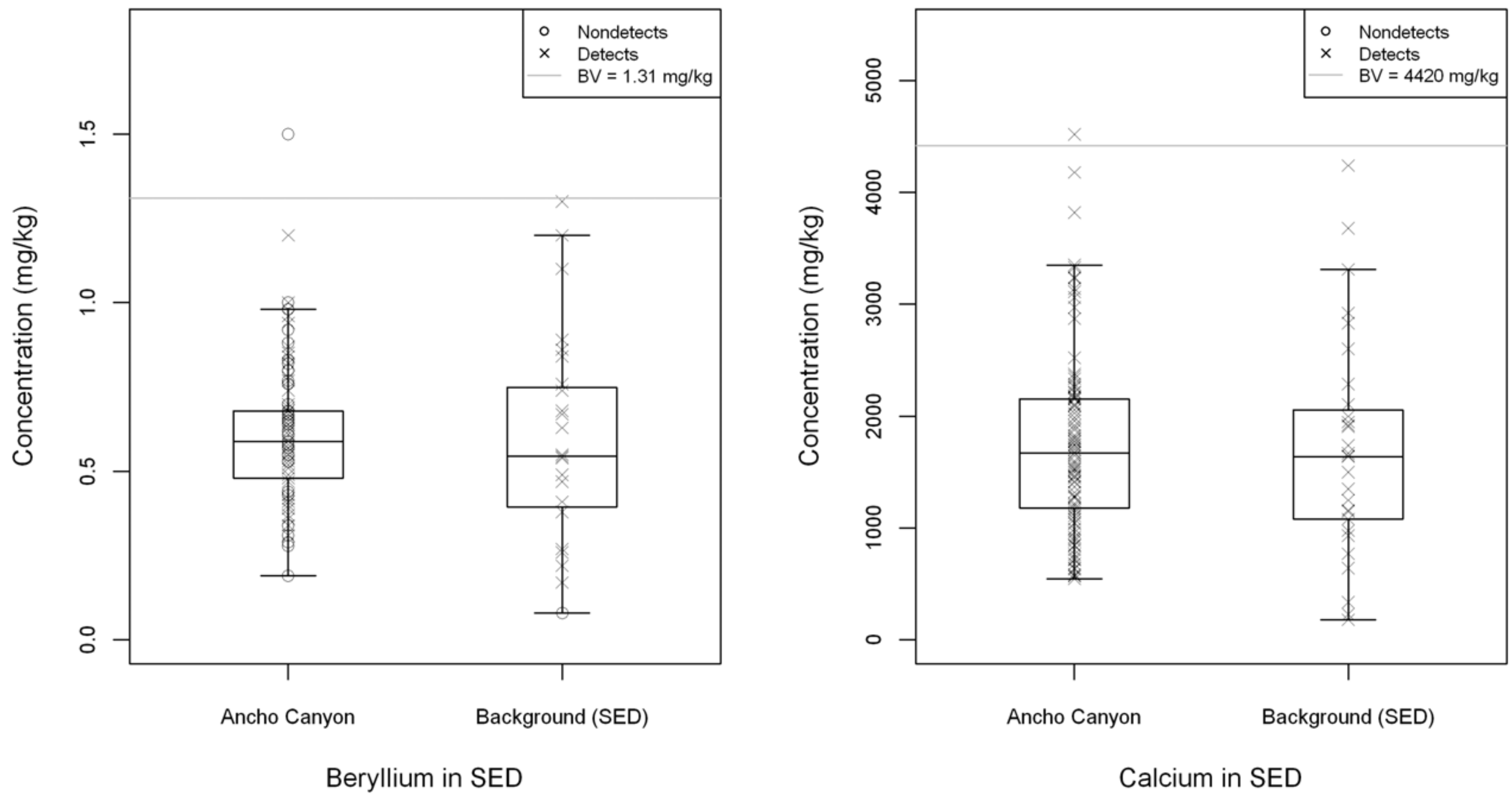

Figure H-15   Box plots for beryllium and calcium in sediment in Ancho Canyon

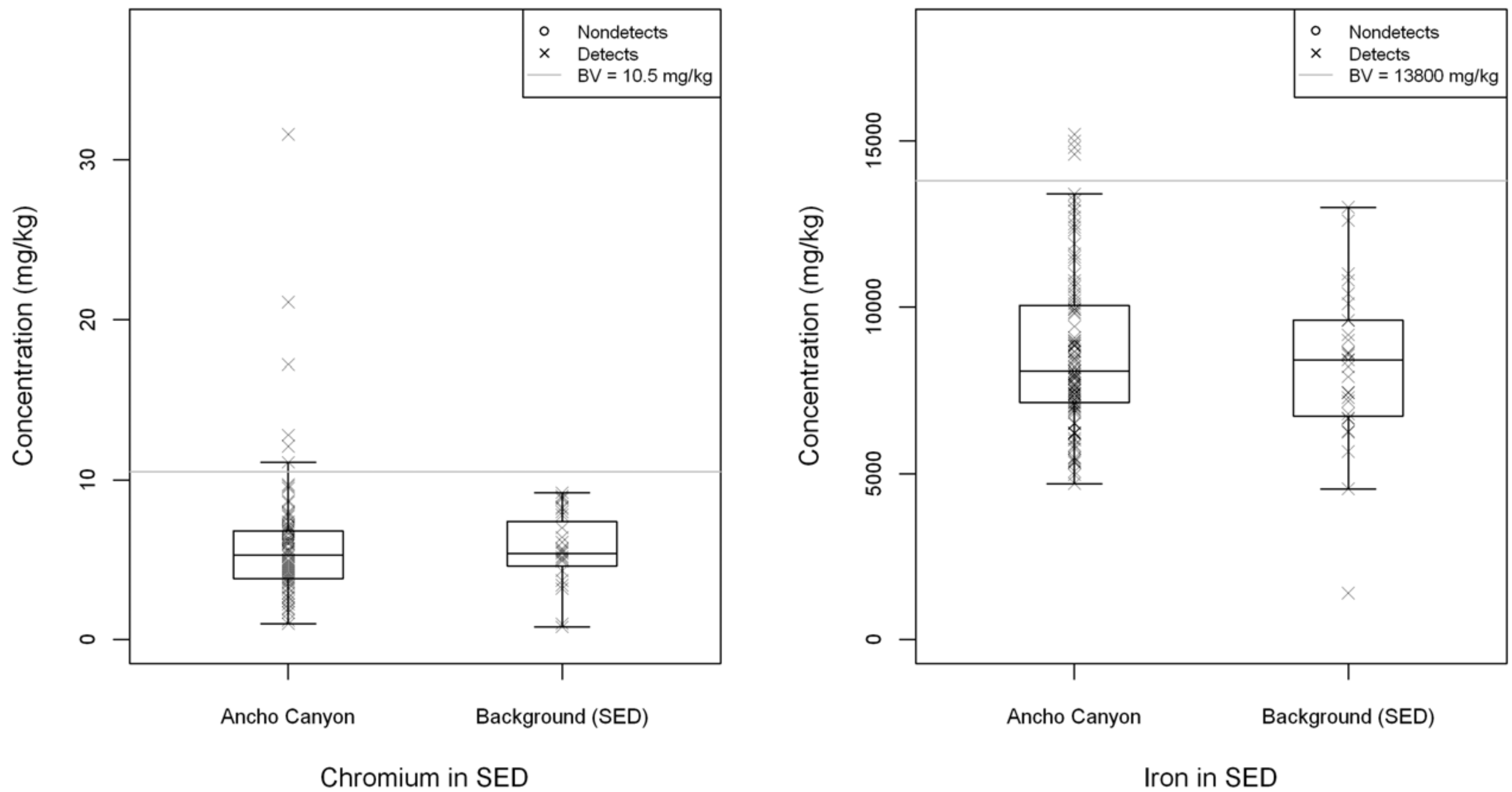

Figure H-16 Box plots for chromium and iron in sediment in Ancho Canyon

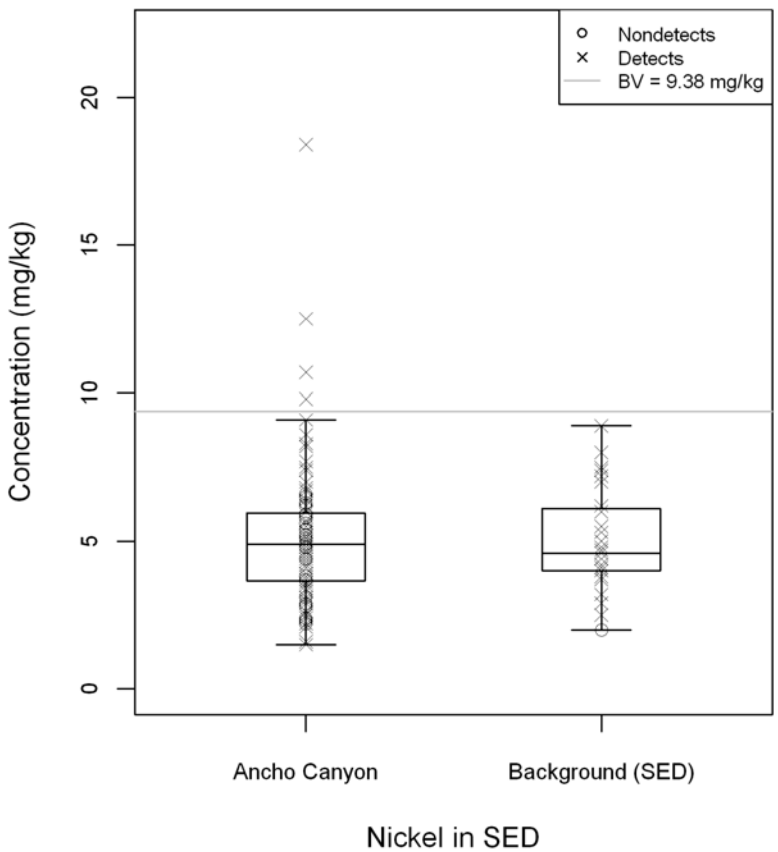

