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Investigation Report for Material Disposal Area U, Consolidated Unit 21-017(a)-99, at Technical Area 21, Revision 1

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EXECUTIVE SUMMARY

This investigation report presents the results of investigation activities at Consolidated Unit 21-017(a)-99, also known as Material Disposal Area (MDA) U at Los Alamos National Laboratory (the Laboratory). MDA U consists of four inactive solid waste management units (SWMUs) consolidated into 21-017(a)-99 in 1999 according to their related operational history: SWMUs 21-017(a) and 21-017(b), the absorption beds on the west and east side of MDA U, respectively; SWMU 21-017(c), a former distribution box located between the two absorption beds (removed in 1985); and SWMU 21-022(f), a sump (21-173) that received effluent from Building 21-152 and discharged to the absorption beds through the distribution box. SWMU 21-022(f) was not included as part of the MDA U investigation because it is being addressed as part of the corrective actions being conducted in conjunction with the DP Site Aggregate Area investigation.

The objective of this investigation was to finalize surface and subsurface chemical and geotechnical characterization of MDA U in accordance with the New Mexico Environment Department-approved MDA U investigation work plan. Characterization data were used to define the nature and extent of contamination associated with waste disposal activities at MDA U and to determine if the site poses a potentially unacceptable risk to human health or the environment.

Field investigation activities in 2005 included characterization drilling and logging of nine boreholes, continuous core sampling in 5-ft intervals, field screening for radiation and volatile organic compounds, collecting surface and subsurface samples for chemical characterization, and collecting subsurface samples for geotechnical characterization. Based on the characterization data from the 2005 investigation, as well as previous investigations conducted at the site, the nature and extent of contamination in both surface and subsurface media have been defined. Additionally, it has been confirmed that no perched saturation zones exist beneath the site.

Currently, the site is located within an industrial area under Laboratory (institutional) control and is expected to remain so for the reasonably foreseeable future. The screening assessment for human health under the industrial scenario showed a carcinogenic risk of approximately 4×10^{-6}, a hazard index (HI) of 0.06, and a dose of 0.7 mrem/yr. For the construction worker scenario, carcinogenic risk was approximately 2×10^{-6}, the HI was approximately 0.9, and the dose was 1.3 mrem/yr. All these values are below the applicable target levels for risk, HI, and dose, indicating that MDA U does not pose a potential unacceptable risk to human health under the industrial and construction worker scenarios. Similarly, the results of the ecological risk screening assessment do not indicate a potential risk to ecological receptors at MDA U.

Based on the results of this and previous investigations, neither additional corrective action nor further characterization is warranted at MDA U. The three SWMUs within the MDA U boundary [SWMUs 21-017(a), 21-017(b), and 21-017(c)] are recommended to be designated as “Complete with Controls,” the control being the maintenance of the land use as industrial.

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1.0 INTRODUCTION

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

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

This investigation report addresses Consolidated Unit 21-017(a)-99, also known as Material Disposal Area (MDA) U, which is potentially contaminated with both hazardous and radioactive chemicals. 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 U.S. Department of Energy policy.

Corrective actions at the Laboratory are subject to the Compliance Order on Consent (the Consent Order) signed by the NMED, the DOE, the Regents of the University of California, and the State of New Mexico Attorney General on March 1, 2005. The Consent Order was issued pursuant to the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978,§ 74-4-10, and the New Mexico Solid Waste Act (SWA), NMSA 1978, § 74-9-36(D).

1.1 General Site Information

MDA U is located on the northeastern section of the Delta Prime (DP) Mesa within Technical Area (TA) 21 (Figure 1.1-1). From 1945 to 1978, TA-21 was used primarily for plutonium research, metal production, and related activities. Since 1978, various administrative and chemical research activities have been conducted at TA-21. The current land use is industrial, and it is expected to remain industrial for the reasonably foreseeable future.

MDA U consists of four inactive SWMUs consolidated into 21-017(a)-99 (Figure 1.1-2) according to their related operational history in 1999. These SWMUs include the following:

- 21-017(a), an absorption bed on the west side of MDA U that received effluent from 1945 to 1976
- 21-017(b), an absorption bed on the east side of MDA U that received effluent from 1945 to 1968
- 21-017(c), a former distribution box located between the two absorption beds that was removed in 1985
- SWMU 21-022(f), a sump (21-173) located outside the MDA U fenced area adjacent to Building 21-370; the sump received effluent from Building 21-152 and discharged to MDA U through the distribution box.

SWMU 21-022(f) was not addressed as part of this investigation. It is included in the corrective actions being proposed for the TA-21 DP Site Aggregate Area (LANL 2005, 90225) because the sump must be removed to allow for effective characterization sampling.

The elevation of DP Mesa in the vicinity of MDA U ranges from 7116 ft to 7122 ft amsl, with a 10% slope northward into DP Canyon. The approximate elevation of the center of MDA U is 7120 ft amsl. The canyon slope ranges in elevation from 7020 ft amsl in the bottom of DP Canyon to 7122 ft amsl along the south edge of MDA U.

1.2 Scope of Field Investigation

The primary objective of the investigation at MDA U is to finalize characterization and assess risk in accordance with the approved investigation work plan (LANL 2004, 90801; NMED 2005, 90611). The work plan identified several data needs.

- The existing site data did not adequately define the extent of tritium, particularly vertically.
- The existing site data did not adequately define the lateral and vertical extent of uranium-234 and other uranium isotopes to the west of the absorption beds.
- The existing site data did not adequately define the lateral and vertical extent of actinium-227 progeny associated with the eastern absorption bed. Additionally, previous analytical results were from gamma spectroscopy rather than alpha spectroscopy, which is a more effective method to target actinium-227 progeny.
- The existing site data did not adequately define the vertical extent of vapor-phase volatile organic compound (VOC) contamination in the subsurface.
- No previously collected samples in any media had been analyzed for cyanide, nitrates, or perchlorates during previous sampling campaigns.
- No previously collected information existed to document whether a perched water horizon exists in the immediate vicinity of MDA U.

Site characterization activities were conducted from June to October 2005 and June to July 2006 to gather the additional information needed to finalize characterization of MDA U. These activities included drilling and sampling nine boreholes for chemical and geotechnical characterization of soil, tuff, and pore-gas samples. Eight of the boreholes were advanced around MDA U, outside of the fence. The ninth borehole was drilled between the absorption beds, penetrating the Cerro Toledo interval (Qct) (327 to 351 ft below ground surface [bgs]) into the Otowi Member (Qbo) of the Bandelier Tuff, to 360 ft bgs, to determine if perched saturation zones exist beneath MDA U. Figure 1.2-1 shows the boreholes drilled in and around MDA U for this investigation, as well as those drilled during previous investigations.

Borehole locations, sample collection depths, and laboratory and geotechnical analyses performed were driven by the requirements of the Consent Order as well as by data needs identified by a thorough review of the historical chemical and geotechnical data available for MDA U, as presented in the historical investigation report (HIR) (LANL 2004, 87454).

2.0 BACKGROUND

2.1 Site Description and Operational History

This section summarizes the site description and operational history for MDA U; complete details are presented in the MDA U HIR (LANL 2004, 87454).

The DP East area began operations in 1945 at Buildings 21-152, 21-153, and 21-155 (Figure 1.1-2). These facilities were used to process polonium and actinium and to produce weapon components. Process waste from the various research and production activities consisted of both solids and liquids. In the late 1940s, it was determined the natural soils and clays at TA-21 were effective in separating radioactive contaminants from waste liquids (Merrill 1990, 11721). Absorption beds consisting of excavated trenches filled with cobbles, gravel, and fine sand were constructed at several locations within TA-21 to use the natural soil and clay characteristics for treating process effluents (LASL 1945, 01093). MDA U is one of the areas where absorption beds were used for disposing of liquid wastes.

MDA U consists of four SWMUs [SWMUs 21-017(a), 21-017(b), 21-017(c), and 21-022 (f)] consolidated in 1999 into 21-017(a)-99 according to their related operational history. As noted in Section 1.1, SWMU 21-022(f) is addressed as part of the corrective actions being conducted in conjunction with the DP Site Aggregate Area investigation (LANL 2005, 90225).

Liquid effluent from Buildings 21-152, 21-153, and 21-155, which later became the Tritium Systems Test Assembly (TSTA) facility, was discharged to the MDA U absorption beds. In addition, oil from precipitrons was disposed of at MDA U (Drager 1946, 01562). Precipitrons were air filters used to remove dust, dirt, smoke, soot, and other solids from ventilating air (Francis 1996, 76137). Dirt particles in the air stream were given electrical charges as they passed through an ionizer and were trapped in dust-collector cells by attraction of these charged particles to plate surfaces of opposite polarity. The oil may have been used in the filtration process or may have been a component of the precipitrons. Disposal of liquid effluent at MDA U from Buildings 21-152 and 21-153 ceased in 1968 (Hakonson 1987, 07422). The western absorption bed continued to receive water from the cooling tower associated with Building 21-155 until approximately 1976 (Purtymun 1976, 01107), but the site has since been inactive.

During their operational lifetime, the absorption beds may not always have performed as designed. The TA-21 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan (LANL 1991, 07529, p. 16-198) cited a 1946 memorandum stating,

> There were early problems with the pits [absorption beds]; they did not function properly, and it was reported that the oil washing from the precipitron is lying on top of the ground. (Drager 1946, 01562)

In addition, a memorandum dated December 18, 1975, stated

> water from a cooling process was being released into the west pit from a nearby building. At that time, there appeared to be permanent water in the west pit, although no overflow into the adjacent drainage was observed. (Purtymun 1976, 01107)

In 1985, removal activities and stabilization of the absorption beds were conducted. A trench measuring 20 ft wide, 100 ft long, and 4 to 13 ft deep was excavated, and soil contaminated with actinium-227 was removed from MDA U and taken to MDA G at TA-54 for disposal (Merrill 1990, 11721, p. 11). The distribution box and iron pipes within the absorption beds and a portion of the line from the cooling tower (LANL 2004, 90801, p. 26) were excavated and taken to MDA G (LANL 1991, 07529, p. 16-199). The line from the cooling tower was found in the west absorption bed, indicating cooling tower effluent had discharged directly into the west bed and not through the sump and distribution box (Mayfield 1985, 01172). Material above the iron pipes was stockpiled and later used to backfill the trench. The absorption bed excavation (walls and bottom) was lined with plastic sheeting and covered with fill. The area between the top of the absorption beds and the embankments surrounding them was backfilled with uncontaminated tuff, covered with 6 in. of topsoil, regraded to avoid potential drainage problems, and revegetated.

In 1987, additional site-stabilization activities were conducted. A ditch was constructed on the south side to divert surface water runoff from upslope. Within the MDA U fence, more topsoil was added, and the area was reseeded. Four brass markers were placed to mark the corners of the MDA. In 1990, additional controls were emplaced to prevent runoff from the surrounding area from flowing across MDA U.

In 2001, exploratory sampling trenches were excavated across each absorption bed (LANL 2001, 70230). The trenches were used to find the plastic liner placed over the excavated areas when the drain line and the absorption bed material were removed in 1985. In the western absorption bed, black plastic was found at a depth of 3.5 to 4 ft. Cobbles up to 20 in. in diameter were observed under the liner. Two plastic liners were found in the eastern absorption bed: a clear liner at approximately 3 ft bgs and a black liner at 7 ft bgs immediately above a cobble layer.

2.2 Historical Investigations

This section summarizes pre-RFI sampling (before 1992) and RFI sampling (1992 to 2001) conducted at MDA U. The results of these investigations were used to (1) identify radionuclides, organic chemicals, and inorganic chemicals at the site; (2) evaluate trends in site contaminant data; and (3) identify data needed to finalize the characterization of MDA U. The analytical results of historical sampling are summarized in Section 2.3, and complete details of historical sampling performed at the site are provided in the MDA U HIR (LANL 2004, 87454). A review and description of RFI data collected at the site and used in this investigation report are presented in Appendix B. Validated RFI data were also used in the risk assessment (Appendix H).

2.2.1 Pre-RFI Historical Investigations (1946 to 1992)

As described in the MDA U HIR (LANL 2004, 87454), the primary pre-RFI sampling and investigation activities conducted at MDA U included the following:

- *1946 effluent sampling*. Effluent discharged to chemical sewer numbers 22 (drain from Building 21-153) and 23 (drain from Building 21-152) was sampled in 1946 (Tribby 1946, 01540). Samples were analyzed for plutonium (isotope not specified) and polonium-210.
- *1976 investigation of soil and water from absorption beds*. The Laboratory's Environmental Studies and Waste Management Group (H-8) analyzed for gross alpha in soil and water samples from the site, including the absorption beds (Purtymun 1976, 01107). At that time, the absorption beds were still uncovered, the eastern absorption bed was inactive, and the western absorption bed received water only from the cooling tower associated with Building 21-155. Cooling tower water from Building 21-155 was the only known influent to the absorption beds in 1976.
- *1980 investigation of soil, vegetation, and tar*. Soil and vegetation samples were collected and analyzed for radionuclides from three locations: the west end of the western absorption bed, the east end of the eastern absorption bed, and the northeast corner immediately outside the fenced area (Mayfield 1985, 01172). Tar, assumed to have originated from oil from the precipitrons, was

also sampled in 1980 and evaluated qualitatively for radionuclides (Drager 1946, 01562; Francis 1996, 76137).

- *1983 subsurface investigation*. Subsurface samples were collected from two boreholes outside the MDA U fence: one north of the eastern absorption bed and one northwest of the western absorption bed (Purtymun 1987, 06687). At each location, samples were collected at 12 depths ranging from 0 to 58 ft and analyzed for tritium, total uranium, and cesium-137.
- *1984 investigation of soil and vegetation*. Soil and vegetation samples were collected around MDA U at twelve locations: three samples were taken at the fenceline, one sample was taken inside the fenceline, and the remaining eight samples were taken outside the fenceline (Environmental Science Group 1987, 06678). Samples were collected at three depths (0 to 1 cm, 1 to 10 cm, and 10 to 30 cm) and analyzed for tritium, uranium, and plutonium-239/240. Not all locations and depths were analyzed for each radionuclide; the most complete data are for the 0 to 1 cm interval.

2.2.2 RFI Historical Investigations (1992 to 2001)

The following investigations were completed to support the RFI at MDA U, as presented in the work RFI plan for TA-21 (LANL 1991, 07529) and subsequent sampling and analysis plans.

1992 DP Mesa-Wide Surface Soil Sampling

Surface sampling was conducted at TA-21 to establish sitewide baseline concentrations for a comprehensive suite of analytes and to identify contaminant trends across TA-21 resulting from airborne stack emissions. Samples were collected at the nodes of a 131- by 131-ft grid covering DP Mesa, Los Alamos Canyon, and DP Canyon (LANL 1994, 26073; LANL 1995, 52350, p. 2-1). During this event, seven samples were collected on DP Mesa East and downslope of MDA U from two different depths at each location (0 to 1 in. and 0 to 6 in.). The samples were analyzed for inorganic and organic chemicals and radionuclides (americium-241, tritium, isotopic plutonium, isotopic thorium, and strontium-90).

1994 Surface Soil and Sediment Sampling

Surface soil samples were collected from a grid covering the entire MDA and extending to the edge of DP Mesa (LANL 1997, 58979). A total of 54 samples were collected from the grid, and 7 additional samples were collected from points off of the grid nodes. Nine channel sediment samples (three locations sampled at three depth intervals [0 to 0.25 ft, 0.25 to 0.5 ft, and 0.5 to 1 ft]) were collected in the small drainage leading into DP Canyon. Soil and sediment samples were analyzed for radionuclides (tritium, total uranium, isotopic plutonium, strontium-90, and gamma-emitting radionuclides by gamma spectroscopy); inorganic chemicals; and semivolatile organic compounds (SVOCs).

1998 Surface Soil, Subsurface Tuff, Subsurface Pore-Gas, and Absorption Bed Sampling

Surface soil samples were collected from three areas: on the mesa top in the area north of MDA U, between MDA U and the mesa edge, and in the DP Canyon drainage north of MDA U at some of the same locations sampled in 1994. The 1998 samples were collected to address data quality issues identified during a review of the 1994 analytical data (LANL 1999, 87295). Eighteen samples from mesa-top locations outside of the MDA U fence were analyzed for polychlorinated biphenyls (PCBs) and radionuclides (isotopic uranium and gamma-emitting radionuclides by gamma spectroscopy), and two samples from the DP Canyon drainage locations were analyzed for isotopic uranium.

Two samples of fill material were collected from each absorption bed below the plastic liner to estimate the remaining inventory of radionuclide contamination (LANL 1998, 87294). Samples were collected from the center line of the absorption beds, the area where the distribution line had been located and where the highest contaminant levels were expected. The samples were analyzed for americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, and gamma-emitting radionuclides by gamma spectroscopy.

Eight vertical boreholes were drilled within and around the two absorption beds to define the vertical extent of contamination (LANL 1998, 62549). Two boreholes were located within the western absorption bed, and two were located within the eastern absorption bed. The remaining four boreholes were located outside the absorption beds but within the MDA U fenceline. Samples were collected at depths of 5, 15, 25, 35, 45, 65, and 75 ft bgs and analyzed for inorganic chemicals, SVOCs, PCBs (5- and 15-ft intervals only), and radionuclides (americium-241, isotopic plutonium and uranium, tritium, strontium-90, and gamma-emitting radionuclides by gamma spectroscopy). Additionally, three samples of pore gas were collected for VOC analysis from each of the eight boreholes at depths of 25, 55, and 75 ft bgs.

2001 Surface Soil and Absorption Bed Sampling

The 2001 investigation was conducted to assess possible mercury contamination identified during the 1994 sampling activities. The 1994 grid was resampled, and 54 surface soil samples were collected at a depth of 0 to 0.5 ft for analysis of mercury (LANL 2001, 70230). Additionally, five surface soil samples were collected and analyzed for tritium.

Fill samples were collected to evaluate residual contamination in the absorption bed materials that remained following partial excavation in 1985 (LANL 2001, 70230). One trench was excavated (approximately 15 ft long and 5- to 7-ft deep) in each absorption bed. The trenches were used to find the plastic liner placed over the excavated areas when the drain line and absorption bed material were removed in 1985. The trenches were excavated to the north and south extent of the liner and previous excavation locations. A total of eight samples were collected, four from each trench, and analyzed for tritium, isotopic uranium, and gamma-emitting radionuclides by gamma spectroscopy.

2.3 Historical Nature and Extent of Contamination

The results of the RFI sampling conducted at MDA U from 1992 to 2001 provided the basis for the 2005 characterization drilling and sampling activities. The nature and extent of surface contamination were adequately defined before the 2005 investigation; the nature and extent of subsurface contamination were the primary focus of the 2005 investigation. Based on the results of previous RFIs, the following conclusions regarding nature and extent of contamination were presented in the approved MDA U investigation work plan (LANL 2004, 90801, p. 9):

- Tritium is pervasive across the site and was detected at the total depth (TD) (75 ft) of two boreholes; the existing site data do not adequately define the extent of tritium, particularly vertically.
- Uranium-234 exists at concentrations above background values (BVs) on the western side of the site, both within and below the absorption beds. Additional data are needed to define the extent of elevated uranium levels to the west and at depth.
- Actinium-227 progeny are present in the eastern absorption bed and at depth within the clay-interbed zone. Additional site data are needed to define the extent of the subsurface release, particularly within the clay-interbed zone. Previous analytical methods used gamma spectroscopy rather than alpha spectroscopy, which is a more effective analytical method to target

actinium-227 progeny. Using the appropriate analytical methods may quantify more accurately the levels of actinium-227 at the site.

- Vapor-phase VOCs in subsurface samples may indicate a potential release from the absorption beds; additional site data are needed to define the nature and extent of vapor-phase VOC contamination in the subsurface.
- No samples in any media were analyzed for cyanide, nitrates, or perchlorates during previous sampling campaigns. All samples proposed in this work plan will be analyzed for these chemicals.

3.0 SCOPE OF ACTIVITIES

This section describes the investigation methodology used during activities conducted at MDA U during the 2005/2006 field effort. Pursuant to the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), this characterization drilling was designed to finalize the subsurface investigation at the site. Characterization drilling was completed on August 3, 2005.

A total of nine boreholes were drilled during the 2005/2006 investigation at MDA U. Eight boreholes were placed around the perimeter of MDA U to define the lateral and vertical extent of site contamination. The ninth borehole, located in the center of MDA U between the absorption beds, was drilled to a depth of 360 ft bgs to define the vertical extent of contamination as well as to determine the nature and depth of fracture zones and any possible perched saturation zones. This deeper borehole penetrated the Cerro Toledo interval, which contains intermittent sands and gravels within which perched saturation zones have been found at other locations within the Laboratory boundary.

The quality procedures (QPs) and standard operating procedures (SOPs) used during 2005/2006 characterization activities are listed in Table 3.0-1. The most current revisions of all QPs and SOPs were used for implementing the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611). Specific details of the methods used for drilling and sampling activities are presented in Appendix C, along with deviations from the approved work plan. The results of data collected at the site are summarized in Section 6.

Figure 1.2-1 shows the location of boreholes drilled at MDA U in 1998 and 2005. Table 3.0-2 summarizes the proposed and actual sample depths related to 2005/2006 characterization activities at MDA U.

3.1 Surface Soil Investigation

Discrete grab samples were collected in 2005 from 0 to 0.5 ft bgs at each of the nine borehole locations before drilling began. These samples were immediately screened for radioactivity using an Eberline E-600 radiation meter held within 1 in. of the sample. Screening for radioactivity was performed to ensure worker safety, to determine the release of samples, and to identify locations for additional sampling. The field-screening process is described in Appendix C.

A stainless-steel scoop and bowl were used to homogenize the samples, which were then transferred to sterile sample collection jars. SOP-06.09, “Spade and Scoop Method for Collection of Soil Samples,” details the sampling procedure followed in collecting surface soil samples.

Surface soil samples were sent to an off-site analytical laboratory for analysis of gamma-emitting radionuclides by gamma spectroscopy, actinium-227 progeny (using alpha spectroscopy), americium-241, strontium-90, isotopic uranium, isotopic plutonium, and tritium, pH, target analyte list

(TAL) metals, SVOCs, PCBs, perchlorate, cyanide, and nitrates. Table 3.1-1 presents the laboratory analyses conducted on the surface soil samples collected as part of this investigation.

3.2 Subsurface Soil Investigation

Eight of the nine boreholes (BH-01, -02, -03, -05, -06, -07, -08, -09) drilled in 2005 were located around the perimeter of the MDA U fenced area and were advanced approximately 120 ft bgs to a target depth of 20 ft into unit 2 of the Tshirege Member of the Bandelier Tuff (Qbt 2). Borehole BH-04, the deep borehole located in the center of MDA U, was drilled to 360 ft bgs. The borehole locations and underground utilities are shown in Figure 1.2-1. Appendix D-1.0 presents the borehole logs generated during characterization drilling in 1998 and 2005 at MDA U.

The depths of the boreholes are as follows:

- Boreholes BH-02, BH-03, BH-05, BH-06, BH-08, and BH-09 were all drilled to the target depth of 120 ft bgs.
- Borehole BH-04 was drilled to the target depth of 360 ft bgs, through the Cerro Toledo interval from 327 to 351 ft bgs, and into the Otowi Member.
- Borehole BH-01 was drilled to a TD of 115 ft bgs. Once drilling reached the Qbt 2 interval, the extremely welded material was difficult to drill. When drilling between 115 and 120 ft bgs, the connection “shoe” for the bottom of the split-spoon barrel dislodged and remained in the borehole when the drilling rods were removed. Several unsuccessful attempts were made to retrieve the shoe. Additionally, the core sample from 110 to 115 ft bgs was disposed of before a sample was collected; therefore, no TD sample was collected for BH-01. The deepest sample interval was 98 to 100 ft bgs at the Qbt 3/Qbt 2 contact. A TD sample collected from BH-09, approximately 200 ft to the east of BH-01 was deemed sufficient to constrain the nature and extent of any potential contamination in the upgradient location of MDA U.
- BH-07 was drilled to a TD of 119 ft bgs. BH-07 was located on a relatively steep slope to the east of MDA U. For a typical borehole with a level surface, one core “run” is advanced 5 ft into the subsurface. Thus, the surface run (the first run) is from 0 to 5 ft bgs. Because of the steep slope at BH-07, the first run was completed only to 4 ft bgs. Therefore, every subsequent run was at 4- and 9-ft intervals.

All subsurface samples were analyzed for radioactivity (gross alpha, beta, and gamma) and radionuclides (gamma spectroscopy, actinium-227 progeny, americium-241, strontium-90, isotopic uranium, isotopic plutonium, tritium), TAL metals, VOCs, SVOCs, PCBs, perchlorate, cyanide, and nitrates. Two subsurface samples were also analyzed for dioxins/furans and high explosives (HE) compounds, per the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611). Table 3.2-1 presents the laboratory analyses conducted on the subsurface soil samples collected as part of this investigation.

3.2.1 Borehole Sampling

Subsurface samples were collected from a minimum of four depths at each borehole (with the exception of BH-01, as described above). Additional samples were collected at intervals of elevated field-screening levels, fracture zones, or zones of elevated soil moisture content. In the deep borehole (BH-04), the minimum target sample depths included

- the interval of highest field screening level,
- the interval of deepest field screening detection,

- the interval corresponding to the depth of absorption beds, and
- borehole TD.

In the eight remaining boreholes, the target minimum sample depths included

- the interval corresponding to the depth of absorption beds,
- the depth of fractured/clay-interbed zone,
- the Qbt 3/Qbt 2 contact, and
- borehole TD (with the exception of BH-01, as noted above).

Samples were collected from each borehole according to the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611). SOP-06.26, "Core Barrel Sampling for Subsurface Earth Materials," describes the sampling procedure followed to collect subsurface samples. Appendix C provides additional details of the subsurface sampling methods.

Field screening was conducted continuously during drilling, as described in Section 6.1.1 and Appendix C. Each 5-ft core was screened immediately upon removal for radioactivity and VOCs from the borehole, and the results were recorded in the field logbook. Screening for radiological constituents was performed on each core while still in the core barrel using an Eberline E-600 alpha/beta/gamma radiation meter within one inch of the sample. Field screening for VOCs was performed using a photoionization detector (PID) equipped with an 11.7 eV lamp. SOP-06.33, "Headspace Vapor Screening Using a Photoionization Detector," was followed for VOC screening. Surface samples collected for each borehole were not field screened for VOCs because VOCs are not expected to be present in surface soils at the site.

Field screening was performed primarily for worker health and safety purposes but was also used to identify additional samples to be collected and the laboratory analysis to be performed based on elevated field-screening results. According to the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), the depth interval with the highest field-screening result for organic vapors would be collected and analyzed for dioxins, furans, and HE compounds. The borehole log for BH-07, provided in Appendix D-1.0, shows the depth interval of the highest field-screening result, 67 to 69 ft bgs. A sample from this interval was collected and analyzed for dioxins, furans, and HE compounds. A sample was also collected for dioxins, furans, and HE compounds from the 92 to 94 ft bgs interval in BH-02.

A total of 85 samples were collected for laboratory or geotechnical analysis. Nine surface samples were collected: one from each borehole before drilling began (Table 3.1-1). Forty-six subsurface samples were collected as well as six field duplicates, four trip blanks, and four rinsate samples (Table 3.2-1). Fourteen samples and two field duplicates were collected from the deep borehole (BH-04) for analysis of geotechnical properties (Table 3.2-2). This analysis is described in more detail in Section 3.2.2.

3.2.2 Geotechnical Analysis

Geotechnical characterization was completed in deep borehole BH-04 to define the geotechnical properties of the bedrock underlying the absorption beds at MDA U. Samples were collected in 0.5-ft intervals in lexan tubes at various target depths to measure moisture, bulk density, porosity, saturated hydraulic conductivity, and unsaturated hydraulic conductivity. The moisture content was measured continuously using a neutron logger during geophysical logging and additional pore-gas sampling. The geotechnical analytical results are discussed in Section 4.0.

Fourteen geotechnical samples were collected from BH-04:

- two at the base of absorption beds
- a minimum of one every 10 ft to a depth of 43 ft bgs for a total of three
- a minimum of one from all tuff units encountered (Qbt 3, Qbt 2, Qbt 1v, Qbt 1g, Qbo) for a total of seven
- two samples from the Cerro Toledo interval showing all observed lithologic changes from sands and gravels to primary ash fall deposits

Two field duplicates were also collected for geotechnical laboratory quality assurance (QA) purposes. Table 3.2-2 shows the sample depths for all geotechnical samples collected at MDA U.

3.2.3 Pore-Gas Sampling

Subsurface pore-gas samples were collected from each of the nine boreholes in one sampling round between September 16, 2005, and October 4, 2005, after characterization drilling and geophysical logging activities were completed. Pore-gas sampling was also conducted in June and July 2006 after each of the nine boreholes was reamed to TD. These pore-gas samples were collected because excessive slough in the boreholes prevented collecting a true TD sample during the initial pore-gas sampling event.

A total of three depth intervals were sampled in each of the nine boreholes at MDA U: one at the approximate base of the absorption beds, one at the top of the slough, and one at TD. During the initial sampling event, pore-gas samples were collected using a straddle-packer system capable of isolating discrete 1-ft sample intervals within the boreholes. During the second sampling event, pore-gas samples were collected using a single packer system. The augers were left in the borehole to ensure that it stayed open to the TD and a single packer was used to isolate the bottom 1 ft of the borehole. All pore-gas samples were collected in the field using SOP-06.31, “Sampling of Subatmospheric Air.” Table 3.2-3 presents a summary of the pore-gas sampling and geophysical-logging intervals of the boreholes at MDA U.

Before pore-gas samples were collected, each depth interval was purged until measurements of carbon dioxide were stable and indicative of subsurface conditions. The pore-gas samples were collected in SUMMA canisters and submitted to the analytical laboratory for VOC analysis using U.S. Environmental Protection Agency (EPA) Method TO-15. The approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611) called for using EPA Method TO-14; however, EPA Method TO-15 is an improved method of TO-14, requested by the Sample Management Office (SMO), and was used to evaluate 2005/2006 pore-gas samples. The QA/quality control (QC) samples for VOCs consisted of one equipment blank and one field duplicate for each of the two pore-gas sampling events. The equipment blank was collected by pulling calibration gas (99.9% ultrahigh-purity nitrogen) through the packer sampling apparatus and was used to evaluate field decontamination procedures. The field duplicate sample was used to evaluate the reproducibility of field sampling techniques. The QA/QC samples were collected according to SOP-01.05, “Field Quality Control Samples.”

Subsurface samples for tritium were also collected during both pore-gas sampling events. The same sample depths were used for tritium as for VOCs. Samples for tritium analysis were collected in silica gel sample tubes using EPA Method 906.0.

QA/QC samples for tritium in pore gas consisted of the same one equipment blank and field duplicate collected during each event. The tritium equipment blank was collected using 5 g of filtered water for the purpose of evaluating field decontamination procedures. The field duplicate was used to evaluate the reproducibility of field-sampling techniques. The QA/QC samples were collected according to SOP-01.05, “Field Quality Control Samples.”

3.2.4 Perched Saturation Sampling

One goal of this investigation was to determine whether perched saturation zones exist in the vicinity of MDA U. These are defined as zones of saturation located above the regional aquifer and are thought to form mainly at horizons where medium properties change dramatically, such as in tuff with zones of varying degrees of welding or at paleosol horizons with clay or caliche found in basalt and volcanic sediment sequences.

One example of lithology containing hydrogeologic properties is the Cerro Toledo interval, encountered from 327 to 351 ft bgs at MDA U. This interval consists of several sequences of interbedded ash flow tuff and fluvial sand and gravel deposits. A more thorough discussion of the geology beneath MDA U is presented in Section 4.4, Subsurface Conditions.

Two moisture zones were observed in BH-04 during characterization drilling: one from 225 to 230 ft bgs and one from 335 to 342 ft bgs in the Cerro Toledo interval. When these moisture zones were encountered at MDA U, drilling was suspended to determine whether sufficient water volume (0.5 L) was available to analyze water quality. This minimum volume of water could not be collected at either of the two zones where elevated moisture was encountered. The thickness and lithologic characteristics of each moisture zone were logged by the field geologist, and analytical and geotechnical samples of native material were collected.

The first zone of observed moisture in BH-04 occurred from 225 to 230 ft bgs. The geologic material consisted of an altered reddish-brown tuff with fine ash matrix, large gray pumice, and native angular lithics up to 3 in. Tuff samples were collected from two intervals, 225 to 227 ft bgs and 228 to 230 ft bgs, for laboratory analysis. A sample for geotechnical properties was collected at 230 to 230.5 ft bgs. Drilling activities were halted for a 24-hr period to allow any water to accumulate in the bottom of the borehole. After 24 hr, an electronic water level indicator (an “e-line”) and downhole video camera were used to determine the presence of water. No water was encountered with the e-line or observed with the down-hole camera.

A second moisture zone in BH-04 occurred from 335 to 342 ft bgs. This moisture zone was located in the Cerro Toledo interval, which consists of coarse gray tuffaceous sand from 337.7 to 338.5 ft bgs, grading to a gravelly, coarse tuffaceous sand to 342 ft bgs. Geotechnical and analytical samples were collected from tuffaceous sand at 337.5 to 338 ft bgs and 338 to 340 ft bgs, respectively. After a 72-hr recovery period, the borehole again was dry, and neither the e-line nor the downhole video camera indicated the presence of water. Drilling then continued to a TD of 360 ft bgs with no further moisture zones observed.

Moisture zones observed in core collected from BH-04 were quantified through results of geotechnical samples, presented in Section 4.9, Materials Testing Results. These zones corresponded with changes in lithology, and although moisture was observed, no evidence of perched saturation zones was observed at either of these intervals.

4.0 FIELD-INVESTIGATION RESULTS

This section summarizes the methods, procedures, and results of the characterization drilling activities at MDA U. Additional details of methodology and procedures can be found in Appendix C. Information and data specific to the definition of nature and extent and chemical characterization of potential contamination are presented in Section 6.0.

4.1 Surface Conditions

MDA U has been an inactive site since 1976 (see Section 2.1). No surface structures exist at the site, other than the chainlink fence that surrounds the MDA. The outlines of the absorption beds are no longer visible at the surface because of the fill that was emplaced at the site in 1985 and 1987.

Dense vegetation surrounds MDA U, and the site itself is heavily vegetated with native shrubs, grasses, and forbs typical of disturbed soils. The vegetation is dominated by the shrub chamisa (*Chrysothamnus nauseosus*).

Because of the flat topography and dense vegetation, erosion at MDA U is minimal. Erosion and sediment transport potential is numerically rated from 1 to 100 using a matrix system based on SOP-02.01, "Surface Water Site Assessments." SWMUs with scores greater than 60 are considered to have a high erosion potential. The three MDA U SWMUs included in this investigation report [SWMUs 21-017(a), 21-017(b), and 21-017(c)] were given an erosion matrix score of 8.8 in 1998, indicating that a very low erosion potential exists at the site. The surface water assessments for these SWMUs are presented in Appendix I.

Quaternary alluvial silts and clays, soil, and fill material make up the surface landscape at TA-21. Surface soils contain more sand in the shallower intervals, grading to a higher clay content with depth. The soils on the north slopes, like those downgradient of MDA U, generally have a higher organic content.

No streams occur on DP Mesa; stormwater and snowmelt generally run off the mesa as sheet flow or in small drainages off the mesa sides. Because of the vegetative cover and the relatively flat topography of MDA U, which slopes gently to the north toward DP Canyon, surface runoff is minimal. A run-on diversion channel on the south side of MDA U directs potential run-on from impervious surfaces upgradient of MDA U to the northeast, around MDA U, and toward DP Canyon. This diversion channel flows into a small drainage leading into DP Canyon north of MDA U. DP Canyon also receives runoff from several historical TA-21 outfalls, MDAs A and T, and several other SWMUs.

4.1.1 Relationship to Other SWMUs and AOCs

SWMUs and AOCs in the vicinity of MDA U include (Figure 1.1-2)

- SWMU 21-013(c), an inactive surface disposal area located southeast of MDA U and east of the now-removed Building 21-153, consists of mounds of earth, an excavated trench, and an earthen berm containing scattered concrete, asphalt, and metal debris. SWMU 21-013(c) was investigated and appears to contain only building materials (LANL 1995, 54320).
- AOC 21-020(b), the location of a removed filter house (former Building 21-153), is the closest upgradient SWMU/AOC to MDA U. This building was located immediately south of MDA U and was used for DP East operations involving the production of weapons components. Actinium-227 and polonium-210 were major process radionuclides at this building, and process effluent was released to the MDA U absorption beds. When the filter house was decommissioned and

removed in 1978, soil under and around the structure was also removed. The activity levels in the remaining soils were less than 30 pCi gross alpha activity/g of soil, which was the detection limit of the Laboratory's alpha screening instrument used at the time (Harper and Garde 1981, 06281). This AOC is now part of Consolidated Unit 21-021-99.

- Consolidated Unit 21-021-99 consists of SWMU 21-021 and AOCs 21-019(a–m), 21-020(a), and 21-020(b). It was investigated as part of a larger group of sites that represent potential surface soil contamination from historical airborne releases from TA-21 operations. This consolidated unit encompasses the entire surface of TA-21 (DP Mesa), which received air emissions from incinerators, filter houses, buildings, and exhaust stacks since the beginning of technical operations in the mid-1940s. Radionuclides were the predominant contaminants in historical air emissions.
- SWMU 21-024(n), an active drainline exiting Building 21-155 to the north and discharging into DP Canyon, consists of a corrugated metal pipe that exits a concrete bulkhead and discharges onto a gravel road adjacent to MDA U (LANL 1994, 31591). The effluent flows north to the ditch paralleling the north perimeter road. From there, it flows east to a culvert that passes under the north perimeter road and into DP Canyon. Two boreholes (BH-06 and BH-03) from the 2005 characterization were drilled through this SWMU. Inorganic chemicals and radionuclides were detected above background in these two boreholes (see Section 6.3).

Any of these SWMUs, AOCs, and consolidated units may have contributed to surface and subsurface contamination at MDA U; however, given the similarity of contaminants encountered at TA-21, it would be difficult to distinguish among potential sources of contamination.

4.2 Exploratory Characterization Drilling

Characterization drilling activities were conducted from June 23, 2005, to August 3, 2005. Drilling was conducted by Spectrum Exploration, Inc., of Albuquerque, New Mexico, using a CME 85 rotary-drill rig equipped with 9-in.-diameter hollow-stem auger flights using a 3-in.-internal-diameter by 5-ft-long continuous split-spoon stainless-steel core-barrel sampler.

Nine boreholes were advanced in and around MDA U for a total drilled footage of 1314 ft. Figure 1.2-1 shows the location of the boreholes drilled at MDA U in 2005 and the location of historical boreholes drilled in 1998. The boreholes drilled in 2005 are described in Section 3.2.

Drilling in all boreholes produced continuous core that was observed and geologically logged for documentation. For each 5-ft interval of core recovered, the following information was recorded in field boring logs: footage and percent recovery, rock-quality designation, lithology, structural features, depth of samples collected, field-screening results for radioactivity and organic vapors, date and time of core retrieval, and other relevant observations.

Core logging, provided in Appendix D-1.0, was conducted once the core was retrieved and field screening for radioactivity and VOCs (see Section 6.0) indicated it was safe to proceed. Lithologic descriptions follow accepted terminology for the regional geology of the Pajarito Plateau. The geologic designations of each tuff unit encountered at MDA U followed accepted stratigraphic terminology (Broxton and Eller 1995, 58207). The lithologic description for each core interval included

- color (using a Munsell Soil Color Chart);
- ash matrix size;
- degree of matrix welding;

- presence and size of phenocrysts;
- presence of pumice clasts in tuff with color, size, alteration, and color, size, and nature of phenocrysts;
- staining and/or presence of clay-fill fracture zones;
- qualitative description of moisture presence; and
- any other information pertinent to the geology of the core recovered.

4.3 Exploratory Characterization Borehole Geophysical Logging

Geophysical surveys were conducted by Apogen Technologies between August 31, 2005, and September 7, 2005. Geophysical logging was completed using the SOP-04.04, "Contract Geophysical Logging" and the logs are presented in Appendix D-2.0. All boreholes were logged using a neutron probe to measure soil moisture (Mount Sopris Instruments [MSI] Model No. 2NUA-1000); a gamma meter (MSI Model No. 2PGA-1000); a three-arm caliper for measuring borehole diameter (MSI Model No. 2PCA-1000); and downhole camera (MSI Model No. OBI-40). The TD measured for each borehole (Table 3.2-2) varied because of sloughing during removal of auger flights after drilling was completed. Other than the sloughing, no field conditions or instrument malfunctions arose that affected the results of geophysical logging.

4.4 Subsurface Conditions

The general stratigraphy beneath MDA U has been defined by characterization drilling conducted in 1998 and 2005. The information presented in this section is specific to the subsurface at MDA U.

The Bandelier Tuff is Quaternary in age (1.6 Ma) and is subdivided into two members: the Tshirege (Qbt) and Otowi (Qbo). Characterization drilling activity took place primarily within the Qbt, a compound sequence of volcanic ash flows and falls. The Tshirege Member is further divided into four distinct cooling units in descending order: Qbt 4, Qbt 3, Qbt 2, and Qbt 1v/Qbt 1g (Broxton and Eller 1995, 58207). While Qbt 4 does not occur at MDA U, it is present to the west of TA-21. The uppermost bedrock unit directly underlying MDA U is Qbt 3, typically a cliff-forming nonwelded to partially welded tuff.

Fill material was observed in all boreholes. The thickness of fill material ranged from 1.5 to 3.5 ft across the site, except along the eastern side of MDA U, where the thickness ranged from 18 to 20.3 ft.

Quaternary Bandelier Tuff Unit 3

Qbt 3 is approximately 100 ft thick and consists primarily of nonwelded to moderately welded ash flow tuff (ignimbrite). The degree of welding and thus the fracture density increase down-section. A target sample interval occurred from 50 to 75 ft bgs, a depth of known clay-filled fractures and thus a potential pathway for contaminant migration. Historically, observed fractures tended to be vertical (Broxton and Eller 1995, 58207) and filled with strong brown clays and detritus washed into fracture zones from the surface. Fracture zones encountered during 2005 characterization drilling activity averaged 1 in. Fracture zones were not continuous throughout the site; the highest frequency of fracturing and stained zones was observed in boreholes BH-06 and BH-03 along the west and northwest side, respectively, of MDA U.

Quaternary Bandelier Tuff Unit 2

Qbt 2 is typically 82 to 90 ft-thick and is a vertical cliff-forming unit with an upper contact defined by the appearance of relatively thin, unconsolidated, nonwelded tuff. The degree of welding is greatest in this unit toward the bottom of the section and contains abundant phenocrysts, especially sanidine, and pumice fragments. Fracture zones are prevalent in this unit and were sampled when encountered in BH-04 during characterization activities performed in 2005.

Quaternary Bandelier Tuff Units 1v and 1g

Qbt 1v vapor-phase unit separates Qbt 1g-glass phase from the overlying Qbt 2. Qbt 1v varies in thickness from 52 to 66 ft at MDA U and is primarily a nonwelded, devitrified ignimbrite. The uppermost portion of Qbt 1v is a slope-forming, nonwelded ash flow tuff, rich in pumice clasts and increasing up section in vapor-phase alteration. Moisture content was noted to increase in Qbt 1v at 225 to 230 ft bgs, the observed contact with the basal layer of Qbt 1v, a distinct, orange-brown devitrified tuff forming columnar joints. This basal colonnade tuff separates the light gray-white nonwelded ash flow of the upper unit 1v from the white-light pinkish gray nonwelded tuff of Qbt 1g.

Unit Qbt 1g-glass phase of the lower Tshirege Member varies across the Pajarito Plateau from 72 to 105 ft in thickness. The thickness of Qbt 1g was observed to be approximately 80 ft at MDA U. This unit is cliff-forming because of the prominent protective bench at the top of the unit; the rest of the unit is a poorly indurated, softer, more massive tuff. This unit is described in detail in the borehole log for BH-04 in Appendix D.

Tsankawi Pumice Bed

The Tsankawi Pumice Bed is the basal pumice fall of the Tshirege Member and is approximately 3 ft thick at MDA U. It is a pumice-rich pyroclastic ash flow tuff and is a distinct unit of coarse ash matrix containing large, fibrous pumice fragments with a vitreous luster and abundant phenocrysts.

An erosional surface of weathered tuff overlying the Cerro Toledo interval between the Tsankawi Pumice Bed indicates a period of exposure and erosion before deposition of the overlying pumice bed. Though this soil horizon may be a barrier to potential contamination migration, pumice beds tend to form a more porous and permeable horizon that can act as a conduit for contaminant migration.

Cerro Toledo and Otowi Intervals

Tshirege and Otowi Members are separated by the Cerro Toledo interval, a volcaniclastic sequence of sediments deposited in braided stream systems (Broxton and Eller 1995, 58207). The Bandelier Tuff and deposits of the Cerro Toledo interval are derived primarily from explosive volcanic eruptions approximately 1.2 Ma (Broxton and Eller 1995, 58207). The Qct interval underlying MDA U is a sequence of at least five different pyroclastic eruptions of silica-rich rhyolites interbedded with fluvial sand and gravel deposits. Other interbedded material observed was poorly sorted sand, gravel, cobble, and boulder deposits derived from lava flows from an earlier depositional activity. Erosional surfaces are common among the interbedded sequences and tuffaceous sands were prevalent. These tuffaceous sand zones contained the highest moisture content observed in the deep borehole. In the Cerro Toledo, the interval of highest moisture content was observed from 335 to 342 ft bgs.

Drilling advanced 20 ft into the Otowi Member, which it is estimated to be approximately 180 ft at MDA U. The Otowi Member is a light-gray to white ash-flow tuff with light-gray to orange-gray pumice clasts. The purpose of drilling into Otowi Member was to finalize site characterization and to gain a more thorough understanding of the Cerro Toledo interval underlying MDA U.

Subsurface lithology through MDA U is presented on two cross sections of the site that intersect at the deep borehole, BH-04. The cross-section locations are shown on Figure 4.4-1. Cross section a-a’ is presented from west to east through boreholes completed in 1998 and 2005 as well as both absorption beds (Figure 4.4-2). Cross section b-b’ is presented from south to north through boreholes completed in 2005 and the distribution box in the center of MDA U (Figure 4.4-3).

4.5 Exploratory Borehole Abandonment

The boreholes were plugged and abandoned in July 2006, according to SOP-05.03, “Monitoring Well and RFI Borehole Abandonment” (Appendix C), following completion of the second pore-gas sampling event.

4.6 Groundwater

The degree of surface disturbance and the geologic properties of the Bandelier Tuff at MDA U lead to differences in groundwater recharge rates. Mesa-top recharge can be locally significant when vegetation is removed, soil and near-surface bedrock are disturbed, or water is artificially added to the local hydrologic system by activities such as effluent disposal. All these conditions occurred in the past at MDA U. However, no effluent has been discharged to the absorption beds since 1976, and the site is densely vegetated with native shrubs, forbs, and grasses.

Two geologic properties of the Bandelier Tuff that influence recharge rates are the degree of welding and devitrification, both effects of the prolonged presence of residual gases and high temperatures following deposition. Because different tuff units were deposited at different temperatures and because individual units were laid out in variable thicknesses over different landscapes, cooling was not uniform. Consequently, welding varies spatially, both between and within separate depositional layers. Welded tuffs tend to be more fractured than nonwelded tuffs. Fractures within the tuff, however, do not enhance the movement of dissolved contaminants unless saturated conditions exist.

Although saturated conditions do not currently exist at MDA U, they may have existed beneath the absorption beds during active waste water disposal from 1945 to 1976. A gravimetric water content of 38% is the typical value for saturation in Bandelier Tuff (Broxton and Eller 1995, 58207). The moisture levels measured in boreholes drilled under the absorption beds during the Phase I RFI are relatively low (LANL 1998, 87294). From 0 to 75 ft bgs, the gravimetric water content was measured at values between 3% and 16% (LANL 2004, 87454). At these moisture levels, the fractures beneath the site are probably not saturated. Only in situations when substantial infiltration occurs from the ground surface, as was potentially the case under the active absorption beds, will the fractures become wet and conduct water. However, modeling studies predict that when fractures disappear at contacts between stratigraphic subunits, when fracture fills are encountered, or when fracture coatings are interrupted, fracture moisture is absorbed into the tuff matrix (Soll and Birdsell 1998, 70011).

Perched groundwater zones are defined as saturated zones located above the regional aquifer and are thought to form mainly at horizons where medium properties change dramatically, such as at paleosol horizons with clay or caliche found in basalt and volcanic sediment sequences (Broxton and Eller 1995, 58207). The Cerro Toledo interval, the Guaje Pumice Bed, and the Puye Formation are examples of significant hydrogeologic property changes in the local stratigraphic sequence where a perched saturation zone may exist.

Perched saturation zones have been observed in some locations on the plateau within approximately 1.25 mi of MDA U, such as at LADP-3 to the southwest in Los Alamos Canyon (in the Guaje Pumice Bed at 6430 ft amsl), R-7 to the south (in the Puye Formation at 6420 ft amsl), and Otowi-4 on the eastern base of DP Mesa (in the Puye Formation at 6380 ft amsl). The Cerro Toledo interval beneath MDA U was encountered at approximately 6793 ft amsl; a perched saturation zone was not observed in the Cerro Toledo interval, nor was there evidence of saturated zones in the subsurface at MDA U.

The regional aquifer is approximately 1300 ft bgs at MDA U. Groundwater was not encountered beneath MDA U during the 2005 drilling. Therefore, groundwater is not a medium of concern at this site.

4.7 Surface Water

Surface water is not present at MDA U.

4.8 Surface Air and Subsurface Vapor Conditions

Surface air monitoring was conducted at MDA U to gauge the amount of airborne particulates using an analog version personal DataRAM. Two monitors were on-site at all times.

Results from airborne particulate monitoring are presented in Table 4.8-1. Air-monitoring results are provided as time-weighted averages (TWA)—the cumulative total for each day's field activities—in units of milligrams per cubic meter. The primary area of concern for airborne particulates during characterization drilling was nearest to the drill rig. When drilling was being performed, airborne particulate volume increased because of the invasive nature of drilling and the fine-grained matrix being drilled. According to the site-specific health and safety plan (SSHASP) for MDA U activities, action levels for dust were 2.0 mg/m^3. At no time, however, did dust levels exceed action levels. The highest volume of dust recorded nearest the drill rig was 0.099 mg/m^3. At the sample preparation table during high wind events the highest recorded value was 0.100 mg/m^3.

Subsurface vapor monitoring was performed at MDA U in September and October 2005 and again during June and July 2006. Pore-gas samples were collected in the field following SOP-06.31, "Sampling of Subatmospheric Air." Pore-gas field screening and sampling are described in Section 3.2.3 (Tables 3.2-3) and Appendix C, and the results are presented in Section 6.2. Pore-gas samples were collected using a straddle-packer or single-packer system designed to isolate discrete 1-ft sample intervals. During the two pore-gas sampling events, a total of three samples were collected from each borehole: one at the depth adjacent to the approximate base of the absorption beds, one at the base of the open borehole (i.e., the top of the slough), and the third at TD. Before sampling, each interval was purged until the measurements of carbon dioxide were stable and representative of subsurface conditions. Subsurface pore-gas samples were collected in SUMMA canisters for VOC analysis following EPA Method TO-15. Silica gel samplers were used to collect samples for tritium analysis following EPA Method 906.0. The results of the pore-gas sampling are presented in Section 6.3 and Appendix B.

4.9 Materials Testing Results

Geotechnical characterization was conducted in the deep borehole, BH-04, to define the geotechnical properties of bedrock units underlying the absorption beds at MDA U. BH-04 was located in the center of MDA U near the former distribution box and between the two absorption beds. Samples were collected in 0.5-ft intervals using lexan tubes. Geotechnical samples were collected in each operable unit from Qbt 3 through to Otowi Member, as described in Section 3.2.2.

Lexan tubes were placed inside the split-spoon core barrel, and the material was inserted directly into the sampling tube during drilling to collect an undisturbed representation of the subsurface. When the core barrel was retrieved, the lexan tubes were sealed at each open end using duct tape, the interval was labeled, and the samples were then sent by the SMO to a fixed geotechnical laboratory for analysis of moisture, bulk density, porosity, and saturated and unsaturated hydraulic conductivity.

The results of the geotechnical analysis are presented in Table 4.9-1, including sample identification, sample interval, media code, and sample date. Geotechnical analyses conducted include percent moisture, bulk density (American Society for Testing and Materials [ASTM] D2937), saturated/unsaturated hydraulic conductivity (ASTM D2434), gravimetric moisture content (ASTM D2216V), and calculated total porosity (Methods of Soil Analysis [MOSA] 18-1986). Test methods for geotechnical analysis are regulated under ASTM and MOSA and produced by the American Society of Agronomy. Table 4.9-1 also presents summary statistics of the geotechnical data (minimum, maximum, median, and average values).

Two zones with elevated saturated hydraulic conductivity were delineated: one in Qbt 1v and one in the Cerro Toledo interval. A spike in bulk density was identified in Qbt 2, which also coincided with a drop in the calculated total porosity. Through the entire borehole, there was an inverse relationship between bulk density and total porosity. Also, a significant drop occurred in saturated hydraulic conductivity from unit Qbt 3 to Qbt 2. At 147.5 ft bgs, the saturated hydraulic conductivity was the lowest in the interval, except for the shallow interval and borehole TD (358 ft). Other geotechnical results from BH-04 include the following.

- As measured in situ using a neutron probe, the percent moisture ranged from 2.2% to 39.2%, with a median value of 8.6%. The moisture tended to increase toward the bottom of the borehole, with moisture observed in two intervals: 230 to 230.5 ft bgs (27.1%) and 357.5 to 358 ft bgs (39.2%). The defined zones of moisture measured historically in Bandelier Tuff at TA-21 had moisture contents of approximately 39% (Broxton and Eller 1995, 58207).
- The gravimetric/volumetric moisture content in BH-04 ranged from 2.8% to 37.4%, with a median value of 12.3%. A general increasing trend of moisture content occurred downhole; however, two significant spikes occurred, one at interval from 230 to 230.5 ft bgs (31.9%) and from 337.5 to 338 ft bgs (37.4%). These two spikes coincide with observed moisture zones encountered in unit Qbt 1v near the contact with Qbt 1g and again at the base of the Cerro Toledo sands near the contact with the Otowi Member.
- Saturated hydraulic conductivity (K_{sat}) values for tuff at MDA U range from 0.00022 to 0.017 cm/sec, with a median value of 0.0036 cm/s. A slight increase in K_{sat} occurred down-section to 23 ft bgs with K_{sat} and decreased continuously with depth. A spike in K_{sat} occurred in the sample interval from 97 to 99 ft bgs, which coincided with the Qbt 3/Qbt 2 contact. K_{sat} decreased significantly in unit Qbt 3 but then continued an increasing trend with spikes at 321 to 321.5 ft bgs and 337.5 to 338 ft bgs.
- Bulk density in tuff at MDA U ranged from 1.0 to 1.6 gm/cm^3, with a median value of 1.2 gm/cm^3. A spike in bulk density occurred at 147.5 to 148 ft, with a value of 1.56 gm/cm^3.
- Total porosity at MDA U ranged in value from 41.1% to 63.9%, with a median value of 53.3%. A significant drop in porosity occurred in unit Qbt 2at 147.5 to 148 ft bgs. Below unit Qbt 2, the porosity tended to increase again to TD, where another slight drop occurred from 357.5 to 358 ft bgs.

The geotechnical results for BH-04 are consistent with observed stratigraphy. An increase in moisture content was measured near the basal contact of Qbt 1v with Qbt 1g from 230 to 235 ft bgs and in the

Cerro Toledo interval from 335 to 342 ft bgs in a fluvial zone of tuffaceous sands. The lithological change at 230 ft bgs was between a more resistant, cliff-forming unit and a soft, vapor-phase, easily weathered unit conducive to subsurface fluid migration. Although moisture was observed in this interval, no evidence indicates this zone is or was connected to a larger network for fluid migration. Moisture in the Cerro Toledo interval was observed in a fluvial tuffaceous sands zone from 335 to 342 ft bgs. This zone also did not appear to have any connection to a larger system.

5.0 REGULATORY CRITERIA

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

In accordance with the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), all relevant and qualified data collected at MDA U historically and during the 2005/2006 characterization activities were evaluated in screening risk assessments (Appendix H). “Relevant data” refers to all samples collected between the surface and 10 ft bgs, and “qualified data” refers to data validated to current standards for data usability.

The human health screening assessment was performed according to NMED and EPA Region 6 guidance (NMED 2005, 90802; EPA 2005, 91002). Soil screening levels (SSLs) used in the human health screening assessment are presented in Appendix H (Table H-4.1-1) and were based on NMED SSLs (NMED 2005, 90802) and EPA Region 6 screening values (EPA 2005, 91002). Screening action levels (SALs) were used to screen radionuclides (LANL 2005, 88493) and were calculated using the radioactive residual materials (RESRAD) model (Appendix H, Table H-4.1-2). As specified in Section VIII.B.1 of the Consent Order, these screening levels will be used as soil cleanup levels unless they are determined to be impracticable or unless values do not exist for the current and reasonably foreseeable future land use. Because the current and reasonably foreseeable future land use is industrial, the industrial SSLs/SALs are the cleanup levels for these sites.

The cleanup goals specified in Section VIII of the Consent Order are a target risk level of 10^{-5} for carcinogens or a hazard index (HI) of 1.0 for noncarcinogens. For radionuclides, the target dose is 15 mrem/yr based on DOE guidance (DOE 2000, 67153). The screening levels presented in Appendix H are based on these cleanup goals.

The ecological screening assessment was performed according to Laboratory guidance (LANL 2004, 87630), and the ecological screening levels used in the screening assessment were obtained from the ECORISK Database, Version 2.2 (LANL 2005, 90032) (Appendix H, Table H-5.2-1).

6.0 SITE CONTAMINATION

The following sections summarize the results of field-screening and fixed analytical sampling performed during characterization activities at MDA U. Appendix B provides details of the analytical results.

6.1 Sampling Summary

With the exceptions presented in Appendix C, sampling and analysis were conducted as specified in the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611). Additional samples were collected at intervals of elevated field-screening levels, fracture zones, and zones of elevated soil-moisture content.

6.1.1 Soil, Rock, and Sediment Sampling

As described in Section 3.2.1, 9 boreholes were drilled at MDA U, and a total of 55 surface and subsurface samples were collected for chemical analysis. The samples were collected at target depths in 2-ft intervals as follows: one surface sample at each borehole before drilling (for a total of 9); 46 subsurface samples; 6 field duplicates (5 subsurface and 1 surface duplicate); 4 trip blanks; and 4 rinsate blanks. Tables 3.1-1 and 3.2-1 list the samples collected in 2005 from the surface and subsurface, respectively.

6.1.2 Vapor Sampling

As described in Sections 3.2.3 and 4.8, subsurface pore-gas samples were collected from each of the nine boreholes during September and October 2005, and again during June and July 2006. Table 3.2-3 presents a summary of pore-gas sampling intervals at MDA U.

6.2 Field-Screening Results

The following sections summarize field-screening results for radioactivity and VOCs from the 2005 characterization drilling.

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

This section summarizes the results of field screening for radioactivity and VOCs, which was performed continuously on core samples from all boreholes during characterization drilling.

Field Screening for Radioactivity

Field screening of subsurface material for radioactivity was performed continuously throughout all characterization drilling, as described in Section 3.2.1 and Appendix C-2.2. The field-screening results for radioactivity from 2005 drilling are provided in Table 6.2-1.

Local background levels, calculated twice daily in ambient air, were consistent within each borehole across the site but varied with changes in borehole location, date, and other environmental factors such as temperature, wind speed, and humidity. Field-screening levels for alpha and beta emitters were also consistent within each borehole, and all measurements were less than two times the local background levels (the target for sample collection based on elevated radioactivity). The consistency of local background levels across the site provided a baseline for naturally occurring radioactivity and also was used throughout characterization drilling as the target to sample based on elevated radiation levels. No samples were collected at MDA U based on elevated radioactivity.

Field Screening for VOCs

Field screening for organic vapors was conducted on each core sample throughout characterization drilling, as described in Section 3.2.1 and Appendix C-2.1. The results of field screening for VOCs are presented in Table 6.2-1.

Local background levels were measured from ambient air and recorded in parts per million. One sample interval had a field-screening result one order of magnitude greater than local background levels and was collected for laboratory analysis. This sample (MD21-05-61052) was located at BH-07 in the 67 to 69 ft bgs interval and was analyzed for dioxins, furans, and HE, in addition to the analyses performed for other samples. No other samples were collected based on elevated VOC field-screening results at MDA U.

6.2.2 Vapor-Sampling Field-Screening Results

All boreholes were purged and screened for carbon dioxide during pore-gas sampling, as described in Section 4.8. In addition, a PID was used to screen for VOCs during the first pore-gas sampling event. The results are presented in Table 6.2-2.

6.3 Analytical Laboratory Results

6.3.1 Soil, Rock, and Sediment Sampling Analytical Results

Analytical results for soil, tuff, and sediment samples (from drainage channel into DP Canyon) collected at MDA U in 1992, 1994, 1998, 2001, and 2005 are summarized in Appendix B. Appendix B also presents an overview of the comparison of the analytical results to BV and/or fallout values (FVs) for inorganic chemicals and radionuclides. The data for all of the samples in Appendix B are provided in Appendix F (on CD accompanying this report).

Inorganic COPCs are listed in Table 6.3-1. The analytical results for which inorganic COPCs were detected above BVs are provided for soil and fill (Table 6.3-2), sediment (Table 6.3-3), and tuff (Table 6.3-4). The locations and analytical results of inorganic chemicals above BVs are shown in Figure 6.3-1 for surface samples (0 to 1 ft) and Figure 6.3-2 for subsurface samples (greater than 1 ft).

The radionuclides identified as COPCs are listed in Table 6.3-1. The analytical results of samples for which radionuclide COPCs were detected above BVs or FVs are provided for soil and fill (Table 6.3-5), sediment (Table 6.3-6), and tuff (Table 6.3-7). The locations and analytical results of radionuclides detected above BVs or FVs are shown in Plate 1 for surface samples (0 to 1 ft) and Figure 6.3-3 for subsurface samples (greater than 1 ft).

Numerous organic chemicals were detected in samples from MDA U. Organic chemicals were retained as COPCs according to their detection status. The organic chemicals identified as COPCs are listed in Table 6.3-1. The analytical results of samples for which organic COPCs were detected are provided for soil and fill (Table 6.3-8), sediment (Table 6.3-9), and tuff (Table 6.3-10). The locations and concentrations of detected organic chemicals are shown in Figure 6.3-4 for surface samples (0 to 1 ft) and Figure 6.3-5 for subsurface samples (greater than 1 ft).

6.3.2 Vapor-Sampling Analytical Results

The analytical results for all MDA U pore-gas samples are summarized in Appendix B, and the complete datasets are included in Appendix F.

The analytical results of tritium and VOCs detected in pore gas are presented in Table 6.3-11. The analytes identified as COPCs based on pore-gas sampling are listed in Table 6.3-1. The locations and analytical results of detections of tritium and VOCs in pore gas are shown in Figure 6.3-6.

7.0 CONCLUSIONS

7.1 Summary of the Investigation Activities

The primary objective of this investigation was to finalize characterization at MDA U. The drilling and sampling activities were performed in accordance with the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), with the exceptions outlined in Appendix C.

During drilling activities in 2005, nine vertical boreholes were advanced in and around MDA U for a total linear footage of 1314 ft. Field screening of radioactivity and VOCs was conducted continuously to monitor health and safety and to determine whether collecting additional samples for laboratory analysis was warranted.

Drilling was completed to characterize the nature and extent of contamination associated with MDA U. The analytical suites and borehole locations satisfied NMED (NMED 2005, 90611) and Consent Order requirements. The data needs identified in the approved work plan were adequately addressed, as detailed in Appendix B and summarized below.

- The vertical extent of tritium in both tuff and pore-gas samples has been defined. Tritium was not detected in any 2005 tuff samples from the boreholes drilled around the perimeter of MDA U. Tritium was detected in the deepest borehole, drilled in the center of MDA U, at values ranging from 0.06 to 0.3 pCi/g. These concentrations correspond with moisture zones at the bottom of the borehole. The highest concentration of tritium in pore gas occurred in the 2005 sample collected in the center of MDA U at a depth of 12 ft bgs; tritium generally decreased with depth and distance away from MDA U and TSTA.[11]
- The vertical and lateral extent of uranium-234 as well as uranium-235 in the western half of the site have been characterized. These radionuclides show consistent decreasing trends with depth and with distance from the western absorption bed.
- The extent of actinium-227 progeny has been characterized at MDA U. The presence of actinium-227 progeny is limited to the fill material within the absorption beds.
- Thirty-six VOCs were detected in pore-gas samples from MDA U. The highest detected concentrations of VOCs in pore gas generally occurred in the1998 boreholes within and immediately adjacent to the MDA U absorption beds. Toluene was the most commonly detected VOC in pore gas. Toluene concentrations were the highest in pore-gas samples from 1998 boreholes drilled along the northern edge of the absorption beds and decreased with distance in all directions. Toluene was either not detected or detected at very low concentrations in the TD pore-gas samples collected in 2006. In addition, all detected concentrations of toluene in tuff samples were below the estimated quantitation limit (EQL). Therefore, the extent of toluene and other VOCs in the subsurface at MDA U is adequately defined.
- All samples collected in 2005 were analyzed for cyanide, nitrates, and perchlorate. Cyanide was not detected in any samples from the site. Perchlorate and nitrates were detected in few samples at low concentrations. The distribution of perchlorate and nitrates at MDA U was not indicative of a release, and neither chemical persisted at depth. Therefore, the nature and extent of cyanide, nitrates, and perchlorate have been defined at MDA U.

The results of the analytical sampling indicate the vertical and lateral extent of contamination of inorganic chemicals, radionuclides, and organic chemicals have been adequately defined at MDA U. In addition, no perched saturation zones were encountered during characterization drilling activity. Two zones with elevated moisture were encountered in the deep borehole, BH-04, but the moisture was not sufficient to allow for the water samples to be collected.

7.2 Comparisons to Screening Levels and Applicable Cleanup Levels

The historical data collected during RFI activities from 1992 to 2001, and additional data collected during the 2005/2006 characterization activities at MDA U were used to determine the COPCs in soil, fill, sediment, and tuff at the site and to complete risk assessments for human and ecological receptors to those COPCs. The COPCs identified for the site are presented in Appendix B. Screening-level comparisons for determining potential risks to human health (both industrial and construction worker receptors) and terrestrial ecological receptors are provided in Appendix H. The cleanup goals specified in Section VIII of the Consent Order are a target risk level of 10^{-5} for carcinogens or an HI of 1.0 for noncarcinogens. For radionuclides, the target dose is 15 mrem/yr based on DOE guidance (DOE 2000, 67153).

7.3 Risk Assessment Summary

7.3.1 Human Health Risk Screening Assessment

The results of the data review identified a number of inorganic, organic and radionuclide COPCs. A human health risk screening assessment (Appendix H) found no COPCs were retained following comparison with industrial and construction worker SSLs and SALs. The HIs (0.06 and 0.9, respectively) did not exceed NMED's target level of 1.0 for noncarcinogens (NMED 2005, 90802). The total excess cancer risks (4×10^{-6} and 2×10^{-6}, respectively) did not exceed NMED's target level of 10^{-5} for carcinogens (NMED 2005, 90802). The total doses (0.7 mrem/yr and 1.3 mrem/yr, respectively) did not exceed DOE's target dose of 15 mrem/yr (DOE 2000, 67153). The total dose of 0.7 mrem/yr is equivalent to a total risk of approximately 9×10^{-6} based on a comparison with EPA's preliminary remediation goals for an outdoor worker (epa-prgs.ornl.gov/radionuclides/download.shtml). The equivalent total risk for a construction worker is not provided because there are no EPA radionuclide PRGs for this activity. Based on these results, MDA U does not pose a potential unacceptable risk to human health under an industrial and a construction worker scenario.

7.3.2 Ecological Risk Screening Assessment

The ecological screening assessment (Appendix H) identified several chemicals of potential ecological concern (COPECs), including some COPECs without ESLs. All the COPECs were eliminated by analyzing a number of factors, including the potential effects to populations (individuals for threatened and endangered species), the area of contamination, the relative toxicity of related compounds, background concentrations, and infrequency of detections. The ecological screening assessment concluded that no potential risk to ecological receptors exists at MDA U.

7.4 Additional Data Requirements

No additional data are needed to characterize nature and extent or assess risk at MDA U. As presented in Appendix B and summarized above, the nature and extent of contamination at MDA U have been defined. Additionally, it was concluded that no perched saturation zones exist at MDA U. The human health and ecological risk screening assessments (Appendix H) conclude that no potential unacceptable risk is posed by COPCs in soil, fill, sediment, and tuff at MDA U. The site is industrial in nature, and it is expected to remain so for the reasonably foreseeable future under the institutional control of the Laboratory.

8.0 RECOMMENDATIONS

Based on the information presented in this investigation report, the characterization activities are complete at MDA U, in accordance with the approved investigation work plan (LANL 2004, 90801; NMED 2005, 90611). MDA U was adequately remediated in 1985, when the distribution box and piping, as well as a portion of the contaminated absorption bed materials, were removed.

The nature and extent of residual contamination have been defined, and it has been shown that the residual contamination does not pose a potential unacceptable risk to human health or the environment. Currently, the site is located within an industrial area under Laboratory (institutional) control. The site is expected to remain so for the reasonably foreseeable future. For these reasons, neither additional corrective action nor further characterization is warranted at MDA U. The Laboratory proposes that the three SWMUs within the MDA U boundary [SWMUs 21-017(a), 21-017(b), and 21-017(c)] be designated as "Complete with Controls," the control being the maintenance of land use as industrial.

9.0 REFERENCES AND MAP DATA SOURCES

9.1 References

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

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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9.2 Map Data Sources

Data sources for Figures 1.2-1 and 6.3-1 through 6.3-7 are provided in this section. The data sources for all other figures are indicated on the figures themselves.

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ER Location ID Points: Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1:2,500 Scale Data; 10 November 2005.

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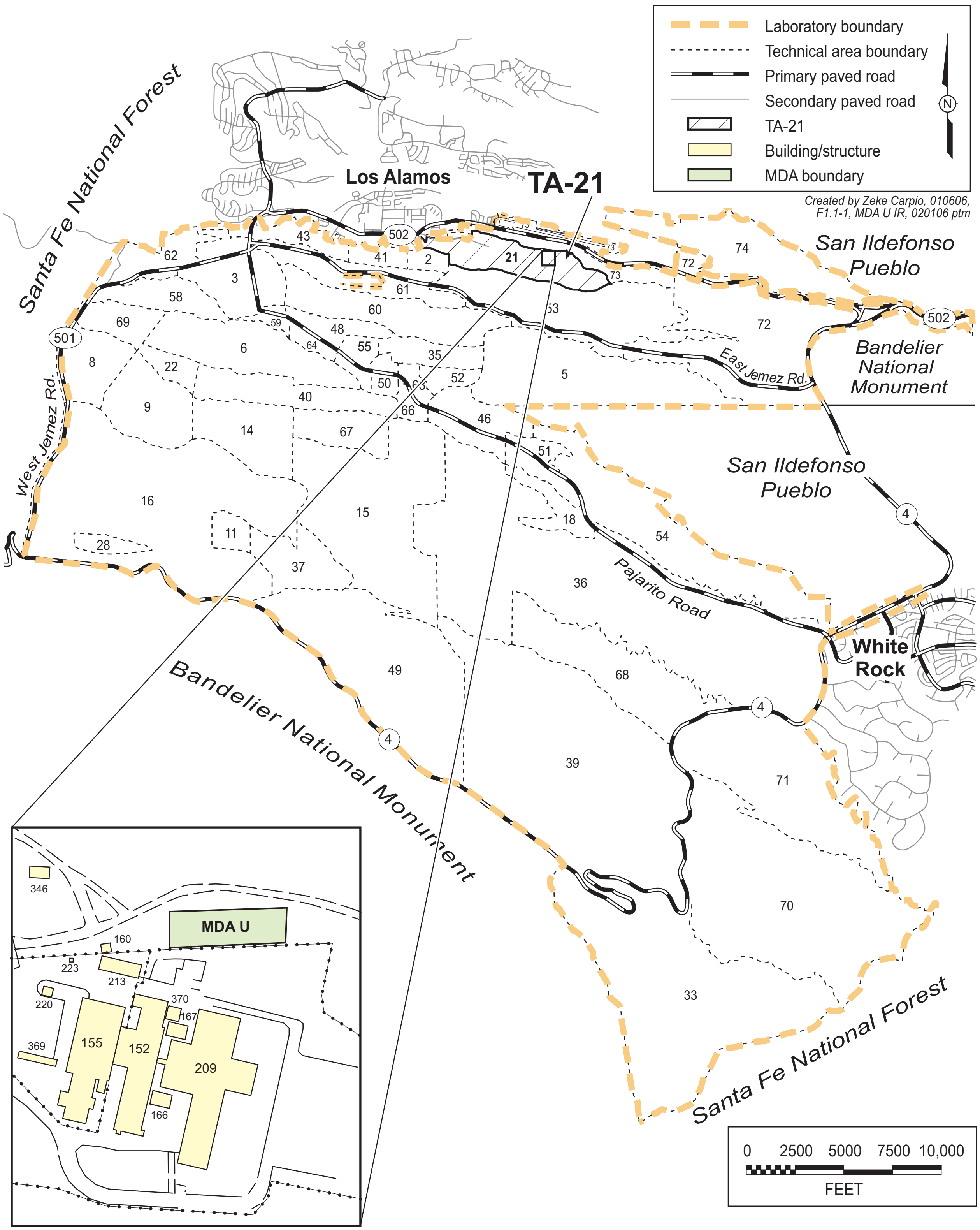

Figure 1.1-1. Location of MDA U in TA-21 with respect to Laboratory technical areas and surrounding land holdings

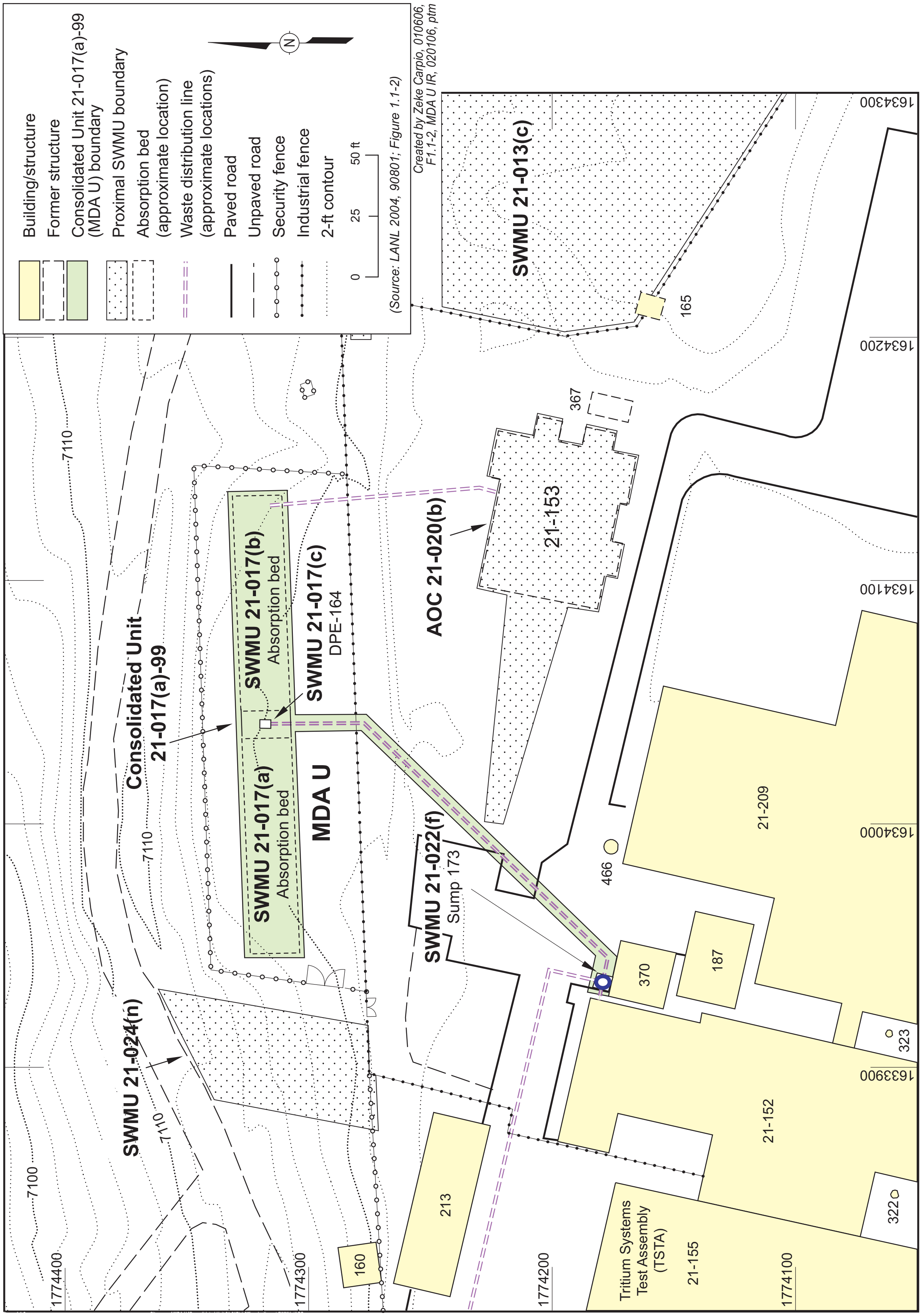

Figure 1.1-2. Site map of MDA U [Consolidated Unit 21-017(a)-99] and adjacent SWMUs/AOCs

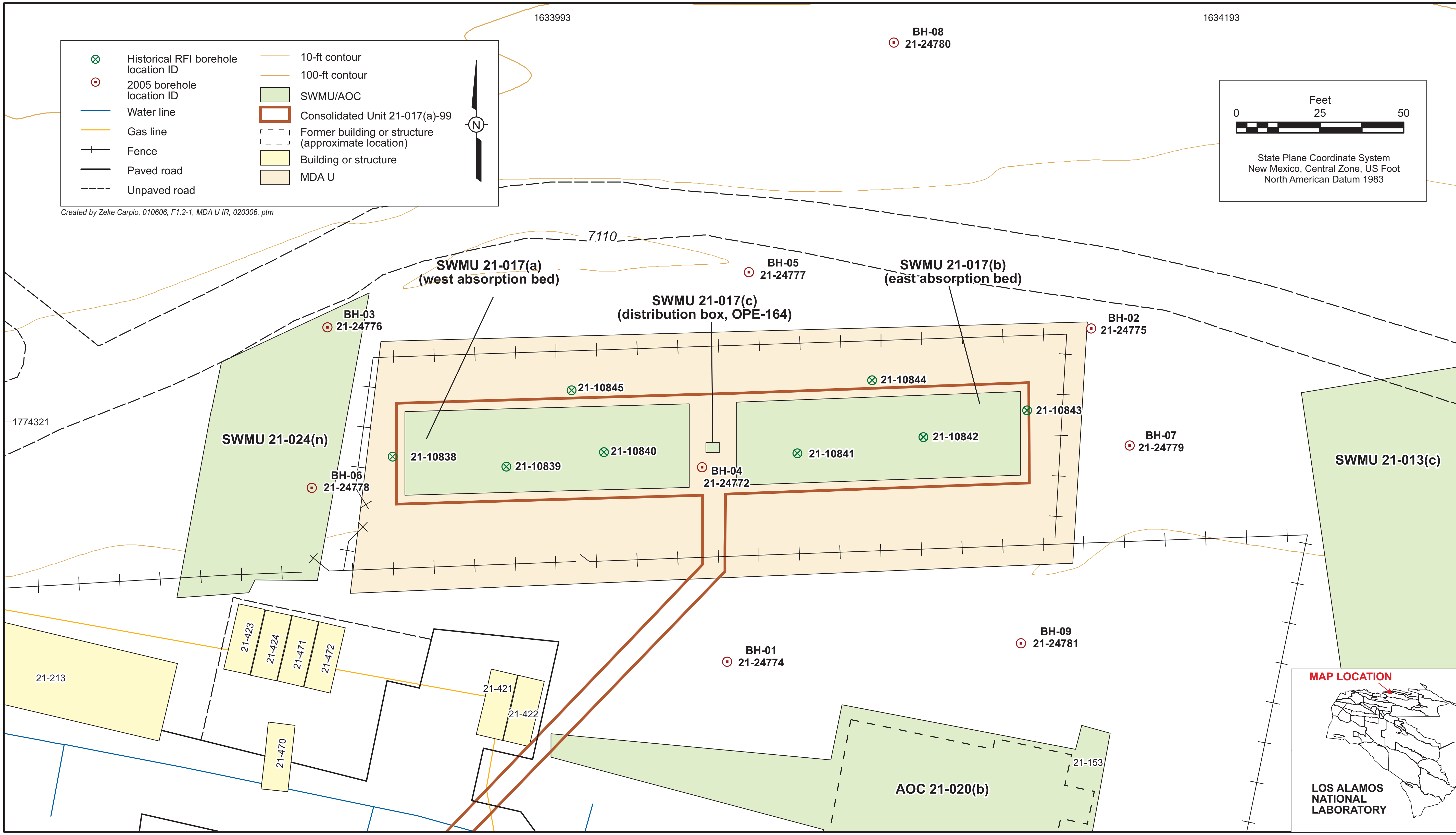

Figure 1.2-1. Location of boreholes at MDA U (1998 and 2005)

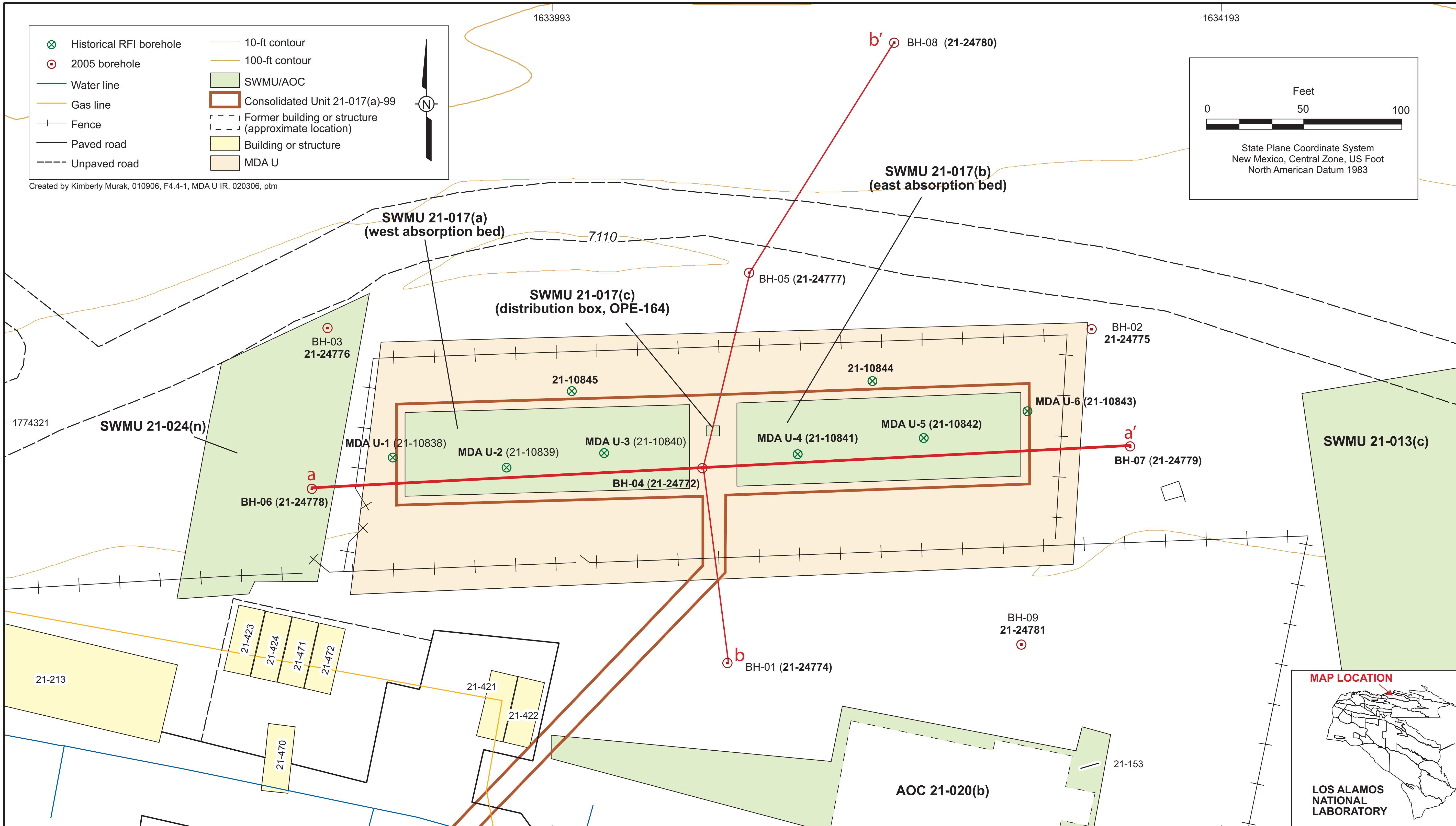

Figure 4.4-1. Cross section locations through MDA U boreholes

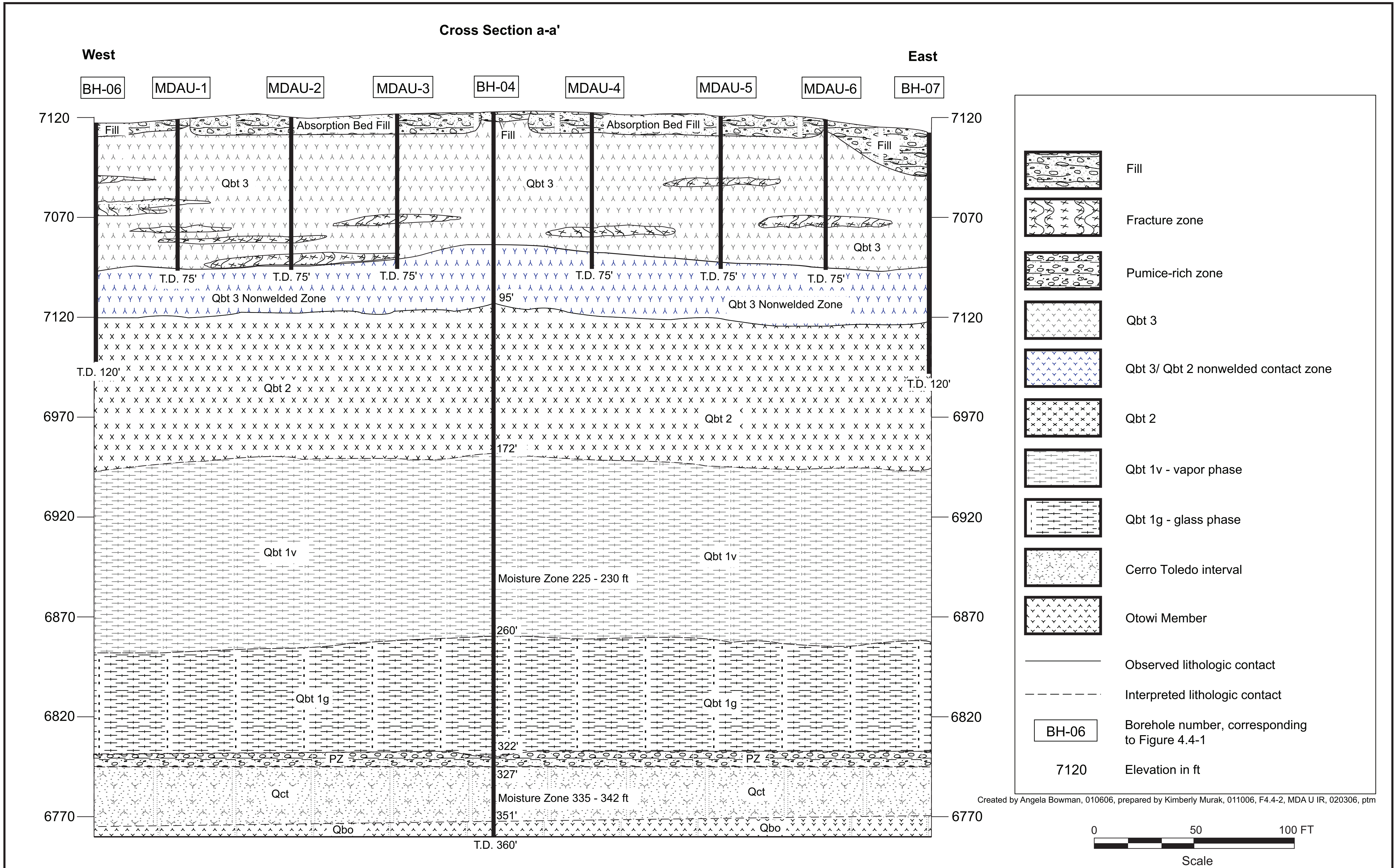

Figure 4.4-2. MDA U cross section showing subsurface lithology (west to east)

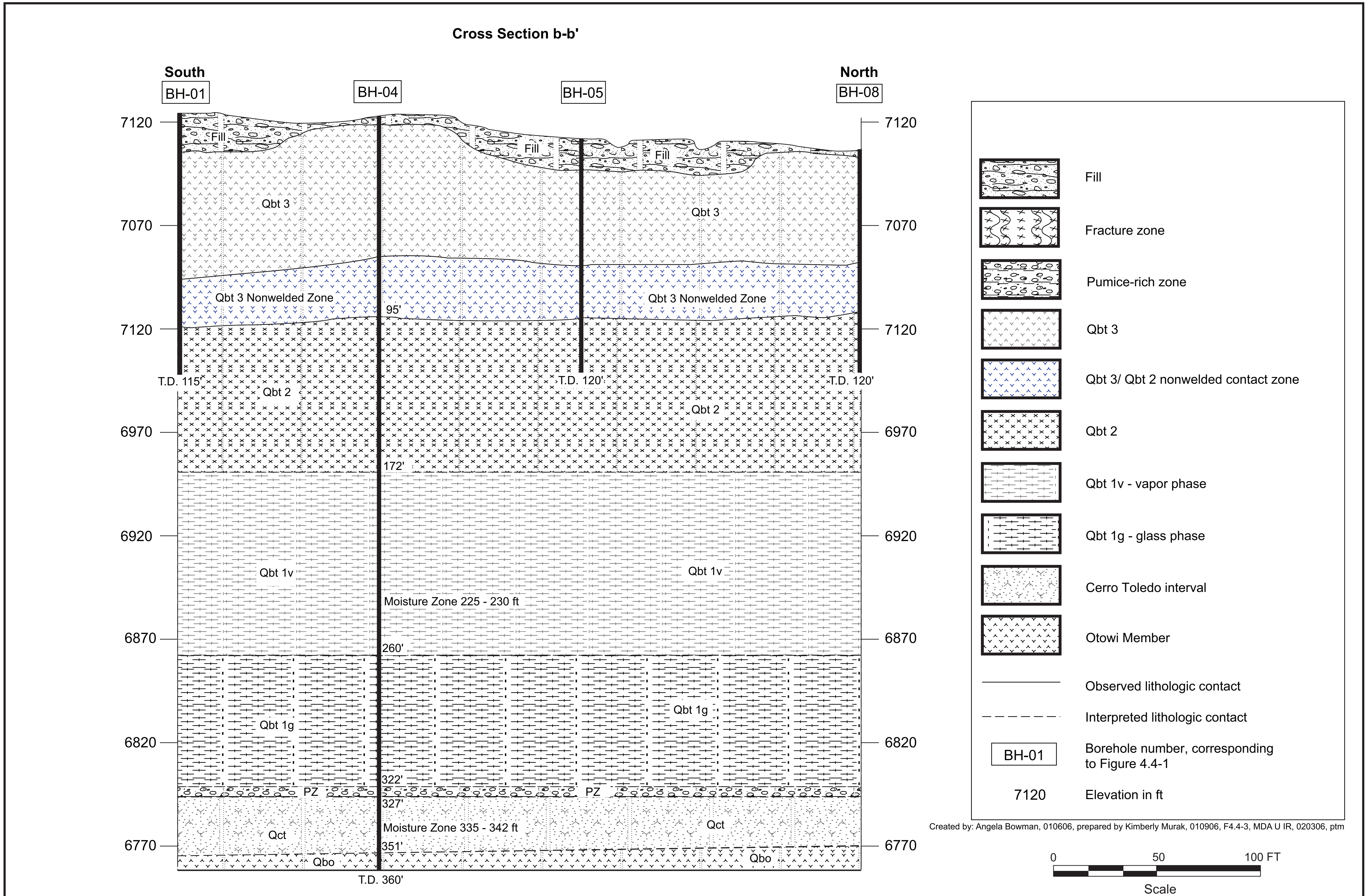

Figure 4.4-3. MDA U cross section showing subsurface lithology (south to north)

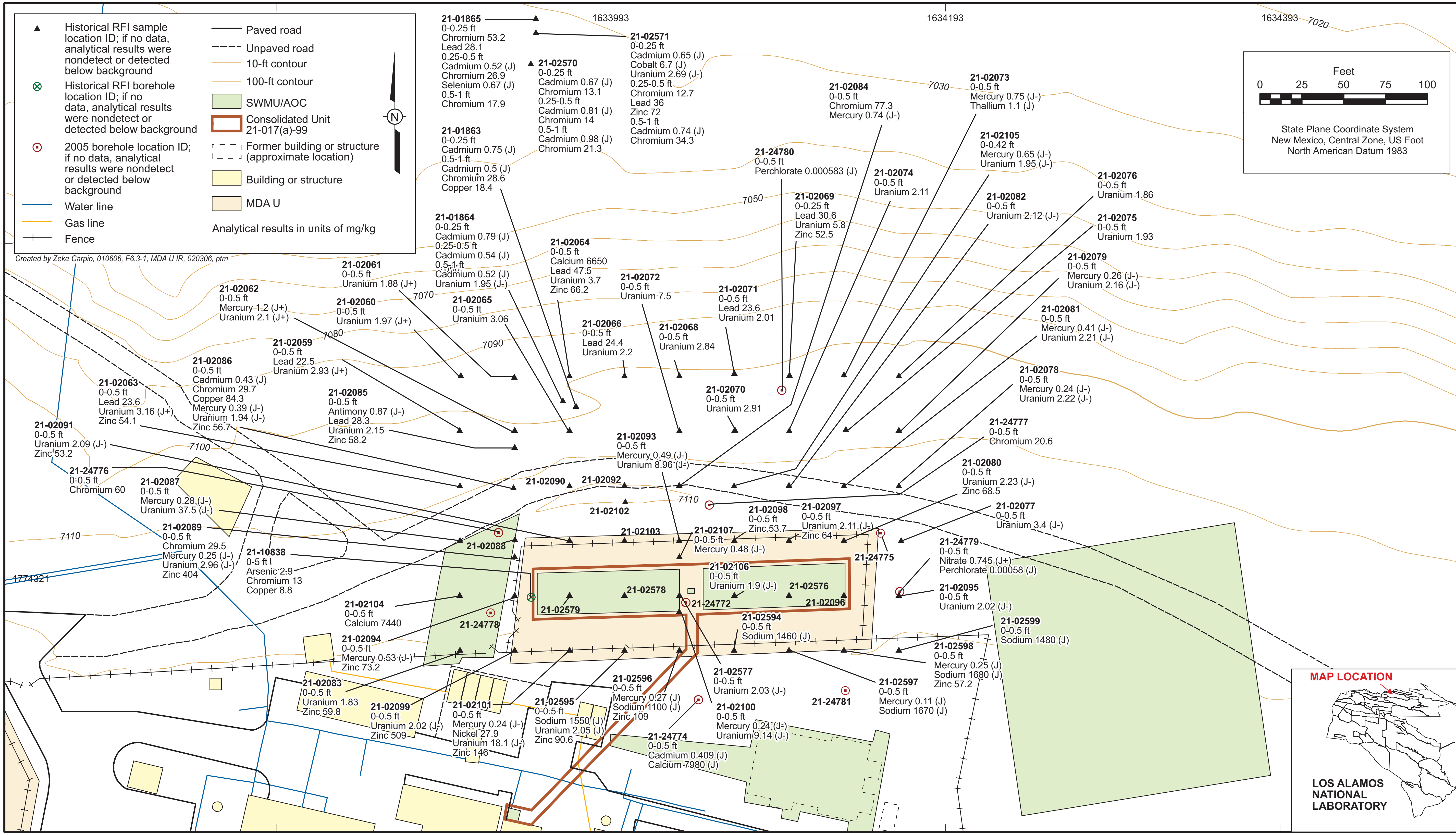

Figure 6.3-1. Inorganic chemicals detected above BVs in MDA U surface samples (0–1 ft)

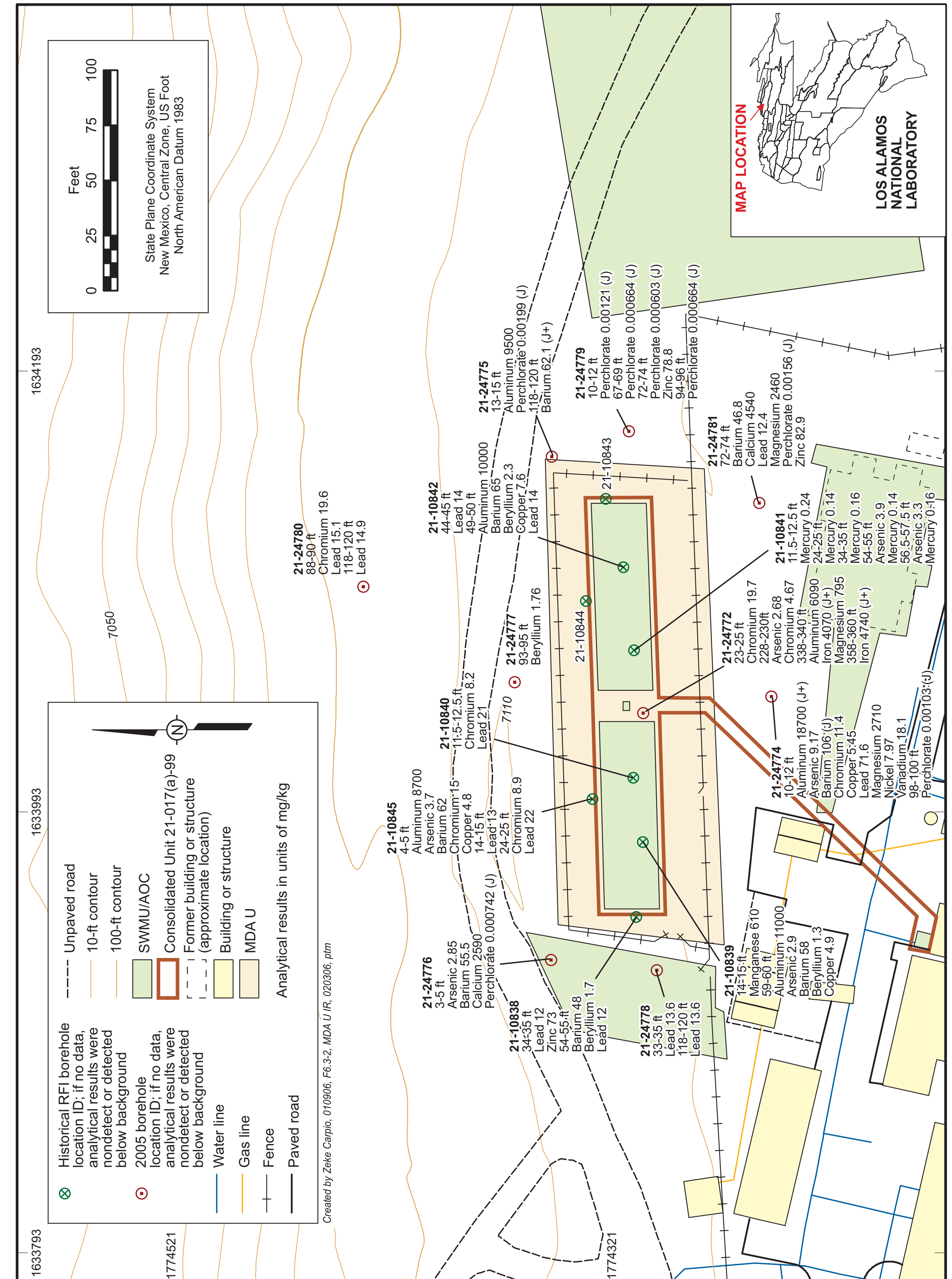

Figure 6.3-2. Inorganic chemicals detected above BVs in MDA U subsurface samples (greater than 1 ft)

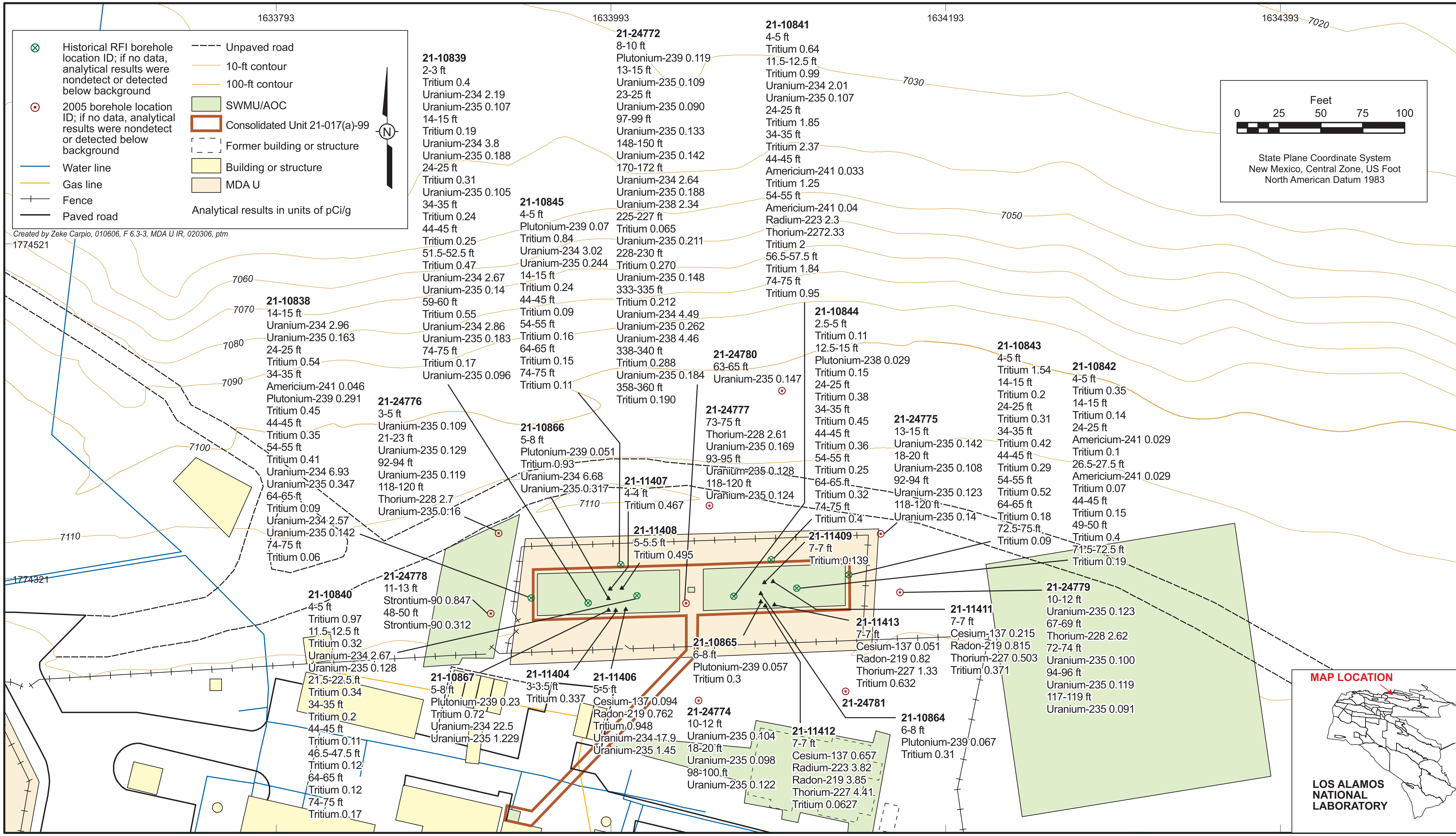

Figure 6.3-3. Radionuclides detected above BVs in MDA U subsurface samples (greater than 1 ft)

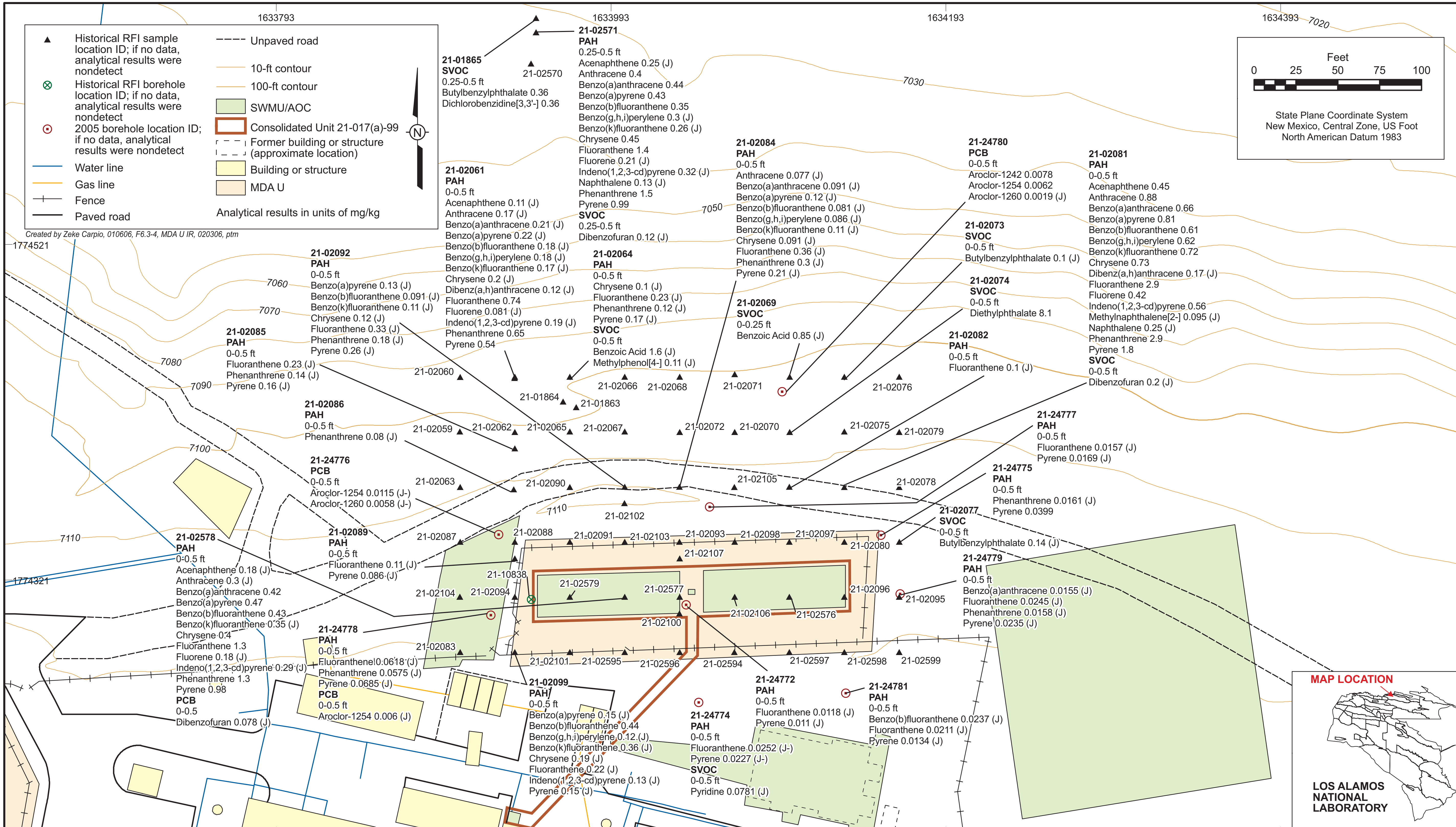

Figure 6.3-4. Organic chemicals detected in MDA U surface samples (0–1 ft)

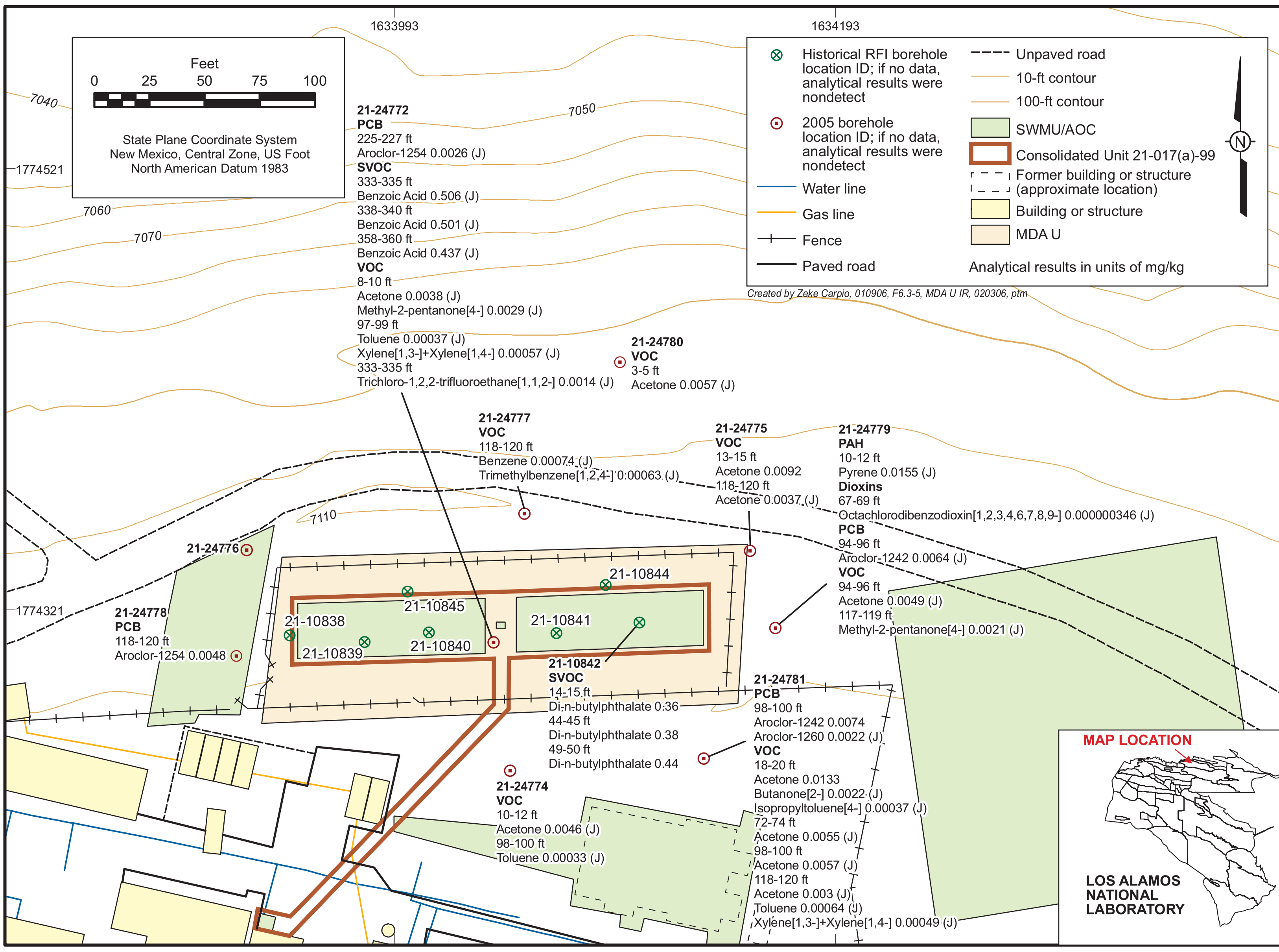

Figure 6.3-5. Organic chemicals detected in MDA U subsurface samples (greater than 1 ft)

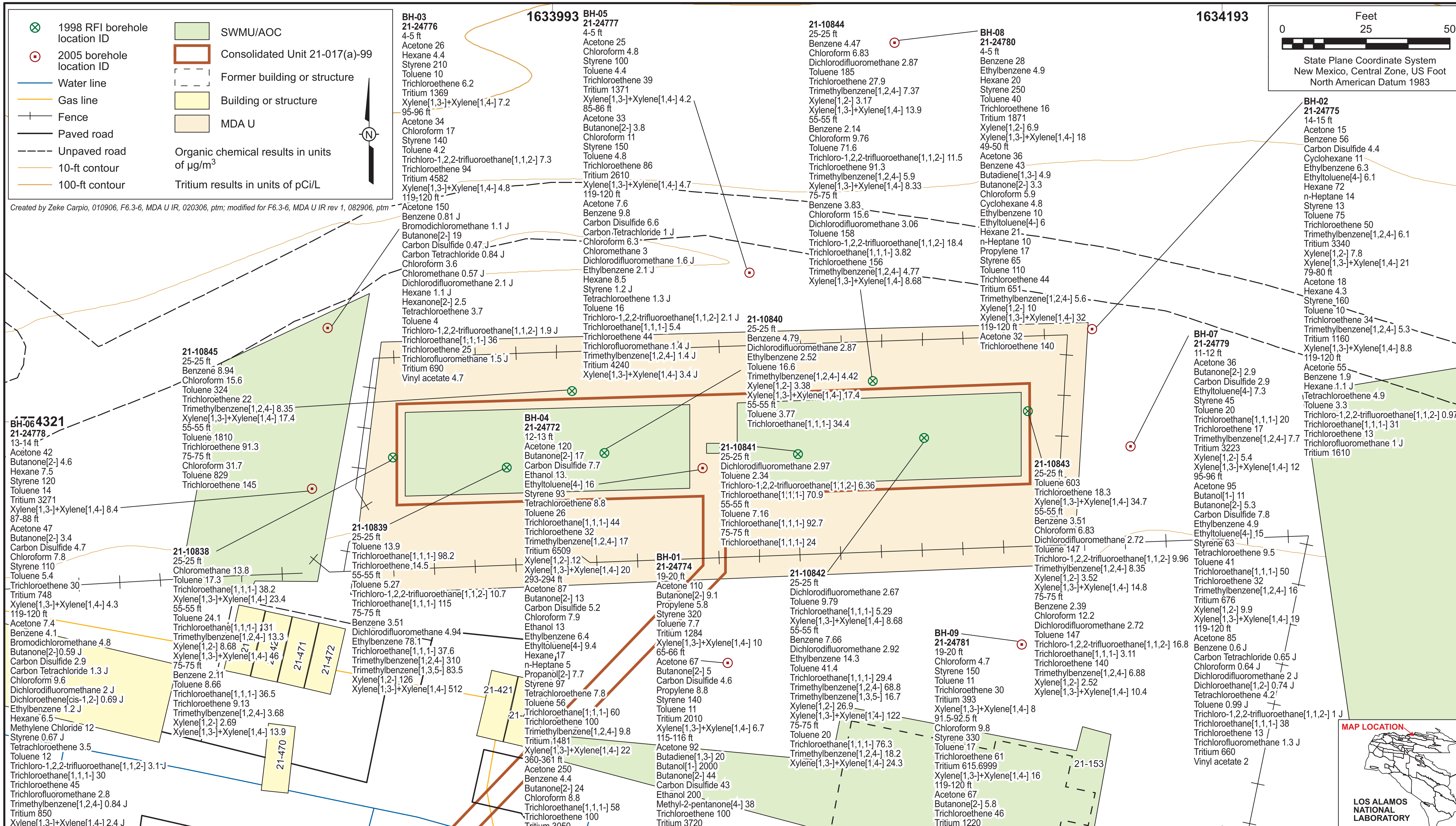

Figure 6.3-6. Organic chemicals and radionuclides detected in pore gas at MDA U

Table 3.0-1
Quality Procedures and Standard Operating Procedures Used for the 2005 Characterization Drilling Activities at MDA U

QP-2.1, Personnel Qualification and Selection Process
QP-2.2, Personnel Training Management
QP-3.4, Corrective Action Process
QP-3.5, Peer Review Process
QP-4.3, Records Management
QP-4.4, Record Transmittal to the Record Processing Facility
QP-4.5, Document Control
QP-4.9, Document Development and Approval Process: Peer Review Required
QP-5.2, Control of Measuring and Test Equipment
QP-5.3, Readiness Planning and Review
QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities
QP-7.1, Procurement
QP-8.1, Inspection and Acceptance Testing
QP-10.3, Stop Work and Restart
SOP-01.01, General Instructions for Field Investigations
SOP-01.02, Sample Containers and Preservation
SOP-01.03, Handling, Packaging, and Transporting Field Samples
SOP-01.04. Sample Control and Field Documentation
SOP-01.05, Field Quality Control Samples
SOP-01.06, Management of Environmental Restoration Project Waste
SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
SOP-01.10, Waste Characterization
SOP-01.12, Field Site Closeout Checklist
SOP-01.13, Initiating and Managing Data Set Requests
SOP-02.01, Surface Water Site Assessments
SOP-03.11, Coordinating and Evaluating Geodetic Surveys
SOP-04.01, Drilling Methods and Drill Site Management
SOP-04.04, Contract Geophysical Logging
SOP-05.02, Well Development
SOP-05.03, Monitoring Well and RFI Borehole Abandonment
SOP-05.08, Operation of Borehole, Logging Equipment
SOP-06.01, Purging and Sampling Methods for Single Completion Wells
SOP-06.02, Field Analytical Measurements of Groundwater
SOP-06.03, Sampling for Volatile Organic Compounds in Groundwater
SOP-06.09, Spade and Scoop Method for Collection of Soil Samples
SOP-06.10, Hand Auger and Thin-Wall Tube Sampler
SOP-06.24, Sample Collection from Split-Spoon Samplers and Shelby Tube Samplers
SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials

Table 3.0-1 (continued)

SOP-06.31, Sampling of Subatmospheric Air
SOP-06.33, Headspace Vapor Screening with a Photoionization Detector
SOP-09.10, Field Sampling of Core and Cuttings for Geological Analysis
SOP-10.14, Performing and Documenting Gross Gamma Radiation Scoping Surveys
SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials
SOP-12.02, Transportation and Admittance of Borehole Materials to the Field Support Facility

Note: These procedures are available at http://erproject.lanl.gov/documents/procedures/sops.html.

Table 3.0-2
Proposed and Actual Drilling Depths and Number of Samples Collected per Borehole at MDA U

Borehole Number	Proposed Depth (ft)	Actual Depth (ft)	Location ID	Surface Samples Collected	Subsurface Samples Collected	Field Duplicate Samples Collected	Geotechnical Samples Collected	Geotechnical Duplicate Samples Collected	Trip Blank Samples Collected	Rinsate Samples Collected	Pore-Gas Samples Collected
BH-01	120	115–116	21-24774	1	3	1	NA*	NA	0	0	3
BH-02	120	119–120	21-24775	1	4	1	NA	NA	0	0	3
BH-03	120	119–120	21-24776	1	4	0	NA	NA	0	0	3
BH-04	360	360–361	21-24772	1	13	2	14	2	4	2	3
BH-05	120	119–120	21-24777	1	4	0	NA	NA	0	0	3
BH-06	120	119–120	21-24778	1	5	1	NA	NA	0	1	3
BH-07	120	119–120	21-24779	1	5	0	NA	NA	0	0	3
BH-08	120	119–120	21-24780	1	4	0	NA	NA	0	1	3
BH-09	120	119–120	21-24781	1	4	1	NA	NA	0	0	3

*NA = Not analyzed.

Table 3.1-1
MDA U Surface Sample Summary

Borehole Number	Sample Depth Interval (ft)	Location ID	Gamma Spectroscopy	Actinium-227 Progeny using Alpha Spectroscopy	Americium-241	Strontium-90	Isotopic Uranium	Isotopic Plutonium	Tritium	pH	TAL Metals	SVOCs	PCBs	Perchlorate	Cyanide	Nitrate
BH-01	0–0.5	21-24774*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-02	0–0.5	21-24775	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-03	0–0.5	21-24776	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-04	0–0.5	21-24772	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-05	0–0.5	21-24777	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-06	0–0.5	21-24778	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-07	0–0.5	21-24779	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-08	0–0.5	21-24780	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-09	0–0.5	21-24781	X	X	X	X	X	X	X	X	X	X	X	X	X	X

*Field duplicate also collected at this location and depth.

Table 3.2-1
MDA U Subsurface Sample Summary

Borehole Number	Sample Depth Interval) (ft)	Location ID	Sampling Justification	Radionuclides[a]	TAL Metals	VOCs	SVOCs	PCBs	Perchlorate	Cyanide	Nitrate	Dioxins, Furans, HE Compounds
BH-01	10–12	21-24774	Pipeline	X	X	X	X	X	X	X	X	NA[b]
BH-01	18–20	21-24774	Base Structure	X	X	X	X	X	X	X	X	NA
BH-01	98–100	21-24774	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-02	13–15	21-24775	Base Structure	X	X	X	X	X	X	X	X	NA
BH-02	18–20	21-24775	Tuff Contact	X	X	X	X	X	X	X	X	NA
BH-02	92–94[c]	21-24775	Qbt3/Qbt2 Contact	X	X	X	X	X	X	X	X	NA
BH-02	118–120	21-24775	Total Depth	X	X	X	X	X	X	X	X	NA
BH-03	3–5	21-24776	Base Structure	X	X	X	X	X	X	X	X	NA
BH-03	21–23	21-24776	Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-03	92–94	21-24776	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-03	118–120	21-24776	Total Depth	X	X	X	X	X	X	X	X	NA
BH-04	8–10	21-24772	Base Structure	X	X	X	X	X	X	X	X	NA
BH-04	13–15	21-24772	Base Structure	X	X	X	X	X	X	X	X	NA
BH-04	23–25	21-24772	1/20-30 ft	X	X	X	X	X	X	X	X	NA
BH-04	33–35	21-24772	1/30-40 ft	X	X	X	X	X	X	X	X	NA
BH-04	43–45	21-24772	1/40-50 ft	X	X	X	X	X	X	X	X	NA
BH-04	97–99[c]	21-24772	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-04	148–150[c]	21-24772	Qbt2	X	X	X	X	X	X	X	X	NA
BH-04	170–172	21-24772	Lithological Contact	X	X	X	X	X	X	X	X	NA
BH-04	225–227	21-24772	Elevated Moisture	X	X	X	X	X	X	X	X	NA
BH-04	228–230	21-24772	Elevated Moisture	X	X	X	X	X	X	X	X	NA
BH-04	333–335	21-24772	Elevated Moisture	X	X	X	X	X	X	X	X	NA
BH-04	338–340	21-24772	Elevated Moisture	X	X	X	X	X	X	X	X	NA
BH-04	358–360	21-24772	Total Depth	X	X	X	X	X	X	X	X	NA
BH-04	Trip blank[d]	21-24772	Trip Blank	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-04	Trip blank[e]	21-24772	Trip Blank	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-04	Rinsate[e]	21-24772	Rinsate	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-04	Trip blank[f]	21-24772	Trip Blank	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-04	Trip blank[g]	21-24772	Trip Blank	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-04	Rinsate[f]	21-24772	Rinsate	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-05	3–5	21-24777	Base Structure	X	X	X	X	X	X	X	X	NA
BH-05	73–75	21-24777	Base Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-05	93–95	21-24777	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA

Table 3.2-1 (continued)

Borehole Number	Sample Depth Interval) (ft)	Location ID	Sampling Justification	Radionuclides[a]	TAL Metals	VOCs	SVOCs	PCBs	Perchlorate	Cyanide	Nitrate	Dioxins, Furans, HE Compounds
BH-05	118–120	21-24777	Total Depth	X	X	X	X	X	X	X	X	NA
BH-06	11–13[c]	21-24778	Base Structure	X	X	X	X	X	X	X	X	NA
BH-06	33–35	21-24778	Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-06	48–50	21-24778	Base Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-06	98–100	21-24778	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-06	118–120	21-24778	Total Depth	X	X	X	X	X	X	X	X	NA
BH-06	Rinsate[h]	21-24778	Rinsate	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-07	10–12	21-24779	Base Structure	X	X	X	X	X	X	X	X	NA
BH-07	67–69	21-24779	Elevated Field Screen - VOCs	X	X	X	X	X	X	X	X	X
BH-07	72–74	21-24779	Base Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-07	94–96	21-24779	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-07	117–119	21-24779	Total Depth	X	X	X	X	X	X	X	X	NA
BH-08	3–5	21-24780	Base Structure	X	X	X	X	X	X	X	X	NA
BH-08	63–65	21-24780	Base Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-08	88–90	21-24780	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-08	118–120	21-24780	Total Depth	X	X	X	X	X	X	X	X	NA
BH-08	Rinsate[i]	21-24780	Rinsate	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH-09	18–20	21-24781	Base Structure	X	X	X	X	X	X	X	X	NA
BH-09	72–74[b]	21-24781	Fracture Zone	X	X	X	X	X	X	X	X	NA
BH-09	98–100	21-24781	Qbt3/Qbt2 contact	X	X	X	X	X	X	X	X	NA
BH-09	118–120	21-24781	Total Depth	X	X	X	X	X	X	X	X	NA

[a] Radionuclide analyses include: gamma spectroscopy, actinium-227 progeny using alpha spectroscopy, americium-241, strontium-90, isotopic uranium, isotopic plutonium, and tritium.

[b] NA = Not analyzed.

[c] Field duplicate also collected at this location and depth.

[d] Trip blank collected July 29, 2005.

[e] Trip blank and rinsate collected August 8, 2005.

[f] Trip blank and rinsate collected July 20, 2005.

[g] Trip blank collected July 22, 2005.

[h] Rinsate collected July 12, 2005.

[i] Rinsate collected June 30, 2005.

Table 3.2-2
Geotechnical Sample Intervals from BH-04 at MDA U

Sample Depth Interval (ft)
10–10.5
12.5–13
22.5–23
32.5–33
42.5–43
97.5–98
147.5–148
183–183.5
230–230.5
297.5–298
321–321.5
332.5–333
337.5–338
357.5–358
Duplicate Geotechnical Samples
95–95.5
182.5–183

Note: Location ID 21-24772.

Table 3.2-3
Geophysical Logging Depths and Pore-Gas Sampling Intervals in Boreholes at MDA U

Borehole Information				Pore-Gas Sampling Depth		
Borehole Number	Location ID	Drilled Depth (ft)	Open Depth (ft)	Base of Structure (ft)	Top of Slough (ft)	Total Depth (ft)
BH-01	21-24774	115	70	19–20	65–66	115–116
BH-02	21-24775	120	84.5	14–15*	79–80	119–120
BH-03	21-24776	120	103	4–5	95–96	119–120
BH-04	21-24772	360	303	12–13	293–294	360–361
BH-05	21-24777	120	93	4–5	85–86	119–120
BH-06	21-24778	120	92.5	13–14	87–88	119–120
BH-07	21-24779	119	108	11–12	95–96	119–120
BH-08	21-24780	120	57	4–5	49–50	119–120
BH-09	21-24781	120	96	19–20	91.5–92.5	119–120

*Field duplicate collected.

Table 4.8-1
Airborne Particulate Monitoring Results

Date	DataRAM #1 Particulate Measurement (mg/m^3)	#1 Location	DataRAM #2 Particulate Measurement (mg/m^3)	#2 Location
06/23/05	n/a[a]	n/a	0.000	Sample table
06/24/05	0.034	Sample table	n/a	n/a
06/27/05	0.007	Fence W of drill rig	0.035	Sample table
06/28/05	0.001	Fence W of drill rig	0.010	Sample table
06/29/05	0.000	Sample table	0.110	Drill rig
06/30/05	0.006	Sample table	0.159	Drill rig
07/05/05	n/a	Sample table	0.089	Drill rig
07/06/05	0.045	Sample table	0.089	Drill rig
07/07/05	0.035	Sample table	0.043	Drill rig
07/11/05	0.037	Sample table	0.042	Drill rig
07/12/05	0.037[b]	Sample table	0.042[b]	Drill rig
07/13/05	n/a	Sample table	0.042[b]	Drill rig
07/14/05	0.014	Sample table	0.012	Drill rig
07/15/05	0.000	Sample table	0.000	Drill rig
07/18/05	0.000	Sample table	0.099	Drill rig
07/19/05	0.000[b]	Sample table	0.099[b]	Drill rig
07/20/05	0.041	Sample table	0.051	Drill rig
07/21/05	n/a	Sample table	n/a	Drill rig
07/22/05	0.034	Sample table	0.074	Drill rig
07/23/05	0.041	Sample table	0.038	Drill rig
07/26/05	0.100	Sample table	0.040	Drill rig
07/27/05	0.100[b]	Sample table	0.040[b]	Drill rig
07/28/05	0.024	Sample table	0.063	Drill rig
07/29/05	0.018	Sample table	0.047	Drill rig
08/01/05	0.030	Sample table	0.063	Drill rig
Average	**0.026**		**0.056**	

[a] n/a = Not applicable.

[b] Estimated value.

Table 4.9-1
Results of Geotechnical Characterization in BH-04 at MDA U

Sample Depth Interval (ft)	Media Code	Moisture Content (%)	Density (g/cm^3)	Saturated Hydraulic Conductivity (cm/s)	Gravimetric/ Volumetric Moisture Content (%)	Calculated Total Porosity (%)
10–10.5	QBT3	3.4	1.37	0.0002	4.6	48.50
12.5–13	QBT3	2.2	1.25	0.0140	2.8	52.80
22.5–23	QBT3	3.6	1.22	0.0150	4.4	53.80
32.5–33	QBT3	4.4	1.28	0.0110	5.6	51.80
42.5–43	QBT3	4.3	1.26	0.0044	5.5	52.30
97–99	QBT3	5.9	1.35	0.0170	7.9	48.90
147.5–148	QBT2	8.3	1.56	0.0011	13.0	41.10
182.5–183.5	QBT1V	8.9	1.30	0.0015	11.6	51.00
230–230.5	QBT1G	27.1	1.18	0.0028	31.9	55.50
297.5–298	QBT1G	16.6	1.10	0.0023	18.3	58.50
321–321.5	QBT1G	17.2	0.98	0.0069	16.8	63.10
332.5–333	QCT	24.2	1.06	0.0017	25.7	60.00
337.5–338	QCT	39.2	0.96	0.0087	37.4	63.90
357.5–358	QBO	16.2	1.15	0.0003	18.7	56.50
	Minimum	2.2	1.0	0.00022	2.8	41.1
	Maximum	39.2	1.6	0.01700	37.4	63.9
	Median	8.6	1.2	0.00360	12.3	53.3
	Average	13.0	1.2	0.00621	14.6	54.1

Table 6.2-1
Field-Screening Results for Subsurface Samples at MDA U

Borehole Number	Sample Depth Interval (ft)	Location ID	PID Background (ppm)	PID (ppm)	Alpha Background (dpm)	Alpha (dpm)	Beta Background (dpm)	Beta/ Gamma (dpm)
BH-01	10–12	21-24774	7.3	7.5	36	96	1745	2760
BH-01	18–20	21-24774	7.3	7.8	36	78	1745	2780
BH-01	98–100	21-24774	16.6	4.6	50	108	1841	2920
BH-02	18–20	21-24775	1.7	2.7	54	<54	1932	803
BH-02	93–95	21-24775	2.3	14.1	73	<73	2080	933
BH-02	118–120	21-24775	2.3	1.0	73	36	2080	847
BH-02	13–15	21-24775	1.7	2.8	54	24	1932	644
BH-02	91–93	21-24775	2.3	14.1	73	<73	2080	933
BH-03	3–5	21-24776	4.8	1.3	56	<56	2000	622
BH-03	21–23	21-24776	4.8	1.9	56	<56	2000	485
BH-03	92–94	21-24776	11.3	7.1	39	<39	1451	564
BH-03	118–120	21-24776	11.3	1.2	39	<39	1451	663
BH-04	10–10.5	21-24772	10.9	4.3	40	84	1762	3260
BH-04	12.5–13	21-24772	10.9	5.0	40	88	1762	3200
BH-04	22.5–23	21-24772	10.9	1.3	40	96	1762	3190
BH-04	32.5–33	21-24772	10.9	5.8	40	60	1762	3280
BH-04	42.5–43	21-24772	2.5	1.4	58	133	1564	3800
BH-04	95–95.5	21-24772	14.2	12.7	52	60	1908	3350
BH-04	97.5–98	21-24772	14.2	12.7	52	60	1908	3350
BH-04	147.5–148	21-24772	3.8	8.9	54	72	2270	3330
BH-04	182.5–183	21-24772	7.5	5.0	42	66	2110	3190
BH-04	183–183.5	21-24772	7.5	5.0	42	66	2110	3190
BH-04	230–230.5	21-24772	3.0	1.4	79	78	2270	3320
BH-04	297.5–298	21-24772	6.2	4.4	76	72	1940	3700
BH-04	321–321.5	21-24772	5.4	3.2	53	84	3130	3460
BH-04	332.5–333	21-24772	4.9	2.2	58	123	2060	3320
BH-04	337.5–338	21-24772	4.9	4.7	58	64	2060	1320
BH-04	357.5–358	21-24772	5.6	5.3	59	96	2160	3240
BH-04	8–10	21-24772	10.9	4.3	40	84	1762	3260
BH-04	13–15	21-24772	10.9	5.0	40	88	1762	3200
BH-04	23–25	21-24772	10.9	1.3	40	96	1762	3190
BH-04	33–35	21-24772	10.9	5.8	40	60	1762	3280
BH-04	43–45	21-24772	2.5	1.4	58	133	1564	3800
BH-04	95.5–97.5	21-24772	14.2	12.7	52	60	1908	3350
BH-04	148–150	21-24772	3.8	8.9	54	72	2270	3330

Table 6.2-1 (continued)

Borehole Number	Sample Depth Interval (ft)	Location ID	PID Background (ppm)	PID (ppm)	Alpha Background (dpm)	Alpha (dpm)	Beta Background (dpm)	Beta/ Gamma (dpm)
BH-04	98–100	21-24772	14.2	12.7	52	60	1908	3350
BH-04	148–150	21-24772	3.8	8.9	54	72	2270	3330
BH-04	170–172	21-24772	7.5	8.8	42	66	2110	3530
BH-04	225–227	21-24772	5.6	11.0	45	78	2120	3420
BH-04	228–230	21-24772	5.6	11.0	45	78	2120	3420
BH-04	333–335	21-24772	4.9	2.2	58	123	2060	3320
BH-04	338–340	21-24772	4.9	4.7	58	64	2060	1320
BH-04	358–360	21-24772	5.6	5.3	59	96	2160	3240
BH-05	3–5	21-24777	0.2	0.4	50	6	1876	1006
BH-05	73–75	21-24777	9.9	5.2	43	<43	2120	927
BH-05	93–95	21-24777	6.4	7.1	51	<51	2270	890
BH-05	118–120	21-24777	6.4	3.7	51	8	2270	762
BH-06	12–14	21-24778	5.7	4.9	81	78	1495	3380
BH-06	33–35	21-24778	15.8	6.1	41.5	90	1995	2300
BH-06	48–50	21-24778	15.8	3.6	41.5	50	1995	2310
BH-06	98–100	21-24778	6.4	6.3	50	84	1932	3510
BH-06	118–120	21-24778	6.4	4.5	50	90	1932	3170
BH-06	10–12	21-24778	5.7	4.9	81	78	1495	3380
BH-07	10–12	21-24779	2.2	NA*	35.9	66	2120	848
BH-07	67–69	21-24779	6.2	162.0	85	<85	2230	202
BH-07	72–74	21-24779	6.2	2.5	85	18	2230	208
BH-07	94–96	21-24779	1.7	2.6	68	18	1927	908
BH-07	117–119	21-24779	1.7	2.0	54	54	1932	828
BH-08	3–5	21-24780	5.6	8.3	63	36	1758	448
BH-08	63–65	21-24780	5.6	0.7	76	<76	2090	724
BH-08	88–90	21-24780	1.0	2.6	52	85	2100	1295
BH-08	118–120	21-24780	1.0	0.6	71	24	1926	1252
BH-09	18–20	21-24781	8.3	8.5	61	72	1561	3130
BH-09	73–75	21-24781	11.3	6.6	66	66	1724	3100
BH-09	98–100	21-24781	6.8	8.0	51	66	1822	3390
BH-09	118–120	21-24781	6.8	7.4	51	102	1822	3220
BH-09	71–73	21-24781	11.3	6.6	66	66	1724	3100

*NA = Not analyzed.

Table 6.2-2
Pore-Gas Sampling Field Screening Results at MDA U

Borehole Number	Location ID	Base-of- Structure Field Screen Results			Top-of-Slough Field Screen Results			Total-Depth Field Screen Results		
		Sample Depth Interval (ft)	Carbon Dioxide (ppm)	PID Results (ppm)	Sample Depth Interval (ft)	Carbon Dioxide (ppm)	PID Results (ppm)	Sample Depth Interval (ft)	Carbon Dioxide (ppm)	PID Results (ppm)
BH-01	21-24774	19–20	472	0.3	65–66	1110	0.2	115–116	3000	NA*
BH-02	21-24775	14–15	3000	0	79–80	2240	0	119–120	0	NA
BH-03	21-24775	4–5	2610	0.5	95–96	6800	0.5	119–120	1000	NA
BH-04	21-24772	12–13	3010	1.4	293–294	2800	4.2	360–361	0	NA
BH-05	21-24777	4–5	8030	0.3	85–86	8260	0.4	119–120	3000	NA
BH-06	21-24778	13–14	1920	0.5	87–88	21200	0.4	119–120	4000	NA
BH-07	21-24779	11–12	2530	0	95–96	8060	0	119–120	0	NA
BH-08	21-24780	4–5	8060	0	49–50	7470	2	119–120	5000	NA
BH-09	21-24781	19–20	3370	0.3	91.5–92.5	4800	0.4	119–120	2000	NA

*NA = Not analyzed; no PID measurements were collected during the second round of pore-gas monitoring.

Table 6.3-1
Summary of COPCs at MDA U by Media

	Soil/Fill	Sediment	Tuff	Pore Gas
Inorganic Chemicals	Chromium Copper Lead Mercury Uranium Zinc Perchlorate Nitrate Silver[b] Thallium	Cadmium Chromium Cobalt Lead Selenium Uranium Zinc Silver[b]	Aluminum Arsenic Barium Beryllium Chromium Copper Iron Lead Mercury Nickel Zinc Antimony[b] Cadmium[b] Selenium[b] Silver[b] Thallium[b] Perchlorate	n/a[a]
Radionuclides	Americium-241 Cesium-137 Plutonium-238 Plutonium-239 Radium-223 Radon-219 Strontium-90 Thorium-227 Tritium Uranium-234 Uranium-235	Plutonium-238 Plutonium-239 Tritium	Americium-241 Plutonium-238 Plutonium-239 Radium-223 Strontium-90 Thorium-227 Thorium-228 Tritium Uranium-234 Uranium-235 Uranium-238	Tritium

Table 6.3-1 (continued)

	Soil/Fill	Sediment	Tuff	Pore Gas
Organic Chemicals	Acenaphthene Anthracene Aroclor-1242 Aroclor-1254 Aroclor-1260 Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Benzoic acid Butylbenzylphthalate Chrysene Dibenz(a,h)anthracene Dibenzofuran Diethylphthalate Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene 2-Methylnaphthalene 4-Methylphenol Naphthalene Phenanthrene Pyrene Pyridine	Acenaphthene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Butylbenzylphthalate Chrysene Dibenzofuran 3,3'-Dichlorobenzidine Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene	Acetone Aroclor-1242 Aroclor-1254 Aroclor-1260 Benzene Benzoic acid 2-Butanone Di-n-butylphthalate 4-Isopropyltoluene 4-Methyl-2-pentanone 1,2,3,4,6,7,8,9-Octachlorodibenzodioxin Pyrene Toluene 1,1,2-Trichloro-1,2,2-trifluoroethane 1,2,4-Trimethylbenzene 1,3-Xylene + 1,4-xylene	Acetone Benzene Bromodichloromethane 2-Butanone 1,3-Butadiene 1-Butanol Carbon disulfide Carbon Tetrachloride Chloroform Chloromethane Cyclohexane Dichlorodifluoromethane 1,2-Dichloroethane cis-1,2-Dichloroethene Ethanol Ethylbenzene 4-Ethyltoluene n-Heptane Hexane 2-Hexanone 4-Methyl-2-pentanone Methylene Chloride Propylene 2-Propanol Styrene Tetrachloroethene Toluene 1,1,2-Trichloro-1,1,2-trifluoroethane 1,1,1-Trichloroethane Trichloroethene Trichlorofluoromethane 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Vinyl Acetate 1,2-Xylene 1,3-Xylene+1,4-xylene

[a] n/a = Not applicable.

[b] Only detection limits above the BV.

Table 6.3-2
Inorganic Chemicals above BVs in Surface Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAA7519	21-01863	0.00–0.25	Soil	—[e]	—	0.75 (J)	—	—	—	—	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	0.43 (U)	—	—	—	—	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	0.5 (J)	—	28.6	18.4	—	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	0.79 (J)	—	—	—	—	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	0.54 (J)	—	—	—	—	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	0.52 (J)	—	—	—	—	—	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	—	—	—	22.5	—	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	—	—	—	—	1.2 (J+)	—
AAB9754	21-02063	0.00–0.50	Soil	—	—	—	—	—	—	23.6	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	6650	—	—	47.5	—	—
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	—	24.4	—	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	—	30.6	—	—
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	23.6	—	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	—	—	0.75 (J-)	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	—	—	—	—	0.26 (J-)	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	—	—	—	—	0.41 (J-)	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	—	77.3	—	—	0.74 (J-)	—
AAB9776	21-02085	0.00–0.50	Soil	—	0.87 (J-)	—	—	—	—	28.3	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	0.43 (J)	—	29.7	84.3	—	0.39 (J-)	—
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	—	0.28 (J-)	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	29.5	—	—	0.25 (J-)	—
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9784	21-02093	0.00–0.50	Soil	—	—	—	—	—	—	—	0.49 (J-)	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	—	—	—	—	0.53 (J-)	—
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	27.9

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	7440	—	—	—	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	—	—	—	—	0.65 (J-)	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	0.48 (J-)	—
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	—	—	—	—	0.27 (J)	—
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	—	—	—	—	0.11 (J)	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	—	—	—	—	0.25 (J)	—
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	0.56 (U)	—	—	—	—	0.11 (U)	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	0.497 (U)	—	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	0.409 (J)	7980 (J)	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	0.493 (U)	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	60	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	0.5 (U)	—	20.6	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	0.507 (U)	—	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	0.508 (U)	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	0.514 (U)	—	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	0.514 (U)	—	—	—	—	—	—

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790**[d]	**5680**	**5680**	**na**	**74.9**	**200**[f]	**100000**
Residential Soil Screening Levels				**100000**	**55**[d]	**391**	**391**	**na**	**5.16**	**16**[f]	**23500**
AAA7519	21-01863	0.00–0.25	Soil	—	—	—	2.4 (U)	—	—	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	—	2.2 (U)	—	—	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	—	2.1 (U)	—	—	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	—	2.4 (U)	—	—	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	—	2.2 (U)	—	—	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	—	2.1 (U)	—	—	1.95 (J-)	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	—	—	—	2.93 (J+)	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	—	—	—	1.97 (J+)	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	—	—	—	1.88 (J+)	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	—	—	—	2.1 (J+)	—
AAB9754	21-02063	0.00–0.50	Soil	—	—	—	—	—	—	3.16 (J+)	54.1
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—	0.78 (U)	3.7	66.2
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	3.06	—
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	0.76 (U)	2.2	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	0.77 (U)	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	2.84	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	0.86 (U)	5.8	52.5
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	2.91	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	2.01	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	0.75 (U)	7.5	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	1.1 (J)	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	0.74 (U)	2.11	—
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	1.93	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	—	—	—	1.86	—

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790**[d]	**5680**	**5680**	**na**	**74.9**	**200**[f]	**100000**
Residential Soil Screening Levels				**100000**	**55**[d]	**391**	**391**	**na**	**5.16**	**16**[f]	**23500**
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	3.4 (J-)	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	—	—	—	2.22 (J-)	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	—	—	—	2.16 (J-)	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	—	—	—	2.23 (J-)	68.5
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	—	—	—	2.21 (J-)	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—	—	2.12 (J-)	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	1.83	59.8
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—	0.81 (U)	2.15	58.2
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—	—	1.94 (J-)	56.7
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	37.5 (J-)	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—	—	2.96 (J-)	404
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	—	—	—	2.09 (J-)	53.2
AAB9784	21-02093	0.00–0.50	Soil	—	—	—	—	—	—	8.96 (J-)	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	—	—	—	—	73.2
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	2.02 (J-)	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	—	—	—	2.11 (J-)	64
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	—	—	—	—	53.7
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	2.02 (J-)	509
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	9.14 (J-)	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	18.1 (J-)	146
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	—	—	—	1.95 (J-)	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	1.9 (J-)	—

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790**[d]	**5680**	**5680**	**na**	**74.9**	**200**[f]	**100000**
Residential Soil Screening Levels				**100000**	**55**[d]	**391**	**391**	**na**	**5.16**	**16**[f]	**23500**
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	2.03 (J-)	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	—	1460 (J)	0.84 (U)	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	—	1550 (J)	0.85 (U)	2.05 (J)	90.6
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	—	1100 (J)	0.84 (U)	—	109
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	—	1670 (J)	0.86 (U)	—	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	—	1680 (J)	0.85 (U)	—	57.2
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	—	1480 (J)	0.89 (U)	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	—	2.2 (U)	—	2.2 (U)	—	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	0.745 (J+)	0.00058 (J)	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	0.000583 (J)	1.54 (U)	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	1.54 (U)	—	—	—	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless otherwise noted.

[c] na = Not available.

[d] Values from EPA Region 6 (EPA 2005, 91002).

[e] — = Not above BV.

[f] Values from EPA Region 9 (http://www.epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf.)

Table 6.3-3
Inorganic Chemicals above BVs in Sediment at MDA U

Sample ID	Location ID	Depth (ft)	Media	Cadmium	Chromium	Cobalt	Lead	Selenium	Silver	Uranium	Zinc
Sediment BV[a]				**0.4**	**10.5**	**4.73**	**19.7**	**0.3**	**1**	**2.22**	**60.2**
Industrial Soil Screening Levels[b]				**564**	**5000[c]**	**20500**	**800**	**5680**	**5680**	**200[d]**	**100000**
Residential Soil Screening Levels[b]				**39**	**2100[c]**	**1520**	**400**	**391**	**391**	**16[d]**	**23500**
AAA7525	21-01865	0.00–0.25	Sediment	0.46 (U)	53.2	—[e]	28.1	0.69 (U)	2.3 (U)	—	—
AAA7526	21-01865	0.25–0.50	Sediment	0.52 (J)	26.9	—	—	0.67 (J)	2.2 (U)	—	—
AAA7527	21-01865	0.50–1.00	Sediment	0.41 (U)	17.9	—	—	0.62 (U)	2.1 (U)	—	—
AAB7281	21-02570	0.00–0.25	Sediment	0.67 (J)	13.1	—	—	0.7 (U)	2.3 (U)	—	—
AAB7282	21-02570	0.25–0.50	Sediment	0.81 (J)	14	—	—	0.67 (U)	2.2 (U)	—	—
AAB7283	21-02570	0.50–1.00	Sediment	0.98 (J)	21.3	—	—	0.65 (U)	2.2 (U)	—	—
AAB7284	21-02571	0.00–0.25	Sediment	0.65 (J)	—	6.7 (J)	—	0.67 (U)	2.2 (U)	2.69 (J-)	—
AAB7285	21-02571	0.25–0.50	Sediment	0.42 (U)	12.7	—	36	0.63 (U)	2.1 (U)	—	72
AAB7286	21-02571	0.50–1.00	Sediment	0.74 (J)	34.3	—	—	0.76 (U)	2.5 (U)	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless noted otherwise.

[c] Values from EPA Region 6 (EPA 2005, 91002).

[d] Values from EPA Region 9 (http://www.epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf.)

[e] — = Not above BV.

Table 6.3-4
Inorganic Chemicals above BV in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na**[c]	**5000**[d]	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100**[d]	**3130**	**23500**	**400**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	—[e]	—	2.9	—	—	—	—	13	8.8	—	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	12
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	—	48	1.7	—	—	—	—	—	12
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	11000	11 (U)	2.9	58	1.3	—	—	—	4.9	—	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	11 (U)	—	—	—	—	—	8.2	—	—	21
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	—	11 (U)	3.9	—	—	—	—	—	—	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	11 (U)	3.3	—	—	—	—	—	—	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	14
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	10000	11 (UJ)	—	65	2.3	—	—	—	7.6	—	14
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	8700	11 (U)	3.7	62	—	—	—	15	4.8	—	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	13
MD21-98-0469	21-10845	24.00–25.00	Qbt 3	—	11 (U)	—	—	—	—	—	8.9	—	—	22
MD21-98-0471	21-10845	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	—	—	19.7	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-05-60980	21-24772	33.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60981	21-24772	43.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	0.51 (U)	—	—	—	—	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	2.68	—	—	0.534 (U)	—	4.67	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	0.521 (U)	1.96 (U)	—	—	0.652 (U)	—	—	—	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	6090	0.51 (U)	1.9 (U)	—	—	0.634 (U)	—	—	—	4070 (J+)	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	1.72 (U)	—	—	0.573 (U)	—	—	—	4740 (J+)	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	18700 (J+)	—	9.17	106 (J)	—	—	—	11.4	5.45	—	71.6
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	9500	—	—	—	—	—	—	—	—	—	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	62.1 (J+)	—	—	—	—	—	—	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	2.85	55.5	—	—	2590	—	—	—	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61035	21-24777	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	1.76	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61044	21-24778	33.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	13.6
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61046	21-24778	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	13.6
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61061	21-24780	88.00–90.00	Qbt 3	—	—	—	—	—	—	—	19.6	—	—	15.1
MD21-05-61062	21-24780	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	14.9
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	—	—	—	46.8	—	—	4540	—	—	—	12.4
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	—	—	—	—	—	0.52 (U)	2.1 (U)	—	—	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	—	—	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	73
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	0.12 (U)	—	—	1.2 (U)	2.4 (U)	—	—	—
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	—	—	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	610	—	—	—	1 (U)	2 (U)	—	—	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	—	—	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.3 (U)	—	—	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	—	0.24	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	—	0.14	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	—	0.16	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	—	—	0.14	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	—	0.16	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340**[d]	**22500**	**790**[d]	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23**[d]	**1560**	**55**[d]	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0469	21-10845	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0471	21-10845	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	—	—	—	1.49 (U)	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	1.51 (U)	—	—	—	—
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	1.52 (U)	—	—	—	—
MD21-05-60980	21-24772	33.00–35.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-60981	21-24772	43.00–45.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	1.56 (U)	—	—	—	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	—	—	—	1.6 (U)	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	1.96 (U)	—	—	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	795	—	—	—	—	1.9 (U)	—	—	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	1.72 (U)	—	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	2710	—	—	7.97	—	1.75 (U)	—	—	18.1	—
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	1.62 (U)	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	0.00103 (J)	1.54 (U)	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	0.00199 (J)	1.49 (U)	—	—	—	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	1.47 (U)	—	—	—	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	—	—	0.000742 (J)	1.7 (U)	—	—	—	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61035	21-24777	3.00–5.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	—	1.55 (U)	—	—	—	—
MD21-05-61044	21-24778	33.00–35.00	Qbt 3	—	—	—	—	—	1.63 (U)	—	—	—	—
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	—	1.6 (U)	—	—	—	—
MD21-05-61046	21-24778	98.00–100.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	1.55 (U)	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	0.00121 (J)	1.54 (U)	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	0.000664 (J)	1.52 (U)	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	0.000603 (J)	1.57 (U)	—	—	—	78.8
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	0.000664 (J)	1.5 (U)	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	1.49 (U)	—	—	—	—
MD21-05-61061	21-24780	88.00–90.00	Qbt 3	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-61062	21-24780	118.00–120.00	Qbt 2	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	—	—	—	—	—	1.52 (U)	—	—	—	—

Table 6.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	2460	—	—	—	0.00156 (J)	1.56 (U)	—	—	—	82.9
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless otherwise noted.

[c] na = Not available.

[d] Values from EPA Region 6 (EPA 2005, 91002).

[e] — = Not above BV.

Table 6.3-5
Radionuclides above BVs/FVs in Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAA0191	21-01178	0.00–0.08	Soil	—[d]	—	0.044	0.664 (J)	—	—	—	—	—	—	—
AAA0192	21-01178	0.00–0.50	Soil	—	—	—	0.593 (J)	—	—	—	—	—	—	—
AAA0193	21-01184	0.00–0.08	Soil	0.105	—	—	1.268 (J)	—	—	—	—	—	—	—
AAA0194	21-01184	0.00–0.50	Soil	0.031	—	—	0.603 (J)	—	—	—	—	—	—	—
AAA0195	21-01192	0.00–0.08	Soil	0.267	—	0.037	3.095 (J)	—	—	—	—	—	—	—
AAA0196	21-01192	0.00–0.50	Soil	—	—	—	0.815 (J)	—	—	—	—	—	—	—
AAA0197	21-01193	0.00–0.08	Soil	—	—	—	0.185 (J)	—	—	—	—	—	—	—
AAA0395	21-01183	0.00–0.08	Soil	—	—	0.024 (J)	—	—	—	—	—	—	—	—
AAA7519	21-01863	0.00–0.25	Soil	—	—	—	0.1676	—	—	—	—	0.433	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	—	0.0821	—	—	—	—	0.243	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	—	0.149	—	—	—	—	0.181	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	—	0.126	—	—	—	—	0.672	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	—	0.1101	—	—	—	—	0.502	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	—	0.1472	—	—	1.34	—	8.1E-02	—	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	1.48	—	—	—	—	0.618	—	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	0.152	—	—	—	—	0.381	—	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	0.272	—	—	—	—	0.256	—	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	0.164	—	—	—	—	0.858	—	—
AAB9754	21-02063	0.00–0.50	Soil	—	1.66	—	1.45	—	—	—	—	1.104	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	2.779	—	—	—	—	—	—	1.31	—	—
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.022	—	—

Table 6.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.413	—	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.112	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.209	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	—	—	—	0.75	—	—
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.12	—	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.635	—	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.375	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.264	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.441	—	—
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.328	—	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	0.793	—	—	—	—	0.315	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.271	—	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	0.1436	—	—	—	—	0.163	—	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	0.8038	—	—	—	—	0.191	—	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	0.1797	—	—	—	—	0.277	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	0.3416	—	—	—	—	0.252	—	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	0.2373	—	—	—	—	0.392	—	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	0.1539	—	—	—	—	1.81	—	—
MD21-01-0434	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	—	—	7.08	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	0.2227	—	—	—	—	0.285	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	0.0282	0.7926 (J)	—	—	—	—	1.491	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	0.1243	—	—	—	—	0.376 (J-)	—	—
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.243	—	—

Table 6.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9779	21-02088	0.00–0.50	Soil	—	—	—	0.1176 (J)	—	—	—	—	0.639	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	0.0253 (J)	0.1829	—	—	—	—	0.733	—	—
AAB9781	21-02090	0.00–0.25	Soil	—	—	—	0.2465	—	—	—	—	0.191	—	—
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	0.2094 (J)	—	—	—	—	0.396	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	—	0.1806 (J)	—	—	—	—	0.271	—	—
AAB9784	21-02093	0.00–0.50	Soil	0.6345	—	—	0.502	—	—	—	—	0.284 (J-)	—	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	0.181	—	—	—	—	0.296 (J-)	—	—
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.281	—	—
AAB9787	21-02096	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.417	—	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	0.2877 (J)	—	—	—	—	0.189	—	—
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	0.1951	—	—	—	—	0.270	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	0.639	—	—	—	—	3.24	—	—
MD21-01-0435	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	—	—	2.42	—	—
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.302 (J-)	—	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	0.3248	—	—	—	—	0.992 (J-)	—	—
MD21-01-0436	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.83	—	—
AAB9793	21-02102	0.00–0.50	Soil	—	—	—	0.2142 (J)	—	—	—	—	0.43	—	—
AAB9794	21-02103	0.00–0.50	Soil	—	—	0.0659	—	—	—	—	—	7.06E-02	—	—
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	—	—	—	—	—	9.11E-02	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	0.1788	—	—	—	—	0.251	—	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.214	—	—
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.333 (J-)	—	—
AAB9891	21-02576	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.336	—	—

Table 6.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**[b]	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.405	—	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.403	—	—
AAB9890	21-02579	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.422 (J-)	—	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	0.0699	—	—	—	—	0.938	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	0.0642	—	—	—	—	2.48	—	—
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	0.238	—	—	—	—	0.590	—	—
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	0.15	—	—	—	—	1.24	—	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	0.0782	—	—	—	—	1.53	—	—
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	0.0662	—	—	—	—	0.215	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	—	—	—	—	—	—	1.54	—	—
MD21-98-0484	21-10857	0.00–0.50	Soil	0.84	—	—	—	—	—	—	—	—	—	—
MD21-98-0485	21-10858	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—	6.87	0.272
MD21-98-0492	21-10855	0.00–0.50	Soil	—	2.56	—	—	—	—	—	—	—	—	—
MD21-98-0500	21-10864	6.00–8.00	Fill	—	—	—	0.067	—	—	—	—	0.31	—	—
MD21-98-0501	21-10864	6.00–8.00	Fill	—	—	—	0.057	—	—	—	—	0.3	—	—
MD21-98-0502	21-10866	5.00–8.00	Fill	—	—	—	0.0511	—	—	—	—	0.93	6.68	0.317
MD21-98-0503	21-10867	5.00–8.00	Fill	—	—	—	0.23	—	—	—	—	0.72	22.5	1.229
MD21-01-0494	21-11404	3.00–3.50	Fill	—	—	—	—	—	—	—	—	0.337	—	—
MD21-01-0496	21-11406	5.00–5.00	Fill	—	0.0938	—	—	—	0.762	—	—	0.948	17.9	1.45
MD21-01-0497	21-11407	4.00–4.00	Fill	—	—	—	—	—	—	—	—	0.467	—	—
MD21-01-0498	21-11408	5.00–5.50	Fill	—	—	—	—	—	—	—	—	0.495	—	—
MD21-01-0499	21-11409	7.00–7.00	Fill	—	—	—	—	—	—	—	—	0.139	—	—
MD21-01-0501	21-11411	7.00–7.00	Fill	—	0.215	—	—	—	0.815	—	0.503	0.371	—	—

Table 6.3-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
MD21-01-0502	21-11412	7.00–7.00	Fill	—	0.657	—	—	3.82	3.85	—	4.41	6.26E-02	—	—
MD21-01-0503	21-11413	7.00–7.00	Fill	—	0.0513	—	—	—	0.82	—	1.33	0.632	—	—
MD21-01-0492	21-22447	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.59	—	—
MD21-01-0493	21-22448	0.00–0.50	Soil	—	—	—	—	—	—	—	—	8.11	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	0.0838	—	—	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	0.0404	—	—	0.169	—	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	0.137	—	—	—	—	—	20.3	1.34
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	0.157	—	—	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	0.164	—	—	—	—	—	3.9	0.29
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	0.108	—	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	0.746	—	—	—	—	—	—	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] na = Not available.

[c] SALs from LANL 2005, 88493.

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

Table 6.3-6
Radionuclides above BVs/FVs in Sediment at MDA U

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238	Plutonium-239	Tritium
Sediment BV[a]				**0.006**	**0.068**	**0.093**
Industrial Screening Action Levels[b]				**240**	**210**	**440000**
Residential Screening Action Levels[b]				**37**	**33**	**750**
AAA7525	21-01865	0.00–0.25	Sediment	0.0221	0.3715	0.171
AAA7526	21-01865	0.25–0.50	Sediment	—[c]	0.2323	—
AAA7527	21-01865	0.50–1.00	Sediment	2.516	4.136	—
AAB7281	21-02570	0.00–0.25	Sediment	—	0.2066	0.129
AAB7282	21-02570	0.25–0.50	Sediment	—	0.1193	0.126
AAB7283	21-02570	0.50–1.00	Sediment	—	—	0.257
AAB7284	21-02571	0.00–0.25	Sediment	—	0.2474	9.9E-02
AAB7285	21-02571	0.25–0.50	Sediment	—	0.2337	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] SALs from LANL 2005, 88493.

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

Table 6.3-7
Radionuclides above BVs or Detected in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	0.0356	—[d]	0.072	—	—	—	—	0.73	11.49	0.565	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	2.96	0.163	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.54	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	0.046	—	0.291	—	—	—	—	0.45	—	—	—
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.35	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.41	6.93	0.347	—
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.09	2.57	0.142	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.06	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	—	—	0.4	2.19	0.107	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.19	3.8	0.188	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.31	—	0.105	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.24	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.25	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	—	—	—	—	—	—	0.47	2.67	0.14	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	—	—	—	—	—	—	—	0.55	2.86	0.183	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.17	—	0.096	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.97	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	—	—	—	—	—	—	0.32	2.67	0.128	—
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	—	—	—	—	—	—	0.34	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.2	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	—	—	—	—	—	—	0.12	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.12	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.17	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.64	—	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	—	—	—	—	—	—	0.99	2.01	0.107	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	1.85	—	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	2.37	—	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	0.033	—	—	—	—	—	—	1.25	—	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	0.04	—	—	2.3	—	2.33	—	2	—	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	—	—	—	—	—	—	1.84	—	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.95	—	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.35	—	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.14	—	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	0.0288	—	—	—	—	—	—	0.1	—	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	0.0286	—	—	—	—	—	—	0.07	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.15	—	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	0.4	—	—	—
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	—	—	—	—	—	—	0.19	—	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.2	—	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.31	—	—	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.42	—	—	—
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.29	—	—	—
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.52	—	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.18	—	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	—	—	—	—	—	—	0.09	—	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	0.0291	—	—	—	—	—	0.15	—	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.38	—	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.45	—	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.36	—	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.25	—	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.32	—	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.4	—	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	—	—	0.07	—	—	—	—	0.84	3.02	0.244	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.24	—	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.09	—	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.16	—	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.15	—	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	0.119	—	—	—	—	—	—	—	—
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.109	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.0901	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.133	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.142	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	—	—	—	2.64	0.188	2.34
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	—	—	6.5E-02	—	0.211	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	—	—	—	—	—	0.27	—	0.148	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	—	—	0.212	4.49	0.262	4.46
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	—	—	0.288	—	0.184	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	—	—	0.19	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.104	—
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.098	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.122	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.142	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.108	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.123	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.14	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.109	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.129	—
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.119	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	—	2.7	—	—	0.16	—
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	—	2.61	—	—	0.169	—

Table 6.3-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.128	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.124	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	0.847	—	—	—	—	—	—
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	0.312	—	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.123	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	2.62	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.0995	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.119	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.0908	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.147	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] na = Not available.

[c] SALs from LANL 2005, 88493.

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

Table 6.3-8
Detected Organic Chemicals in Surface Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260
Industrial Soil Screening Levels[a]				**31.9[b]**	**1.93[b]**	**8.26**	**8.26**	**8.26**
Residential Soil Screening Levels[a]				**31.9[b]**	**1.93[b]**	**1.12**	**1.12**	**1.12**
AAB9752	21-02061	0.00–0.50	Soil	0.11 (J)	0.17 (J)	—	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	0.45	0.88	—	—	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	0.077 (J)	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—
AAB9889	21-02578	0.00–0.50	Soil	0.18 (J)	0.3 (J)	—	—	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—[c]	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	0.0115 (J-)	0.0058 (J-)
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	0.006 (J)	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	0.0078	0.0062	0.0019 (J)
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	—	—

Table 6.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
Industrial Soil Screening Levels[a]				**23.4**	**2.34**	**23.4**	**21.3**[b,d]	**234**
Residential Soil Screening Levels[a]				**6.21**	**0.621**	**6.21**	**21.3**[b,d]	**61.2**
AAB9752	21-02061	0.00–0.50	Soil	0.21 (J)	0.22 (J)	0.18 (J)	0.18 (J)	0.17 (J)
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	0.66	0.81	0.61	0.62	0.72
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	0.091 (J)	0.12 (J)	0.081 (J)	0.086 (J)	0.11 (J)
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	0.13 (J)	0.091 (J)	—	0.11 (J)
AAB9790	21-02099	0.00–0.50	Soil	—	0.15 (J)	0.44	0.12 (J)	0.36 (J)
AAB9889	21-02578	0.00–0.50	Soil	0.42	0.47	0.43	—	0.35 (J)
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	0.0155 (J)	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	0.0237 (J)	—	—

Table 6.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Benzoic Acid	Butylbenzylphthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran
Industrial Soil Screening Levels[a]				**100000[e]**	**240[b,e]**	**0.955[b]**	**2.34**	**36.1[b]**
Residential Soil Screening Levels[a]				**100000[e]**	**240[b,e]**	**0.955[b]**	**0.621**	**36.1[b]**
AAB9752	21-02061	0.00–0.50	Soil	—	—	0.2 (J)	0.12 (J)	—
AAB9755	21-02064	0.00–0.50	Soil	1.6 (J)	—	0.1 (J)	—	—
AAB9760	21-02069	0.00–0.25	Soil	0.85 (J)	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	0.1 (J)	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	0.14 (J)	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	0.73	0.17 (J)	0.2 (J)
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	0.091 (J)	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	0.12 (J)	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	0.19 (J)	—	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	0.4	—	0.078 (J)
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	—	—

Table 6.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Diethylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]
Industrial Soil Screening Levels[a]				**100000**[e]	**24400**	**39.7**[b]	**23.4**	**92.5**[f]
Residential Soil Screening Levels[a]				**49000**[e]	**2290**	**39.7**[b]	**6.21**	**25.2**[f]
AAB9752	21-02061	0.00–0.50	Soil	—	0.74	0.081 (J)	0.19 (J)	—
AAB9755	21-02064	0.00–0.50	Soil	—	0.23 (J)	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	8.1	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	2.9	0.42	0.56	0.095 (J)
AAB9773	21-02082	0.00–0.50	Soil	—	0.1 (J)	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	0.36 (J)	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	0.23 (J)	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	0.11 (J)	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	0.33 (J)	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	0.22 (J)	—	0.13 (J)	—
AAB9889	21-02578	0.00–0.50	Soil	—	1.3	0.18 (J)	0.29 (J)	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	0.0118 (J)	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	0.0252 (J-)	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	0.0157 (J)	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	0.0618 (J)	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	0.0245 (J)	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	0.0211 (J)	—	—	—

Table 6.3-8 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	Pyridine
Industrial Soil Screening Levels[a]				**10000[e]**	**92.5**	**20500**	**21.3[b]**	**2000[e]**
Residential Soil Screening Levels[a]				**310[e]**	**25.2**	**1830**	**21.3[b]**	**61[e]**
AAB9752	21-02061	0.00–0.50	Soil	—	—	0.65	0.54	—
AAB9755	21-02064	0.00–0.50	Soil	0.11 (J)	—	0.12 (J)	0.17 (J)	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	0.25 (J)	2.9	1.8	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	0.3 (J)	0.21 (J)	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	0.14 (J)	0.16 (J)	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	0.08 (J)	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	0.086 (J)	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	0.18 (J)	0.26 (J)	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	0.15 (J)	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	1.3	0.98	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	0.011 (J)	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	0.0227 (J-)	0.0781 (J)
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	0.0161 (J)	0.0399	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	0.0169 (J)	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	0.0575 (J)	0.0685 (J)	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	0.0158 (J)	0.0235 (J)	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	0.0134 (J)	—

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] — = Not detected.

[d] Pyrene used as a surrogate based on structural similarity.

[e] Values from EPA Region 6 (EPA 2005, 91002).

[f] Naphthalene used as a surrogate based on structural similarity.

Table 6.3-9
Detected Organic Chemicals in Sediment at MDA U

Part 1

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Butylbenzylphthalate	Chrysene
Industrial Soil Screening Levels[a]				**31.9**[b]	**1.93**[b]	**23.4**	**2.34**	**23.4**	**21.3**[b]	**234**	**240**[b,c]	**0.955**[b]
Residential Soil Screening Levels[a]				**31.9**[b]	**1.93**[b]	**6.21**	**0.621**	**6.21**	**21.3**[b]	**62.1**	**240**[b,c]	**0.955**[b]
AAA7526	21-01865	0.25–0.50	Sediment	—[d]	—	—	—	—	—	—	0.36	—
AAB7285	21-02571	0.25–0.50	Sediment	0.25 (J)	0.4	0.44	0.43	0.35	0.3 (J)	0.26 (J)	—	0.45

Part 2

Sample ID	Location ID	Depth (ft)	Media	Dibenzofuran	Dichlorobenzidine[3,3'-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Industrial Soil Screening Levels[a]				**36.1**[b]	**42.6**	**24400**	**39.7**[b]	**23.4**	**92.5**	**20500**	**21.3**[b]
Residential Soil Screening Levels[a]				**36.1**[b]	**10.8**	**2290**	**39.7**[b]	**6.21**	**25.2**	**1830**	**21.3**[b]
AAA7526	21-01865	0.25–0.50	Sediment	—	0.36	—	—	—	—	—	—
AAB7285	21-02571	0.25–0.50	Sediment	0.12 (J)	—	1.4	0.21 (J)	0.32 (J)	0.13 (J)	1.5	0.99

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] Value from EPA Region 6 (EPA 2005, 91002).

[d] — = Not detected.

Table 6.3-10
Detected Organic Chemicals in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzene	Benzoic Acid	Butanone[2-]	Di-n-butylphthalate
Industrial Soil Screening Levels[a]				**53000**	**8.26**	**8.26**	**8.26**	**8.08**	**100000[b]**	**48,700[b]**	**68400**
Residential Soil Screening Levels[a]				**12600**	**1.12**	**1.12**	**1.12**	**3.32**	**100000[b]**	**31,800[b]**	**6110**
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—[c]	—	—	—	—	—	—	0.36
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.38
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	0.44
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	0.0038 (J)	—	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	0.0026 (J)	—	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	0.506 (J)	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	0.501 (J)	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	0.437 (J)	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	0.0046 (J)	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	0.0092	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	0.0037 (J)	—	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	0.00074 (J)	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	0.0048	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	0.0049 (J)	0.0064 (J)	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	0.0057 (J)	—	—	—	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	0.0133	—	—	—	—	—	0.0022 (J)	—
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	0.0055 (J)	—	—	—	—	—	—	—
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	0.0057 (J)	0.0074	—	0.0022 (J)	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	0.003 (J)	—	—	—	—	—	—	—

Table 6.3-10 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Pyrene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Industrial Soil Screening Levels[a]				**34.1**[d]	**7010**	**na**[e]	**21.3**[d]	**252**[d]	**3280**[d]	**64.5**	**133**[d]
Residential Soil Screening Levels[a]				**34.1**[d]	**4360**	**na**	**21.3**[d]	**252**[d]	**3280**[d]	**17.7**	**102**
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	0.0029 (J)	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	0.00037 (J)	—	—	0.00057 (J)
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	0.0014 (J)	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	—	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	0.00033 (J)	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	0.00063 (J)	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	0.0155 (J)	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	3.46E-07 (J)	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	0.0021 (J)	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	0.00037 (J)	—	—	—	—	—	—	—

Table 6.3-10 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Pyrene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Industrial Soil Screening Levels[a]				**34.1[d]**	**7010**	**na[e]**	**21.3[d]**	**252[d]**	**3280[d]**	**64.5**	**133[d]**
Residential Soil Screening Levels[a]				**34.1[d]**	**4360**	**na**	**21.3[d]**	**252[d]**	**3280[d]**	**17.7**	**102**
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	0.00064 (J)	—	—	0.00049 (J)

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] — = Not detected.

[d] Value from EPA Region 6 (EPA 2005, 91002).

[e] na = Not available.