Figure H-17   Box plot for nickel in sediment in Ancho Canyon

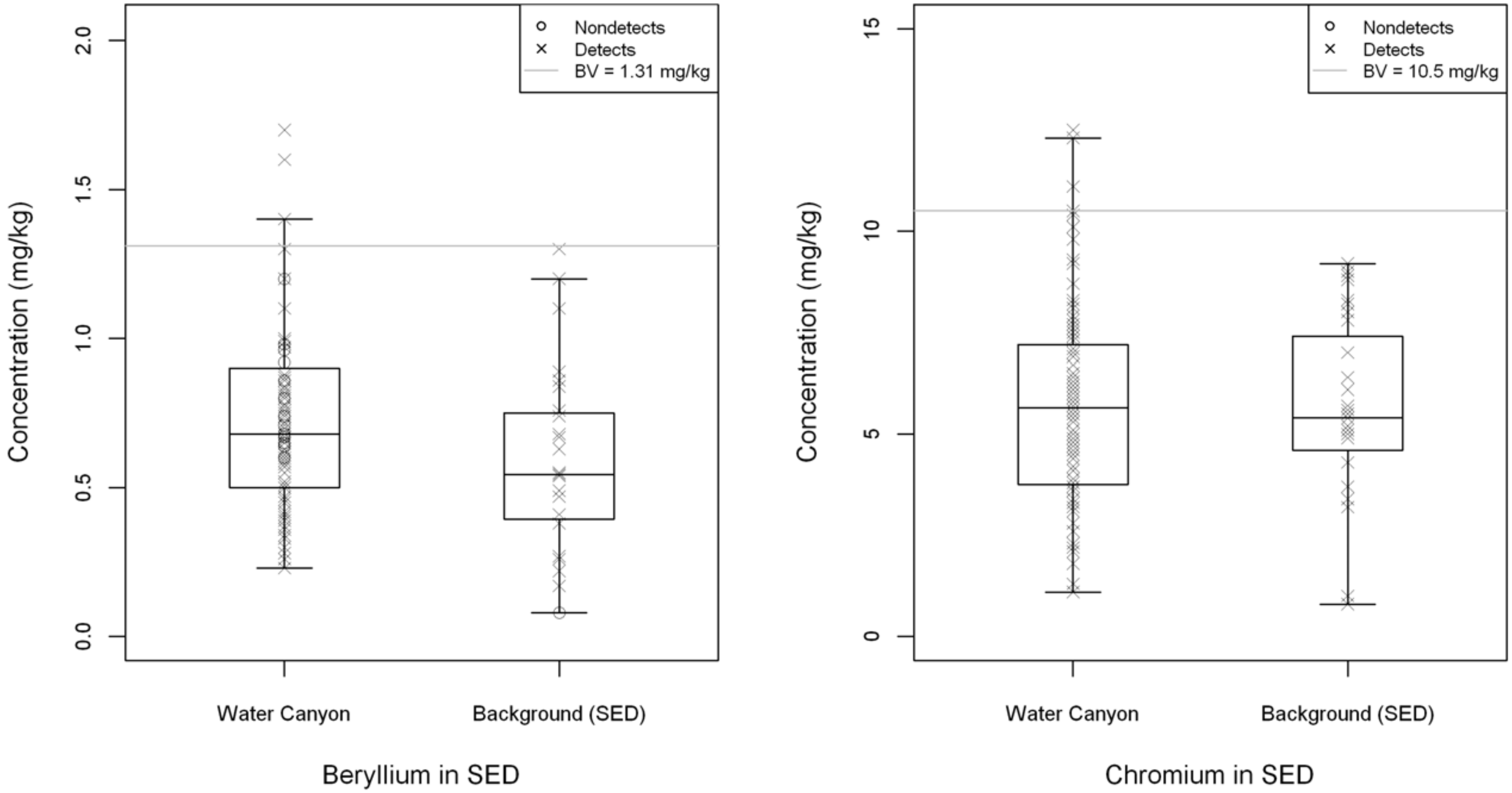

Figure H-18 Box plots for beryllium and chromium in sediment in Water Canyon

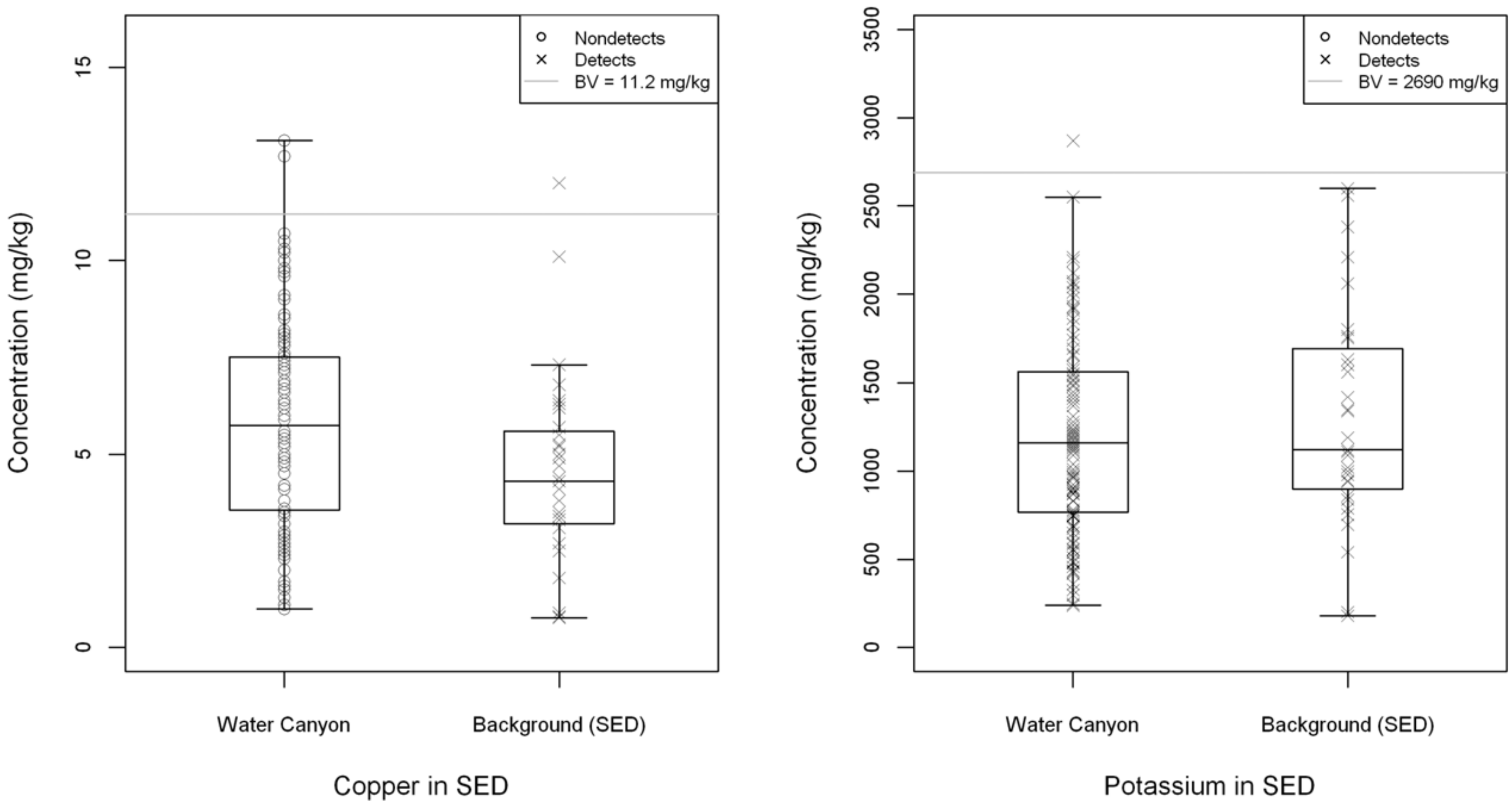

Figure H-19 Box plots for copper and potassium in sediment in Water Canyon

Table H-1
Statistical Analysis of Inorganic Chemicals in Soil for Area 1, SWMU 49-001(a)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to Los Alamos National Laboratory (LANL) Background Value (BV)
Barium	0.97512	0.99621	No
Calcium	0.9997	0.96626	No
Sodium	1	0.99612	No
Zinc	1	0.99996	No

Table H-2
Statistical Analysis of Inorganic Chemicals in Tuff for Area 1, SWMU 49-001(a)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Beryllium	0.37433	0.53179	No
Iron	0.34489	0.53179	No
Magnesium	0.09371	0.05203	No