Table 6.3-11
Detected VOCs and Tritium in Pore Gas at MDA U

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-98-0398	21-10838	25	—*	—	—	—	—	—	—	—	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	—
MD21-98-0400	21-10838	75	—	2.11	—	—	—	—	—	—	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	—	3.51	—	—	—	—	—	—	—
MD21-98-0418	21-10840	25	—	4.79	—	—	—	—	—	—	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	—	—	—	—	—	—	—	—	—
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	—	—	—	—	—	—	—
MD21-98-0440	21-10842	55	—	7.66	—	—	—	—	—	—	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	—
MD21-98-0450	21-10843	55	—	3.51	—	—	—	—	—	—	6.83
MD21-98-0451	21-10843	75	—	2.39	—	—	—	—	—	—	12.2
MD21-98-0460	21-10844	25	—	4.47	—	—	—	—	—	—	6.83
MD21-98-0461	21-10844	55	—	2.14	—	—	—	—	—	—	9.76
MD21-98-0462	21-10844	75	—	3.83	—	—	—	—	—	—	15.6

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-98-0474	21-10845	25	—	8.94	—	—	—	—	—	—	15.6
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	31.7
MD21-05-63502	21-24772	12	120	—	—	—	—	17	7.7	—	—
MD21-05-63501	21-24772	293	87	—	—	—	—	13	5.2	—	7.9
MD21-06-72590	21-24772	361	250	4.4	—	—	—	24	—	—	8.8
MD21-05-63504	21-24774	19	110	—	—	—	—	9.1	—	—	—
MD21-05-63503	21-24774	65	67	—	—	—	—	5	4.6	—	—
MD21-06-72587	21-24774	116	92	—	—	20	2000	44	43	—	—
MD21-05-63506	21-24775	14	15	56	—	—	—	—	4.4	—	—
MD21-05-63505	21-24775	79	18	—	—	—	—	—	—	—	—
MD21-06-72588	21-24775	120	55	1.9	—	—	—	—	—	—	—
MD21-05-63508	21-24776	4	26	—	—	—	—	—	—	—	—
MD21-05-63507	21-24776	95	34	—	—	—	—	—	—	—	17
MD21-06-72589	21-24776	120	150	0.81 J	1.1 J	—	—	19	0.47 J	0.84 J	3.6
MD21-05-63510	21-24777	4	25	—	—	—	—	—	—	—	4.8
MD21-05-63509	21-24777	85	33	—	—	—	—	3.8	—	—	11
MD21-06-72591	21-24777	120	7.6	9.8	—	—	—	—	6.6	1 J	6.3
MD21-05-63512	21-24778	13	42	—	—	—	—	4.6	—	—	—
MD21-05-63511	21-24778	87	47	—	—	—	—	3.4	4.7	—	7.8
MD21-06-72592	21-24778	120	7.4	4.1	4.8	—	—	0.59 J	2.9	1.3 J	9.6
MD21-05-63514	21-24779	11	36	—	—	—	—	2.9	2.9	—	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-05-63513	21-24779	95	95	—	—	—	11	5.3	7.8	—	—
MD21-06-72593	21-24779	120	85	0.6 J	—	—	—	—	—	0.65 J	0.64 J
MD21-05-63521	21-24780	4	—	28	—	—	—	—	—	—	—
MD21-05-63516	21-24780	49	46	25	—	—	—	7.2	—	—	—
MD21-06-63896	21-24780	49	36	43	—	4.9	—	3.3	—	—	5.9
MD21-06-72594	21-24780	120	32	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	—	—	4.7
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	—	—	9.8
MD21-06-72595	21-24781	120	67	—	—	—	—	5.8	—	—	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-98-0398	21-10838	25	13.8	—	—	—	—	—	—	—	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	—
MD21-98-0400	21-10838	75	—	—	—	—	—	—	—	—	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	—	—	4.94	—	—	—	78.1	—	—
MD21-98-0418	21-10840	25	—	—	2.87	—	—	—	2.52	—	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	—	—	2.97	—	—	—	—	—	—
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	2.67	—	—	—	—	—	—
MD21-98-0440	21-10842	55	—	—	2.92	—	—	—	14.3	—	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	—
MD21-98-0450	21-10843	55	—	—	2.72	—	—	—	—	—	—
MD21-98-0451	21-10843	75	—	—	2.72	—	—	—	—	—	—
MD21-98-0460	21-10844	25	—	—	2.87	—	—	—	—	—	—
MD21-98-0461	21-10844	55	—	—	—	—	—	—	—	—	—
MD21-98-0462	21-10844	75	—	—	3.06	—	—	—	—	—	—
MD21-98-0474	21-10845	25	—	—	—	—	—	—	—	—	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	—
MD21-05-63502	21-24772	12	—	—	—	—	—	13	—	16	—
MD21-05-63501	21-24772	293	—	—	—	—	—	13	6.4	9.4	17
MD21-06-72590	21-24772	361	—	—	—	—	—	—	—	—	—
MD21-05-63504	21-24774	19	—	—	—	—	—	—	—	—	—
MD21-05-63503	21-24774	65	—	—	—	—	—	—	—	—	—
MD21-06-72587	21-24774	116	—	—	—	—	—	200	—	—	—
MD21-05-63506	21-24775	14	—	11	—	—	—	—	6.3	6.1	72
MD21-05-63505	21-24775	79	—	—	—	—	—	—	—	—	4.3
MD21-06-72588	21-24775	120	—	—	—	—	—	—	—	—	1.1 J
MD21-05-63508	21-24776	4	—	—	—	—	—	—	—	—	4.4
MD21-05-63507	21-24776	95	—	—	—	—	—	—	—	—	—
MD21-06-72589	21-24776	120	0.57 J	—	2.1 J	—	—	—	—	—	1.1 J
MD21-05-63510	21-24777	4	—	—	—	—	—	—	—	—	—
MD21-05-63509	21-24777	85	—	—	—	—	—	—	—	—	—
MD21-06-72591	21-24777	120	3	—	1.6 J	—	—	—	2.1 J	—	8.5
MD21-05-63512	21-24778	13	—	—	—	—	—	—	—	—	7.5
MD21-05-63511	21-24778	87	—	—	—	—	—	—	—	—	—
MD21-06-72592	21-24778	120	—	—	2 J	—	0.69 J	—	1.2 J	—	6.5
MD21-05-63514	21-24779	11	—	—	—	—	—	—	—	7.3	—
MD21-05-63513	21-24779	95	—	—	—	—	—	—	4.9	15	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-06-72593	21-24779	120	—	—	2 J	0.74 J	—	—	—	—	—
MD21-05-63521	21-24780	4	—	—	—	—	—	—	4.9	—	20
MD21-05-63516	21-24780	49	—	—	—	—	—	—	—	—	26
MD21-06-63896	21-24780	49	—	4.8	—	—	—	—	10	6	21
MD21-06-72594	21-24780	120	—	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	—	—	—
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	—	—	—
MD21-06-72595	21-24781	120	—	—	—	—	—	—	—	—	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-98-0398	21-10838	25	—	—	—	—	—	—	—	—	17.3	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	24.1	—
MD21-98-0400	21-10838	75	—	—	—	—	—	—	—	—	8.66	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	13.9	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	5.27	10.7
MD21-98-0410	21-10839	75	—	—	—	—	—	—	—	—	—	—
MD21-98-0418	21-10840	25	—	—	—	—	—	—	—	—	16.6	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	3.77	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	6.03	—
MD21-98-0429	21-10841	25	—	—	—	—	—	—	—	—	2.34	6.36
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	7.16	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	—	—	—	—	—	—	9.79	—
MD21-98-0440	21-10842	55	—	—	—	—	—	—	—	—	41.4	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	20	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	603	—
MD21-98-0450	21-10843	55	—	—	—	—	—	—	—	—	147	9.96
MD21-98-0451	21-10843	75	—	—	—	—	—	—	—	—	147	16.8
MD21-98-0460	21-10844	25	—	—	—	—	—	—	—	—	185	—
MD21-98-0461	21-10844	55	—	—	—	—	—	—	—	—	71.6	11.5
MD21-98-0462	21-10844	75	—	—	—	—	—	—	—	—	158	18.4
MD21-98-0474	21-10845	25	—	—	—	—	—	—	—	—	324	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	1810	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	829	—
MD21-05-63502	21-24772	12	—	—	—	—	—	—	93	8.8	26	—
MD21-05-63501	21-24772	293	—	—	—	5	7.7 (J)	—	97	7.8	56	—
MD21-06-72590	21-24772	361	—	—	—	—	—	—	—	—	—	—
MD21-05-63504	21-24774	19	—	—	—	—	—	5.8	320	—	7.7	—
MD21-05-63503	21-24774	65	—	—	—	—	—	8.8	140	—	11	—
MD21-06-72587	21-24774	116	—	38	—	—	—	—	—	—	—	—
MD21-05-63506	21-24775	14	—	—	—	14	—	—	13	—	75	—
MD21-05-63505	21-24775	79	—	—	—	—	—	—	160	—	10	—
MD21-06-72588	21-24775	120	—	—	—	—	—	—	—	4.9	3.3	0.97 J
MD21-05-63508	21-24776	4	—	—	—	—	—	—	210	—	10	—
MD21-05-63507	21-24776	95	—	—	—	—	—	—	140	—	4.2	7.3 (J)
MD21-06-72589	21-24776	120	2.5	—	—	—	—	—	—	3.7	4	1.9 J
MD21-05-63510	21-24777	4	—	—	—	—	—	—	100	—	4.4	—
MD21-05-63509	21-24777	85	—	—	—	—	—	—	150	—	4.8	—
MD21-06-72591	21-24777	120	—	—	—	—	—	—	1.2 J	1.3 J	16	2.1 J
MD21-05-63512	21-24778	13	—	—	—	—	—	—	120	—	14	—
MD21-05-63511	21-24778	87	—	—	—	—	—	—	110	—	5.4	—
MD21-06-72592	21-24778	120	—	—	12	—	—	—	0.67 J	3.5	12	3.1 J
MD21-05-63514	21-24779	11	—	—	—	—	—	—	45	—	20	—
MD21-05-63513	21-24779	95	—	—	—	—	—	—	63	9.5	41	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-06-72593	21-24779	120	—	—	—	—	—	—	—	4.2	0.99 J	1 J
MD21-05-63521	21-24780	4	—	—	—	—	—	—	250	—	40	—
MD21-05-63516	21-24780	49	—	—	—	4.5	—	—	400	—	43	—
MD21-06-63896	21-24780	49	—	—	—	10	—	17	65	—	110	—
MD21-06-72594	21-24780	120	—	—	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	150	—	11	—
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	330	—	17	—
MD21-06-72595	21-24781	120	—	—	—	—	—	—	—	—	—	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-98-0398	21-10838	25	38.2	—	—	—	—	—	—	23.4	—
MD21-98-0399	21-10838	55	131	—	—	13.3	—	—	8.68	46	—
MD21-98-0400	21-10838	75	36.5	9.13	—	3.68	—	—	2.69	13.9	—
MD21-98-0408	21-10839	25	98.2	14.5	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	115	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	37.6	—	—	310	83.5	—	126	512	—
MD21-98-0418	21-10840	25	—	—	—	4.42	—	—	3.38	17.4	—
MD21-98-0419	21-10840	55	34.4	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	16.9	24.2	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	70.9	—	—	—	—	—	—	—	—
MD21-98-0430	21-10841	55	92.7	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	24	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	5.29	—	—	—	—	—	—	8.68	—
MD21-98-0440	21-10842	55	29.4	—	—	68.8	16.7	—	26.9	122	—
MD21-98-0441	21-10842	75	76.3	—	—	18.2	—	—	—	24.3	—
MD21-98-0449	21-10843	25	—	18.3	—	—	—	—	—	34.7	—
MD21-98-0450	21-10843	55	—	—	—	8.35	—	—	3.52	14.8	—
MD21-98-0451	21-10843	75	3.11	140	—	6.88	—	—	2.52	10.4	—
MD21-98-0460	21-10844	25	—	27.9	—	7.37	—	—	3.17	13.9	—
MD21-98-0461	21-10844	55	—	91.3	—	5.9	—	—	—	8.33	—
MD21-98-0462	21-10844	75	3.82	156	—	4.77	—	—	—	8.68	—
MD21-98-0474	21-10845	25	—	22	—	8.35	—	—	—	17.4	—

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-98-0475	21-10845	55	—	91.3	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	145	—	—	—	—	—	—	—
MD21-05-63502	21-24772	12	44	32	—	17	—	—	12	20	6509
MD21-05-63501	21-24772	293	60	100	—	9.8	—	—	—	22	1481
MD21-06-72590	21-24772	361	58	100	—	—	—	—	—	—	3050
MD21-05-63504	21-24774	19	—	—	—	—	—	—	—	10	1284
MD21-05-63503	21-24774	65	—	—	—	—	—	—	—	6.7	2010
MD21-06-72587	21-24774	116	—	100	—	—	—	—	—	—	3720
MD21-05-63506	21-24775	14	—	50	—	6.1	—	—	7.8	21	3340
MD21-05-63505	21-24775	79	—	34	—	5.3	—	—	—	8.8	1160
MD21-06-72588	21-24775	120	31	13	1 J	—	—	—	—	—	1610
MD21-05-63508	21-24776	4	—	6.2	—	—	—	—	—	7.2	1369
MD21-05-63507	21-24776	95	—	94	—	—	—	—	—	4.8	4582
MD21-06-72589	21-24776	120	36	25	1.5 J	—	—	4.7	—	—	690
MD21-05-63510	21-24777	4	—	39	—	—	—	—	—	4.2	1371
MD21-05-63509	21-24777	85	—	86	—	—	—	—	—	4.7	2610
MD21-06-72591	21-24777	120	5.4	44	1.4 J	1.4 J	—	—	—	3.4 J	4240
MD21-05-63512	21-24778	13	—	—	—	—	—	—	—	8.4	3271
MD21-05-63511	21-24778	87	—	30	—	—	—	—	—	4.3	748
MD21-06-72592	21-24778	120	30	45	2.8	0.84 J	—	—	—	2.4 J	850
MD21-05-63514	21-24779	11	20	17	—	7.7	—	—	5.4	12	3222
MD21-05-63513	21-24779	95	50	32	—	16	—	—	9.9	19	676

Table 6.3-11 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-06-72593	21-24779	120	38	13	1.3 J	—	—	2	—	—	660
MD21-05-63521	21-24780	4	—	16	—	—	—	—	6.9	18	1871
MD21-05-63516	21-24780	49	—	34	—	—	—	—	—	20	376
MD21-06-63896	21-24780	49	—	44	—	5.6	—	—	10	32	—
MD21-06-72594	21-24780	120	—	140	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	30	—	—	—	—	—	8	393
MD21-05-63517	21-24781	91.5	—	61	—	—	—	—	—	16	616
MD21-06-72595	21-24781	120	—	46	—	—	—	—	—	—	1220

Note: VOC units in µg/m^3. Tritium reported in pCi/L.

* — = Not detected

Appendix A

Acronyms, Glossary, and
Metric Conversion and Data Qualifier Definition Tables

A-1.0 ACRONYMS

amsl	above mean sea level
AOC	area of concern
AUF	area use factor
ASTM	American Society for Testing and Materials
B&K	Brüel & Kjaer
BCG	Bioconcentration Guide
bgs	below ground surface
BV	background value
CME	corrective measures evaluation
COC	chain of custody
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cpm	counts per minute
CRDL	contract-required detection limit
CST	Chemical Science and Technology
CWDR	Chemical Waste Disposal Request (form)
DGPS	differential global positioning system
DL	detection limit
DOE	Department of Energy
DP	Delta Prime
dpm	disintegration(s) per minute
EDL	estimated detection limit
EPA	Environmental Protection Agency
EQL	estimated quantitation limit
ER	Environmental Restoration Project
ESL	ecological screening level
FV	fallout value
HE	high explosive
HI	hazard index
HIR	historical investigation report
HQ	hazard quotient
HR	home range
HWA	Hazardous Waste Act

IA	Information Architecture (Project)
ICPES	inductively coupled plasma emission spectrometry
IDW	investigation-derived waste
IRIS	Integrated Risk Information System
LANL	Los Alamos National Laboratory
LCS	laboratory-control sample
LIR	Laboratory Implementation Requirement
MDA	material disposal area
MDL	method detection limit
MOSA	Methods of Soil Analysis
MS	matrix spike
NCEA	National Center for Environmental Assessment
NMED	New Mexico Environment Department
NMHWA	New Mexico Hazardous Waste Act
NOAEL	no observed adverse effect level
PAH	polycyclic aromatic hydrocarbon
PAUF	population area use factor
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PQL	practical quantitation limit
PRG	preliminary remediation goal
QA	quality assurance
QC	quality control
QP	quality procedure
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RfD	reference dose
RFI	RCRA facility investigation
SAL	screening action level
SAP	sampling and analysis plan
SF	slope factor
SMO	Sample Management Office
SOP	standard operating procedure

SOW	statement of work
SSHASP	site-specific health and safety plan
SSL	soil-screening level
SSO	Site Safety Officer
SVOC	semivolatile organic compound
SWA	Solid Waste Act
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list
TD	total depth
T&E	threatened and endangered
TPU	total propagated uncertainty
TRV	toxicity reference value
TSTA	Tritium Systems Test Assembly
TWA	total-weighted average
UC	University of California
UCL	upper confidence limit
VOC	volatile organic compound
WCSF	Waste Characterization Strategy Form
WPF	Waste Profile Form

A-2.0 GLOSSARY

abandonment—The plugging of a well or borehole in a manner that precludes the migration of surface runoff or groundwater along the length of the well or borehole.

absorption—The uptake of water, other fluids, or dissolved chemicals by a cell or organism (e.g., tree roots absorb dissolved nutrients in soil).

action level—(1) A numerical value that has been established by statistical analysis or has been set according to regulatory limits and is used as a criterion for action. Contamination found in a particular medium below an appropriate action level is not generally subject to remediation or further study. (2) A health- and environment-based concentration derived using chemical-specific toxicity information and standardized exposure assumptions. An action level can be developed on a facility-specific basis or can be taken from standardized lists.

administrative authority—For Los Alamos National Laboratory, one or more regulatory agencies, such as the New Mexico Environment Department, the U.S. Environmental Protection Agency, or the U.S. Department of Energy, as appropriate.

administrative controls—Nonphysical or nonengineered mechanisms for managing risks to human health and the environment.

aggregate—At the Los Alamos National Laboratory, an area within a *watershed* containing solid waste management units (SWMUs) and/or areas of concern (AOCs), and the media affected or potentially affected by releases from those SWMUs and/or AOCs. Aggregates are designated to promote efficient and effective corrective action activities.

alluvial—Pertaining to geologic deposits or features formed by running water.

alpha radiation—A form of particle radiation that is highly ionizing and has low penetration. Alpha radiation consists of two protons and two neutrons bound together into a particle that is identical to a helium nucleus and can be written as He^{2+}.

analysis—A critical evaluation, usually made by breaking a subject (either material or intellectual) down into its constituent parts, then describing the parts and their relationship to the whole. Analyses may include physical analysis, chemical analysis, toxicological analysis, and knowledge-of-process determinations.

analyte—The element, nuclide, or ion a chemical analysis seeks to identify and/or quantify; the chemical constituent of interest.

analytical method—A procedure or technique for systematically performing an activity.

area of concern—(1) A release that may warrant investigation or remediation and is not a solid waste management unit (SWMU). (2) An area at Los Alamos National Laboratory[0] that may have had a release of a hazardous waste or a hazardous constituent but is not a SWMU.

area of contamination—As defined by the U.S. Environmental Protection Agency, certain areas of generally dispersed contamination that could be equated to a Resource Conservation and Recovery Act (RCRA) landfill. The movement of hazardous wastes within those areas would not be considered land disposal and would not trigger RCRA land-disposal restrictions. An area of contamination may be designated by the Environmental Remediation and Surveillance Program as part of a corrective action for waste management purposes, subject to approval by the administrative authority.

artificial fill—A material that has been imported and typically consists of disturbed *soils* mixed with crushed Bandelier Tuff or other rock types.

ash-flow tuff—A tuff deposited by a hot, dense volcanic current. Ash-flow tuff can be either welded tuff or nonwelded tuff.

as low as reasonably achievable (ALARA)—(1) An approach to radiation protection for controlling or managing exposure (both individual and collective) to the work force and the general public. (2) An approach for controlling or managing releases of radioactive material to the environment at levels as low as social, technical, economic, practical, and public-policy considerations permit. ALARA is not a dose limit.

assessment—(1) The act of reviewing, inspecting, testing, checking, conducting surveillance, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. (2) An evaluation process used to measure the performance or effectiveness of a system and its elements. In this glossary, assessment is an all-inclusive term used to denote any one of the following: audit, performance evaluation, management system review, peer review, inspection, or surveillance.

assessment endpoint—In an ecological risk assessment, the expression of an environmental value to be protected (e.g., fish biomass or reproduction of avian populations).

background concentration—Naturally occurring concentrations of an inorganic chemical or radionuclide in soil, sediment, or tuff.

background data—Data that represent naturally occurring concentrations of inorganic and radionuclide constituents in a geologic medium. Los Alamos National Laboratory's (the Laboratory's) background data are derived from samples collected at locations that are either within, or adjacent to, the Laboratory. These locations (1) are representative of geological media found within Laboratory boundaries, and (2) have not been affected by Laboratory operations.

background level—(1) The concentration of a substance in an environmental medium (air, water, or soil) that occurs naturally or is not the result of human activities. (2) In exposure assessment, the concentration of a substance in a defined control area over a fixed period of time before, during, or after a data-gathering operation.

background radiation—The amount of radioactivity naturally present in the environment, including cosmic rays from space and natural radiation from soils and rock.

background sample—A sample collected from an area or site that is similar to the one being studied but known, or thought, to be free from constituents of concern.

background value (BV)—A statistically derived concentration (i.e., the upper tolerance limit [UTL]) of a chemical used to represent the background data set. If a UTL cannot be derived, either the detection limit or maximum reported value in the background data set is used.

barrier—Any material or structure that prevents, or substantially delays, the movement of solid-, liquid-, or gaseous-phase chemicals in environmental media.

bentonite—An absorbent aluminum silicate clay formed from volcanic ash and used in various adhesives, cements, and ceramic fillers. Because bentonite can absorb large quantities of water and expand to several times its normal volume, it is a common drilling mud additive.

best management practices—Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

beta radiation—High-energy electrons emitted by certain types of radioactive nuclei, such as potassium-40. The beta particles emitted are a form of ionizing radiation also known as beta rays.

bias—The systematic deviation from a true value that remains constant over replicated measurements within the statistical precision of the measurement process.

blank—A sample that is expected to have a negligible or unmeasurable amount of an analyte. Results of blank sample analyses indicate whether field samples might have been contaminated during the sample collection, transport, storage, preparation, or analysis processes.

borehole—(1) A hole drilled or bored into the ground, usually for exploratory or economic purposes. (2) A hole into which casing, screen, and other materials may be installed to construct a well.

borehole logging—The process of making remote measurements of physical, chemical, or other parameters at multiple depths in a borehole.

calibration—A process used to identify the relationship between the true analyte concentration or other variable and the response of a measurement instrument, chemical analysis method, or other measurement system.

calibration blank—A calibration standard prepared to contain negligible or unmeasurable amounts of analytes. A calibration blank is used to establish the zero concentration point for analytical measurement calibrations.

calibration standard—A sample prepared to contain known amounts of analytes of interest and other constituents required for an analysis.

caliche (properly called pedogenic calcite, also known as calcrete)—A layer of hard subsoil encrusted with calcium carbonate that occurs in arid or semiarid regions or precipitates out of groundwater (groundwater caliche). Typically found in near-surface soil.

canyon—A stream-cut chasm or gorge, the sides of which are composed of cliffs or a series of cliffs rising from the chasm's bed. Canyons are characteristic of arid or semiarid regions where downcutting by streams greatly exceeds weathering.

cap—A modern engineered landfill cover that is designed and constructed to minimize or eliminate the release of constituents into the environment.

certificate of completion—A document to be issued by the New Mexico Environment Department (NMED) under the March 1, 2005, Compliance Order on Consent (Consent Order) once NMED determines that the requirements of the Consent Order have been satisfied for a particular solid waste management unit or area of concern.

chain of custody—An unbroken, documented trail of accountability that is designed to ensure the uncompromised physical integrity of samples, data, and records.

chemical—Any naturally occurring or human-made substance characterized by a definite molecular composition.

chemical analysis—A process used to measure one or more attributes of a sample in a clearly defined, controlled, and systematic manner. Chemical analysis often requires treating a sample chemically or physically before measurement.

chemical of concern—A chemical identified in human-health or ecological risk assessments as posing a risk.

chemical of potential concern (COPC)—A detected chemical compound or element that has the potential to adversely affect human receptors as a result of its concentration, distribution, and toxicity.

chemical of potential ecological concern—A detected chemical compound or element that has the potential to adversely affect ecological receptors as a result of its concentration, distribution, and toxicity.

cleanup—A series of actions taken to deal with the release, or threat of a release, of a hazardous substance that could affect humans and/or the environment. The term cleanup is sometimes used interchangeably with the terms remedial action, removal action, or corrective action.

cleanup levels—Media-specific contaminant concentration levels that must be met by a selected corrective action. Cleanup levels are established by using criteria such as the protection of human health and the environment; compliance with regulatory requirements; reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; and cost.

Code of Federal Regulations (CFR)—A document that codifies all rules of the executive departments and agencies of the federal government. The code is divided into 50 volumes, known as titles. Title 40 of the CFR (referenced as 40 CFR) covers environmental regulations.

collocated sample—One of two or more samples collected within close proximity of each other and meant to represent the same immediate area.

Compliance Order on Consent (Consent Order)—For the Environmental Remediation and Surveillance Program, an enforcement document signed by the New Mexico Environment Department, the U.S. Department of Energy, and the Regents of the University of California on March 1, 2005, which prescribes the requirements for corrective action at Los Alamos National Laboratory. The purposes of the Consent Order are (1) to define the nature and extent of releases of contaminants at, or from, the facility; (2) to identify and evaluate, where needed, alternatives for corrective measures to clean up contaminants in the environment and prevent or mitigate the migration of contaminants at, or from, the facility; and (3) to implement such corrective measures. The Consent Order supersedes the corrective action requirements previously specified in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

Consent Order—See Compliance Order on Consent.

consolidated unit—A group of solid waste management units (SWMUs), or SWMUs and areas of concern, which generally are geographically proximate and have been combined for the purposes of investigation, reporting, or remediation.

contaminant—(1) Chemicals and radionuclides present in environmental media or on debris above background levels. (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any hazardous waste listed or identified as characteristic in 40 Code of Federal Regulations (CFR) 261 (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]); any hazardous constituent listed in 40 CFR 261 Appendix VIII (incorporated by 20.4.1.200 NMAC) or 40 CFR 264 Appendix IX (incorporated by 20.4.1.500 NMAC); any groundwater contaminant listed in the Water Quality Control Commission (WQCC) Regulations at 20.6.3.3103 NMAC; any toxic pollutant listed in the WQCC Regulations at 20.6.2.7 NMAC; explosive compounds; nitrate; and perchlorate. (Note: Under the Consent Order, the term "contaminant" does not include radionuclides or the radioactive portion of mixed waste.)

contract analytical laboratory—An analytical laboratory under contract to the University of California to analyze samples from work performed at Los Alamos National Laboratory.

controlled area—An indoor or outdoor Los Alamos National Laboratory area to which access is controlled for security reasons or for the protection of individuals from exposure to radiation and/or hazardous materials.

corrective action—(1) In the Resource Conservation and Recovery Act, an action taken to rectify conditions potentially adverse to human health or the environment. (2) In the quality assurance field, the process of rectifying and preventing nonconformances.

corrective measure—An action taken at a solid waste management unit or area of concern to protect human health or the environment in the event of a release of contaminants into the environment, or to prevent a release of contaminants into the environment.

corrective measure evaluation—An evaluation of potential remedial alternatives undertaken to identify a preferred remedy that will be protective of human health and the environment and that will attain appropriate cleanup goals.

cumulative risk—The evaluation of a simultaneous exposure of a receptor to multiple media, pathways, and contaminants in order to estimate the resulting health and environmental effects.

Curie—A unit of radioactivity defined as the quantity of any radioactive nuclide that has an activity of 3.7×10^{10} disintegrations per second (dps).

daily calibration—The combination of a calibration blank and calibration standard used to determine if the instrument response to an analyte concentration is within acceptable bounds relative to the initial calibration. A daily calibration establishes the instrument response factors on which quantitations are based, thus verifying the satisfactory performance of an instrument on a day-to-day basis.

data package—The hard copy deliverable for each sample delivery group produced by a contract analytical laboratory in accordance with the statement of work for analytical services.

data-quality assessment—The statistical and/or scientific evaluation of a data set that establishes whether the data set is adequate for its intended use.

data-quality objectives—Qualitative and quantitative statements of the overall level of uncertainty that a decision maker will accept regarding results or decisions based on environmental data. The objectives provide the statistical framework for planning and managing environmental data operations that will meet user needs.

data validation—A systematic process that applies a defined set of performance-based criteria to a body of data and that may result in the qualification of the data. The data-validation process is performed independently of the analytical laboratory that generates the data set and occurs before conclusions are drawn from the data. The process may include a standardized data review (routine data validation) and/or a problem-specific data review (focused data validation).

data verification—The process of evaluating the completeness, correctness, consistency, and compliance of a laboratory data package against a specified standard or contract.

- Completeness: All required information is present—in both hard copy and electronic forms.
- Correctness: The reported results are based on properly documented and correctly applied algorithms.
- Consistency: The values are the same when they appear in different reports or are transcribed from one report to another.
- Compliance: The data pass numerical quality-control tests based on parameters or limits specified in a contract or in an auxiliary document.

decommissioning—The permanent removal of facilities and their components from service after the discontinued use of structures or buildings that are deemed no longer useful. Decommissioning must take place in accordance with regulatory requirements and applicable environmental policies.

decontamination—The removal of unwanted material from the surface of, or from within, another material.

desk instruction—A document that describes the process for performing administrative activities (except those governed by the Environmental Remediation and Surveillance Program's Quality Management Plan).

detect (detection)—An analytical result, as reported by an analytical laboratory, that denotes a chemical or radionuclide to be present in a sample at a given concentration.

detection limit—The minimum concentration that can be determined by a single measurement of an instrument. A detection limit implies a specified statistical confidence that the analytical concentration is greater than zero.

discharge—The accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into, or on, any land or water.

disposal—The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into, or on, any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

document catalog number—A unique document identifier designed to track every document generated by the Environmental Remediation and Surveillance Program. (This number is automatically assigned when an online document signature form is obtained.)

document control—The process of ensuring that documents are reviewed for adequacy, approved for release by authorized personnel, and distributed to, and used at, the location where the prescribed activity is to be performed.

dose (dosage)—(1) The actual quantity of a chemical that is administered to an organism or to which it is exposed. (2) The amount of a substance that reaches a specific tissue (e.g., the liver). (3) The amount of a substance that is available for interaction with metabolic processes after it has crossed an organism's outer boundary.

dose equivalent—The product of the absorbed dose from ionizing radiation and factors that account for biological differences as a result of the radiation type and its distribution in the body.

drill bit—The cutting tool attached to the bottom of a drill stem.

drill rod (drill pipe)—Special pipe used to transmit rotation and energy from the drill rig to the bit. This conduit conveys circulation fluids such as air, water, or other mixtures to cool the bit and evacuate the borehole cuttings.

duplicate analysis—An analysis performed on one member of a pair of identically prepared subsamples taken from the same sample.

ecological screening levels—Soil, sediment, or water concentrations that are used to screen for potential ecological effects. The concentrations are based on a chemical's no-observed-adverse-effect level for a receptor, below which no risk is indicated.

end state—The physical state of a site after agreed-upon remediation activities have been completed.

environmental assessment—An environmental analysis that is prepared, pursuant to the National Environmental Policy Act, to determine whether a particular federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Restoration (ER) Project—A Los Alamos National Laboratory project established in 1989 as part of a U.S. Department of Energy nationwide program, and precursor of today's Environmental Remediation and Surveillance (ERS) Program. This program is designed (1) to investigate hazardous and/or radioactive materials that may be present in the environment as a result of past Laboratory operations, (2) to determine if the materials currently pose an unacceptable risk to human health or the environment, and (3) to remediate (clean up, stabilize, or restore) those sites where unacceptable risk is still present.

environmental samples—Air, soil, water, or other media samples that have been collected from streams, wells, and soils, or other locations, and that are not expected to exhibit properties classified as hazardous by the U.S. Department of Transportation.

environmental surveillance—The collection and analysis of samples from air, water, soil, foodstuffs, biota, and other media to determine the environmental quality of an industry or community. Environmental surveillance is performed commonly at sites that contain nuclear facilities.

equipment blank (rinsate blank)—A sample used to rinse sample-collection equipment and expected to have negligible or unmeasurable amounts of analytes. The equipment blank is collected after the equipment decontamination is completed but before the collection of another field sample.

ER data—Data derived from samples that have been collected and paid for through Environmental Remediation and Surveillance Program funding.

ER database (ERDB)—A database housing analytical and other programmatic information for the Environmental Remediation and Surveillance Program. The ERDB currently contains about 3 million analyses in 300 tables.

ER identification (ER ID) number—A unique identifier assigned by the Environmental Remediation and Surveillance Program's Records Processing Facility to each document when it is submitted as a final record.

error—The quantifiable difference between an observed value and the true value of a parameter being measured.

evapotranspiration—(1) The discharge of water from the earth's surface to the atmosphere by evaporation from lakes, streams, and soil surfaces and by transpiration from plants. (2) The loss of water from the soil by evaporation and/or by transpiration from the plants growing in the soil.

exposure pathway—Any path from the sources of contaminants to humans and other species or settings through air, soil, water, or food.

exposure unit—The bounded area or volume within which a person or other receptor could be exposed to contaminants that have been released into the environment.

facility—All contiguous land (and structures, other appurtenances, and improvements on the land) used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units. For the purpose of implementing a corrective action, a facility is all the contiguous property that is under the control of the owner or operator seeking a permit under Subtitle C of the Resource Conservation and Recovery Act.

fault—A fracture, or zone of fractures, in rock along which vertical or horizontal movement has taken place and adjacent rock layers or bodies have been displaced.

Federal Register—The official daily publication for Rules, Proposed Rules, and Notices from federal agencies and organizations, as well as Executive Orders and other presidential documents.

field blank (field reagent blank)—A blank sample prepared in the field or carried to the sampling site, exposed to sampling conditions (e.g., by removing bottle caps), and returned to a laboratory to be analyzed in the same manner in which environmental samples are being analyzed. Field blanks are used to identify the presence of any contamination that may have been added during the sampling and analysis process.

field duplicate (replicate) samples—Two separate, independent samples taken from the same source, which are collected as collocated samples (i.e., equally representative of a sample matrix at a given location and time).

field matrix spike—A known amount of a field sample to which a known amount of a target analyte has been added and used to compute the proportion of the added analyte that is recovered upon analysis.

field notebook—A record of activities performed in the field or a compilation of field data.

field reagent blank—See field blank.

field sample—See sample.

field split sample—A field sample that has been homogenized and divided, in the field, into equally representative portions that are submitted for analysis.

focused data validation—A technically based analyte-, sample-, and data-use-specific process that extends the qualification of data beyond the method or contractual compliance and provides a higher level of confidence that an analyte is present or absent. If an analyte is present, the quality of the quantitation may be obtained through focused validation.

formal training—Training that is conducted by a qualified individual in settings such as a classroom or the field.

gamma radiation—A form of electromagnetic, high-energy ionizing radiation emitted from a nucleus. Gamma rays are essentially the same as x-rays (though at higher energy) and require heavy shielding, such as concrete or steel, to be blocked.

grab sample—A specimen collected by a single application of a field sampling procedure to a target population (e.g., the surface soil from a single hole collected after the spade-and-scoop sampling procedure, or a single air filter left in the field for three months).

graded approach—A management tool used to evaluate the importance and relative risk of an item, activity, or service in the working process.

gravimetric moisture content—See water content.

ground cover—Natural or human-made materials (e.g., grasses, pine needles, asphalt, or concrete) which overlay soils.

groundwater—Interstitial water that occurs in saturated earth material and is capable of entering a well in sufficient amounts to be used as a water supply.

grout—Cement or bentonite mixtures used for sealing boreholes and wells and for zone isolation. Only Portland Type I or II cement is approved for use at investigative sites.

half-life—(1) The time required for a pollutant to lose one-half of its original concentration (for example, the biochemical half-life of DDT [dichlorodiphenyltrichloroethane] in the environment is 15 yr). (2) The time required for one half of the atoms in a radioactive element to undergo self-transmutation or decay (the half-life of radium is 1620 yr). (3) The time required for the elimination of one half of a total dose from the body.

hazard index—The sum of hazard quotients for multiple contaminants to which a receptor may have been exposed.

Hazardous and Solid Waste Amendments (HSWA)—Public Law No. 98-616, 98 Stat. 3221, enacted in 1984, which amended the Resource Conservation and Recovery Act of 1976 (42 United States Code § 6901 et seq).

hazardous constituent (hazardous waste constituent)—According to the March 1, 2005, Compliance Order of Consent (Consent Order), any constituent identified in Appendix VIII of Part 261, Title 40 Code of Federal Regulations (CFR) (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]) or any constituent identified in 40 CFR 264, Appendix IX (incorporated by 20.4.1.500 NMAC).

hazardous waste—(1) Solid waste that is listed as a hazardous waste, or exhibits any of the characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity, as provided in 40 CFR, Subpart C). (2) According to the March 1, 2005, Compliance Order of Consent (Consent Order), any solid waste or combination of solid wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, meets the description set forth in New Mexico Statutes Annotated 1978, § 74-4-3(K) and is listed as a hazardous waste or exhibits a hazardous waste characteristic under 40 CFR 261 (incorporated by 20.4.1.200 New Mexico Administrative Code).

Hazardous Waste Bureau—The New Mexico Environment Department bureau charged with providing regulatory oversight and technical guidance to New Mexico hazardous waste generators and to treatment, storage, and disposal facilities, as required by the New Mexico Hazardous Waste Act.

Hazardous Waste Facility Permit[0]—The authorization issued to Los Alamos National Laboratory (the Laboratory) by the New Mexico Environment Department that allows the Laboratory to operate as a hazardous waste treatment, storage, and disposal facility.

hazard quotient (HQ)—The ratio of the estimated site-specific exposure concentration of a single chemical from a site to the estimated daily exposure level at which no adverse health effects are likely to occur.

holding time—The maximum elapsed time a sample can be stored without unacceptable changes in analyte concentrations. Holding times apply under prescribed conditions, and deviations from these conditions may affect the holding times. Extraction holding time refers to the time lapsed between sample collection and sample preparation. Analytical holding time refers to the time lapsed between sample preparation and analysis.

HSWA module—See Module VIII.

hydraulic conductivity—(1) A coefficient of proportionality that describes the rate at which a fluid can move through a permeable medium. The rate is a function of both the medium and the fluid flowing through it. (2) The quantity of water that will flow through a unit of cross-sectional area of a porous material per unit time under a hydraulic gradient of 1.00 (measured at right angles to the direction of flow) at a specified temperature.

hydraulic gradient—The rate of change in hydraulic head per unit of distance in the direction of groundwater flow.

hydraulic head—The elevation of the water table or potentiometric surface as measured in a well.

hydrogen-ion activity (pH)—The effective concentration (activity) of dissociated hydrogen ions (H^+); a measure of the acidity or alkalinity of a solution that is numerically equal to 7 for neutral solutions, increases with alkalinity, and decreases as acidity increases.

independent quality assessment—A planned and documented activity performed by individuals outside the Environmental Remediation and Surveillance (ERS) Program to determine—by investigation, examination, or evaluation of objective evidence—the extent to which the ERS quality program is being implemented.

industrial scenario—A land-use condition in which current Los Alamos National Laboratory operations or industrial/commercial operations within Los Alamos County are continued or planned. Any necessary remediation involves cleanup to standards designed to ensure a safe and healthy work environment for workers.

initial calibration—The process used to establish the relationship between instrument response and analyte concentration at several analyte concentration values in order to demonstrate that an instrument is capable of acceptable analytical performance.

institutional controls—Controls that prohibit or limit access to contaminated media. Institutional controls may include use restrictions, permitting requirements, standard operating procedures, laboratory implementation requirements, laboratory implementation guidance, and laboratory performance requirements.

instrument detection limit (IDL)—A measure of instrument sensitivity without any consideration for contributions to the signal from reagents. The IDL is calculated as follows: Three times the average of the standard deviations obtained on three nonconsecutive days from the analysis of a standard solution, with seven consecutive measurements of that solution per day. The standard solution must be prepared at a concentration of three to five times the instrument manufacturer’s estimated IDL.

instrument performance check—The analysis of a chemical of known relative mass abundances to indicate how well a mass spectrometer is performing over a specified mass range.

interim measure—An action that can be implemented to minimize or prevent the migration of contaminants and to minimize or prevent actual or potential human or ecological exposure to contaminants, while long-term final corrective action remedies are evaluated and, if necessary, implemented.

internal standards—Compounds added to a sample after the sample has been prepared for qualitative and quantitative instrument analysis. The compounds serve as a standard of retention time and response that is invariant from run to run.

investigation-derived waste—Solid waste or hazardous waste that was generated as a result of corrective action investigation or remediation field activities. Investigation-derived waste may include drilling muds, cuttings, and purge water from the installation of test pits or wells; purge water, soil, and other materials from the collection of samples; residues from the testing of treatment technologies and pump-and-treat systems; contaminated personal protective equipment; and solutions (aqueous or otherwise) used to decontaminate nondisposable protective clothing and equipment.

laboratory control sample (LCS)—A known matrix that has been spiked with compound(s) representative of target analytes. LCSs are used to document laboratory performance, and the acceptance criteria for LCSs are method-specific.

laboratory qualifier (laboratory flag)—Codes applied to data by a contract analytical laboratory to indicate, on a gross scale, a verifiable or potential data deficiency. These flags are applied according to the U.S. Environmental Protection Agency contract-laboratory program guidelines.

land disposal—Placement in or on the land, except in a corrective-action management unit or staging pile; this includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, or land treatment facility.

land-disposal restrictions—Requirements in Title 40 Code of Federal Regulations, Section 268 that specify treatment standards that protect human health and the environment when hazardous waste is land disposed. All hazardous waste, except under certain limited circumstances, must meet a specific treatment standard before it can be land disposed.

LANL (Los Alamos National Laboratory) data validation qualifiers—The Los Alamos National Laboratory data qualifiers which are defined by, and used, in the Environmental Remediation and Surveillance (ERS) Program validation process. The qualifiers describe the general usability (or quality) of data. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate ERS standard operating procedure.

LANL (Los Alamos National Laboratory) data validation reason codes—The Los Alamos National Laboratory designations applied to sample data by data validators who are independent of the contract laboratory that performed a given sample analysis. Reason codes provide an analysis-specific explanation for applying a qualifier, with some description of the qualifier’s potential impact on data use. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate Environmental Remediation and Surveillance Program standard operating procedure.

log book—A notebook used to record tabulated data (e.g., the history of calibrations, sample tracking, numerical data, or other technical data).

logging run—A single data-collecting pass with a logging tool as the tool moves up or down in the borehole or a portion of the borehole. A logging operation generally consists of a main run and one or more repeat runs with each logging tool.

logging tool—A device that is run in a borehole to make borehole logging measurements.

log header—One or more pages of information included with each hard copy of borehole logging data and with logging data recorded digitally on magnetic tapes or disks. The minimum information required in the log header is specified in the borehole logging technical specifications and includes such information as name and location of the hole, the logging services performed, and the date and time of the log's beginning and end.

long-term environmental stewardship—All the activities required to maintain an adequate level of protection for human health and the environment from risks posed by nuclear and/or chemical materials, waste, and contamination that remain after cleanup is complete.

Los Alamos unlimited release (LA-UR) number—A unique identification number required for all documents or presentations prepared for distribution outside Los Alamos National Laboratory (the Laboratory). LA-UR numbers are obtained by filling out a technical information release form (http://enterprise.lanl.gov/alpha.htm) and submitting the form together with 2 copies of the document to the Laboratory's Classification Group (S-7) for review.

lower acceptance limit (LAL)—The lowest limit that is acceptable according to quality control (QC) criteria for a specific QC sample and for a specific method. Any results lower than the LAL are qualified following the routine validation procedure.

material disposal area (MDA)—A subset of the solid waste management units at Los Alamos National Laboratory (the Laboratory) that include disposal units such as trenches, pits, and shafts. Historically, various disposal areas (but not all) were designated by the Laboratory as MDAs.

matrix—Relatively fine material in which coarser fragments or crystals are embedded; also called "ground mass" in the case of igneous rocks.

matrix spike—An aliquot of a sample to which a known concentration of target analyte has been added. Matrix spike samples are used to measure the ability to recover prescribed analytes from a native sample matrix. The spiking typically occurs before sample preparation and analysis.

matrix spike duplicate—An intralaboratory duplicate sample to which a known amount of target analyte has been added. Spiking typically occurs before sample preparation and analysis.

maximum contaminant level (MCL)—Under the Safe Drinking Water Act, the maximum permissible level of a contaminant in water that is delivered to any user of a public water system serving 15 or more connections and 25 or more people. MCLs are enforceable standards and take into account the feasibility and cost of attaining the standards.

measuring and test equipment—Devices or systems used to calibrate, measure, gauge, test, or inspect entities to control or acquire data and verify conformance to specified requirements.

medium (environmental)—Any material capable of absorbing or transporting constituents. Examples of media include tuffs, soils and sediments derived from these tuffs, surface water, soil water, groundwater, air, structural surfaces, and debris.

medium (geological)—The solid part of the hydrogeological system; may be unsaturated or saturated.

method blank—An analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing, and which is prepared and analyzed in the same manner as the corresponding environmental samples. The method blank is used to assess the potential for sample contamination during preparation and analysis.

method detection limit (MDL)—The minimum concentration of a substance that can be measured and reported with a known statistical confidence that the analyte concentration is greater than zero. After subjecting samples to the usual preparation, the MDL is determined by analyzing those samples of a given matrix type that contain the analyte. The MDL is used to establish detection status.

migration—The movement of inorganic and organic chemical species through unsaturated or saturated materials.

migration pathway—A route (e.g., a stream or subsurface flow path) for the potential movement of contaminants to environmental receptors (plants, humans, or other animals).

minimum detectable activity (MDA)—For the analysis of radionuclides, the lowest detectable radioactivity for a given analytical technique. The following equation is used to calculate the MDA unless otherwise noted or approved by Los Alamos National Laboratory. (Note: "MDA" here should not to be confused with material disposal area):

$$\mathrm{MDA} = \frac{4.65(\mathrm{BKG})^{0.5} + 2.71}{2.22 \times \mathrm{EFF} \times \mathrm{V} \times \mathrm{T_s} \times \mathrm{Y}} \quad ,$$

where BKG = the total background counts,

EFF = the fraction detector efficiency,

V = the volume or unit weight,

T_s = the sample count duration, and

Y = the fractional chemical recovery obtained from the tracer recovery.

Depending on the type of analysis, other terms may also be required in the denominator (e.g., gamma abundance).

mitigation—(1) Minimizing environmental impacts by limiting the degree or magnitude of an action and its implementation, (2) Rectifying an environmental impact by repairing, rehabilitating, or restoring the affected environment, (3) Reducing or eliminating an environmental impact over time by preservation and maintenance operations during the life of the action, (4) Compensating for an environmental impact by replacing or providing substitute resources or environments.

mixed waste—Waste containing both hazardous and source, special nuclear, or byproduct materials subject to the Atomic Energy Act of 1954.

National Pollutant Discharge Elimination System—The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits to discharge wastewater or storm water, and for imposing and enforcing pretreatment requirements under the Clean Water Act.

no further action—Under the Resource Conservation and Recovery Act, a corrective-action determination whereby, based on evidence or risk, no further investigation or remediation is warranted.

nonconformance—Any deficiency in a physical characteristic, documentation, or procedure that renders the quality of an item or service unacceptable or indeterminate.

nonconformance code—A code that identifies the type of nonconformance and the associated process, activity, or application.

nondetect—A result that is less than the method detection limit.

notice of deficiency—A written notification from the administrative authority to a facility owner/operator following the review of a permit application or other permit-related plan or report. A notice of deficiency requests additional information before a decision can be made regarding the original plan or report.

notices of approval, of approval with modification, or of disapproval—Notices issued by the New Mexico Environment Department (NMED). Upon receipt of a work plan, schedule, report, or other deliverable document, NMED reviews the document and approves the document as submitted, modifies the document and approves it as modified, or disapproves the document. A notice of approval means that the document is approved as submitted. A notice of approval with modifications means that the document is approved but with modifications specified by NMED. A notice of disapproval means that the document is disapproved and it states the deficiencies and other reasons for disapproval.

operable units (OUs)—At Los Alamos National Laboratory, 24 areas originally established for administering the Environmental Remediation and Surveillance Program. Set up as groups of potential release sites, the OUs were aggregated according to geographic proximity for the purposes of planning and conducting Resource Conservation and Recovery Act (RCRA) facility assessments and RCRA facility investigations. As the project matured, it became apparent that there were too many areas to allow efficient communication and to ensure consistency in approach. In 1994, the 24 OUs were reduced to 6 administrative field units.

other regulated material (ORM)—Material, such as a consumer commodity, that, although otherwise subject to the regulations of Subchapter C of 49 Code of Federal Regulations (CFR) 100, presents a limited hazard during the material’s transportation as a result of its form, quantity, or packaging. An ORM must be a material for which exceptions are provided in 49 CFR 172.101.

outfall—A place where effluent is discharged into receiving waters.

percent recovery (%R)—The amount of material detected in a sample (less any amount already in the sample) divided by the amount added to the sample, expressed as a percentage.

perched water—A zone of unpressurized water held above the water table by impermeable rock or sediment.

performance criteria—Measurable criteria used to assess all or part of a process.

polychlorinated biphenyls (PCBs)—Any chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees, or any combination that contains such substances. PCBs are colorless, odorless compounds that are chemically, electrically, and thermally stable and have proven to be toxic to both humans and other animals.

porosity—The degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

potential release site—A term for a potentially contaminated site at Los Alamos National Laboratory that refers to solid waste management units and areas of concern.

precision—The degree of mutual agreement among a series of individual measurements, values, or results.

prepared sample—A sample that has been treated to render it amenable to analysis. The sample preparation may include additives or treatments such as digestate, distillate, electroplate, extract, filter retentate, filtrate, homogenate, precipitate, pulverized/sieved portion of sample, or residue.

qualifications—The requisites (e.g., education, training, skills, or experience) that equip an individual for a professional position, such as assessor or lead assessor.

quality assessment—A system of activities whose purpose is to provide assurance that overall quality control is being executed effectively. Quality assessment involves a continuing evaluation of a production system's products and performance.

quality assurance/quality control—A system of procedures, checks, audits, and corrective actions set up to ensure that all U.S. Environmental Protection Agency research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

quality control—See quality assurance/quality control.

quality-control sample—A specimen that, upon analysis, is intended to provide information that is useful for adjusting, controlling, or verifying the continuing acceptability of sampling and/or analysis activities in progress.

quality level 1—The highest level assigned to a document or activity. At this level, documents and activities must meet applicable requirements of a quality management plan and/or a quality assurance project plan.

quality level 2—A level that is assigned to those documents or activities that require good management, engineering, or laboratory practices, and that may follow the requirements in U.S. Department of Energy orders or the Los Alamos National Laboratory's Laboratory implementation requirements.

quality management—The portion of an organization's overall management system that determines and implements the quality policy. Quality management includes strategic planning, allocation of resources, and other systematic activities (e.g., planning implementation and assessment) pertaining to an organization's quality standards.

quality management plan (QMP)—A document providing a framework for planning, implementing, and assessing work performed by an organization and for carrying out required quality assurance/quality control. A QMP is part of an organization's structured and documented management system that describes the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan for ensuring quality in work processes, products, and services.

Quaternary—The second period of the Cenozoic Era, following the Tertiary, and including the last two to three million years of earth history.

radiation—A stream of particles or electromagnetic waves emitted by atoms and molecules of a radioactive substance as a result of nuclear decay. The particles or waves emitted can consist of neutrons, positrons, alpha particles, beta particles, or gamma radiation.

radioactive material—For purposes of complying with U.S. Department of Transportation regulations, any material having a specific activity (activity per unit mass of the material) greater than 2 nanocuries per gram (nCi/g) and in which the radioactivity is evenly distributed.

radioactive waste—Waste that, by either monitoring and analysis, or acceptable knowledge, or both, has been determined to contain added (or concentrated and naturally occurring) radioactive material or activation products, or that does not meet radiological release criteria.

radioactivity (radioactive decay; radioactive disintegration)—The spontaneous change in an atom by the emission of charged particles and/or gamma rays.

radionuclide—Radioactive particle (human-made or natural) with a distinct atomic weight number.

RCRA facility investigation (RFI)—A Resource Conservation and Recovery Act (RCRA) investigation that determines if a release has occurred and characterizes the nature and extent of contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

record—Any book, paper, map, photograph, machine-readable material, or other documentary material, regardless of physical form or characteristics.

reference set—A hard-copy compilation of reference items cited in Environmental Remediation and Surveillance Program documents.

regional aquifer—Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

reporting limit (RL)—The numerical value that an analytical laboratory (in conjunction with its client) selects for determining if a target analyte has been detected. Results below the RL are considered to be undetected, but results above the RL are considered to be detected. The RLs are not necessarily based on instrument sensitivity. RLs can be established at the instrument detection limit, method detection limit, estimated quantitation limit, or contract-required detection limit.

representativeness—The degree to which data accurately and precisely represent a characteristic of a population or an environmental condition.

request for supplemental information—A request issued by the administrative authority (AA) that states that some aspect(s) of a plan or report does not meet the AA's requirements and that additional information is needed.

request number—An identifying number assigned by the Environmental Remediation and Surveillance Program to a group of samples submitted for analysis.

Resource Conservation and Recovery Act—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Public Law [PL] 94-580, as amended by PL 95-609 and PL 96-482, United States Code 6901 et seq.).

restricted area—Any area to which access is controlled by a licensee to protect individuals from exposure to radiation and radioactive materials. The "restricted area" shall not include areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

rinsate blank—See equipment blank.

risk—A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

risk analysis—In the quality assurance field, a qualitative evaluation of the probability and the potential consequences associated with noncompliant documents or work activities.

risk assessment—See baseline risk assessment.

routine data validation—The process of reviewing analytical data relative to quantitative routine acceptance criteria. The objective of routine data validation is two-fold—

- to estimate the technical quality of the data relative to minimum national standards adopted by the Environmental Remediation and Surveillance Program, and
- to indicate to data users the technical data quality at a gross level by assigning laboratory qualifiers to environmental data whose quality indicators do not meet acceptance criteria.

runoff—The portion of the precipitation on a drainage area that is discharged from the area.

run-on—Surface water that flows onto an area as a result of runoff occurring higher up on a slope.

sample—A portion of a material (e.g., rock, soil, water, or air), which, alone or in combination with other portions, is expected to be representative of the material or area from which it is taken. Samples are typically either sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term field sample may be used.

sample matrix—In chemical analysis, that portion of a sample that is exclusive of the analytes of interest. Together, the matrix and the analytes of interest form the sample.

screening action level (SAL)—A radionuclide's medium-specific concentration level; it is calculated by using conservative criteria below which it is generally assumed that no potential exists for a dose that is unacceptable to human health. The derivation of a SAL is based on conservative exposure and on land-use assumptions. However, if an applicable regulatory standard exists that is less than the value derived, it is used in place of the SAL.

screening risk assessment—A risk assessment that is performed with few data and many assumptions in order to identify exposures that should be evaluated more carefully for potential risk.

site characterization—Defining the pathways and methods of migration of hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; or concentration profiles.

site closeout inspection—An on-site inspection conducted after the completion of fieldwork. The closeout inspection verifies that all fieldwork has been completed and that all compliance issues have been resolved.

site closeout packet—Documentation related to fieldwork that includes field logs, waste-management documentation, best management practice (BMP) inspection records, and sample-management records.

site-specific health and safety plan (SSHASP)—A health and safety plan that has been tailored to a site or to an Environmental Remediation and Surveillance (ERS) Program field activity and that has been approved by an ERS health and safety representative. A SSHASP contains information specific to the project, including the scope of work, relevant history, descriptions of hazards from activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment and hazard mitigation).

soil—(1) A material that overlies bedrock and has been subject to soil-forming processes. (2) A sample media group that includes naturally occurring and artificial fill materials.

soil moisture—The water contained in the pore space of the unsaturated zone.

soil screening level (SSL)—The concentration of a chemical (inorganic or organic) below which no potential for unacceptable risk to human health exists. The derivation of an SSL is based on conservative exposure and land-use assumptions, and on target levels of either a hazard quotient of 1.0 for a noncarcinogenic chemical or a cancer risk of 10^{-5} for a carcinogenic chemical.

solid waste management unit (SWMU)—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments, waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas). (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any discernible site at which solid waste has been placed at any time, and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

split sample—A sample that has been divided into two or more portions that are expected to be of the same composition; used to characterize within-sample heterogeneity, sample handling, and measurement variability.

split-spoon sampler—A hollow, tubular sampling device below a drill stem that is driven by a weight to retrieve soil samples. The core barrel can be opened to remove samples. This is a sampling method commonly used with auger drilling. The split-spoon sampler can be driven into the ground or can be advanced inside hollow-stem augers.

standard operating procedure—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

surface sample—A sample taken at a collection depth that is (or was) representative of the medium's surface during the period of investigative interest. A typical depth interval for a surface sample is 0 to 6 in. for mesa-top locations, but may be up to several feet in sediment-deposition areas within canyons.

target analyte—A chemical or parameter, the concentration, mass, or magnitude of which is designed to be quantified by a particular test method.

technical area (TA)—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

technical notebook—A record of the methodology, observations, and results of technical activity investigations.

topography—The physical or natural features of an object or entity and their structural relationships.

trip blank—A sample of analyte-free medium taken from a sampling site and returned to an analytical laboratory unopened, along with samples taken in the field; used to monitor cross contamination of samples during handling and storage both in the field and in the analytical laboratory.

tuff—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

U.S. Department of Energy—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

U.S. Environmental Protection Agency (EPA)—The federal agency responsible for enforcing environmental laws. Although state regulatory agencies may be authorized to administer some of this responsibility, EPA retains oversight authority to ensure the protection of human health and the environment.

vadose zone—The zone between the land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

welded tuff—A volcanic deposit hardened by the action of heat, pressures from overlying material, and hot gases.

work plan—A document that specifies the activities to be performed when implementing an investigation or remedy. At a minimum, the work plan should identify the scope of the work to be performed, specify the procedures to be used to perform the work, and present a schedule for performing the work. The work plan may also present the technical basis for performing the work.

A-3.0 METRIC CONVERSION TABLE

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

A-4.0 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 (QA/QC) parameters.

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Appendix B

Data Review

B-1.0 OVERVIEW OF DATA

The historical Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) data and 2005 borehole data collected during the investigation of Material Disposal Area (MDA) U at Technical Area (TA) 21 are of varying quality, depending on the available documentation that accompanies the analytical results. In the Environmental Restoration [ER] Database, all data records include a vintage code field denoting how and where samples were submitted for analyses. In the early years of the ER Project, the samples were submitted to the Los Alamos National Laboratory (the Laboratory) Chemical Science and Technology (CST) Division. They were either analyzed at a CST laboratory or shipped to one of several off-site contract laboratories. Samples analyzed at a CST laboratory are identified by the vintage code "CST Onsite." Samples shipped by CST Division to off-site laboratories are identified by the vintage code "CST Offsite." From late 1995 until the present, samples have been shipped through the Sample Management Office (SMO) to off-site contract laboratories. These samples are identified by the vintage code "SMO."

Because samples analyzed at CST laboratories were not accompanied by full chain-of-custody and quality-control documentation, CST Onsite samples are used as screening-level samples only. As a result, CST Onsite sampling data are not included in this data review. Those data have been used at various times during the course of the current and previous investigations to guide sampling and analysis but are not used to determine nature and extent and are not included in the screening risk assessments (Appendix H).

Because CST Offsite sampling data were reviewed, whenever possible, by examining the original data packages and validating the reported results, most CST Offsite data are used in this investigation. CST Offsite data have been included with the SMO data in the determination of nature and extent. The tables presented in this appendix include all useable (both SMO and CST Offsite vintage) data collected at MDA U.

Site data are evaluated by media to facilitate the comparison with media-specific background data. Background data are available for soil (all soil horizons, designated by the media code ALLH), sediment (media code SED), and for several geologic units, including Bandelier Tuff (media codes Qbt 3, Qbt 2, Qbt 1v, Qbt 1g, Qct, and Qbo). Fill material is undifferentiated and may include soil and crushed tuff in varying proportions; fill material is compared to soil background values (BVs) (LANL 1998, 59730).

In some cases, individual analytical results are qualified as "rejected" because of various data-quality issues. Rejected analytical results are not included in the data review, the evaluations of nature and extent, or the screening risk assessments. Data-quality issues, including rejected analytical results, are discussed in Appendix E.

B-1.1 Identification of Chemicals of Potential Concern

The purpose of the data review is to identify chemicals of potential concern (COPCs) for MDA U. Inorganic chemical and radionuclide data were compared with media-specific background data. For background comparisons, the first step was to compare the site data with a BV. A BV may be a calculated value for the background data set (upper tolerance limit [95, 95] or the 95% upper confidence bound on the 95th quantile), a detection limit (DL), a fallout value (FV), or it may be calculated based on secular equilibrium or a total analysis. An FV for fallout radionuclides applies only to surface samples, generally from depths of 0 to 0.5 ft; the fallout radionuclides are tritium, cesium-137, americium-241, plutonium-238, plutonium-239, and strontium-90. In some cases, background data and/or a BV or FV are unavailable; in these cases the inorganic chemicals and radionuclides were evaluated according to detection status. Background comparisons do not apply to organic chemicals, which were evaluated according to their detection status.

If a site-specific datum exceeds its BV, an additional evaluation of the datum (e.g., box plots) may be performed by comparing the range of concentrations in the site data set for that chemical with the range of concentrations in the background data set. If the site concentrations are within the range of background concentrations, the analyte was eliminated as a COPC.

B-2.0 OVERVIEW OF RFI DATA

The MDA U data presented in this report are from samples collected in 1992, 1994, 1998, 2001, and 2005/2006. These data include analytical results from 172 soil and fill samples, 108 tuff samples, 52 pore-gas samples collected from the mesa top, and 11 sediment samples collected from the drainage channel north of MDA U. The soil samples include 159 samples identified as soil and 13 fill samples. The 108 tuff samples were collected from 5 different units of tuff (91 from Qbt 3, 12 from Qbt 2, 2 from Qbt 1v, 1 from Qbo, and 2 from Qct). Figure B-2.0-1 shows the sample locations for MDA U.

B-2.1 Results of Inorganic Chemicals in Samples at MDA U

B-2.1.1 Inorganic Chemicals in Soil and Fill Material

A total of 129 samples were collected from soil and fill material and analyzed for inorganic chemicals. Sixty-five soil samples were analyzed for total uranium. Eight soil samples and one fill sample collected in 2005 were also analyzed for nitrate, cyanide, and perchlorate. Table B-2.1-1 summarizes the soil and fill samples collected and the requested inorganic chemical analyses for each sample. Some antimony, cadmium, manganese, and mercury results were rejected in surface soil and fill samples. The rejected and qualified data are discussed in Section E-2.1.

Table B-2.1-2 presents the frequency of inorganic chemicals above BV in soil and fill samples at MDA U. Twelve inorganic chemicals (antimony, cadmium, calcium, chromium, copper, lead, mercury, nickel, sodium, thallium, uranium, and zinc) were reported with at least one result above the BV. Selenium and silver results had only DLs above the BV. Nitrate and perchlorate do not have BVs for comparison, but both analytes were detected in at least one sample. Table B-2.1-3 presents the inorganic chemical results above the BV and detected inorganic chemicals that have no BV. The locations and concentrations of inorganic chemicals above BV in surface soil and fill are shown in Figure 6.3-1 of the investigation report.

- Antimony, cadmium, calcium, nickel, selenium, and sodium were detected above their respective BVs but are not retained as COPCs because they fall within the range of concentrations in the background data set (see Figures B-2.1-1 to B-2.1-6).
- Seven inorganic chemicals (chromium, copper, lead, mercury, thallium, uranium, and zinc) were reported with at least one detected result above background. These inorganic chemicals were retained as COPCs in soil and fill.
- Perchlorate and nitrate were detected in at least one sample but have no BVs. These inorganic chemicals were retained as COPCs in soil and fill.
- Silver was not detected but had DLs above BV. Silver was retained as a COPC because of elevated DLs.

B-2.1.2 Inorganic Chemicals in Sediment

Nine samples were collected from sediment in a small drainage channel leading into DP Canyon and analyzed for inorganic chemicals. Eight sediment samples were analyzed for uranium. Table B-2.1-1 summarizes the sediment samples collected and the requested inorganic chemical analyses for each sample. Nine mercury results were rejected in sediment samples. The rejected and qualified data are discussed in Section E-2.1.

Table B-2.1-2 presents the frequency of inorganic chemicals above BV in sediment samples at MDA U. Seven inorganic chemicals (cadmium, chromium, cobalt, lead, selenium, uranium, and zinc) were reported with at least one result above the BV. Silver results had only DLs above the BV. Table B-2.1-4 presents the results above the BV and the detected analytes that have no BV for comparison. The locations and concentrations of inorganic chemicals above BV in sediment are shown in Figure 6.3-1 of the investigation report.

- Seven inorganic chemicals (cadmium, chromium, cobalt, lead, selenium, uranium, and zinc) were reported with at least one detected result above background. These inorganic chemicals were retained as COPCs in sediment.
- Silver was not detected above its BV, but it had DLs above the BV. Silver is retained as a COPC because of elevated DLs.

B-2.1.3 Inorganic Chemicals in Tuff

Of the 112 samples collected from tuff at MDA U, 108 (1 from Qbo, 2 from Qbt 1v, 12 from Qbt 2, 91 from Qbt 3, and 2 from Qct) were analyzed for inorganic chemicals. Forty-four (2 from Qct, 12 from Qbt 2, and 29 from Qbt 3) were also analyzed for nitrate, cyanide, and perchlorate. Table B-2.1-1 summarizes the tuff samples collected and the requested inorganic chemical analyses for each sample. Some results for antimony, copper, lead, manganese, and mercury were rejected in the tuff samples. The rejected and qualified data are discussed in Section E-2.1.

Table B-2.1-2 presents the frequency of inorganic chemicals above BV in tuff samples at MDA U. Table B-2.1-5 presents the results above the BV and inorganic chemicals detected but with no background data. The locations and concentrations of inorganic chemicals above BV in tuff are shown in Figure 6.3-2 of the investigation report.

- Magnesium, manganese, and vanadium were detected above their respective BVs but were not retained as COPCs because they fell within the range of concentrations in the background data set (see Figures B-2.1-7 to B-2.1-9).
- Eleven inorganic chemicals (aluminum, arsenic, barium, beryllium, chromium, copper, iron, lead, mercury, nickel, and zinc) were reported with at least one detected result above background. These inorganic chemicals were retained as COPCs in tuff.
- Antimony, cadmium, selenium, silver, and thallium were reported with only DLs above the BV. These five inorganic chemicals were retained as COPCs in tuff because of elevated DLs.
- Perchlorate was detected in eight tuff samples, but it has no BV, so it was retained as a COPC in tuff.
- Calcium was detected above the BV in two samples in tuff. Calcium is an essential nutrient (EPA 1989, 08021) and was not retained as a COPC.

B-2.2 Results of Radionuclides in Samples at MDA U

B-2.2.1 Radionuclides in Soil and Fill Material

A total of 126 samples were collected from soil and fill material and analyzed for radionuclides. Table B-2.1-1 summarizes the soil and fill samples and the requested radionuclide analyses for each sample. Some results for cesium-137, plutonium-238, plutonium-239, thorium-227, and uranium-235 were rejected in surface soil and fill samples. The rejected and qualified data are discussed in Section E-4.1.

Table B-2.2-1 presents the frequency of radionuclides detected above BV or FV in the soil and fill samples at MDA U. Table B-2.2-2 presents the results that were detected above the BV or FV and detected if no BV or FV was available. The locations and analytical results of radionuclides above BV or FV in surface soil and fill are shown in Plate 1.

- Eight radionuclides (americium-241, cesium-137, plutonium-238, plutonium-239, strontium-90, tritium, uranium-234, and uranium-235) were greater than BV or FV in at least one sample. These eight radionuclides were retained as COPCs in soil and fill.
- Radium-223, radon-219, and thorium-227 were detected in at least one sample but have no BV for comparison. These radionuclides were retained as COPCs in soil and fill.

B-2.2.2 Radionuclides in Sediment

Eleven samples were collected from sediment and analyzed for radionuclides. Table B-2.1-1 summarizes the sediment samples and the requested radionuclide analyses for each sample. No radionuclide results were rejected in sediment data. The qualified data are discussed in Section E-4.1.

Table B-2.2-1 presents the frequency of radionuclides detected above BV or FV in sediment samples at MDA U. Three radionuclides (plutonium-238, plutonium-239, and tritium) were detected above BV or FV in at least one sample. These three radionuclides were retained as COPCs in sediment. Table B-2.2-3 presents the detections above BV or FV. The locations and analytical results of radionuclides above BV or FV in sediment are shown in Plate 1.

B-2.2.3 Radionuclides in Tuff

A total of 108 samples were collected from tuff (1 from Qbo, 2 from Qbt 1v, 12 from Qbt 2, 91 from Qbt 3, and 2 from Qct) and analyzed for radionuclides. The radionuclide analyses for these samples included americium-241, radionuclides from gamma spectroscopy, isotopic uranium, isotopic plutonium, tritium, and strontium-90. A subset of the samples was also analyzed for isotopic thorium. Table B-2.1-1 summarizes the tuff samples collected and the requested radionuclide analyses for each sample. Thirty-six results for cesium-134 were rejected. The rejected and qualified data are described in Section E-4.1.

Table B-2.2-1 presents the frequency of radionuclides detected above the BV or detected in tuff samples at MDA U. Table B-2.2-4 presents the results that were detected above the BV and results of detected analytes, which have no BV for comparison. The locations and analytical results of radionuclides above BV or detected in tuff are shown in Figure 6.3-3 of the investigation report.

- Seven radionuclides (americium-241, plutonium-238, plutonium-239, radium-223, strontium-90, thorium-227, and tritium) were detected in at least one tuff sample. These seven radionuclides were retained as COPCs in tuff.
- Thorium-228, uranium-234, uranium-235, and uranium-238 were detected above their respective BVs in at least one tuff sample. These four radionuclides were retained as COPCs in tuff.

B-2.3 Results of Organic Chemicals in Samples at MDA U

B-2.3.1 Organic Chemicals in Soil and Fill Material

A total of 95 samples were collected from soil and fill and analyzed for organic chemicals. Table B-2.1-1 summarizes the soil and fill samples and the requested organic chemical analyses for each sample. The samples were analyzed for polychlorinated biphenyls (PCBs) and semivolatile organic compounds (SVOCs). All the SVOC results were rejected in one sample. The rejected and qualified data are discussed in Section E-3.1.

Table B-2.3-1 presents the frequency of organic chemicals detected in the soil and fill samples at MDA U. Twenty-five organic chemicals were detected in at least one sample in the soil and fill samples. Identification of COPCs for organic chemicals is based on detection status. Table B-2.3-2 presents the detected concentrations for the organic COPCs in soil and fill. The locations and concentrations of detected organic chemicals in surface soil and fill are shown in Figure 6.3-4 of the investigation report.

All 25 detected organic chemicals were retained as COPCs (acenaphthene; anthracene; Aroclor-1242; Aroclor-1254; Aroclor-1260; benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; benzo[g,h,i]perylene; benzo[k]fluoranthene; benzoic acid; butyl benzyl phthalate; chrysene; dibenz[a,h]anthracene; dibenzofuran; diethylphthalate; fluoranthene; fluorine; indeno(1,2,3-cd]pyrene; 2-methylnaphthalene; 4-methylphenol; naphthalene; phenanthrene; pyrene; and pyridine).

B-2.3.2 Organic Chemicals in Sediment

Eleven samples were collected from sediment and analyzed for organic chemicals. Table B-2.1-1 summarizes the sediment samples and the requested organic chemical analyses for each sample. Two samples were analyzed for PCBs and the other nine samples were analyzed for SVOCs. No results from the sediment samples were rejected. The qualified data are discussed in Section E-3.1.

Table B-2.3-1 presents the frequency of organic chemicals detected in the sediment samples at MDA U. Seventeen organic chemicals were detected in at least one sample in the sediment samples. Identification of COPCs for organic chemicals is based on detection status. Table B-2.3-3 presents the detected concentrations for the organic COPCs in sediment. The locations and concentrations of detected organic chemicals in sediment are shown in Figure 6.3-4 of the investigation report

All 17 detected organic chemicals were retained as COPCs (acenaphthene; anthracene; benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; benzo[g,h,i]perylene; benzo[k]fluoranthene; butylbenzylphthalate; chrysene; dibenzofuran; 3,3'-dichlorobenzidine; fluoranthene; fluorine; indeno[1,2,3-cd]pyrene; naphthalene; phenanthrene; and pyrene).

B-2.3.3 Organic Chemicals in Tuff

A total of 108 samples were collected from tuff (1 from Qbo, 2 from Qbt 1v, 12 from Qbt 2, 91 from Qbt 3, and 2 from Qct) and analyzed for SVOCs. Of these samples, 61 were also analyzed for PCBs and 46 were analyzed for volatile organic compounds (VOCs). Two samples from Qbt 3 were analyzed for dioxins, furans, and high explosives. Table B-2.1-1 summarizes the tuff samples collected and the requested organic chemical analyses for each sample. No results from the tuff samples were rejected. The qualified data are discussed in Section E-3.1.

Table B-2.3-1 presents the frequency of organic chemicals detected in tuff samples at MDA U. Table B-2.3-4 presents the detected concentrations for the organic chemical COPCs in tuff. The locations and concentrations of detected organic chemicals are shown in Figure 6.3-5 of the investigation report.

All sixteen detected organic chemicals were retained as COPCs (acetone; Aroclor-1242; Aroclor-1254; Aroclor-1260; benzene; benzoic acid; 2-butanone; di-n-butylphthalate; 4-isopropyltoluene; 4-methyl-2-pentanone; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; pyrene; toluene; 1,1,2-trichloro-1,2,2-trifluoroethane; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene).

B-2.4 Pore-Gas Sample Results at MDA U

A total of 52 pore-gas samples were collected from boreholes at MDA U in 1998 and 2005/2006. Twenty-eight samples were analyzed for tritium, and 52 samples were analyzed for a suite of VOCs. Table B-2.4-1 summarizes the pore-gas samples collected and the requested tritium and VOC analyses for each sample. No results for pore-gas data were rejected. The qualified data are described in Section E-3.1.

Table B-2.4-2 presents the frequency of tritium and VOCs detected in the pore-gas samples at MDA U. Table B-2.4-3 presents the results for all of the detected VOCs and tritium in pore gas. The locations and analytical results of detected VOCs and tritium are shown in Figure 6.3-6 of the investigation report.

- Thirty-six organic chemicals were detected in pore-gas samples and retained as COPCs in pore gas (acetone; benzene; bromodichloromethane; 2-butanone; 1,3-butadiene; 1-butanol; carbon disulfide; carbon tetrachloride; chloroform; chloromethane; cyclohexane; dichlorodifluoromethane; 1,2-dichloroethane; cis-1,2-dichloroethene; ethanol; ethylbenzene; 4-ethyltoluene; n-heptane; hexane; 2-hexanone; 4-methyl-2-pentanone; methylene chloride; 2-propanol; propylene; styrene; tetrachloroethene; toluene; 1,1,2-trichloro-1,1,2-trifluoroethane; 1,1,1-trichloroethane; trichloroethene; trichlorofluoromethane; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; vinyl acetate; 1,2-xylene; 1,3-xylene+1,4-xylene).
- Tritium was detected in all but one 2005/2006 pore-gas sample and was retained as a COPC in pore gas.

B-2.5 Summary of COPCs at MDA U

Table B-2.5-1 provides a summary of the COPCs at MDA U by media.

B-3.0 NATURE AND EXTENT

The MDA U investigation work plan (LANL 2004, 90801) and approval with modifications (NMED 2005, 90611) stipulated additional sampling to finalize the definition of the nature and extent of contamination at MDA U. Sample locations and analytical suites were chosen to satisfy the additional data needs as well as the requirements presented in the March 1, 2005, Compliance Order on Consent. The work plan identified several data needs related to nature and extent.

- The existing site data did not adequately define the extent of tritium, particularly vertically.
- The existing site data did not adequately define the lateral and vertical extent of uranium-234 and other uranium isotopes to the west of the absorption beds.
- The existing site data did not adequately define the lateral and vertical extent of actinium-227 progeny associated with the eastern absorption bed. Additionally, previous analytical results were

from gamma spectroscopy rather than alpha spectroscopy, which is a more effective method to target actinium-227 progeny.

- The existing site data did not adequately define the vertical extent of vapor-phase VOC contamination in the subsurface.
- No previously collected samples in any media had been analyzed for cyanide, nitrates, or perchlorate during previous sampling campaigns.

With the exception of the need for cyanide, nitrates, and perchlorate data for all media at the site, all additional data required focus on subsurface characterization.

B-3.1 Surface Nature and Extent

Figure 6.3-1, Plate 1, and Figure 6.3-4 in the investigation report present the analytical results for inorganic chemicals, radionuclides, and organic chemicals, respectively, in surface soils, fill, and sediments at MDA U.

The nine surface samples (eight soil and one fill) collected during the 2005 investigation were analyzed for cyanide, nitrates, and perchlorate to satisfy Consent Order requirements and to ensure the extent of these potential contaminants has been defined. Nitrates were detected in one surface sample, and perchlorate was detected in two. Both chemicals were detected at low concentrations (i.e., below the estimated detection limits [EDLs]). Cyanide was not detected in any of the surface samples. Therefore, the lateral extent of cyanide, nitrates, and perchlorate in the surface at MDA U is defined.

The distribution of other contaminants in the surface at MDA U is consistent with data from "nonprocess" areas throughout TA-21 (LANL 1994, 26073). These data are the result of grid sampling across TA-21 to determine the effects of airborne sources of contamination (e.g., stacks, incinerators). Because MDA U is within the industrial area of TA-21 and may be affected by several other sources of contamination, it is not always possible to determine the lateral extent of surface contamination relative to background. Although the nonprocess area data are not used as BVs (i.e., COPCs are not eliminated as a result of comparisons to nonprocess area data, and all the COPC data are included in the risk screening process), these data are useful in helping to determine when the surface sample data are the result of activities conducted at MDA U and when they may be the result of historical industrial activities conducted at TA-21 as a whole. MDA U, which is a subsurface contamination area, would not be expected to be the only source of contamination in surface soils in and around the site. Most of the COPCs detected in surface soils collected as part of the MDA U investigations are distributed along the roadway, along the fenceline (in the case of zinc), or along the boundary with Tritium System Test Assembly (TSTA) building (in the case of tritium). Very few COPCs were detected in surface soils collected within the MDA U boundary; therefore, the nature and extent of contamination in the surface at MDA U have been defined.

Sediment samples were collected from a small drainage to the north of MDA U during previous investigations. This drainage receives runoff from the road north of MDA U as well as from the run-on diversion channel constructed around the perimeter of MDA U. The run-on diversion channel collects surface runoff from the roads, buildings, and parking lots north of MDA U and diverts it to prevent erosion impacts to the disposal site. Sediment samples collected from the drainage downgradient of MDA U were found to contain inorganic chemicals, radionuclides, and organic chemicals in concentrations very similar to those seen in soils from along the roadway north of MDA U and from nonprocess areas throughout TA-21. Chromium, plutonium-238 and plutonium-239, tritium, and polycyclic aromatic hydrocarbons (PAHs) were the most commonly detected chemicals in the sediment samples. No sediment samples were collected during the 2005/2006 investigation, because samples from the drainage do not represent contaminant migration from MDA U.

B-3.2 Subsurface Nature and Extent

Figures 6.3-2, 6.3-3, and 6.3-5 of the investigation report present the analytical results for inorganic chemicals, radionuclides, and organic chemicals, respectively, in subsurface tuff and fill at MDA U. Figure 6.3-6 presents the analytical results for tritium and VOCs in pore gas at MDA U.

B-3.2.1 Inorganic Chemicals

As presented in the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), the subsurface nature and extent of inorganic chemicals had been largely defined at MDA U, based on the historical RFI data sets. Data needs for inorganic chemicals were identified as lateral extent of mercury, detected in the subsurface at location 21-10845, and cyanide, nitrate, and perchlorate data. In addition to these data needs, the updated nature and extent of inorganic COPCs, identified in Section B-2.1, are discussed below. Figure 6.3-2 of the investigation report presents the distribution of inorganic COPCs in tuff.

Seventeen inorganic chemicals were identified as COPCs in tuff (Figure 6.3-2 of the investigation report and Table B-2.1-5). Of these, five inorganic chemicals (antimony, cadmium, selenium, silver, and thallium) were not detected (i.e., had DLs above the BV) and, therefore, extent has been defined. The remaining 12 inorganic tuff COPCs are discussed below.

- The extent of mercury in the subsurface upgradient (south) of MDA U was identified as a data need in the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611). It was not detected in either of the upgradient boreholes drilled in 2005 (21-24772 and 21-24781). Therefore, the lateral extent of mercury in tuff at MDA U has been defined.
- Aluminum, arsenic, barium, beryllium, chromium, copper, iron, nickel, and zinc were detected in less than ten tuff samples above their respective BVs. All but six of these concentrations are within 2 times the tuff BVs, and none persist at depth. Therefore, the extent of aluminum, arsenic, barium, beryllium, chromium, copper, iron, nickel, and zinc in tuff at MDA U has been defined.
- Lead was detected above the tuff BV (11.2 mg/kg) in thirteen tuff samples. In all but three of these samples, lead is within the range of the background data set (maximum of 15.5 mg/kg). The remaining three concentrations are located within a relatively shallow interval (less than 25 ft) of three different boreholes. Lead concentrations of 21 and 22 mg/kg were detected in boreholes in the western half of MDA U at intervals of 11.5 and 24 ft. The highest lead concentration of 71.6 mg/kg was detected at 10 ft at location 21-24774 directly south of the MDA U fence. Lead was not detected in any of the deeper samples within these boreholes. The extent of lead in tuff at MDA U has been defined.
- Perchlorate was detected in eight tuff samples at MDA U. All the detections were at trace concentrations (approximately 0.001 mg/kg, which is less than the EDL of 0.002 mg/kg). Only one borehole, 21-24779, located immediately east of MDA U, had multiple (five) detections of perchlorate. Perchlorate was not detected in the deepest sample from this location and, therefore, the extent of perchlorate has been defined.
- Nitrate and cyanide were not detected in any of the tuff samples collected from the boreholes in 2005. Therefore, the extent of nitrate and cyanide has been defined.

B-3.2.2 Radionuclides

As presented in the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), three data needs involving radionuclides were identified for MDA U. The vertical extent of tritium required further definition, the extent of uranium-234 required further definition to the west and at depth, and the nature and extent of actinium-227 progeny were not adequately defined. An updated discussion of nature and extent of radionuclide COPCs, identified in Section B-2.2, is presented below.

Tuff and Absorption Bed Samples

The distribution of radionuclides in tuff and absorption bed samples is shown in Figure 6.3-3 of the investigation report.

Radium-223, radon-219, and thorium-227 (i.e., actinium-227 progeny) have no BVs and were detected in one, four, and three fill samples, respectively, collected from trenches within the MDA U absorption beds. All detections were less than 4 pCi/g, and these progeny were not detected in any other MDA U samples; therefore, the extent has been defined for these three actinium-227 progeny. Cesium-137 was also detected in the same fill samples as the actinium-227 progeny but was not detected in the tuff.

Eleven radionuclides were detected in tuff (Table B-2.2-4). Eight of these radionuclides (americium-241, plutonium-238, plutonium-239, radium-223, strontium-90, thorium-227, thorium-228, and uranium-238) were detected in eight or fewer samples in different boreholes and were not detected at the bottom of any of the boreholes (Figure 6.3-3 of the investigation report). In addition, the naturally occurring radionuclides with BVs (thorium-228 and uranium-238) were detected at levels just above their respective BVs. The extent of these eight radionuclides has been defined in tuff at MDA U.

Uranium-234 and uranium-235 were detected above BVs in fill samples collected within the MDA U absorption bed materials but decrease by an order of magnitude in the underlying tuff. Although uranium-234 and uranium-235 were detected frequently in the subsurface at MDA U, they were generally within 2 times their respective tuff BVs, except on the west side of MDA U, in borehole 21-10838, where these radionuclides exceeded their BVs by up to 6 times. These results correlate with surface soil results, historical total uranium results, and 1998 trench sample results, which indicate the presence of these radionuclides at elevated levels in and around the western half of MDA U. However, both uranium-234 and uranium-235 exhibited decreasing trends with depth in boreholes, and laterally (farther west) in the subsurface, based on the results from 2005 boreholes. Therefore, the extent of uranium-234 and uranium-235 in the subsurface at MDA U has been defined.

Tritium was detected in all six absorption bed fill samples collected during trenching activities conducted in 1998 and 2001. All concentrations were less than 1 pCi/g, indicating that MDA U did not receive high volumes of tritium-contaminated wastewater. Although tritium was detected at the total depth (TD) (75 ft) of all of the 1998 boreholes within MDA U (at concentrations less than 1 pCi/g), it was not detected in any of the 2005 boreholes surrounding the perimeter of MDA U, which were drilled and sampled to depths of 100 to 120 ft bgs. Tritium was detected at low levels (from 0.06 to 0.3 pCi/g) in the bottom five intervals (225 to 360 ft below ground surface [bgs]) sampled in the borehole at location 21-24772, the deep borehole drilled in 2005. These intervals correlate with increased moisture content encountered during drilling. Based on the low concentrations of tritium detected within the absorption beds and subsurface at MDA U, MDA U is not a significant source of tritium contamination, and the vertical extent of tritium has been defined.

Pore-Gas Samples

All pore-gas samples collected in 2005/2006 were analyzed for tritium (Figure 6.3-6 of the investigation report and Table B-2.4-3). The maximum detected concentration (6509 pCi/m^3) occurred at location 21-24772 in the center of MDA U at a depth of 12 ft and decreased with depth to 3050 pCi/m^3 (Figure 6.3-6 of the investigation report). Three boreholes (locations 21-24774, 21-24777, and 21-24781) had higher concentrations of tritium in the TD sample than in the shallow sample from the same borehole. The remaining six boreholes showed a decreasing trend of tritium in pore gas with depth. A decreasing trend also occurred with distance to the north and west of MDA U, away from TSTA. No tritium was detected in pore-gas from TD at location 21-24780, the farthest downgradient borehole from MDA U. Therefore, the extent of tritium in pore gas has been defined.

B-3.2.3 Organic Chemicals

As presented in the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611), the nature and extent of organic chemicals has been largely defined at MDA U, based on the historical RFI data sets. Additional data needs for organic chemicals were identified as vertical extent of VOCs in pore gas, and additional organic chemical sampling including dioxin, furan, and high explosive analysis to satisfy NMED's approval with modification (NMED 2005, 90611). In addition to these data needs, the updated nature and extent of organic COPCs, identified in Section B-2.3, are discussed below.

Tuff Samples

Sixteen organic chemicals were detected in tuff (Figure 6.3-5 of the investigation report and Table B-2.3-4). Acetone was detected in 10 samples. All other detected organic chemicals occurred in three or fewer samples. The following summary addresses these detected organic chemicals.

- Acetone was detected in six boreholes, but most results were below the estimated quantitation limit (EQL). The two detected concentrations of acetone above the EQL were collected at depths of less than 20 ft. Because acetone was detected at trace levels (below the EQL) and exhibited a decrease in concentration with depth, the extent of acetone has been defined and further sampling for extent is not warranted.
- Two 2005 samples were analyzed for dioxins, furans, and high explosives to satisfy the requirements of NMED's approval with modification (NMED 2005, 90611). The chemical 1,2,3,4,6,7,8,9-octachlorodibenzodioxin was detected in one sample from location 21-24779 (to the east of MDA U) at a depth of 67 ft. This result (0.000000346 mg/kg), which is below the EQL, was the only dioxin/furan congener detection in both samples. The other sample analyzed for dioxins and furans was collected at a depth of 92 ft at location 21-24775, just north of location 21-24779, and it had no detected concentrations of dioxins or furans. Neither sample had detectable concentrations of high explosives. The nature and extent of dioxins, furans, and high explosives at MDA U has been defined.
- Di-n-butylphthalate was detected in three depth intervals at location 21-10842, which was drilled through the eastern absorption bed in 1998: 14–15 ft, 44–45 ft, and 49–50 ft. Di-n-butylphthalate was not detected in the bottom of this borehole, nor was it detected in any other tuff sample at MDA U. Therefore, the extent of di-n-butylphthalate has been defined.
- Benzoic acid was detected in the three samples collected at the bottom of location 21-24772 between the depths of 333 and 360 ft but was not detected in any other tuff samples from

MDA U. All three benzoic acid results are below the EQL; therefore, the extent of benzoic acid in tuff at MDA U has been defined, and further sampling for extent is not warranted.

- Aroclor-1254 was detected in the deepest sample collected at location 21-24778, directly west of MDA U at a depth of 118 ft. Aroclor-1254 was also detected at location 21-24772 (the deepest borehole) at a depth of 225 ft; it was not detected in any deeper samples. The extent of Aroclor-1254 is defined because it was detected only twice and did not persist in the deeper samples from MDA U.
- Aroclor-1242 and Aroclor-1260 were detected in one sample at location 21-24781 at a depth of 98 ft; neither chemical was detected in the deepest sample collected from this borehole. Aroclor-1242 was also detected below the EQL at 94 ft at location 21-24779 but was not detected in the deepest sample from that location. The extent of Aroclor-1242 and Aroclor-1260 has been defined because they were detected in only one or two samples and were not detected at TD.
- The remaining detected organic chemicals (benzene; 2-butanone; 4-isopropyltoluene; 4-methyl-2-pentanone; pyrene; toluene; 1,1,2-trichloro-1,2,2-trifluoroethane; 1,2,4-trimethylbenzene; and 1,3-xylene+1,4-xylene) were detected below the EQLs in four or fewer tuff samples. The extent of these detected chemicals has been defined based on trace-level concentrations and further sampling for extent is not warranted.

Pore-Gas Samples

VOCs were detected in pore gas samples from MDA U at low concentrations (generally less than 500 μg/m^3) (Figure 6.3-6 of the investigation report and Table B-2.4-3). The maximum detected concentrations of dichlorodifluoromethane; ethylbenzene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; 1,2-xylene; and 1,3-xylene+1,4-xylene were at the total depth of 75 ft in the 1998 borehole at location 21-10839 within the western bed at MDA U. These VOCs were either not detected or were detected at lower concentrations in pore gas from the surrounding boreholes. Styrene, which was not detected in any of the 1998 pore-gas samples, was detected in most of the 2005/2006 pore-gas samples at concentrations ranging from <1 to 400 μg/m^3. Styrene was either not detected or was detected at lower concentrations in the 2006 pore-gas samples collected at TD, indicating a decreasing trend with depth.

Toluene was the most frequently detected VOC in pore gas at MDA U. The highest concentrations of toluene in pore gas were detected in 1998 boreholes drilled adjacent to the northern edge of the absorption beds (locations 21-10843, 21-10844, and 21-10845). It was detected at a maximum concentration of 1810 μg/m^3 in borehole location 21-10845 at a depth of 55 ft. The concentration of toluene at 75 ft (TD) in the same borehole decreased to 829 μg/m^3. Toluene was detected in most pore-gas samples collected from the 2005/2006 boreholes but at lower concentrations, on average, than in the 1998 pore-gas samples. The maximum concentration (110 μg/m^3) in the 2005/2006 pore-gas samples from around MDA U was detected in location 21-24780, north of MDA U and north of the road next to MDA U. In general, toluene concentrations in pore gas decrease in all directions from the maximum detections located along the northern edge of the absorption beds. In addition, all of the boreholes at MDA U showed decreasing concentrations of toluene in pore gas with depth (Figure 6.3-6 of the investigation report); toluene was either not detected or detected at low concentrations in the pore-gas samples collected at TD in 2006. Therefore, the extent of toluene in pore gas has been defined.

B-3.3 Summary of Nature and Extent

The nature and extent of contamination both in the surface and subsurface at MDA U have been defined. Surface contamination, in general, appears to be related to industrial activities at TA-21 rather than to wastewater disposal activities at MDA U. Analytical data for the absorption bed materials do not indicate that MDA U presents a significant source of contamination in the subsurface. This observation is supported by the subsurface tuff data from MDA U; few COPCs were detected in boreholes at concentrations above BVs or EQLs.

B-4.0 REFERENCES

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

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), December 1989. "Risk Assessment Guidance for Superfund Vol. I, Human Health Evaluation Manual (Part A)," Interim Final, EPA 540/89/002, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1989, 08021)

LANL (Los Alamos National Laboratory), January 28, 1994. "Phase Report IB, TA-21 Operable Unit RCRA Facility Investigation: Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation," Los Alamos National Laboratory document LA-UR-93-4390, Los Alamos, New Mexico. (LANL 1994, 26073)

LANL (Los Alamos National Laboratory), September 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 59730)

LANL (Los Alamos National Laboratory), November 2004. "Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21," Los Alamos National Laboratory document LA-UR-04-7268, Los Alamos, New Mexico. (LANL 2004, 90801)

NMED (New Mexico Environment Department), March 21, 2005. "Approval with Modifications, Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515 HWB-LANL-04-015," New Mexico Environment Department letter to D. Gregory, DOE. And P.G. Nanos, LANL, from J. Bearzi, NMED, Santa Fe, New Mexico. (NMED 2005, 90611)

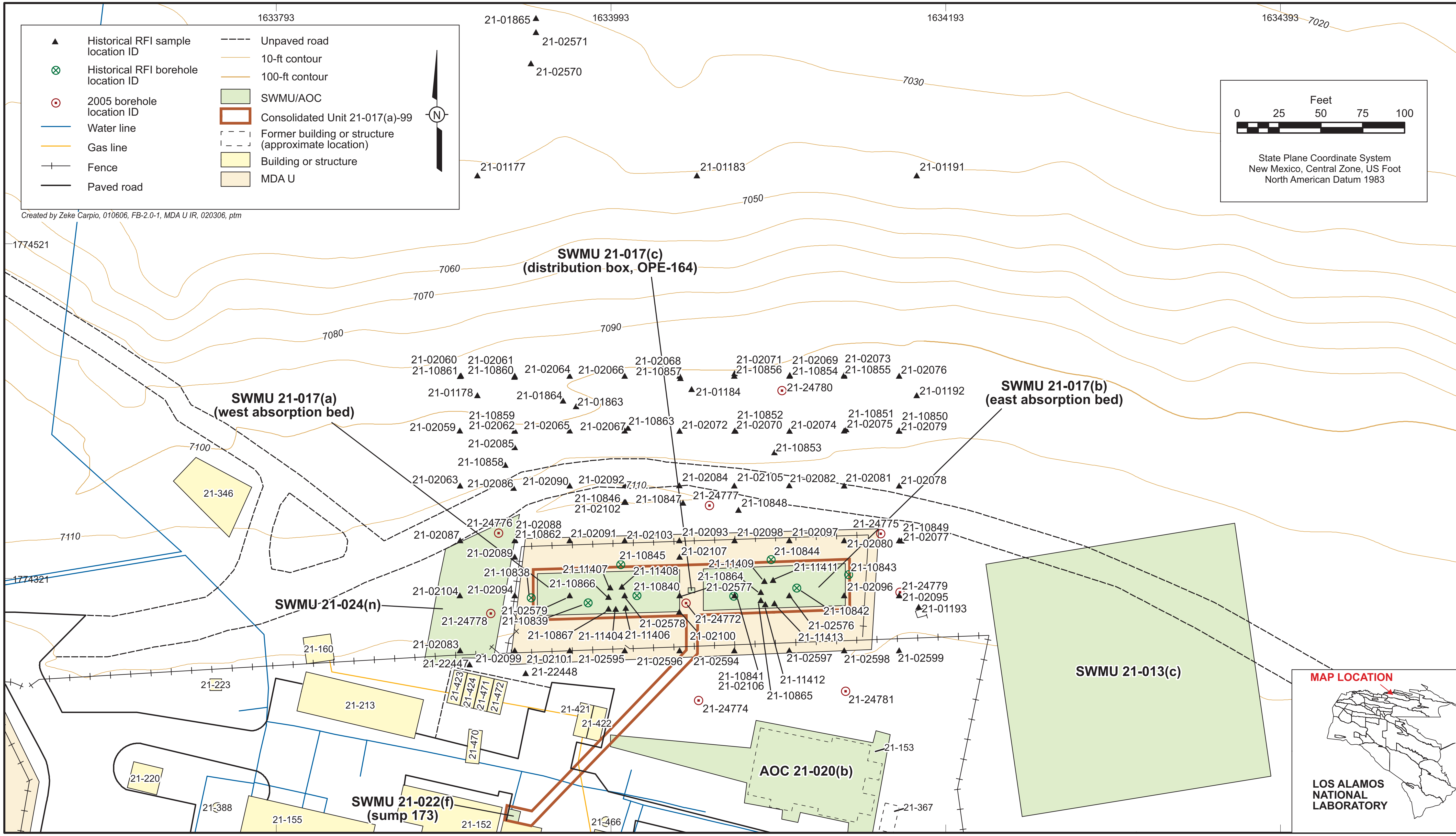

Figure B-2.0-1. RFI sampling locations at MDA U, 1992–2006

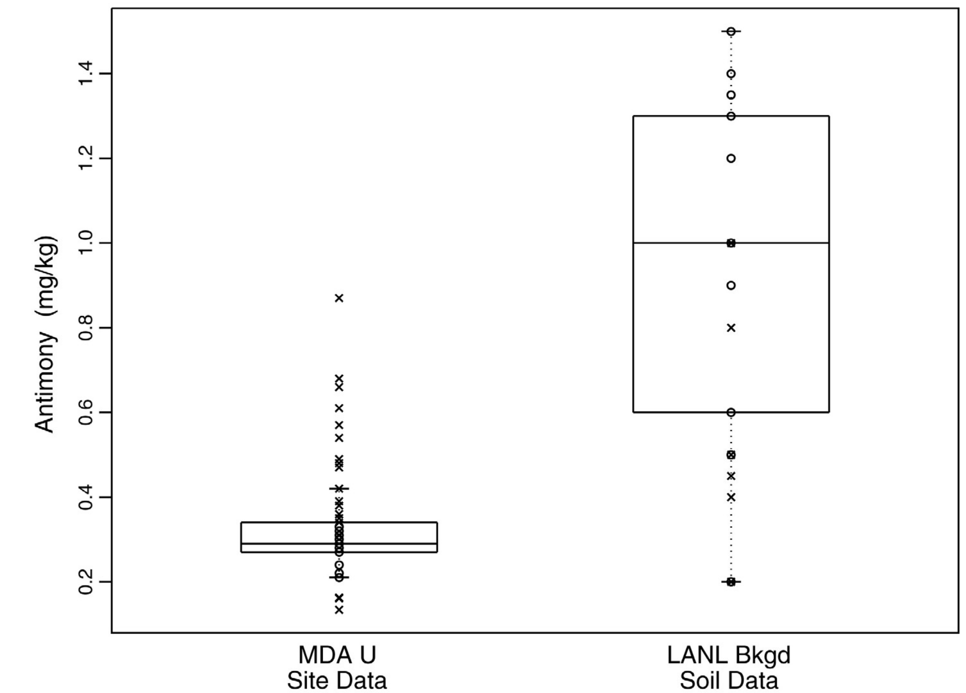

Figure B-2.1-1. **Box plots of antimony concentrations from LANL all-horizon background data and soil and fill material at MDA U**

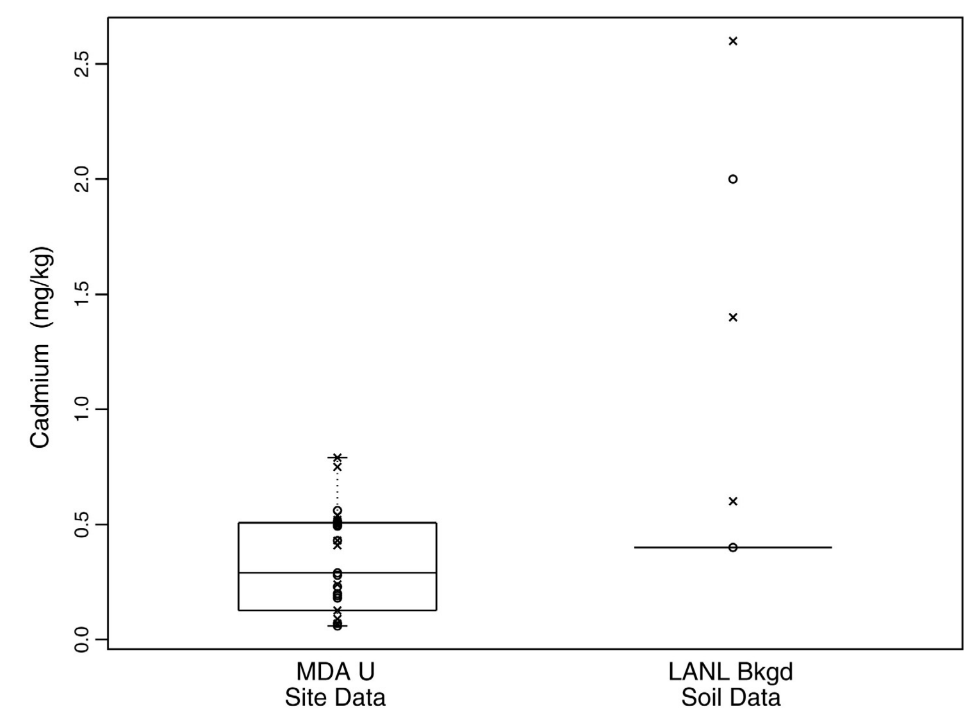

Figure B-2.1-2. **Box plots of cadmium concentrations from LANL all-horizon background data and soil and fill material at MDA U**

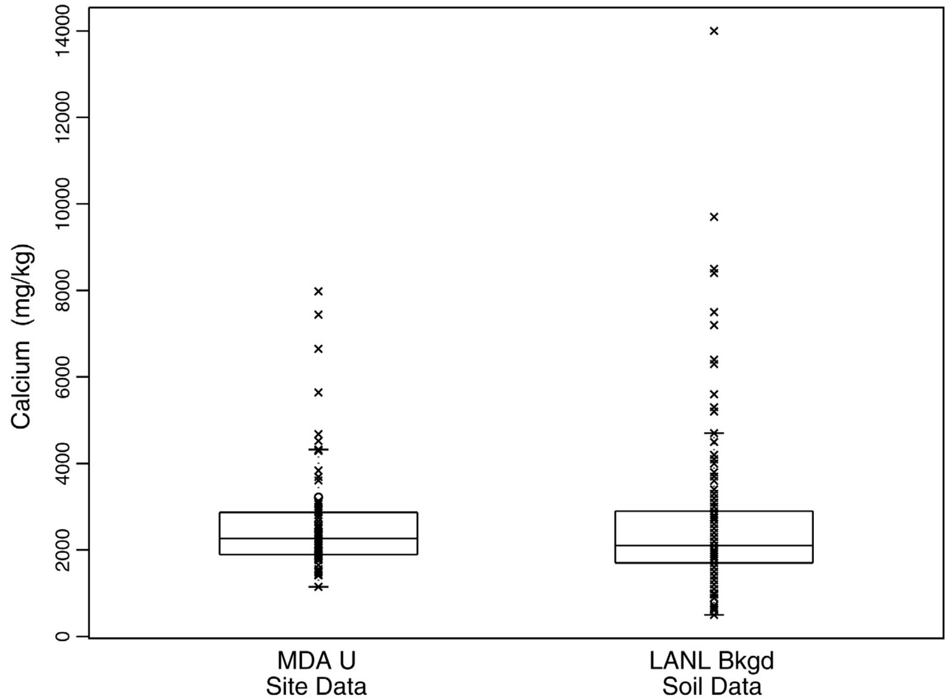

Figure B-2.1-3. Box plots of calcium concentrations from LANL all-horizon background data and soil and fill material at MDA U

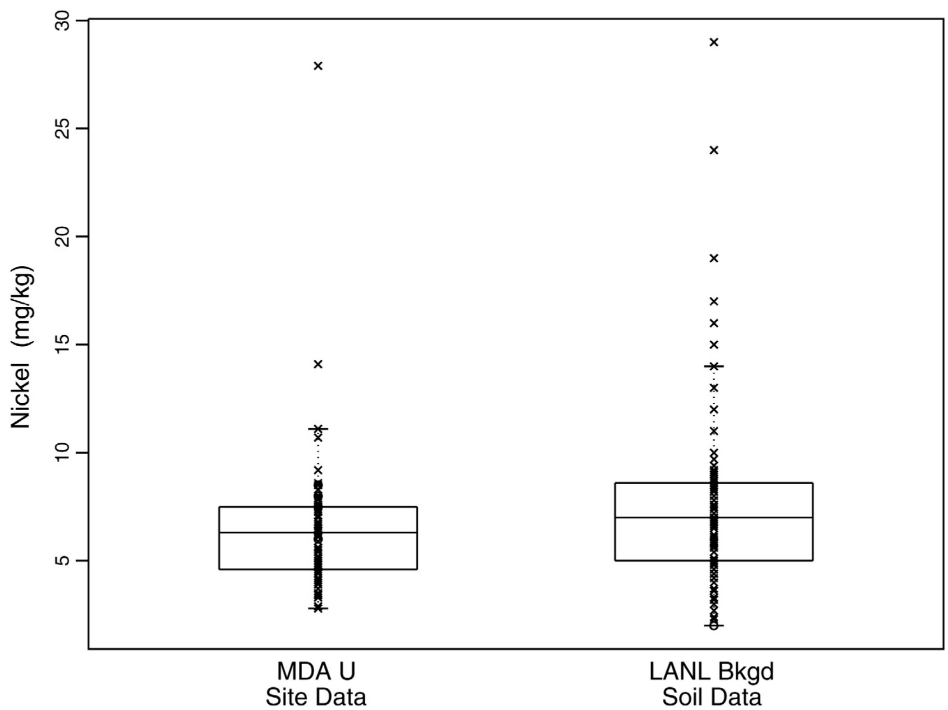

Figure B-2.1-4. Box plots of nickel concentrations from LANL all-horizon background data and soil and fill material at MDA U

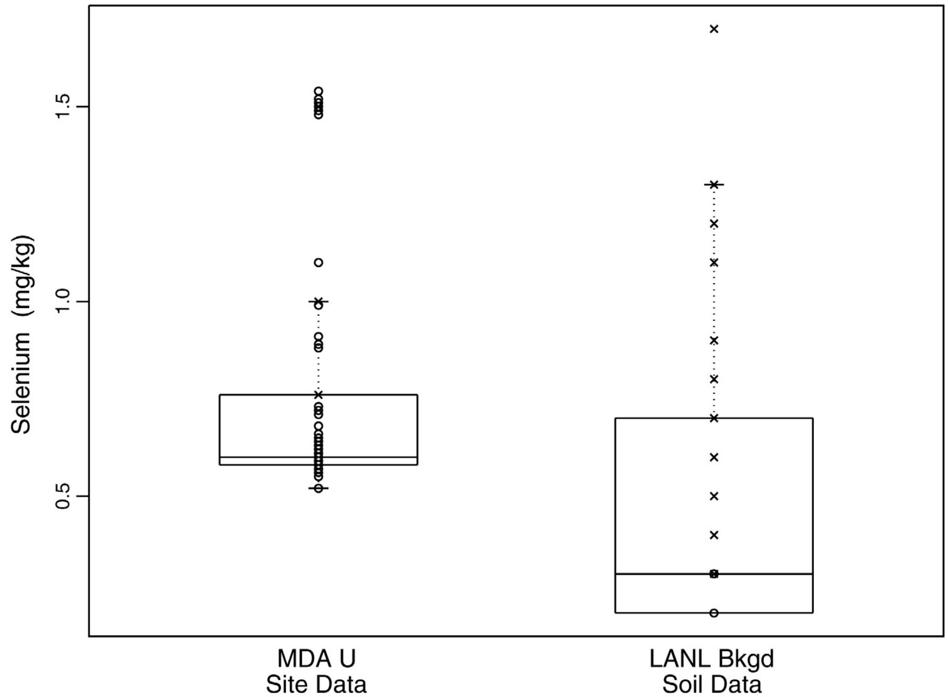

Figure B-2.1-5. Box plots of selenium concentrations from LANL all-horizon background data and soil and fill material at MDA U

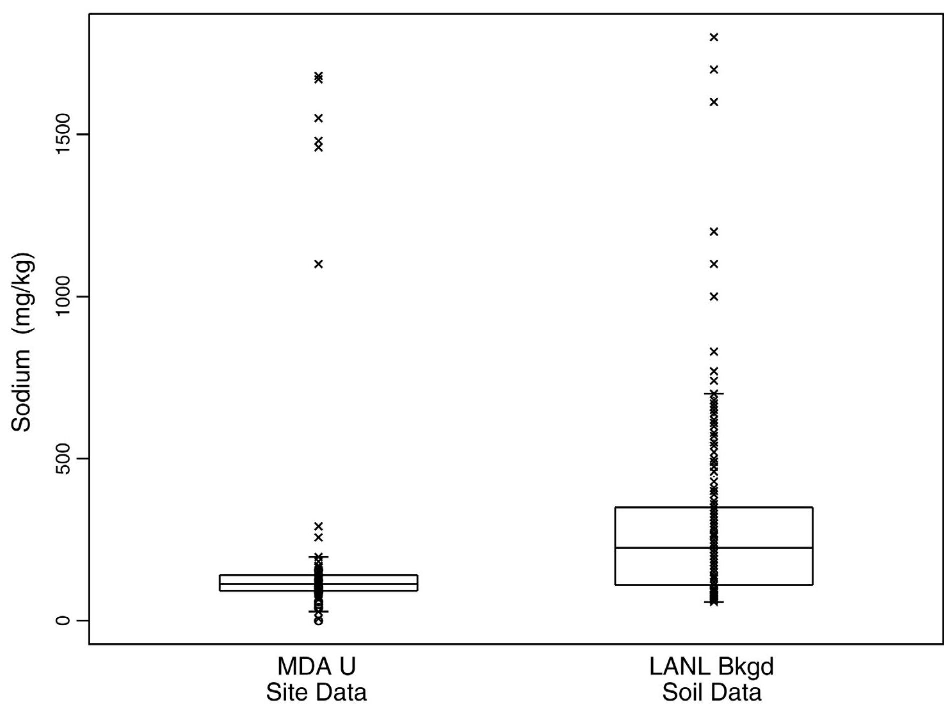

Figure B-2.1-6. Box plots of sodium concentrations from LANL all-horizon background data and soil and fill material at MDA U

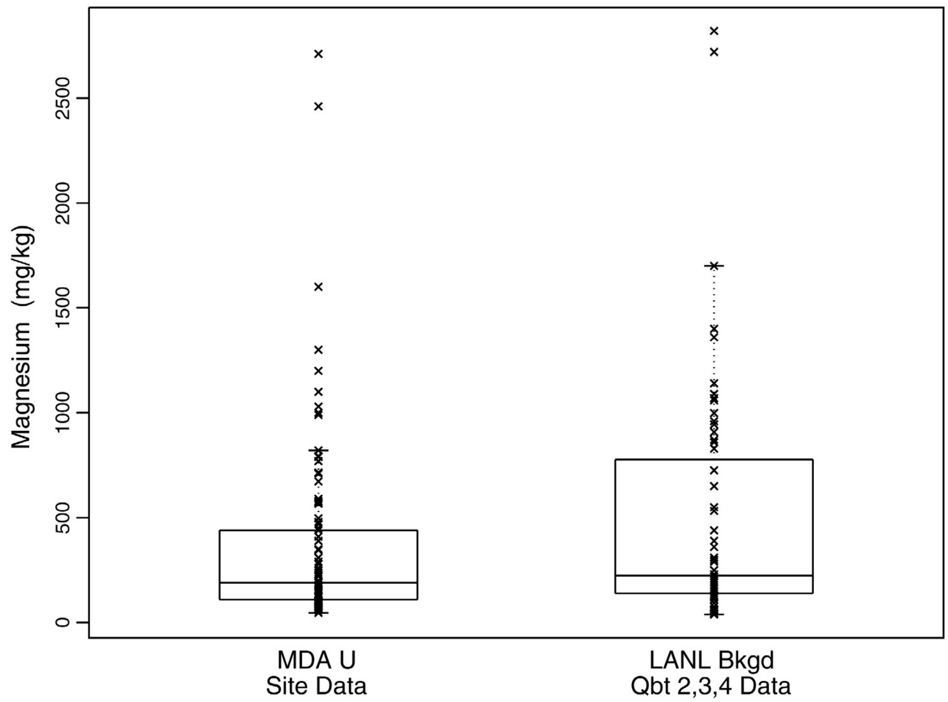

Figure B-2.1-7. Box plots of magnesium concentrations from LANL Qbt 2, 3, 4 background data and Qbt 2, 3, 4 tuff material at MDA U

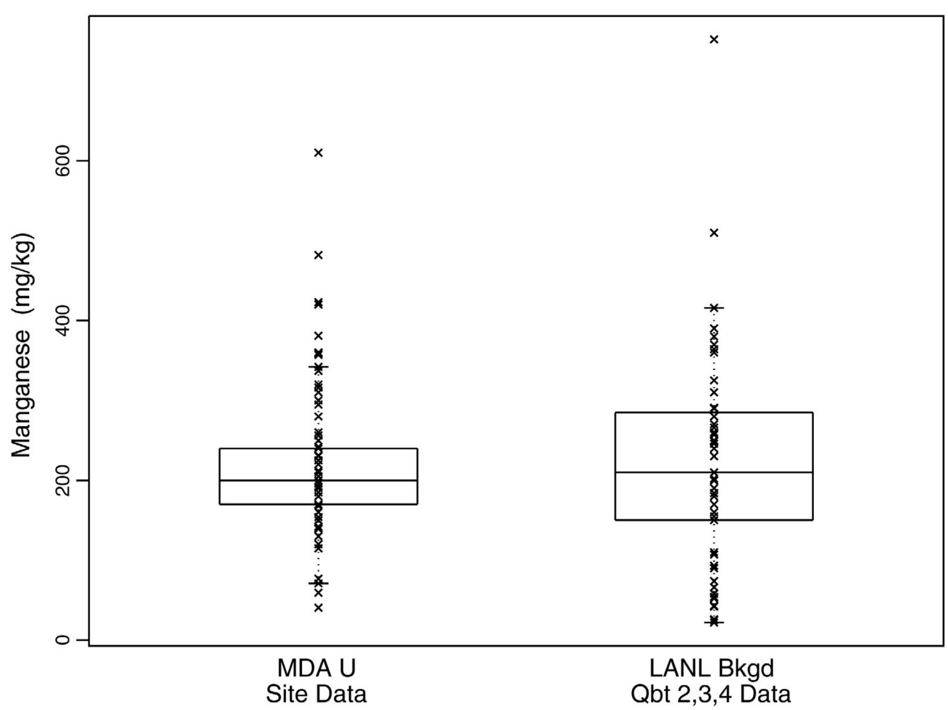

Figure B-2.1-8. Box plots of manganese concentrations from LANL Qbt 2, 3, 4 background data and Qbt 2, 3, 4 tuff material at MDA U

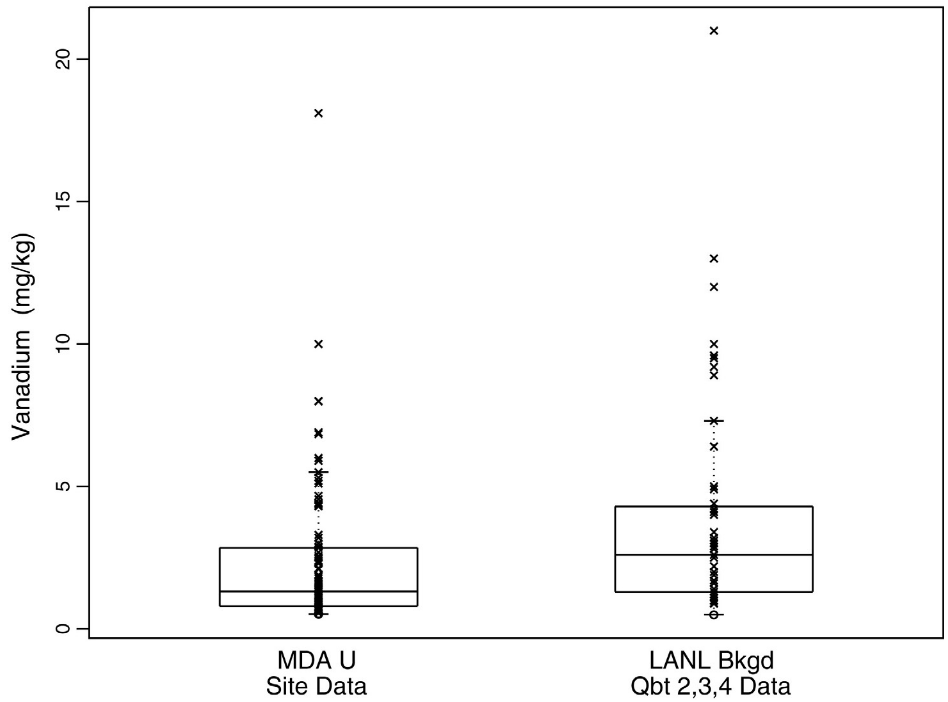

Figure B-2.1-9. Box plots of vanadium concentrations from LANL at Qbt 2, 3, 4 background data and Qbt 2, 3, 4 tuff material at MDA U

Table B-2.1-1
Soil, Fill, Sediment, and Tuff Samples Collected at MDA U

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
1992 Samples													
AAA0396	21-01177	0–0.08	Soil	INV[a]	—[b]	—	—	—	—	—	—	—	—
AAA0191	21-01178	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0192	21-01178	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0395	21-01183	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0193	21-01184	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0194	21-01184	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0391	21-01191	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0195	21-01192	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0196	21-01192	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0197	21-01193	0–0.08	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0198	21-01193	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—
AAA0199	21-01193	0–0.5	Soil	FD[c]	—	—	—	—	—	—	—	—	—
1994 Samples													
AAA7519	21-01863	0–0.25	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7520	21-01863	0.25–0.5	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7521	21-01863	0.5–1	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7522	21-01864	0–0.25	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7523	21-01864	0.25–0.5	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7524	21-01864	0.5–1	Soil	INV	—	—	19223	—	19490	—	—	—	18603
AAA7525	21-01865	0–0.25	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAA7526	21-01865	0.25–0.5	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAA7527	21-01865	0.5–1	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB9750	21-02059	0–0.5	Soil	INV	—	—	19596	—	19855	—	—	—	18922

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
AAB9751	21-02060	0–0.5	Soil	INV	—	—	19596	—	19855	—	—	—	18922
AAB9752	21-02061	0–0.5	Soil	INV	—	—	19596	—	19855	—	—	—	18922
AAB9753	21-02062	0–0.5	Soil	INV	—	—	19596	—	19855	—	—	—	18922
AAB9754	21-02063	0–0.5	Soil	INV	—	—	19596	—	19855	—	—	—	18922
AAB9755	21-02064	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9756	21-02065	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9757	21-02066	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9758	21-02067	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9759	21-02068	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9760	21-02069	0–0.25	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9761	21-02070	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9762	21-02071	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9763	21-02072	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9764	21-02073	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9765	21-02074	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9766	21-02075	0–0.5	Soil	INV	—	—	19599	—	19854	—	—	—	18952
AAB9767	21-02076	0–0.5	Soil	INV	—	—	19648	—	19908	—	—	—	19085
AAB9768	21-02077	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9769	21-02078	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9803	21-02078	0–0.5	Soil	FD	—	—	19616	—	19914	—	—	—	19023
AAB9770	21-02079	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9771	21-02080	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9772	21-02081	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9773	21-02082	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9774	21-02083	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
AAB9775	21-02084	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9776	21-02085	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9777	21-02086	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9778	21-02087	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9779	21-02088	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9780	21-02089	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9781	21-02090	0–0.25	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9782	21-02091	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9783	21-02092	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9784	21-02093	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9785	21-02094	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9786	21-02095	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9787	21-02096	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9788	21-02097	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9789	21-02098	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9790	21-02099	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9791	21-02100	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9792	21-02101	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9793	21-02102	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9794	21-02103	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9802	21-02103	0–0.5	Soil	FD	—	—	19648	—	19908	—	—	—	19085
AAB9795	21-02104	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9796	21-02105	0–0.42	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9797	21-02106	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9798	21-02107	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
AAB7281	21-02570	0–0.25	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB7282	21-02570	0.25–0.5	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB7283	21-02570	0.5–1	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB7284	21-02571	0–0.25	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB7285	21-02571	0.25–0.5	Sediment	INV	—	—	19223	—	—	—	—	—	18603
AAB7286	21-02571	0.5–1	Sediment	INV	—	—	19223	—	19490	—	—	—	18603
AAB9891	21-02576	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9888	21-02577	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9889	21-02578	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAB9890	21-02579	0–0.5	Soil	INV	—	—	19616	—	19914	—	—	—	19023
AAC0135	21-02594	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0136	21-02595	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0137	21-02596	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0138	21-02597	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0139	21-02598	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0140	21-02599	0–0.5	Soil	INV	—	—	20240	—	19912	—	—	—	19365
AAC0144	21-02599	0–0.5	Soil	FD	—	—	20240	—	19912	—	—	—	19365
1998 Samples													
MD21-98-0497	21-02570	0–0.5	Sediment	INV	—	—	—	—	—	—	—	4710R	—
MD21-98-0496	21-02571	0–0.5	Sediment	INV	—	—	—	—	—	—	—	4710R	—
MD21-98-0394	21-10838	0–5	Qbt 3	INV	—	—	4647R	—	—	—	—	4646R	4646R
MD21-98-0392	21-10838	14–15	Qbt 3	INV	—	—	4726R	—	—	—	—	4725R	4725R
MD21-98-0395	21-10838	24–25	Qbt 3	INV	—	—	4726R	—	—	—	—	—	4725R
MD21-98-0393	21-10838	34–35	Qbt 3	INV	—	—	4726R	—	—	—	—	—	4725R
MD21-98-0397	21-10838	44–45	Qbt 3	INV	—	—	4726R	—	—	—	—	—	4725R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-98-0507	21-10838	54–55	Qbt 3	INV	—	—	4726R	—	—	—	—	—	4725R
MD21-98-0396	21-10838	64–65	Qbt 3	INV	—	—	4711R	—	—	—	—	—	4710R
MD21-98-0506	21-10838	74–75	Qbt 3	INV	—	—	4711R	—	—	—	—	—	4710R
MD21-98-0508	21-10839	2–3	Qbt 3	INV	—	—	4711R	—	—	—	—	4710R	4710R
MD21-98-0402	21-10839	14–15	Qbt 3	INV	—	—	4741R	—	—	—	—	4740R	4740R
MD21-98-0403	21-10839	24–25	Qbt 3	INV	—	—	4741R	—	—	—	—	—	4740R
MD21-98-0405	21-10839	34–35	Qbt 3	INV	—	—	4741R	—	—	—	—	—	4740R
MD21-98-0406	21-10839	44–45	Qbt 3	INV	—	—	4741R	—	—	—	—	—	4740R
MD21-98-0509	21-10839	51.5–52.5	Qbt 3	INV	—	—	4741R	—	—	—	—	—	4740R
MD21-98-0404	21-10839	59–60	Qbt 3	INV	—	—	4768R	—	—	—	—	—	4767R
MD21-98-0407	21-10839	74–75	Qbt 3	INV	—	—	4768R	—	—	—	—	—	4767R
MD21-98-0412	21-10840	4–5	Qbt 3	INV	—	—	4768R	—	—	—	—	4767R	4767R
MD21-98-0414	21-10840	11.5–12.5	Qbt 3	INV	—	—	4786R	—	—	—	—	4785R	4785R
MD21-98-0413	21-10840	21.5–22.5	Qbt 3	INV	—	—	4786R	—	—	—	—	—	4785R
MD21-98-0415	21-10840	34–35	Qbt 3	INV	—	—	4794R	—	—	—	—	—	4793R
MD21-98-0417	21-10840	44–45	Qbt 3	INV	—	—	4794R	—	—	—	—	—	4793R
MD21-98-0416	21-10840	46.5–47.5	Qbt 3	INV	—	—	4794R	—	—	—	—	—	4793R
MD21-98-0422	21-10840	64–65	Qbt 3	INV	—	—	4794R	—	—	—	—	—	4793R
MD21-98-0511	21-10840	74–75	Qbt 3	INV	—	—	4794R	—	—	—	—	—	4793R
MD21-98-0423	21-10841	4–5	Qbt 3	INV	—	—	4824R	—	—	—	—	4823R	4823R
MD21-98-0425	21-10841	11.5–12.5	Qbt 3	INV	—	—	4824R	—	—	—	—	4823R	4823R
MD21-98-0424	21-10841	24–25	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R
MD21-98-0426	21-10841	34–35	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R
MD21-98-0428	21-10841	44–45	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R
MD21-98-0513	21-10841	54–55	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-98-0427	21-10841	56.5–57.5	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R
MD21-98-0512	21-10841	74–75	Qbt 3	INV	—	—	4824R	—	—	—	—	—	4823R
MD21-98-0433	21-10842	4–5	Qbt 3	INV	—	—	4857R	—	—	—	—	4856R	4856R
MD21-98-0435	21-10842	14–15	Qbt 3	INV	—	—	4857R	—	—	—	—	4856R	4856R
MD21-98-0434	21-10842	24–25	Qbt 3	INV	—	—	4857R	—	—	—	—	—	4856R
MD21-98-0438	21-10842	26.5–27.5	Qbt 3	INV	—	—	4857R	—	—	—	—	—	4856R
MD21-98-0436	21-10842	44–45	Qbt 3	INV	—	—	4857R	—	—	—	—	—	4856R
MD21-98-0437	21-10842	49–50	Qbt 3	INV	—	—	4857R	—	—	—	—	—	4856R
MD21-98-0515	21-10842	71.5–72.5	Qbt 3	INV	—	—	4857R	—	—	—	—	—	4856R
MD21-98-0443	21-10843	4–5	Soil	INV	—	—	4877R	—	—	—	—	4876R	4876R
MD21-98-0445	21-10843	14–15	Qbt 3	INV	—	—	4877R	—	—	—	—	4876R	4876R
MD21-98-0444	21-10843	24–25	Qbt 3	INV	—	—	4877R	—	—	—	—	—	4876R
MD21-98-0446	21-10843	34–35	Qbt 3	INV	—	—	4877R	—	—	—	—	—	4876R
MD21-98-0447	21-10843	44–45	Qbt 3	INV	—	—	4877R	—	—	—	—	—	4876R
MD21-98-0448	21-10843	54–55	Qbt 3	INV	—	—	4877R	—	—	—	—	—	4876R
MD21-98-0453	21-10843	64–65	Qbt 3	INV	—	—	4882R	—	—	—	—	—	4881R
MD21-98-0516	21-10843	72.5–75	Qbt 3	INV	—	—	4882R	—	—	—	—	—	4881R
MD21-98-0517	21-10843	72.5–75	Qbt 3	FD	—	—	4882R	—	—	—	—	—	4881R
MD21-98-0454	21-10844	2.5–5	Qbt 3	INV	—	—	4901R	—	—	—	—	4900R	4900R
MD21-98-0456	21-10844	12.5–15	Qbt 3	INV	—	—	4901R	—	—	—	—	4900R	4900R
MD21-98-0455	21-10844	24–25	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0457	21-10844	34–35	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0458	21-10844	44–45	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0459	21-10844	54–55	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0464	21-10844	64–65	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-98-0519	21-10844	74–75	Qbt 3	INV	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0465	21-10844	74–75	Qbt 3	FD	—	—	4901R	—	—	—	—	—	4900R
MD21-98-0468	21-10845	4–5	Qbt 3	INV	—	—	4912R	—	—	—	—	4911R	4911R
MD21-98-0470	21-10845	14–15	Qbt 3	INV	—	—	4912R	—	—	—	—	4911R	4911R
MD21-98-0469	21-10845	24–25	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0471	21-10845	34–35	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0472	21-10845	44–45	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0473	21-10845	54–55	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0520	21-10845	64–65	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0521	21-10845	74–75	Qbt 3	INV	—	—	4912R	—	—	—	—	—	4911R
MD21-98-0482	21-10846	0–0.5	Soil	INV	—	—	—	—	—	—	—	4646R	—
MD21-98-0481	21-10847	0–0.5	Soil	INV	—	—	—	—	—	—	—	4646R	—
MD21-98-0479	21-10848	0–0.5	Soil	INV	—	—	—	—	—	—	—	4646R	—
MD21-98-0478	21-10849	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0480	21-10850	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0486	21-10851	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0487	21-10852	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0489	21-10853	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0483	21-10854	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0492	21-10855	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0488	21-10856	0–0.5	Soil	INV	—	—	—	—	—	—	—	4676R	—
MD21-98-0484	21-10857	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0485	21-10858	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0491	21-10859	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0493	21-10860	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-98-0490	21-10861	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0495	21-10862	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0494	21-10863	0–0.5	Soil	INV	—	—	—	—	—	—	—	4725R	—
MD21-98-0500	21-10864	6–8	Qbt 3	INV	—	—	—	—	—	—	—	—	—
MD21-98-0501	21-10865	6–8	Qbt 3	INV	—	—	—	—	—	—	—	—	—
MD21-98-0502	21-10866	5–8	Qbt 3	INV	—	—	—	—	—	—	—	—	—
MD21-98-0503	21-10867	5–8	Qbt 3	INV	—	—	—	—	—	—	—	—	—
2001 Samples													
MD21-01-0469	21-02059	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0486	21-02060	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0484	21-02061	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0471	21-02062	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0468	21-02063	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0485	21-02064	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0470	21-02065	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0483	21-02066	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0473	21-02067	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0482	21-02068	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0481	21-02069	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0474	21-02070	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0480	21-02071	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0472	21-02072	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0479	21-02073	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0475	21-02074	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0477	21-02075	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-01-0476	21-02076	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0456	21-02077	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0461	21-02078	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0478	21-02079	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0457	21-02080	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0460	21-02081	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0459	21-02082	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0434	21-02083	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0490	21-02083	0–0.5	Soil	FD	—	—	23S	—	—	—	—	—	—
MD21-01-0465	21-02084	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0467	21-02086	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0451	21-02087	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0450	21-02088	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0463	21-02090	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0453	21-02091	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0464	21-02092	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0454	21-02093	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0448	21-02094	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0462	21-02095	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0442	21-02096	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0458	21-02097	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0455	21-02098	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0435	21-02099	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0436	21-02101	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0452	21-02103	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-01-0449	21-02104	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0466	21-02105	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0445	21-02106	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0443	21-02576	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0444	21-02577	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0446	21-02578	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0447	21-02579	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0437	21-02594	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0438	21-02595	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0439	21-02596	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0440	21-02597	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0441	21-02598	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0487	21-02599	0–0.5	Soil	INV	—	—	23S	—	—	—	—	—	—
MD21-01-0488	21-02599	0–0.5	Soil	FD	—	—	23S	—	—	—	—	—	—
MD21-01-0494	21-11404	3–3.5	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0495	21-11404	3–3.5	Soil	FD	—	—	—	—	—	—	—	—	—
MD21-01-0496	21-11406	5–5	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0497	21-11407	4–4	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0498	21-11408	5–5.5	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0499	21-11409	7–7	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0500	21-11409	7–7	Soil	FD	—	—	—	—	—	—	—	—	—
MD21-01-0501	21-11411	7–7	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0502	21-11412	7–7	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0503	21-11413	7–7	Soil	INV	—	—	—	—	—	—	—	—	—
MD21-01-0492	21-22447	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-01-0493	21-22448	0–0.5	Soil	INV	—	—	—	—	—	—	—	—	—
2005 Samples													
MD21-05-60922	21-24772	0–0.5	Fill	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-60977	21-24772	8–10	Qbt 3	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-60978	21-24772	13–15	Qbt 3	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-60979	21-24772	23–25	Qbt 3	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-60980	21-24772	33–35	Qbt 3	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-60981	21-24772	43–45	Qbt 3	INV	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-62678	21-24772	97–99	Qbt 3	INV	3561S	3561S	3561S	3561S	—	—	—	3560S	3560S
MD21-05-60982	21-24772	97–99	Qbt 3	FD	3557S	3557S	3557S	3557S	—	—	—	3556S	3556S
MD21-05-62679	21-24772	148–150	Qbt 2	INV	3583S	3583S	3583S	3583S	—	—	—	3582S	3582S
MD21-05-61079	21-24772	148–150	Qbt 2	FD	3586S	3586S	3586S	3586S				3585S	3585S
MD21-05-62680	21-24772	170–172	Qbt 2	INV	3583S	3583S	3583S	3583S	—	—	—	3582S	3582S
MD21-05-62681	21-24772	225–227	Qbt 1v	INV	—	—	3599S	—	—	—	—	3599S	3599S
MD21-05-62682	21-24772	228–230	Qbt 1v	INV	—	—	3599S	—	—	—	—	3599S	3599S
MD21-05-62956	21-24772	333–335	Qct	INV	3632S	3632S	3632S	3632S	—	—	—	3632S	3632S
MD21-05-62957	21-24772	338–340	Qct	INV	3632S	3632S	3632S	3632S	—	—	—	3632S	3632S
MD21-05-62958	21-24772	358–360	Qbo	INV	3632S	3632S	3632S	3632S	—	—	—	3632S	3632S
MD21-05-61010	21-24774	0–0.5	Fill	INV	—	—	—	—	—	—	—	—	—
MD21-05-61010	21-24774	0–0.5	Soil	INV	3517S	3517S	3517S	3517S	—	—	—	3516S	3516S
MD21-05-61077	21-24774	0–0.5	Soil	FD	3517S	3517S	3517S	3517S	—	—	—	3516S	3516S
MD21-05-61011	21-24774	10–12	Qbt 3	INV	3517S	3517S	3517S	3517S	—	—	—	3516S	3516S
MD21-05-61012	21-24774	18–20	Qbt 3	INV	3517S	3517S	3517S	3517S	—	—	—	3516S	3516S
MD21-05-61013	21-24774	98–100	Qbt 3	INV	3517S	3517S	3517S	3517S	—	—	—	3516S	3516S
MD21-05-61018	21-24775	0–0.5	Soil	INV	3441S	3441S	3441S	3441S	—	—	—	3440S	3440S

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-05-61023	21-24775	13–15	Qbt 3	INV	3441S	3441S	3441S	3441S	—	—	—	3440S	3440S
MD21-05-61020	21-24775	18–20	Qbt 3	INV	3441S	3441S	3441S	3441S	—	—	—	3440S	3440S
MD21-05-61021	21-24775	92–94	Qbt 3	INV	3444S	3444S	3444S	3444S	—	3443S	3443S	3443S	3443S
MD21-05-61075	21-24775	92–94	Qbt 3	FD	3444S	3444S	3444S	3444S	—	3443S	3443S	3443S	3443S
MD21-05-61022	21-24775	118–120	Qbt 2	INV	3444S	3444S	3444S	3444S	—	—	—	3443S	3443S
MD21-05-61026	21-24776	0–0.5	Soil	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61027	21-24776	3–5	Qbt 3	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61028	21-24776	21–23	Qbt 3	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61029	21-24776	92–94	Qbt 2	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61030	21-24776	118–120	Qbt 2	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61034	21-24777	0–0.5	Soil	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61035	21-24777	3–5	Qbt 3	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61036	21-24777	73–75	Qbt 3	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61037	21-24777	93–95	Qbt 2	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61038	21-24777	118–120	Qbt 2	INV	3478S	3478S	3478S	3478S	—	—	—	3477S	3477S
MD21-05-61042	21-24778	0–0.5	Soil	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61043	21-24778	11–13	Qbt 3	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61076	21-24778	11–13	Qbt 3	FD	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61044	21-24778	33–35	Qbt 3	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61045	21-24778	48–50	Qbt 3	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61046	21-24778	98–100	Qbt 3	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61047	21-24778	118–120	Qbt 2	INV	3483S	3483S	3483S	3483S	—	—	—	3481S	3481S
MD21-05-61050	21-24779	0–0.5	Soil	INV	3434S	3434S	3434S	3434S	—	—	—	3432S	3432S
MD21-05-61051	21-24779	10–12	Qbt 3	INV	3434S	3434S	3434S	3434S	—	—	—	3432S	3432S
MD21-05-61052	21-24779	67–69	Qbt 3	INV	3434S	3434S	3434S	3434S	—	3433S	3432S	3432S	3432S

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	Anions	Cyanide	Metals	Perchlorate	Uranium	Dioxins and Furans	High Explosives	PCBs	SVOCs
MD21-05-61053	21-24779	72–74	Qbt 3	INV	3434S	3434S	3434S	3434S	—	—	—	3432S	3432S
MD21-05-61054	21-24779	94–96	Qbt 2	INV	3441S	3441S	3441S	3441S	—	—	—	3440S	3440S
MD21-05-61055	21-24779	117–119	Qbt 2	INV	3441S	3441S	3441S	3441S	—	—	—	3440S	3440S
MD21-05-61058	21-24780	0–0.5	Soil	INV	3473S	3473S	3473S	3473S	—	—	—	3472S	3472S
MD21-05-61059	21-24780	3–5	Qbt 3	INV	3473S	3473S	3473S	3473S	—	—	—	3472S	3472S
MD21-05-61060	21-24780	63–65	Qbt 3	INV	3473S	3473S	3473S	3473S	—	—	—	3472S	3472S
MD21-05-61061	21-24780	88–90	Qbt 3	INV	3473S	3473S	3473S	3473S	—	—	—	3472S	3472S
MD21-05-61062	21-24780	118–120	Qbt 2	INV	3473S	3473S	3473S	3473S	—	—	—	3472S	3472S
MD21-05-61066	21-24781	0–0.5	Fill	INV	—	—	—	—	—	—	—	—	—
MD21-05-61066	21-24781	0–0.5	Soil	INV	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S
MD21-05-61067	21-24781	18–20	Qbt 3	INV	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S
MD21-05-61068	21-24781	72–74	Qbt 3	INV	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S
MD21-05-61078	21-24781	72–74	Qbt 3	FD	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S
MD21-05-61069	21-24781	98–100	Qbt 3	INV	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S
MD21-05-61070	21-24781	118–120	Qbt 2	INV	3531S	3531S	3531S	3531S	—	—	—	3531S	3531S

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
1992 Samples												
AAA0396	21-01177	0–0.08	Soil	INV	—	—	—	—	13015	—	—	13015
AAA0191	21-01178	0–0.08	Soil	INV	—	—	—	—	12740	—	—	12740
AAA0192	21-01178	0–0.5	Soil	INV	—	—	—	—	12740	—	—	12740
AAA0395	21-01183	0–0.08	Soil	INV	—	13015	—	—	13015	—	—	13015
AAA0193	21-01184	0–0.08	Soil	INV	—	12740	—	—	12740	—	—	12740
AAA0194	21-01184	0–0.5	Soil	INV	—	12740	—	—	12740	—	—	12740
AAA0391	21-01191	0–0.08	Soil	INV	—	—	—	—	13015	—	—	13015
AAA0195	21-01192	0–0.08	Soil	INV	—	12740	—	—	12740	—	—	12740
AAA0196	21-01192	0–0.5	Soil	INV	—	—	—	—	12740	—	—	12740
AAA0197	21-01193	0–0.08	Soil	INV	—	12740	—	—	12740	—	—	12740
AAA0198	21-01193	0–0.5	Soil	INV	—	—	—	—	12740	12740	12740	12740
AAA0199	21-01193	0–0.5	Soil	FD	—	12740	—	—	12740	—	—	12740
1994 Samples												
AAA7519	21-01863	0–0.25	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7520	21-01863	0.25–0.5	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7521	21-01863	0.5–1	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7522	21-01864	0–0.25	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7523	21-01864	0.25–0.5	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7524	21-01864	0.5–1	Soil	INV	—	—	19490	19490	19490	—	—	19490
AAA7525	21-01865	0–0.25	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAA7526	21-01865	0.25–0.5	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAA7527	21-01865	0.5–1	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB9750	21-02059	0–0.5	Soil	INV	—	—	19855	19855	19855	—	—	—
AAB9751	21-02060	0–0.5	Soil	INV	—	—	19855	19855	19855	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
AAB9752	21-02061	0–0.5	Soil	INV	—	—	19855	19855	19855	—	—	—
AAB9753	21-02062	0–0.5	Soil	INV	—	—	19855	19855	19855	—	—	—
AAB9754	21-02063	0–0.5	Soil	INV	—	—	19855	19855	19855	—	—	—
AAB9755	21-02064	0–0.5	Soil	INV	—	—	19854	19854	19854	—	—	—
AAB9756	21-02065	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9757	21-02066	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9758	21-02067	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9759	21-02068	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9760	21-02069	0–0.25	Soil	INV	—	—	19854	19854	19854	—	—	—
AAB9761	21-02070	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9762	21-02071	0–0.5	Soil	INV	—	—	19854	19854	19854	—	—	—
AAB9763	21-02072	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9764	21-02073	0–0.5	Soil	INV	—	—	19854	19854	19854	—	—	—
AAB9765	21-02074	0–0.5	Soil	INV	—	—	19854	19854	19854	—	19854	—
AAB9766	21-02075	0–0.5	Soil	INV	—	—	19854	19854	19854	—	—	—
AAB9767	21-02076	0–0.5	Soil	INV	—	—	19908	19908	19908	—	—	—
AAB9768	21-02077	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9769	21-02078	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9803	21-02078	0–0.5	Soil	FD	—	—	19914	19914	19914	—	—	—
AAB9770	21-02079	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9771	21-02080	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9772	21-02081	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9773	21-02082	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9774	21-02083	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9775	21-02084	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
AAB9776	21-02085	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9777	21-02086	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9778	21-02087	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9779	21-02088	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9780	21-02089	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9781	21-02090	0–0.25	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9782	21-02091	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9783	21-02092	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9784	21-02093	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9785	21-02094	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9786	21-02095	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9787	21-02096	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9788	21-02097	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9789	21-02098	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9790	21-02099	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9791	21-02100	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB9792	21-02101	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9793	21-02102	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9794	21-02103	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9802	21-02103	0–0.5	Soil	FD	—	—	19908	19908	19908	—	—	—
AAB9795	21-02104	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9796	21-02105	0–0.42	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9797	21-02106	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9798	21-02107	0–0.5	Soil	INV	—	—	19914	19914	19914	—	—	—
AAB7281	21-02570	0–0.25	Sediment	INV	—	—	19490	19490	19490	—	—	19490

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
AAB7282	21-02570	0.25–0.5	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB7283	21-02570	0.5–1	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB7284	21-02571	0–0.25	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB7285	21-02571	0.25–0.5	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB7286	21-02571	0.5–1	Sediment	INV	—	—	19490	19490	19490	—	—	19490
AAB9891	21-02576	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9888	21-02577	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9889	21-02578	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAB9890	21-02579	0–0.5	Soil	INV	—	—	19914	19914	19914	—	19914	—
AAC0135	21-02594	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0136	21-02595	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0137	21-02596	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0138	21-02597	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0139	21-02598	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0140	21-02599	0–0.5	Soil	INV	—	—	19912	19912	19912	—	—	—
AAC0144	21-02599	0–0.5	Soil	FD	—	—	19912	19912	19912	—	—	—
1998 Samples												
MD21-98-0497	21-02570	0–0.5	Sediment	INV	—	—	4712R	—	—	—	4712R	—
MD21-98-0496	21-02571	0–0.5	Sediment	INV	—	—	4712R	—	—	—	4712R	—
MD21-98-0394	21-10838	0–5	Qbt 3	INV	—	4648R	4648R	4648R	4648R	—	4648R	4648R
MD21-98-0392	21-10838	14–15	Qbt 3	INV	—	4727R	4727R	4727R	4727R	—	4727R	4727R
MD21-98-0395	21-10838	24–25	Qbt 3	INV	—	4727R	4727R	4727R	4727R	—	4727R	4727R
MD21-98-0393	21-10838	34–35	Qbt 3	INV	—	4727R	4727R	4727R	4727R	—	4727R	4727R
MD21-98-0397	21-10838	44–45	Qbt 3	INV	—	4727R	4727R	4727R	4727R	—	4727R	4727R
MD21-98-0507	21-10838	54–55	Qbt 3	INV	—	4727R	4727R	4727R	4727R	—	4727R	4727R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-98-0396	21-10838	64–65	Qbt 3	INV	—	4712R	4712R	4712R	4712R	—	4712R	4712R
MD21-98-0506	21-10838	74–75	Qbt 3	INV	—	4712R	4712R	4712R	4712R	—	4712R	4712R
MD21-98-0508	21-10839	2–3	Qbt 3	INV	—	4712R	4712R	4712R	4712R	—	4712R	4712R
MD21-98-0402	21-10839	14–15	Qbt 3	INV	—	4742R	4742R	4742R	4742R	—	4742R	4742R
MD21-98-0403	21-10839	24–25	Qbt 3	INV	—	4742R	4742R	4742R	4742R	—	4742R	4742R
MD21-98-0405	21-10839	34–35	Qbt 3	INV	—	4742R	4742R	4742R	4742R	—	4742R	4742R
MD21-98-0406	21-10839	44–45	Qbt 3	INV	—	4742R	4742R	4742R	4742R	—	4742R	4742R
MD21-98-0509	21-10839	51.5–52.5	Qbt 3	INV	—	4742R	4742R	4742R	4742R	—	4742R	4742R
MD21-98-0404	21-10839	59–60	Qbt 3	INV	—	4769R	4769R	4769R	4769R	—	4769R	4769R
MD21-98-0407	21-10839	74–75	Qbt 3	INV	—	4769R	4769R	4769R	4769R	—	4769R	4769R
MD21-98-0412	21-10840	4–5	Qbt 3	INV	—	4769R	4769R	4769R	4769R	—	4769R	4769R
MD21-98-0414	21-10840	11.5–12.5	Qbt 3	INV	—	4787R	4787R	4787R	4787R	—	4787R	4787R
MD21-98-0413	21-10840	21.5–22.5	Qbt 3	INV	—	4787R	4787R	4787R	4787R	—	4787R	4787R
MD21-98-0415	21-10840	34–35	Qbt 3	INV	—	4795R	4795R	4795R	4795R	—	4795R	4795R
MD21-98-0417	21-10840	44–45	Qbt 3	INV	—	4795R	4795R	4795R	4795R	—	4795R	4795R
MD21-98-0416	21-10840	46.5–47.5	Qbt 3	INV	—	4795R	4795R	4795R	4795R	—	4795R	4795R
MD21-98-0422	21-10840	64–65	Qbt 3	INV	—	4795R	4795R	4795R	4795R	—	4795R	4795R
MD21-98-0511	21-10840	74–75	Qbt 3	INV	—	4795R	4795R	4795R	4795R	—	4795R	4795R
MD21-98-0423	21-10841	4–5	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0425	21-10841	11.5–12.5	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0424	21-10841	24–25	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0426	21-10841	34–35	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0428	21-10841	44–45	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0513	21-10841	54–55	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0427	21-10841	56.5–57.5	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-98-0512	21-10841	74–75	Qbt 3	INV	—	4825R	4825R	4825R	4825R	—	4825R	4825R
MD21-98-0433	21-10842	4–5	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0435	21-10842	14–15	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0434	21-10842	24–25	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0438	21-10842	26.5–27.5	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0436	21-10842	44–45	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0437	21-10842	49–50	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0515	21-10842	71.5–72.5	Qbt 3	INV	—	4858R	4858R	4858R	4858R	—	4858R	4858R
MD21-98-0443	21-10843	4–5	Soil	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0445	21-10843	14–15	Qbt 3	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0444	21-10843	24–25	Qbt 3	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0446	21-10843	34–35	Qbt 3	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0447	21-10843	44–45	Qbt 3	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0448	21-10843	54–55	Qbt 3	INV	—	4878R	4878R	4878R	4878R	—	4878R	4878R
MD21-98-0453	21-10843	64–65	Qbt 3	INV	—	4883R	4883R	4883R	4883R	—	4883R	4883R
MD21-98-0516	21-10843	72.5–75	Qbt 3	INV	—	4883R	4883R	4883R	4883R	—	4883R	4883R
MD21-98-0517	21-10843	72.5–75	Qbt 3	FD	—	4883R	4883R	4883R	4883R	—	4883R	4883R
MD21-98-0454	21-10844	2.5–5	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0456	21-10844	12.5–15	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0455	21-10844	24–25	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0457	21-10844	34–35	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0458	21-10844	44–45	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0459	21-10844	54–55	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0464	21-10844	64–65	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0519	21-10844	74–75	Qbt 3	INV	—	4902R	4902R	4902R	4902R	—	4902R	4902R

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-98-0465	21-10844	74–75	Qbt 3	FD	—	4902R	4902R	4902R	4902R	—	4902R	4902R
MD21-98-0468	21-10845	4–5	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0470	21-10845	14–15	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0469	21-10845	24–25	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0471	21-10845	34–35	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0472	21-10845	44–45	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0473	21-10845	54–55	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0520	21-10845	64–65	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0521	21-10845	74–75	Qbt 3	INV	—	4913R	4913R	4913R	4913R	—	4913R	4913R
MD21-98-0482	21-10846	0–0.5	Soil	INV	—	—	4648R	—	—	—	4648R	—
MD21-98-0481	21-10847	0–0.5	Soil	INV	—	—	4648R	—	—	—	4648R	—
MD21-98-0479	21-10848	0–0.5	Soil	INV	—	—	4648R	—	—	—	4648R	—
MD21-98-0478	21-10849	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0480	21-10850	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0486	21-10851	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0487	21-10852	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0489	21-10853	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0483	21-10854	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0492	21-10855	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0488	21-10856	0–0.5	Soil	INV	—	—	4677R	—	—	—	4677R	—
MD21-98-0484	21-10857	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0485	21-10858	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0491	21-10859	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0493	21-10860	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0490	21-10861	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-98-0495	21-10862	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0494	21-10863	0–0.5	Soil	INV	—	—	4727R	—	—	—	4727R	—
MD21-98-0500	21-10864	6–8	Fill	INV	—	4932R	4932R	4932R	4932R	—	4932R	4932R
MD21-98-0501	21-10865	6–8	Fill	INV	—	4932R	4932R	4932R	4932R	—	4932R	4932R
MD21-98-0502	21-10866	5–8	Fill	INV	—	4932R	4932R	4932R	4932R	—	4932R	4932R
MD21-98-0503	21-10867	5–8	Fill	INV	—	4932R	4932R	4932R	4932R	—	4932R	4932R
2001 Samples												
MD21-01-0469	21-02059	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0486	21-02060	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0484	21-02061	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0471	21-02062	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0468	21-02063	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0485	21-02064	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0470	21-02065	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0483	21-02066	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0473	21-02067	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0482	21-02068	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0481	21-02069	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0474	21-02070	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0480	21-02071	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0472	21-02072	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0479	21-02073	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0475	21-02074	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0477	21-02075	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0476	21-02076	0–0.5	Soil	INV	—	—	—	—	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-01-0456	21-02077	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0461	21-02078	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0478	21-02079	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0457	21-02080	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0460	21-02081	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0459	21-02082	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0434	21-02083	0–0.5	Soil	INV	—	—	—	24S	—	—	—	—
MD21-01-0490	21-02083	0–0.5	Soil	FD	—	—	—	24S	—	—	—	—
MD21-01-0465	21-02084	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0467	21-02086	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0451	21-02087	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0450	21-02088	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0463	21-02090	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0453	21-02091	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0464	21-02092	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0454	21-02093	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0448	21-02094	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0462	21-02095	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0442	21-02096	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0458	21-02097	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0455	21-02098	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0435	21-02099	0–0.5	Soil	INV	—	—	—	24S	—	—	—	—
MD21-01-0436	21-02101	0–0.5	Soil	INV	—	—	—	24S	—	—	—	—
MD21-01-0452	21-02103	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0449	21-02104	0–0.5	Soil	INV	—	—	—	—	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-01-0466	21-02105	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0445	21-02106	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0443	21-02576	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0444	21-02577	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0446	21-02578	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0447	21-02579	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0437	21-02594	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0438	21-02595	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0439	21-02596	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0440	21-02597	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0441	21-02598	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0487	21-02599	0–0.5	Soil	INV	—	—	—	—	—	—	—	—
MD21-01-0488	21-02599	0–0.5	Soil	FD	—	—	—	—	—	—	—	—
MD21-01-0494	21-11404	3–3.5	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0495	21-11404	3–3.5	Fill	FD	—	—	236S	236S	—	—	236S	—
MD21-01-0496	21-11406	5–5	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0497	21-11407	4–4	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0498	21-11408	5–5.5	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0499	21-11409	7–7	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0500	21-11409	7–7	Fill	FD	—	—	236S	236S	—	—	236S	—
MD21-01-0501	21-11411	7–7	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0502	21-11412	7–7	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0503	21-11413	7–7	Fill	INV	—	—	236S	236S	—	—	236S	—
MD21-01-0492	21-22447	0–0.5	Soil	INV	—	—	—	24S	—	—	—	—
MD21-01-0493	21-22448	0–0.5	Soil	INV	—	—	—	24S	—	—	—	—

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
2005 Samples												
MD21-05-60922	21-24772	0–0.5	Fill	INV	—	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-60977	21-24772	8–10	Qbt 3	INV	3556S	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-60978	21-24772	13–15	Qbt 3	INV	3556S	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-60979	21-24772	23–25	Qbt 3	INV	3556S	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-60980	21-24772	33–35	Qbt 3	INV	3556S	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-60981	21-24772	43–45	Qbt 3	INV	3556S	3558S	3558S	3558S	3558S	—	3558S	3558S
MD21-05-62678	21-24772	97–99	Qbt 3	INV	3560S	3562S	3562S	3562S	3562S	—	3562S	3562S
MD21-05-60982	21-24772	97–99	Qbt 3	FD	3556S	3558S	3558S	3558S	3558S	3558S	3558S	3558S
MD21-05-62679	21-24772	148–150	Qbt 2	INV	3582S	3584S	3584S	3584S	3584S	—	3584S	3584S
MD21-05-61079	21-24772	148–150	Qbt 3	FD	3585S	3587S	3587S	3587S	3587S	3587S	3587S	3587S
MD21-05-62680	21-24772	170–172	Qbt 2	INV	3582S	3584S	3584S	3584S	3584S	—	3584S	3584S
MD21-05-62681	21-24772	225–227	Qbt 1v	INV	3599S	3599S	3599S	3599S	3599S	—	3599S	3599S
MD21-05-62682	21-24772	228–230	Qbt 1v	INV	3599S	3599S	3599S	3599S	3599S	—	3599S	3599S
MD21-05-62956	21-24772	333–335	Qct	INV	3632S	3632S	3632S	3632S	3632S	—	3632S	3632S
MD21-05-62957	21-24772	338–340	Qct	INV	3632S	3632S	3632S	3632S	3632S	—	3632S	3632S
MD21-05-62958	21-24772	358–360	Qbo	INV	3632S	3632S	3632S	3632S	3632S	—	3632S	3632S
MD21-05-61010	21-24774	0–0.5	Soil	INV	—	3518S	3518S	3518S	3518S	3518S	3518S	3518S
MD21-05-61077	21-24774	0–0.5	Soil	FD	3516S	3518S	3518S	3518S	3518S	3518S	3518S	3518S
MD21-05-61011	21-24774	10–12	Qbt 3	INV	3516S	3518S	3518S	3518S	3518S	3518S	3518S	3518S
MD21-05-61012	21-24774	18–20	Qbt 3	INV	3516S	3518S	3518S	3518S	3518S	3518S	3518S	3518S
MD21-05-61013	21-24774	98–100	Qbt 3	INV	3516S	3518S	3518S	3518S	3518S	3518S	3518S	3518S
MD21-05-61018	21-24775	0–0.5	Soil	INV	—	3442S	3442S	3442S	3442S	3442S	3442S	3442S
MD21-05-61023	21-24775	13–15	Qbt 3	INV	3440S	3442S	3442S	3442S	3442S	3442S	3442S	3442S
MD21-05-61020	21-24775	18–20	Qbt 3	INV	3440S	3442S	3442S	3442S	3442S	3442S	3442S	3442S

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-05-61021	21-24775	92–94	Qbt 3	INV	3443S	3445S	3445S	3445S	3445S	3445S	3445S	3445S
MD21-05-61075	21-24775	92–94	Qbt 3	FD	3443S	3445S	3445S	3445S	3445S	3445S	3445S	3445S
MD21-05-61022	21-24775	118–120	Qbt 2	INV	3443S	3445S	3445S	3445S	3445S	3445S	3445S	3445S
MD21-05-61026	21-24776	0–0.5	Soil	INV	—	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61028	21-24776	21–23	Qbt 3	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61027	21-24776	3–5	Qbt 3	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61029	21-24776	92–94	Qbt 2	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61030	21-24776	118–120	Qbt 2	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61034	21-24777	0–0.5	Soil	INV	—	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61035	21-24777	3–5	Qbt 3	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61036	21-24777	73–75	Qbt 3	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61037	21-24777	93–95	Qbt 2	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61038	21-24777	118–120	Qbt 2	INV	3477S	3479S	3479S	3479S	3479S	3479S	3479S	3479S
MD21-05-61042	21-24778	0–0.5	Soil	INV	—	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61043	21-24778	11–13	Qbt 3	INV	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61076	21-24778	11–13	Qbt 3	FD	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61044	21-24778	33–35	Qbt 3	INV	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61045	21-24778	48–50	Qbt 3	INV	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61046	21-24778	98–100	Qbt 3	INV	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61047	21-24778	118–120	Qbt 2	INV	3481S	3484S	3484S	3484S	3484S	3484S	3484S	3484S
MD21-05-61050	21-24779	0–0.5	Soil	INV	—	3435S	3435S	3435S	3435S	3435S	3435S	3435S
MD21-05-61051	21-24779	10–12	Qbt 3	INV	3432S	3435S	3435S	3435S	3435S	3435S	3435S	3435S
MD21-05-61052	21-24779	67–69	Qbt 3	INV	3432S	3435S	3435S	3435S	3435S	3435S	3435S	3435S
MD21-05-61053	21-24779	72–74	Qbt 3	INV	3432S	3435S	3435S	3435S	3435S	3435S	3435S	3435S
MD21-05-61054	21-24779	94–96	Qbt 2	INV	3440S	3442S	3442S	3442S	3442S	3442S	3442S	3442S

Table B-2.1-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Sample Type Code	VOCs	Americium-241	Gamma Spectroscopy	Tritium	Isotopic Plutonium	Isotopic Thorium	Isotopic Uranium	Strontium-90
MD21-05-61055	21-24779	117–119	Qbt 2	INV	3440S	3442S	3442S	3442S	3442S	3442S	3442S	3442S
MD21-05-61058	21-24780	0–0.5	Soil	INV	—	3474S	3474S	3474S	3474S	3474S	3474S	3474S
MD21-05-61059	21-24780	3–5	Qbt 3	INV	3472S	3474S	3474S	3474S	3474S	3474S	3474S	3474S
MD21-05-61060	21-24780	63–65	Qbt 3	INV	3472S	3474S	3474S	3474S	3474S	3474S	3474S	3474S
MD21-05-61061	21-24780	88–90	Qbt 3	INV	3472S	3474S	3474S	3474S	3474S	3474S	3474S	3474S
MD21-05-61062	21-24780	118–120	Qbt 2	INV	3472S	3474S	3474S	3474S	3474S	3474S	3474S	3474S
MD21-05-61066	21-24781	0–0.5	Soil	INV	—	3531S	3531S	3531S	3531S	3531S	3531S	3531S
MD21-05-61067	21-24781	18–20	Qbt 3	INV	3531S	3531S	3531S	3531S	3531S	3531S	3531S	3531S
MD21-05-61068	21-24781	72–74	Qbt 3	INV	3531S	3531S	3531S	3531S	3531S	3531S	3531S	3531S
MD21-05-61078	21-24781	72–74	Qbt 3	FD	3531S	3531S	3531S	3531S	3531S	3531S	3531S	3531S
MD21-05-61069	21-24781	98–100	Qbt 3	INV	3531S	3531S	3531S	3531S	3531S	3531S	3531S	3531S
MD21-05-61070	21-24781	118–120	Qbt 2	INV	3531S	3531S	3531S	3531S	3531S	3531S	3531S	3531S

Note: Numbers in analytical suite columns are analytical request numbers.

[a] INV = Investigation sample.

[b] — = Analysis not requested for this sample.

[c] FD= Field duplicate.

Table B-2.1-2
Frequency of Inorganic Chemicals Detected above BVs at MDA U

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Aluminum	Fill	1	1	11700 to 11700	29200	0/1	0/1
Aluminum	Qbo	1	1	984 to 984	3560	0/1	0/1
Aluminum	Qbt 1v	2	2	1770 to 1930	8170	0/2	0/2
Aluminum	Qbt 2	12	12	209 to 4180	7340	0/12	0/12
Aluminum	Qbt 3	91	91	139 to 18700	7340	5/91	0/91
Aluminum	Qct	2	2	743 to 6090	3560	1/2	0/2
Aluminum	Sediment	9	9	2210 to 7250	15400	0/9	0/9
Aluminum	Soil	74	74	3410 to 24100	29200	0/74	0/74
Antimony	Fill	1	1	0.163 to 0.163	0.83	0/1	0/1
Antimony	Qbo	1	0	[0.454 to 0.454]	0.5	0/1	0/1
Antimony	Qbt 1v	2	2	0.113 to 0.118	0.5	0/2	0/2
Antimony	Qbt 2	6	0	[0.398 to 0.403]	0.5	0/6	0/6
Antimony	Qbt 3	54	0	[0.397 to 11]	0.5	0/54	42/54
Antimony	Qct	2	0	[0.51 to 0.521]	0.5	0/2	2/2
Antimony	Sediment	9	0	[0.21 to 0.27]	0.83	0/9	0/9
Antimony	Soil	62	19	0.134 to 0.87	0.83	1/62	0/62
Arsenic	Fill	1	1	2.68 to 2.68	8.17	0/1	0/1
Arsenic	Qbo	1	0	[1.72 to 1.72]	0.56	0/1	1/1
Arsenic	Qbt 1v	2	2	1.6 to 2.68	1.81	1/2	0/2
Arsenic	Qbt 2	12	12	0.726 to 1.81	2.79	0/12	0/12
Arsenic	Qbt 3	91	88	0.61 to 9.17	2.79	7/91	0/91
Arsenic	Qct	2	0	[1.9 to 1.96]	0.56	0/2	2/2
Arsenic	Sediment	9	9	1.4 to 2.6	3.98	0/9	0/9
Arsenic	Soil	74	74	1.5 to 5.2	8.17	0/74	0/74
Barium	Fill	1	1	113 to 113	295	0/1	0/1
Barium	Qbo	1	1	7.56 to 7.56	25.7	0/1	0/1

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Barium	Qbt 1v	2	2	13.4 to 18.2	26.5	0/2	0/2
Barium	Qbt 2	12	12	7.32 to 62.1	46	1/12	0/12
Barium	Qbt 3	91	91	1.6 to 106	46	7/91	0/91
Barium	Qct	2	2	2.76 to 15	25.7	0/2	0/2
Barium	Sediment	9	9	41.2 to 105	127	0/9	0/9
Barium	Soil	74	74	54.4 to 199	295	0/74	0/74
Beryllium	Fill	1	1	0.693 to 0.693	1.83	0/1	0/1
Beryllium	Qbo	1	1	0.783 to 0.783	1.44	0/1	0/1
Beryllium	Qbt 1v	2	2	0.484 to 0.71	1.7	0/2	0/2
Beryllium	Qbt 2	12	12	0.238 to 1.76	1.21	1/12	0/12
Beryllium	Qbt 3	91	45	0.144 to 2.3	1.21	3/91	0/91
Beryllium	Qct	2	2	0.179 to 1.18	1.44	0/2	0/2
Beryllium	Sediment	9	9	0.28 to 0.63	1.31	0/9	0/9
Beryllium	Soil	74	68	0.11 to 1.4	1.83	0/74	0/74
Cadmium	Fill	1	0	[0.497 to 0.497]	0.4	0/1	1/1
Cadmium	Qbo	1	0	[0.573 to 0.573]	0.4	0/1	1/1
Cadmium	Qbt 1v	2	0	[0.51 to 0.534]	0.4	0/2	2/2
Cadmium	Qbt 2	12	1	0.109 to [0.513]	1.63	0/12	0/12
Cadmium	Qbt 3	91	6	0.122 to 1.2	1.63	0/91	0/91
Cadmium	Qct	2	0	[0.634 to 0.652]	0.4	0/2	2/2
Cadmium	Sediment	9	6	[0.41] to 0.98	0.4	6/9	3/9
Cadmium	Soil	32	13	[0.06] to 0.79	0.4	7/32	8/32
Calcium	Fill	1	1	1860 to 1860	6120	0/1	0/1
Calcium	Qbo	1	1	643 to 643	1900	0/1	0/1
Calcium	Qbt 1v	2	2	791 to 1010	3700	0/2	0/2
Calcium	Qbt 2	12	12	196 to 1110	2200	0/12	0/12

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Calcium	Qbt 3	91	91	151 to 4540	2200	2/91	0/91
Calcium	Qct	2	2	338 to 913	1900	0/2	0/2
Calcium	Sediment	9	9	925 to 2000	4420	0/9	0/9
Calcium	Soil	74	73	1150 to 7980	6120	3/74	0/74
Chromium	Fill	1	1	8.37 to 8.37	19.3	0/1	0/1
Chromium	Qbo	1	1	0.836 to 0.836	2.6	0/1	0/1
Chromium	Qbt 1v	2	2	1.52 to 4.67	2.24	1/2	0/2
Chromium	Qbt 2	12	12	0.784 to 2.92	7.14	0/12	0/12
Chromium	Qbt 3	91	66	0.505 to 19.7	7.14	7/91	0/91
Chromium	Qct	2	2	0.535 to 2.46	2.6	0/2	0/2
Chromium	Sediment	9	9	4.8 to 53.2	10.5	8/9	0/9
Chromium	Soil	74	74	3.3 to 77.3	19.3	6/74	0/74
Cobalt	Fill	1	1	3.63 to 3.63	8.64	0/1	0/1
Cobalt	Qbo	1	0	[0.573 to 0.573]	8.89	0/1	0/1
Cobalt	Qbt 1v	2	2	0.439 to 0.65	1.78	0/2	0/2
Cobalt	Qbt 2	12	2	0.236 to [0.517]	3.14	0/12	0/12
Cobalt	Qbt 3	91	38	0.226 to 2.6	3.14	0/91	0/91
Cobalt	Qct	2	1	[0.652] to 0.892	8.89	0/2	0/2
Cobalt	Sediment	9	9	2.2 to 6.7	4.73	1/9	0/9
Cobalt	Soil	74	68	1.6 to 8.1	8.64	0/74	0/74
Copper	Fill	1	1	7.12 to 7.12	14.7	0/1	0/1
Copper	Qbo	1	1	0.758 to 0.758	3.96	0/1	0/1
Copper	Qbt 1v	2	2	1.26 to 1.94	3.26	0/2	0/2
Copper	Qbt 2	12	12	1.13 to 2.16	4.66	0/12	0/12
Copper	Qbt 3	86	66	0.518 to 8.8	4.66	5/86	0/86
Copper	Qct	2	2	0.707 to 2.4	3.96	0/2	0/2

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Copper	Sediment	9	9	1.8 to 5.5	11.2	0/9	0/9
Copper	Soil	74	74	1.7 to 84.3	14.7	2/74	0/74
Cyanide (Total)	Fill	1	0	[0.234 to 0.234]	0.5	0/1	0/1
Cyanide (Total)	Qbo	1	0	[0.266 to 0.266]	0.5	0/1	0/1
Cyanide (Total)	Qbt 2	12	1	0.137 to [0.259]	0.5	0/12	0/12
Cyanide (Total)	Qbt 3	29	2	0.133 to [0.289]	0.5	0/29	0/29
Cyanide (Total)	Qct	2	0	[0.302 to 0.322]	0.5	0/2	0/2
Cyanide (Total)	Soil	8	1	0.188 to [0.255]	0.5	0/8	0/8
Iron	Fill	1	1	10200 to 10200	21500	0/1	0/1
Iron	Qbo	1	1	4740 to 4740	3700	1/1	0/1
Iron	Qbt 1v	2	2	3880 to 4510	9900	0/2	0/2
Iron	Qbt 2	12	12	4560 to 7290	14500	0/12	0/12
Iron	Qbt 3	91	91	860 to 14100	14500	0/91	0/91
Iron	Qct	2	2	816 to 4070	3700	1/2	0/2
Iron	Sediment	9	9	3230 to 7900	13800	0/9	0/9
Iron	Soil	74	74	1200 to 16000	21500	0/74	0/74
Lead	Fill	1	1	10.1 to 10.1	22.3	0/1	0/1
Lead	Qbo	1	1	1.6 to 1.6	13.5	0/1	0/1
Lead	Qbt 1v	2	2	4.65 to 13.5	18.4	0/2	0/2
Lead	Qbt 2	12	12	0.835 to 14.9	11.2	2/12	0/12
Lead	Qbt 3	90	90	0.461 to 71.6	11.2	11/90	0/90
Lead	Qct	2	2	2.43 to 6.21	13.5	0/2	0/2
Lead	Sediment	9	9	7.2 to 36	19.7	2/9	0/9
Lead	Soil	74	74	4.4 to 47.5	22.3	7/74	0/74
Magnesium	Fill	1	1	1830 to 1830	4610	0/1	0/1
Magnesium	Qbo	1	1	273 to 273	739	0/1	0/1

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Magnesium	Qbt 1v	2	2	99.1 to 370	780	0/2	0/2
Magnesium	Qbt 2	12	12	58.7 to 497	1690	0/12	0/12
Magnesium	Qbt 3	91	91	46.6 to 2710	1690	2/91	0/91
Magnesium	Qct	2	2	126 to 795	739	1/2	0/2
Magnesium	Sediment	9	9	526 to 1410	2370	0/9	0/9
Magnesium	Soil	74	74	690 to 4070	4610	0/74	0/74
Manganese	Fill	1	1	307 to 307	671	0/1	0/1
Manganese	Qbo	1	1	116 to 116	189	0/1	0/1
Manganese	Qbt 1v	2	2	159 to 226	408	0/2	0/2
Manganese	Qbt 2	8	8	185 to 420	482	0/8	0/8
Manganese	Qbt 3	86	86	40.7 to 610	482	1/86	0/86
Manganese	Qct	2	2	41 to 168	189	0/2	0/2
Manganese	Sediment	9	9	199 to 478	543	0/9	0/9
Manganese	Soil	72	72	144 to 558	671	0/72	0/72
Mercury	Fill	1	1	0.0131 to 0.0131	0.1	0/1	0/1
Mercury	Qbo	1	0	[0.0112 to 0.0112]	0.1	0/1	0/1
Mercury	Qbt 2	12	1	0.0025 to [0.0104]	0.1	0/12	0/12
Mercury	Qbt 3	91	19	[0.0029] to 0.24	0.1	5/91	41/91
Mercury	Qct	2	1	[0.0129] to 0.0148	0.1	0/2	0/2
Mercury	Soil	86	48	[0.017] to 1.2	0.1	18/86	1/86
Nickel	Fill	1	1	6.49 to 6.49	15.4	0/1	0/1
Nickel	Qbo	1	1	0.521 to 0.521	2	0/1	0/1
Nickel	Qbt 1v	2	2	0.28 to 0.322	2	0/2	0/2
Nickel	Qbt 2	12	12	0.205 to 1.11	6.58	0/12	0/12
Nickel	Qbt 3	91	40	0.119 to 7.97	6.58	1/91	0/91
Nickel	Qct	2	2	0.215 to 1.66	2	0/2	0/2

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Nickel	Sediment	9	9	2.2 to 5.2	9.38	0/9	0/9
Nickel	Soil	74	70	2.8 to 27.9	15.4	1/74	0/74
Nitrate	Fill	1	0	[1.01 to 1.01]	na[b]	0/1	n/a[c]
Nitrate	Qbo	1	0	[1.15 to 1.15]	na	0/1	n/a
Nitrate	Qbt 2	12	0	[0.995 to 1.05]	na	0/12	n/a
Nitrate	Qbt 3	29	0	[0.996 to 1.18]	na	0/29	n/a
Nitrate	Qct	2	0	[1.28 to 1.31]	na	0/2	n/a
Nitrate	Soil	8	1	0.745 to [1.04]	na	1/8	n/a
Perchlorate	Fill	1	0	[0.00202 to 0.00202]	na	0/1	n/a
Perchlorate	Qbo	1	0	[0.046 to 0.046]	na	0/1	n/a
Perchlorate	Qbt 2	12	1	0.000664 to [0.00209]	na	1/12	n/a
Perchlorate	Qbt 3	29	7	0.000603 to [0.00236]	na	7/29	n/a
Perchlorate	Qct	2	0	[0.0512 to 0.0525]	na	0/2	n/a
Perchlorate	Soil	8	2	0.00058 to [0.00207]	na	2/8	n/a
Potassium	Fill	1	1	1510 to 1510	3460	0/1	0/1
Potassium	Qbo	1	1	386 to 386	2390	0/1	0/1
Potassium	Qbt 1v	2	2	370 to 1100	6670	0/2	0/2
Potassium	Qbt 2	12	12	119 to 702	3500	0/12	0/12
Potassium	Qbt 3	91	91	64 to 2240	3500	0/91	0/91
Potassium	Qct	2	2	284 to 798	2390	0/2	0/2
Potassium	Sediment	9	7	344 to 896	2690	0/9	0/9
Potassium	Soil	74	74	574 to 2860	3460	0/74	0/74
Selenium	Fill	1	0	[1.49 to 1.49]	1.52	0/1	0/1
Selenium	Qbo	1	0	[1.72 to 1.72]	0.3	0/1	1/1
Selenium	Qbt 1v	2	0	[1.53 to 1.6]	0.3	0/2	2/2
Selenium	Qbt 2	12	0	[1.47 to 1.55]	0.3	0/12	12/12

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Selenium	Qbt 3	91	0	[0.52 to 1.75]	0.3	0/91	91/91
Selenium	Qct	2	0	[1.9 to 1.96]	0.3	0/2	2/2
Selenium	Sediment	9	1	[0.62 to 0.76]	0.3	1/9	8/9
Selenium	Soil	74	3	[0.52 to 1.54]	1.52	0/74	2/74
Silver	Fill	1	1	0.0604 to 0.0604	1	0/1	1/1
Silver	Qbo	1	0	[0.227 to 0.227]	1	0/1	0/1
Silver	Qbt 1v	2	1	0.0513 to [0.216]	1	0/2	0/2
Silver	Qbt 2	12	1	0.0473 to [0.208]	1	0/12	0/12
Silver	Qbt 3	91	8	0.0425 to [2.4]	1	0/91	62/91
Silver	Qct	2	1	0.0556 to [0.26]	1	0/2	0/2
Silver	Sediment	9	0	[2.1 to 2.5]	1	0/9	9/9
Silver	Soil	74	43	0.0578 to [2.4]	1	0/74	7/74
Sodium	Fill	1	1	139 to 139	915	0/1	0/1
Sodium	Qbo	1	1	743 to 743	4350	0/1	0/1
Sodium	Qbt 1v	2	2	86.9 to 923	6330	0/2	0/2
Sodium	Qbt 2	12	12	89.3 to 493	2770	0/12	0/12
Sodium	Qbt 3	91	91	61 to 1230	2770	0/91	0/91
Sodium	Qct	2	2	581 to 935	4350	0/2	0/2
Sodium	Sediment	9	9	30.2 to 110	1470	0/9	0/9
Sodium	Soil	74	54	[0.25] to 1680	915	6/74	0/74
Thallium	Fill	1	1	0.171 to 0.171	0.73	0/1	0/1
Thallium	Qbo	1	0	[0.227 to 0.227]	1.22	0/1	0/1
Thallium	Qbt 1v	2	1	[0.204] to 0.21	1.24	0/2	0/2
Thallium	Qbt 2	12	0	[0.199 to 0.208]	1.1	0/12	0/12
Thallium	Qbt 3	91	4	0.0851 to [2.2]	1.1	0/91	38/91
Thallium	Qct	2	1	0.146 to [0.255]	1.22	0/2	0/2

Table B-2.1-2 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (mg/kg)	BV (mg/kg)	Frequency of Detects above BV	Frequency of Nondetects above BV
Thallium	Sediment	9	0	[0.21 to 0.25]	0.73	0/9	0/9
Thallium	Soil	74	9	0.0966 to [2.2]	0.73	1/74	14/74
Uranium	Sediment	8	8	1.11 to 2.69	2.22	1/8	0/8
Uranium	Soil	65	65	0.957 to 37.5	1.82	39/65	0/65
Vanadium	Fill	1	1	16 to 16	39.6	0/1	0/1
Vanadium	Qbo	1	1	1.55 to 1.55	4.59	0/1	0/1
Vanadium	Qbt 1v	2	2	1.11 to 2.81	4.48	0/2	0/2
Vanadium	Qbt 2	12	12	0.961 to 5.19	17	0/12	0/12
Vanadium	Qbt 3	91	82	[0.52] to 18.1	17	1/91	0/91
Vanadium	Qct	2	2	0.674 to 3.96	4.59	0/2	0/2
Vanadium	Sediment	9	9	6.2 to 15.7	19.7	0/9	0/9
Vanadium	Soil	74	74	7.9 to 27	39.6	0/74	0/74
Zinc	Fill	1	1	28.2 to 28.2	48.8	0/1	0/1
Zinc	Qbo	1	1	14.4 to 14.4	40	0/1	0/1
Zinc	Qbt 1v	2	2	15.8 to 43.1	84.6	0/2	0/2
Zinc	Qbt 2	12	12	34.4 to 60.3	63.5	0/12	0/12
Zinc	Qbt 3	91	91	8.91 to 82.9	63.5	3/91	0/91
Zinc	Qct	2	2	7.05 to 21.8	40	0/2	0/2
Zinc	Sediment	9	9	18.5 to 72	60.2	1/9	0/9
Zinc	Soil	74	74	18.1 to 509	48.8	17/74	0/74

Note: BVs from LANL 1998, 59730.

[a] Brackets indicate a nondetected concentration.

[b] na = Not available.

[c] n/a= Not applicable.

Table B-2.1-3
Inorganic Chemicals above BVs in Surface Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAA7519	21-01863	0.00–0.25	Soil	—[e]	—	0.75 (J)	—	—	—	—	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	0.43 (U)	—	—	—	—	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	0.5 (J)	—	28.6	18.4	—	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	0.79 (J)	—	—	—	—	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	0.54 (J)	—	—	—	—	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	0.52 (J)	—	—	—	—	—	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	—	—	—	22.5	—	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	—	—	—	—	1.2 (J+)	—
AAB9754	21-02063	0.00–0.50	Soil	—	—	—	—	—	—	23.6	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	6650	—	—	47.5	—	—
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	—	24.4	—	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	—	30.6	—	—
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	23.6	—	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	—	—	0.75 (J-)	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—

Table B-2.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	—	—	—	—	0.26 (J-)	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	—	—	—	—	0.41 (J-)	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	—	77.3	—	—	0.74 (J-)	—
AAB9776	21-02085	0.00–0.50	Soil	—	0.87 (J-)	—	—	—	—	28.3	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	0.43 (J)	—	29.7	84.3	—	0.39 (J-)	—
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	—	0.28 (J-)	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	29.5	—	—	0.25 (J-)	—
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9784	21-02093	0.00–0.50	Soil	—	—	—	—	—	—	—	0.49 (J-)	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	—	—	—	—	0.53 (J-)	—
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	—	0.24 (J-)	27.9

Table B-2.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel
Soil BV[a]				**29200**	**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**
Industrial Soil Screening Levels[b]				**100000**	**454**	**564**	**na[c]**	**5000[d]**	**45400**	**800**	**340[d]**	**22500**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**39**	**na**	**2100[d]**	**3130**	**400**	**23[d]**	**1560**
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	7440	—	—	—	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	—	—	—	—	0.65 (J-)	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	0.48 (J-)	—
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	—	—	—	—	0.27 (J)	—
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	—	—	—	—	0.11 (J)	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	—	—	—	—	0.25 (J)	—
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	0.56 (U)	—	—	—	—	0.11 (U)	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	0.409 (J)	7980 (J)	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	0.493 (U)	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	60	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	0.5 (U)	—	20.6	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	0.507 (U)	—	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	0.508 (U)	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	0.514 (U)	—	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	0.514 (U)	—	—	—	—	—	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	0.497 (U)	—	—	—	—	—	—

Table B-2.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790**[d]	**5680**	**5680**	**na**	**74.9**	**200**[f]	**100000**
Residential Soil Screening Levels				**100000**	**55**[d]	**391**	**391**	**na**	**5.16**	**16**[f]	**23500**
AAA7519	21-01863	0.00–0.25	Soil	—	—	—	2.4 (U)	—	—	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	—	2.2 (U)	—	—	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	—	2.1 (U)	—	—	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	—	2.4 (U)	—	—	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	—	2.2 (U)	—	—	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	—	2.1 (U)	—	—	1.95 (J-)	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	—	—	—	2.93 (J+)	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	—	—	—	1.97 (J+)	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	—	—	—	1.88 (J+)	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	—	—	—	2.1 (J+)	—
AAB9754	21-02063	0.00–0.50	Soil	—	—	—	—	—	—	3.16 (J+)	54.1
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—	0.78 (U)	3.7	66.2
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	3.06	—
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	0.76 (U)	2.2	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	0.77 (U)	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	2.84	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	0.86 (U)	5.8	52.5
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	2.91	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	2.01	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	0.75 (U)	7.5	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	1.1 (J)	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	0.74 (U)	2.11	—
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	1.93	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	—	—	—	1.86	—

Table B-2.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790[d]**	**5680**	**5680**	**na**	**74.9**	**200[f]**	**100000**
Residential Soil Screening Levels				**100000**	**55[d]**	**391**	**391**	**na**	**5.16**	**16[f]**	**23500**
AA B9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	3.4 (J-)	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	—	—	—	2.22 (J-)	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	—	—	—	2.16 (J-)	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	—	—	—	2.23 (J-)	68.5
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	—	—	—	2.21 (J-)	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—	—	2.12 (J-)	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	1.83	59.8
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—	0.81 (U)	2.15	58.2
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—	—	1.94 (J-)	56.7
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	37.5 (J-)	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—	—	2.96 (J-)	404
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	—	—	—	2.09 (J-)	53.2
AAB9784	21-02093	0.00–0.50	Soil	—	—	—	—	—	—	8.96 (J-)	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	—	—	—	—	73.2
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	2.02 (J-)	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	—	—	—	2.11 (J-)	64
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	—	—	—	—	53.7
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	2.02 (J-)	509
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	9.14 (J-)	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	18.1 (J-)	146
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	—	—	—	1.95 (J-)	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	1.9 (J-)	—

Table B-2.1-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Nitrate	Perchlorate	Selenium	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV				**na**	**na**	**1.52**	**1**	**915**	**0.73**	**1.82**	**48.8**
Industrial Soil Screening Levels				**100000**	**790**[d]	**5680**	**5680**	**na**	**74.9**	**200**[f]	**100000**
Residential Soil Screening Levels				**100000**	**55**[d]	**391**	**391**	**na**	**5.16**	**16**[f]	**23500**
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	—
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	2.03 (J-)	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	—	1460 (J)	0.84 (U)	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	—	1550 (J)	0.85 (U)	2.05 (J)	90.6
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	—	1100 (J)	0.84 (U)	—	109
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	—	1670 (J)	0.86 (U)	—	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	—	1680 (J)	0.85 (U)	—	57.2
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	—	1480 (J)	0.89 (U)	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	—	2.2 (U)	—	2.2 (U)	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	0.745 (J+)	0.00058 (J)	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	0.000583 (J)	1.54 (U)	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	1.54 (U)	—	—	—	—	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—	—	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless otherwise noted.

[c] na = Not available.

[d] Values from EPA Region 6 (EPA 2005, 91002).

[e] — = Not above BV.