Table H-3
Statistical Analysis of Inorganic Chemicals in Soil for Area 2, MDA AB

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Calcium	0.93709	0.87969	No
Zinc	1	0.90909	No

Table H-4
Statistical Analysis of Inorganic Chemicals in Soil for Area 3, SWMU 49-001(e)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Calcium	0.23971	0.50037	No
Sodium	1	0.96331	No
Zinc	0.48236	0.22924	No

Table H-5
Statistical Analysis of Inorganic Chemicals in Soil for Area 4, SWMU 49-001(f)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Calcium	0.97422	0.96933	No
Cobalt	0.05064	0.12045	No
Zinc	0.99991	0.79044	No

Table H-6
Statistical Analysis of Inorganic Chemicals in Tuff for Area 4, SWMU 49-001(f)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Beryllium	0.2811	0.4205	No

Table H-7
Statistical Analysis of Inorganic Chemicals in Tuff for Area 11, SWMU 49-003

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Beryllium	0.07466	0.09235	No
Iron	0.31702	0.5123	No

Table H-8
Statistical Analysis of Inorganic Chemicals in Soil for Area 12, SWMU 49-008(d)

Analyte	Gehan Test p-Value	Quantile Test	Elevated with Respect to LANL BV
Barium	0.91559	0.56241	No
Calcium	0.99889	0.56241	No
Chromium	0.83324	0.99011	No
Cobalt	0.99837	0.74346	No
Copper	0.08649	0.05286	No
Lead	0.88942	0.56241	No
Manganese	0.99562	0.98809	No
Nickel	0.35912	0.98987	No
Sodium	1	0.55845	No
Zinc	0.59486	0.15209	No

Table H-9
Statistical Analysis of Inorganic Chemicals in Sediment for Ancho Canyon

Analyte	Gehan Test p-Value	Quantile Test	Slippage Test	Elevated with Respect to LANL BV
Beryllium	0.91708	—*	0.78767	No
Calcium	0.27886	0.90687	—	No
Chromium	0.84149	0.90687	—	No
Iron	0.30683	0.15281	—	No
Nickel	0.82984	0.90687	—	No

*— = Statistical test not run.

Table H-10
Statistical Analysis of Inorganic Chemicals in Sediment for Water Canyon

Analyte	Gehan Test p-Value	Quantile Test	Slippage Test	Elevated with Respect to LANL BV
Beryllium	0.11267	—*	0.30035	No
Chromium	0.57068	0.77447	—	No
Copper	—	—	0.62156	No
Potassium	0.72677	0.77447	—	No

*— = Statistical test not run.