[f] Values from EPA Region 9 (http://www.epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf.)

Table B-2.1-4
Inorganic Chemicals above BVs in Sediment at MDA U

Sample ID	Location ID	Depth (ft)	Media	Cadmium	Chromium	Cobalt	Lead	Selenium	Silver	Uranium	Zinc
Sediment BV[a]				**0.4**	**10.5**	**4.73**	**19.7**	**0.3**	**1**	**2.22**	**60.2**
Industrial Soil Screening Levels[b]				**564**	**5000**[c]	**20500**	**800**	**5680**	**5680**	**200**[d]	**100000**
Residential Soil Screening Levels[b]				**39**	**2100**[c]	**1520**	**400**	**391**	**391**	**16**[d]	**23500**
AAA7525	21-01865	0.00–0.25	Sediment	0.46 (U)	53.2	—[e]	28.1	0.69 (U)	2.3 (U)	—	—
AAA7526	21-01865	0.25–0.50	Sediment	0.52 (J)	26.9	—	—	0.67 (J)	2.2 (U)	—	—
AAA7527	21-01865	0.50–1.00	Sediment	0.41 (U)	17.9	—	—	0.62 (U)	2.1 (U)	—	—
AAB7281	21-02570	0.00–0.25	Sediment	0.67 (J)	13.1	—	—	0.7 (U)	2.3 (U)	—	—
AAB7282	21-02570	0.25–0.50	Sediment	0.81 (J)	14	—	—	0.67 (U)	2.2 (U)	—	—
AAB7283	21-02570	0.50–1.00	Sediment	0.98 (J)	21.3	—	—	0.65 (U)	2.2 (U)	—	—
AAB7284	21-02571	0.00–0.25	Sediment	0.65 (J)	—	6.7 (J)	—	0.67 (U)	2.2 (U)	2.69 (J-)	—
AAB7285	21-02571	0.25–0.50	Sediment	0.42 (U)	12.7	—	36	0.63 (U)	2.1 (U)	—	72
AAB7286	21-02571	0.50–1.00	Sediment	0.74 (J)	34.3	—	—	0.76 (U)	2.5 (U)	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless noted otherwise.

[c] Values from EPA Region 6 (EPA 2005, 91002).

[d] Values from EPA Region 9 (http://www.epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf.)

[e] — = Not above BV.

Table B-2.1-5
Inorganic Chemicals above BV in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na**[c]	**5000**[d]	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100**[d]	**3130**	**23500**	**400**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	—[e]	—	2.9	—	—	—	—	13	8.8	—	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	12
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	—	48	1.7	—	—	—	—	—	12
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	11000	11 (U)	2.9	58	1.3	—	—	—	4.9	—	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	11 (U)	—	—	—	—	—	8.2	—	—	21
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	—	11 (U)	3.9	—	—	—	—	—	—	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	11 (U)	3.3	—	—	—	—	—	—	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	14
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	10000	11 (UJ)	—	65	2.3	—	—	—	7.6	—	14
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	11 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	10 (UJ)	—	—	—	—	—	—	—	—	—
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	10 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	8700	11 (U)	3.7	62	—	—	—	15	4.8	—	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	13
MD21-98-0469	21-10845	24.00–25.00	Qbt 3	—	11 (U)	—	—	—	—	—	8.9	—	—	22
MD21-98-0471	21-10845	34.00–35.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	11 (U)	—	—	—	—	—	—	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	—	—	19.7	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na**[c]	**5000**[d]	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100**[d]	**3130**	**23500**	**400**
MD21-05-60980	21-24772	33.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-60981	21-24772	43.00–45.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	0.51 (U)	—	—	—	—	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	2.68	—	—	0.534 (U)	—	4.67	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	0.521 (U)	1.96 (U)	—	—	0.652 (U)	—	—	—	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	6090	0.51 (U)	1.9 (U)	—	—	0.634 (U)	—	—	—	4070 (J+)	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	1.72 (U)	—	—	0.573 (U)	—	—	—	4740 (J+)	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	18700 (J+)	—	9.17	106 (J)	—	—	—	11.4	5.45	—	71.6
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	9500	—	—	—	—	—	—	—	—	—	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	62.1 (J+)	—	—	—	—	—	—	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	2.85	55.5	—	—	2590	—	—	—	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61035	21-24777	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Copper	Iron	Lead
Qbt 2,3,4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**
Qbt 1v BV[a]				**8170**	**0.5**	**1.81**	**26.5**	**1.7**	**0.4**	**3700**	**2.24**	**3.26**	**9900**	**18.4**
Qbt 1g, Qct, Qbo BV[a]				**3560**	**0.5**	**0.56**	**25.7**	**1.44**	**0.4**	**1900**	**2.6**	**3.96**	**3700**	**13.5**
Industrial Soil Screening Levels[b]				**100000**	**454**	**17.7**	**78300**	**2250**	**564**	**na[c]**	**5000[d]**	**45400**	**100000**	**800**
Residential Soil Screening Levels[b]				**77800**	**31.3**	**3.9**	**5450**	**156**	**39**	**na**	**2100[d]**	**3130**	**23500**	**400**
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	1.76	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61044	21-24778	33.00–35.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	13.6
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61046	21-24778	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	13.6
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61061	21-24780	88.00–90.00	Qbt 3	—	—	—	—	—	—	—	19.6	—	—	15.1
MD21-05-61062	21-24780	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	14.9
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	—	—	—	46.8	—	—	4540	—	—	—	12.4
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	—	—	—	—	—	0.52 (U)	2.1 (U)	—	—	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	—	—	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	73
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	0.12 (U)	—	—	1.2 (U)	2.4 (U)	—	—	—
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	—	—	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	610	—	—	—	1 (U)	2 (U)	—	—	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	—	—	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.3 (U)	—	—	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	—	—	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340**[d]	**22500**	**790**[d]	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23**[d]	**1560**	**55**[d]	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	0.54 (U)	2.2 (U)	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	0.53 (U)	2.1 (U)	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	—	0.24	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	—	0.14	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	—	0.16	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	—	—	0.14	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	—	0.16	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	—	—	—	—	1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	1 (U)	2 (U)	2 (U)	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0469	21-10845	24.00–25.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0471	21-10845	34.00–35.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.2 (U)	2.2 (U)	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	—	0.11 (U)	—	—	1.1 (U)	2.1 (U)	2.1 (U)	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	—	—	—	1.49 (U)	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	1.51 (U)	—	—	—	—
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	1.52 (U)	—	—	—	—
MD21-05-60980	21-24772	33.00–35.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-60981	21-24772	43.00–45.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	1.56 (U)	—	—	—	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	—	—	—	1.6 (U)	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	1.96 (U)	—	—	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	795	—	—	—	—	1.9 (U)	—	—	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	1.72 (U)	—	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	2710	—	—	7.97	—	1.75 (U)	—	—	18.1	—
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	1.62 (U)	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	0.00103 (J)	1.54 (U)	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	0.00199 (J)	1.49 (U)	—	—	—	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	1.47 (U)	—	—	—	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	—	—	0.000742 (J)	1.7 (U)	—	—	—	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61035	21-24777	3.00–5.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	—	1.55 (U)	—	—	—	—
MD21-05-61044	21-24778	33.00–35.00	Qbt 3	—	—	—	—	—	1.63 (U)	—	—	—	—
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	—	1.6 (U)	—	—	—	—
MD21-05-61046	21-24778	98.00–100.00	Qbt 3	—	—	—	—	—	1.53 (U)	—	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	1.55 (U)	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	0.00121 (J)	1.54 (U)	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	0.000664 (J)	1.52 (U)	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	0.000603 (J)	1.57 (U)	—	—	—	78.8
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	0.000664 (J)	1.5 (U)	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	1.5 (U)	—	—	—	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	1.49 (U)	—	—	—	—
MD21-05-61061	21-24780	88.00–90.00	Qbt 3	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-61062	21-24780	118.00–120.00	Qbt 2	—	—	—	—	—	1.48 (U)	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	—	—	—	—	—	1.52 (U)	—	—	—	—

Table B-2.1-5 (continued)

Sample ID	Location ID	Depth (ft)	Media	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt 2,3,4 BV[a]				**1690**	**482**	**0.1**	**6.58**	**na**	**0.3**	**1**	**1.1**	**17**	**63.5**
Qbt 1v BV[a]				**780**	**408**	**0.1**	**2**	**na**	**0.3**	**1**	**1.24**	**4.48**	**84.6**
Qbt 1g, Qct, Qbo BV[a]				**739**	**189**	**0.1**	**2**	**na**	**0.3**	**1**	**1.22**	**4.59**	**40**
Industrial Soil Screening Levels[b]				**na**	**100000**	**340[d]**	**22500**	**790[d]**	**5680**	**5680**	**74.9**	**1140**	**100000**
Residential Soil Screening Levels[b]				**na**	**10200**	**23[d]**	**1560**	**55[d]**	**391**	**391**	**5.16**	**78.2**	**23500**
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	2460	—	—	—	0.00156 (J)	1.56 (U)	—	—	—	82.9
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	1.54 (U)	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	—	1.5 (U)	—	—	—	—

Note: Units are mg/kg.

[a] BVs from LANL 1998, 59730.

[b] SSLs from NMED 2005, 90802, unless otherwise noted.

[c] na = Not available.

[d] Values from EPA Region 6 (EPA 2005, 91002).

[e] — = Not above BV.

Table B-2.2-1
Frequency of Radionuclides Detected above BVs/FVs or Detected at MDA U

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Actinium-227	Fill	1	0	[0.986 to 0.986]	n/a[b]	0/1
Actinium-227	Qbt 2	2	0	[-0.171 to -0.00739]	n/a	0/2
Actinium-227	Qbt 3	6	0	[-0.0813 to 0.139]	n/a	0/6
Americium-241	Fill	13	0	[-0.047 to -0.084]	0.013	0/13
Americium-241	Qbo	1	0	[-0.006 to -0.006]	n/a	0/1
Americium-241	Qbt 1v	2	0	[0.003 to 0.009]	n/a	0/2
Americium-241	Qbt 2	12	0	[-0.0215 to 0.0398]	n/a	0/12
Americium-241	Qbt 3	91	6	[-0.039] to 0.046	n/a	6/91
Americium-241	Qct	2	0	[-0.027 to -0.0102]	n/a	0/2
Americium-241	Sediment	11	0	[0.01 to 0.254]	0.04	0/11
Americium-241	Soil	96	6	[-0.46] to 0.84	0.013	6/96
Cesium-134	Fill	13	0	[-0.047 to 0.045]	n/a	0/13
Cesium-134	Qbt 2	3	0	[0.0743 to 0.102]	n/a	0/3
Cesium-134	Qbt 3	71	0	[-0.068 to 0.109]	n/a	0/71
Cesium-134	Qct	1	0	[0.0807 to 0.0807]	n/a	0/1
Cesium-134	Sediment	2	0	[-0.004 to 0.044]	n/a	0/2
Cesium-134	Soil	21	0	[-0.075 to 0.083]	n/a	0/21
Cesium-137	Fill	13	4	[-0.016 to 0.657]	1.65	0/13
Cesium-137	Qbo	1	0	[-0.018 to -0.018]	n/a	0/1
Cesium-137	Qbt 1v	2	0	[-0.016 to -0.005]	n/a	0/2
Cesium-137	Qbt 2	12	0	[-0.025 to 0.022]	n/a	0/12
Cesium-137	Qbt 3	91	0	[-0.061 to 0.16]	n/a	0/91
Cesium-137	Qct	2	0	[-0.025 to -0.014]	n/a	0/2
Cesium-137	Sediment	7	7	0.212 to 0.523	0.9	0/7
Cesium-137	Soil	59	50	[-0.012] to 2.78	1.65	3/59
Cobalt-60	Fill	13	0	[-0.072 to 0.029]	n/a	0/13

Table B-2.2-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Cobalt-60	Qbo	1	0	[0.00274 to 0.00274]	n/a	0/1
Cobalt-60	Qbt 1v	2	0	[-0.0292 to 0.0674]	n/a	0/2
Cobalt-60	Qbt 2	12	0	[-0.0165 to 0.0267]	n/a	0/12
Cobalt-60	Qbt 3	91	0	[-0.071 to 0.092]	n/a	0/91
Cobalt-60	Qct	2	0	[0.0238 to 0.0489]	n/a	0/2
Cobalt-60	Sediment	2	0	[-0.003 to 0.008]	n/a	0/2
Cobalt-60	Soil	27	0	[-0.136 to 0.074]	n/a	0/27
Europium-152	Fill	13	0	[-0.0445 to 0.06]	n/a	0/13
Europium-152	Qbo	1	0	[-0.0186 to -0.0186]	n/a	0/1
Europium-152	Qbt 1v	2	0	[-0.0986 to -0.0539]	n/a	0/2
Europium-152	Qbt 2	12	0	[-0.102 to 0.0525]	n/a	0/12
Europium-152	Qbt 3	91	0	[-0.394 to 0.22]	n/a	0/91
Europium-152	Qct	2	0	[0.0297 to 0.0466]	n/a	0/2
Europium-152	Sediment	2	0	[-0.06 to -0.017]	n/a	0/2
Europium-152	Soil	27	0	[-0.27 to 0.11]	n/a	0/27
Plutonium-238	Fill	5	0	[-0.0062 to 0.0059]	0.023	0/5
Plutonium-238	Qbo	1	0	[0.00308 to 0.00308]	n/a	0/1
Plutonium-238	Qbt 1v	2	0	[0.00388 to 0.00737]	n/a	0/2
Plutonium-238	Qbt 2	12	0	[-0.0351 to 0.00761]	n/a	0/12
Plutonium-238	Qbt 3	91	1	[-0.0246] to 0.0291	n/a	1/91
Plutonium-238	Qct	2	0	[0.0099 to 0.0245]	n/a	0/2
Plutonium-238	Sediment	9	2	[-0.0004] to 2.516	0.006	2/9
Plutonium-238	Soil	73	19	[-0.0013] to 0.0659	0.023	6/73
Plutonium-239	Fill	5	4	[0.0372 to 0.0372]	0.054	0/1
Plutonium-239	Qbo	1	0	[-0.0246 to -0.0246]	n/a	0/1
Plutonium-239	Qbt 1v	2	0	[-0.00184 to 0.00968]	n/a	0/2

Table B-2.2-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Plutonium-239	Qbt 2	12	0	[-0.00292 to 0.0307]	n/a	0/12
Plutonium-239	Qbt 3	91	3	[-0.0065] to 0.119	n/a	3/98
Plutonium-239	Qct	2	0	[-0.0105 to -0.0033]	n/a	0/2
Plutonium-239	Sediment	9	9	0.0226 to 4.136	0.068	7/9
Plutonium-239	Soil	70	60	[-0.0053] to 3.1	0.054	54/70
Radium-223	Fill	13	1	[-0.305 to 3.82]	n/a	1/13
Radium-223	Qbo	1	0	[-0.637 to -0.637]	n/a	0/1
Radium-223	Qbt 1v	2	0	[0.0201 to 0.118]	n/a	0/2
Radium-223	Qbt 2	12	0	[-0.697 to 1.06]	n/a	0/12
Radium-223	Qbt 3	91	1	[-1.3] to 2.3	n/a	1/91
Radium-223	Qct	2	0	[0.315 to 0.321]	n/a	0/2
Radium-223	Sediment	2	0	[-0.32 to 0]	n/a	0/2
Radium-223	Soil	27	0	[-0.8 to 0.8]	n/a	0/27
Radon-219	Qbt 3	62	0	[-0.65 to 1.8]	n/a	0/62
Radon-219	Sediment	2	0	[-0.01 to 0.14]	n/a	0/2
Radon-219	Soil	19	0	[-0.61] to 1.1	n/a	0/19
Ruthenium-106	Fill	13	0	[-0.14 to 0.13]	n/a	0/13
Ruthenium-106	Qbo	1	0	[0.127 to 0.127]	n/a	0/1
Ruthenium-106	Qbt 1v	2	0	[-0.0517 to 0.189]	n/a	0/2
Ruthenium-106	Qbt 2	12	0	[-0.238 to 0.294]	n/a	0/12
Ruthenium-106	Qbt 3	91	0	[-0.77 to 0.45]	n/a	0/91
Ruthenium-106	Qct	2	0	[-0.172 to 0.142]	n/a	0/2
Ruthenium-106	Sediment	2	0	[-0.18 to 0.05]	n/a	0/2
Ruthenium-106	Soil	27	0	[-0.38 to 0.75]	n/a	0/27
Sodium-22	Fill	13	0	[-0.071 to 0.034]	n/a	0/13
Sodium-22	Qbo	1	0	[-0.0167 to -0.0167]	n/a	0/1

Table B-2.2-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Sodium-22	Qbt 1v	2	0	[-0.0105 to 0.0113]	n/a	0/2
Sodium-22	Qbt 2	12	0	[-0.0313 to 0.0098]	n/a	0/12
Sodium-22	Qbt 3	91	0	[-0.118 to 0.072]	n/a	0/91
Sodium-22	Qct	2	0	[-0.000346 to 0.00178]	n/a	0/2
Sodium-22	Sediment	2	0	[0.006 to 0.011]	n/a	0/2
Sodium-22	Soil	27	0	[-0.086 to 0.089]	n/a	0/27
Strontium-90	Fill	5	0	[-0.24 to 0.12]	1.31	0/5
Strontium-90	Qbo	1	0	[-0.0384 to -0.0384]	n/a	0/1
Strontium-90	Qbt 1v	2	0	[0.0485 to 0.0709]	n/a	0/2
Strontium-90	Qbt 2	12	0	[-0.191 to 0.17]	n/a	0/12
Strontium-90	Qbt 3	91	2	[-0.27] to 0.847	n/a	2/91
Strontium-90	Qct	2	0	[-0.0479 to 0.000318]	n/a	0/2
Strontium-90	Sediment	9	4	[0.02] to 0.42	1.04	0/9
Strontium-90	Soil	85	12	[-0.2] to 1.34	1.31	1/85
Thorium-227	Fill	12	3	[-0.63] to 4.41	n/a	3/12
Thorium-227	Qbo	1	0	[0.169 to 0.169]	n/a	0/1
Thorium-227	Qbt 1v	2	0	[-0.0911 to -0.0299]	n/a	0/2
Thorium-227	Qbt 2	12	0	[-0.207 to 0.291]	n/a	0/12
Thorium-227	Qbt 3	91	1	[-4.13] to 2.33	n/a	1/91
Thorium-227	Qct	2	0	[-0.162 to -0.0661]	n/a	0/2
Thorium-227	Sediment	2	0	[-2.93 to 0]	n/a	0/2
Thorium-227	Soil	27	0	[-3.74] to 0.2	n/a	0/27
Thorium-228	Qbt 2	10	10	2.02 to 2.7	2.52	1/10
Thorium-228	Qbt 3	23	23	1.65 to 2.62	2.52	2/23
Thorium-228	Soil	13	9	1.4 to [5.569]	2.28	0/13
Thorium-230	Qbt 2	10	10	1.33 to 1.74	1.98	0/10

Table B-2.2-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Thorium-230	Qbt 3	23	23	0.919 to 1.78	1.98	0/23
Thorium-230	Soil	9	9	0.945 to 1.3	2.29	0/9
Thorium-232	Qbt 2	10	10	2.02 to 2.45	2.52	0/10
Thorium-232	Qbt 3	23	23	1.61 to 2.42	2.52	0/23
Thorium-232	Soil	9	9	1.2 to 1.77	2.33	0/9
Tritium	Fill	13	12	[-0.462] to 0.93	n/a	0/3
Tritium	Qbo	1	1	0.19 to 0.19	n/a	1/1
Tritium	Qbt 1v	2	2	0.065 to 0.27	n/a	2/2
Tritium	Qbt 2	12	0	[-1.98 to 0.833]	n/a	0/12
Tritium	Qbt 3	91	59	[-3.24 to 2.78]	n/a	59/91
Tritium	Qct	2	2	0.212 to 0.288	n/a	2/2
Tritium	Sediment	9	8	[0.0058] to 0.257	0.093	5/9
Tritium	Soil	79	71	[-1.29] to 8.11	n/a	71/79
Uranium-234	Fill	13	13	0.549 to 22.5	2.59	3/13
Uranium-234	Qbo	1	1	2.08 to 2.08	4	0/1
Uranium-234	Qbt 1v	2	2	2.66 to 2.67	3.12	0/2
Uranium-234	Qbt 2	12	12	1.35 to 2.64	1.98	1/12
Uranium-234	Qbt 3	91	91	0.575 to 11.49	1.98	11/91
Uranium-234	Qct	2	2	2.46 to 4.49	4	1/2
Uranium-234	Sediment	2	2	0.978 to 1.249	2.59	0/2
Uranium-234	Soil	28	28	0.766 to 20.3	2.59	3/28
Uranium-235	Fill	13	10	[0.022 to 1.45]	0.2	3/13
Uranium-235	Qbo	1	1	0.142 to 0.142	0.18	0/1
Uranium-235	Qbt 1v	2	2	0.148 to 0.211	0.14	2/2
Uranium-235	Qbt 2	12	9	[0.0755] to 0.188	0.09	9/12
Uranium-235	Qbt 3	91	80	0.0232 to 0.565	0.09	28/91

Table B-2.2-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range[a] (pCi/g)	BV (pCi/g)	Frequency of Detects above BV
Uranium-235	Qct	2	2	0.184 to 0.262	0.18	2/2
Uranium-235	Sediment	2	2	0.073 to 0.083	0.2	0/2
Uranium-235	Soil	57	24	0.025 to 1.34	0.2	3/57
Uranium-238	Fill	13	13	0.433 to 1.69	2.29	0/13
Uranium-238	Qbo	1	1	2.19 to 2.19	3.9	0/1
Uranium-238	Qbt 1v	2	2	2.78 to 3.01	3.05	0/2
Uranium-238	Qbt 2	12	12	1.21 to 2.34	1.93	1/12
Uranium-238	Qbt 3	91	91	0.579 to 1.67	1.93	0/91
Uranium-238	Qct	2	2	2.87 to 4.46	3.9	1/2
Uranium-238	Sediment	2	2	0.799 to 0.802	2.29	0/2
Uranium-238	Soil	28	28	0.682 to 1.88	2.29	0/28

Note: BVs from LANL 1998, 59730.

[a] Brackets indicate a nondetected concentration.

[b] n/a= Not applicable.

Table B-2.2-2
Radionuclides above BVs/FVs in Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAA0191	21-01178	0.00–0.08	Soil	—[d]	—	0.044	0.664 (J)	—	—	—	—	—	—	—
AAA0192	21-01178	0.00–0.50	Soil	—	—	—	0.593 (J)	—	—	—	—	—	—	—
AAA0193	21-01184	0.00–0.08	Soil	0.105	—	—	1.268 (J)	—	—	—	—	—	—	—
AAA0194	21-01184	0.00–0.50	Soil	0.031	—	—	0.603 (J)	—	—	—	—	—	—	—
AAA0195	21-01192	0.00–0.08	Soil	0.267	—	0.037	3.095 (J)	—	—	—	—	—	—	—
AAA0196	21-01192	0.00–0.50	Soil	—	—	—	0.815 (J)	—	—	—	—	—	—	—
AAA0197	21-01193	0.00–0.08	Soil	—	—	—	0.185 (J)	—	—	—	—	—	—	—
AAA0395	21-01183	0.00–0.08	Soil	—	—	0.024 (J)	—	—	—	—	—	—	—	—
AAA7519	21-01863	0.00–0.25	Soil	—	—	—	0.1676	—	—	—	—	0.433	—	—
AAA7520	21-01863	0.25–0.50	Soil	—	—	—	0.0821	—	—	—	—	0.243	—	—
AAA7521	21-01863	0.50–1.00	Soil	—	—	—	0.149	—	—	—	—	0.181	—	—
AAA7522	21-01864	0.00–0.25	Soil	—	—	—	0.126	—	—	—	—	0.672	—	—
AAA7523	21-01864	0.25–0.50	Soil	—	—	—	0.1101	—	—	—	—	0.502	—	—
AAA7524	21-01864	0.50–1.00	Soil	—	—	—	0.1472	—	—	1.34	—	8.1E-02	—	—
AAB9750	21-02059	0.00–0.50	Soil	—	—	—	1.48	—	—	—	—	0.618	—	—
AAB9751	21-02060	0.00–0.50	Soil	—	—	—	0.152	—	—	—	—	0.381	—	—
AAB9752	21-02061	0.00–0.50	Soil	—	—	—	0.272	—	—	—	—	0.256	—	—
AAB9753	21-02062	0.00–0.50	Soil	—	—	—	0.164	—	—	—	—	0.858	—	—
AAB9754	21-02063	0.00–0.50	Soil	—	1.66	—	1.45	—	—	—	—	1.104	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	2.779	—	—	—	—	—	—	1.31	—	—
AAB9756	21-02065	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.022	—	—

Table B-2.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9757	21-02066	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.413	—	—
AAB9758	21-02067	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.112	—	—
AAB9759	21-02068	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.209	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—	—	—	—	0.75	—	—
AAB9761	21-02070	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.12	—	—
AAB9762	21-02071	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.635	—	—
AAB9763	21-02072	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.375	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.264	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.441	—	—
AAB9766	21-02075	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.328	—	—
AAB9767	21-02076	0.00–0.50	Soil	—	—	—	0.793	—	—	—	—	0.315	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.271	—	—
AAB9769	21-02078	0.00–0.50	Soil	—	—	—	0.1436	—	—	—	—	0.163	—	—
AAB9770	21-02079	0.00–0.50	Soil	—	—	—	0.8038	—	—	—	—	0.191	—	—
AAB9771	21-02080	0.00–0.50	Soil	—	—	—	0.1797	—	—	—	—	0.277	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	—	0.3416	—	—	—	—	0.252	—	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	0.2373	—	—	—	—	0.392	—	—
AAB9774	21-02083	0.00–0.50	Soil	—	—	—	0.1539	—	—	—	—	1.81	—	—
MD21-01-0434	21-02083	0.00–0.50	Soil	—	—	—	—	—	—	—	—	7.08	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	—	0.2227	—	—	—	—	0.285	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	0.0282	0.7926 (J)	—	—	—	—	1.491	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	0.1243	—	—	—	—	0.376 (J-)	—	—
AAB9778	21-02087	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.243	—	—

Table B-2.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9779	21-02088	0.00–0.50	Soil	—	—	—	0.1176 (J)	—	—	—	—	0.639	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	0.0253 (J)	0.1829	—	—	—	—	0.733	—	—
AAB9781	21-02090	0.00–0.25	Soil	—	—	—	0.2465	—	—	—	—	0.191	—	—
AAB9782	21-02091	0.00–0.50	Soil	—	—	—	0.2094 (J)	—	—	—	—	0.396	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	—	0.1806 (J)	—	—	—	—	0.271	—	—
AAB9784	21-02093	0.00–0.50	Soil	0.6345	—	—	0.502	—	—	—	—	0.284 (J-)	—	—
AAB9785	21-02094	0.00–0.50	Soil	—	—	—	0.181	—	—	—	—	0.296 (J-)	—	—
AAB9786	21-02095	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.281	—	—
AAB9787	21-02096	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.417	—	—
AAB9788	21-02097	0.00–0.50	Soil	—	—	—	0.2877 (J)	—	—	—	—	0.189	—	—
AAB9789	21-02098	0.00–0.50	Soil	—	—	—	0.1951	—	—	—	—	0.270	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	0.639	—	—	—	—	3.24	—	—
MD21-01-0435	21-02099	0.00–0.50	Soil	—	—	—	—	—	—	—	—	2.42	—	—
AAB9791	21-02100	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.302 (J-)	—	—
AAB9792	21-02101	0.00–0.50	Soil	—	—	—	0.3248	—	—	—	—	0.992 (J-)	—	—
MD21-01-0436	21-02101	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.83	—	—
AAB9793	21-02102	0.00–0.50	Soil	—	—	—	0.2142 (J)	—	—	—	—	0.43	—	—
AAB9794	21-02103	0.00–0.50	Soil	—	—	0.0659	—	—	—	—	—	7.06E-02	—	—
AAB9795	21-02104	0.00–0.50	Soil	—	—	—	—	—	—	—	—	9.11E-02	—	—
AAB9796	21-02105	0.00–0.42	Soil	—	—	—	0.1788	—	—	—	—	0.251	—	—
AAB9797	21-02106	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.214	—	—
AAB9798	21-02107	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.333 (J-)	—	—
AAB9891	21-02576	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.336	—	—

Table B-2.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
AAB9888	21-02577	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.405	—	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.403	—	—
AAB9890	21-02579	0.00–0.50	Soil	—	—	—	—	—	—	—	—	0.422 (J-)	—	—
AAC0135	21-02594	0.00–0.50	Soil	—	—	—	0.0699	—	—	—	—	0.938	—	—
AAC0136	21-02595	0.00–0.50	Soil	—	—	—	0.0642	—	—	—	—	2.48	—	—
AAC0137	21-02596	0.00–0.50	Soil	—	—	—	0.238	—	—	—	—	0.590	—	—
AAC0138	21-02597	0.00–0.50	Soil	—	—	—	0.15	—	—	—	—	1.24	—	—
AAC0139	21-02598	0.00–0.50	Soil	—	—	—	0.0782	—	—	—	—	1.53	—	—
AAC0140	21-02599	0.00–0.50	Soil	—	—	—	0.0662	—	—	—	—	0.215	—	—
MD21-98-0443	21-10843	4.00–5.00	Soil	—	—	—	—	—	—	—	—	1.54	—	—
MD21-98-0484	21-10857	0.00–0.50	Soil	0.84	—	—	—	—	—	—	—	—	—	—
MD21-98-0485	21-10858	0.00–0.50	Soil	—	—	—	—	—	—	—	—	—	6.87	0.272
MD21-98-0492	21-10855	0.00–0.50	Soil	—	2.56	—	—	—	—	—	—	—	—	—
MD21-98-0500	21-10864	6.00–8.00	Fill	—	—	—	0.067	—	—	—	—	0.31	—	—
MD21-98-0501	21-10864	6.00–8.00	Fill	—	—	—	0.057	—	—	—	—	0.3	—	—
MD21-98-0502	21-10866	5.00–8.00	Fill	—	—	—	0.0511	—	—	—	—	0.93	6.68	0.317
MD21-98-0503	21-10867	5.00–8.00	Fill	—	—	—	0.23	—	—	—	—	0.72	22.5	1.229
MD21-01-0494	21-11404	3.00–3.50	Fill	—	—	—	—	—	—	—	—	0.337	—	—
MD21-01-0496	21-11406	5.00–5.00	Fill	—	0.0938	—	—	—	0.762	—	—	0.948	17.9	1.45
MD21-01-0497	21-11407	4.00–4.00	Fill	—	—	—	—	—	—	—	—	0.467	—	—
MD21-01-0498	21-11408	5.00–5.50	Fill	—	—	—	—	—	—	—	—	0.495	—	—
MD21-01-0499	21-11409	7.00–7.00	Fill	—	—	—	—	—	—	—	—	0.139	—	—
MD21-01-0501	21-11411	7.00–7.00	Fill	—	0.215	—	—	—	0.815	—	0.503	0.371	—	—

Table B-2.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223	Radon-219	Strontium-90	Thorium-227	Tritium	Uranium-234	Uranium-235
Soil BV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na[b]**	**na**	**1.31**	**na**	**na**	**2.59**	**0.2**
Industrial Screening Action Levels[c]				**180**	**23**	**240**	**210**	**na**	**na**	**1900**	**na**	**440000**	**1500**	**87**
Residential Screening Action Levels[c]				**30**	**5.6**	**37**	**33**	**na**	**na**	**5.7**	**na**	**750**	**170**	**17**
MD21-01-0502	21-11412	7.00–7.00	Fill	—	0.657	—	—	3.82	3.85	—	4.41	6.26E-02	—	—
MD21-01-0503	21-11413	7.00–7.00	Fill	—	0.0513	—	—	—	0.82	—	1.33	0.632	—	—
MD21-01-0492	21-22447	0.00–0.50	Soil	—	—	—	—	—	—	—	—	1.59	—	—
MD21-01-0493	21-22448	0.00–0.50	Soil	—	—	—	—	—	—	—	—	8.11	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	0.0838	—	—	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	0.0404	—	—	0.169	—	—	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	0.137	—	—	—	—	—	20.3	1.34
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	0.157	—	—	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	0.164	—	—	—	—	—	3.9	0.29
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	0.108	—	—	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	0.746	—	—	—	—	—	—	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] na = Not available.

[c] SALs from LANL 2005, 88493.

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

Table B-2.2-3
Radionuclides above BVs/FVs in Sediment at MDA U

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238	Plutonium-239	Tritium
Sediment BV[a]				**0.006**	**0.068**	**0.093**
Industrial Screening Action Levels[b]				**240**	**210**	**440000**
Residential Screening Action Levels[b]				**37**	**33**	**750**
AAA7525	21-01865	0.00–0.25	Sediment	0.0221	0.3715	0.171
AAA7526	21-01865	0.25–0.50	Sediment	—[c]	0.2323	—
AAA7527	21-01865	0.50–1.00	Sediment	2.516	4.136	—
AAB7281	21-02570	0.00–0.25	Sediment	—	0.2066	0.129
AAB7282	21-02570	0.25–0.50	Sediment	—	0.1193	0.126
AAB7283	21-02570	0.50–1.00	Sediment	—	—	0.257
AAB7284	21-02571	0.00–0.25	Sediment	—	0.2474	9.9E-02
AAB7285	21-02571	0.25–0.50	Sediment	—	0.2337	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] SALs from LANL 2005, 88493.

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

Table B-2.2-4
Radionuclides above BVs or Detected in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0394	21-10838	0.00–5.00	Qbt 3	0.0356	—[d]	0.072	—	—	—	—	0.73	11.49	0.565	—
MD21-98-0392	21-10838	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	2.96	0.163	—
MD21-98-0395	21-10838	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.54	—	—	—
MD21-98-0393	21-10838	34.00–35.00	Qbt 3	0.046	—	0.291	—	—	—	—	0.45	—	—	—
MD21-98-0397	21-10838	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.35	—	—	—
MD21-98-0507	21-10838	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.41	6.93	0.347	—
MD21-98-0396	21-10838	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.09	2.57	0.142	—
MD21-98-0506	21-10838	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.06	—	—	—
MD21-98-0508	21-10839	2.00–3.00	Qbt 3	—	—	—	—	—	—	—	0.4	2.19	0.107	—
MD21-98-0402	21-10839	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.19	3.8	0.188	—
MD21-98-0403	21-10839	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.31	—	0.105	—
MD21-98-0405	21-10839	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.24	—	—	—
MD21-98-0406	21-10839	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.25	—	—	—
MD21-98-0509	21-10839	51.50–52.50	Qbt 3	—	—	—	—	—	—	—	0.47	2.67	0.14	—
MD21-98-0404	21-10839	59.00–60.00	Qbt 3	—	—	—	—	—	—	—	0.55	2.86	0.183	—
MD21-98-0407	21-10839	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.17	—	0.096	—
MD21-98-0412	21-10840	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.97	—	—	—
MD21-98-0414	21-10840	11.50–12.50	Qbt 3	—	—	—	—	—	—	—	0.32	2.67	0.128	—
MD21-98-0413	21-10840	21.50–22.50	Qbt 3	—	—	—	—	—	—	—	0.34	—	—	—
MD21-98-0415	21-10840	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.2	—	—	—

Table B-2.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0417	21-10840	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-98-0416	21-10840	46.50–47.50	Qbt 3	—	—	—	—	—	—	—	0.12	—	—	—
MD21-98-0422	21-10840	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.12	—	—	—
MD21-98-0511	21-10840	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.17	—	—	—
MD21-98-0423	21-10841	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.64	—	—	—
MD21-98-0425	21-10841	11.50–12.50	Qbt 3	—	—	—	—	—	—	—	0.99	2.01	0.107	—
MD21-98-0424	21-10841	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	1.85	—	—	—
MD21-98-0426	21-10841	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	2.37	—	—	—
MD21-98-0428	21-10841	44.00–45.00	Qbt 3	0.033	—	—	—	—	—	—	1.25	—	—	—
MD21-98-0513	21-10841	54.00–55.00	Qbt 3	0.04	—	—	2.3	—	2.33	—	2	—	—	—
MD21-98-0427	21-10841	56.50–57.50	Qbt 3	—	—	—	—	—	—	—	1.84	—	—	—
MD21-98-0512	21-10841	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.95	—	—	—
MD21-98-0433	21-10842	4.00–5.00	Qbt 3	—	—	—	—	—	—	—	0.35	—	—	—
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.14	—	—	—
MD21-98-0434	21-10842	24.00–25.00	Qbt 3	0.0288	—	—	—	—	—	—	0.1	—	—	—
MD21-98-0438	21-10842	26.50–27.50	Qbt 3	0.0286	—	—	—	—	—	—	0.07	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.15	—	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	0.4	—	—	—
MD21-98-0515	21-10842	71.50–72.50	Qbt 3	—	—	—	—	—	—	—	0.19	—	—	—
MD21-98-0445	21-10843	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.2	—	—	—
MD21-98-0444	21-10843	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.31	—	—	—

Table B-2.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na[b]**	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-98-0446	21-10843	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.42	—	—	—
MD21-98-0447	21-10843	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.29	—	—	—
MD21-98-0448	21-10843	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.52	—	—	—
MD21-98-0453	21-10843	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.18	—	—	—
MD21-98-0516	21-10843	72.50–75.00	Qbt 3	—	—	—	—	—	—	—	0.09	—	—	—
MD21-98-0454	21-10844	2.50–5.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-98-0456	21-10844	12.50–15.00	Qbt 3	—	0.0291	—	—	—	—	—	0.15	—	—	—
MD21-98-0455	21-10844	24.00–25.00	Qbt 3	—	—	—	—	—	—	—	0.38	—	—	—
MD21-98-0457	21-10844	34.00–35.00	Qbt 3	—	—	—	—	—	—	—	0.45	—	—	—
MD21-98-0458	21-10844	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.36	—	—	—
MD21-98-0459	21-10844	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.25	—	—	—
MD21-98-0464	21-10844	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.32	—	—	—
MD21-98-0519	21-10844	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.4	—	—	—
MD21-98-0468	21-10845	4.00–5.00	Qbt 3	—	—	0.07	—	—	—	—	0.84	3.02	0.244	—
MD21-98-0470	21-10845	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	0.24	—	—	—
MD21-98-0472	21-10845	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.09	—	—	—
MD21-98-0473	21-10845	54.00–55.00	Qbt 3	—	—	—	—	—	—	—	0.16	—	—	—
MD21-98-0520	21-10845	64.00–65.00	Qbt 3	—	—	—	—	—	—	—	0.15	—	—	—
MD21-98-0521	21-10845	74.00–75.00	Qbt 3	—	—	—	—	—	—	—	0.11	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	—	0.119	—	—	—	—	—	—	—	—
MD21-05-60978	21-24772	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.109	—

Table B-2.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-05-60979	21-24772	23.00–25.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.0901	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.133	—
MD21-05-62679	21-24772	148.00–150.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.142	—
MD21-05-62680	21-24772	170.00–172.00	Qbt 2	—	—	—	—	—	—	—	—	2.64	0.188	2.34
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	—	—	6.5E-02	—	0.211	—
MD21-05-62682	21-24772	228.00–230.00	Qbt 1v	—	—	—	—	—	—	—	0.27	—	0.148	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	—	—	0.212	4.49	0.262	4.46
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	—	—	0.288	—	0.184	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	—	—	0.19	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.104	—
MD21-05-61012	21-24774	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.098	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.122	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.142	—
MD21-05-61020	21-24775	18.00–20.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.108	—
MD21-05-61021	21-24775	92.00–94.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.123	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.14	—
MD21-05-61027	21-24776	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.109	—
MD21-05-61028	21-24776	21.00–23.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.129	—
MD21-05-61029	21-24776	92.00–94.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.119	—
MD21-05-61030	21-24776	118.00–120.00	Qbt 2	—	—	—	—	—	—	2.7	—	—	0.16	—
MD21-05-61036	21-24777	73.00–75.00	Qbt 3	—	—	—	—	—	—	2.61	—	—	0.169	—

Table B-2.2-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Plutonium-238	Plutonium-239	Radium-223	Strontium-90	Thorium-227	Thorium-228	Tritium	Uranium-234	Uranium-235	Uranium-238
Qbt 2,3,4 BV[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**	**2.52**	**na**	**1.98**	**0.09**	**1.93**
Qbt 1v BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3.75**	**na**	**3.12**	**0.14**	**3.05**
Qbt 1g, Qct, Qbo BV[a]				**na**	**na**	**na**	**na**	**na**	**na**	**4.9**	**na**	**4**	**0.18**	**3.9**
Industrial Screening Action Levels[c]				**180**	**240**	**210**	**na**	**1900**	**na**	**9.0**	**440000**	**1500**	**87**	**430**
Residential Screening Action Levels[c]				**30**	**37**	**33**	**na**	**5.7**	**na**	**5.0**	**750**	**170**	**17**	**86**
MD21-05-61037	21-24777	93.00–95.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.128	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.124	—
MD21-05-61043	21-24778	11.00–13.00	Qbt 3	—	—	—	—	0.847	—	—	—	—	—	—
MD21-05-61045	21-24778	48.00–50.00	Qbt 3	—	—	—	—	0.312	—	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.123	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	2.62	—	—	—	—
MD21-05-61053	21-24779	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.0995	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.119	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—	—	0.0908	—
MD21-05-61060	21-24780	63.00–65.00	Qbt 3	—	—	—	—	—	—	—	—	—	0.147	—

Note: Units are pCi/g.

[a] BVs from LANL 1998, 59730.

[b] na = Not available.

[c] SALs from LANL 2005, 88493.

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

Table B-2.3-1
Frequency of Detected Organic Chemicals at MDA U

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range* (mg/kg)	Frequency of Detects
Acenaphthene	Sediment	9	1	0.25 to [0.46]	1/9
Acenaphthene	Soil	73	3	[0.0336 to 0.46]	3/73
Acetone	Qbt 2	12	3	0.003 to [0.0066]	3/12
Acetone	Qbt 3	29	7	0.0038 to [0.029]	7/29
Anthracene	Sediment	9	1	[0.34] to [0.46]	1/9
Anthracene	Soil	73	4	[0.0336] to 0.88	4/73
Aroclor-1242	Qbt 2	12	1	[0.0033] to 0.0064	1/12
Aroclor-1242	Qbt 3	44	1	[0.0034] to [0.027]	1/44
Aroclor-1242	Soil	27	1	[0.0034] to [0.034]	1/27
Aroclor-1254	Qbt 1v	2	1	0.0026 to [0.0036]	1/2
Aroclor-1254	Qbt 2	12	1	[0.0033] to [0.0063]	1/12
Aroclor-1254	Soil	27	3	[0.0034] to [0.037]	3/27
Aroclor-1260	Qbt 3	44	1	[0.0021] to [0.036]	1/44
Aroclor-1260	Soil	27	2	0.0019 to [0.037]	2/27
Benzene	Qbt 2	12	1	0.00074 to [0.0014]	1/12
Benzo(a)anthracene	Sediment	9	1	[0.34] to [0.46]	1/9
Benzo(a)anthracene	Soil	73	5	0.0155 to 0.66	5/73
Benzo(a)pyrene	Sediment	9	1	[0.34] to [0.46]	1/9
Benzo(a)pyrene	Soil	73	6	[0.0336] to 0.81	6/73
Benzo(b)fluoranthene	Sediment	9	1	[0.34] to [0.46]	1/9
Benzo(b)fluoranthene	Soil	73	7	[0.0183] to 0.61	7/73
Benzo(g,h,i)perylene	Sediment	9	1	0.3 to [0.46]	1/9
Benzo(g,h,i)perylene	Soil	73	4	[0.0336] to 0.62	4/73
Benzo(k)fluoranthene	Sediment	9	1	0.26 to [0.46]	1/9
Benzo(k)fluoranthene	Soil	73	6	[0.0336] to 0.72	6/73
Benzoic Acid	Qbo	1	1	0.437 to 0.437	1/1

Table B-2.3-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range* (mg/kg)	Frequency of Detects
Benzoic Acid	Qct	2	2	0.501 to 0.506	2/2
Benzoic Acid	Soil	74	2	[0.672] to [3.7]	2/74
Butanone[2-]	Qbt 3	29	1	0.0022 to [0.029]	1/29
Butylbenzylphthalate	Sediment	9	1	[0.34] to [0.46]	1/9
Butylbenzylphthalate	Soil	73	2	0.1 to [1.36]	2/73
Chrysene	Sediment	9	1	[0.34] to [0.46]	1/9
Chrysene	Soil	73	7	[0.0135] to 0.73	7/73
Dibenz(a,h)anthracene	Soil	73	2	[0.0336] to [0.46]	2/73
Dibenzofuran	Sediment	9	1	0.12 to [0.46]	1/9
Dibenzofuran	Soil	73	2	0.078 to [1.36]	2/73
Dichlorobenzidine[3,3'-]	Sediment	9	1	[0.34] to [0.46]	1/9
Diethylphthalate	Soil	73	1	[0.336] to 8.1	1/73
Di-n-butylphthalate	Qbt 3	91	3	[0.33] to 0.44	3/91
Fluoranthene	Fill	1	1	0.0118 to 0.0118	1/1
Fluoranthene	Sediment	9	1	[0.34] to 1.4	1/9
Fluoranthene	Soil	73	15	0.0157 to 2.9	15/73
Fluorene	Sediment	9	1	0.21 to [0.46]	1/9
Fluorene	Soil	73	3	[0.0336] to [0.46]	3/73
Indeno(1,2,3-cd)pyrene	Sediment	9	1	0.32 to [0.46]	1/9
Indeno(1,2,3-cd)pyrene	Soil	73	4	[0.0336] to 0.56	4/73
Isopropyltoluene[4-]	Qbt 3	29	1	0.00037 to [0.0058]	1/29
Methyl-2-pentanone[4-]	Qbt 2	12	1	[0.0013] to [0.007]	1/12
Methyl-2-pentanone[4-]	Qbt 3	29	1	0.0029 to [0.029]	1/29
Methylnaphthalene[2-]	Soil	73	1	[0.0336] to [0.46]	1/73
Methylphenol[4-]	Soil	74	1	0.11 to [1.36]	1/74
Naphthalene	Sediment	9	1	0.13 to [0.46]	1/9

Table B-2.3-1 (continued)

Analyte	Media	Number of Analyses	Number of Detects	Concentration Range* (mg/kg)	Frequency of Detects
Naphthalene	Soil	73	1	[0.0336] to [0.46]	1/73
Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Qbt 3	2	1	[2.01E-07] to 3.46E-07	1/2
Phenanthrene	Sediment	9	1	[0.34] to 1.5	1/9
Phenanthrene	Soil	73	11	0.0158 to 2.9	11/73
Pyrene	Fill	1	1	0.011 to 0.011	1/1
Pyrene	Qbt 3	91	1	0.0155 to [0.39]	1/91
Pyrene	Sediment	9	1	[0.34] to 0.99	1/9
Pyrene	Soil	73	15	0.0134 to 1.8	15/73
Pyridine	Soil	8	1	0.0781 to [1.36]	1/8
Toluene	Qbt 2	12	1	0.00064 to [0.0014]	1/12
Toluene	Qbt 3	29	2	0.00033 to [0.0058]	2/29
Trichloro-1,2,2-trifluoroethane[1,1,2-]	Qct	2	1	0.0014 to [0.0056]	1/2
Trimethylbenzene[1,2,4-]	Qbt 2	12	1	0.00063 to [0.0014]	1/12
Xylene[1,3-]+Xylene[1,4-]	Qbt 2	12	1	0.00049 to [0.0028]	1/12
Xylene[1,3-]+Xylene[1,4-]	Qbt 3	29	1	0.00057 to [0.0116]	1/29

*Brackets indicate a nondetected concentration.

Table B-2.3-2
Detected Organic Chemicals in Surface Soil and Fill at MDA U

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260
Industrial Soil Screening Levels[a]				**31.9[b]**	**1.93[b]**	**8.26**	**8.26**	**8.26**
Residential Soil Screening Levels[a]				**31.9[b]**	**1.93[b]**	**1.12**	**1.12**	**1.12**
AAB9752	21-02061	0.00–0.50	Soil	0.11 (J)	0.17 (J)	—	—	—
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	0.45	0.88	—	—	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	0.077 (J)	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	—	—
AAB9889	21-02578	0.00–0.50	Soil	0.18 (J)	0.3 (J)	—	—	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—[c]	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	0.0115 (J-)	0.0058 (J-)
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	0.006 (J)	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	0.0078	0.0062	0.0019 (J)
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	—	—

Table B-2.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene
Industrial Soil Screening Levels[a]				**23.4**	**2.34**	**23.4**	**21.3[b,d]**	**234**
Residential Soil Screening Levels[a]				**6.21**	**0.621**	**6.21**	**21.3[b,d]**	**61.2**
AAB9752	21-02061	0.00–0.50	Soil	0.21 (J)	0.22 (J)	0.18 (J)	0.18 (J)	0.17 (J)
AAB9755	21-02064	0.00–0.50	Soil	—	—	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	0.66	0.81	0.61	0.62	0.72
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	0.091 (J)	0.12 (J)	0.081 (J)	0.086 (J)	0.11 (J)
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	0.13 (J)	0.091 (J)	—	0.11 (J)
AAB9790	21-02099	0.00–0.50	Soil	—	0.15 (J)	0.44	0.12 (J)	0.36 (J)
AAB9889	21-02578	0.00–0.50	Soil	0.42	0.47	0.43	—	0.35 (J)
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	0.0155 (J)	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	0.0237 (J)	—	—

Table B-2.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Benzoic Acid	Butylbenzylphthalate	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran
Industrial Soil Screening Levels[a]				**100000**[e]	**240**[b,e]	**0.955**[b]	**2.34**	**36.1**[b]
Residential Soil Screening Levels[a]				**100000**[e]	**240**[b,e]	**0.955**[b]	**0.621**	**36.1**[b]
AAB9752	21-02061	0.00–0.50	Soil	—	—	0.2 (J)	0.12 (J)	—
AAB9755	21-02064	0.00–0.50	Soil	1.6 (J)	—	0.1 (J)	—	—
AAB9760	21-02069	0.00–0.25	Soil	0.85 (J)	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	0.1 (J)	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	0.14 (J)	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	—	0.73	0.17 (J)	0.2 (J)
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	0.091 (J)	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	0.12 (J)	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	0.19 (J)	—	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	0.4	—	0.078 (J)
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	—	—

Table B-2.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Diethylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]
Industrial Soil Screening Levels[a]				**100000[e]**	**24400**	**39.7[b]**	**23.4**	**92.5[f]**
Residential Soil Screening Levels[a]				**49000[e]**	**2290**	**39.7[b]**	**6.21**	**25.2[f]**
AAB9752	21-02061	0.00–0.50	Soil	—	0.74	0.081 (J)	0.19 (J)	—
AAB9755	21-02064	0.00–0.50	Soil	—	0.23 (J)	—	—	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	8.1	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	2.9	0.42	0.56	0.095 (J)
AAB9773	21-02082	0.00–0.50	Soil	—	0.1 (J)	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	0.36 (J)	—	—	—
AAB9776	21-02085	0.00–0.50	Soil	—	0.23 (J)	—	—	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	—	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	0.11 (J)	—	—	—
AAB9783	21-02092	0.00–0.50	Soil	—	0.33 (J)	—	—	—
AAB9790	21-02099	0.00–0.50	Soil	—	0.22 (J)	—	0.13 (J)	—
AAB9889	21-02578	0.00–0.50	Soil	—	1.3	0.18 (J)	0.29 (J)	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	0.0118 (J)	—	—	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	0.0252 (J-)	—	—	—
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	0.0157 (J)	—	—	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	0.0618 (J)	—	—	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	0.0245 (J)	—	—	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	0.0211 (J)	—	—	—

Table B-2.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	Pyridine
Industrial Soil Screening Levels[a]				**10000**[e]	**92.5**	**20500**	**21.3**[b]	**2000**[e]
Residential Soil Screening Levels[a]				**310**[e]	**25.2**	**1830**	**21.3**[b]	**61**[e]
AAB9752	21-02061	0.00–0.50	Soil	—	—	0.65	0.54	—
AAB9755	21-02064	0.00–0.50	Soil	0.11 (J)	—	0.12 (J)	0.17 (J)	—
AAB9760	21-02069	0.00–0.25	Soil	—	—	—	—	—
AAB9764	21-02073	0.00–0.50	Soil	—	—	—	—	—
AAB9765	21-02074	0.00–0.50	Soil	—	—	—	—	—
AAB9768	21-02077	0.00–0.50	Soil	—	—	—	—	—
AAB9772	21-02081	0.00–0.50	Soil	—	0.25 (J)	2.9	1.8	—
AAB9773	21-02082	0.00–0.50	Soil	—	—	—	—	—
AAB9775	21-02084	0.00–0.50	Soil	—	—	0.3 (J)	0.21 (J)	—
AAB9776	21-02085	0.00–0.50	Soil	—	—	0.14 (J)	0.16 (J)	—
AAB9777	21-02086	0.00–0.50	Soil	—	—	0.08 (J)	—	—
AAB9780	21-02089	0.00–0.50	Soil	—	—	—	0.086 (J)	—
AAB9783	21-02092	0.00–0.50	Soil	—	—	0.18 (J)	0.26 (J)	—
AAB9790	21-02099	0.00–0.50	Soil	—	—	—	0.15 (J)	—
AAB9889	21-02578	0.00–0.50	Soil	—	—	1.3	0.98	—
MD21-05-60922	21-24772	0.00–0.50	Fill	—	—	—	0.011 (J)	—
MD21-05-61010	21-24774	0.00–0.50	Soil	—	—	—	0.0227 (J-)	0.0781 (J)
MD21-05-61018	21-24775	0.00–0.50	Soil	—	—	0.0161 (J)	0.0399	—
MD21-05-61026	21-24776	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61034	21-24777	0.00–0.50	Soil	—	—	—	0.0169 (J)	—
MD21-05-61042	21-24778	0.00–0.50	Soil	—	—	0.0575 (J)	0.0685 (J)	—
MD21-05-61050	21-24779	0.00–0.50	Soil	—	—	0.0158 (J)	0.0235 (J)	—
MD21-05-61058	21-24780	0.00–0.50	Soil	—	—	—	—	—
MD21-05-61066	21-24781	0.00–0.50	Soil	—	—	—	0.0134 (J)	—

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] — = Not detected.

[d] Pyrene used as a surrogate based on structural similarity.

[e] Values from EPA Region 6 (EPA 2005, 91002).

[f] Naphthalene used as a surrogate based on structural similarity.

Table B-2.3-3
Detected Organic Chemicals in Sediment at MDA U

Part 1

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Butylbenzylphthalate	Chrysene
Industrial Soil Screening Levels[a]				**31.9**[b]	**1.93**[b]	**23.4**	**2.34**	**23.4**	**21.3**[b]	**234**	**240**[b,c]	**0.955**[b]
Residential Soil Screening Levels[a]				**31.9**[b]	**1.93**[b]	**6.21**	**0.621**	**6.21**	**21.3**[b]	**62.1**	**240**[b,c]	**0.955**[b]
AAA7526	21-01865	0.25–0.50	Sediment	—[d]	—	—	—	—	—	—	0.36	—
AAB7285	21-02571	0.25–0.50	Sediment	0.25 (J)	0.4	0.44	0.43	0.35	0.3 (J)	0.26 (J)	—	0.45

Part 2

Sample ID	Location ID	Depth (ft)	Media	Dibenzofuran	Dichlorobenzidine[3,3'-]	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Industrial Soil Screening Levels[a]				**36.1**[b]	**42.6**	**24400**	**39.7**[b]	**23.4**	**92.5**	**20500**	**21.3**[b]
Residential Soil Screening Levels[a]				**36.1**[b]	**10.8**	**2290**	**39.7**[b]	**6.21**	**25.2**	**1830**	**21.3**[b]
AAA7526	21-01865	0.25–0.50	Sediment	—	0.36	—	—	—	—	—	—
AAB7285	21-02571	0.25–0.50	Sediment	0.12 (J)	—	1.4	0.21 (J)	0.32 (J)	0.13 (J)	1.5	0.99

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] Value from EPA Region 6 (EPA 2005, 91002).

[d] — = Not detected.

Table B-2.3-4
Detected Organic Chemicals in Tuff at MDA U

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzene	Benzoic Acid	Butanone[2-]	Di-n-butylphthalate
Industrial Soil Screening Levels[a]				**53000**	**8.26**	**8.26**	**8.26**	**8.08**	**100000[b]**	**48,700[b]**	**68400**
Residential Soil Screening Levels[a]				**12600**	**1.12**	**1.12**	**1.12**	**3.32**	**100000[b]**	**31,800[b]**	**6110**
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—[c]	—	—	—	—	—	—	0.36
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	0.38
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	0.44
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	0.0038 (J)	—	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	0.0026 (J)	—	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	0.506 (J)	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	0.501 (J)	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	0.437 (J)	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	0.0046 (J)	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	0.0092	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	0.0037 (J)	—	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	0.00074 (J)	—	—	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	0.0048	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	0.0049 (J)	0.0064 (J)	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	0.0057 (J)	—	—	—	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	0.0133	—	—	—	—	—	0.0022 (J)	—
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	0.0055 (J)	—	—	—	—	—	—	—
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	0.0057 (J)	0.0074	—	0.0022 (J)	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	0.003 (J)	—	—	—	—	—	—	—

Table B-2.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Pyrene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Industrial Soil Screening Levels[a]				**34.1**[d]	**7010**	**na**[e]	**21.3**[d]	**252**[d]	**3280**[d]	**64.5**	**133**[d]
Residential Soil Screening Levels[a]				**34.1**[d]	**4360**	**na**	**21.3**[d]	**252**[d]	**3280**[d]	**17.7**	**102**
MD21-98-0435	21-10842	14.00–15.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44.00–45.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-98-0437	21-10842	49.00–50.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-60977	21-24772	8.00–10.00	Qbt 3	—	0.0029 (J)	—	—	—	—	—	—
MD21-05-62678	21-24772	97.00–99.00	Qbt 3	—	—	—	—	0.00037 (J)	—	—	0.00057 (J)
MD21-05-62681	21-24772	225.00–227.00	Qbt 1v	—	—	—	—	—	—	—	—
MD21-05-62956	21-24772	333.00–335.00	Qct	—	—	—	—	—	0.0014 (J)	—	—
MD21-05-62957	21-24772	338.00–340.00	Qct	—	—	—	—	—	—	—	—
MD21-05-62958	21-24772	358.00–360.00	Qbo	—	—	—	—	—	—	—	—
MD21-05-61011	21-24774	10.00–12.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61013	21-24774	98.00–100.00	Qbt 3	—	—	—	—	0.00033 (J)	—	—	—
MD21-05-61023	21-24775	13.00–15.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61022	21-24775	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61038	21-24777	118.00–120.00	Qbt 2	—	—	—	—	—	—	0.00063 (J)	—
MD21-05-61047	21-24778	118.00–120.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61051	21-24779	10.00–12.00	Qbt 3	—	—	—	0.0155 (J)	—	—	—	—
MD21-05-61052	21-24779	67.00–69.00	Qbt 3	—	—	3.46E-07 (J)	—	—	—	—	—
MD21-05-61054	21-24779	94.00–96.00	Qbt 2	—	—	—	—	—	—	—	—
MD21-05-61055	21-24779	117.00–119.00	Qbt 2	—	0.0021 (J)	—	—	—	—	—	—
MD21-05-61059	21-24780	3.00–5.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61067	21-24781	18.00–20.00	Qbt 3	0.00037 (J)	—	—	—	—	—	—	—

Table B-2.3-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	Methyl-2-pentanone[4-]	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Pyrene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Industrial Soil Screening Levels[a]				**34.1**[d]	**7010**	**na**[e]	**21.3**[d]	**252**[d]	**3280**[d]	**64.5**	**133**[d]
Residential Soil Screening Levels[a]				**34.1**[d]	**4360**	**na**	**21.3**[d]	**252**[d]	**3280**[d]	**17.7**	**102**
MD21-05-61068	21-24781	72.00–74.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61069	21-24781	98.00–100.00	Qbt 3	—	—	—	—	—	—	—	—
MD21-05-61070	21-24781	118.00–120.00	Qbt 2	—	—	—	—	0.00064 (J)	—	—	0.00049 (J)

Note: Units are mg/kg.

[a] SSLs from NMED 2005, 90802, unless otherwise noted.

[b] Values are Csat, not risk-based.

[c] — = Not detected.

[d] Value from EPA Region 6 (EPA 2005, 91002).

[e] na = Not available.

Table B-2.4-1
Samples Collected for Pore-Gas Analyses at MDA U

Sample ID	Location ID	Depth (ft)	Sample Type Code	VOCs	Tritium
MD21-98-0398	21-10838	25–25	INV[a]	4724R	—[b]
MD21-98-0399	21-10838	55–55	INV	4724R	—
MD21-98-0400	21-10838	75–75	INV	4713R	—
MD21-98-0408	21-10839	25–25	INV	4743R	—
MD21-98-0409	21-10839	55–55	INV	4743R	—
MD21-98-0410	21-10839	75–75	INV	4764R	—
MD21-98-0418	21-10840	25–25	INV	4788R	—
MD21-98-0419	21-10840	55–55	INV	4796R	—
MD21-98-0420	21-10840	75–75	INV	4796R	—
MD21-98-0429	21-10841	25–25	INV	4826R	—
MD21-98-0430	21-10841	55–55	INV	4826R	—
MD21-98-0431	21-10841	75–75	INV	4826R	—
MD21-98-0439	21-10842	25–25	INV	4859R	—
MD21-98-0440	21-10842	55–55	INV	4859R	—
MD21-98-0441	21-10842	75–75	INV	4859R	—
MD21-98-0449	21-10843	25–25	INV	4879R	—
MD21-98-0450	21-10843	55–55	INV	4879R	—
MD21-98-0451	21-10843	75–75	INV	4884R	—
MD21-98-0460	21-10844	25–25	INV	4903R	—
MD21-98-0461	21-10844	55–55	INV	4903R	—
MD21-98-0462	21-10844	75–75	INV	4903R	—
MD21-98-0474	21-10845	25–25	INV	4914R	—
MD21-98-0475	21-10845	55–55	INV	4914R	—
MD21-98-0476	21-10845	75–75	INV	4914R	—
MD21-98-0477	21-10845	75–75	FD[c]	4914R	—
MD21-05-63502	21-24772	12–13	INV	4004S	4005S
MD21-05-63501	21-24772	293–294	INV	4004S	4005S
MD21-06-72590	21-24772	360–361	INV	5554S	5556S
MD21-05-63504	21-24774	19–20	INV	3967S	3968S
MD21-05-63503	21-24774	65–66	INV	3967S	3968S
MD21-06-72587	21-24774	115–116	INV	5553S	5556S
MD21-05-63506	21-24775	14–15	INV	4035S	4036S
MD21-05-63522	21-24775	14–15	FD	4035S	4036S
MD21-05-63505	21-24775	79–80	INV	4035S	4036S
MD21-06-72588	21-24775	119–120	INV	5555S	5556S
MD21-05-63508	21-24776	4–5	INV	3987S	3988S
MD21-05-63507	21-24776	95–96	INV	3967S	3968S

Table B-2.4-1 (continued)

Sample ID	Location ID	Depth (ft)	Sample Type Code	VOCs	Tritium
MD21-06-72589	21-24776	119–120	INV	5555S	5556S
MD21-05-63510	21-24777	4–5	INV	3987S	3988S
MD21-05-63509	21-24777	85–86	INV	3987S	3988S
MD21-06-72591	21-24777	119–120	INV	5555S	5556S
MD21-05-63512	21-24778	13–14	INV	3967S	3968S
MD21-05-63511	21-24778	87–88	INV	3967S	3968S
MD21-06-72592	21-24778	119–120	INV	5555S	5556S
MD21-05-63514	21-24779	11–12	INV	4035S	4036S
MD21-05-63513	21-24779	95–96	INV	4035S	4036S
MD21-06-72593	21-24779	119–120	INV	5555S	5556S
MD21-05-63521	21-24780	4–5	INV	4035S	4036S
MD21-05-63515	21-24780	49–50	INV	—	4005S
MD21-05-63516	21-24780	49–50	INV	4004S	4005S
MD21-06-63896	21-24780	49–50	INV	4051S	—
MD21-06-72594	21-24780	119–120	INV	5553S	5556S
MD21-05-63518	21-24781	19–20	INV	3967S	3968S
MD21-05-63517	21-24781	91.5–92.5	INV	3967S	3968S
MD21-06-72595	21-24781	119–120	INV	5553S	5556S
MD21-06-72596	21-24781	119–120	FD	5553S	5556S

Note: Numbers in analytical suite columns are analytical request numbers.

[a] INV = Investigation sample.

[b] — = Analysis not requested for this sample.

[c] FD= Field duplicate.

Table B-2.4-2
Frequency of Detected VOC and Tritium Concentrations in Pore Gas at MDA U

Analyte	Number of Analyses	Number of Detects	Concentration Range* (μg/m^3)
Ethylbenzene	52	10	1.2 to 78.1
Styrene	52	21	0.67 to 400
Butadiene[1,3-]	22	2	[1.7] to 20
Dichloroethane[1,2-]	52	1	0.74 to [21.8]
Vinyl acetate	6	2	[1.8 to 22]
Methyl-2-pentanone[4-]	28	1	[2] to 38
Trimethylbenzene[1,3,5-]	52	2	[0.82] to 83.5
Toluene	52	46	0.99 to 1810
Hexane	27	12	1.1 to 72
Cyclohexane	27	2	[1.7 to 12]
Propylene	22	3	[5.2 to 25]
Tetrachloroethene	52	8	1.3 to [36.6]
n-Heptane	22	4	[3.1 to 15]
Dichloroethene[cis-1,2-]	52	1	0.69 to [21.4]
Carbon Tetrachloride	52	4	0.65 to [34]
Hexanone[2-]	28	1	[2 to 60]
Ethyltoluene[4-]	28	6	[1 to 18]
Ethanol	22	3	[5.7] to 200
Propanol[2-]	22	1	[7.5 to 36]
Acetone	28	25	7.4 to 250
Chloroform	52	20	0.64 to 31.7
Butanol[1-]	22	2	[9.2] to 2000
Benzene	52	20	0.6 to 56
Trichloroethane[1,1,1-]	52	26	[2.84] to 131
Chloromethane	52	3	0.57 to [30]
Methylene Chloride	52	1	[1.7 to 18.7]
Carbon Disulfide	28	11	0.47 to 43
Bromodichloromethane	28	2	1.1 to [24]
Trichlorofluoromethane	52	5	1 to [30.3]
Dichlorodifluoromethane	52	13	1.6 to [26.7]
Trichloro-1,2,2-trifluoroethane[1,1,2-]	52	12	0.97 to [41.4]
Butanone[2-]	28	16	0.59 to 44
Trichloroethene	52	36	[2.69] to 156
Xylene[1,2-]	52	14	[0.8] to 126
Trimethylbenzene[1,2,4-]	52	21	0.84 to 310
Tritium (pCi/L)	28	27	[230] to 6508.876
Xylene[1,3-]+Xylene[1,4-]	51	36	2.4 to 512

Note: Units are μg/m^3, unless otherwise specified.
*Brackets indicate a nondetected concentration.

Table B-2.4-3
Detected VOCs and Tritium in Pore Gas at MDA U

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-98-0398	21-10838	25	—*	—	—	—	—	—	—	—	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	—
MD21-98-0400	21-10838	75	—	2.11	—	—	—	—	—	—	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	—	3.51	—	—	—	—	—	—	—
MD21-98-0418	21-10840	25	—	4.79	—	—	—	—	—	—	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	—	—	—	—	—	—	—	—	—
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	—	—	—	—	—	—	—
MD21-98-0440	21-10842	55	—	7.66	—	—	—	—	—	—	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	—
MD21-98-0450	21-10843	55	—	3.51	—	—	—	—	—	—	6.83
MD21-98-0451	21-10843	75	—	2.39	—	—	—	—	—	—	12.2
MD21-98-0460	21-10844	25	—	4.47	—	—	—	—	—	—	6.83
MD21-98-0461	21-10844	55	—	2.14	—	—	—	—	—	—	9.76
MD21-98-0462	21-10844	75	—	3.83	—	—	—	—	—	—	15.6

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-98-0474	21-10845	25	—	8.94	—	—	—	—	—	—	15.6
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	31.7
MD21-05-63502	21-24772	12	120	—	—	—	—	17	7.7	—	—
MD21-05-63501	21-24772	293	87	—	—	—	—	13	5.2	—	7.9
MD21-06-72590	21-24772	361	250	4.4	—	—	—	24	—	—	8.8
MD21-05-63504	21-24774	19	110	—	—	—	—	9.1	—	—	—
MD21-05-63503	21-24774	65	67	—	—	—	—	5	4.6	—	—
MD21-06-72587	21-24774	116	92	—	—	20	2000	44	43	—	—
MD21-05-63506	21-24775	14	15	56	—	—	—	—	4.4	—	—
MD21-05-63505	21-24775	79	18	—	—	—	—	—	—	—	—
MD21-06-72588	21-24775	120	55	1.9	—	—	—	—	—	—	—
MD21-05-63508	21-24776	4	26	—	—	—	—	—	—	—	—
MD21-05-63507	21-24776	95	34	—	—	—	—	—	—	—	17
MD21-06-72589	21-24776	120	150	0.81 J	1.1 J	—	—	19	0.47 J	0.84 J	3.6
MD21-05-63510	21-24777	4	25	—	—	—	—	—	—	—	4.8
MD21-05-63509	21-24777	85	33	—	—	—	—	3.8	—	—	11
MD21-06-72591	21-24777	120	7.6	9.8	—	—	—	—	6.6	1 J	6.3
MD21-05-63512	21-24778	13	42	—	—	—	—	4.6	—	—	—
MD21-05-63511	21-24778	87	47	—	—	—	—	3.4	4.7	—	7.8
MD21-06-72592	21-24778	120	7.4	4.1	4.8	—	—	0.59 J	2.9	1.3 J	9.6
MD21-05-63514	21-24779	11	36	—	—	—	—	2.9	2.9	—	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Acetone	Benzene	Bromodichloromethane	Butadiene[1,3-]	Butanol[1-]	Butanone[2-]	Carbon Disulfide	Carbon Tetrachloride	Chloroform
MD21-05-63513	21-24779	95	95	—	—	—	11	5.3	7.8	—	—
MD21-06-72593	21-24779	120	85	0.6 J	—	—	—	—	—	0.65 J	0.64 J
MD21-05-63521	21-24780	4	—	28	—	—	—	—	—	—	—
MD21-05-63516	21-24780	49	46	25	—	—	—	7.2	—	—	—
MD21-06-63896	21-24780	49	36	43	—	4.9	—	3.3	—	—	5.9
MD21-06-72594	21-24780	120	32	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	—	—	4.7
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	—	—	9.8
MD21-06-72595	21-24781	120	67	—	—	—	—	5.8	—	—	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-98-0398	21-10838	25	13.8	—	—	—	—	—	—	—	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	—
MD21-98-0400	21-10838	75	—	—	—	—	—	—	—	—	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	—	—	4.94	—	—	—	78.1	—	—
MD21-98-0418	21-10840	25	—	—	2.87	—	—	—	2.52	—	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	—	—	2.97	—	—	—	—	—	—
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	2.67	—	—	—	—	—	—
MD21-98-0440	21-10842	55	—	—	2.92	—	—	—	14.3	—	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	—
MD21-98-0450	21-10843	55	—	—	2.72	—	—	—	—	—	—
MD21-98-0451	21-10843	75	—	—	2.72	—	—	—	—	—	—
MD21-98-0460	21-10844	25	—	—	2.87	—	—	—	—	—	—
MD21-98-0461	21-10844	55	—	—	—	—	—	—	—	—	—
MD21-98-0462	21-10844	75	—	—	3.06	—	—	—	—	—	—
MD21-98-0474	21-10845	25	—	—	—	—	—	—	—	—	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	—
MD21-05-63502	21-24772	12	—	—	—	—	—	13	—	16	—
MD21-05-63501	21-24772	293	—	—	—	—	—	13	6.4	9.4	17
MD21-06-72590	21-24772	361	—	—	—	—	—	—	—	—	—
MD21-05-63504	21-24774	19	—	—	—	—	—	—	—	—	—
MD21-05-63503	21-24774	65	—	—	—	—	—	—	—	—	—
MD21-06-72587	21-24774	116	—	—	—	—	—	200	—	—	—
MD21-05-63506	21-24775	14	—	11	—	—	—	—	6.3	6.1	72
MD21-05-63505	21-24775	79	—	—	—	—	—	—	—	—	4.3
MD21-06-72588	21-24775	120	—	—	—	—	—	—	—	—	1.1 J
MD21-05-63508	21-24776	4	—	—	—	—	—	—	—	—	4.4
MD21-05-63507	21-24776	95	—	—	—	—	—	—	—	—	—
MD21-06-72589	21-24776	120	0.57 J	—	2.1 J	—	—	—	—	—	1.1 J
MD21-05-63510	21-24777	4	—	—	—	—	—	—	—	—	—
MD21-05-63509	21-24777	85	—	—	—	—	—	—	—	—	—
MD21-06-72591	21-24777	120	3	—	1.6 J	—	—	—	2.1 J	—	8.5
MD21-05-63512	21-24778	13	—	—	—	—	—	—	—	—	7.5
MD21-05-63511	21-24778	87	—	—	—	—	—	—	—	—	—
MD21-06-72592	21-24778	120	—	—	2 J	—	0.69 J	—	1.2 J	—	6.5
MD21-05-63514	21-24779	11	—	—	—	—	—	—	—	7.3	—
MD21-05-63513	21-24779	95	—	—	—	—	—	—	4.9	15	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Chloromethane	Cyclohexane	Dichlorodifluoromethane	Dichloroethane[1,2-]	Dichloroethene[cis-1,2-]	Ethanol	Ethylbenzene	Ethyltoluene[4-]	Hexane
MD21-06-72593	21-24779	120	—	—	2 J	0.74 J	—	—	—	—	—
MD21-05-63521	21-24780	4	—	—	—	—	—	—	4.9	—	20
MD21-05-63516	21-24780	49	—	—	—	—	—	—	—	—	26
MD21-06-63896	21-24780	49	—	4.8	—	—	—	—	10	6	21
MD21-06-72594	21-24780	120	—	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	—	—	—
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	—	—	—
MD21-06-72595	21-24781	120	—	—	—	—	—	—	—	—	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-98-0398	21-10838	25	—	—	—	—	—	—	—	—	17.3	—
MD21-98-0399	21-10838	55	—	—	—	—	—	—	—	—	24.1	—
MD21-98-0400	21-10838	75	—	—	—	—	—	—	—	—	8.66	—
MD21-98-0408	21-10839	25	—	—	—	—	—	—	—	—	13.9	—
MD21-98-0409	21-10839	55	—	—	—	—	—	—	—	—	5.27	10.7
MD21-98-0410	21-10839	75	—	—	—	—	—	—	—	—	—	—
MD21-98-0418	21-10840	25	—	—	—	—	—	—	—	—	16.6	—
MD21-98-0419	21-10840	55	—	—	—	—	—	—	—	—	3.77	—
MD21-98-0420	21-10840	75	—	—	—	—	—	—	—	—	6.03	—
MD21-98-0429	21-10841	25	—	—	—	—	—	—	—	—	2.34	6.36
MD21-98-0430	21-10841	55	—	—	—	—	—	—	—	—	7.16	—
MD21-98-0431	21-10841	75	—	—	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	—	—	—	—	—	—	—	—	9.79	—
MD21-98-0440	21-10842	55	—	—	—	—	—	—	—	—	41.4	—
MD21-98-0441	21-10842	75	—	—	—	—	—	—	—	—	20	—
MD21-98-0449	21-10843	25	—	—	—	—	—	—	—	—	603	—
MD21-98-0450	21-10843	55	—	—	—	—	—	—	—	—	147	9.96
MD21-98-0451	21-10843	75	—	—	—	—	—	—	—	—	147	16.8
MD21-98-0460	21-10844	25	—	—	—	—	—	—	—	—	185	—
MD21-98-0461	21-10844	55	—	—	—	—	—	—	—	—	71.6	11.5
MD21-98-0462	21-10844	75	—	—	—	—	—	—	—	—	158	18.4
MD21-98-0474	21-10845	25	—	—	—	—	—	—	—	—	324	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-98-0475	21-10845	55	—	—	—	—	—	—	—	—	1810	—
MD21-98-0476	21-10845	75	—	—	—	—	—	—	—	—	829	—
MD21-05-63502	21-24772	12	—	—	—	—	—	—	93	8.8	26	—
MD21-05-63501	21-24772	293	—	—	—	5	7.7 (J)	—	97	7.8	56	—
MD21-06-72590	21-24772	361	—	—	—	—	—	—	—	—	—	—
MD21-05-63504	21-24774	19	—	—	—	—	—	5.8	320	—	7.7	—
MD21-05-63503	21-24774	65	—	—	—	—	—	8.8	140	—	11	—
MD21-06-72587	21-24774	116	—	38	—	—	—	—	—	—	—	—
MD21-05-63506	21-24775	14	—	—	—	14	—	—	13	—	75	—
MD21-05-63505	21-24775	79	—	—	—	—	—	—	160	—	10	—
MD21-06-72588	21-24775	120	—	—	—	—	—	—	—	4.9	3.3	0.97 J
MD21-05-63508	21-24776	4	—	—	—	—	—	—	210	—	10	—
MD21-05-63507	21-24776	95	—	—	—	—	—	—	140	—	4.2	7.3 (J)
MD21-06-72589	21-24776	120	2.5	—	—	—	—	—	—	3.7	4	1.9 J
MD21-05-63510	21-24777	4	—	—	—	—	—	—	100	—	4.4	—
MD21-05-63509	21-24777	85	—	—	—	—	—	—	150	—	4.8	—
MD21-06-72591	21-24777	120	—	—	—	—	—	—	1.2 J	1.3 J	16	2.1 J
MD21-05-63512	21-24778	13	—	—	—	—	—	—	120	—	14	—
MD21-05-63511	21-24778	87	—	—	—	—	—	—	110	—	5.4	—
MD21-06-72592	21-24778	120	—	—	12	—	—	—	0.67 J	3.5	12	3.1 J
MD21-05-63514	21-24779	11	—	—	—	—	—	—	45	—	20	—
MD21-05-63513	21-24779	95	—	—	—	—	—	—	63	9.5	41	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Hexanone[2-]	Methyl-2-pentanone[4-]	Methylene Chloride	n-Heptane	Propanol[2-]	Propylene	Styrene	Tetrachloroethene	Toluene	Trichloro-1,2,2-trifluoroethane[1,1,2-]
MD21-06-72593	21-24779	120	—	—	—	—	—	—	—	4.2	0.99 J	1 J
MD21-05-63521	21-24780	4	—	—	—	—	—	—	250	—	40	—
MD21-05-63516	21-24780	49	—	—	—	4.5	—	—	400	—	43	—
MD21-06-63896	21-24780	49	—	—	—	10	—	17	65	—	110	—
MD21-06-72594	21-24780	120	—	—	—	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	—	—	—	—	—	150	—	11	—
MD21-05-63517	21-24781	91.5	—	—	—	—	—	—	330	—	17	—
MD21-06-72595	21-24781	120	—	—	—	—	—	—	—	—	—	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-98-0398	21-10838	25	38.2	—	—	—	—	—	—	23.4	—
MD21-98-0399	21-10838	55	131	—	—	13.3	—	—	8.68	46	—
MD21-98-0400	21-10838	75	36.5	9.13	—	3.68	—	—	2.69	13.9	—
MD21-98-0408	21-10839	25	98.2	14.5	—	—	—	—	—	—	—
MD21-98-0409	21-10839	55	115	—	—	—	—	—	—	—	—
MD21-98-0410	21-10839	75	37.6	—	—	310	83.5	—	126	512	—
MD21-98-0418	21-10840	25	—	—	—	4.42	—	—	3.38	17.4	—
MD21-98-0419	21-10840	55	34.4	—	—	—	—	—	—	—	—
MD21-98-0420	21-10840	75	16.9	24.2	—	—	—	—	—	—	—
MD21-98-0429	21-10841	25	70.9	—	—	—	—	—	—	—	—
MD21-98-0430	21-10841	55	92.7	—	—	—	—	—	—	—	—
MD21-98-0431	21-10841	75	24	—	—	—	—	—	—	—	—
MD21-98-0439	21-10842	25	5.29	—	—	—	—	—	—	8.68	—
MD21-98-0440	21-10842	55	29.4	—	—	68.8	16.7	—	26.9	122	—
MD21-98-0441	21-10842	75	76.3	—	—	18.2	—	—	—	24.3	—
MD21-98-0449	21-10843	25	—	18.3	—	—	—	—	—	34.7	—
MD21-98-0450	21-10843	55	—	—	—	8.35	—	—	3.52	14.8	—
MD21-98-0451	21-10843	75	3.11	140	—	6.88	—	—	2.52	10.4	—
MD21-98-0460	21-10844	25	—	27.9	—	7.37	—	—	3.17	13.9	—
MD21-98-0461	21-10844	55	—	91.3	—	5.9	—	—	—	8.33	—
MD21-98-0462	21-10844	75	3.82	156	—	4.77	—	—	—	8.68	—
MD21-98-0474	21-10845	25	—	22	—	8.35	—	—	—	17.4	—

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-98-0475	21-10845	55	—	91.3	—	—	—	—	—	—	—
MD21-98-0476	21-10845	75	—	145	—	—	—	—	—	—	—
MD21-05-63502	21-24772	12	44	32	—	17	—	—	12	20	6509
MD21-05-63501	21-24772	293	60	100	—	9.8	—	—	—	22	1481
MD21-06-72590	21-24772	361	58	100	—	—	—	—	—	—	3050
MD21-05-63504	21-24774	19	—	—	—	—	—	—	—	10	1284
MD21-05-63503	21-24774	65	—	—	—	—	—	—	—	6.7	2010
MD21-06-72587	21-24774	116	—	100	—	—	—	—	—	—	3720
MD21-05-63506	21-24775	14	—	50	—	6.1	—	—	7.8	21	3340
MD21-05-63505	21-24775	79	—	34	—	5.3	—	—	—	8.8	1160
MD21-06-72588	21-24775	120	31	13	1 J	—	—	—	—	—	1610
MD21-05-63508	21-24776	4	—	6.2	—	—	—	—	—	7.2	1369
MD21-05-63507	21-24776	95	—	94	—	—	—	—	—	4.8	4582
MD21-06-72589	21-24776	120	36	25	1.5 J	—	—	4.7	—	—	690
MD21-05-63510	21-24777	4	—	39	—	—	—	—	—	4.2	1371
MD21-05-63509	21-24777	85	—	86	—	—	—	—	—	4.7	2610
MD21-06-72591	21-24777	120	5.4	44	1.4 J	1.4 J	—	—	—	3.4 J	4240
MD21-05-63512	21-24778	13	—	—	—	—	—	—	—	8.4	3271
MD21-05-63511	21-24778	87	—	30	—	—	—	—	—	4.3	748
MD21-06-72592	21-24778	120	30	45	2.8	0.84 J	—	—	—	2.4 J	850
MD21-05-63514	21-24779	11	20	17	—	7.7	—	—	5.4	12	3222
MD21-05-63513	21-24779	95	50	32	—	16	—	—	9.9	19	676

Table B-2.4-3 (continued)

Sample ID	Location ID	Depth (ft)	Trichloroethane[1,1,1-]	Trichloroethene	Trichlorofluoromethane	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Vinyl Acetate	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]	Tritium (pCi/L)
MD21-06-72593	21-24779	120	38	13	1.3 J	—	—	2	—	—	660
MD21-05-63521	21-24780	4	—	16	—	—	—	—	6.9	18	1871
MD21-05-63516	21-24780	49	—	34	—	—	—	—	—	20	376
MD21-06-63896	21-24780	49	—	44	—	5.6	—	—	10	32	—
MD21-06-72594	21-24780	120	—	140	—	—	—	—	—	—	—
MD21-05-63518	21-24781	19	—	30	—	—	—	—	—	8	393
MD21-05-63517	21-24781	91.5	—	61	—	—	—	—	—	16	616
MD21-06-72595	21-24781	120	—	46	—	—	—	—	—	—	1220

Note: VOC units in µg/m^3. Tritium reported in pCi/L.

* — = Not detected

Table B-2.5-1
Summary of COPCs at MDA U by Media

	Soil/Fill	Sediment	Tuff	Pore Gas
Inorganic Chemicals	Chromium Copper Lead Mercury Uranium Zinc Perchlorate Nitrate Silver[b] Thallium	Cadmium Chromium Cobalt Lead Selenium Uranium Zinc Silver[b]	Aluminum Arsenic Barium Beryllium Chromium Copper Iron Lead Mercury Nickel Zinc Antimony[b] Cadmium[b] Selenium[b] Silver[b] Thallium[b] Perchlorate	n/a[a]
Radionuclides	Americium-241 Cesium-137 Plutonium-238 Plutonium-239 Radium-223 Radon-219 Strontium-90 Thorium-227 Tritium Uranium-234 Uranium-235	Plutonium-238 Plutonium-239 Tritium	Americium-241 Plutonium-238 Plutonium-239 Radium-223 Strontium-90 Thorium-227 Thorium-228 Tritium Uranium-234 Uranium-235 Uranium-238	Tritium

Table B-2.5-1 (continued)

	Soil/Fill	Sediment	Tuff	Pore Gas
Organic Chemicals	Acenaphthene Anthracene Aroclor-1242 Aroclor-1254 Aroclor-1260 Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Benzoic acid Butylbenzylphthalate Chrysene Dibenz(a,h)anthracene Dibenzofuran Diethylphthalate Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene 2-Methylnaphthalene 4-Methylphenol Naphthalene Phenanthrene Pyrene Pyridine	Acenaphthene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Butylbenzylphthalate Chrysene Dibenzofuran 3,3'-Dichlorobenzidine Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene	Acetone Aroclor-1242 Aroclor-1254 Aroclor-1260 Benzene Benzoic acid 2-Butanone Di-n-butylphthalate 4-Isopropyltoluene 4-Methyl-2-pentanone 1,2,3,4,6,7,8,9-Octachlorodibenzodioxin Pyrene Toluene 1,1,2-Trichloro-1,2,2-trifluoroethane 1,2,4-Trimethylbenzene 1,3-Xylene + 1,4-xylene	Acetone Benzene Bromodichloromethane 2-Butanone 1,3-Butadiene 1-Butanol Carbon disulfide Carbon Tetrachloride Chloroform Chloromethane Cyclohexane Dichlorodifluoromethane 1,2-Dichloroethane cis-1,2-Dichloroethene Ethanol Ethylbenzene 4-Ethyltoluene n-Heptane Hexane 2-Hexanone 4-Methyl-2-pentanone Methylene Chloride Propylene 2-Propanol Styrene Tetrachloroethene Toluene 1,1,2-Trichloro-1,1,2-trifluoroethane 1,1,1-Trichloroethane Trichloroethene Trichlorofluoromethane 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Vinyl Acetate 1,2-Xylene 1,3-Xylene+1,4-xylene

[a] n/a = Not applicable.

[b] Only detection limits above the BV.

Appendix C

Field Methods

C-1.0 INTRODUCTION

This appendix summarizes field methods used for the 2005/2006 investigation at Material Disposal Area (MDA) U at Technical Area (TA) 21, also referred to as Consolidated Unit 21-017(a)-99. Table C-1.0-1 provides general method information, and the following sections provide more detailed field methods for MDA U. All activities were conducted in accordance with the applicable Environmental Programs Directorate standard operating procedures (SOPs), which may be found at the following URL: http://erproject.lanl.gov/documents/procedures/sops.html.

C-2.0 EXPLORATORY DRILLING CHARACTERIZATION

All boreholes were completed using a CME 85 drill rig equipped with 9-in. hollow-stem augers using continuous split-spoon sampling. The approved MDA U investigation work plan discussed the possible need to use a more advanced rotary drilling method for the deep borehole (BH-04) to reach the target depth of 360 ft below ground surface (bgs). However, hollow-stem augers were sufficient to drill through the subsurface material at all nine boreholes.

C-2.1 Borehole Logging

Continuous boring logs were completed for all boreholes drilled at MDA U in 1998 and 2005 (Appendix D of this report). For the 2005 drilling activities, all boreholes were continuously cored and logged in 5-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, rock-quality designation, lithology, depth of samples collected, field-screening results for radioactivity and organic vapors, core description time, and other relevant observations.

The lithologic description for each core interval included

- color (using a Munsell Soil Color Chart);
- ash matrix size;
- degree of welding of matrix;
- presence and size of phenocrysts;
- presence of pumice clasts (in tuff) with color, size, alteration, and color, size, and nature of phenocrysts;
- staining and/or presence of clay-filled fracture zones;
- qualitative description of moisture presence; and
- any other information pertinent to the geology of the core recovered.

C-2.2 Borehole Abandonment

After drilling was completed, each borehole was covered with 2-by-2 ft plywood boards and an orange pylon cone for safety purposes. The boreholes were left open until the final round of pore-gas samples were collected. The boreholes were plugged and abandoned in July 2006, according to SOP-05.03, “Monitoring Well and RFI Borehole Abandonment.”