Appendix I

Borehole 49-2-700-1 Chemical Data
and Geochemical Evaluation Scatter Plots

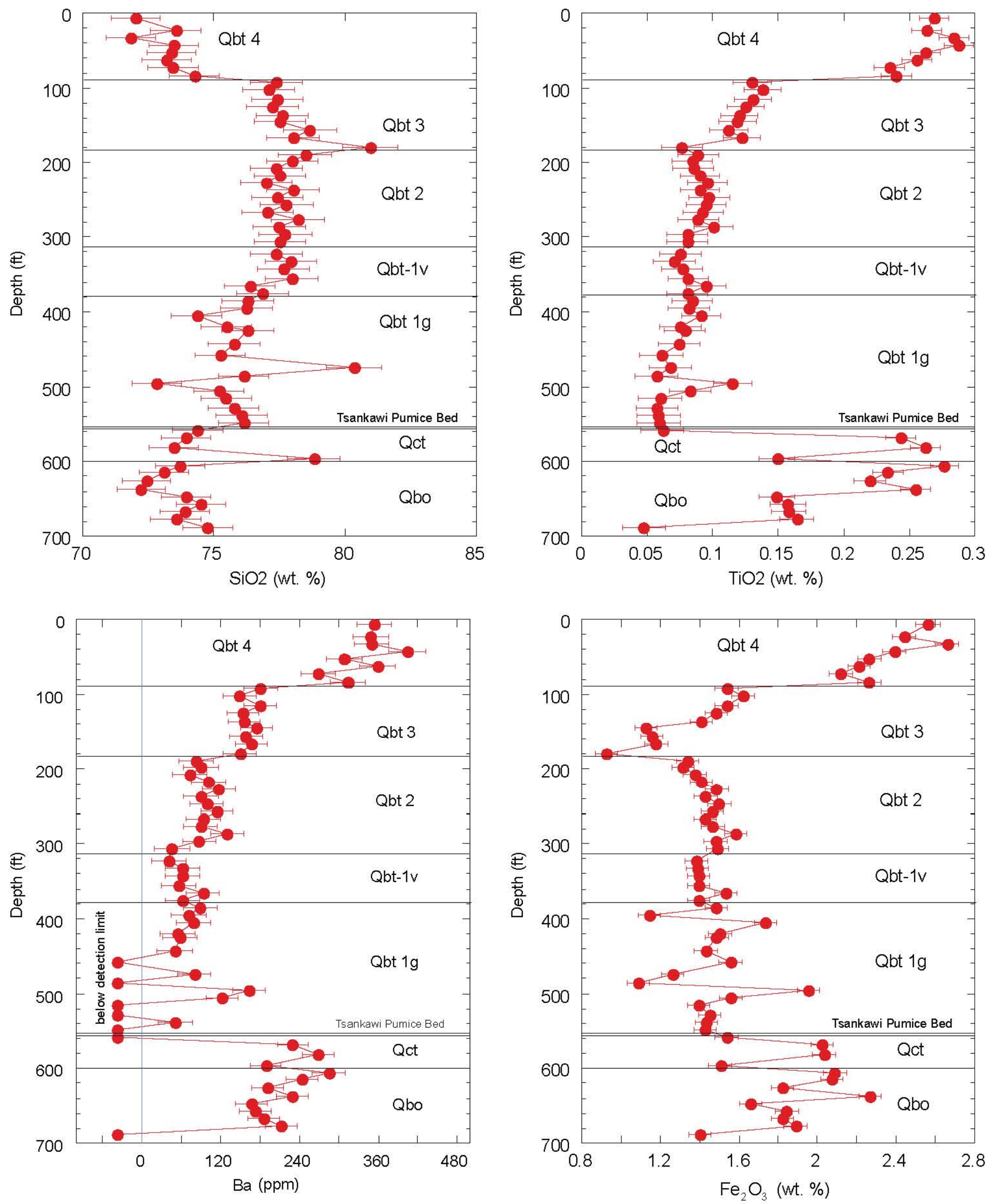

Figure I-1 Comparison of chemical data with preliminary stratigraphic units of borehole 49-2-700-1

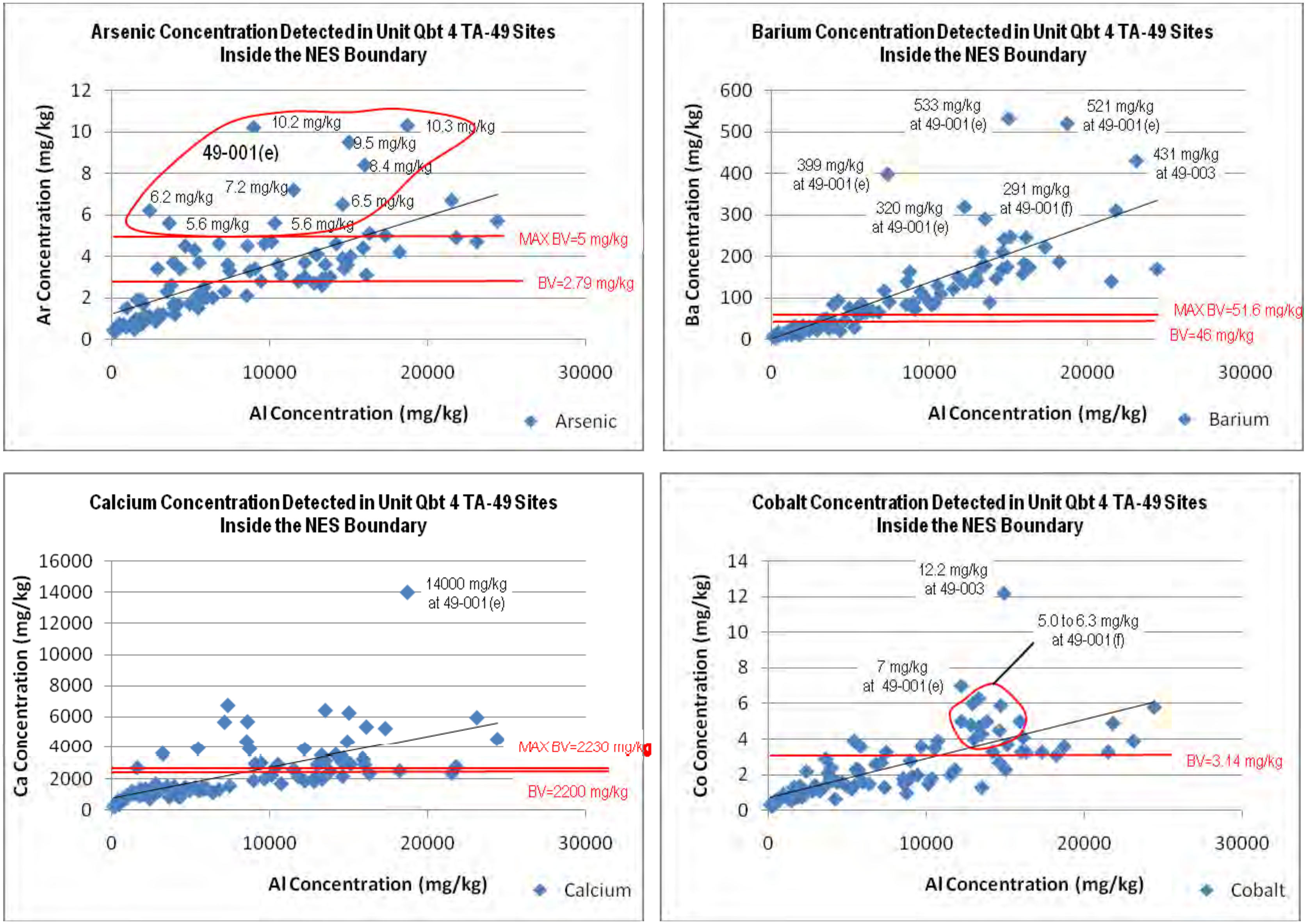

Figure I-2 Scatter plots of arsenic, calcium, barium, and cobalt with aluminum from Qbt 4 sample data collected from TA-49

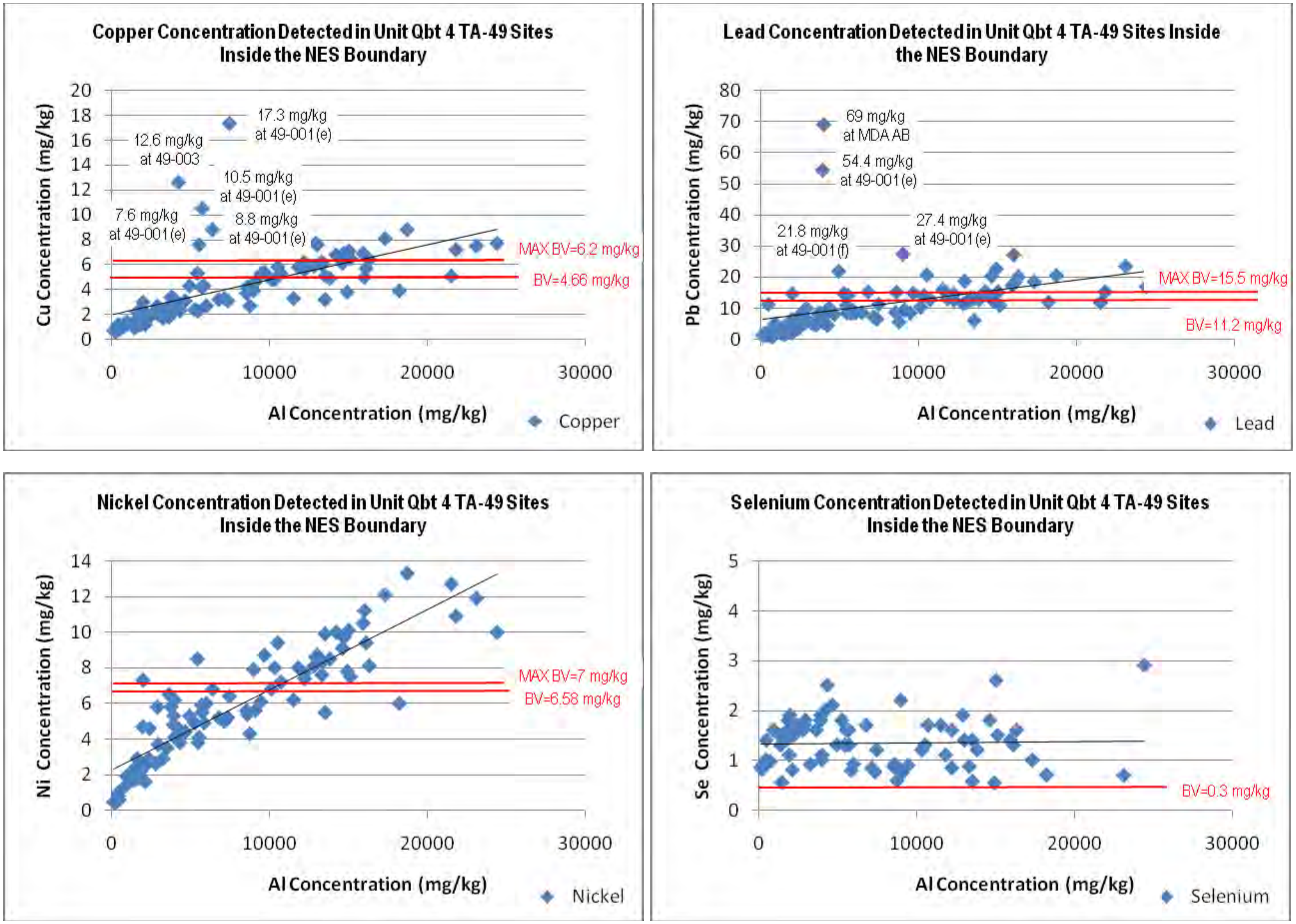

Figure I-3 **Scatter plots of copper, nickel, lead, and selenium with aluminum from Qbt 4 sample data collected from TA-49**