C-3.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used during the 2005/2006 drilling and sampling activities at MDA U. The field-screening results are presented in Section 6 of the investigation report. Field screening for volatile organic compounds (VOCs) and radioactivity was performed continuously on core samples from each borehole. Field screening for VOCs was not conducted on surface samples because the volatile nature of compounds means they cannot be measured at the surface. All field-screening results are presented in Appendix D of this report.

C-3.1 Field Screening for VOCs

Organic vapor screening was conducted using a MiniRAE 2000 portable VOC monitor model PGM-7600 photoionization detector (PID). Field screening for VOCs was conducted on each core by a level-2 site safety officer (SSO), according to SOP-06.33 “Headspace Vapor Screening with a Photoionization Detector.” The PID was equipped with an 11.7 eV lamp with sensitivity to 1 ppm. Screening was performed by removing sample material from the connection “shoe” of the core barrel base before the core barrel was opened, sealing it in a plastic bag, letting it sit for approximately 5 min, and measuring VOCs with the PID inserted into the plastic bag. A new sterile bag was used for each screening performed to avoid potential cross-contamination. All readings were recorded in parts per million. Although the approved MDA U investigation work plan (LANL 2004, 90801, NMED 2005, 90611) specifies field screening for VOCs every 10 ft, screening was conducted every 5 ft for consistency with field screening for radioactivity and collection of core samples for laboratory analysis. The field-screening results for organic vapors are presented in Table 6.2-1 of investigation report.

C-3.2 Field Screening for Radioactivity

Immediately upon separating the split-spoon core barrel, each core was screened for radioactivity, targeting alpha and beta/gamma emitters. Screening was conducted by a Los Alamos National Laboratory (the Laboratory) radiological control technician (RCT) using an Eberline E-600 radiation meter with an SHP-380AB alpha/beta scintillation detector held within 1-in. of the core barrel. The Eberline E-600 with attachment SHP-380AB consists of a dual phosphor plate covered by two mylar windows housed in a light-excluding metal body. The phosphor plate is a plastic scintillator for the detection of beta emissions and is thinly coated with zinc sulfide for the detection of alpha emissions. The operational range varies from trace emissions to 1 mil disintegrations per minute (dpm).

Local background levels for radioactivity were measured in ambient air. However, local background levels of radioactivity in ambient air are not directly applicable to background levels in subsurface material. Tuff and other native material underlying MDA U contain naturally occurring radionuclides. These naturally occurring radionuclides resulted in screening measurements that were consistently in the range of 1000 to 3000 dpm and do not necessarily indicate the presence of radioactive contaminants in tuff.

Local background levels in air were calculated daily using the following procedure. Minimum detectable activity describes the instrument’s lower detection limit. To determine the minimum detectable activity in the field using the SHP-380AB attachment, a background reading was obtained. This reading was typically taken from the sampling table at MDA U before drilling began for the day. The minimum detectable activity was calculated as follows:

$$\text{minimum detectable activity} = \frac{2.71 + 4.65/(R_b \times 0.2)}{0.2}$$

where R_b is the background rate in counts per minute (cpm). Minimum detectable activity was then converted from cpm to dose per minute as follows:

$$\text{dose per minute} = \frac{\text{corrected cpm}}{\text{efficiency}}$$

where efficiency was assumed to be 20% for the SHP-380AB attachment based on the manufacturer's specifications. All field results for radioactivity were recorded in dose per minute.

C-4.0 FIELD INSTRUMENT CALIBRATION

The instruments were calibrated twice daily: once in the morning and once again in the afternoon. Several environmental factors affected the instruments' integrity, including air temperature, atmospheric pressure, wind speed, and humidity. Calibration of the PID was conducted by the SSO. Calibration of the Eberline E-600 was conducted by the RCT. All calibrations were performed according to the manufacturers' specifications and requirements.

C-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 in the health and safety site logbook:

- instrument ID number
- initial and final span settings
- date and time
- concentration and type of calibration gas used (isobutylene at 100 ppm)
- name of the SSO performing the calibration.

All daily calibration procedures for the MiniRAE 2000 PID met the manufacturer's specifications for standard reference gas calibration and the requirements of Quality Procedure (QP) 5.2, "Control of Measuring and Test Equipment."

C-4.2 Eberline E-600 Instrument Calibration

The Eberline E-600 was calibrated daily by the RCT before local background levels for radioactivity were measured. The instrument was calibrated using plutonium-239 and chloride-36 sources for alpha and beta emissions, respectively. The following five checks were performed as part of the calibration procedures: calibration date, physical damage, battery, response to a source of radioactivity, and background. All calibrations performed for the Eberline E-600 met the manufacturer's specifications, the requirements of QP-5.2, and the applicable radiation detection instrument manual.

C-5.0 SURFACE AND SUBSURFACE SAMPLING

This section summarizes the methods used for collecting samples for laboratory analysis, including surface soil and fill, subsurface rock, and subsurface pore-gas samples. The samples were collected according to the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611).

C-5.1 Surface Soil and Fill Sampling Methods

A total of nine discrete grab surface samples (eight soil and one fill) were collected in 2005 for fixed laboratory analysis. Before drilling began, these samples were collected from 0 to 0.5 ft bgs at each of the nine borehole locations in accordance with SOP-06.09, “Spade and Scoop Method for Collection of Soil Samples.” Tables 3.0-2 and 3.1-1 of the main text lists the samples.

The surface samples were screened immediately for radioactivity using an Eberline E-600 radiation meter held within 1 in. of the sample. A stainless-steel scoop and bowl were used to homogenize the samples, which were then transferred to sterile sample collection jars for transport to the Sample Management Office (SMO).

C-5.2 Rock Sampling Methods

A total of 46 tuff samples were collected from boreholes at MDA U in 2005 for fixed laboratory analysis. These samples were collected in accordance with SOP-06.26, “Core Barrel Sampling for Subsurface Earth Materials.” Borehole samples were collected in a stainless-steel split-spoon core-barrel sampler which retrieved core in 5-ft intervals. The samples collected, listed by borehole and depth, are listed in Tables 3.0-2 and 3.2-1 of the investigation report.

Core retrieved from the subsurface was field screened and visually inspected to determine the specific 2-ft section of core to be sampled. Once this determination was made, VOC samples were collected from undisturbed core.

Samples for VOC analysis were collected using EnCore samplers to minimize the loss of subsurface VOCs during the sample collection process. EnCore samplers consist of a coring device that also serves as the shipping container. A clean coring tool was inserted into the fresh core surface for sample collection, taking care not to trap air behind the sample. This was done to maximize accuracy for VOC analysis. Following extraction of a core sample, the exterior of the EnCore barrel was quickly wiped with a clean disposable towel, allowing for a tight seal with the cap on the open end of the sampler. The sample was then labeled, inserted into a sealable pouch, immediately cooled to 4 ± 2 °C and prepared for transfer to the SMO. All EnCore sampling followed the manufacturer’s instructions.

Following VOC sampling, the 2-ft core section to be sampled was then removed from the core barrel and placed in a stainless-steel bowl and homogenized. The material was crushed with a decontaminated rock hammer and stainless-steel spoon to allow enough core material to fit into sample containers. The samples were placed in sterile sample containers, sealed, and labeled. Each sample was labeled with the borehole number, date, time, depth interval, and type of material.

All core and drill cuttings that remained after the completion of sampling and logging were placed in plastic waste bags, secondarily contained in sealed 55-gal. steel drums, and stored on site until all final waste disposition can be completed.

C-5.3 Subsurface Pore-Gas Sampling Methods

Subsurface pore-gas samples were collected at MDA U in September and October 2005. A second pore-gas sampling event was conducted in June and July 2006, after each of the nine boreholes had been reamed to total depth (TD). These pore-gas samples were collected because excessive slough in the boreholes prevented the collection of a true TD sample during the initial round of pore-gas sampling. All pore-gas samples were collected in accordance with SOP 6.31, "Sampling of Subatmospheric Air."

Including both pore-gas sampling events, three depth intervals were sampled in each of the nine boreholes at MDA U. In each borehole, one pore gas sample was collected at the approximate base of the absorption beds, one at the top of the sloughed interval, and one at TD. The initial pore-gas sampling event was conducted using a straddle-packer system capable of isolating discrete 1-ft sample intervals within the boreholes. The second pore-gas sampling event was conducted using a single packer system. During this event, the augers were left in the borehole to ensure it stayed open to the TD. A single packer was then used to isolate the bottom 1 ft of the borehole. Pore-gas sample depths and borehole information are discussed in Section 3.2 of the report and presented in Table 3.2-3.

Before pore-gas sampling, each sample interval was purged until measurements of carbon dioxide were stable and indicative of subsurface conditions. Carbon dioxide levels were monitored using a Brüel & Kjaer (B&K) multi-gas gas analyzer during the first sampling event, and a Landtec GEM500 landfill gas analyzer during the second sampling event. During the first event, a PID was also used to field screen for the presence of VOCs in pore gas, primarily for health and safety purposes. Subsurface pore-gas samples were collected in SUMMA canisters and submitted to the SMO for shipment to the analytical laboratory for VOC analysis using U.S. Environmental Protection Agency (EPA) Method TO-15. Samples were also collected in silica gel sample tubes for tritium analysis using EPA Method 906.0.

C-5.4 Quality Assurance/Quality Control Samples

Quality assurance (QA)/quality control (QC) samples for soils and tuff were collected in accordance with SOP-01.05, "Field Quality Control Samples." Field duplicate samples were collected at a frequency of at least one duplicate sample for every ten samples collected for a total of six. Field rinsate samples were collected from sampling equipment at a frequency of at least 1 rinsate sample for every 20 samples (for a total of 4). Field trip blanks also were collected at a frequency of 1 per 20 samples, for a total of 4.

The QA/QC samples for VOCs in pore gas consisted of one equipment blank and one field duplicate for each of the two pore-gas sampling events. The equipment blank was collected by pulling zero gas (99.9% ultrahigh-purity nitrogen) through the packer sampling apparatus. The equipment blank was used to evaluate field decontamination procedures. The field duplicate sample was collected for an evaluation of the reproducibility of field sampling techniques. The QA/QC samples were collected in accordance with SOP-01.05, "Field Quality Control Samples."

C-5.5 Sample Documentation and Handling

Field personnel completed a sample collection log and associated chain-of-custody (COC) form for each sample set. Sample containers were sealed with signed COC seals and placed in coolers at approximately 4°C. Samples were packaged with preservatives, as necessary, depending upon the analytical method to be used, packed, handled, and shipped in accordance with SOP-01.03, "Handling, Packaging, and Transporting Field Samples," and SOP-01.02, "Sample Containers and Preservation."

Swipe samples were collected and analyzed by the RCT before the characterization sample containers were removed from the site. Samples were transported to the SMO in sealed coolers before they were shipped to the analytical laboratory. The SMO personnel reviewed and approved the sample collection logs and COC forms and accepted custody of the samples.

C-5.6 Decontamination of Sampling Equipment

The split-spoon core barrel and all other sampling equipment that made (or could have made) contact with sample material were decontaminated after each 5-ft core was retrieved and logged. Decontamination included wiping the equipment with a household-strength cleaning spray and sterile paper towels. Decontamination of the drilling equipment was conducted before mobilization of the drill rig to another borehole to avoid cross-contamination between samples and borehole locations. Decontamination activities were performed in accordance with SOP-01.08, “Field Decontamination of Drilling and Sampling Equipment,” and SOP-01.05, “Field Quality Control Samples.”

C-6.0 GEOPHYSICAL LOGGING

Geophysical logging was conducted at MDA U from August 31 to September 7, 2005. Boreholes BH-01 through BH-09 were logged using a neutron probe for measuring the soil moisture content, a natural gamma meter for measuring gamma radiation, a three-arm caliper for measuring borehole diameter, and a downhole camera for recording borehole wall imagery, such as orientation and character of potential fracture zones. SOP-04.04, “Contract Geophysical Logging,” and SOP-05.08, “Operation of Borehole Logging Equipment,” were followed for all geophysical logging activities.

During geophysical logging, all data were collected using Mount Sopris Instrument (MSI) Company instruments. The soil moisture content was measured using an MSI model number 2NUA-1000 neutron-thermal detector. Gamma radiation was measured using an MSI model number 2PGA-1000 gamma/SP/SPR meter. Borehole diameter was measured using an MSI model number 2PCA-1000 three-arm caliper. Video logging of the borehole was recorded using an MSI model number OBI-40 ALT optical televiewer.

The results of the geophysical logging are presented in Appendix D.

C-7.0 GEODETIC SURVEYING

Geodetic surveys of all boreholes and sampled locations were performed by a certified surveyor using a Trimble RTK 5700 differential global positioning system (DGPS) referenced from published and monumented external Laboratory survey control points in the vicinity. All borehole and sample locations were surveyed according to SOP-03.11, “Coordinating and Evaluating Geodetic Surveys.” Horizontal accuracy of the monumented control points is within 0.1 ft. The DGPS instrument referenced from Laboratory control points is accurate within 0.2 ft.

C-8.0 INVESTIGATION-DERIVED WASTE STORAGE AND DISPOSAL

Investigation-derived waste (IDW) generated during this investigation consisted of drill cuttings, personal protective equipment (PPE), and sampling supplies and plastics. All IDW generated during the MDA U field investigation was managed in accordance with the procedures described in Appendix B of the approved MDA U work plan (LANL 2004, 90801; NMED 2005, 90611) and applicable SOPs. These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy (DOE) orders, and Laboratory implementation requirements (LIRs). The SOPs applicable to the characterization and management of IDW at MDA U are

- SOP-01.06, “Management of Environmental Restoration Project Waste,” and
- SOP-01.10, “Waste Characterization.”

Before field investigation activities were undertaken, a waste characterization strategy form (WCSF) was prepared and approved per the requirements of SOP-01.10. The WCSF provided information on IDW characterization, management, containerization, and estimated volumes. The IDW characterization was completed through a combination of review of existing data and documentation, review of analytical data from samples collected from the media being investigated (subsurface soil/tuff), and direct sampling of containerized waste. The WCSF and related waste management documentation, such as the waste profile form (WPFs) and chemical waste disposal requests (CWDRs), are included in Appendix G of this investigation report.

The selection of waste containers was based on appropriate U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately following containerization, each waste container was individually labeled with a unique identification number and with information regarding waste classification, contents, radioactivity, and date generated. The 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.

The Environmental Remediation and Surveillance Program waste minimization awareness plan was implemented during field investigations at MDA U to minimize the waste generated. This plan is updated annually, as required by Module VIII of the Laboratory’s Hazardous Waste Facility Permit.

The IDW waste streams associated with the investigation of MDA U are identified in Table C-8.0-1 and are briefly described below. Table C-8.0-1 also summarizes the waste types, estimated volumes, characterization methods, methods of on-site management, and disposition path for each of the following waste streams.

- *Borehole Drill Cuttings:* This waste stream was generated during drilling activities. Based on previous site investigations, waste was considered suspect low-level waste and was managed in a radioactive waste staging area and stored in 55-gal. drums. Characterization of the drill cuttings was based on a combination of historical data, and analytical data generated during 2005 site characterization activities. The estimated volume is approximately 30 yd^3 stored in 55-gal. drums. This waste was disposed of at Area G of TA-54 in August 2006.
- *Plastics, Personal Protective Equipment, and Sampling Wastes*: This waste stream included various types of plastics, disposable gloves and coveralls, and sampling supplies such as plastic scoops, plastic bags, jars, and dry decontamination waste. Contamination of these contact wastes generated during field activities was conservatively assumed to be identical to those found in the associated environmental media. Therefore, characterization of this waste was based on the results of the laboratory analysis of the characterization samples from the boreholes. The analytical results indicated that the boreholes may contain low-level radioactive material; thus, this waste stream was managed on-site as low-level waste. The estimated volume of this waste is approximately 1 to 2 yd^3 stored in 55-gal. drums. This waste was disposed of at TA-54 Area G in August 2006.

Documentation for the management, storage, and disposal of IDW from MDA U is presented in Appendix G of this investigation report.

C-9.0 DEVIATIONS FROM APPROVED WORK PLAN

Deviations from the approved MDA U investigation work plan (LANL 2004, 90801; NMED 2005, 90611) include the following.

1. Moisture content was to be collected at 5-ft intervals in the upper 40 ft of each borehole and at 10-ft intervals below 40 ft. During characterization activities, the moisture content was measured continuously as a component of geophysical characterization, thus providing for a more accurate determination of the moisture profile within each borehole since continuous, rather than intermittent, data were collected.

2. The approved MDA U investigation work plan (LANL 2004, 90801, NMED 2005, 90611) specified using a model 139 rate meter for measuring gross alpha and an ESP-1 for measuring beta/gamma; instead, the Eberline E-600 was used because the specified instruments are outdated and less accurate than the Eberline E-600. The Eberline E-600 can detect alpha and beta emissions separately and reduces the amount of background beta emissions. (The background of beta emissions from cosmic rays can obscure the relatively small alpha signal from plutonium or uranium; therefore, eliminating the cosmic-ray background allows for the detection of smaller amounts of alpha-emitting material.)

3. Field screening for VOCs was to be conducted at 10-ft intervals. During the borehole characterization activities, field screening for VOCs was conducted at 5-ft intervals.

4. The approved MDA U investigation work plan called for using brass sleeves to collect geotechnical samples from the deep borehole. The use of brass sleeves was specified to provide stability and maintain the integrity of deep geotechnical samples. Instead, plastic lexan tubes were used because of their availability and flexibility of use. Lexan tubes also maintain the integrity of geotechnical samples and did not affect analysis of geotechnical properties.

Other deviations to the approved MDA U investigation work plan are detailed in Attachment 1, Record of Technical Change, and included changes to (1) the planned location of borehole BH-08 and (2) the target depths of boreholes BH-01 and BH-07. These deviations were the result of field conditions encountered during drilling activities and did not have a negative impact on the overall characterization of MDA U.

C-10.0 REFERENCES

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

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

LANL (Los Alamos National Laboratory), November 2004. "Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21," Los Alamos National Laboratory document LA-UR-04-7268, Los Alamos, New Mexico. (LANL 2004, 90801)

NMED (New Mexico Environment Department), 2005. "Approval with Modifications, Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515 HWB-LANL-04-015," New Mexico Environment Department letter dated March 21, 2005, Santa Fe, New Mexico. (NMED 2005, 90611)

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Table C-1.0-1
Description of Investigation Methods

Method	Summary
Spade-and-Scoop Collection of Soil Samples	This method was used for collection of surface (i.e., 0–6 in.) soil or fill samples. A hole was dug to the desired depth, as prescribed in the work plan, and a discrete grab sample was collected. The sample was homogenized in a decontaminated stainless steel bowl before transferring to the appropriate sample containers.
Split-Spoon Core-Barrel Sampling	The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. The stainless steel core barrel (3 in. inner diameter and 5 ft long) is pushed directly into the subsurface media using a hollow-stem auger drilling rig. A continuous length of core is extracted with the core barrel. Once core has been extracted, the section is screened for radioactivity and organic vapors, photographed, and described in a geologic log. If located within a targeted sample interval, a portion of the core is then collected for fixed laboratory analysis.
Field Logging, Handling, and Documentation of Borehole Materials	Upon reaching the surface, core barrels were immediately opened for field screening, logging, and sampling. Logging of borehole materials included run number, core recovery percentage, depth interval (in 5-ft increments), field-screening results, lithological and structural description, and a photograph. Once the core material was logged, selected samples were taken from discrete intervals of the core. All borehole material not sampled was then disposed of as waste. No material from the boreholes at MDA U was archived.
Headspace Vapor Screening	Samples from each 5-ft core interval were field screened for VOCs by placing a portion of the sample in a plastic sample bag. The bag was sealed and gently shaken, and allowed to equilibrate for approximately 5 min. The sample was then screened by inserting a PID probe equipped with an 11.7 eV lamp into the container. The results were then recorded in units of ppm.
Sampling of Sub-Atmospheric Air	Subsurface pore-gas samples were collected from three discrete zones within each borehole (estimated base of disposal unit, top of sloughed interval, and TD of borehole). During field measurements, subsurface vapor samples were monitored for carbon dioxide during purging with a B&K or Landtec multigas analyzer. Analytical samples were collected only after readings had stabilized. Vapor samples were collected using a SUMMA canister and analyzed by EPA Method TO-15. All instruments used during field screening were calibrated daily following the manufacturers' specifications.
Handling, Packaging, and Shipping of Samples	Samples were sealed and labeled before being packed in ice, and sample containers and the containers used for transport were examined to ensure they were free of external contamination. Samples were packaged to minimize the possibility of breakage during transportation. After environmental samples were collected, packaged, and preserved, they were transported to the SMO. A split of each sample was sent to an SMO-approved radiation screening laboratory under COC. Once radiation screening results were received, the SMO then sent the corresponding analytical samples to fixed laboratories for full analysis.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times were based on EPA guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample were printed in the sample collection logs provided by the SMO (size and type of container, preservatives, etc.). All samples were preserved by placing them in insulated containers with ice to maintain a temperature of 4°C.

Table C-1.0-1 (continued)

Method	Summary
Subsurface Moisture Measurements Using a Neutron Probe	Moisture measurements were collected with a CPN 503 DR run through the Laboratory-owned borehole logging system. Moisture measurements were taken on approximately 2-in. intervals for the entire open length of the borehole and the data recorded on a laptop computer connected to the probe. Calibration and operation of the neutron probe were conducted according to the manufacturer's specifications.
Operation of Laboratory-Owned Borehole Logging Trailer	Laboratory-owned geophysical logging equipment, including caliper, gamma, neutron, and 360-degree camera surveys, was used for post-drilling characterization of the subsurface. The boreholes were logged over the maximum available depth.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented on standard forms generated by the SMO. These forms included sample collection logs, chain-of-custody forms, and sample container labels. Collection logs 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.
Coordinating and Evaluating 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 (IA) project standards IA-CB02, "GIS Horizontal Spatial Reference System," and IA-D802, "Geospatial Positioning Accuracy Standard for A/E/C/ and Facility Management." All coordinates are expressed as SPCS 83, NM Central, U.S. feet coordinates. All elevation data are reported relative to the National Geodetic Vertical Datum of 1983.
Management, Characterization, and Storage of Investigation-Derived Waste	Investigation-derived waste (IDW) was managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and the characterization approach for each waste stream managed. Waste characterization complied with on-site or off-site waste acceptance criteria, as appropriate. All stored IDW was be marked with appropriate signage and labels, as appropriate. Drummed IDW was stored on pallets to prevent deterioration of containers. The means to store, control, and transport each potential waste type and its classification were determined before field operations began. A waste storage area was established before waste was generated. Each container of waste generated was individually labeled as to waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination.
Field Quality Control Samples	Field quality control samples were collected as directed in the Consent Order as follows: *Field Duplicate*: 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 5%, collected by rinsing sampling equipment with deionized water, which is collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: Required for all field events that include the collection of samples for VOC analysis. Trip-blank containers consist of certified clean sand that are opened and kept with the other sample containers during the sampling process.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination was the preferred method of decontamination used at MDA U to minimize the generation of liquid waste. Dry decontamination included the use of a wire brush or other tool for removal of soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes.

Table C-8.0-1
Summary of IDW Generation and Management

Waste Stream	Waste Type	Volume	Characterization Method	On-Site Management	Disposition
Drill cuttings	Nonhazardous, low-level radioactive waste	30 yd^3	Acceptable knowledge (analytical results for 2005 borehole samples)	55-gal. drums	Disposal at TA-54, Area G
Spent PPE and disposable sampling supplies	Nonhazardous, low-level radioactive waste	1–2 yd^3	Acceptable knowledge (analytical results for 2005 samples)	55-gal. drums	Disposal at TA-54, Area G

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Attachment C-1

Record of Technical Change

RECORD OF TECHNICAL CHANGE

Date: June 23, 2005

Shaw Project No.: 116033

Project Name: TA-21 MDA U

Phase/Task: Characterization Drilling Field Work

Applicable Document(s):

November 2004. Historical Investigation Report for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21. (LANL 2004, 87454)

November 2004. Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21. (LANL 2004, 90801)

March 21, 2005. Approval with Modifications. Investigation Work Plan for Material Disposal Area U, Solid Waste Management Unit 21-017(a)-99, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515 HWB-LANL-04-015. New Mexico Environment Department, Proceeding Under the New Mexico Hazardous Waste Act § 74-4-10 and the New Mexico Solid Waste Act § 74-9-36(D), Santa Fe, New Mexico. (NMED 2005, 90611)

Description of Technical Change(s):

The changes detailed in this Record of Technical Change are a result of access conditions and drilling factors that occurred during the course of drilling at MDA U.

(a) Change of Borehole Location.

During a site visit to mark borehole locations (06/20/05: A. Bowman, B. Coel-Roback, J. Lyman, C. Schultz, D. Starnes), it was decided that location of BH-08 would need to be moved from an upgradient position along the southwest corner outside MDA U fenced area due to site access issues. This borehole was moved to a downgradient location to allow for better definition of nature and extent downgradient from MDA U. Also, access would have been extremely difficult to get a CME drill rig into the original location.

(b) Change in the Total Depths of Boreholes Drilled.

According to the “Approval with Modifications” letter dated March 21, 2005 from NMED, a total of nine boreholes were to be drilled instead of four at MDA U: eight boreholes to a total depth of 120 feet bgs and one to 360 feet bgs. With the exception of BH-07 and BH-01, all boreholes were drilled to their target total depths.

BH-07 was drilled to a total depth of 119 ft bgs. BH-07 is located to the east of MDA U on a relatively steep slope. For a typical borehole with a level surface, one core “run” is advanced 5 ft into the subsurface, providing a 5-ft recovery. Thus, the surface run, or first run, is from 0 to 5 ft bgs. Because of the steep slope at BH-07, the first run resulted in a core recovery from 0-4 ft bgs and every subsequent run for BH-07 ended at 4 and 9 ft intervals. The total depth of BH-07 is 119 ft bgs, 1-ft short of the target total depth of 120 ft bgs.

BH-01 was drilled to a total depth of 115 ft bgs. Drilling was very difficult in interval Qbt2 due to the extremely welded nature of native tuff. When drilling between 115 and 120 ft bgs, the split-spoon core barrel connection "shoe" dislodged and remained in the borehole when the drilling rods were removed. Additionally, the core sample from 110 to 115 ft bgs was disposed of before sampling material from this interval was obtained; therefore, no sample from the bottom of BH-01 was collected. Four total samples—including a surface sample—were collected at BH-01. A duplicate surface sample was also collected at this borehole location.

The changes represent: A minor change.

Estimated impact on present and/or completed work: None.

Prepared By: Angela Bowman, Shaw E&I.

Client Notified: Yes X No _ Date: 06/20/05; Updated: 12/01/05.

Contract Change Order Required: Yes _ No X

Contract Change Order No.: Not Applicable

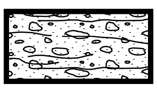
Appendix D

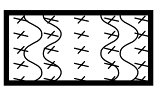
Borehole Logs

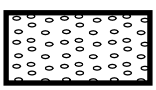
D-1.0 BOREHOLE LOGS

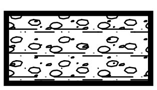
Listed below are explanations for each column in the Lithologic Drilling Logs for each borehole drilled in 1998 and 2005 as well as the graphical representation of each unit encountered at MDA U.

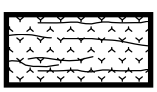
Run No.	Each 5 ft core retrieved, in numerical order
Recovery	The amount of sample recovered in each run, expressed in feet
Depth	Depth of important lithological feature, expressed in feet
Graphic	The graphical picture of each lithologic unit, see legend below
Lithologic Description	Narrative description of each lithologic unit
Alpha	Radionuclide field screen for alpha emitters, expressed in dose per minute (dpm)
Beta	Radionuclide field screen for beta emitters, expressed in dose per minute (dpm)
PID	Organic Vapor field screen, expressed in parts per million (ppm)
Comments	Sample depth interval collected, justification for sampling, and the LANL sample identification number.

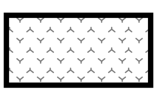

Fill

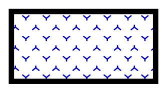

Fracture Zone

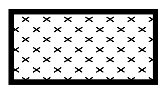

Moisture Zone

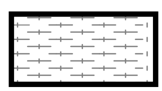

Pumice Rich Zone

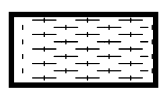

Staining Zone

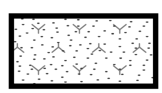

Qbt3

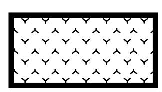

Qbt3/ Qbt2 NON welded Contact Zone


Qbt2


Qbt1v - vapor phase


Qbt1g - glass phase


Qct


Qbo

Lithologic Drilling Log of Borehole: BH-01

Location ID: 21-24774

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Due S outside MDA U

Date Started: 07/13/05
Date Completed: 7/14/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	5	5	FILL SILT with 30% CLAY; (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry	60	2830	3.5	0-0.5 ft, surface sample **MD21-05-61010**
2	5	10		90	2440	4.0	0-0.5 ft, duplicate surface sample **MD21-05-61077**
3	5	15	(Qbt3) TUFF (5YR5/1) gray; SLIGHTLY welded; phenocrysts (quartz) 1-3mm, 5%; pumice clasts <1 cm, 3%, light to dark gray	96	2760	7.5	10-12 ft, pipeline sample **MD21-05-61011**
4	5	20	(Qbt3) MOISTURE ZONE 18-20 ft, reddish-gray staining, >5%	78	2780	7.8	
5	4	25	(Qbt3) Banded staining, continuous, <0.5-ft thick from 25-30 ft bgs	96	3000	7.0	18-20 ft, base structure sample **MD21-05-61012**
6	4	30		66	2830	6.6	
7	4	35	(Qbt3) TUFF (5YR5/1 to 6/1) gray SLIGHTLY to NON welded; decreasing phenocrysts, <1-1mm 3%; increasing pumice, altered white (clay-like) to 3 cm, 5%	90	3270	6.9	
8	4	40		102	3160	7.5	
9	5	45		90	2920	7.4	
10	5	50		121	3290	7.0	
11	5	55	(Qbt3) SAME with sanidine, <1-1 mm observed at 65 ft bgs	121	3340	6.6	
12	5	60		108	3050	6.8	
13	5	65		102	3060	7.3	
14	5	70		60	3000	7.0	No observed fracture zone. No sample collected.
15	4	75		78	3190	5.6	
16	4	80		115	3500	6.9	
17	4	85	(Qbt3) PUMICE ZONE, altered white, clay-like; pumice fragments to >5 cm	102	3180	3.3	
18	4	90	(Qbt3) TUFF (5YR5/1) gray NON welded; phenocrysts, mafic, <1-2 mm, 5%; pumice fragments, altered white, clay-like, <1-3 cm, 3%	102	3610	2.3	
19	4	95		115	3180	5.1	98-100 ft, Qbt3/Qbt2 contact sample **MD21-05-61013**
20	3.5	100	(Qbt2) TUFF (5YR5/1 to 5/2) gray to reddish gray; MODERATELY with sharp grade to VERY welded; welded nodules, rounded, to 3 cm throughout; pumice, dark gray, to 4 cm, 5%, recrystallized; phenocrysts <1-3 mm, 5% Drilling extremely difficult at 110 ft bgs	108	2920	4.6	
21	3.5	105		115	3000	5.6	
22	3.5	110		66	3080	6.4	No total depth sample collected.
23	0	115	**Borehole T.D. 115 ft bgs**	NA	NA	NA	

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-02 — Location ID: 21-24775

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: NE corner outside MDA U

Date Started: 06/27/05
Date Completed: 6/28/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	3.5	5	FILL SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry; roots and other organics present throughout	24	577	0.5	0-0.5 ft, surface sample **MD21-05-61018**
2	3	10	FILL GRAVEL Well-graded; sub-rounded to 3 mm; dry	18	706	2.3	
3	3	15		24	644	2.8	13-15 ft, base structure sample **MD21-05-61023**
4	3.5	20	FILL SAND (10YR6/2 to 5/2) light brownish gray to reddish brown; well-graded; coarse to 3 mm; rounded to subrounded; dry	<54	803	2.7	18-20 ft, tuff contact sample **MD21-05-61020**
5	5	25	(Qbt3) TUFF (5YR7/1 to 6/2) light to pinkish gray; fine ash matrix; MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%; reddish brown staining (<5%) throughout	30	749	2.0	
6	5	30		18	896	0.8	
7	5	35		24	957	2.7	
8	5	40		6	822	3.4	
9	5	45	(Qbt3) TUFF (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON welded; trace phenocrysts <1 mm, <3%; altered white pumice, 1 cm, <3%	18	1000	2.2	
10	5	50		6	723	2.6	
11	3.5	55		18	914	3.8	
12	4	60		<73	841	4.2	
13	3.5	65		<73	1019	2.9	
14	3.5	70	(Qbt3) TUFF (5YR5/1 to 5/2) gray grading to reddish gray; fine ash matrix; NON welded welded nodules, rounded, to 3 cm throughout matrix; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, gray to light gray, 1-3 cm, 3%, slightly recrystallized	24	859	4.6	
15	3.5	75		<73	1062	3.2	
16	4	80		24	834	3.1	
17	3.5	85		18	982	2.3	
18	3.5	90		18	988	4.8	91-93 ft, duplicate sample **MD21-05-61075**
19	4	95	(Qbt2) TUFF (5YR5/2) reddish gray; medium ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-1 mm, 5%; pumice, dark gray, 1 cm, 5%	<73	933	14.1	93-95 ft, Qbt3/Qbt2 contact sample **MD21-05-61021**
20	2	100		6	1049	0.8	
21	5	105		<73	1117	4.0	
22	5	110		36	1031	5.0	
23	5	115		12	755	2.2	118-120 ft, T.D. sample **MD21-05-61022**
24	4	120	**Borehole T.D. 120 ft bgs**	36	847	1.0	

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-03

Location ID: 21-24776

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: NW corner outside MDA U

Date Started: 07/06/05
Date Completed: 7/7/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	5	5	<bg	622	1.3	0-0.5 ft, surface sample **MD21-05-61026**; 3-5 ft, base structure sample **MD21-05-61027**
2	2.5	10	<bg	761	2.4	
3	3.5	15	<bg	1019	3.1	
4	5	20	6	607	1.8	21-23 ft, fracture zone sample **MD21-05-61028**
5	5	25	<bg	485	1.9	
6	5	30	9	626	2.0	
7	5	35	42	632	2.3	
8	5	40	18	847	1.8	
9	5	45	<bg	577	3.8	
10	5	50	<bg	890	3.9	
11	5	55	<bg	945	2.6	
12	5	60	<bg	1068	1.6	
13	5	65	6	583	2.0	
14	3.5	70	<bg	779	3.7	
15	4	75	<bg	589	3.3	
16	4	80	18	552	2.7	
17	4	85	42	546	5.0	
18	5	90	18	853	1.6	
19	5	95	<bg	564	7.1	92-94 ft, Qbt3/Qbt2 contact sample **MD21-05-61029**
20	3.5	100	<bg	1098	8.1	
21	3.5	105	30	908	6.9	
22	4	110	<bg	755	7.8	
23	5	115	24	589	1.1	
24	3.5	120	<bg	663	1.2	118-120 ft, total depth sample **MD21-05-61030**

Lithological Description

FILL SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry; roots and other organics present throughout

(Qbt3) TUFF (5YR7/1 to 6/2) light gray to pinkish gray; fine ash matrix; SLIGHTLY to MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5% with altered white (clay-like) pumice, 3%; reddish brown staining (<5%)

FRACTURE ZONE 60-degree clay-fill fracture, reddish brown, 2 cm thickness

(Qbt3) TUFF (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON welded; trace phenocrysts <1 mm, <3%; altered white pumice, 1 cm, <3%

(Qbt3) TUFF (5YR5/1 to 5/2) gray to reddish gray; fine ash matrix; SLIGHTLY to NON welded; welded nodules, rounded, to 3 cm throughout matrix; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, dark gray to gray, 2-4 cm, 3%, slightly recrystallized

(Qbt2) TUFF (5YR5/2) reddish gray; medium ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-1 mm, 5%; pumice, dark gray, 1 cm, 5%

Borehole T.D. 120 ft bgs

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U between absorption beds

Date Started: 07/19/05
Date Completed: 8/1/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
			FILL SILT with 30% CLAY (7.5YR5/6) strong brown; low plasticity; loose, dry; does not appear to be fill material below 3 ft bgs				0-0.5 ft, surface sample **MD21-05-60922**
1	4.5	5	(Qbt3) TUFF (5YR6/1 to 6/2) light gray to pinkish gray; NON to SLIGHTLY welded; phenocrysts (quartz) <1-2 mm, 3%; pumice, altered white (clay-like) and gray, recrystallized, <1-1cm, 5%	60	2910	4.9	
2	3	10		84	3260	4.3	8-10 ft, base structure sample **MD21-05-60977** 10-10.5 ft, geotechnical sample **MD21-05-60923**
3	2	15		88	3200	5.0	13-15 ft, base structure sample **MD21-05-60978**
4	3.5	20		90	3060	5.6	12.5-13 ft, geotechnical sample **MD21-05-50924**
5	5	25		96	3190	1.3	23-25 ft, sample **MD21-05-60979**
6	5	30		96	3080	6.1	22.5-23 ft, geotechnical sample **MD21-05-60925**
7	5	35		60	3280	5.8	33-35 ft, sample **MD21-05-50980**
8	5	40		60	3510	1.1	32.5-33 ft, geotechnical sample **MD21-05-60926**
9	2.5	45		133	3800	1.4	43-45 ft, sample **MD21-05-60981**
10	5	50		127	2930	3.2	42.5-43 ft, geotechnical sample **MD21-05-60927**
11	5	55		54	3140	2.7	
12	5	60		66	3290	3.0	
13	5	65		60	2980	3.7	
14	5	70	(Qbt3) TUFF (5YR6/1) light gray; fine ash matrix; NON welded; phenocrysts (quartz and sanidine) <1-3mm, 5%; pumice, light gray, altered white (clay-like) 2-4cm, 5%	84	3320	3.5	
15	5	75		72	3080	3.9	
		80					

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U between absorption beds

Date Started: 07/19/05
Date Completed: 8/1/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
16	5			84	2750	4.5	
17	5	85		90	3110	12.3	
18	5	90		102	3230	12.8	
			(Qbt3) TUFF MOISTURE ZONE				
19	5	95	(Qbt2) TUFF (5YR5/1 to 5/2) gray grading to reddish gray; WELDED; phenocrysts (quartz and sanidine) <1-3mm, 3%; altered light gray pumice, <1-2 cm, 3%; drilling difficult through this welded zone	78	3130	12.7	98-100 ft, Qbt3/Qbt2 contact sample **MD21-05-62678**
20	5	100		60	3350	15.1	95.5-97.5 ft, duplicate sample **MD21-05-60982**
21	5	105		108	3460	13.8	97.5-98 ft, geotechnical sample **MD21-05-60929** 95-95.5 ft, geotechnical duplicate sample **MD21-05-60928**
22	5	110		60	3350	12.4	
		115		NA	NA	NA	
		120		NA	NA	NA	
25	5	125	(Qbt2) TUFF (5YR4/1 to 4/2) dark gray to dark reddish gray; WELDED; phenocrysts (quartz and sanidine) <1-1mm, 3%; pumice, slightly recrystallized dark gray, <1-2cm, 5%	84	3510	1.4	
26	5	130		48	3130	4.1	
27	5	135		84	3260	4.3	
28	5	140		90	3140	5.0	
29	5	145		96	3080	6.1	148-150 ft, Qbt2 sample **MD21-05-62679**
30	2.5	150		72	3330	8.9	148-150 ft, duplicate sample **MD21-05-61079**
31	5	155		102	2900	8.1	147.5-148 ft, geotechnical sample **MD21-05-60930**
		160					

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U between absorption beds

Date Started: 07/19/05
Date Completed: 8/1/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
32	5			SAME AS ABOVE	66	3340	7.6	
33	5	165			78	3360	8.4	
34	5	170			96	3330	8.5	170-172 ft, contact sample **MD21-05-62680**
35	3.5	175		(Qbt1v) TUFF (5YR5/2) reddish gray; fine ash matrix; NON to SLIGHTLY welded; phenocrysts (quartz), 1-3 mm, 5%; pumice, gray to dark gray, <1-1cm, 3%; clastics and clay fragments, <1-2 mm, present at 180 ft bgs	66	3530	8.8	
36	5	180			42	3360	5.1	
37	4.5	185			66	3190	5.0	182.5-183 ft, geotechnical duplicate sample **MD21-05-60931**
38	5	190		(Qbt1v) TUFF (5YR5/2 to 4/2) reddish gray to dark reddish gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), 1-3 mm, 5%; pumice, reddish brown, <1-1cm, 3%; medium olive staining at 190 ft bgs, <5%	96	3200	4.5	183-183.5 ft, geotechnical sample **MD21-05-60932**
39	5	195			72	3610	3.3	
40	5	200			127	3830	4.1	
41	5	205			84	3240	3.4	
42	5	210			90	3370	4.6	
43	5	215			78	3330	4.2	
44	5	220			96	3270	3.5	
45	5	225		(Qbt1v) MOISTURE ZONE	102	3240	4.3	225-227 ft, high moisture content sample **MD21-05-62681**
46	5	230		(Qbt1v) TUFF (5YR5/6 to 5/4) yellowish red to reddish brown; SLIGHTLY welded; phenocrysts <1-2 mm, 5%; pumice, altered brown, <1-2 cm, 3%; intermittent reworked fine brown sand from 245-250 ft bgs	78	3420	11.0	228-230 ft, high moisture content **MD21-05-62682**
47	5	235			78	3320	1.4	230-230.5 ft, geotechnical sample **MD21-05-60933**
		240						

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U between absorption beds

Date Started: 07/19/05
Date Completed: 8/1/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
48	5				84	3390	2.6	
49	5	245			69	3640	4.8	
50	5	250			94	3450	3.5	
51	5	255			70	3250	6.7	
52	5	260		(Qbt1g) TUFF (5YR6/3 to 6/2) light reddish brown to pinkish gray; medium ash matrix; NON welded; phenocrysts (quartz and abundant glassy minerals), <1-2 mm, >5%; large altered white to light gray vitreous pumice, 2-5cm, containing quartz phenocrysts <1-1mm, 3%	75	3360	7.3	
53	5	265			96	3490	3.3	
54	5	270			82	3390	3.1	
55	5	275			118	3350	3.1	
56	5	280			78	3375	2.6	
57	5	285			76	2990	4.2	
58	5	290			80	3390	3.8	
59	5	295			74	3060	4.8	
60	5	300			72	3700	4.4	297.5-298 ft, geotechnical sample **MD21-05-60934**
61	5	305			110	3410	2.2	
62	5	310			120	4070	2.7	
63	5	315			90	3540	2.2	
		320						

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/14/05

Lithologic Drilling Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U between absorption beds

Date Started: 07/19/05
Date Completed: 8/1/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
64	5				102	3490	3.3	321-321.5 ft, geotechnical sample **MD21-05-60935**
65	4	325		PUMICE RICH ZONE NON-welded; white altered pumice fragments to 4 cm, >10%; coarse matrix, (5YR6/6) reddish yellow	84	3460	3.2	
66	5	330		(Qct) TUFFACEOUS SAND with SILT and CLAY (5YR6/6) reddish yellow; coarse; angular; moist at bottom	58	3250	3.5	332.5-333 ft, geotechnical sample **MD21-05-60936**
67	5	335		(Qct) TUFF MOISTURE ZONE	123	3320	2.2	333-335 ft, high moisture content sample **MD21-05-62956**
68	5	340			64	1320	4.7	337.5-338 ft, geotechnical sample **MD21-05-60937**
69	4.5	345		(Qct) SAND with CLAY (5YR5/2); well sorted; fine; minor lithics, moist from 335 to 342; reworked pumice fragments, native lithics, tuffaceous sand and gravel at 340 ft bgs	67	3370	2.2	338-340 ft, high moisture content sample **MD21-05-62957**
70	5	350			72	3140	3.3	
71	5	355		TUFF; (5YR4/3); NON welded; moist; lithic rich; trace orange fibrous pumice; phenocrysts to 2mm, 3%; lithics to 3cm, 5%; large native chunks to 4cm; fine ash matrix, dry	67	3160	3.4	
72	5	360		**Borehole T.D. 360 ft bgs**	96	3240	5.3	357.5-358 ft, geotechnical sample **MD21-05-60938** 358-360 ft, total depth sample **MD21-05-62958**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-05

Location ID: 21-24777

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Due N outside MDA U

Date Started: 07/05/05
Date Completed: 7/6/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
				FILL SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry; roots and other organics present throughout				0-0.5 ft, surface sample **MD21-05-61034** 3-5 ft, base structure sample, **MD21-05-61035**
1	4	5			6	1006	0.4	
2	5	10			0	509	0.5	
3	5	15		(Qbt3) TUFF (5YR7/1) light gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), <1-1 mm, 5%; pumice fragments, dark gray, 1 cm, 3%	0	859	1.7	
4	5	20			0	792	1.3	
5	5	25			0	816	1.2	
6	5	30			12	810	1.9	
7	5	35		Staining zone, reddish brown, 5%	0	902	1.4	
				(Qbt3) TUFF (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON welded; trace phenocrysts <1 mm, <3%; altered white (clay-like) pumice, 1 cm, <3%				
8	5	40			0	847	4.7	
9	5	45			24	712	4.5	
10	5	50			6	540	4.9	
11	4	55			0	730	4.4	
12	4	60			12	951	4.6	
13	3.5	65			0	828	2.5	
14	4	70		(Qbt3) TUFF (5YR5/1 to 5/2) gray grading to reddish gray; fine ash matrix; NON welded; welded nodules, rounded, to 3 cm throughout; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, gray to light gray, 2-4 cm, 3%, slightly recrystallized	24	963	3.4	
15	4	75			0	927	5.2	73-75 ft, base fractrure zone sample **MD21-05-61036**
16	5	80			24	994	4.8	
17	5	85			0	718	2.2	
18	5	90			12	515	1.8	
19	5	95		(Qbt2) TUFF (5YR5/2) reddish gray; medium ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-1 mm, 5%; pumice, dark gray, 1 cm, 5%	0	890	7.1	93-95 ft, Qbt3/Qbt2 contact sample **MD21-05-61037**
20	5	100			0	988	2.6	
21	2.2	105			0	1000	6.2	
22	5	110			6	822	3.3	
23	5	115			36	736	4.7	
24	5	120		**T.D. borehole 120 ft bgs**	8	672	3.7	118-120 ft, total depth sample **MD21-05-61038**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-06

Location ID: 21-24778

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: W edge outside MDA U

Date Started: 07/11/05
Date Completed: 7/12/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	3.5	5		FILL SILT with 30% CLAY (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry (Qbt3) TUFF (5YR5/1 to 6/1) gray to light gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), <1-3 mm, 5%; pumice, gray, 1-3 cm, 3%	72	3100	2.6	0-0.5 ft, surface sample **MD21-05-61042**
2	5	10			66	3160	2.1	10-12 ft, duplicate base structure sample **MD21-05-61076**
3	5	15			78	3380	4.9	
4	4	20			78	3180	5.6	12-14 ft, base structure sample **MD21-05-61043**
5	2	25			84	3280	4.9	
6	3	30			98	3540	5.4	
7	5	35		(Qbt3) FRACTURE ZONE reddish brown banded staining 2-3 mm throughout, 60-degree clay-filled fracture zone at 33 ft bgs	90	2300	6.1	33-35 ft, strong fracture zone sample **MD21-05-61044**
8	5	40		(Qbt3) TUFF (5YR7/1) light gray; fine ash matrix; MODERATELY welded; phenocrysts <1-3 mm, 5%; pumice, dark gray and altered white (clay-like), 1-3 cm, 3%; minor (<5%) reddish brown staining throughout	46	2450	5.8	
9	5	45			45	2400	2.4	
10	4.5	50		(Qbt3) FRACTURE ZONE reddish brown vertical clay-filled fracture, 2 cm thickness	50	2310	3.6	48-50 ft, base fracture zone sample **MD21-05-61045**
11	5	55			39	2190	6.1	
12	5	60			40	2080	5.4	
13	5	65		(Qbt3) TUFF (5YR7/1 to 6/1) light gray grading to gray; fine ash matrix; SLIGHTLY welded; phenocrysts <1-3 mm, 5%; pumice, dark gray, 1-3 cm, 3%. Minor (<3%) reddish brown staining from 50-52 ft bgs	41	2100	5.5	
14	5	70			40	2100	4.3	
15	4	75			42	2100	4.9	
16	4	80			35	1995	4.4	
17	5	85		(Qbt3) TUFF (5YR7/1) light gray; fine ash matrix; NON welded; phenocrysts (quartz and mafic minerals) <1-3 mm, 5%; pumice, gray to light gray, 1-3 cm, 3%. Increasing sanidine from 85-99 ft bgs	84	3140	2.1	
18	4.5	90			78	3000	5.1	
19	5	95			42	3290	3.2	
20	5	100			84	3510	6.3	98-100 ft, Qbt3/Qbt2 contact sample **MD21-05-61046**
21	5	105		(Qbt2) TUFF (5YR5/2) reddish gray; medium ash matrix; MODERATELY welded; phenocrysts (sanidine and quartz) 1-4 mm, 5%; pumice fragments, light gray, recrystallized, <1 cm, 3%	60	3100	5.7	
22	5	110			78	3330	4.8	
23	4.5	115			78	3200	4.2	
24	5	120		**Borehole T.D. 120 ft bgs**	90	3170	4.5	118-120 ft, total depth sample **MD21-05-61047**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-07

Location ID: 21-24779

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: E edge outside MDA U

Date Started: 06/23/05
Date Completed: 6/27/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	3.5	5	FILL SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry; caliche present throughout and reworked light gray tuff	3.6	418	1.2	0-0.5 ft, surface sample **MD21-05-61050**
2	5	10		1.8	547	2.3	10-12 ft, base structure sample **MD21-05-61051**
3	2	15		66	848	2.6	
4	2.5	20		48	1125	2.7	
5	3	25	(Qbt3) TUFF (5YR7/1 to 6/2) light to pinkish gray; fine ash matrix; MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%; reddish brown staining (<5%) throughout.	35.9	617	1.2	
6	3.5	30	Intermittent CHANNEL ZONE from 24-31 ft bgs; native lithics (dacites); well-graded; coarse to 3 mm; rounded to subrounded; dry	35.9	187	2.0	
7	2.5	35	COBBLE ZONE rounded, 3-6 cm, native dacites	35.9	518	50	
8	4.5	40		5	580	41	
9	4	45		5	1083	43	
10	4	50		5	610	43	
11	5	55	(Qbt3) TUFF (5YR7/2 to 6/1) pinkish gray to light gray; fine to medium ash matrix; MODERATELY welded; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%	5	261	52	
12	5	60		5	543	45	
13	4	65		5	380	44	
14	5	70	Elevated field screen level for organic vapors	5	202	162	67-69 ft, elevated field screen sample **MD21-05-61052** NOTE: This sample also analyzed for Dioxins, Furans and HE
15	4	75	(Qbt3) TUFF (5YR7/2 to 5/2) pinkish gray grading to reddish gray; fine ash matrix; NON welded; phenocrysts (quartz and mafic minerals) <1-1 mm, 5%; pumice gray to altered white, <1-1 cm, 3%; minor staining, <5%, reddish brown, toward 94 ft bgs	18	208	4.2	
16	4	80		6	785	11.4	
17	4	85		85	128	6.2	72-74 ft, base fracture zone sample **MD21-05-61053**
18	4.5	90		85	276	10.8	
19	4.5	95		85	356	7.5	94-96 ft, Qbt3/Qbt2 contact sample **MD21-05-61054**
20	4	100	(Qbt2) TUFF (5YR5/2) reddish gray; fine ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-2 mm, 3%; trace pumice fragments, <2 mm, <3%	18	908	2.6	
21	4	105		12	785	1.9	
22	3.5	110		12	1025	1.8	
23	5	115		30	785	1.6	
24	5	119	**Borehole T.D. 119 ft bgs**	54	828	2.0	117-119 ft, total depth sample **MD21-05-61055**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: BH-08

Location ID: 21-24780

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: S MDA U approximately 50 ft

Date Started: 06/29/05
Date Completed: 6/30/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
			FILL (5YR4/6) strong brown silt with clay (20%); roots, other organic debris present				0-0.5 ft, surface sample **MD21-05-61058**
1	4.5	5		36	448	8.3	3-5 ft, base structure sample **MD21-05-61059**
2	5	10	(Qbt3) TUFF (5YR6/2 to 7/1) pinkish gray grading to light gray; fine ash matrix; MODERATELY to SLIGHTLY welded; phenocrysts (quartz), <1-2 mm, 3%; pumice fragments, dark gray to gray, <1-3 cm, 3%	0	963	4.3	
3	5	15		42	1056	4.4	
4	5	20		6	933	4.6	
5	5	25		630	1086	3.8	
6	5	30		0	1146	2.3	
7	5	35		0	632	1.9	
8	5	40		0	650	2.2	
9	4.5	45		30	718	1.7	
10	3.5	50		30	1160	3.4	
11	4	55		6	838	1.3	
12	3.5	60		0	963	1.6	
13	3	65		0	724	0.7	63-65 ft, base fracture zone sample **MD21-05-61060**
14	3.5	70	(Qbt3) SAME grading to (5YR5/2) reddish gray; fine ash matrix; NON welded; phenocrysts (quartz and mafic minerals), <1-2 mm, 3%; pumice fragments, altered gray, <1-1 cm, <3%	24	902	1.1	
15	3.8	75		0	1320	0.2	
16	3	80		6	939	0.7	
17	3.5	85		30	1240	2.1	
18	3.5	90	(Qbt2) TUFF (5YR6/2 to 5/2) pinkish gray to reddish gray; medium ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-3 mm, 5%; pumice fragments, altered greenish gray and dark gray, <1-2 cm, 3%	85	1295	2.5	88-90 ft, Qbt3/Qbt2 contact sample **MD21-05-61061**
19	4	95		42	1129	2.6	
20	3.8	100		18	1277	2.4	
21	3.5	105		12	1098	2.8	
22	3	110		6	920	3.6	
23	3.5	115		0	1405	2.2	
24	5	120	**Borehole T.D. 120 ft bgs**	24	1252	0.6	118-120 ft, total depth sample **MD21-05-61085**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

Lithologic Drilling Log of Borehole: BH-09

Location ID: 21-24781

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: SE corner outside MDA U

Date Started: 07/15/05
Date Completed: 7/18/2005
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
		0		FILL SILT with 30% CLAY (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry				0-0.5 ft, surface sample **MD21-05-61066**
1	4.5	5			90	3210	2.3	
2	3	10			60	3270	7.0	
3	3	15		(Qbt3) TUFF (5YR5/1) gray; SLIGHTLY welded; phenocrysts 1-3mm, 5%; pumice <1 cm, 3%, light to dark gray; slightly moist from 18-20 ft bgs with reddish-gray staining; zones of banded staining, continuous, <0.5-ft thick present throughout interval	121	3250	7.5	
4	3.5	20			72	3130	8.5	18-20 ft, base structure sample **MD21-05-61067**
5	4	25			66	3060	7.8	
6	3.5	30			78	3240	8.5	
7	4	35			72	3030	9.3	
8	4.5	40		(Qbt3) TUFF (5YR5/1 to 6/1) gray SLIGHTLY to NON welded; decreasing phenocrysts, <1-1mm 3%; increasing pumice, altered white (clay-like) to 3 cm, 5%. Sanidine present at 65 ft bgs	121	3320	9.7	
9	5	45			115	3160	9.8	
10	5	50			60	3010	9.3	
11	5	55			72	3240	7.8	
12	5	60			72	3280	7.2	
13	5	65			84	3140	8.3	
14	4.5	70			66	2970	6.4	
15	5	75			66	3100	6.6	71-73 ft, duplicate fracture zone sample **MD21-05-61078**
16	4.5	80			54	3400	9.2	73-75 ft, fracture zone sample **MD21-05-61068**
17	5	85		(Qbt3) PUMICE ZONE altered white (clay-like); pumice fragments, 1-5 cm	96	3590	7.3	
18	5	90		(Qbt3) TUFF (5YR5/1 to 5/2) gray to reddish gray; fine ash matrix; NON welded; phenocrysts (quartz, mafic minerals) <1-1mm, 5%; pumice fragments, altered white (clay-like), <3-5 cm, 3%	84	3330	7.1	
19	5	95			90	3220	7.5	
20	5	100		(Qbt2) TUFF (5YR5/1 to 4/1) gray to dark gray, welded; phenocrysts <1-3mm, 5% increasing sanidine at 110 ft bgs; recrystalized pumice, dark gray, 1-3cm, 5%	66	3390	8.0	98-100 ft, Qbt3/Qbt2 contact sample **MD21-05-61069**
21	5	105			102	5690	7.8	
22	3	110		(Qbt2) TUFF (5YR5/1 to 4/1) gray to dark gray, welded; phenocrysts <1-3mm, 5% sanidine to 5%; recrystalized pumice, dark gray, 1-3cm, 5%	139	3350	7.2	
23	3.5	115			84	3330	7.6	
24	5	120		**Borehole T.D. 120 ft bgs**	102	3220	7.4	118-120 ft, total depth sample **MD21-05-61070**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

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Lithologic Drilling Log of Borehole: MDA U-1

Location ID: 21-10838

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Adjacent to west end of MDA U Boundary

Date Started: 9/22/1998
Date Completed: 9/25/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	0.5			FILL reworked brown tuff with organics	NA	No Detectable Activity	NA	
2	1.25			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA		NA	
3	1.8	5			NA	NDA	NA	4-5 ft, core **MD21-98-0394**
4	2.5				NA	NDA NDA	NA	
5	2.5	10			NA	NDA	NA	
6	2.5				NA	NDA	NA	14-15 ft, core **MD21-98-0392**
7	2.5	15			NA	NDA	NA	
8	2.5				NA	NDA	NA	
9	2.5	20			NA	NDA	NA	
10	2.5				NA	NDA	NA	
11	2.5	25			NA	NDA	NA	24-25 ft, core **MD21-98-0395**
12	2.5				NA	NDA	NA	25 ft, soil gas
13	2.5	30			NA	NDA	NA	**MD21-98-0398**
14	2.5				NA	NDA	NA	
15	2.5	35			NA	NDA	NA	34-35 ft, core **MD21-98-0393**
16	2.5				NA	NDA	NA	
17	2.5	40			NA	NDA	NA	
18	2.5			FRACTURE ZONE brown, clay-filled fracture, 2-5 mm	NA	NDA	NA	
19	2.5	45		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	44-45 ft, core **MD21-98-0397**
20	2.5				NA	NDA	NA	
21	2.5	50			NA	NDA	NA	
22	2.5				NA	NDA	NA	
23	2.5	55		FRACTURE ZONE brown, clay-filled fracture, 2-5 mm	NA	NDA	NA	54-55 ft, core **MD21-98-0507**
24	2.5			FRACTURE ZONE brown, clay-filled fracture, 2-5 mm	NA	NDA	NA	55 ft, soil gas
25	2.5	60		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	**MD21-98-0399**
26	2.5				NA	NDA	NA	
27	2.5	65		FRACTURE ZONE brown, clay-filled fracture, 2-5 mm	NA	NDA	NA	64-65 ft, core **MD21-98-0396**
28	2.5				NA	NDA	NA	
29	2.5	70		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
30	2.5				NA	NDA	NA	
		75		**Borehole T.D. 75 ft bgs**				74-75 ft, core **MD21-98-0506** 75 ft, soil gas **MD21-98-0400**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: MDA U-2 — Location ID: 21-10839

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U

Date Started: 9/28/1998
Date Completed: 9/30/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	1.5			TOPSOIL. Brown, with organics.	NA	193.66 b/g	NA	
2	0.5			FILL. Reworked gray tuff.	NA	No Detectable Activity	NA	MD21-98-0508 Core, 2-3 ft.
3	1.5	5		COBBLES and BOULDERS. Absorption bed FILL material.	NA	NDA	NA	
4	2.5			(Qbt3) TUFF. (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm.	NA	NDA	NA	
5	2.5	10			NA	NDA	NA	
6	2.5				NA	NDA	NA	
7	2.5	15			NA	NDA	NA	MD21-98-0402 Core, 14-15 ft.
8	2.5				NA	72.55 b/g	NA	
9	2.5	20			NA	134.55 b/g	NA	
10	2.5				NA	51.55 b/g	NA	
11	2.5	25			NA	NDA	NA	MD21-98-0403 Core, 24-25 ft.
12	2.5				NA	NDA	NA	MD21-98-0408 Soil Gas, 25 ft.
13	2.5	30			NA	108.55 b/g	NA	
14	2.5				NA	NDA	NA	
15	2.5	35			NA	NDA	NA	MD21-98-0405 Core, 34-35 ft.
16	2.5				NA	NDA	NA	
17	2.5	40			NA	NDA	NA	
18	2.5				NA	NDA	NA	
19	2.5	45			NA	NDA	NA	MD21-98-0406 Core, 44-45 ft.
20	2.5				NA	NDA	NA	
21	2.5	50			NA	23.55 b/g	NA	
22	2.5				NA	NDA	NA	MD21-98-0509 Core, 51.5-52.5 ft.
23	2.5	55			NA	NDA	NA	MD21-98-0409 Soil Gas, 55 ft.
24	2.5				NA	NDA	NA	
25	2.5	60		FRACTURE ZONE. brown clay interbeds, 2-5 mm	NA	178.55 b/g	NA	MD21-98-0404 Core, 59-60 ft.
26	2.0			(Qbt3) TUFF. (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm.	NA	NDA	NA	
27	2.0	65			NA	NDA	NA	
28	2.0				NA	NDA	NA	
29	2.0	70		FRACTURE ZONE. brown clay interbeds, 2-5 mm	NA	NDA	NA	
30	2.0				NA	NDA	NA	
		75		**Borehole T.D. 75 ft bgs**				MD21-98-0407 Core, 74-75 ft. MD21-98-0410 Soil Gas, 75 ft.

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/15/05

Lithologic Drilling Log of Borehole: MDA U-3

Location ID: 21-10840

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U

Date Started: 9/30/1998
Date Completed: 10/2/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	2.0		TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	2.5		FILL Reworked gray tuff	NA		NA	
3	1.0	5		NA	113.5 b/g	NA	4-5 ft, core **MD21-98-0412**
4	0.12		COBBLES and BOULDERS Absorption bed FILL material	NA	NDA NDA	NA	
5	2.5	10		NA	NDA	NA	
6	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	11.5-12.5 ft, core **MD21-98-0414**
7	2.5	15		NA	NDA	NA	
8	2.5			NA	NDA	NA	
9	2.5	20		NA	NDA	NA	
10	2.5			NA	127.0 b/g	NA	21.5-22.5 ft, core **MD21-98-0413**
11	2.5	25		NA	NDA	NA	25 ft, soil gas **MD21-98-0418**
12	2.5			NA	NDA	NA	
13	2.5	30		NA	NDA	NA	
14	2.5			NA	NDA	NA	
15	2.5	35		NA	24.23 b/g	NA	34-35 ft, core **MD21-98-0415**
16	2.0			NA	NDA	NA	
17	2.5	40		NA	NDA	NA	
18	2.5			NA	NDA	NA	
19	2.5	45		NA	NDA	NA	44-45 ft, core **MD21-98-0417**
20	2.5			NA	NDA	NA	46.5-47.5 ft, core **MD21-98-0416**
21	2.5	50		NA	NDA	NA	
22	2.5			NA	NDA	NA	
23	2.5	55	FRACTURE ZONE brown clay interbeds, 2-5 mm	NA	NDA	NA	55 ft, soil gas **MD21-98-0419**
24	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
25	2.5	60		NA	NDA	NA	
26	2.0			NA	NDA	NA	
27	2.0	65		NA	59.23 b/g	NA	64-65 ft, core **MD21-98-0422**
28	1.7			NA	NDA	NA	
29	2.0	70		NA	NDA	NA	
30	2.0			NA	NDA	NA	
		75	**Borehole T.D. 75 ft bgs**				74-75 ft, core **MD21-98-0511** 75 ft, soil gas **MD21-98-0420**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

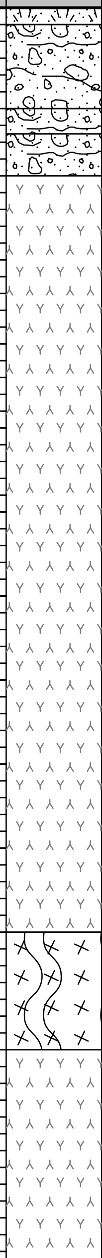
Shaw® Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

Lithologic Drilling Log of Borehole: MDA U-4 — Location ID: 21-10841

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U

Date Started: 10/05/1998
Date Completed: 10/5/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"



Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	1.8		TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	2.0		FILL Reworked gray tuff	NA		NA	
3	2.0	5		NA	NDA	NA	4-5 ft, core **MD21-98-0423**
4	0		FILL Silty CLAY and fine SAND, brown; COBBLES and BOULDERS Absorption bed	NA	NDA NDA	NA	
5	2.5	10	FILL material	NA	NDA	NA	
6	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	0.98 cpm	NDA	NA	11.5-12.5 ft, core **MD21-98-0425**
7	2.5	15		NA	NDA	NA	
8	2.5			NA	NDA	NA	
9	2.5	20		NA	NDA	NA	
10	2.5			NA	NDA	NA	
11	2.5	25		NA	NDA	NA	24-25 ft, core **MD21-98-0424**
12	2.0			NA	NDA	NA	25 ft, soil gas **MD21-98-0429**
13	2.5	30		NA	NDA	NA	
14	2.5			NA	NDA	NA	
15	2.5	35		NA	NDA	NA	34-35 ft, core **MD21-98-0426**
16	2.5			NA	NDA	NA	
17	2.5	40		NA	NDA	NA	
18	2.0			NA	NDA	NA	
19	2.0	45		NA	NDA	NA	44-45 ft, core **MD21-98-0428**
20	2.5			NA	NDA	NA	
21	2.0	50		NA	NDA	NA	
22	2.5			NA	NDA	NA	
23	2.0	55	FRACTURE ZONE brown clay interbeds, 2-5 mm	NA	NDA	NA	54-55 ft, core **MD21-98-0513**; 55 ft, soil gas **MD21-98-0430**; 56.5-57.5 ft, core **MD21-98-0427**
24	2.0			NA	NDA	NA	
25	2.0	60		NA	NDA	NA	
26	2.0		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
27	2.0	65		NA	NDA	NA	
28	1.8			NA	NDA	NA	
29	1.8	70		NA	NDA	NA	
30	1.7			NA	NDA	NA	
		75	**Borehole T.D. 75 ft bgs**				74-75 ft, core **MD21-98-0512**; 75 ft, soil gas **MD21-98-0431**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

Lithologic Drilling Log of Borehole: MDA U-5 Location ID: 21-10842

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Inside MDA U

Date Started: 10/06/1998
Date Completed: 10/7/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	0			TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	1.8			FILL Reworked gray tuff	NA		NA	
3	1.8	5			NA	NDA	NA	4-5 ft, core **MD21-98-0433**
4	1.8			COBBLES and BOULDERS Absorption bed FILL material	NA	18.37 cpm	NA	
5	0	10			NA	NDA	NA	
6	2.0			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA NDA	NA	
7	1.8	15			NA	17.37 cpm	NA	14-15 ft, core **MD21-98-0435**
8	2.5				NA	NDA	NA	
9	2.5	20		FRACTURE ZONE brown clay interbeds, 2-5 mm	NA	NDA	NA	
10	1.8				NA	NDA	NA	
11	1.8	25		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	24-25 ft, core **MD21-98-0434**
12	2.0				NA	24.52 cpm	NA	25 ft, soil gas **MD21-98-0439**
13	2.0	30		FRACTURE ZONE brown clay interbeds, 2-5 mm	NA	NDA	NA	26.5-27.5 ft, core **MD21-98-0438**
14	2.5				NA	NDA	NA	
15	2.0	35		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
16	2.2				NA	NDA	NA	
17	2.0	40			NA	NDA	NA	
18	2.0				NA	NDA	NA	
19	2.0	45			NA	NDA	NA	44-45 ft, core **MD21-98-0436**
20	1.8				NA	NDA	NA	
21	2.0	50			NA	58.52 cpm	NA	49-50 ft, core **MD21-98-0437**
22	2.0				NA	NDA	NA	
23	2.2	55		No recovery pushed boulder in tip of spoon	NA	NDA	NA	55 ft, soil gas **MD21-98-0440**
24	0				NA	NDA	NA	
25	0	60			NA	NDA	NA	
26	0			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
27	2.0	65			NA	NDA	NA	
28	2.0				NA	NDA	NA	
29	2.2	70			NA	96.52 cpm	NA	
30	2.2				NA	NDA	NA	71.5-72.5 ft, core **MD21-98-0515**
		75		**Borehole T.D. 75 ft bgs**				75 ft, soil gas **MD21-98-0481**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

Lithologic Drilling Log of Borehole: MDA U-6 — Location ID: 21-10843

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Adjacent to east end of MDA U Boundary
Date Started: 10/13/1998
Date Completed: 10/14/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Graphic	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	0			TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	2.0			FILL Reworked gray tuff	NA		NA	
3	2.5	5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	4-5 ft, core **MD21-98-0443**
4	2.5				NA	NDA NDA	NA	
5	2.5	10			NA	NDA	NA	
6	2.5				NA	NDA	NA	
7	2.5	15			NA	NDA	NA	14-15 ft, core **MD21-98-0445**
8	2.5				NA	NDA	NA	
9	2.5	20		SAME MODERATELY welded	NA	NDA	NA	
10	2.5			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
11	2.5	25			NA	NDA	NA	24-25 ft, core **MD21-98-0444**
12	2.5				NA	NDA	NA	25 ft, soil gas
13	2.5	30			NA	NDA	NA	**MD21-98-0449**
14	2.5				NA	NDA	NA	
15	2.5	35			NA	NDA	NA	34-35 ft, core **MD21-98-0446**
16	2.5				NA	NDA	NA	
17	2.5	40			NA	NDA	NA	
18	2.5				NA	NDA	NA	
19	2.5	45			NA	NDA	NA	44-45 ft, core **MD21-98-0447**
20	2.5				NA	NDA	NA	
21	2.5	50			NA	NDA	NA	
22	2.5			FRACTURE ZONE Iron staining present, 2-5 mm	NA	NDA	NA	
23	2.5	55			NA	NDA	NA	54-55 ft, core **MD21-98-0448**
24	2.5			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	55 ft, soil gas
25	2.5	60			NA	NDA	NA	**MD21-98-0450**
26	2.5				NA	NDA	NA	
27	2.5	65			NA	NDA	NA	64-65 ft, core **MD21-98-0453**
28	2.5				NA	NDA	NA	
29	2.5	70		SAME Lens of powder ash, 10-20 mm	NA	NDA	NA	
30	2.5			(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	72.5-75 ft, core **MD21-98-0516/0517**
		75		**Borehole T.D. 75 ft bgs**				75 ft, soil gas **MD21-98-0451**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

Shaw® Shaw Environmental, Inc.

Lithologic Drilling Log of Borehole: MDA U-7 — Location ID: 21-10844

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Adjacent to north end of MDA U Boundary

Date Started: 10/14/1998
Date Completed: 10/15/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	0		TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	2.5		FILL Reworked gray tuff with asphalt material	NA		NA	
3	2.5	5	(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	4-5 ft, core **MD21-98-0454**
4	2.5			NA	NDA NDA	NA	
5	2.5	10	FRACTURE ZONE Oxidized zone 2-5 mm	NA	NDA	NA	
6	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
7	2.5	15		NA	NDA	NA	14-15 ft, core **MD21-98-0456**
8	2.5		FRACTURE ZONE brown clay-fill fracture, 2-5 mm	NA	NDA	NA	
9	2.5	20		NA	NDA	NA	
10	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
11	2.5	25		NA	NDA	NA	24-25 ft, core **MD21-98-0455**
12	2.5			NA	NDA	NA	25 ft, soil gas **MD21-98-0460**
13	2.5	30		NA	NDA	NA	
14	2.5			NA	NDA	NA	
15	2.5	35		NA	NDA	NA	34-35 ft, core **MD21-98-0457**
16	2.5		FRACTURE ZONE oxidized brown clay-fill fracture, 2-5 mm	NA	NDA	NA	
17	2.5	40		NA	NDA	NA	
18	2.5			NA	NDA	NA	
19	2.5	45		NA	NDA	NA	44-45 ft, core **MD21-98-0458**
20	2.5			NA	NDA	NA	
21	2.5	50	(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
22	2.5			NA	NDA	NA	
23	2.5	55		NA	NDA	NA	54-55 ft, core **MD21-98-0459**
24	2.5			NA	NDA	NA	55 ft, soil gas **MD21-98-0461**
25	2.5	60		NA	NDA	NA	
26	2.5			NA	NDA	NA	
27	2.5	65		NA	NDA	NA	64-65 ft, core **MD21-98-0464**
28	2.5			NA	NDA	NA	
29	2.5	70		NA	NDA	NA	
30	2.5			NA	NDA	NA	74-75 ft, core **MD21-98-0519/0465**
		75	**Borehole T.D. 75 ft bgs**				75 ft, soil gas **MD21-98-0462**

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

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MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

Lithologic Drilling Log of Borehole: MDA U-8   Location ID: 21-10845

Los Alamos National Laboratory, Los Alamos, NM
Project Name: MDA U Characterization Drilling
PRS ID: 21-017(a)-99
Borehole Location: Adjacent to north end of MDA U Boundary
Date Started: 10/19/1998
Date Completed: 10/19/1998
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon 3.0"

Run No.	Recovery (ft)	Depth (ft)	Lithological Description	Alpha (dpm)	Beta (dpm)	PID (ppm)	Comments
1	0		TOPSOIL Brown, with organics	NA	No Detectable Activity	NA	
2	2.5		FILL Reworked gray-brown tuff	NA		NA	
3	2.5	5	(Qbt3) TUFF Brown, weathered, clayey silt-filled fractures	NA	NDA	NA	4-5 ft, core **MD21-98-0468**
4	2.5			NA	NDA NDA	NA	
5	2.5	10	FRACTURE ZONE Brown, clay-fill fractures, 2-5 mm	NA	NDA	NA	
6	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
7	2.5	15		NA	NDA	NA	14-15 ft, core **MD21-98-0470**
8	2.5		FRACTURE ZONE Brown, clay-fill fractures, 2-5 mm	NA	NDA	NA	
9	2.5	20		NA	NDA	NA	
10	2.5		(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	
11	2.5	25		NA	NDA	NA	24-25 ft, core **MD21-98-0469**
12	2.5			NA	NDA	NA	25 ft, soil gas
13	2.5	30		NA	NDA	NA	**MD21-98-0474**
14	2.5			NA	NDA	NA	
15	2.5	35		NA	NDA	NA	34-35 ft, core **MD21-98-0471**
16	2.5		FRACTURE ZONE Oxidized brown, clay-fill fractures, 2-5 mm	NA	NDA	NA	
17	2.5	40		NA	NDA	NA	
18	2.5			NA	NDA	NA	
19	2.5	45	(Qbt3) TUFF (5YR6/1) gray; POORLY to NON welded; phenocrysts (quartz and sanidine), 10-20%; pumice fragments 2-5 mm	NA	NDA	NA	44-45 ft, core **MD21-98-0472**
20	2.5			NA	NDA	NA	
21	2.5	50		NA	NDA	NA	
22	2.5			NA	NDA	NA	
23	2.5	55		NA	NDA	NA	54-55 ft, core **MD21-98-0473**
24	2.5			NA	NDA	NA	55 ft, soil gas
25	2.5	60		NA	NDA	NA	**MD21-98-0475**
26	2.5			NA	NDA	NA	
27	2.5	65		NA	NDA	NA	64-65 ft, core **MD21-98-0520**
28	2.5			NA	NDA	NA	
29	2.5	70		NA	NDA	NA	
30	2.5			NA	NDA	NA	74-75 ft, core **MD21-98-0521** 75 ft, soil gas **MD21-98-0476/0477**
		75	**Borehole T.D. 75 ft bgs**				

Field Geologist: A. Bowman, Shaw E & I
Driller: D. Starnes, Spectrum Exploration

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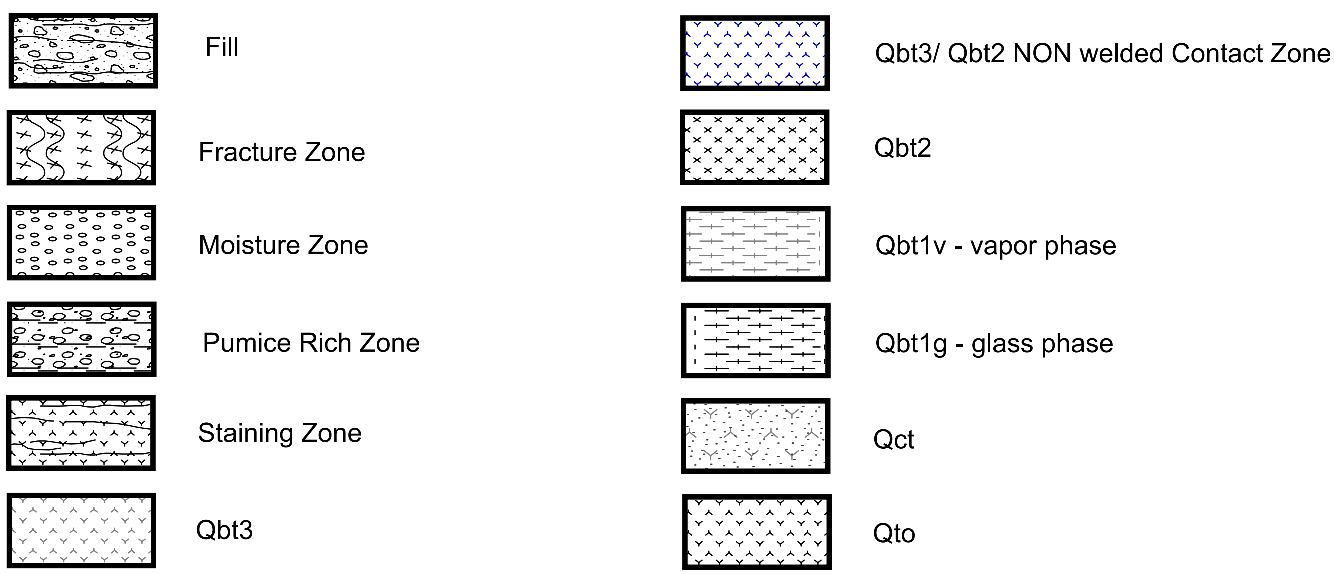
MDA U BOREHOLES (REVISED) FINAL MDA U BOREHOLES.GPJ MDAU.GDT 12/7/05

D-2.0 GEOPHYSICAL LOGS

Listed below are explanations for each column in the Geophysical Logs for each borehole logged in 2005 as well as the graphical representation of each unit encountered at MDA U.

PID	Field Screen levels for organic vapors, measured in parts per million.
CO2	Carbon dioxide levels reached to ensure stabilization during pore gas sampling, measured in parts per million
Sample ID	Laboratory Sample Identification, beginning with MD21-05-XXXXX
Depth	Depth of important lithological features, expressed in feet below ground surface (ft bgs)
Contact Depth	Depth of important lithological contacts, expressed in feet below ground surface (ft bgs)
Graphic	The graphical picture of each lithologic unit, see legend below
Lithologic Description	Narrative description of each lithologic unit
Borehole Image	Video image recorded during geophysical logging
Neutron	Neutron log of soil moisture content, expressed in counts per second (cps)
Gamma	Gamma log of gamma emitters, expressed in counts per second (cps)



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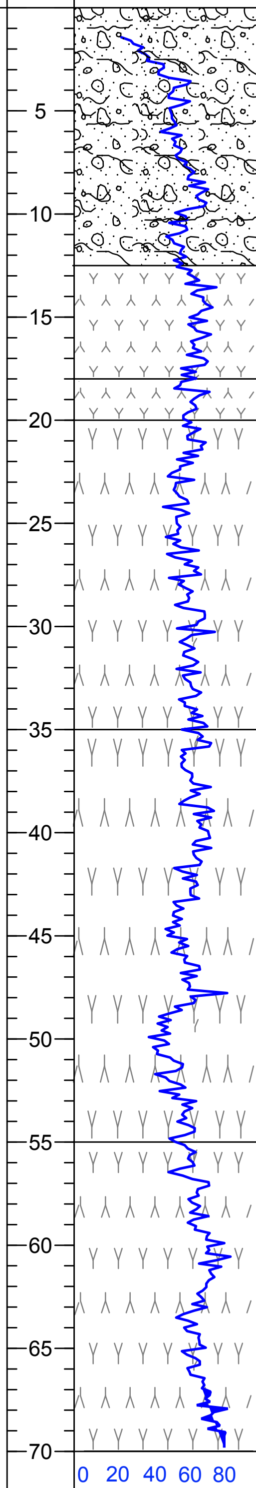
Los Alamos, NM 87544
Phone (505) 661-5200

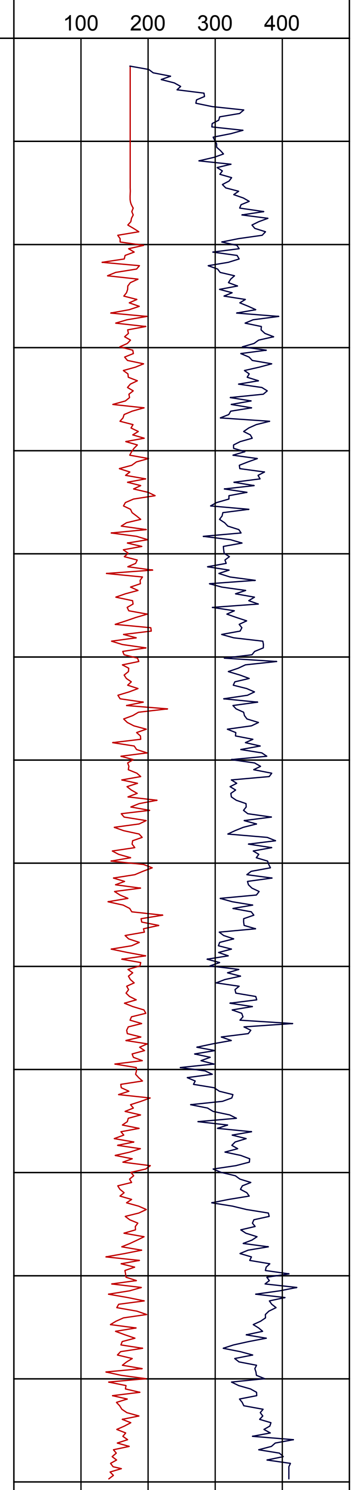
Shaw® Shaw Environmental, Inc.

Geophysical Log of Borehole: BH-01

Location ID: 21-24774
Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/19/05
Date Completed: 09/19/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)	LITHOLOGIC DESCRIPTION
			0–12.5	FILL SILT with 30% CLAY; (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry
			12.5–18	(Qbt3) TUFF (5YR5/1) gray; SLIGHTLY welded; phenocrysts (quartz) 1-3mm, 5%; pumice clasts <1 cm, 3%, light to dark gray.
			18–20	(Qbt3) MOISTURE ZONE 18-20 ft, reddish-gray staining, >5%
0.3	472	-63504	20–35	(Qbt3) Banded staining, continuous, <0.5-ft thick from 25-30 ft bgs.
			35–55	(Qbt3) TUFF. (5YR5/1 to 6/1) gray SLIGHTLY to NON welded; decreasing phenocrysts, <1-1mm 3%; increasing pumice, altered white (clay-like) to 3 cm, 5%.
0.2	1110	-63503	55–70	(Qbt3) SAME with sanidine, <1-1 mm observed at 65 ft bgs.
			70	**Geophysical Logging Total Depth 70 ft bgs**





LAENGN01 MDA U GEOPHYSICAL LOGS.GPJ LAENGN01.GDT 12/14/05

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Shaw® Shaw Environmental, Inc.

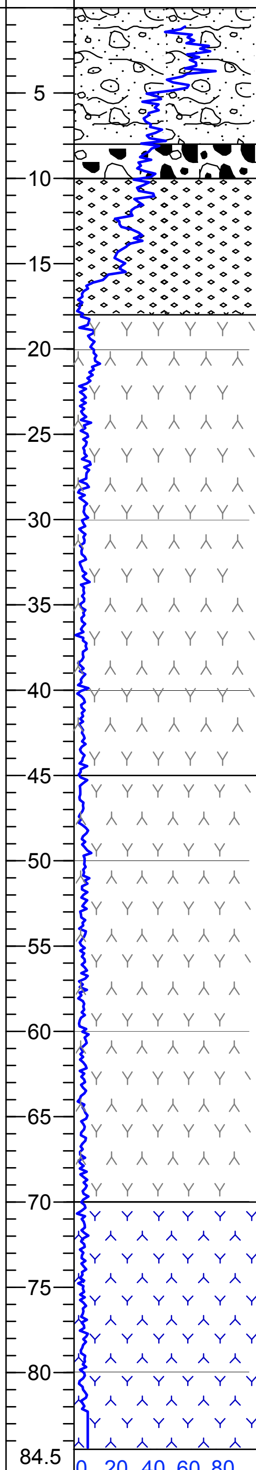
Geophysical Log of Borehole: BH-02

Location ID: 21-24775

Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/27/05
Date Completed: 09/28/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)
0	3000	-63506
0	3000	-63522
0	2240	-63505

DEPTH (ft.) — GRAPHIC LOG — VOLUMETRIC WATER CONTENT (PERCENT)



LITHOLOGIC DESCRIPTION

FILL. SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry. Roots and other organics present throughout.

FILL. GRAVEL. Well-graded; sub-rounded to 3 mm; dry.

FILL. SAND. (10YR6/2 to 5/2) light brownish gray to reddish brown; well-graded; coarse to 3 mm; rounded to subrounded; dry.

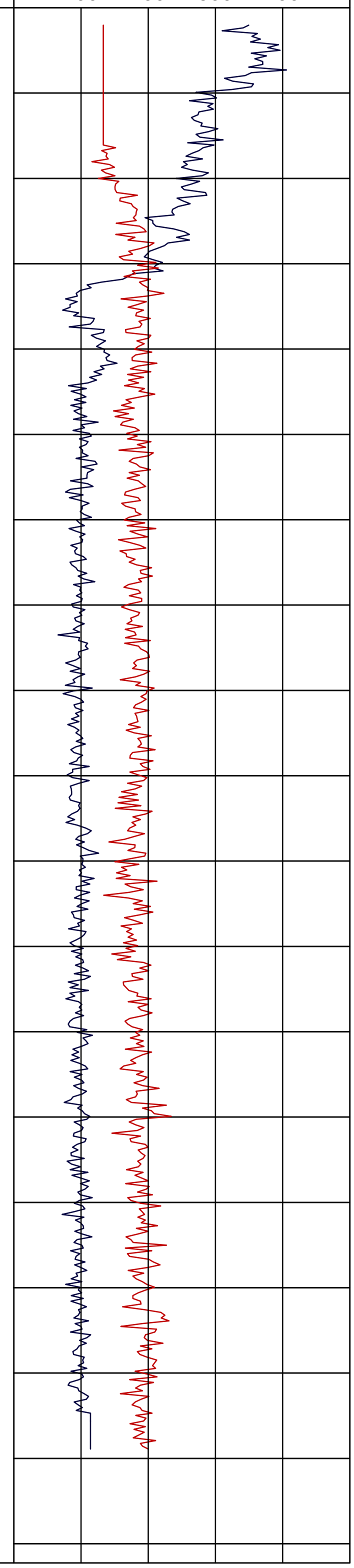
(Qbt3) TUFF. (5YR7/1 to 6/2) light to pinkish gray; fine ash matrix; MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%; reddish brown staining (<5%) throughout.

(Qbt3) TUFF. (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON-welded; trace phenocrysts <1 mm, <3%; altered white pumice, 1 cm, <3%.

(Qbt3) TUFF. (5YR5/1 to 5/2) gray grading to reddish gray; fine ash matrix; SLIGHTLY to NON welded; welded nodules, rounded, to 3 cm throughout matrix; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, gray to light gray, 1-3 cm, 3%, slightly recrystallized.

Geophysical Logging Total Depth 84.5 ft bgs

Neutron (counts per second)
Gamma (counts per second)



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Shaw® Shaw Environmental, Inc.

Location ID: 21-24776

Los Alamos National Laboratory

Project Name: MDA U Geophysical Logging

Date Started: 09/20/05

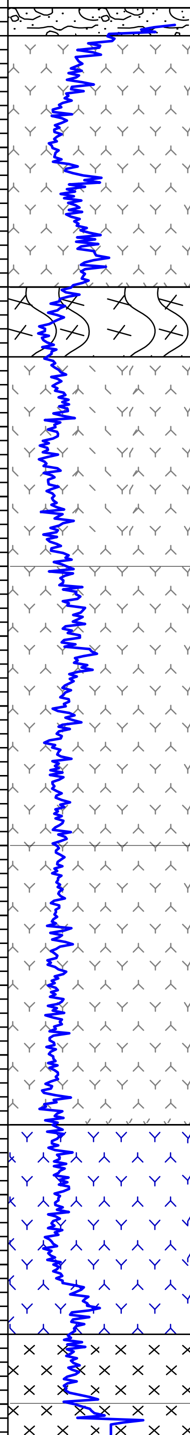
Date Completed: 09/21/05

Logged By: Apogen Technologies

Geophysical Log of Borehole: BH-03

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)
0.5	2610	-63508	5
0.5	6800	-63507	97

GRAPHIC LOG / VOLUMETRIC WATER CONTENT (PERCENT)



LITHOLOGIC DESCRIPTION

FILL. SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry. Roots and other organics present throughout.