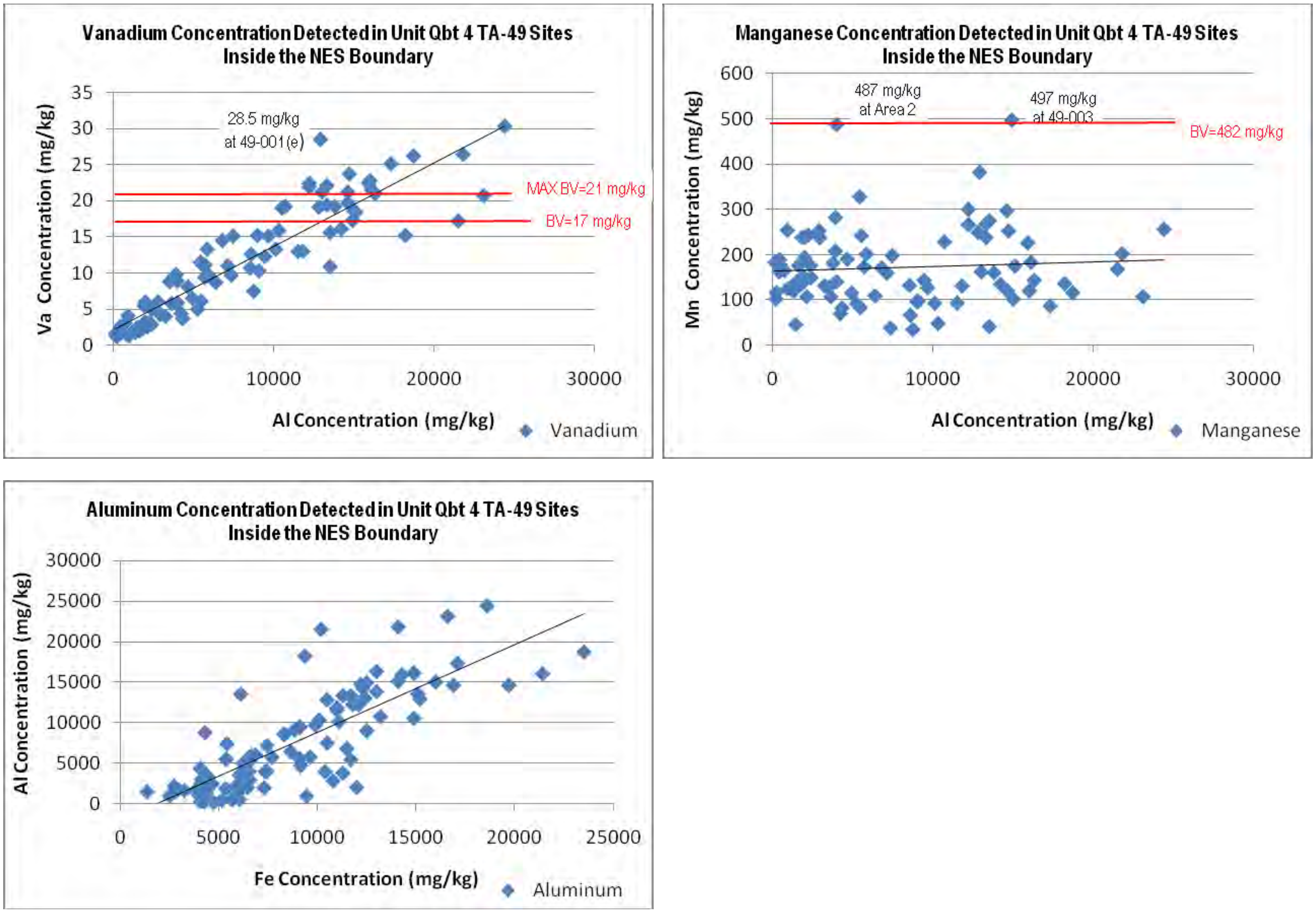

Figure I-4 Scatter plots of vanadium and manganese with aluminum and aluminum with iron from Qbt 4 sample data collected from TA-49