(Qbt3) TUFF. (5YR7/1 to 6/2) light gray to pinkish gray; fine ash matrix; SLIGHTLY grading to MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5% with altered white (clay-like) pumice, 3%; reddish brown staining (<5%).

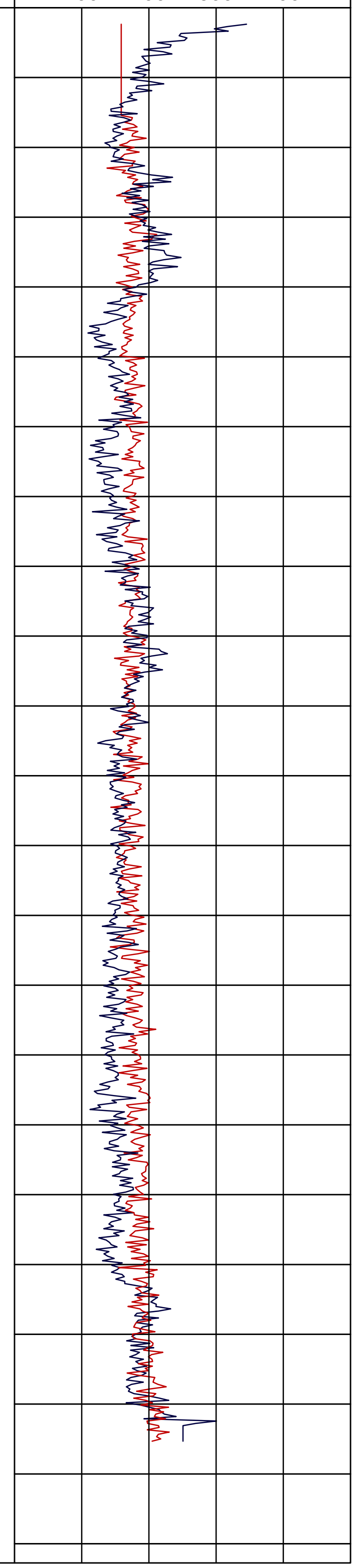
FRACTURE ZONE. 60-degree clay-fill fracture, 2 cm.

(Qbt3) TUFF. (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON welded; trace phenocrysts <1 mm, <3%; altered white pumice, 1 cm, <3%.

(Qbt3) TUFF. (5YR5/1 to 5/2) gray to reddish gray; fine ash matrix; SLIGHTLY to NON welded; welded nodules, rounded, to 3 cm throughout matrix; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, dark gray to gray, 2-4 cm, 3%, slightly recrystallized.

(Qbt2) TUFF. (5YR5/2) reddish gray; medium ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-1 mm, 5%; pumice, dark gray, 1 cm, 5%.

Geophysical Logging Total Depth 103 ft bgs



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Shaw® Shaw Environmental, Inc.

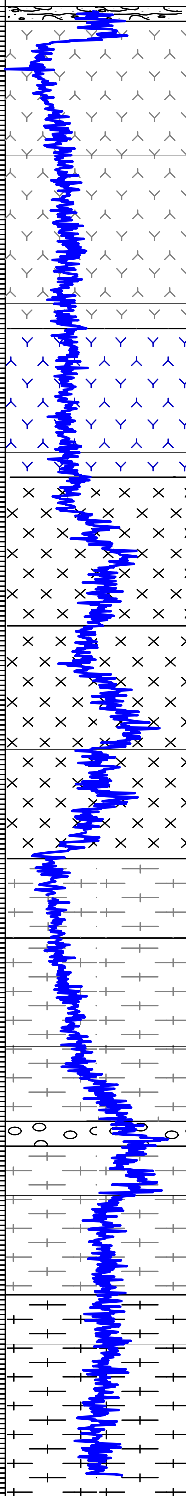
Geophysical Log of Borehole: BH-04

Location ID: 21-24772

Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/21/05
Date Completed: 09/21/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)
1.4	3010	-63502	15
4.2	2800	-63501	295

GRAPHIC LOG
VOLUMETRIC WATER CONTENT (PERCENT)



LITHOLOGIC DESCRIPTION

FILL. SILT with 30% CLAY. (7.5YR5/6) strong brown; low plasticity; loose, dry. Does not appear to be fill material below 3 ft bgs.

(Qbt3) TUFF. (5YR6/1 to 6/2) light gray to pinkish gray; NON to SLIGHTLY welded; phenocrysts (quartz) <1-2 mm, 3%; pumice, altered white (clay-like) and gray, recrystallized, <1-1cm, 5%.

(Qbt3) TUFF. (5YR6/1) light gray; NON welded; phenocrysts (quartz and sanidine) <1-3mm, 5%; pumice, light gray and altered white (clay-like) 2-4cm, 5%.

(Qbt2) TUFF. (5YR5/1 to 5/2) gray grading to reddish gray; WELDED; phenocrysts (quartz and sanidine) <1-3mm, 3%; altered light gray pumice, <1-2 cm, 3%; drilling difficult through this welded zone.

(Qbt2) TUFF. (5YR4/1 to 4/2) dark gray to dark reddish gray; WELDED; phenocrysts (quartz and sanidine) <1-1mm, 3%; pumice, slightly recrystallized dark gray, <1-2cm, 5%.

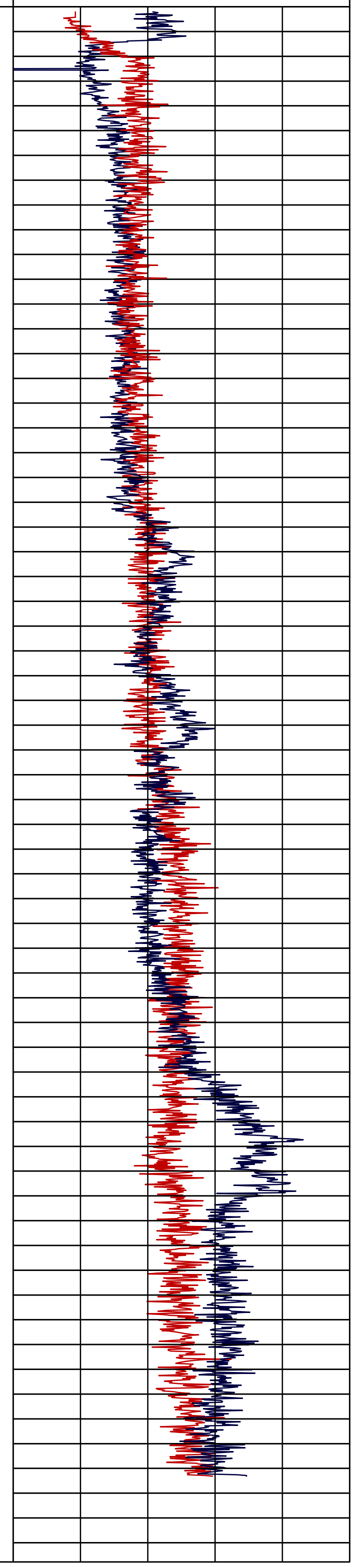
(Qbt1v) TUFF. (5YR5/2) reddish gray; fine ash matrix; NON to SLIGHTLY welded; phenocrysts (quartz), 1-3 mm, 5%; pumice, gray to dark gray, <1-1cm, 3%. Clastics and clay fragments, <1-2 mm, present at 180 ft bgs.
(Qbt1v) TUFF. (5YR5/2 to 4/2) reddish gray to dark reddish gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), 1-3 mm, 5%; pumice, reddish brown, <1-1cm, 3%; medium olive staining at 190 ft bgs, <5%.

(Qbt1v) MOISTURE ZONE
(Qbt1v) TUFF. (5YR5/6 to 5/4) yellowish red to reddish brown; SLIGHTLY welded; phenocrysts <1-2 mm, 5%; pumice, altered brown, <1-2 cm, 3%. Intermittent reworked fine brown sand from 245-250 ft bgs.

(Qbt1g) TUFF. (5YR6/3 to 6/2) light reddish brown to pinkish gray; medium ash matrix; NON welded; phenocrysts (quartz and abundant glassy minerals), <1-2 mm, >5%; large altered white to light gray vitreous pumice, 2-5cm, containing quartz phenocrysts <1-1mm, 3%.

Geophysical Logging Total Depth 303 ft bgs

Neutron (counts per second)
Gamma (counts per second)



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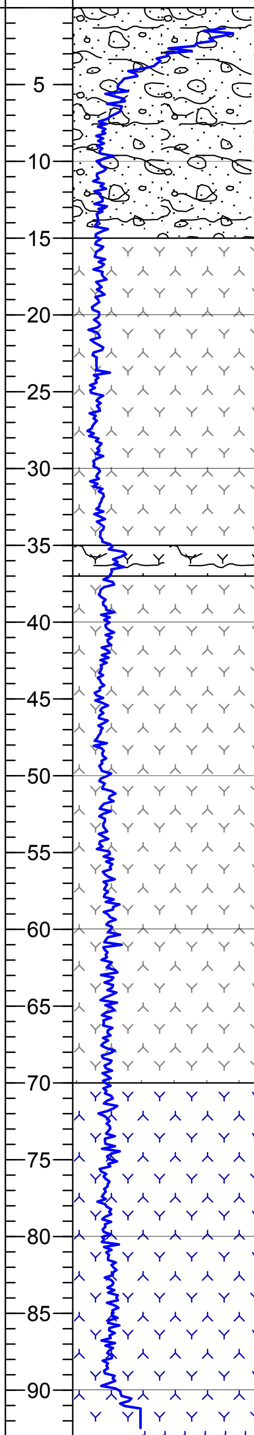
Geophysical Log of Borehole: BH-05

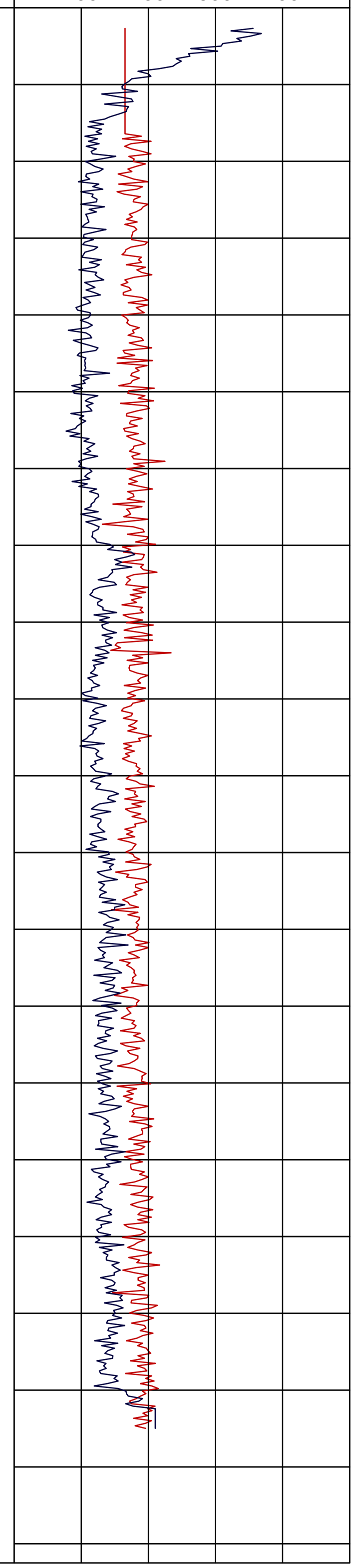
Location ID: 21-24777
Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/21/05
Date Completed: 09/21/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)	LITHOLOGIC DESCRIPTION
0.3	8030	-63510	5	FILL. SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry. Roots and other organics present throughout.
			15	(Qbt3) TUFF. (5YR7/1) light gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), <1-1 mm, 5%; pumice fragments, dark gray, 1 cm, 3%.
			35	Staining zone, reddish brown, 5%.
			37	(Qbt3) TUFF. (5YR6/1 to 6/2) gray to pinkish gray; fine ash matrix; NON welded; trace phenocrysts <1 mm, <3%; altered white (clay-like) pumice, 1 cm, <3%.
			70	(Qbt3) TUFF. (5YR5/1 to 5/2) gray grading to reddish gray; fine ash matrix; SLIGHTLY to NON welded; welded nodules, rounded, to 3 cm throughout; phenocrysts (quartz and mafic minerals), <1-3 mm, 5%; pumice, gray to light gray, 2-4 cm, 3%, slightly recrystallized.
0.4	8260	-63509	85	
			93	**Geophysical Logging Total Depth 93 ft bgs**

GRAPHIC LOG
VOLUMETRIC WATER CONTENT (PERCENT)



Neutron (counts per second)
Gamma (counts per second)



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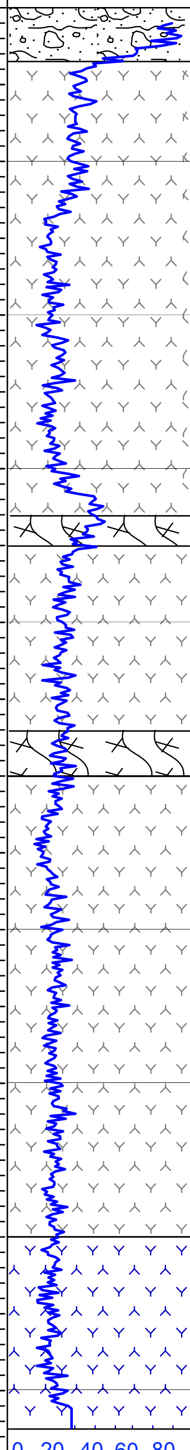
Shaw® Shaw Environmental, Inc.

Geophysical Log of Borehole: BH-06

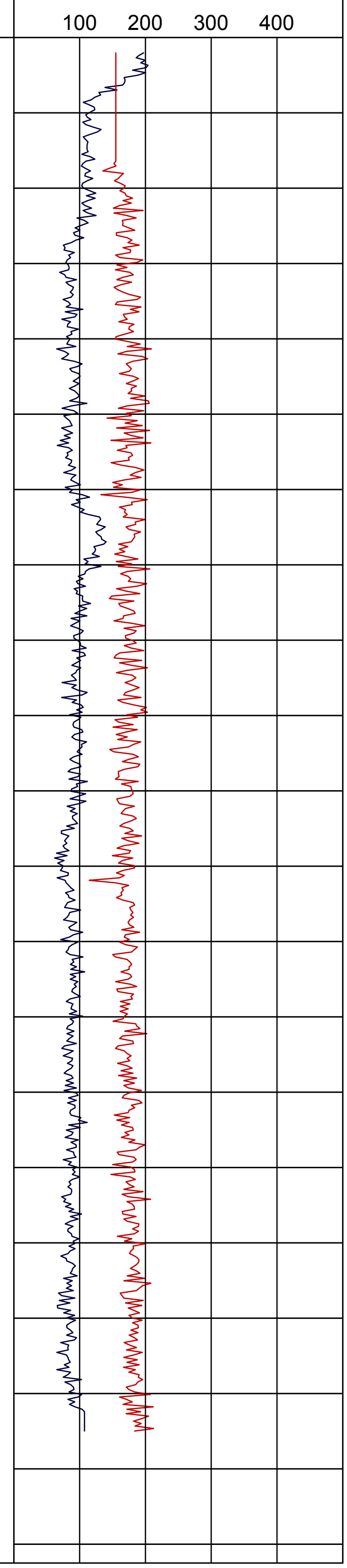
Location ID: 21-24778
Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/19/05
Date Completed: 09/20/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)	LITHOLOGIC DESCRIPTION
			0–3.5	FILL. SILT with 30% CLAY. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry.
0.5	1920	-63512	3.5–33	(Qbt3) TUFF. (5YR5/1 to 6/1) gray to light gray; fine ash matrix; SLIGHTLY welded; phenocrysts (quartz), <1-3 mm, 5%; pumice, gray, 1-3 cm, 3%.
			33–35	(Qbt3) FRACTURE ZONE, reddish brown banded staining 2-3 mm throughout, 60-degree clay-filled fracture zone at 33 ft bgs.
			35–47	(Qbt3) TUFF. (5YR7/1) light gray; fine ash matrix; MODERATELY welded; phenocrysts <1-3 mm, 5%; pumice, dark gray and altered white (clay-like), 1-3 cm, 3%; minor (<5%) reddish brown staining throughout.
			47–50	(Qbt3) FRACTURE ZONE, reddish brown vertical clay-filled fracture, 2 cm thickness.
			50–80	(Qbt3) TUFF. (5YR7/1 to 6/1) light gray grading to gray; fine ash matrix; SLIGHTLY welded; phenocrysts <1-3 mm, 5%; pumice, dark gray, 1-3 cm, 3%. Minor (<3%) reddish brown staining from 50-52 ft bgs.
0.4	21,200	-63511	80–93	(Qbt3) TUFF. (5YR7/1) light gray; fine ash matrix; NON welded; phenocrysts (quartz and mafic minerals) <1-3 mm, 5%; pumice, gray to light gray, 1-3 cm, 3%. Increasing sanidine from 85-99 ft bgs.

GRAPHIC LOG
VOLUMETRIC WATER CONTENT (PERCENT)



Neutron (counts per second)
Gamma (counts per second)



Geophysical Logging Total Depth 92.5 ft bgs

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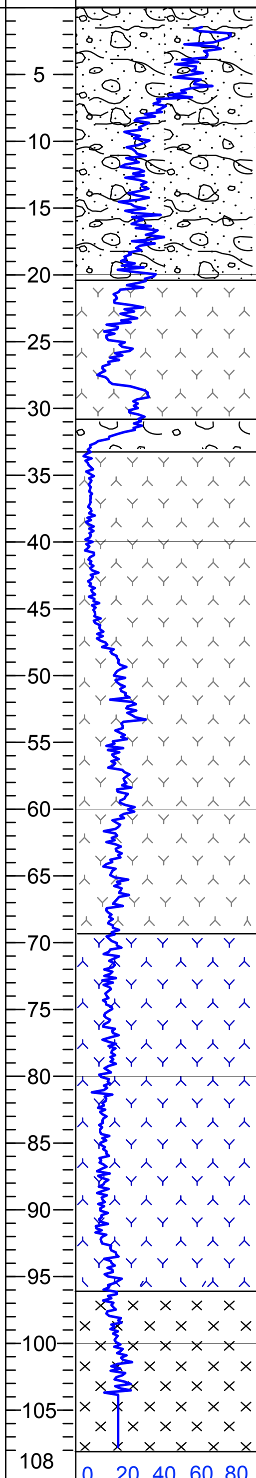
Shaw® Shaw Environmental, Inc.

Geophysical Log of Borehole: BH-07

Location ID: 21-24779
Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/27/05
Date Completed: 09/27/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)
0	2530	-63514
0	8060	-63513

DEPTH (ft.) / GRAPHIC LOG / VOLUMETRIC WATER CONTENT (PERCENT)



LITHOLOGIC DESCRIPTION

FILL. SILT with 40% CLAY and 10% GRAVEL, rounded to 4 mm. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry. Caliche present throughout and reworked light gray tuff.

(Qbt3) TUFF. (5YR7/1 to 6/2) light to pinkish gray; fine ash matrix; MODERATELY welded; fine to medium ash matrix; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%; reddish brown staining (<5%) throughout. Intermittent CHANNEL ZONE from 24-31 ft bgs; native lithics (dacites); well-graded; coarse to 3 mm; rounded to subrounded; dry.

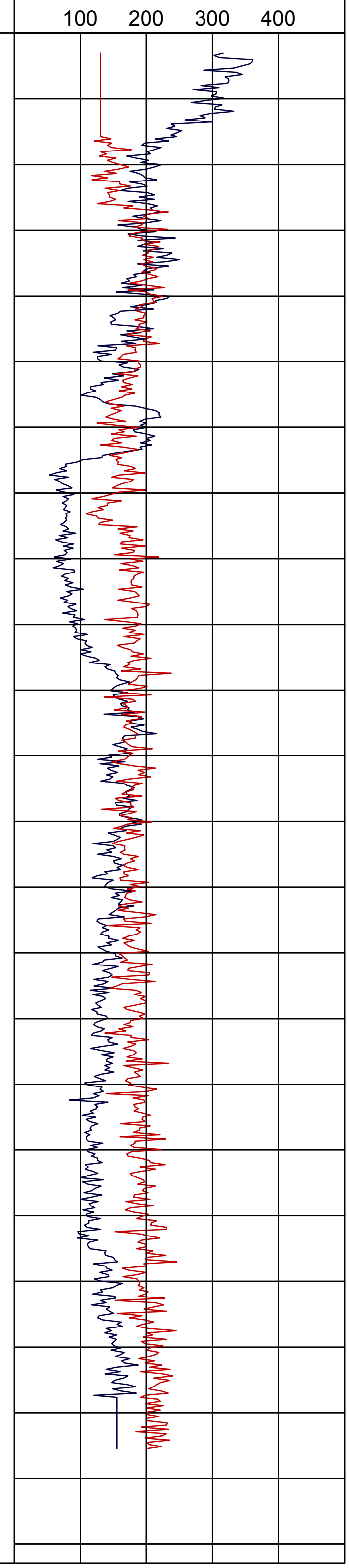
COBBLE ZONE, rounded, 3-6 cm, native dacites.
(Qbt3) TUFF. (5YR7/2 to 6/1) pinkish gray to light gray; fine to medium ash matrix; MODERATELY welded; phenocrysts (quartz) 1-3 mm, 3%; dark gray pumice to 1 cm, 5%, with altered white (clay-like) pumice, 3%.

Elevated field screen level for organic vapors.
(Qbt3) TUFF. (5YR7/2 to 5/2) pinkish gray grading to reddish gray; fine ash matrix; NON to MODERATELY welded; phenocrysts (quartz and mafic minerals) <1-1 mm, 5%; pumice gray to altered white, <1-1 cm, 3%; minor staining, <5%, reddish brown, toward 94 ft.

(Qbt2) TUFF. (5YR5/2) reddish gray; fine ash matrix; WELDED; phenocrysts (quartz and sanidine), <1-2 mm, 3%; trace pumice fragments, <2 mm, <3%.

Geophysical Logging Total Depth 108 ft bgs

Neutron (counts per second)
Gamma (counts per second)



LAENGN01 MDA U GEOPHYSICAL LOGS.GPJ LAENGN01.GDT 12/14/05

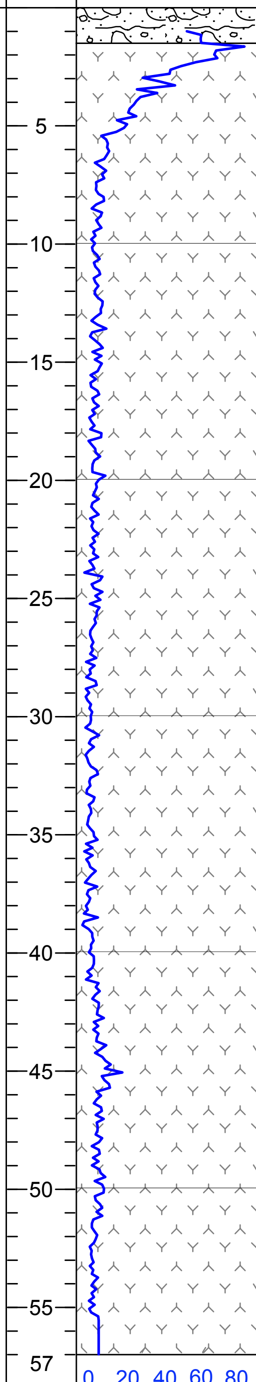
335 Central Park Square
Los Alamos, NM 87544
Phone (505) 661-5200

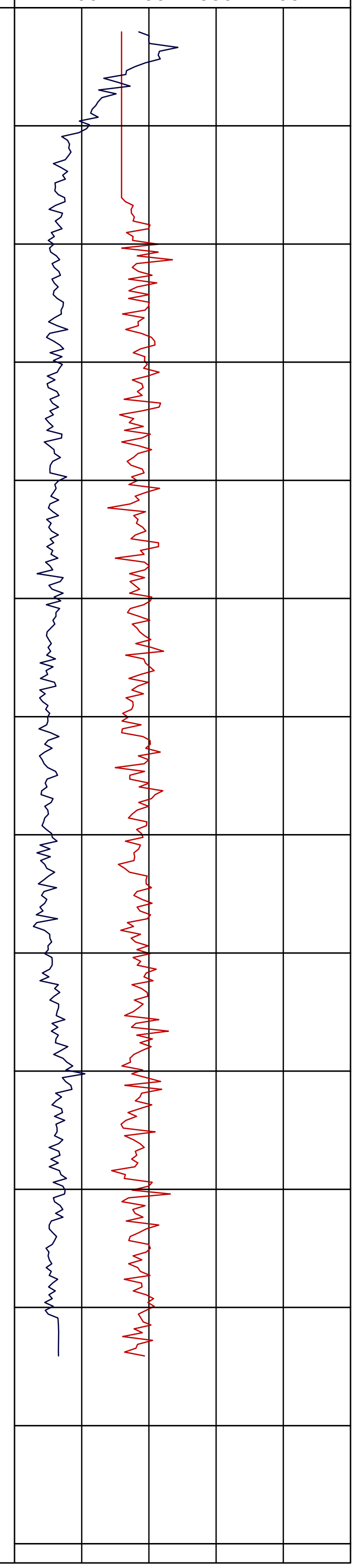
Shaw® Shaw Environmental, Inc.

Geophysical Log of Borehole: BH-08

Location ID: 21-24780
Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/27/05
Date Completed: 10/04/05
Logged By: Apogen Technologies

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)	GRAPHIC LOG / VOLUMETRIC WATER CONTENT (PERCENT)	LITHOLOGIC DESCRIPTION	Neutron (counts per second) / Gamma (counts per second)
					FILL. (5YR4/6) strong brown silt with clay (20%); roots, other organic debris present.	
0	8060	-63521			(Qbt3) TUFF. (5YR6/2 to 7/1) pinkish gray grading to light gray; fine ash matrix; MODERATELY to SLIGHTLY welded; phenocrysts (quartz), <1-2 mm, 3%; pumice fragments, dark gray to gray, <1-3 cm, 3%.	
2	7470	-63515				
2	7470	-63896				
			57		Geophysical Logging Total Depth 57 ft bgs	





335 Central Park Square
Los Alamos, NM 87544
Phone (505) 661-5200

Shaw® Shaw Environmental, Inc.

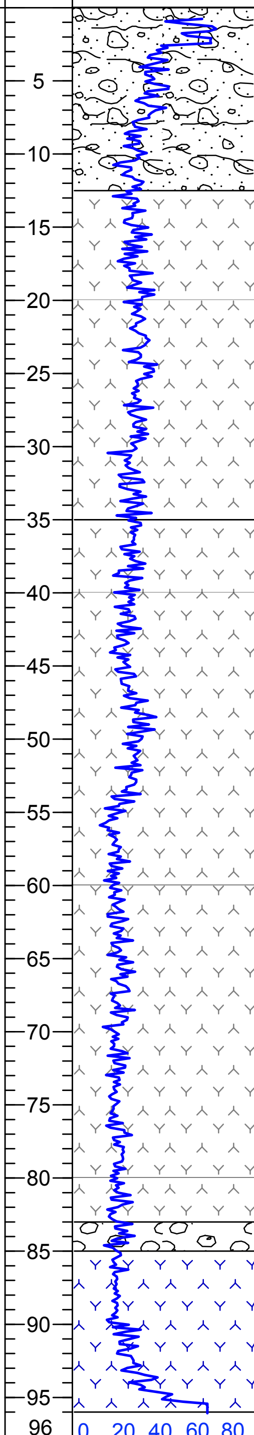
Location ID: 21-24781

Los Alamos National Laboratory
Project Name: MDA U Geophysical Logging
Date Started: 09/16/05
Date Completed: 09/16/05
Logged By: Apogen Technologies

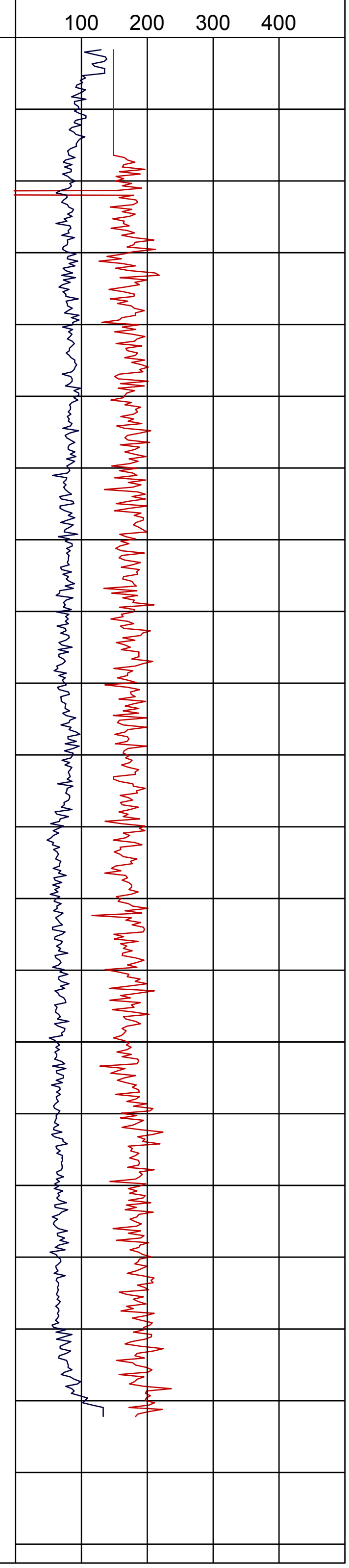
Geophysical Log of Borehole: BH-09

PID (ppm)	CO2 (ppm)	Sample ID (MD21-05-XXXXX)	DEPTH (ft.)	LITHOLOGIC DESCRIPTION
			0–12	FILL. SILT with 30% CLAY. (7.5YR 5/6) strong brown; low plasticity; soft; loose; dry.
0.3	3370	-63518	20	(Qbt3) TUFF. (5YR5/1) gray; SLIGHTLY welded; phenocrysts 1-3mm, 5%; pumice <1 cm, 3%, light to dark gray. Moisture zone from 18-20 ft bgs with moderate reddish-gray staining. Zones of banded staining, continuous, <0.5-ft thick present throughout interval.
			35	(Qbt3) TUFF. (5YR5/1 to 6/1) gray SLIGHTLY to NON-welded; decreasing phenocrysts, <1-1mm 3%; increasing pumice, altered white (clay-like) to 3 cm, 5%. Sanidine present at 65 ft bgs.
			83	(Qbt3) PUMICE ZONE. Altered white (clay-like); pumice fragments, 1-5 cm.
0.4	4800	-63517	85–96	(Qbt3) TUFF. (5YR5/1) gray NON welded; phenocrysts (quartz and mafic minerals) <1-1mm, 5%; pumice fragments, altered white (clay-like), <3-5 cm, 3%.

GRAPHIC LOG
VOLUMETRIC WATER CONTENT (PERCENT)



Neutron (counts per second)
Gamma (counts per second)



Geophysical Logging Total Depth 96 ft bgs

LAENGN01 MDA U GEOPHYSICAL LOGS.GPJ LAENGN01.GDT 12/14/05

Appendix E

Analytical Program

E-1.0 INTRODUCTION

This appendix discusses analytical methods and data quality review for all of the samples collected in 1992, 1994, 1998, 2001, and 2005 investigations conducted at Material Disposal Area (MDA) U at Los Alamos National Laboratory (the Laboratory). Additionally, this appendix summarizes the effects of data quality exceptions on the acceptability of the analytical laboratory 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, 54609), and the Los Alamos National Laboratory's statement of work (SOW) for analytical laboratories (LANL 2000, 71233). 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 (MS), laboratory-control samples (LCSs), internal standards, initial and continuing calibrations, surrogates, and tracers.

The type and frequency of laboratory QC analyses are described in the analytical laboratories SOW (LANL 1995, 49738; LANL 2000, 71233) and the applicable analytical methods. Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in the Environmental Programs Directorate's standard operating procedure (SOP) SOP-01.02, "Sample Containers and Preservation." A focused data validation was also performed for each data package (also referred to as request numbers).

The following SOPs were used for data validation.

- SOP-15.01, Rev. 1, Routine Validation of Volatile Organic Data
- SOP-15.02, Rev. 1, Routine Validation of Semivolatile Organic Data
- SOP-15.04, Rev. 1, Routine Validation of High Explosives Data
- SOP-15.05, Rev. 1, ICN 1, Routine Validation of Inorganic Data
- SOP-15.06, R1, ICN1, Routine Validation of Gamma Spectroscopy Data
- SOP-15.07, R1, ICN1, Routine Validation of Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Data

The focused validation included a more detailed review of the data generated by the analytical laboratory. The analytical data and instrument printouts used during focused validation are provided in Appendix F.

Analytical data were reviewed and evaluated based on U.S. Environmental Protection Agency (EPA) National Functional Guidelines for inorganic and organic chemical data review where applicable (EPA 1999, 66649; EPA 1994, 48639). As a result of the data validation and assessment efforts, qualifiers are assigned to the analytical records as appropriate. The data qualifiers used in the data validation procedures are defined in Appendix A.

E-2.0 INORGANIC CHEMICAL ANALYTICAL METHODS

Samples from MDA U were analyzed for inorganic chemicals in 1994, 1998, 2001, and 2005/2006. A total of 253 samples (246 samples and 7 field duplicates) were analyzed for target analyte list (TAL) metals. Seventy-three samples were analyzed for uranium, and 53 samples were analyzed for cyanide, perchlorate, and nitrate. Table B-2.1-1 (Appendix B) summarizes the samples collected and the analyses requested for each sample.

The samples were analyzed for TAL metals using SW-846 methods 6010, 6010B, 7471, and 7471A. Other analytical methods included SW-846 methods 7420 for lead; 7840, 6020, and 7841 for thallium; 9012A for cyanide; 7740 for selenium; and 7060 for arsenic. Perchlorate was analyzed by SW-846 method 8321A and EPA Method 314. Nitrate was analyzed by EPA Method 300. Total uranium was analyzed using kinetic phosphorescence analysis.

The mercury results were reported from samples collected in 1994. Some of the same locations were resampled in 2001, and the samples collected were analyzed for mercury. All the data from these samples are included in the data set and contribute information to the evaluation of the nature and extent of contamination.

E-2.1 Inorganic Chemical QA/QC Samples

The LCSs, method blanks, MS samples, field duplicate samples, interference check samples, and serial dilution samples were analyzed to assess the accuracy and precision of inorganic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 49738; LANL 2000, 71233) and described briefly in the sections below. Because some of the analyses were 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. The analytical results for the samples were qualified according to National Functional Guidelines (EPA 1994, 48639) if the individual LCS recovery indicated an unacceptable bias in the measurement of individual analytes. The LCS recoveries should fall into the control limits of 75% to 125% (LANL 1995, 49738; LANL 2000, 71233).

Preparation blanks are used to measure bias and potential cross-contamination. The blank results for inorganic chemical analyses were within acceptable limits for all the analyses. All target analytes should be below the method detection limit (MDL) in the preparation blank.

The accuracy of inorganic chemical analyses is also assessed using MS samples. These samples are designed to provide information about the effect of each sample matrix on the sample preparation procedures and analytical technique. The spike sample recoveries should be within the acceptance range of 75% to 125%.

Analyzing laboratory duplicate samples assesses the precision of inorganic chemical analyses. All relative percent differences between the sample and laboratory duplicate should be ±35% (LANL 1995, 49738; LANL 2000, 71233).

The following inorganic chemical data were rejected:

- For the MDA U samples, some of the inorganic chemical results were rejected. Thirty-six mercury results were rejected (R) because the holding times had been exceeded. Thirty-four of these samples were collected in 1994, and mercury was sampled again in more recent sampling events. The other two samples were collected in 2005 in borehole 21-24772.
- A total of 131 sample results for analytes including antimony, cadmium, copper, lead, manganese, and mercury were rejected (R) because of low spike recovery. These samples were collected in 1994 (64 samples analyzed for antimony, cadmium, and mercury); 1998 (28 samples analyzed for antimony, copper, lead, manganese); and in 2005 (39 samples analyzed for antimony and manganese).

Other inorganic chemical results were reported as estimated concentrations or with estimated detection limits:

- One nitrate result was considered estimated and possibly biased high (J+) because of high MS sample recovery.
- Two nitrate results and one cyanide result from two soil samples collected in 2005 were not detected but were reported with an estimated detection limit (UJ) because the analysis exceeded the holding times. Eight nitrate results and four cyanide results from tuff samples collected in 2005 were also reported with an estimated detection limit (UJ) because the analysis exceeded the holding times. One cyanide result from a 2005 tuff sample was reported as estimated and possibly biased low (J-) because the holding time had been exceeded.
- Multiple inorganic chemical results from 1994, one mercury result from 2001, and multiple inorganic chemical results from 2005 sampling were estimated (J) because they were reported below the practical quantitation limit (PQL), but above the MDL.
- Nine inorganic chemical results (barium, calcium, and mercury) from the 2005 samples were reported as estimated (J) concentrations because both the sample and laboratory duplicate sample results were greater than or equal to five times the reporting limit and the duplicate relative percent difference was greater than 35%.
- Ten inorganic chemical results (lead in one 2005 sample; chromium, nickel, potassium, and sodium in 1994 samples) were reported as estimated (J) concentrations or estimated and possible biased high (J+) because the serial dilution sample relative percent difference was greater than 10%, and the sample result was greater than 50 times MDL.
- Inorganic chemical results for antimony, lead, selenium, and uranium (1994 samples), antimony and manganese (1998 samples) and antimony, manganese, and potassium (2005 samples) were estimated and possibly biased low (J-) or had estimated detection limits (UJ) because the analyte was recovered below the lower acceptance level but greater than 30% in the associated spike sample.
- Fourteen mercury results from samples collected in 1994 were reported as estimated and possibly biased low (J-) because the samples were analyzed after the appropriate holding time.
- Aluminum (one sample), barium, calcium, iron, magnesium, manganese, sodium (one sample), and potassium results from samples collected in 2005 were reported as estimated and potentially biased high (J+) because of the high MS sample recoveries.
- Multiple aluminum and potassium results and one mercury result from samples collected in 2005 were reported as estimated and potentially biased high (J+) because the laboratory control sample was above the warning limit.
- Eighteen sodium results (1994 samples), one chromium result and three mercury results (from 2005 samples) were reported as not detected (U) because the concentration was less than 5 times the amount found in the preparation blank.
- Nineteen uranium results from samples collected in 1994 were reported as estimated and biased low (J-) because of either low MS sample recovery or low laboratory control sample recovery.
- Five uranium results from samples collected in 1994 were reported as estimated and biased high (J+) because of a high matrix spike sample recovery.

These estimated detected concentrations and estimated detection limits did not affect the usability of the data set because the results were still used as reported. The rejected data limit the number of sample results for those six inorganic chemicals, but data are available for these inorganic chemicals from all sampling events so nature and extent of contamination can still be evaluated.

E-3.0 ORGANIC CHEMICAL ANALYSIS METHODS

Samples at MDA U were analyzed for organic chemicals. Ninety-one samples were analyzed for polychlorinated biphenyl (PCBs), 46 samples were analyzed for volatile organic compounds (VOCs), 192 samples were analyzed for semivolatile organic compounds (SVOCs), and 2 samples were analyzed for dioxins/furans and high explosive (HE) compounds. Table B-2.1-1 (Appendix B) summarizes the samples collected and the analyses requested for each sample.

The samples were analyzed for these organic chemicals using EPA SW-846 Methods 8082 (PCBs), 8260 (VOCs), 8270C (SVOCs), 8290 (dioxins and furans), and 8321A (HE). All QC procedures were followed, as required by the analytical laboratories SOW (LANL 1995, 49738; LANL 2000, 71233) and the applicable analytical methods.

Fifty-two pore-gas samples were analyzed for VOCs. Pore-gas samples were analyzed for VOCs using EPA Method TO-14 in 1998 and EPA Method TO-15 in 2005/2006.

E-3.1 Organic Chemical QA/QC Samples

QC samples are designed to produce a qualitative measure of the reliability of a specific part of an analytical procedure. The methods for validating organic chemical sample results on the basis of the various QA/QC sample types are specified in Environmental Programs Directorate's procedures for analyzing SVOCs, VOCs, and pesticides and PCBs. Because some of the analyses were performed before the current SOWs were implemented (LANL 1995, 49738; LANL 2000, 71233), slightly different QA/QC procedures may have been followed. The validation of organic chemical data using QA/QC samples and other methods may result in the rejection of the data or the assignment of various qualifiers to individual sample results (see Appendix A for the definitions of the qualifiers used).

Calibration verifications, LCSs, method blanks, surrogates, and internal standards were analyzed to assess the accuracy and precision of organic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 49738; LANL 2000, 71233) and the applicable analytical methods, and summarized below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical instrument and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the linearity of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration verifies that the initial calibration is still linear and valid. The continuing calibration also serves to determine that analyte identification criteria, such as retention times and spectral matching, are being met.

The LCS is a sample of the same matrix that has been spiked with the target analytes, and it serves as a monitor of overall performance. The analytical results for the samples were qualified according to National Functional Guidelines (EPA 1999, 66649) if the individual LCS recoveries were not within method-specific acceptance criteria.

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing and which is extracted and analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during extraction and analysis.

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

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

For the MDA U samples, some of the SVOC results were rejected (R). All SVOCs for sample AAB9761 were rejected because at least one surrogate sample recovery was less than 10%.

Other organic chemical results were reported as estimated concentrations or with estimated detection limits. They are as follows.

- Multiple PCBs, VOCs, SVOCs (from 1994 and 2005 samples) and dioxin/furan (from 2005 samples) results were reported as estimated (J) because they were detected below the PQL.
- Two detected PCB results and 33 PCB detection limits were estimated (J-) or had estimated detection limits (UJ) because the extraction holding times were exceeded. Five of these samples were collected in 2005.
- Eleven PCB results were not detected (U) because the results were less than 5 times the amount in the method blank.
- Six samples collected in 1998 had all PCB results reported with estimated detection limits (UJ) because of low surrogate recoveries.
- Six SVOC results (samples collected in 1994 and 2005) and one VOC result (sample collected in 2005) were not detected (U) because the mass spectrum did not meet the method specifications.
- Some SVOC results and PCB results (samples collected in 2005) were reported with estimated detection limits (UJ) because of low LCS recoveries or because the criteria for calibration standards were not met.
- One VOC result for tetrachloroethene from a sample collected in 2005 was reported as not detected (U) because the concentration was less than 5 times the amount in the method blank.
- Five VOC results from samples collected in 2005 were reported with an estimated detection limit (UJ) because of a low laboratory control sample recovery.
- Three acetone results from samples collected in 2005 were reported as estimated and possibly biased high because of the high recovery in the laboratory control sample.

For pore-gas samples, a total of 32 results for benzyl chloride, 1,2-dichlorobenzene, 1,4 dichlorobenzene, hexachlorobutadiene, and 1,2,4-trimethylbenzene were reported as not detected with an estimated detection limit (UJ) because of the low LCS recoveries. Three results for hexachlorobutadiene and one result each for benzyl chloride, trans-1,3-dichloropropene, and vinyl acetate were reported as not detected with an estimated detection limit (UJ) because the criteria for initial or continuing calibration standards were exceeded. Multiple VOCs were reported as not detected (U) because the associated mass spectrum did not meet method specifications.

These estimated detected concentrations (J) and estimated detection limits (UJ) did not affect the usability of the data set because the results were still used as reported. The rejected data affected only the SVOC results for one sample collected in 1994. Sufficient SVOC data are available from the sampling events so nature and extent of contamination could be evaluated.

E-4.0 RADIOCHEMICAL ANALYSIS METHODS

Samples at MDA U were analyzed for radionuclides. A total of 227 samples (224 samples and 3 field duplicates) were collected for analyses of gamma spectroscopy suite isotopes; 148 samples were collected for gas-flow proportional counting of strontium-90; multiple samples were collected for alpha spectroscopy of americium-241 (127 samples), isotopic plutonium (207 samples), isotopic thorium (42 samples) and uranium isotopes (181 samples); and 209 samples were collected for liquid scintillation analysis of tritium. Table B-2.1-1 (Appendix B) summarizes the samples collected and the analyses requested for each sample.

The samples were analyzed for these radionuclides using HASL-300 Methods and EPA Methods 901.1 (gamma spectroscopy), 906.0 (tritium), and 905.0 (strontium-90). All QC procedures were followed as required by the analytical laboratories SOW (LANL 1995, 49738; LANL 2000, 71233).

In 2005/2006, 28 pore-gas samples were collected for tritium analysis and were analyzed using EPA Method 906.0.

E-4.1 Radionuclide QA/QC Samples

Radionuclides with reported values less than the minimum detectable activity were qualified as nondetected (U). Each radionuclide result was also compared with the corresponding 1 sigma total propagated uncertainty (TPU). If the result was less than three times the TPU, the radionuclide was qualified as nondetected (U).

Certain gamma spectroscopy analytes are subject to spectral interference from energies of other radionuclides. When this interference occurs it is not possible to measure these radionuclides reliably. Laboratory results indicated spectral interference for several gamma spectroscopy analytes. These values were rejected (R) because of spectral interference. All other radionuclide results are usable for evaluation and interpretation purposes.

The precision and bias of radiochemical analyses performed at off-site fixed laboratories were assessed using LCSs, method blanks, and tracers. LCSs were analyzed to assess the accuracy of radionuclide analyses. The LCSs serve as a monitor of the overall performance of each step during the analysis, including the radiochemical separation preparation. Method blanks are also used to assess bias. The analytical services SOWs (LANL 1995, 49738; LANL 2000, 71233) specify that the method blank concentration should not exceed the required minimum detectable activity.

For the MDA U samples, some of the radionuclide results were rejected (R). Thirty-nine results for cesium-134, one result for thorium-227, and one result for uranium-235 were rejected (R) because spectral interference prevented positive identification of the analytes. Twelve results for plutonium-238 and fifteen results for plutonium-239 were rejected because the duplicate error ratio was greater than 4.

Other radionuclide results were reported as estimated concentrations or as estimated nondetected concentrations:

- Radionuclide results were reported as nondetected concentrations (U) because the sample concentration was below the minimum detectable concentration or because the sample concentration was below 3 times the TPU.
- One sample analyzed for americium-241 (sample collected in 1992) was a nondetect (U) because the associated sample concentration was less than 5 times the amount in the method blank.
- Seven tritium results (samples collected in 1994) were estimated and possibly biased low (J-) because the associated matrix spike recovery was less than the lower acceptance limit but greater than 10%.
- One plutonium-238 and one plutonium-239 result (sample collected in 1994) were estimated and possibly biased low (J-) because the percent recovery of the tracer is less than 30% but greater than 10%.
- Three plutonium-238 and 16 plutonium-239 results (samples collected in 1992 and 1994) were estimated (J) because the duplicate and sample results have a duplicate error ratio greater than 2.0.

These estimated detected concentrations and estimated nondetected concentrations did not affect the usability of the data set because the results were still used as reported. The rejected data limit the number of sample results for cesium-134, thorium-227, uranium-235, plutonium-238, and plutonium-239, but the data are available for these radionuclides from all sampling events so the nature and extent of contamination can still be evaluated.

E-5.0 REFERENCES

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

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

EPA (U.S. Environmental Protection Agency), February 1, 1994. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," OSWER 9240.1-35, EPA540/R-94-013, Washington, D.C. (EPA 1994, 48639)

EPA (U.S. Environmental Protection Agency), October 1, 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," OSWER 9240.1-05A-P, PB99-963506, EPA540/R-99-008, Washington, D.C. (EPA 1999, 66649)

LANL (Los Alamos National Laboratory), July 1995. "Statement of Work for Analytical Support, Revision 2," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 1995, 49738)

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, 54609)

LANL (Los Alamos National Laboratory), December 2000. "Statement of Work for Analytical Laboratories, Revision 1," Los Alamos National Laboratory document, Los Alamos, New Mexico. (LANL 2000, 71233)

Appendix F

Analytical Reports
(on CDs attached to this document)

One of the CDs included with this appendix contains the analytical data in the form of data tables. This CD is labeled “Appendix F, Part 1 of 5.”

All available reports from the contract laboratories are included in this appendix. These reports are provided on four CDs labeled “Appendix F, Part 2 of 5” through “Appendix F, Part 5 of 5.”

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Appendix G

Waste Management Documentation

This appendix contains the waste management records for waste streams generated during investigation of Material Disposal Area U, also known as Consolidated Unit 21-017(a)-99, at Technical Area 21. The Waste Characterization Strategy Form (WCSF) was prepared to address characterization approaches, on-site waste management, and final disposition options. Also included are the Waste Profile Forms (WPFs) and the Chemical Waste Disposal Request (CWDR) forms for each waste stream.

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Waste Characterization Strategy Form

For instructions regarding this form, see section 8 of ER-SOP-01.10, R1.

Project Title	**Characterization and Remediation at TA-21, Consolidated Unit 21-017(a)-99, MDA U**
Operating Unit #	**N/A**
PRS #	**Consolidated Unit 21-017(a)-99: includes SWMU 21-017(a); SWMU 21-017(b); SWMU 21-017(c); SWMU 21-022(f)**
Activity Type	**Site characterization which includes soil sampling and borehole drilling**
Field Team Leader	**Curtis Shultz, Portage Environmental, Inc.**
Waste Management Coordinator	**Douglas Hopinkah, Shaw E&I**
Completed by	**D. Hopinkah**
Date	**6/15/05**

Description of activity: The primary objective of this project is to characterize contamination associated with Consolidated Unit 21-017(a)-99 through borehole drilling and soil sampling. Surface soil samples will be collected at each of the nine proposed borehole locations (Figure 4.2-1)*. Samples will be field screened for radioactivity (gross alpha, beta, and gamma) and then analyzed for radionuclides (actinium-227 progeny, americium-241, strontium-90, isotopic uranium, isotopic plutonium, and tritium); inorganic chemicals (target analyte list metals [TAL]; volatile and semi-volatile organic compounds (VOCs and SVOCs, respectively); polychlorinated biphenyls (PCBs); perchlorates; cyanide; and nitrates. Alpha spectroscopy is being prescribed to quantify activities of actinium-227 progeny. Table 4.1-1summarizes the proposed analytical suites for this investigation. A total of nine boreholes (BH-1 through BH-9) are proposed for MDA U. Including the eight boreholes that were drilled in 1998, the total number of boreholes drilled at MDA U will equal 17. BH-1 through BH-3 and BH-5 through BH-9 will be drilled to a total depth (TD) of approximately 120 feet (ft) using hollow-stem auger methods. See Figure 4.2-1 (and supplemental figure 4.2-1 with hand drawn borehole locations) for all borehole locations. These boreholes will bound the lateral extent of tritium and actinium-227 identified in the fracture/clay-interbed zone observed at a depth of 50-75 ft below ground surface (bgs) from boreholes drilled in 1998. Because the bottom of Tshirege Member of Quarternary Bandelier tuff unit 3 (Qbt 3) is a non-welded horizon and the top of Qbt 2 is a welded horizon, the contact between these two units (approximately 100ft bgs) may be a zone of potential contamination accumulation and is an important target sampling depth. BH-4 will be drilled to a TD of approximately 360 ft bgs and will penetrate the Cerro Toledo interval to constrain the vertical extent of tritium and VOCs, and to determine if saturation zones are encountered at or above the Cerro Toledo interval. BH-4 is at the location of the former distribution box between the two absorption beds.

Subsurface samples will be collected from a minimum of four depths at each borehole. Core from the boreholes will be continuously screened for radiological contamination, visually inspected, and geologically logged. Field screening for organic vapors in headspace samples will occur once per 10 ft of borehole advancement. Additional samples may be collected based on field screening results or field observations of biasing features such as elevated moisture zones, staining, fracture zones (including a paired unfractured sample), clay-rich zones, geologic contacts, or other indicators of possible contamination accumulation. Table 4.2-1 summarizes the core and sample intervals and field screening approaches for the boreholes. Subsurface pore gas samples will be collected from each borehole. In each borehole, one sample will be collected at the depth in the borehole nearest to the depth of the targeted disposal unit and the second sample will be collected at TD. Each subsurface pore gas sample will be analyzed for VOCs and tritium. If saturation is encountered during borehole advancement, drilling activities will be stopped to determine if there is a sufficient amount of water for sample collection. If saturation is insufficient for sample collection, borehole advancement will proceed. If a sample is collected for groundwater, the analytical sampling suite will consist of metals, VOCs, SVOCs, radionuclides, tritium, nitrates, perchlorate, anions, alkalinity, total organic carbon, total inorganic carbon, and total dissolved solids. Geotechnical analysis will be conducted on samples from BH-4. Continuous neutron logging will be conducted to determine moisture content. Samples for saturated and unsaturated hydraulic conductivity, matric potential, porosity, chloride, and bulk density analysis will be collected once in the soil, once in each tuff unit, and at a minimum, twice from the Cerro Toledo interval.

Investigation boreholes will be grouted once all sampling activities have been conducted. Borehole cuttings will be properly disposed of.

Please note that all figure and table numbering referenced in this WCSF corresponds directly to the numbering system found in the MDA U Investigation Work Plan.

Site history and description:

The sites comprising Consolidated Unit 21-017(a)-99 began operation in 1945 at Buildings 21-152, 21-153 and 21-155; none of these sites are currently active. They are located on Delta Prime (DP) Mesa within Technical Area 21 (TA-21). The primary function of the area was plutonium and actinium research and production, of which both solid and liquid wastes were generated. During these activities, it was determined that the natural soils and clays at TA-21 were an effective source of separating radioactive contamination from liquid wastes (MDA U Investigation Work Plan, LA-UR-04-7268). These characteristics of the soils and clays were used in treating process effluents in the absorption beds that were installed at the time of operations. Consolidated Unit 21-017(a)-99 is comprised of four individual SWMUs 1) SWMU 21-017(a), wastewater absorption bed on the west side of MDA U and received effluent from 1945 to 1976; 2) SWMU 21-017(b), wastewater absorption bed on the east side of MDA U and received effluent from 1945 to 1968; 3) SWMU 21-017(c), former distribution box located between the two absorption beds and which was removed in 1985; 4) SWMU 21-022(f), sump located southwest of and historically connected to the distribution box that received effluent from Buildings 21-152 and 21-370. Note: SWMU 21-022(f) will not be addressed in this investigation because it will be handled under a separate work plan. All are located west of the TA-21 operational facilities and on the south side of DP Road.

MDA U contains two wastewater absorption beds that are approximately 80 ft long, 20 ft wide and 6 ft deep (LASL 1945, 00109, and Appendix C). Each bed had an estimated surface area of approximately 1600 ft^2 (Merrill 1990, 11721, pg. 11) with an estimated volume of 9600 ft^3. The absorption beds were filled with a 2 foot layer of 5-10 inch diameter sized cobbles, overlain by a 6 inch layer of gravel and a 6 inch layer of fine sand. These materials were covered with a 12 inch layer of soil. Effluent was discharged to the absorption beds via the distribution box from sump 21-173, directly from Building 21-153 into the eastern absorption bed, and directly from Building 21-155 and the cooling tower into the western absorption bed. In addition, oil from precipitrons was disposed of at MDA U (Drager 1946, 01562). The precipitrons were air filters installed in the filter building (21-153) through which air exhausted from 21-152 (Francis 1976, 76137). The oil may have been used in the filtration process or may have been a component of the precipitrons. The TA-21 Resource Conservation and Recovery Act Facility Investigation (RFI) work plan (LANL 1991, 07529, pgs. 16-198) states, “There were early problems with the pits (absorption beds); they did not function properly, and it was reported that oil washing from the precipitron is lying on top of the ground (Drager 1946, 01562). Disposal of liquid effluent at MDA U from Buildings 21-152 and 21-153 ceased in 1968 (Hakonson 1987, 17422). The western absorption bed [SWMU 21-017(a)] continued to receive wastewater from the cooling tower associated with Building 21-155 until approximately 1976 (Purtymun 1976, 01107). The site has been inactive since.

Excavation of material from a trench 20ft wide by 100 ft long by 4-13 ft deep reported a minimum of approximately 8000 ft^3 during site stabilization efforts in 1985 (Merrill 1990, 11721). The distribution box and pipelines within the absorption beds, portions of the two absorption beds, and a portion of the cooling tower were excavated and taken to MDA G, within Area G of TA-54 (LANL 1991, 07529, pgs. 16-199). Approximately 3000 ft^3 of the excavated material was taken to MDA G, TA-54, indicating that a significant volume of material was returned to the site (Benson 2004, 87383). The absorption bed excavation (walls and bottom) was marked with plastic sheeting and covered with fill. The area between the top of the absorption beds and the embankments surrounding them was filled with uncontaminated tuff, covered with 6 inches of top soil, regraded and revegetated. In 1987, site stabilization efforts were complete.

Although limited information exists on waste volume generation at MDA U, it is estimated that the absorption beds received approximately 135,000 gallons of liquid waste between 1945 and 1968 (Walker et al. 1981, 06277). “It is known that the primary contaminant of waste discharged into the two absorption beds was Polonium-210. Although the amount of discharge is unknown, its half-life is 138.4 days, so it must have decayed [to stable lead] to undetectable levels. The absorption beds received 2.5 Ci (Curies) of actinium-227 in 1953 (Christenson 1973, 0440.1).” Actinium-227 came principally from effluents of filter Building 21-153, which scrubbed the actinium-227 out of the air in several process buildings at TA-21 (DOE 1979, 08610.1). Actinium-227 has a half-life of about 21.8 years and decays to francium, thorium, radium and radon. A 1946 memorandum (Tribby 1946, 01540) indicates plutonium, as well as polonium, was measured in effluent discharged to MDA U.

Tritium was probably present in the water cooling tower and may also have reached the beds from TA-21 air-emission sources, such as stacks and filter houses. Uranium-235 and sources of gamma radiation may have been discharged to the beds.

Pre-RFI and RFI sampling was conducted at MDA U beginning from the first field investigation in 1946 to the most recent investigation in 2001. Levels of plutonium from Buildings 21-152 and 21-153 were up to 650pCi/L; polonium levels were as high as 21,000 pCi/L (Tribby 1946, 01540). In 1976 soil samples were collected outside of and from the absorption beds. A sample of standing water was also collected from the western absorption bed. The maximum gross alpha levels measured in the soil and the water were 3345 pCi/g and 18 pCi/g, respectively (LANL 1991, 07529, pgs. 16-219). Data is presented in Table 3.1-1(LANL 2004, 87545). In 1980 soil and vegetation samples were collected from the absorptions beds and immediately outside the fenced area. Both soil and vegetation were reported to have elevated concentrations of tritium (30,000 pCi/L and 7,000 pCi/L, respectively). The data is presented in Tables 3.1-2 and 3.1-3 (LANL 2004, 87545). In 1983 subsurface soil samples were collected from two boreholes at MDA U (U-E and U-W). The samples were analyzed for tritium, total tritium and cesium-137. Tritium values are presented in Figure 3.1-2 (LANL 2004, 87545) with levels from both boreholes exceeding the maximum background levels (Purtymun 1987, 06687; LANL 1991, 07529, pgs. 16-214). All cesium-137 values were below the maximum background level. RFI surface soil and sediment sampling was conducted in 1992, 1994, 1998 and 2001. Data values are summarized in Tables 3.4-2, 3.4-4 and 3.4-6 (LANL 2004, 87545).

Characterization Strategy:

Waste #1: Decontamination water: This waste stream may potentially accumulate as wash liquids generated from the decontamination of sampling and heavy equipment. The majority of equipment decontamination will be performed using dry techniques in accordance with LANL ER-SOP-01.08, R1, “Field Decontamination of Drilling and Sampling Equipment.” Decontamination water will be stored in 55-gallon drums, managed accordingly, and will be disposed of at either the Radioactive Liquid Waste Treatment Facility (RLWTF) or the Sanitary Waste Water Systems (SWWS) for non-contaminated water generated, pending waste characterization analytical results.

Waste #2: *Plastics, Personal Protective Equipment, and Sampling Wastes*: This waste stream will include various types of plastic sheeting (i.e., tarps and contamination control covers), disposable gloves and coveralls, and sampling supplies such as plastic scoops, plastic bags, jars, and dry decontamination waste. Plastics, personnel protective equipment, and sampling-related wastes have the potential to be contaminated through direct contact with contaminated environmental media and debris. Because this waste is generated only during field activities, it is assumed that the waste contaminants will be identical to the contaminants found in the environmental media with which it has been in contact. Therefore, characterization of this waste will be based on results of the fixed laboratory analysis of the characterization and confirmation samples for environmental media. Pending analytical results, this waste stream will be managed on site and then disposed of in accordance with final analytical results. The estimated volume will be approximately 1-2 yd^3 stored in 55-gallon drums.

Waste #3: Borehole Drill Cuttings: This waste stream will be generated during characterization drilling activities at SWMU 21-017(a)-99. Based on previous site investigations, waste is suspect LLW which will be managed in a radioactive waste staging area and stored in 55-gallon drums. The estimated volume is approximately 10 yd^3. The waste will be disposed at TA-54 Area G. Characterization will be based on a combination of historical data, analytical data generated during site characterization, and direct sampling of containerized waste.

Waste Characterization Strategy Form (continued)

CHARACTERIZATION TABLE

WASTE DESCRIPTION	Waste # 1 Decon-water	Waste # 2 PPE, Admin., & Sampling waste	Waste # 3 Borehole drill cuttings
Estimated Volume	55 gallons	2 yd³	100 yd³
Packaging	55-gallon drum	55-gallon drum(s)	55-gallon drum(s)
Regulatory classification		LLW	LLW
Solid	X	X	X
RCRA			
TSCA			
New Mexico Special			
CHARACTERIZATION METHOD			
AK: Existing Data/Documentation	X	X	X
AK: from Site Characterization	X	X	X
Direct Sampling of Containerized Waste	X		X
ANALYTICAL TESTING			
Volatile Organic Constituents EPA 8260-B	X	X	X
Semivolatiles EPA 8270-C	X	X	X
Organic Pesticides EPA 8081-A			
Organic Herbicides EPA 8151-A			
PCBs EPA 8082	X		X
Total Metals EPA 6010-B	X	X	X
Total Cyanide EPA 9012-A	X		X
High Explosives Constituents EPA 8330			
Asbestos			
TPH EPA 8015			
TCLP Metals (EPA 1311/6010-B)			
TCLP Organics (EPA 1311/8260 & 1311/8270)			
TCLP Pest. & Herb. (EPA 1311/8081/1311/8151-A)			
Gross Alpha (alphacounting)	X	X	X
Gross Beta (beta counting)	X	X	X
Gross Gamma (gamma counting)	X	X	X
Tritium (liquid scintillation)	X	X	X
Gamma spectroscopy	X	X	X
Isotopic plutonium (chem. separation/alpha spec.)	X	X	X
Isotopic uranium (chem. separation/alpha spec.)	X	X	X
Total uranium (6020 ICPMS)			
Strontium-90 (beta proportional counting)	X	X	X

Americium-241 (chem. separation/alpha spec.)	X	X	X
SWSC Suite			
Ignitability			
Waste Profile Form #			

Waste Characterization Strategy Form (continued)

SIGNATURES	DATE
Team Leader (Print name and then sign below.) Becky Coel-Roback Mitchell S. Goldberg [signature]	6/17/05
Regulatory Compliance Focus Area representative (Print name and then sign below.) Kelly VanDerpoel [signature]	6/17/05
ER Waste Management Coordinator (Print name and then sign below.) Leonard Trujillo [signature]	6/17/05
Waste Services representative (Print name and then sign below.) Michelle Coriz [signature]	6/20/05

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Table 3.1-1
1976 Analytical Results for Gross Alpha at MDA U

Location	Description	Gross Alpha[a] (d/m/g[b])	Gross Alpha[c] (pCi/g)
Group H-7 Analysis (12/12/75)			
1	Soil 0–2 in. (East Pit)	7360	3345
1	Soil 2–4 in. (East Pit)	730	331
2	Muck surface (West Pit)	1990	904
3	Soil surface (outside fence)	12.5	6
4	Soil surface (Drain 2)	7.4	3
5	Water (West Pit)	40	18
6	Water (Drain 2)	148	67
Group H-8 Soil Analyses (12/22/75)			
Location	**Description**	**Gross Alpha[d] (d/m/g)**	**Gross Alpha[c] (pCi/g)**
A	Surface (Drain 1)	<44	<20
B	Surface (same as H-7 Loc. 4)	120	55
C	Surface (same as H-7 Loc. 3)	<44	<20
D	Surface (composite road)	<44	<20
E	Surface (slope)	<44	<20

Source: "TA-21 Operable Unit RFI Work Plan for Environmental Restoration" (LANL 1991, 07529, Table 16.6-II, p. 16-219).

[a] Acid leach.

[b] d/m/g = Disintegrations per minute per gram.

[c] Assumes original measurements were properly calibrated to d/m/g.

[d] Direct soil counting with a zinc sulfide gross alpha detection system.

Table 3.1-2
Selected Radionuclide Analyses for 1980 Soil Samples

Location	Depth (cm)	Tritium (pCi/L[a])	Total Uranium (µg/g[b])	Plutonium-239/240 (pCi/g)	Gamma Spectra
Background[c]		7200	3.4	0.023	
U-1	0–1	2700±400	26.1±2.6	tracer swamped	Total U is high enriched with ^{235}U
	1–10	3900±400	25.6±2.6	17.5±0.3	
	10–30	3800±400	10.9±1.1	2.2±0.0	
U-2	0–1	37200±800	7.0±0.7	2.4±0.1	^{227}Ac daughters in great abundance
	1–10	11800±500	6.3±0.6	2.2±0.1	
	10–30	27300±700	4.3±0.5	0.1±0.0	
U-3	0–1	10600±500	4.7±0.5	1.6±0.0	Normal
	1–10	6500±500	4.4±0.5	2.5±0.1	Normal
	10–30	5400±500	4.5±0.5	2.0±0.1	Normal

Source: "TA-21 Operable Unit RFI Work Plan for Environmental Restoration" (LANL 1991, 07529, Table 16.6-III, p. 16-220).
[a] pCi/L = picoCuries per liter of soil moisture.
[b] µg/g = microgram per gram of soil.
[c] Upper limit background levels from Purtymun (1987, 06687).

Table 3.1-3
Selected Radionuclide Analyses for 1980 Vegetation Samples

Location	Species	Tritium (pCi/L[a])	Plutonium-239/240 (pCi/g[b])
Background[c]		800	0.00023
U-1	Salix sp. (willow)	7200±400	0.8±0.1
U-2	Pinus pon. (ponderosa)	5800±300	0.6±0.0
	Bromus tec. (downy chess)	-9800±1300	1.1±0.1
U-3	Guttierezia s. (snakeweed)	3300±300	0.2±0.0
	Bromus tec. (downy chess)	-800±300	2.3±0.1
	Artemesia car. (wormwood)	300±300	1.8±0.0

Source: "TA-21 Operable Unit RFI Work Plan for Environmental Restoration" (LANL 1991, 07529, Table 16.6-III, p. 16-220).
[a] pCi/L = picoCuries per liter of tissue moisture.
[b] pCi/g = picoCuries per gram of ash.
[c] Upper limit background levels from The Environmental Surveillance Group (1987, 06678).

Table 3.4-2
Inorganic Chemicals Detected Above Background Values

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value[a]				29200	0.83	8.17	295	1.83	0.4	6120	19.3	8.64
Qbt2,3,4 Background Value[a]				7340	0.5	2.79	46	1.21	1.63	2200	7.14	3.14
Sediment Background Value[a]				15400	0.83	3.98	127	1.31	0.4	4420	10.5	4.73
Industrial Soil Screening Levels[b]				1.0E+5	454	17.7	7.8E+4	2250	1128[c]	n/a[d]	450	2.03E+4
AAA0396	21-01177	0–0.08	Soil	—[e]	29.9 (U)[f]	74.8 (U)	—	—	1.5 (U)	—	—	—
AAA0191	21-01178	0–0.08	Soil	52300	6 (U)	—	412	2.3	2 (U)	—	—	11
AAA0192	21-01178	0–0.5	Soil	56800	6 (U)	—	440	2.4	2 (U)	—	—	—
AAA0395	21-01183	0–0.08	Soil	—	25.3 (U)	63.3 (U)	—	—	1.3 (U)	—	—	—
AAA0193	21-01184	0–0.08	Soil	52000	6 (U)	—	383	2.2	2 (U)	—	—	—
AAA0194	21-01184	0–0.5	Soil	60700	6 (U)	—	397	2.3	2 (U)	—	—	—
AAA0391	21-01191	0–0.08	Soil	—	25.3 (U)	63.2 (U)	—	—	1.3 (U)	—	—	—
AAA0195	21-01192	0–0.08	Soil	46800	6 (U)	—	376	2.1	2 (U)	9500	—	—
AAA0196	21-01192	0–0.5	Soil	53100	6 (U)	—	348	2.2	2 (U)	7100	—	—
AAA0197	21-01193	0–0.08	Soil	58500	6 (U)	—	497	2.3	2 (U)	—	20	—
AAA0198	21-01193	0–0.5	Soil	61400	6 (U)	—	527	2.4	2 (U)	—	22	—
AAA0199[i]	21-01193	0–0.08	Soil	57300	6 (U)	—	466	2.3	2 (U)	—	—	—
AAA7519	21-01863	0–0.25	Soil	—	—	—	—	—	0.75 (U)	—	—	—
AAA7520	21-01863	0.25–0.5	Soil	—	—	—	—	—	0.43 (U)	—	—	—
AAA7521	21-01863	0.5–1	Soil	—	—	—	—	—	0.5 (U)	—	28.6 (J)[g]	—
AAA7522	21-01864	0–0.25	Soil	—	—	—	—	—	0.79 (U)	—	—	—
AAA7523	21-01864	0.25–0.5	Soil	—	—	—	—	—	0.54 (U)	—	—	—
AAA7524	21-01864	0.5–1	Soil	—	—	—	—	—	0.52 (U)	—	—	—
AAA7525	21-01865	0–0.25	Sediment	—	—	—	—	—	0.46 (U)	—	53.2 (J)	—
AAA7526	21-01865	0.25–0.5	Sediment	—	—	—	—	—	0.52 (U)	—	26.9 (J)	—
AAA7527	21-01865	0.5–1	Sediment	—	—	—	—	—	0.41 (U)	—	17.9 (J)	—
AAB9750	21-02059	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9751	21-02060	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9753	21-02062	0–0.5	Soil	—	—	—	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value				29200	0.83	8.17	295	1.83	0.4	6120	19.3	8.64
Qbt2,3,4 Background Value				7340	0.5	2.79	46	1.21	1.63	2200	7.14	3.14
Sediment Background Value				15400	0.83	3.98	127	1.31	0.4	4420	10.5	4.73
Industrial Soil Screening Level				1.0E+5	454	17.7	7.8E+4	2250	1128[c]	n/a	450	2.0E+4
AAB9754	21-02063	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9755	21-02064	0–0.5	Soil	—	—	—	—	—	—	6650	—	—
AAB9756	21-02065	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9757	21-02066	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9758	21-02067	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9759	21-02068	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9760	21-02069	0–0.25	Soil	—	—	—	—	—	—	—	—	—
AAB9761	21-02070	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9762	21-02071	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9763	21-02072	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9764	21-02073	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9765	21-02074	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9766	21-02075	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9767	21-02076	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9768	21-02077	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9769	21-02078	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9803[j]	21-02078	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9770	21-02079	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9771	21-02080	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9772	21-02081	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9773	21-02082	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9774	21-02083	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9775	21-02084	0–0.5	Soil	—	—	—	—	—	—	—	77.3 (J)	—
AAB9776	21-02085	0–0.5	Soil	—	0.87 (U)	—	—	—	—	—	—	—
AAB9777	21-02086	0–0.5	Soil	—	—	—	—	—	0.43 (U)	—	29.7 (J)	—
AAB9778	21-02087	0–0.5	Soil	—	—	—	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**
Qbt2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**
Industrial Soil Screening Level				**1.0E+5**	**454**	**17.7**	**7.8E+4**	**2250**	**1128[c]**	**n/a**	**450**	**2.0E+4**
AAB9779	21-02088	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9780	21-02089	0–0.5	Soil	—	—	—	—	—	—	—	29.5 (J)	—
AAB9781	21-02090	0–0.25	Soil	—	—	—	—	—	—	—	—	—
AAB9782	21-02091	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9783	21-02092	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9784	21-02093	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9785	21-02094	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9786	21-02095	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9787	21-02096	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9788	21-02097	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9789	21-02098	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9790	21-02099	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9791	21-02100	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9792	21-02101	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9794	21-02103	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9802[j]	21-02103	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9795	21-02104	0–0.5	Soil	—	—	—	—	—	—	7440	—	—
AAB9796	21-02105	0–0.42	Soil	—	—	—	—	—	—	—	—	—
AAB9797	21-02106	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB9798	21-02107	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAB7281	21-02570	0–0.25	Sediment	—	—	—	—	—	0.67 (U)	—	13.1 (J)	—
AAB7282	21-02570	0.25–0.5	Sediment	—	—	—	—	—	0.81 (U)	—	14 (J)	—
AAB7283	21-02570	0.5–1	Sediment	—	—	—	—	—	0.98 (U)	—	21.3 (J)	—
AAB7284	21-02571	0–0.25	Sediment	—	—	—	—	—	0.65 (U)	—	—	6.7 (U)
AAB7285	21-02571	0.25–0.5	Sediment	—	—	—	—	—	0.42 (U)	—	12.7 (J)	—
AAB7286	21-02571	0.5–1	Sediment	—	—	—	—	—	0.74 (U)	—	34.3 (J)	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**
Qbt2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**
Industrial Soil Screening Level				**1.0E+5**	**454**	**17.7**	**7.8E+4**	**2250**	**1128[c]**	**n/a**	**450**	**2.0E+4**
AAB9888	21-02577	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0135	21-02594	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0136	21-02595	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0137	21-02596	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0138	21-02597	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0139	21-02598	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0140	21-02599	0–0.5	Soil	—	—	—	—	—	—	—	—	—
AAC0144[j]	21-02599	0–0.5	Soil	—	—	—	—	—	—	—	—	—
MD21-98-0394	21-10838	0–5	Qbt3	—	—	2.9	—	—	—	—	13	—
MD21-98-0392	21-10838	14–15	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0395	21-10838	24–25	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0393	21-10838	34–35	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0397	21-10838	44–45	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0507	21-10838	54–55	Qbt3	—	—	—	48	1.7	—	—	—	—
MD21-98-0396	21-10838	64–65	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0506	21-10838	74–75	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0508	21-10839	2–3	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0402	21-10839	14–15	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0403	21-10839	24–25	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0405	21-10839	34–35	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0406	21-10839	44–45	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0509	21-10839	51.5–52.5	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0404	21-10839	59–60	Qbt3	11000	11 (U)	2.9	58	1.3	—	—	—	—
MD21-98-0407	21-10839	74–75	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0412	21-10840	4–5	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0414	21-10840	11.5–12.5	Qbt3	—	11 (U)	—	—	—	—	—	8.2	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**
Qbt2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**
Industrial Soil Screening Level				**1.0E+5**	**454**	**17.7**	**7.8E+4**	**2250**	**1128[c]**	**n/a**	**450**	**2.0E+4**
MD21-98-0413	21-10840	21.5–22.5	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0415	21-10840	34–35	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0417	21-10840	44–45	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0416	21-10840	46.5–47.5	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0422	21-10840	64–65	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0511	21-10840	74–75	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0423	21-10841	4–5	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0425	21-10841	11.5–12.5	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0424	21-10841	24–25	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0426	21-10841	34–35	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0428	21-10841	44–45	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0513	21-10841	54–55	Qbt3	—	11 (U)	3.9	—	—	—	—	—	—
MD21-98-0427	21-10841	56.5–57.5	Qbt3	—	11 (U)	3.3	—	—	—	—	—	—
MD21-98-0512	21-10841	74–75	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0433	21-10842	4–5	Qbt3	—	11 (UJ)[h]	—	—	—	—	—	—	—
MD21-98-0435	21-10842	14–15	Qbt3	—	10 (UJ)	—	—	—	—	—	—	—
MD21-98-0434	21-10842	24–25	Qbt3	—	10 (UJ)	—	—	—	—	—	—	—
MD21-98-0438	21-10842	26.5–27.5	Qbt3	—	10 (UJ)	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44–45	Qbt3	—	11 (UJ)	—	—	—	—	—	—	—
MD21-98-0437	21-10842	49–50	Qbt3	10000	11 (UJ)	—	65	2.3	—	—	—	—
MD21-98-0515	21-10842	71.5–72.5	Qbt3	—	11 (UJ)	—	—	—	—	—	—	—
MD21-98-0443	21-10843	4–5	Soil	—	—	—	—	—	0.56 (U)	—	—	—
MD21-98-0445	21-10843	14–15	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0444	21-10843	24–25	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0446	21-10843	34–35	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0447	21-10843	44–45	Qbt3	—	—	—	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt
Soil Background Value				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**
Qbt2,3,4 Background Value				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**
Sediment Background Value				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**
Industrial Soil Screening Level				**1.0E+5**	**454**	**17.7**	**7.8E+4**	**2250**	**1128[c]**	**n/a**	**450**	**2.0E+4**
MD21-98-0448	21-10843	54–55	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0453	21-10843	64–65	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0516	21-10843	72.5–75	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0517[J]	21-10843	72.5–75	Qbt3	—	10 (U)	—	—	—	—	—	—	—
MD21-98-0454	21-10844	2.5–5	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0456	21-10844	12.5–15	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0455	21-10844	24–25	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0457	21-10844	34–35	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0458	21-10844	44–45	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0459	21-10844	54–55	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0464	21-10844	64–65	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0465[c]	21-10844	74–75	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0519	21-10844	74–75	Qbt3	—	—	—	—	—	—	—	—	—
MD21-98-0468	21-10845	4–5	Qbt3	8700	11 (U)	3.7	62	—	—	—	15	—
MD21-98-0470	21-10845	14–15	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0469	21-10845	24–25	Qbt3	—	11 (U)	—	—	—	—	—	8.9	—
MD21-98-0471	21-10845	34–35	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0472	21-10845	44–45	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0473	21-10845	54–55	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0520	21-10845	64–65	Qbt3	—	11 (U)	—	—	—	—	—	—	—
MD21-98-0521	21-10845	74–75	Qbt3	—	11 (U)	—	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				**14.7**	**22.3**	**N.A.**[i]	**671**	**0.1**	**N.A.**	**15.4**	**3460**
Qbt2,3,4 Background Value				**4.66**	**11.2**	**N.A.**	**482**	**0.1**	**N.A.**	**6.58**	**3500**
Sediment Background Value				**11.2**	**19.7**	**N.A.**	**543**	**0.1**	**N.A.**	**9.38**	**2690**
Industrial Soil Screening Level				**4.54E+4**	**750**	**2.30E+4**	**2.18E+4**	**341**	**5680**	**2.25E+4**	**n/a**
AAA0396	21-01177	0–0.08	Soil	—	—	29.9 (U)	—	—	7.5 (U)	—	—
AAA0191	21-01178	0–0.08	Soil	—	—	24	—	—	4 (U)	—	24200
AAA0192	21-01178	0–0.5	Soil	—	—	26	—	—	4 (U)	—	24900
AAA0395	21-01183	0–0.08	Soil	—	25.2	25.3 (U)	—	—	6.3 (U)	—	—
AAA0193	21-01184	0–0.08	Soil	—	—	22	—	—	4 (U)	—	24400
AAA0194	21-01184	0–0.5	Soil	—	—	25	—	—	4 (U)	—	28000
AAA0391	21-01191	0–0.08	Soil	—	26.7	25.3 (U)	—	—	6.3 (U)	—	—
AAA0195	21-01192	0–0.08	Soil	15	37	21	734	—	4 (U)	—	21600
AAA0196	21-01192	0–0.5	Soil	—	—	23	—	—	4 (U)	—	25500
AAA0197	21-01193	0–0.08	Soil	—	—	26	—	—	4 (U)	—	22800
AAA0198	21-01193	0–0.5	Soil	16	—	27	—	—	4 (U)	—	23800
AAA0199[j]	21-01193	0–0.08	Soil	—	—	25	—	—	4 (U)	—	22800
AAA7519	21-01863	0–0.25	Soil	—	—	—	—	—	—	—	—
AAA7520	21-01863	0.25–0.5	Soil	—	—	—	—	—	—	—	—
AAA7521	21-01863	0.5–1	Soil	18.4	—	—	—	—	—	—	—
AAA7522	21-01864	0–0.25	Soil	—	—	—	—	—	—	—	—
AAA7523	21-01864	0.25–0.5	Soil	—	—	—	—	—	—	—	—
AAA7524	21-01864	0.5–1	Soil	—	—	—	—	—	—	—	—
AAA7525	21-01865	0–0.25	Sediment	—	28.1	—	—	—	—	—	—
AAA7526	21-01865	0.25–0.5	Sediment	—	—	—	—	—	—	—	—
AAA7527	21-01865	0.5–1	Sediment	—	—	—	—	—	—	—	—
AAB9750	21-02059	0–0.5	Soil	—	22.5	—	—	—	—	—	—
AAB9751	21-02060	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9753	21-02062	0–0.5	Soil	—	—	—	—	1.2 (J)	—	—	—
AAB9754	21-02063	0–0.5	Soil	—	23.6	—	—	0.11 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				**14.7**	**22.3**	**N.A.**[i]	**671**	**0.1**	**N.A.**	**15.4**	**3460**
Qbt2,3,4 Background Value				**4.66**	**11.2**	**N.A.**	**482**	**0.1**	**N.A.**	**6.58**	**3500**
Sediment Background Value				**11.2**	**19.7**	**N.A.**	**543**	**0.1**	**N.A.**	**9.38**	**2690**
Industrial Soil Screening Level				**4.54E+4**	**750**	**2.30E+4**	**2.18E+4**	**341**	**5680**	**2.25E+4**	**n/a**
AAB9755	21-02064	0–0.5	Soil	—	47.5	—	—	0.13 (U)	—	—	—
AAB9756	21-02065	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9757	21-02066	0–0.5	Soil	—	24.4	—	—	0.11 (U)	—	—	—
AAB9758	21-02067	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9759	21-02068	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9760	21-02069	0–0.25	Soil	—	30.6	—	—	0.12 (U)	—	—	—
AAB9761	21-02070	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9762	21-02071	0–0.5	Soil	—	23.6	—	—	0.11 (U)	—	—	—
AAB9763	21-02072	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9764	21-02073	0–0.5	Soil	—	—	—	—	0.75	—	—	—
AAB9765	21-02074	0–0.5	Soil	—	—	—	—	0.12 (U)	—	—	—
AAB9766	21-02075	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9767	21-02076	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9768	21-02077	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9769	21-02078	0–0.5	Soil	—	—	—	—	0.24 (J)	—	—	—
AAB9803[j]	21-02078	0–0.5	Soil	—	—	—	—	0.31 (J)	—	—	—
AAB9770	21-02079	0–0.5	Soil	—	—	—	—	0.26 (J)	—	—	—
AAB9771	21-02080	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9772	21-02081	0–0.5	Soil	—	—	—	—	0.41 (J)	—	—	—
AAB9773	21-02082	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9774	21-02083	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9775	21-02084	0–0.5	Soil	—	—	—	—	0.74 (J)	—	—	—
AAB9776	21-02085	0–0.5	Soil	—	28.3	—	—	0.46 (J)	—	—	—
AAB9777	21-02086	0–0.5	Soil	84.3	—	—	—	0.39 (J)	—	—	—
AAB9778	21-02087	0–0.5	Soil	—	—	—	—	0.28 (J)	—	—	—
AAB9779	21-02088	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				14.7	22.3	N.A.[i]	671	0.1	N.A.	15.4	3460
Qbt2,3,4 Background Value				4.66	11.2	N.A.	482	0.1	N.A.	6.58	3500
Sediment Background Value				11.2	19.7	N.A.	543	0.1	N.A.	9.38	2690
Industrial Soil Screening Level				4.54E+4	750	2.30E+4	2.18E+4	341	5680	2.25E+4	n/a
AAB9780	21-02089	0–0.5	Soil	—	—	—	—	0.25 (J)	—	—	—
AAB9781	21-02090	0–0.25	Soil	—	—	—	—	0.31 (J)	—	—	—
AAB9782	21-02091	0–0.5	Soil	—	—	—	—	0.31 (J)	—	—	—
AAB9783	21-02092	0–0.5	Soil	—	—	—	—	0.63 (J)	—	—	—
AAB9784	21-02093	0–0.5	Soil	—	—	—	—	0.49 (J)	—	—	—
AAB9785	21-02094	0–0.5	Soil	—	—	—	—	0.53 (J)	—	—	—
AAB9786	21-02095	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9787	21-02096	0–0.5	Soil	—	—	—	—	0.33 (J)	—	—	—
AAB9788	21-02097	0–0.5	Soil	—	—	—	—	0.43 (J)	—	—	—
AAB9789	21-02098	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9790	21-02099	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9791	21-02100	0–0.5	Soil	—	—	—	—	0.24 (J)	—	—	—
AAB9792	21-02101	0–0.5	Soil	—	—	—	—	0.24 (J)	—	27.9 (J)	—
AAB9794	21-02103	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9802[j]	21-02103	0–0.5	Soil	—	—	—	—	0.11 (U)	—	—	—
AAB9795	21-02104	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9796	21-02105	0–0.42	Soil	—	—	—	—	0.65 (J)	—	—	—
AAB9797	21-02106	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9798	21-02107	0–0.5	Soil	—	—	—	—	0.48 (J)	—	—	—
AAB7281	21-02570	0–0.25	Sediment	—	—	—	—	—	—	—	—
AAB7282	21-02570	0.25–0.5	Sediment	—	—	—	—	—	—	—	—
AAB7283	21-02570	0.5–1	Sediment	—	—	—	—	—	—	—	—
AAB7284	21-02571	0–0.25	Sediment	—	—	—	—	—	—	—	—
AAB7285	21-02571	0.25–0.5	Sediment	—	36	—	—	—	—	—	—
AAB7286	21-02571	0.5–1	Sediment	—	—	—	—	—	—	—	—
AAB9888	21-02577	0–0.5	Soil	—	—	—	—	0.43 (J)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				14.7	22.3	N.A.[i]	671	0.1	N.A.	15.4	3460
Qbt2,3,4 Background Value				4.66	11.2	N.A.	482	0.1	N.A.	6.58	3500
Sediment Background Value				11.2	19.7	N.A.	543	0.1	N.A.	9.38	2690
Industrial Soil Screening Level				4.54E+4	750	2.30E+4	2.18E+4	341	5680	2.25E+4	n/a
AAC0135	21-02594	0–0.5	Soil	—	—	—	—	—	—	—	—
AAC0136	21-02595	0–0.5	Soil	—	—	—	—	—	—	—	—
AAC0137	21-02596	0–0.5	Soil	—	—	—	—	0.27 (J)	—	—	—
AAC0138	21-02597	0–0.5	Soil	—	—	—	—	0.11 (J)	—	—	—
AAC0139	21-02598	0–0.5	Soil	—	—	—	—	0.25 (J)	—	—	—
AAC0140	21-02599	0–0.5	Soil	—	—	—	—	—	—	—	—
AAC0144[j]	21-02599	0–0.5	Soil	—	—	—	—	—	—	—	—
MD21-98-0394	21-10838	0–5	Qbt3	8.8	—	—	—	—	—	—	—
MD21-98-0392	21-10838	14–15	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0395	21-10838	24–25	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0393	21-10838	34–35	Qbt3	—	12	—	—	0.11 (U)	—	—	—
MD21-98-0397	21-10838	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0507	21-10838	54–55	Qbt3	—	12	—	—	0.12 (U)	—	—	—
MD21-98-0396	21-10838	64–65	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0506	21-10838	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0508	21-10839	2–3	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0402	21-10839	14–15	Qbt3	—	—	—	610	—	—	—	—
MD21-98-0403	21-10839	24–25	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0405	21-10839	34–35	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0406	21-10839	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0509	21-10839	51.5–52.5	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0404	21-10839	59–60	Qbt3	4.9	—	—	—	0.11 (U)	—	—	—
MD21-98-0407	21-10839	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0412	21-10840	4–5	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0414	21-10840	11.5–12.5	Qbt3	—	21	—	—	0.11 (U)	—	—	—
MD21-98-0413	21-10840	21.5–22.5	Qbt3	—	—	—	—	0.11 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				**14.7**	**22.3**	**N.A.**[1]	**671**	**0.1**	**N.A.**	**15.4**	**3460**
Qbt2,3,4 Background Value				**4.66**	**11.2**	**N.A.**	**482**	**0.1**	**N.A.**	**6.58**	**3500**
Sediment Background Value				**11.2**	**19.7**	**N.A.**	**543**	**0.1**	**N.A.**	**9.38**	**2690**
Industrial Soil Screening Level				**4.54E+4**	**750**	**2.30E+4**	**2.18E+4**	**341**	**5680**	**2.25E+4**	**n/a**
MD21-98-0415	21-10840	34–35	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0417	21-10840	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0416	21-10840	46.5–47.5	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0422	21-10840	64–65	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0511	21-10840	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0423	21-10841	4–5	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0425	21-10841	11.5–12.5	Qbt3	—	—	—	—	0.24	—	—	—
MD21-98-0424	21-10841	24–25	Qbt3	—	—	—	—	0.14	—	—	—
MD21-98-0426	21-10841	34–35	Qbt3	—	—	—	—	0.16	—	—	—
MD21-98-0428	21-10841	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0513	21-10841	54–55	Qbt3	—	—	—	—	0.14	—	—	—
MD21-98-0427	21-10841	56.5–57.5	Qbt3	—	—	—	—	0.16	—	—	—
MD21-98-0512	21-10841	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0433	21-10842	4–5	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0435	21-10842	14–15	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0434	21-10842	24–25	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0438	21-10842	26.5–27.5	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44–45	Qbt3	—	14	—	—	0.11 (U)	—	—	—
MD21-98-0437	21-10842	49–50	Qbt3	7.6	14	—	—	0.11 (U)	—	—	—
MD21-98-0515	21-10842	71.5–72.5	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0443	21-10843	4–5	Soil	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0445	21-10843	14–15	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0444	21-10843	24–25	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0446	21-10843	34–35	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0447	21-10843	44–45	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0448	21-10843	54–55	Qbt3	—	—	—	—	0.11 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Potassium
Soil Background Value				**14.7**	**22.3**	**N.A.**[i]	**671**	**0.1**	**N.A.**	**15.4**	**3460**
Qbt2,3,4 Background Value				**4.66**	**11.2**	**N.A.**	**482**	**0.1**	**N.A.**	**6.58**	**3500**
Sediment Background Value				**11.2**	**19.7**	**N.A.**	**543**	**0.1**	**N.A.**	**9.38**	**2690**
Industrial Soil Screening Level				**4.54E+4**	**750**	**2.30E+4**	**2.18E+4**	**341**	**5680**	**2.25E+4**	**n/a**
MD21-98-0453	21-10843	64–65	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0516	21-10843	72.5–75	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0517[j]	21-10843	72.5–75	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0454	21-10844	2.5–5	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0456	21-10844	12.5–15	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0455	21-10844	24–25	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0457	21-10844	34–35	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0458	21-10844	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0459	21-10844	54–55	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0464	21-10844	64–65	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0465[j]	21-10844	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0519	21-10844	74–75	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0468	21-10845	4–5	Qbt3	4.8	—	—	—	0.11 (U)	—	—	—
MD21-98-0470	21-10845	14–15	Qbt3	—	13	—	—	0.11 (U)	—	—	—
MD21-98-0469	21-10845	24–25	Qbt3	—	22	—	—	0.11 (U)	—	—	—
MD21-98-0471	21-10845	34–35	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0472	21-10845	44–45	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0473	21-10845	54–55	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0520	21-10845	64–65	Qbt3	—	—	—	—	0.11 (U)	—	—	—
MD21-98-0521	21-10845	74–75	Qbt3	—	—	—	—	0.11 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				**1.52**	**1**	**915**	**N.A.**	**0.73**	**1.82**	**39.6**	**48.8**
Qbt2,3,4 Background Value				**0.3**	**1**	**2770**	**N.A.**	**1.1**	**2.40**	**17**	**63.5**
Sediment Background Value				**0.3**	**1**	**1470**	**N.A.**	**0.73**	**2.22**	**19.7**	**60.2**
Industrial Soil Screening Level				**5680**	**5680**	**n/a**	**1.0E+5**	**74.9**	**200**	**7950**	**1.0E+5**
AAA0396	21-01177	0–0.08	Soil	74.8 (U)	3 (U)	—	25.3	74.8 (U)	5.1	—	—
AAA0191	21-01178	0–0.08	Soil	—	—	15400	123	20 (U)	5.11	—	—
AAA0192	21-01178	0–0.5	Soil	—	1.2	15800	127	20 (U)	4.77	—	—
AAA0395	21-01183	0–0.08	Soil	63.3 (U)	2.5 (U)	—	15.5	63.3 (U)	4.9	—	—
AAA0193	21-01184	0–0.08	Soil	—	—	16200	114	20 (U)	5.2	—	—
AAA0194	21-01184	0–0.5	Soil	—	—	19000	109	20 (U)	4.19	—	—
AAA0391	21-01191	0–0.08	Soil	63.2 (U)	2.5 (U)	—	11.8	63.2 (U)	5.1	—	—
AAA0195	21-01192	0–0.08	Soil	—	—	14000	123	20 (U)	7.21	—	52
AAA0196	21-01192	0–0.5	Soil	—	—	17800	114	20 (U)	4.14	—	—
AAA0197	21-01193	0–0.08	Soil	—	—	13900	142	20 (U)	3.75	45	57
AAA0198	21-01193	0–0.5	Soil	—	—	14300	151	20 (U)	3.72	48	—
AAA0199[j]	21-01193	0–0.08	Soil	—	—	14200	134	20 (U)	3.65	42	58
AAA7519	21-01863	0–0.25	Soil	—	2.4 (U)	—	—	—	—	—	—
AAA7520	21-01863	0.25–0.5	Soil	—	2.2 (U)	—	—	—	—	—	—
AAA7521	21-01863	0.5–1	Soil	—	2.1 (U)	—	—	—	—	—	—
AAA7522	21-01864	0–0.25	Soil	—	2.4 (U)	—	—	—	—	—	—
AAA7523	21-01864	0.25–0.5	Soil	—	2.2 (U)	—	—	—	—	—	—
AAA7524	21-01864	0.5–1	Soil	—	2.1 (U)	—	—	—	1.95 (J)	—	—
AAA7525	21-01865	0–0.25	Sediment	0.69 (U)	2.3 (U)	—	—	—	—	—	—
AAA7526	21-01865	0.25–0.5	Sediment	0.67 (U)	2.2 (U)	—	—	—	—	—	—
AAA7527	21-01865	0.5–1	Sediment	0.62 (U)	2.1 (U)	—	—	—	—	—	—
AAB9750	21-02059	0–0.5	Soil	—	—	—	—	—	2.93 (J)	—	—
AAB9751	21-02060	0–0.5	Soil	—	—	—	—	—	1.97 (J)	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	—	—	1.88 (J)	—	—
AAB9753	21-02062	0–0.5	Soil	—	—	—	—	—	2.1 (J)	—	—
AAB9754	21-02063	0–0.5	Soil	—	—	—	—	—	3.16 (J)	—	54.1

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				**1.52**	**1**	**915**	**N.A.**	**0.73**	**1.82**	**39.6**	**48.8**
Qbt2,3,4 Background Value				**0.3**	**1**	**2770**	**N.A.**	**1.1**	**2.40**	**17**	**63.5**
Sediment Background Value				**0.3**	**1**	**1470**	**N.A.**	**0.73**	**2.22**	**19.7**	**60.2**
Industrial Soil Screening Level				**5680**	**5680**	**n/a**	**1.0E+5**	**74.9**	**200**	**7950**	**1.0E+5**
AAB9755	21-02064	0–0.5	Soil	—	—	—	—	0.78 (U)	3.7 (J)	—	66.2
AAB9756	21-02065	0–0.5	Soil	—	—	—	—	—	3.06 (J)	—	—
AAB9757	21-02066	0–0.5	Soil	—	—	—	—	0.76 (U)	2.2 (J)	—	—
AAB9758	21-02067	0–0.5	Soil	—	—	—	—	0.77 (U)	—	—	—
AAB9759	21-02068	0–0.5	Soil	—	—	—	—	—	2.84 (J)	—	—
AAB9760	21-02069	0–0.25	Soil	—	—	—	—	0.86 (U)	5.8 (J)	—	52.5
AAB9761	21-02070	0–0.5	Soil	—	—	—	—	—	2.91 (J)	—	—
AAB9762	21-02071	0–0.5	Soil	—	—	—	—	—	2.01 (J)	—	—
AAB9763	21-02072	0–0.5	Soil	—	—	—	—	0.75 (U)	7.5 (J)	—	—
AAB9764	21-02073	0–0.5	Soil	—	—	—	—	1.1 (U)	—	—	—
AAB9765	21-02074	0–0.5	Soil	—	—	—	—	0.74 (U)	2.11 (J)	—	—
AAB9766	21-02075	0–0.5	Soil	—	—	—	—	—	1.93 (J)	—	—
AAB9767	21-02076	0–0.5	Soil	—	—	—	—	—	1.86 (J)	—	—
AAB9768	21-02077	0–0.5	Soil	—	—	—	—	—	3.4 (J)	—	—
AAB9769	21-02078	0–0.5	Soil	—	—	—	—	—	2.22 (J)	—	—
AAB9803	21-02078	0–0.5	Soil	—	—	—	—	—	2.37 (J)	—	—
AAB9770	21-02079	0–0.5	Soil	—	—	—	—	—	2.16 (J)	—	—
AAB9771	21-02080	0–0.5	Soil	—	—	—	—	—	2.23 (J)	—	68.5
AAB9772	21-02081	0–0.5	Soil	—	—	—	—	—	2.21 (J)	—	—
AAB9773	21-02082	0–0.5	Soil	—	—	—	—	—	2.12 (J)	—	—
AAB9774	21-02083	0–0.5	Soil	—	—	—	—	—	1.83 (J)	—	59.8
AAB9775	21-02084	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9776	21-02085	0–0.5	Soil	—	—	—	—	0.81 (U)	2.15 (J)	—	58.2
AAB9777	21-02086	0–0.5	Soil	—	—	—	—	—	1.94	—	56.7
AAB9778	21-02087	0–0.5	Soil	—	—	—	—	—	37.5	—	—
AAB9779	21-02088	0–0.5	Soil	—	—	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				1.52	1	915	N.A.	0.73	1.82	39.6	48.8
Qbt2,3,4 Background Value				0.3	1	2770	N.A.	1.1	2.40	17	63.5
Sediment Background Value				0.3	1	1470	N.A.	0.73	2.22	19.7	60.2
Industrial Soil Screening Level				5680	5680	n/a	1.0E+5	74.9	200	7950	1.0E+5
AAB9780	21-02089	0–0.5	Soil	—	—	—	—	—	2.96	—	404
AAB9781	21-02090	0–0.25	Soil	—	—	—	—	—	—	—	—
AAB9782	21-02091	0–0.5	Soil	—	—	—	—	—	2.09 (J)	—	53.2
AAB9783	21-02092	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9784	21-02093	0–0.5	Soil	—	—	—	—	—	8.96	—	—
AAB9785	21-02094	0–0.5	Soil	—	—	—	—	—	—	—	73.2
AAB9786	21-02095	0–0.5	Soil	—	—	—	—	—	2.02 (J)	—	—
AAB9787	21-02096	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9788	21-02097	0–0.5	Soil	—	—	—	—	—	2.11 (J)	—	64
AAB9789	21-02098	0–0.5	Soil	—	—	—	—	—	—	—	53.7
AAB9790	21-02099	0–0.5	Soil	—	—	—	—	—	2.02 (J)	—	509
AAB9791	21-02100	0–0.5	Soil	—	—	—	—	—	9.14	—	—
AAB9792	21-02101	0–0.5	Soil	—	—	—	—	—	18.1	—	146
AAB9794	21-02103	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9802[j]	21-02103	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9795	21-02104	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9796	21-02105	0–0.42	Soil	—	—	—	—	—	1.95 (J)	—	—
AAB9797	21-02106	0–0.5	Soil	—	—	—	—	—	1.9 (J)	—	—
AAB9798	21-02107	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB7281	21-02570	0–0.25	Sediment	0.7 (U)	2.3 (U)	—	—	—	—	—	—
AAB7282	21-02570	0.25–0.5	Sediment	0.67 (U)	2.2 (U)	—	—	—	—	—	—
AAB7283	21-02570	0.5–1	Sediment	0.65 (U)	2.2 (U)	—	—	—	—	—	—
AAB7284	21-02571	0–0.25	Sediment	0.67 (U)	2.2 (U)	—	—	—	2.69 (J)	—	—
AAB7285	21-02571	0.25–0.5	Sediment	0.63 (U)	2.1 (U)	—	—	—	—	—	72
AAB7286	21-02571	0.5–1	Sediment	0.76 (U)	2.5 (U)	—	—	—	—	—	—
AAB9888	21-02577	0–0.5	Soil	—	—	—	—	—	2.03 (J)	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				**1.52**	**1**	**915**	**N.A.**	**0.73**	**1.82**	**39.6**	**48.8**
Qbt2,3,4 Background Value				**0.3**	**1**	**2770**	**N.A.**	**1.1**	**2.40**	**17**	**63.5**
Sediment Background Value				**0.3**	**1**	**1470**	**N.A.**	**0.73**	**2.22**	**19.7**	**60.2**
Industrial Soil Screening Level				**5680**	**5680**	**n/a**	**1.0E+5**	**74.9**	**200**	**7950**	**1.0E+5**
AAC0135	21-02594	0–0.5	Soil	—	—	1460 (J)	—	0.84 (U)	—	—	—
AAC0136	21-02595	0–0.5	Soil	—	—	1550 (J)	—	0.85 (U)	2.05 (J)	—	90.6
AAC0137	21-02596	0–0.5	Soil	—	—	1100 (J)	—	0.84 (U)	—	—	109
AAC0138	21-02597	0–0.5	Soil	—	—	1670 (J)	—	0.86 (U)	—	—	—
AAC0139	21-02598	0–0.5	Soil	—	—	1680 (J)	—	0.85 (U)	—	—	57.2
AAC0140	21-02599	0–0.5	Soil	—	—	1480 (J)	—	0.89 (U)	—	—	—
AAC0144	21-02599	0–0.5	Soil	—	—	1370 (J)	—	0.86 (U)	—	—	—
MD21-98-0394	21-10838	0–5	Qbt3	0.52 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0392	21-10838	14–15	Qbt3	1 (U)	2 (U)	—	—	—	—	—	—
MD21-98-0395	21-10838	24–25	Qbt3	1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0393	21-10838	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	73
MD21-98-0397	21-10838	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0507	21-10838	54–55	Qbt3	1.2 (U)	2.4 (U)	—	—	—	—	—	—
MD21-98-0396	21-10838	64–65	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0506	21-10838	74–75	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0508	21-10839	2–3	Qbt3	1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0402	21-10839	14–15	Qbt3	1 (U)	2 (U)	—	—	—	—	—	—
MD21-98-0403	21-10839	24–25	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0405	21-10839	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0406	21-10839	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0509	21-10839	51.5–52.5	Qbt3	1.1 (U)	2.2 (U)	—	—	—	—	—	—
MD21-98-0404	21-10839	59–60	Qbt3	1.1 (U)	2.3 (U)	—	—	—	—	—	—
MD21-98-0407	21-10839	74–75	Qbt3	1.1 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0412	21-10840	4–5	Qbt3	1.1 (U)	2.2 (U)	—	—	—	—	—	—
MD21-98-0414	21-10840	11.5–12.5	Qbt3	0.53 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0413	21-10840	21.5–22.5	Qbt3	0.53 (U)	2.1 (U)	—	—	—	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				**1.52**	**1**	**915**	**N.A.**	**0.73**	**1.82**	**39.6**	**48.8**
Qbt2,3,4 Background Value				**0.3**	**1**	**2770**	**N.A.**	**1.1**	**2.40**	**17**	**63.5**
Sediment Background Value				**0.3**	**1**	**1470**	**N.A.**	**0.73**	**2.22**	**19.7**	**60.2**
Industrial Soil Screening Level				**5680**	**5680**	**n/a**	**1.0E+5**	**74.9**	**200**	**7950**	**1.0E+5**
MD21-98-0415	21-10840	34–35	Qbt3	0.53 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0417	21-10840	44–45	Qbt3	0.54 (U)	2.2 (U)	—	—	—	—	—	—
MD21-98-0416	21-10840	46.5–47.5	Qbt3	0.54 (U)	2.2 (U)	—	—	—	—	—	—
MD21-98-0422	21-10840	64–65	Qbt3	0.54 (U)	2.2 (U)	—	—	—	—	—	—
MD21-98-0511	21-10840	74–75	Qbt3	0.53 (U)	2.1 (U)	—	—	—	—	—	—
MD21-98-0423	21-10841	4–5	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0425	21-10841	11.5–12.5	Qbt3	1 (U)	2 (U)	—	—	2 (U)	—	—	—
MD21-98-0424	21-10841	24–25	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0426	21-10841	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0428	21-10841	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0513	21-10841	54–55	Qbt3	1.1 (U)	2.2 (U)	—	—	2.2 (U)	—	—	—
MD21-98-0427	21-10841	56.5–57.5	Qbt3	1.1 (U)	2.2 (U)	—	—	2.2 (U)	—	—	—
MD21-98-0512	21-10841	74–75	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0433	21-10842	4–5	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0435	21-10842	14–15	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0434	21-10842	24–25	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0438	21-10842	26.5–27.5	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0436	21-10842	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0437	21-10842	49–50	Qbt3	1.1 (U)	2.2 (U)	—	—	2.2 (U)	—	—	—
MD21-98-0515	21-10842	71.5–72.5	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0443	21-10843	4–5	Soil	—	2.2 (U)	—	—	2.2 (U)	—	—	—
MD21-98-0445	21-10843	14–15	Qbt3	1 (U)	2 (U)	—	—	2 (U)	—	—	—
MD21-98-0444	21-10843	24–25	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0446	21-10843	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0447	21-10843	44–45	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0448	21-10843	54–55	Qbt3	1.1 (U)	2.2 (U)	—	—	2.2 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				**1.52**	**1**	**915**	**N.A.**	**0.73**	**1.82**	**39.6**	**48.8**
Qbt2,3,4 Background Value				**0.3**	**1**	**2770**	**N.A.**	**1.1**	**2.40**	**17**	**63.5**
Sediment Background Value				**0.3**	**1**	**1470**	**N.A.**	**0.73**	**2.22**	**19.7**	**60.2**
Industrial Soil Screening Level				**5680**	**5680**	**n/a**	**1.0E+5**	**74.9**	**200**	**7950**	**1.0E+5**
MD21-98-0453	21-10843	64–65	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0516	21-10843	72.5–75	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0517[j]	21-10843	72.5–75	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0454	21-10844	2.5–5	Qbt3	1 (U)	2 (U)	—	—	2 (U)	—	—	—
MD21-98-0456	21-10844	12.5–15	Qbt3	1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0455	21-10844	24–25	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0457	21-10844	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0458	21-10844	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0459	21-10844	54–55	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0464	21-10844	64–65	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0465[j]	21-10844	74–75	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0519	21-10844	74–75	Qbt3	1 (U)	2 (U)	—	—	2 (U)	—	—	—
MD21-98-0468	21-10845	4–5	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0470	21-10845	14–15	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0469	21-10845	24–25	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0471	21-10845	34–35	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0472	21-10845	44–45	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0473	21-10845	54–55	Qbt3	1.1 (U)	2.2 (U)	—	—	2.2 (U)	—	—	—

Table 3.4-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Selenium	Silver	Sodium	Strontium	Thallium	Uranium	Vanadium	Zinc
Soil Background Value				1.52	1	915	N.A.	0.73	1.82	39.6	48.8
Qbt2,3,4 Background Value				0.3	1	2770	N.A.	1.1	2.40	17	63.5
Sediment Background Value				0.3	1	1470	N.A.	0.73	2.22	19.7	60.2
Industrial Soil Screening Level				5680	5680	n/a	1.0E+5	74.9	200	7950	1.0E+5
MD21-98-0520	21-10845	64–65	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—
MD21-98-0521	21-10845	74–75	Qbt3	1.1 (U)	2.1 (U)	—	—	2.1 (U)	—	—	—

Note: Values are in mg/kg.

[a] From "Inorganic and Radionuclide Background Data for Soil, Sediment and Bandelier Tuff at Los Alamos National Laboratory" (LANL 1998, 59730).

[b] From New Mexico Environment Department, "Technical Background Document for Development of Soil Screening Levels, Revision 2.0" (NMED 2004, 85615), unless otherwise noted.

[c] Calculated from New Mexico Environment Department, "Technical Background Document for Development of Soil Screening Levels, Revision 2.0" (NMED 2004, 85615) using inputs from Eq. 7 (p. 15) and Table C-1.

[d] n/a = Not applicable.

[e] — indicates result was not detected, does not exceed the background values, or was not analyzed.

[f] "U" indicates a nondetected result for which the detection limit is greater than background.

[g] "J" indicates a result with an estimated value.

[h] "UJ" indicates result is not detected; detection limit is estimated.

[i] N.A. = Not available.

[j] Field duplicate.

Table 3.4-4
Organic Chemicals Detected

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene
Industrial Soil Screening Level[a]				3.48E+4	2.64E+5	23.4	2.34	23.4	3.13E+4[b]	234	2340
AAA7526	21-01865	0.25–0.5	Sediment	—[c]	—	—	—	—	—	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9765	21-02074	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB9772	21-02081	0–0.5	Soil	0.45	0.88	0.66	0.81	0.61	0.62	0.72	0.73
AAB9790	21-02099	0–0.5	Soil	—	—	—	—	0.44	—	—	—
AAB7285	21-02571	0.25–0.5	Sediment	—	—	0.44	—	—	—	—	0.45
AAB9889	21-02578	0–0.5	Soil	—	—	0.42	0.47	0.43	—	—	0.4
MD21-98-0435	21-10842	14–15	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0436	21-10842	44–45	Qbt3	—	—	—	—	—	—	—	—
MD21-98-0437	21-10842	49–50	Qbt3	—	—	—	—	—	—	—	—

Table 3.4-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	3,3'-Dichlorobenzidine	Diethylphthalate	Di-n-butylphthalate	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
Industrial Soil Screening Level				42.6	1.0E+5	6.84E+4	2.44E+4	2.94E+4	23.4	2.05E+4	3.13E+4
AAA7526	21-01865	0.25–0.5	Sediment	0.36	—	—	—	—	—	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	0.74	—	—	0.65	0.54
AAB9765	21-02074	0–0.5	Soil	—	8.1	—	—	—	—	—	—
AAB9772	21-02081	0–0.5	Soil	—	—	—	2.9	0.42	0.56	2.9	1.8
AAB9790	21-02099	0–0.5	Soil	—	—	—	—	—	—	—	—
AAB7285	21-02571	0.25–0.5	Sediment	—	—	—	1.4	—	—	1.5 (J)[d]	0.99 (J)
AAB9889	21-02578	0–0.5	Soil	—	—	—	1.3	—	—	1.3	0.98
MD21-98-0435	21-10842	14–15	Qbt3	—	—	0.36	—	—	—	—	—
MD21-98-0436	21-10842	44–45	Qbt3	—	—	0.38	—	—	—	—	—
MD21-98-0437	21-10842	49–50	Qbt3	—	—	0.44	—	—	—	—	—

Note: Values are in mg/kg.

[a] From New Mexico Environment Department, "Technical Background Document for Development of Soil Screening Levels, Revision 2.0" (NMED 2004, 85615), unless otherwise noted.

[b] Based on pyrene as a surrogate chemical.

[c] — = Result was not detected or was not analyzed.

[d] "J" indicates a result with an estimated value.

Table 3.4-6
Radionuclides Detected Above Background/Fallout Values

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value[c]				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.[d]**	**N.A.**	**1.31**	**N.A.**	**n/a[e]**	**2.59**	**0.2**
Qbt2,3,4 Background Value[c]				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value[c]				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Screening Action Level[f]				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
MD21-01-0492	21-01001	0–0.5	Soil	—[g]	—	—	—	—	—	—	—	1.59	—	—
MD21-01-0493	21-01001	0–0.5	Soil	—	—	—	—	—	—	—	—	8.11	—	—
AAA0396	21-01177	0–0.08	Soil	—	—	—	1.84	—	—	—	—	0.456	—	—
AAA0191	21-01178	0–0.08	Soil	—	—	0.044	0.664	—	—	—	—	0.7	—	—
AAA0192	21-01178	0–0.5	Soil	—	—	—	0.593	—	—	—	—	0.989	—	—
AAA0395	21-01183	0–0.08	Soil	0.131	—	0.024	2.686	—	—	—	—	0.189	—	—
AAA0193	21-01184	0–0.08	Soil	0.105	—	—	1.268	—	—	—	—	0.711	—	—
AAA0194	21-01184	0–0.5	Soil	0.031	—	—	0.603	—	—	—	—	0.9	—	—
AAA0391	21-01191	0–0.08	Soil	—	—	0.03	2.348	—	—	—	—	0.278	—	—
AAA0195	21-01192	0–0.08	Soil	0.267	—	0.037	3.095	—	—	—	—	0.711	—	—
AAA0196	21-01192	0–0.5	Soil	—	—	—	0.815	—	—	—	—	0.922	—	—
AAA0197	21-01193	0–0.08	Soil	—	—	—	0.185	—	—	—	—	0.833	—	—
AAA0198	21-01193	0–0.5	Soil	—	—	—	—	—	—	—	—	1.389	—	—
AAA0199[h]	21-01193	0–0.08	Soil	—	—	—	0.069	—	—	—	—	0.856	—	—
AAA7519	21-01863	0–0.25	Soil	—	—	—	0.168	—	—	—	—	0.433	—	—
AAA7520	21-01863	0.25–0.5	Soil	—	—	—	0.082	—	—	—	—	0.243	—	—
AAA7521	21-01863	0.5–1	Soil	—	—	—	0.149	—	—	—	—	0.181	—	—
AAA7522	21-01864	0–0.25	Soil	—	—	—	0.126	—	—	—	—	0.672	—	—
AAA7523	21-01864	0.25–0.5	Soil	—	—	—	0.110	—	—	1.61	—	0.502	—	—
AAA7524	21-01864	0.5–1	Soil	—	—	—	0.147	—	—	2.63	—	0.081	—	—
AAA7525	21-01865	0–0.25	Sediment	—	—	0.022	0.371	—	—	—	—	0.171	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	**n/a**	**2.59**	**0.2**
Qbt2,3,4 Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
AAA7526	21-01865	0.25–0.5	Sediment	—	—	—	0.232	—	—	—	—	—	—	—
AAA7527	21-01865	0.5–1	Sediment	—	—	2.516	4.136	—	—	—	—	—	—	—
AAB9750	21-02059	0–0.5	Soil	—	—	—	1.48	—	—	—	—	0.618	—	—
AAB9751	21-02060	0–0.5	Soil	—	—	—	0.152	—	—	—	—	0.381	—	—
AAB9752	21-02061	0–0.5	Soil	—	—	—	0.272	—	—	—	—	0.256	—	—
AAB9753	21-02062	0–0.5	Soil	—	—	—	0.164	—	—	—	—	0.858	—	—
AAB9754	21-02063	0–0.5	Soil	—	1.66	—	1.45	—	—	—	—	1.104	—	—
AAB9755	21-02064	0–0.5	Soil	—	2.779	—	2.696	—	—	—	—	1.310	—	—
AAB9756	21-02065	0–0.5	Soil	—	—	—	1.168	—	—	—	—	1.022	—	0.243
AAB9757	21-02066	0–0.5	Soil	—	—	—	1.557	—	—	—	—	0.413	—	—
AAB9758	21-02067	0–0.5	Soil	—	—	—	0.218	—	—	—	—	0.112	—	—
AAB9759	21-02068	0–0.5	Soil	—	—	—	1.244	—	—	—	—	0.209	—	0.204
AAB9760	21-02069	0–0.25	Soil	—	—	—	1.734	—	—	—	—	0.750	—	—
AAB9761	21-02070	0–0.5	Soil	—	—	—	0.449	—	—	—	—	0.120	—	—
AAB9762	21-02071	0–0.5	Soil	—	—	—	1.896	—	—	—	—	0.635	—	—
AAB9763	21-02072	0–0.5	Soil	—	—	—	—	—	—	—	—	0.375	—	—
AAB9764	21-02073	0–0.5	Soil	—	—	—	0.302	—	—	—	—	0.264	—	—
AAB9765	21-02074	0–0.5	Soil	—	—	—	0.826	—	—	—	—	0.441	—	—
AAB9766	21-02075	0–0.5	Soil	—	—	—	0.639	—	—	—	—	0.328	—	—
AAB9767	21-02076	0–0.5	Soil	—	—	—	0.793	—	—	—	—	0.315	—	—
AAB9768	21-02077	0–0.5	Soil	—	—	—	—	—	—	2.96	—	0.271	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	n/a	**2.59**	**0.2**
Qbt2,3,4 Background Value				n/a	n/a	n/a	n/a	**N.A.**	**N.A.**	n/a	**N.A.**	n/a	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
AAB9769	21-02078	0–0.5	Soil	—	—	—	0.144	—	—	—	—	0.163	—	—
AAB9803[h]	21-02078	0–0.5	Soil	—	—	—	0.107	—	—	—	—	0.200	—	—
AAB9770	21-02079	0–0.5	Soil	—	—	—	0.804	—	—	—	—	0.191	—	—
AAB9771	21-02080	0–0.5	Soil	—	—	—	0.180	—	—	—	—	0.277	—	—
AAB9772	21-02081	0–0.5	Soil	—	—	—	0.342	—	—	—	—	0.252	—	—
AAB9773	21-02082	0–0.5	Soil	—	—	—	0.237	—	—	—	—	0.392	—	0.211
AAB9774	21-02083	0–0.5	Soil	—	—	—	0.154	—	—	—	—	1.810	—	—
MD21-01-0434	21-02083	0–0.5	Soil	—	—	—	—	—	—	—	—	7.08	—	—
MD21-01-0490[h]	21-02083	0–0.5	Soil	—	—	—	—	—	—	—	—	5.81	—	—
AAB9775	21-02084	0–0.5	Soil	—	—	—	0.223	—	—	—	—	0.285	—	—
AAB9776	21-02085	0–0.5	Soil	0.255	—	0.028	0.793	—	—	—	—	1.491	—	—
AAB9777	21-02086	0–0.5	Soil	—	—	—	0.124	—	—	—	—	0.376	—	0.346
AAB9778	21-02087	0–0.5	Soil	—	—	—	—	—	—	—	—	0.243	—	—
AAB9779	21-02088	0–0.5	Soil	—	—	—	0.118	—	—	—	—	0.639	—	0.243
AAB9780	21-02089	0–0.5	Soil	—	—	0.025	0.183	—	—	—	—	0.733	—	0.332
AAB9781	21-02090	0–0.25	Soil	—	—	—	0.247	—	—	—	—	0.191	—	0.278
AAB9782	21-02091	0–0.5	Soil	—	—	—	0.209	—	—	—	—	0.396	—	—
AAB9783	21-02092	0–0.5	Soil	—	—	—	0.181	—	—	—	—	0.271	—	—
AAB9784	21-02093	0–0.5	Soil	0.634	—	—	0.502	—	—	—	—	0.284	—	—
AAB9785	21-02094	0–0.5	Soil	—	—	—	0.181	—	—	—	—	0.296	—	0.343
AAB9786	21-02095	0–0.5	Soil	—	—	—	—	—	—	—	—	0.281	—	—
AAB9787	21-02096	0–0.5	Soil	—	—	—	—	—	—	—	—	0.417	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	**n/a**	**2.59**	**0.2**
Qbt2,3,4 Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
AAB9788	21-02097	0–0.5	Soil	—	—	—	0.288	—	—	—	—	0.189	—	—
AAB9789	21-02098	0–0.5	Soil	—	—	—	0.195	—	—	—	—	0.270	—	—
AAB9790	21-02099	0–0.5	Soil	—	—	—	0.639	—	—	—	—	3.246	—	—
MD21-01-0435	21-02099	0–0.5	Soil	—	—	—	—	—	—	—	—	2.42	—	—
AAB9791	21-02100	0–0.5	Soil	—	—	—	—	—	—	—	—	0.302	—	—
AAB9792	21-02101	0–0.5	Soil	—	—	—	0.325	—	—	—	—	0.992	—	—
MD21-01-0436	21-02101	0–0.5	Soil	—	—	—	—	—	—	—	—	1.83	—	—
AAB9793	21-02102	0–0.5	Soil	—	—	—	0.214	—	—	—	—	0.430	—	0.225
AAB9794	21-02103	0–0.5	Soil	—	—	0.066	—	—	—	—	—	0.071	—	—
AAB9802[h]	21-02103	0–0.5	Soil	—	—	—	—	—	—	—	—	0.403	—	—
AAB9795	21-02104	0–0.5	Soil	—	—	—	—	—	—	—	—	0.091	—	—
AAB9796	21-02105	0–0.42	Soil	—	—	—	0.179	—	—	—	—	0.251	—	—
AAB9797	21-02106	0–0.5	Soil	—	—	—	—	—	—	—	—	0.214	—	—
AAB9798	21-02107	0–0.5	Soil	—	—	—	—	—	—	—	—	0.333	—	—
AAB7281	21-02570	0–0.25	Sediment	—	—	—	0.207	—	—	—	—	0.129	—	—
AAB7282	21-02570	0.25–0.5	Sediment	—	—	—	0.119	—	—	—	—	0.126	—	—
AAB7283	21-02570	0.5–1	Sediment	—	—	—	—	—	—	—	—	0.257	—	—
AAB7284	21-02571	0–0.25	Sediment	—	—	—	0.247	—	—	—	—	0.099	—	—
AAB7285	21-02571	0.25–0.5	Sediment	—	—	—	0.234	—	—	—	—	—	—	—
AAB9891	21-02576	0–0.5	Soil	—	—	—	—	—	—	—	—	0.336	—	—
AAB9888	21-02577	0–0.5	Soil	—	—	—	—	—	—	—	—	0.405	—	—
AAB9889	21-02578	0–0.5	Soil	—	—	—	—	—	—	—	—	0.403	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	n/a	**2.59**	**0.2**
Qbt2,3,4 Background Value				n/a	n/a	n/a	n/a	**N.A.**	**N.A.**	n/a	**N.A.**	n/a	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
AAB9890	21-02579	0–0.5	Soil	—	—	—	—	—	—	—	—	0.422	—	—
AAC0135	21-02594	0–0.5	Soil	—	—	—	0.070	—	—	—	—	0.938	—	—
AAC0136	21-02595	0–0.5	Soil	—	—	—	0.064	—	—	—	—	2.479	—	—
AAC0137	21-02596	0–0.5	Soil	—	—	—	0.238	—	—	—	—	0.590	—	—
AAC0138	21-02597	0–0.5	Soil	—	—	—	0.15	—	—	—	—	1.239	—	—
AAC0139	21-02598	0–0.5	Soil	—	—	—	0.078	—	—	—	—	1.530	—	—
AAC0140	21-02599	0–0.5	Soil	—	—	—	0.066	—	—	—	—	0.215	—	—
AAC0144[h]	21-02599	0–0.5	Soil	—	—	—	0.069	—	—	—	—	0.235	—	—
MD21-98-0394	21-10838	0–5	Qbt3	0.036	—	—	0.072	—	—	—	—	0.73	11.49	0.565
MD21-98-0392	21-10838	14–15	Qbt3	—	—	—	—	—	—	—	—	—	2.96	0.163
MD21-98-0395	21-10838	24–25	Qbt3	—	—	—	—	—	—	—	—	0.54	—	—
MD21-98-0393	21-10838	34–35	Qbt3	0.046	—	—	0.291	—	—	—	—	0.45	—	—
MD21-98-0397	21-10838	44–45	Qbt3	—	—	—	—	—	—	—	—	0.35	—	—
MD21-98-0507	21-10838	54–55	Qbt3	—	—	—	—	—	—	—	—	0.41	6.93	0.347
MD21-98-0396	21-10838	64–65	Qbt3	—	—	—	—	—	—	—	—	0.09	2.57	0.142
MD21-98-0506	21-10838	74–75	Qbt3	—	—	—	—	—	—	—	—	0.06	—	—
MD21-98-0508	21-10839	2–3	Qbt3	—	—	—	—	—	—	—	—	0.4	2.19	0.107
MD21-98-0402	21-10839	14–15	Qbt3	—	—	—	—	—	—	—	—	0.19	3.8	0.188
MD21-98-0403	21-10839	24–25	Qbt3	—	—	—	—	—	—	—	—	0.31	—	0.105
MD21-98-0405	21-10839	34–35	Qbt3	—	—	—	—	—	—	—	—	0.24	—	—
MD21-98-0406	21-10839	44–45	Qbt3	—	—	—	—	—	—	—	—	0.25	—	—
MD21-98-0509	21-10839	51.5–52.5	Qbt3	—	—	—	—	—	—	—	—	0.47	2.67	0.14

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	**n/a**	**2.59**	**0.2**
Qbt2,3,4 Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
MD21-98-0404	21-10839	59–60	Qbt3	—	—	—	—	—	—	—	—	0.55	2.86	0.183
MD21-98-0407	21-10839	74–75	Qbt3	—	—	—	—	—	—	—	—	0.17	—	0.096
MD21-98-0412	21-10840	4–5	Qbt3	—	—	—	—	—	—	—	—	0.97	—	—
MD21-98-0414	21-10840	11.5–12.5	Qbt3	—	—	—	—	—	—	—	—	0.32	2.67	0.128
MD21-98-0413	21-10840	21.5–22.5	Qbt3	—	—	—	—	—	—	—	—	0.34	—	—
MD21-98-0415	21-10840	34–35	Qbt3	—	—	—	—	—	—	—	—	0.2	—	—
MD21-98-0417	21-10840	44–45	Qbt3	—	—	—	—	—	—	—	—	0.11	—	—
MD21-98-0416	21-10840	46.5–47.5	Qbt3	—	—	—	—	—	—	—	—	0.12	—	—
MD21-98-0422	21-10840	64–65	Qbt3	—	—	—	—	—	—	—	—	0.12	—	—
MD21-98-0511	21-10840	74–75	Qbt3	—	—	—	—	—	—	—	—	0.17	—	—
MD21-98-0423	21-10841	4–5	Qbt3	—	—	—	—	—	—	—	—	0.64	—	—
MD21-98-0425	21-10841	11.5–12.5	Qbt3	—	—	—	—	—	—	—	—	0.99	2.01	0.107
MD21-98-0424	21-10841	24–25	Qbt3	—	—	—	—	—	—	—	—	1.85	—	—
MD21-98-0426	21-10841	34–35	Qbt3	—	—	—	—	—	—	—	—	2.37	—	—
MD21-98-0428	21-10841	44–45	Qbt3	0.033	—	—	—	—	—	—	—	1.25	—	—
MD21-98-0513	21-10841	54–55	Qbt3	0.04	—	—	—	2.3	—	—	2.33	2	—	—
MD21-98-0427	21-10841	56.5–57.5	Qbt3	—	—	—	—	—	—	—	—	1.84	—	—
MD21-98-0512	21-10841	74–75	Qbt3	—	—	—	—	—	—	—	—	0.95	—	—
MD21-98-0433	21-10842	4–5	Qbt3	—	—	—	—	—	—	—	—	0.35	—	—
MD21-98-0435	21-10842	14–15	Qbt3	—	—	—	—	—	—	—	—	0.14	—	—
MD21-98-0434	21-10842	24–25	Qbt3	0.029	—	—	—	—	—	—	—	0.1	—	—
MD21-98-0436	21-10842	26.5–27.5	Qbt3	0.029	—	—	—	—	—	—	—	0.07	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	**n/a**	**2.59**	**0.2**
Qbt2,3,4 Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
MD21-98-0436	21-10842	44–45	Qbt3	—	—	—	—	—	—	—	—	0.15	—	—
MD21-98-0437	21-10842	49–50	Qbt3	—	—	—	—	—	—	—	—	0.4	—	—
MD21-98-0515	21-10842	71.5–72.5	Qbt3	—	—	—	—	—	—	—	—	0.19	—	—
MD21-98-0443	21-10843	4–5	Soil	—	—	—	—	—	—	—	—	1.54	—	—
MD21-98-0445	21-10843	14–15	Qbt3	—	—	—	—	—	—	—	—	0.2	—	—
MD21-98-0444	21-10843	24–25	Qbt3	—	—	—	—	—	—	—	—	0.31	—	—
MD21-98-0446	21-10843	34–35	Qbt3	—	—	—	—	—	—	—	—	0.42	—	—
MD21-98-0447	21-10843	44–45	Qbt3	—	—	—	—	—	—	—	—	0.29	—	—
MD21-98-0448	21-10843	54–55	Qbt3	—	—	—	—	—	—	—	—	0.52	—	—
MD21-98-0453	21-10843	64–65	Qbt3	—	—	—	—	—	—	—	—	0.18	—	—
MD21-98-0516	21-10843	72.5–75	Qbt3	—	—	—	—	—	—	—	—	0.09	—	—
MD21-98-0517[h]	21-10843	72.5–75	Qbt3	—	—	—	—	—	—	—	—	0.1	—	—
MD21-98-0454	21-10844	2.5–5	Qbt3	—	—	—	—	—	—	—	—	0.11	—	—
MD21-98-0456	21-10844	12.5–15	Qbt3	—	—	0.029	—	—	—	—	—	0.15	—	—
MD21-98-0455	21-10844	24–25	Qbt3	—	—	—	—	—	—	—	—	0.38	—	—
MD21-98-0457	21-10844	34–35	Qbt3	—	—	—	—	—	—	—	—	0.45	—	—
MD21-98-0458	21-10844	44–45	Qbt3	—	—	—	—	—	—	—	—	0.36	—	—
MD21-98-0459	21-10844	54–55	Qbt3	—	—	—	—	—	—	—	—	0.25	—	—
MD21-98-0464	21-10844	64–65	Qbt3	—	—	—	—	—	—	—	—	0.32	—	—
MD21-98-0465[h]	21-10844	74–75	Qbt3	—	—	—	—	—	—	—	—	0.33	—	—
MD21-98-0519	21-10844	74–75	Qbt3	—	—	—	—	—	—	—	—	0.4	—	—
MD21-98-0468	21-10845	4–5	Qbt3	—	—	—	0.07	—	—	—	—	0.84	3.02	0.244

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	n/a	**2.59**	**0.2**
Qbt2,3,4 Background Value				n/a	n/a	n/a	n/a	**N.A.**	**N.A.**	n/a	**N.A.**	n/a	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
MD21-98-0470	21-10845	14–15	Qbt3	—	—	—	—	—	—	—	—	0.24	—	—
MD21-98-0472	21-10845	44–45	Qbt3	—	—	—	—	—	—	—	—	0.09	—	—
MD21-98-0473	21-10845	54–55	Qbt3	—	—	—	—	—	—	—	—	0.16	—	—
MD21-98-0520	21-10845	64–65	Qbt3	—	—	—	—	—	—	—	—	0.15	—	—
MD21-98-0521	21-10845	74–75	Qbt3	—	—	—	—	—	—	—	—	0.11	—	—
MD21-98-0492	21-10855	0–0.5	Soil	—	2.56	—	—	—	—	—	—	—	—	—
MD21-98-0484	21-10857	0–0.5	Soil	0.84	—	—	—	—	—	—	—	—	—	—
MD21-98-0485	21-10858	0–0.5	Soil	—	—	—	—	—	—	—	—	—	6.87	0.272
MD21-98-0500	21-10864	6–8	Qbt3	—	—	—	0.067	—	—	—	—	0.31	—	—
MD21-98-0501	21-10865	6–8	Qbt3	—	—	—	0.057	—	—	—	—	0.3	—	—
MD21-98-0502	21-10866	5–8	Qbt3	—	—	—	0.051	—	—	—	—	0.93	6.68	0.317
MD21-98-0503	21-10867	5–8	Qbt3	—	—	—	0.23	—	—	—	—	0.72	22.5	1.229
MD21-01-0494	21-11404	3–3.5	Soil	—	—	—	—	—	—	—	—	0.337	—	—
MD21-01-0495[h]	21-11404	3–3.5	Soil	—	—	—	—	—	—	—	—	0.356	—	—
MD21-01-0496	21-11406	5–5	Soil	—	0.094	—	—	—	0.762	—	—	0.948	17.9	1.45
MD21-01-0497	21-11407	4–4	Soil	—	—	—	—	—	—	—	—	0.467	—	—
MD21-01-0498	21-11408	5–5.5	Soil	—	—	—	—	—	—	—	—	0.495	—	—
MD21-01-0499	21-11409	7–7	Soil	—	—	—	—	—	—	—	—	0.139	—	—
MD21-01-0500[h]	21-11409	7–7	Soil	—	—	—	—	—	—	—	—	0.141	—	—
MD21-01-0501	21-11411	7–7	Soil	—	0.215	—	—	—	0.815	—	0.503	0.371	—	—

Table 3.4-6 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239	Radium-223[a]	Radon-219[a]	Strontium-90	Thorium-227[a]	Tritium[b]	Uranium-234	Uranium-235
Soil Background Value				**0.013**	**1.65**	**0.023**	**0.054**	**N.A.**	**N.A.**	**1.31**	**N.A.**	**n/a**	**2.59**	**0.2**
Qbt2,3,4 Background Value				**n/a**	**n/a**	**n/a**	**n/a**	**N.A.**	**N.A.**	**n/a**	**N.A.**	**n/a**	**1.98**	**0.09**
Sediment Background Value				**0.040**	**0.90**	**0.006**	**0.068**	**N.A.**	**N.A.**	**1.04**	**N.A.**	**0.093**	**2.59**	**0.2**
Industrial Soil Screening Level				**140**	**19.7**	**176**	**159**	**N.A.**	**N.A.**	**1615**	**N.A.**	**15140**	**1087**	**73.1**
MD21-01-0502	21-11412	7–7	Soil	—	0.657	—	—	3.82	3.85	—	4.41	0.063	—	—
MD21-01-0503	21-11413	7–7	Soil	—	0.051	—	—	—	0.82	—	1.33	0.632	—	—

Note: Values are in pCi/g.

[a] Radium-223, radon-219, and thorium-227 are reported because they are progeny of actinium-227, a known contaminant released at the site.

[b] Although there is a soil background value for tritium (0.76 pCi/mL), it is not used for comparisons in this dataset. Not enough information is available to convert all of the earlier tritium results in soil to the correct units for background value comparisons. The sediment background value is in units of pCi/g and therefore comparison of detections in sediment to background value is performed.

[c] From "Inorganic and Radionuclide Background Data for Soil, Sediment and Bandelier Tuff at Los Alamos National Laboratory" (LANL 1998, 59730).

[d] N.A.= No available.

[e] n/a = Not applicable.

[f] Calculated using the dose-based computer model RESRAD 6.21 and a radiation dose limit of 15 mrem/yr.

[g] — Indicates result was not detected, does not exceed the background/fallout value, or was not analyzed.

[h] Field duplicate.

Table 4.1-1
Analytical Suites for Proposed Samples at MDA U

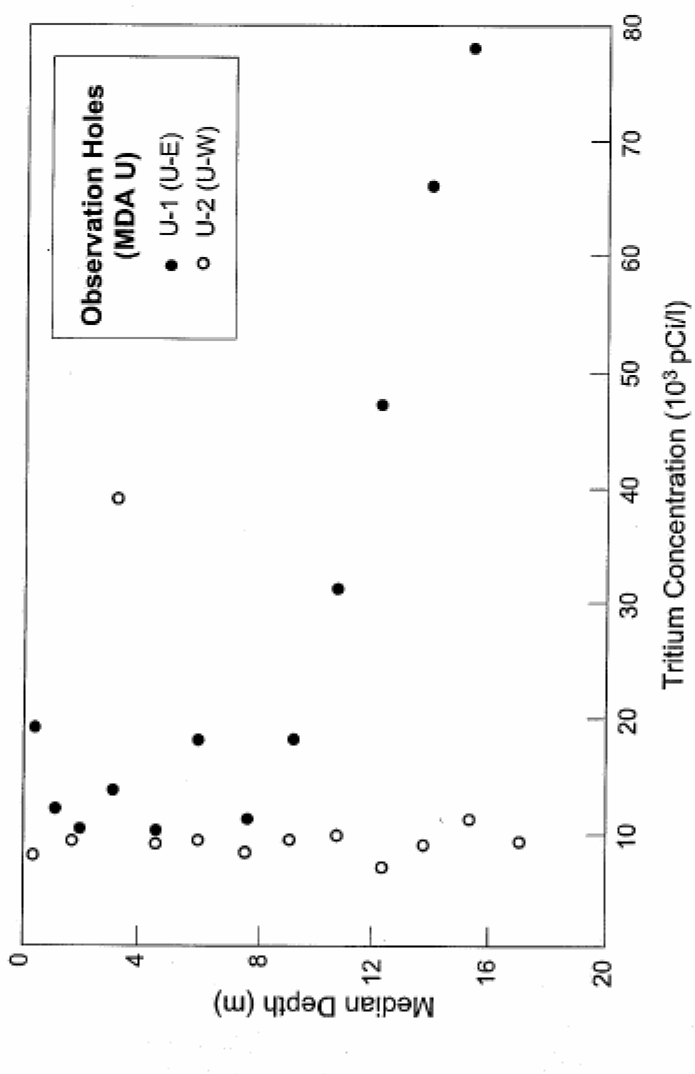
Location//Issue Addressed	Location	Geologic Units Anticipated	VOCs[a]	SVOCs	TAL Metals	Perchlorate	Cyanide	PCBs	Nitrate	Geotechnical Properties	Gamma Spectroscopy	Alpha Spectroscopy[b]	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Pore Gas VOCs	Pore Gas Tritium
BH-4: Vertical bounds of absorption bed contamination and perched saturated zones.	Former location of distribution box between east and west absorption bed.	Fill, soil, Quaternary Bandelier Tuff (Qbt) Units 3, 2, 1 and Cerro Toledo interval[c]	X[d]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH-1 through BH-3 and BH-5 through BH-9: lateral bounds of subsurface contamination	8 locations outside of MDA U fence	Fill, soil, Quaternary Bandelier Tuff (Qbt) 3 and 2	X	X	X	X	X	X	X	—[e]	X	X	X	X	X	X	X	X	X
Surface Soils	4 borehole locations	Soil	—	X	X	X	X	X	X	—	X	X	X	X	X	X	X	—	—

[a] VOCs for pore gas by EPA Method TO-14.
[b] Alpha spectroscopy is the recommended analysis for actinium-227 progeny.
[c] Tuff sample for permeability tests immediately above Qbt2/Qct contact in borings that pass into the Cerro Toledo interval.
[d] X = Analysis will be conducted.
[e] — = Analysis will not be conducted.

Table 4.2-1
Summary of Proposed Sampling at MDA U

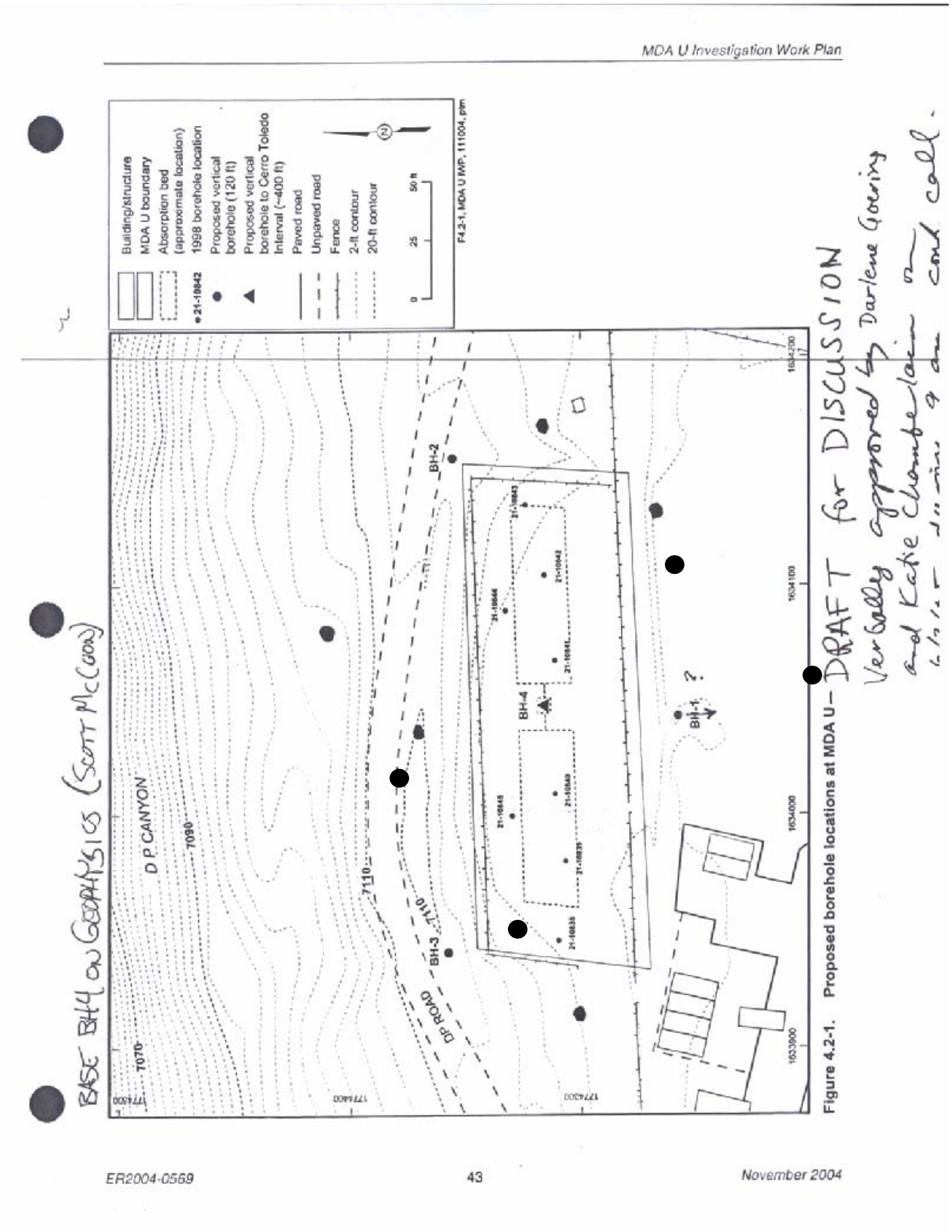
Sample Location	Location	Approximate Total Depth	Minimum Number of Samples*	Field Screening Intervals	Core Intervals
BH-4	Former location of distribution box between east and west absorption bed.	360 ft bgs	1 surface and a minimum of 4 subsurface (Total = 5)	Continuous for radiological contamination Every 10 ft for VOCs or if any field indicators of contamination found	Continuous
BH-1 BH-2 BH-3 BH-5 BH-6 BH-7 BH-8 BH-9	Surrounding MDA U	120 ft bgs	1 surface and a minimum of 4 subsurface per borehole (Total = 40)	Continuous for radiological contamination Every 10 ft for VOCs or if any field indicators of contamination found	Continuous

* Additional samples will be collected if any of the following features are present: evidence of contamination (i.e., staining or elevated screening levels); lithologic contacts; fractures; fracture-fill material; surge beds; or a higher permeability unit. These criteria do not apply to the sediment samples.



Source: "TA-21 Operable Unit RFI Work Plan for Environmental Restoration" (LANL 1991, 07528, Figure 16.6-3, p. 16-215)
F3.1-2, MDA U HIR, 112804, pl/m/lm

Figure 3.1-2. 1983 borehole investigation tritium results


MDA U Investigation Work Plan
Building/structure
MDA U boundary
Absorption bed (approximate location)
1998 borehole location
Proposed vertical borehole (120 ft)
Proposed vertical borehole to Cerro Toledo interval (~400 ft)
Paved road
Unpaved road
Fence
2-ft contour
20-ft contour
0 25 50 ft
F4.2-1, MDA U IWP, 111004, pm
D P CANYON
DP ROAD
7070
7090
7110
BH-1
BH-2
BH-3
BH-4
Figure 4.2-1. Proposed borehole locations at MDA U
ER2004-0569
43
November 2004
DRAFT for DISCUSSION
BASE BH4 ON GEOPHYSICS (SCOTT McCLOW)

ENV-Environmental Characterization & Remediation Document Signature Form

Document Catalog Number: ER2005-0927
(Please prefix the name of all electronic versions of this document with this number.)

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Solid Waste Regulatory Compliance (SWRC) KELLY VANDERPOEL	Kelly VanDerpoel	12/16/05	
Project Leader BECKY COEL-ROBACK	[signature]	12/16/05	

Document Catalog Number ER2005-0927

WASTE PROFILE FORM

Contact (if other than given below)	For rapid processing, complete all sections in black or blue ink and mail to: SOLID WASTE OPERATIONS GROUP at **MS J595.** For assistance with completing this form, call SOLID WASTE OPERATIONS GROUP at **5-4000.**	Reference Number (For SOLID WASTE OPERATIONS GROUP use only.)

Generator's Z Number	Waste Generator's Name (print)		WMC's Z Number	WMC's Name (print)		
146032	Becky Coel-Roback		192466	Douglas Hopinkah		
Generator's Telephone	**Generator's Mail Stop**	**Waste Generating Group**	**Waste Stream Technical Area**	**Building**	**Room**	**WMC Telephone**
665-5011	M992	ENV-ECR	TA-21	outside	n/a	661-5274

Waste Accumulation (Check only one.)

- ☐ Satellite Accumulation Area Site no: ______
- ☐ Less-than-90-days Storage Area Site no: ______
- ☐ TSDF Site no: ______
- ☐ Universal Waste Storage Area Site no: ______
- ☐ Used Oil for Recycle Site no: ______
- ☒ ER Site SWMU/AOC #: 21-017(a)-99
- ☐ PCBs Storage Area Site no: ______
- ☐ NM Special Waste Site no: ______
- ☒ Rad Staging Area Site no: ______
- ☐ Rad Storage Area Site no: ______
- ☐ None of the Above

ER Use Only

Method of Characterization (Check as many as apply.)

- ☒ Chemical/Physical Analysis ☐ Attached Sample #: Sec. 5
- ☒ Radiological Analysis ☐ Attached Sample #: ______
- ☒ PCB Analysis ☐ Attached Sample #: ______
- ☒ Acceptable Knowledge Documentation ☐ Attached Documentation #: See 5
- ☐ MSDS ☐ Attached

Section 1 – Waste Prevention/Minimization (answer all questions)

Question			
Can hazard segregation, elimination, or material substitution be used?	☐ Yes (Provide comments)	☒ No	
Can any of the materials in the waste stream be recycled or reused?	☐ Yes (Provide comments)	☒ No	
Has waste minimization been incorporated into procedures or other process controls?	☒ Yes	☐ No (Provide comments)	
Can this waste be generated outside a RCA?	☐ Yes (Provide comments)	☐ No	☒ N/A

Section 2 - Chemical and Physical Information

Waste Type (Check only one.)
- ☐ Unused/Unspent Chemical (Complete all sections as appropriate.)
- ☒ Process Waste/Spent Chemical/ Other (Complete all sections.)

Radiological Information

Was Waste Generated in a RCA? ☒ Yes ☐ No
- ☐ Non-radioactive
- ☒ Radioactive – Low Level
- ☐ Radioactive - Transuranic

Waste Destination (Check only one)
- ☐ SWWS (Complete Attachment 1)
- ☐ RLWTF (Complete Attachment 2)
- ☐ RLWTP (Complete Attachment 3)
- ☐ TA-16/HE (Complete Attachment 4)
- ☐ NTS (Complete Attachment 5)

Classification Information
- ☒ Unclassified
- ☐ Classified/Sensitive

Waste Category (Check all that apply.)
- ☒ Inorganic
- ☒ Organic
- ☐ Solvent *
- ☐ Degreaser *
- ☐ Dioxin
- ☐ Electroplating
- ☐ Treated Hazardous waste or residue
- ☐ No-Longer Contained-In
- ☐ Explosive process
- ☐ Infectious/Medical
- ☐ Biological
- ☐ Beryllium
- ☐ Empty Container (See instructions)
- ☐ Battery (See instructions)
- Asbestos ☐ friable ☐ non-friable
- PCB Source Concentration
  - ☐ PCB < 50 ppm
  - ☐ PCB ≥ 50 - < 500 ppm
  - ☐ PCB ≥ 500 ppm
- ☐ Hazardous Waste Contaminated Soil
- ☐ Untreated Hazardous Debris
- ☐ Commercial Solid Waste
- ☒ Other (Describe below)

* See instructions.

Waste Source (Check only one.)

Waste Source A
- ☐ Decon
- ☐ Materials Processing/Production
- ☐ Research/Development/Testing
- ☐ Scheduled Maintenance
- ☐ Housekeeping - Routine
- ☐ Spill Cleanup – Routine
- ☐ Sampling - Routine Monitoring
- ☐ Other (Describe below)

Waste Source B
- ☐ Abatement
- ☐ Construction/Upgrades
- ☐ Demolition
- ☐ Decon/Decom
- ☒ Investigative Derived
- ☐ Orphan/Legacy
- ☐ Remediation/Restoration
- ☐ Repacking (Secondary)
- ☐ Unscheduled Maintenance
- ☐ Housekeeping (Non-routine)
- ☐ Spill Cleanup (Non-routine)
- ☐ UST - Non-petroleum
- ☐ UST - Petroleum
- ☐ Other (Describe below)

Waste Matrix (Check only one.)

Gas
- ☐ ≤ 1.5 Atmospheres pressure
- ☐ > 1.5 Atmospheres pressure
- ☐ Liquefied compressed gas

Liquid
- ☐ Aqueous
- ☐ Non-aqueous
- ☐ Suspended Solids/ Aqueous
- ☐ Suspended Solids/ Non-aqueous

Solid
- ☐ Powder/Ash/Dust
- ☒ Solid
- ☐ Sludge
- ☐ Absorbed/solidified liquid
- ☐ Debris

Matrix Type (Check only one.)
- ☒ Homogeneous
- ☐ Heterogeneous (Describe below)

Estimated Annual Volume (m^3): 12 m^3

Section 3 – Process and Waste Descriptions

Process Description:
This solid waste has been generated from drilling activities on a project at TA-21 MDA U.

Waste Description:
This waste stream consists of drill cuttings packaged in 55-gallon drums which are lined with HDPE Liners.

Section 4 – Characteristics

Ignitability (Check only one.)	Corrosivity (Check only one.)	Reactivity (Check as many as apply.)	Boiling Point (Check only one.)
(°F) (°C)	(pH)		(°F) (°C)
☐ < 73 < 22.8	☐ ≤ 2.0	☐ RCRA Unstable	☐ ≤ 95 ≤ 35
☐ 73 - 99 22.8 - 37.2	☐ 2.1 – 4.0	☐ Water Reactive	☐ > 95 > 35
☐ 100 - 139 37.8 - 59.4	☐ 4.1 – 6.0	☐ Cyanide Bearing	
☐ 140 -200 60.0 - 93.3	☐ 6.1 – 9.0	☐ Sulfide Bearing	
☐ > 200 > 93.3	☐ 9.1 - 12.4	☐ Pyrophoric	
☐ EPA Ignitable – Non-liquid	☐ ≥ 12.5	☐ Shock Sensitive	
☐ DOT Flammable Gas	☐ Liquid corrosive to steel	☐ Explosive - DOT Div. ______	
☐ DOT Oxidizer	☒ Non-aqueous	☒ Non-reactive	☒ Not applicable
☒ Not ignitable			

Identify for all contaminants listed.	Characterization Method: AK	TCLP	Total	None or Non-detect	Concentration of Contaminants: Contaminant present at Minimum	Maximum	Regulatory Limit
Toxicity Characteristic Metals					(10,000 ppm = 1%)		
Arsenic	☐	☐	☒	☐	2.68	to 9.17 ppm	5.0 ppm
Barium	☐	☐	☒	☐	46.8	to 106.0 ppm	100.0 ppm
Cadmium	☐	☐	☒	☐	0.0	to 0.409 ppm	1.0 ppm
Chromium (Total)	☐	☐	☒	☐	4.67	to 60.0 ppm	5.0 ppm
Lead	☐	☐	☒	☐	12.4	to 71.6 ppm	5.0 ppm
Mercury	☐	☐	☒	☒	______	to ______ ppm	0.2 ppm
Selenium	☐	☐	☒	☒	______	to ______ ppm	1.0 ppm
Silver	☐	☐	☒	☒	______	to ______ ppm	5.0 ppm
Toxicity Characteristic Organics							
Benzene	☐	☐	☒	☒	0.0	to 0.00074 ppm	0.5 ppm
Carbon tetrachloride	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm
Chlorobenzene	☐	☐	☒	☒	______	to ______ ppm	100.0 ppm
Chloroform	☐	☐	☒	☒	______	to ______ ppm	6.0 ppm
o – cresol	☐	☐	☒	☒	______	to ______ ppm	200.0 ppm
m – cresol	☐	☐	☒	☒	______	to ______ ppm	200.0 ppm
p – cresol	☐	☐	☒	☒	______	to ______ ppm	200.0 ppm
Cresol – mixed	☐	☐	☒	☒	______	to ______ ppm	200.0 ppm
1,4-Dichlorobenzene	☐	☐	☒	☒	______	to ______ ppm	7.5 ppm
1,2-Dichloroethane	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm
1,1-Dichloroethylene	☐	☐	☒	☒	______	to ______ ppm	0.7 ppm
2,4-Dinitrotoluene	☐	☐	☒	☒	______	to ______ ppm	0.13 ppm
Hexachlorobenzene	☐	☐	☒	☒	______	to ______ ppm	0.13 ppm
Hexachlorobutadiene	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm
Hexachloroethane	☐	☐	☒	☒	______	to ______ ppm	3.0 ppm
Methyl ethyl ketone	☐	☐	☒	☐	0.0	to 0.0022 ppm	200.0 ppm
Nitrobenzene	☐	☐	☒	☒	______	to ______ ppm	2.0 ppm
Pentachlorophenol	☐	☐	☒	☒	______	to ______ ppm	100.0 ppm
Pyridine	☐	☐	☒	☐	0.0	to 0.0781 ppm	5.0 ppm
Tetrachloroethylene	☐	☐	☒	☒	______	to ______ ppm	0.7 ppm
Trichloroethylene	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm
2,4,5-Trichlorophenol	☐	☐	☒	☒	______	to ______ ppm	400.0 ppm
2,4,6-Trichlorophenol	☐	☐	☒	☒	______	to ______ ppm	2.0 ppm
Vinyl chloride	☐	☐	☒	☒	______	to ______ ppm	0.2 ppm
Herbicides and Pesticides							
Chlordane	☐	☐	☒	☒	______	to ______ ppm	0.03 ppm
2,4-D	☐	☐	☒	☒	______	to ______ ppm	10.0 ppm
Endrin	☐	☐	☒	☒	______	to ______ ppm	0.02 ppm
Heptachlor (& its epoxide)	☐	☐	☒	☒	______	to ______ ppm	0.008 ppm
Lindane	☐	☐	☒	☒	______	to ______ ppm	0.4 ppm
Methoxychlor	☐	☐	☒	☒	______	to ______ ppm	10.0 ppm
Toxaphene	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm
2,4,5-TP (Silvex)	☐	☐	☒	☒	______	to ______ ppm	0.5 ppm

Section 5 - Additional Constituents and Information

Additional Constituents and Contaminants. Please account for 100% of waste. Ranges should be given within guidelines of individual constituents. List all other constituents (including inerts) not identified above and attach any applicable analysis. No chemical formulas allowed in this field. Continue in Section 3 Additional Information as necessary. CAS Numbers are needed for all chemical constituents, for material without a CAS Number enter "No CAS Number." Contact Waste Services at 5-4000 for assistance.

CAS No.	Name of constituent	Minimum	Maximum
	drill cuttings	90	to 95 %
	plastics (liners)	5	to 10 %
			to %
			to %
			to %
			to %
			to %
			to %
			to %
			to %
			to %
			to %
			to %
	Total of max. ranges of this section and page 2	108.43	in %

Additional Information (Use additional sheet if necessary.)
If additional information is available on the chemical, physical, or radiological character of the waste not covered on this form, provide it below:

-Referencing WCSF: TA-21, Material Disposal Area (MDA) U Characterization and Remediation.
-This is waste stream #3 and #2.
-See attached spread sheet for "Additional Constituents and Information."
-Analytical data in file: Referencing Document #: MDA U-2005
-There is no documented historical use of solvents at this site.

Section 6 - Work Control Documentation (answer all questions)

Do the procedures for this process cover how to manage this waste? ☒ Yes ☐ No (Provide comments)

Do the procedures for this process address controls to prevent changes to waste constituents and concentrations or addition or removal of waste to/from containers? ☒ Yes ☐ No (Provide comments)

Section 7 - Packaging and Storage Control

Describe how the waste will be packaged in according to the applicable WAC: The 55-gallon drums are lined with HDPE liner.

Identify the storage management controls that will be used for this waste stream: (check all that apply)

☐ Tamper indication devices ☐ Locked cabinet or building
☐ Limited use locks with log-in for waste ☒ Other (describe) Drums are in locked fence area.

Section 8 – Waste Certification Statements (check only one)

☒ Waste appears to meet WAC chapter for: Ch. 5
☐ Waste stream needs exception/exemption for treatment, storage, or disposal at:
☐ Waste does not meet the criteria for any known TSDF. (DOE approval is required. Contact the Waste Management Program Office for assistance.)

WASTE GENERATOR CERTIFICATION: Based on my knowledge of the waste and/or chemical/physical analysis, I certify that the waste characterization information on this form is correct and that it meets the requirements of the applicable waste acceptance criteria. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature [signature] Date 12/16/05

WASTE CERTIFYING OFFICIAL: I have reviewed this form and any associated attachments and the characterization information provided appears to be complete and accurate. I certify, to the best of my knowledge, that the waste characterization information provided by the waste generator meets the requirements of the applicable WAC.

Signature [signature] Date 11/29/05

CAS No.	Name of Constituent	Minimum (%)	Maximum (%)
1314-62-1	Vanadium	0	0.00181
	Zinc	0.00788	0.00829
67-64-1	Acetone	0.00000023	0.0000013
53469-21-9	Aroclor-1242	0.00000064	0.00000141
11097-69-1	Aroclor-1254	0.00000026	0.00000115
11096-82-5	Aroclor-1260	0.00000019	0.00000058
56-55-3	Benzo(a)anthracene	0	0.00000155
65-85-0	Benzo(b)flouranthene	0	0.00000237
	Benzoic Acid	0.0000437	0.0000506
	Flouranthene	0.00000118	0.00000618
	Isopropyltoluene[4]	0.000000028	0.000000037
	Methyl-2-pentanone[4]	0.00000013	0.00000031
	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	2.52E-11	3.46E-11
85-01-8	Phenanthrene	0.00000158	0.00000575
129-00-0	Pyrene	0.0000011	0.00000685
108-88-3	Toluene	0.000000033	0.000000064
	Trichloro-1,2,2-triflouroethane[1,1,2-]	0	0.00000014
	Trimethylbenzene[1,2,4-]	0	0.000000063
	Xylene[1,3-]+Xylene[1,4-]	0.000000028	0.000000057
7429-90-5	Aluminum	0.609	1.87
7440-41-7	Beryllium	0	0.000176
	Calcium	0.259	0.798
7440-50-8	Copper	0	0.000545
	Cyanide (total)	0.0000137	0.0000188
	Iron	0.407	0.474
	Magnesium	0.0795	0.246
7440-02-0	Nickel	0	0.000797
	Nitrate	0	0.0000745
	Perchlorate	0.000000058	0.00000199

LOS ALAMOS NATIONAL LABORATORY
WASTE PROFILE SYSTEM

WPF #: 39013

31-Jan-2006 10:01 AM **(Version: 0)** p.1

Generator :	**COEL-ROBACK, BECKY**	MS :	**M992**	PH :	**6655011**	Z#:	**146032**
WMC :	**HOPINKAH, DOUGLAS**	MS :	**M892**	PH :	**505 05--**	Z#:	**192466**
Contact :							
RCRA Rev :	**Elicio Andy U**	MS :	**J595**	PH :	**5056676956**	Z#:	**118692**
Status :	**ACTIVE**	Activation Date :	**01/23/2006**	Expiration Date:	**01/23/2007**		
Group :	**ENV-ECR**	TA :	**21**	Bldg :	**000000**	Room :	**OUTSIDE**

You are required to keep a copy of the WPF(s) in your files for at least three years. This WPF(s) is valid for one year or as long as the composition of the waste you have characterized remains the same. Should your waste change, please submit a new WPF to NWIS-SWO Customer Service.

Waste Accumu : **Rad Staging Area Area Site ID# 21**
ER Waste PRS# 21-017-(A)-99

Method of Char : Chemical/Physical Analysis Number: SEC.5
Radiological Analysis
PCB Analysis
Acceptable Knowledge Documentation Number: SEC.5

Waste Prevention/Minimization

Can hazard segregation, elimination, or material substitution be used?	N
Can any of the materials in the waste stream be recycled or reused?	N
Has waste minimization been incorporated into procedures or other process controls>	Y
Can this waste be generated outside a RCA?	NA

Waste Type : **Process Waste/Spent Chemical/Other**

Waste Classes: RCA Waste - **RCA Waste**
RAD Waste - **Radioactive-LL**

Waste Category: **Inorganic**
Organic
PCB < 50 ppm
Other

Waste Sources : **Investigative Derived**

Waste Matrix : **Solid**

Matrix Type : **Homogeneous**

Process Desc :
THIS SOILD WASTE HAS BEEN GENERATED FROM DRILLING ACTIVITIES ON A PROJECT AT TA-21-MDA U.

Waste Desc : THIS WASTE STREAM CONSISTS OF DRILL CUTTINGS PACKAGED IN 55-GALLON DRUMS WHICH ARE LINED WITH HDPE LINERS.

Ignitability : **Not ignitable**

Corrosivity : **Non-aqueous**

Reactivity : **Non-reactive**

Boiling Point : **Not applicable**

Toxicity Characteristic Metals:

Contaminant	Method	Limit	Min	Max	Unit
ARSENIC	**TOTA**		**2.68**	**9.17**	**PPM**
BARIUM	**TOTA**		**46.8**	**106**	**PPM**
CADMIUM	**TOTA**		**0**	**0.409**	**PPM**
CHROMIUM	**TOTA**		**4.67**	**60**	**PPM**
LEAD	**TOTA**		**12.4**	**71.6**	**PPM**

Toxicity Characteristic Organic Compounds:

Contaminant	Method	Limit	Min	Max	Unit
BENZENE	**TOTA**		**0**	**0.00074**	**PPM**
METHYL ETHYL KETONE	**TOTA**		**0**	**0.0022**	**PPM**
PYRIDINE	**TOTA**		**0**	**0.0781**	**PPM**

Additional Chemical Constituents and Contaminants:

CAS NO	Constituent	MIN	MAX	UOM
	DRILL CUTTINGS	90	95	%
	PLASTICS (LINERS)	5	10	%
1314-62-1	VANADIUM	0	0.00181	%
	ZINC	0.00788	0.00829	%
67-64-1	ACETONE	0.00000023	0.0000013	%
53469-21-9	AROCLOR-1242	0.00000064	0.00000141	%
11097-69-1	AROCLOR-1254	0.00000026	0.00000115	%
11096-82-5	AROCLOR-1260	0.00000019	0.00000058	%
56-55-3	BENZO(A)ANTHRACENE	0	0.00000155	%
65-85-0	BENZO(B)FLOURANTHENE	0	0.00000237	%
	BENZOIC ACID	0.0000437	0.0000506	%
	FLOURANTHENE	0.00000118	0.00000618	%
	ISOPROPYLTOLUENE[4]	0.000000028	0.000000037	%
	METHYL-2-PENTANONE[4]	0.00000013	0.00000031	%
	OCTACHLORODIBENZODIOXIN[1,2,3,4,6,7,8,9-]	0.000000000252	0.0000000000346	%
85-01-8	PHENANTHRENE	0.00000158	0.00000575	%
129-00-0	PYRENE	0.0000011	0.00000685	%
108-88-3	TOLUENE	0.000000033	0.000000064	%
	TRICHLORO-1,2,2-TRIFLOUROETHANE[1,1,2-]	0	0.00000014	%
	TRIMETHYLBENZENE[1,2,4-]	0	0.000000063	%
	XYLENE[1,3-] + XYLENE[1,4-]	0.000000028	0.000000057	%
7429-90-5	ALUMINUM	0.609	1.87	%
7440-41-7	BERYLLIUM	0	0.000176	%
	CALCIUM	0.259	798	%
7440-50-8	COPPER	0	0.000545	%
	CYANIDE (TOTAL)	0.0000137	0.0000188	%
	IRON	0.407	0.474	%
	MAGNESIUM	0.0795	0.246	%
7440-02-0	NICKEL	0	0.000797	%
	NITRATE	0	0.0000745	%
	PERCHLORATE	0.000000058	0.00000199	%

Additional Information: REFERENCING WCSF: TA-21, MATERIAL DISPOSAL AREA (MDA) U CHARACTERIZATION AND REMEDIATION. THIS IS WASTE STREAM #3 AND #2. SEE ATTACHED SPREAD SHEET FOR "ADDITIONAL CONSTITUENTS AND INFORMATION." ANALYTICAL DATA IN FILE: REFERENCING DOCUMENT#: MDA U-2005. THERE IS NO DOCUMENTED HISTORICAL USE OF SOLVENTS AT THIS SITE.

Work Control Documentation:

Do the procedures for this process cover how to manage this waste?	Y
Do the procedures for this process cover controls to prevent changes to waste constituents and concentrations or addition or removal of waste?	Y

Waste Certification Statements:

Waste appears to meet WAC chapter for: CH.5

WASTE CHARACTERIZATION INFORMATION

Radioactivity Category :	**RADIOACTIVE-LL**
RCRA Category :	**NON HAZARDOUS**
Secondary Info :	N/A
Waste Classification :	**LOW-LEVEL WASTE**
Waste Acceptances :	
EPA Hazardous Waste Code :	N/A

WASTE PROFILE FORM
WPF #: 39013

For rapid processing, complete all sections in black or blue ink and mail to:

SOLID WASTE OPERATIONS GROUP at MS J595.

For assistance with completing this form, call SOLID WASTE OPERATIONS GROUP at 5-4000

Contact(if other than given below)

Generators Z Number	Waste Generators Name(print)		WMCs Z Number	WMCs Name(print)		
146032	**Becky Coel-Roback**		**192466**	**HOPINKAH, DOUGLAS**		
Becky Coel-Roback **6655011**	Generators Mail Stop **M992**	Waste Generating Group **ENV-ECR**	Waste Stream Technical Area **21**	Building **000000**	Room **OUTSIDE**	WMC Phone # **05**

Waste Accumulation (Check only one)

- [ ] Satellite Accumulation Area Site no: _____
- [ ] Less-than-90-days Storage Area Site no: _____
- [ ] TSDF Site no: _____
- [ ] Universal Waste Storage Area Site no: _____
- [ ] Used Oil for Recycle Site no: _____
- [ ] PCBs Storage Area Site no: _____
- [ ] NM Special Waste Site no: _____
- [X] Rad Staging Area Area Site no: 21
- [ ] Rad Storage Area Area Site no: _____
- [ ] None of the Above

ER Use Only ER Site SWMU/AOC #:

Method of Characterization (Check as many as apply.)

- [X] Chemical/Physical Analysis [ ] Attached Samp#: SEC.5
- [X] Radiological Analysis [ ] Attached Samp#: ______
- [X] PCB Analysis [ ] Attached Samp#: ______
- [X] AKD [ ] Attached Doc#: SEC.5
- [ ] MSDS [ ] Attached

Section 1 - Waste Prevention/Minimization (answer all questions)

Question			
Can hazard segregation, elimination, or material substitution be used?	[ ] Yes*	[X] No	
Can any of the materials in the waste stream be recycled or reused	[ ] Yes*	[X] No	
Has waste minimization been incorporated into procedures or other process controls?	[X] Yes	[ ] No	
Can this waste be generated outside a RCA?	[ ] Yes*	[ ] No	[ ] N/A

*Provide Comment

Section 2 - Chemical and Physical Information

Waste Type (Check only one.)

- [ ] Unused/Unspent Chemical
- [X] Process Waste/Spent Chem/ Other
- [ ] Green is Clean Waste

Radiological Information

Was Waste Generated in an RCA? [X] Yes [ ] No

- [ ] Non-rad
- [X] Radioactive-LL
- [ ] Radioactive-TRU

Waste Destination (Check only one)

- [ ] SWWS (Complete Attach 1)
- [ ] RLWTF(Complete Attach 2)
- [ ] RLWTP(Complete Attach 3)
- [ ] TA16/HE(Complete Attach 4)

Classification Information

- [ ] Unclassified
- [ ] Classified/Sensitive

Waste Category-Chk all that apply

- [X] Inorganic
- [X] Organic
- [ ] Solvent *
- [ ] Degreaser *
- [ ] Dioxin
- [ ] Electroplating
- [ ] Treated Hazardous waste or residue
- [ ] No Longer Contained-In
- [ ] Explosive process
- [ ] Infectious/Medical
- [ ] Biological
- [ ] Beryllium
- [ ] Empty Container
- [ ] Battery
- Asbestos [ ] - friable [ ] - non-friable
- PCB [X] PCB < 50 ppm [ ] PCB >= 50 - < 500 ppm [ ] PCB >= 500 ppm
- [ ] Hazardous Waste Contaminanted Soil
- [ ] Untreated Hazardous Debris
- [ ] Commercial Solid Waste
- [X] Other

*See instructions

Waste Source-Check only one

Waste Source A

- [ ] Decon
- [ ] Materials Processing/Production
- [ ] Research/Development/Testing
- [ ] Scheduled Maintenance
- [ ] Housekeeping - Routine
- [ ] Spill Cleanup - Routine
- [ ] Sampling - Routine Monitoring
- [ ] Other (Describe below)

Waste Source B

- [ ] Abatement
- [ ] Construction/Upgrades
- [ ] Demolition
- [ ] Decon/Decom
- [X] Investigative Derived
- [ ] Orphan/Legacy
- [ ] Remediation/Restoration
- [ ] Repacking (Secondary)
- [ ] Unscheduled Maintenance
- [ ] Housekeeping - Non-routine
- [ ] Spill Cleanup - Non-routine
- [ ] UST - Non-petroleum
- [ ] UST - Petroleum
- [ ] Other (Describe below)

Waste Matrix-Check only one

Gas

- [ ] Gas <= 1.5 Atmospheres pressure
- [ ] Gas > 1.5 Atmospheres pressure
- [ ] Liquified compressed gas

Liquid

- [ ] Aqueous
- [ ] Non-aqueous
- [ ] Suspended Solids / Aqueous
- [ ] Suspended Solids / Non-aqueous

Solid

- [ ] Powder/Ash
- [X] Solid
- [ ] Sludge
- [ ] Absorbed Liquid
- [ ] Debris

Matrix Type (check only one.)

- [X] Homogeneous
- [ ] Heterogeneous

Estimated Annual Volume (m3)

12

WASTE PROFILE FORM
WPF #: 39013

Section 3 - Process and Waste Descriptions

Process Description:

THIS SOILD WASTE HAS BEEN GENERATED FROM DRILLING ACTIVITIES ON A PROJECT AT TA-21-MDA U.

Waste Description:

THIS WASTE STREAM CONSISTS OF DRILL CUTTINGS PACKAGED IN 55-GALLON DRUMS WHICH ARE LINED WITH HDPE LINERS.

Section 4 - Characteristics

Ignitability (Check only one.)	Corrosivity (Check only one.) pH	Reactivity (Check as many as apply.)	Boiling Point (Check only one.)
☐ <73 F <22.8 C	☐ <= 2.0	☐ RCRA Unstable	☐ <= 95 F <= 35 C
☐ 73 - 99 F 22.8 - 37.2 C	☐ 2.1 - 4.0	☐ Water Reactive	☐ > 95 F > 35 C
☐ 100 - 139 F 37.8 - 59.4 C	☐ 4.1 - 6.0	☐ Cyanide Bearing	☒ Not applicable
☐ 140 - 200 F 60.0 - 99.3 C	☐ 6.1 - 9.0	☐ Sulfide Bearing	
☐ > 200 F >99.3	☐ 9.1 - 12.4	☐ Pyrophoric	
☐ EPA Ignitable - Non-liquid	☐ >= 12.5	☐ Shock Sensitive	
☐ DOT Flammable Gas	☐ Liquid corrosive to steel	☐ Explosive	
☐ DOT Oxidizer	☒ Non-aqueous	☒ Non-reactive	
☒ Not ignitable			

Identify for all contaminants listed.	Characterization Method: AK	TCLP	Total	None or Non-detect	Concentration of Contaminants — Contaminant present at: Minimum		Maximum		Regulatory Limit
Toxicity Characteristic Metals					(10,000 ppm=1%)				
ARSENIC	☐	☐	☒	☐	2.68	to	9.17	ppm	5.0 PPM
BARIUM	☐	☐	☒	☐	46.8	to	106	ppm	100.0 PPM
CADMIUM	☐	☐	☒	☐	0	to	0.409	ppm	1.0 PPM
CHROMIUM	☐	☐	☒	☐	4.67	to	60	ppm	5.0 PPM
LEAD	☐	☐	☒	☐	12.4	to	71.6	ppm	5.0 PPM
MERCURY	☐	☐	☐	☐		to		ppm	0.2 PPM
SELENIUM	☐	☐	☐	☐		to		ppm	1.0 PPM
SILVER	☐	☐	☐	☐		to		ppm	5.0 PPM
BENZENE	☐	☐	☒	☐	0	to	0.00074	ppm	0.5 PPM
CARBON TETRACHLORIDE	☐	☐	☐	☐		to		ppm	0.5 PPM
CHLOROBENZENE	☐	☐	☐	☐		to		ppm	100.0 PPM
CHLOROFORM	☐	☐	☐	☐		to		ppm	6.0 PPM
O-CRESOL	☐	☐	☐	☐		to		ppm	200.0 PPM
M-CRESOL	☐	☐	☐	☐		to		ppm	200.0 PPM
P-CRESOL	☐	☐	☐	☐		to		ppm	200.0 PPM
CRESOL - MIXED	☐	☐	☐	☐		to		ppm	200.0 PPM
1,4-DICHLOROBENZENE	☐	☐	☐	☐		to		ppm	7.5 PPM
1,2-DICHLOROETHANE	☐	☐	☐	☐		to		ppm	0.5 PPM
1,1-DICHLOROETHYLENE	☐	☐	☐	☐		to		ppm	0.7 PPM
2,4-DINITROTOLUENE	☐	☐	☐	☐		to		ppm	0.13 PPM
HEXACHLOROBENZENE	☐	☐	☐	☐		to		ppm	0.13 PPM
HEXACHLOROBUTADIENE	☐	☐	☐	☐		to		ppm	0.5 PPM
HEXACHLOROETHANE	☐	☐	☐	☐		to		ppm	3.0 PPM
METHYL ETHYL KETONE	☐	☐	☒	☐	0	to	0.0022	ppm	200.0 PPM

WASTE PROFILE FORM
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Identify for all contaminants listed.	Characterization Method			Concentration of Contaminants				Regulatory Limit
	AK	TCLP	Total	None or Non-detect	Contaminant present at Minimum		Maximum	
Toxicity Characteristic Metals					(10,000 ppm=1%)			
NITROBENZENE	☐	☐	☐	☐		to	ppm	2.0 PPM
PENTACHLOROPHENOL	☐	☐	☐	☐		to	ppm	100.0 PPM
PYRIDINE	☐	☐	☒	☐	0	to	0.0781 ppm	5.0 PPM
TETRACHLOROETHYLENE	☐	☐	☐	☐		to	ppm	0.7 PPM
TRICHLOROETHYLENE	☐	☐	☐	☐		to	ppm	0.5 PPM
2,4,5-TRICHLOROPHENOL	☐	☐	☐	☐		to	ppm	400.0 PPM
2,4,6-TRICHLOROPHENOL	☐	☐	☐	☐		to	ppm	2.0 PPM
VINYL CHLORIDE	☐	☐	☐	☐		to	ppm	0.2 PPM
CHLORODANE	☐	☐	☐	☐		to	ppm	0.03 PPM
2,4-D	☐	☐	☐	☐		to	ppm	10.0 PPM
ENDRIN	☐	☐	☐	☐		to	ppm	0.02 PPM
HEPTACHLOR (& ITS EPOXIDE)	☐	☐	☐	☐		to	ppm	0.008 PPM
LINDANE	☐	☐	☐	☐		to	ppm	0.4 PPM
METHOXYCHLOR	☐	☐	☐	☐		to	ppm	10.0 PPM
TOXAPHENE	☐	☐	☐	☐		to	ppm	0.5 PPM
2,4,5-TP(Silvex)	☐	☐	☐	☐		to	ppm	0.5 PPM

WASTE PROFILE FORM
WPF #: 39013

Section 5 - Additional Constituents and Information

Additional Constituents and Contaminates. Please account for 100% of waste. Ranges should be given within guidelines of LIG 404-00-03 of individual constituents. List all other constituents (including inerts) not identified above and attach any applicable analysis. No chemical formulas allowed in this field. Continue in Section 3 Additional Information as necessary. CAS Numbers are needed for all chemical constituents, for material without a CAS Number enter "No CAS Number." Contact Waste Services at 5-4000 for assistance.

CAS No.	Name of constituent	Minimum		Maximum	
	DRILL CUTTINGS	90	to	95	%
	PLASTICS (LINERS)	5	to	10	%
1314-62-1	VANADIUM	0	to	0.00181	%
	ZINC	0.00788	to	0.00829	%
67-64-1	ACETONE	0.00000023	to	0.0000013	%
53469-21-9	AROCLOR-1242	0.00000064	to	0.00000141	%
11097-69-1	AROCLOR-1254	0.00000026	to	0.00000115	%
11096-82-5	AROCLOR-1260	0.00000019	to	0.00000058	%
56-55-3	BENZO(A)ANTHRACENE	0	to	0.00000155	%
65-85-0	BENZO(B)FLOURANTHENE	0	to	0.00000237	%
	BENZOIC ACID	0.0000437	to	0.0000506	%
	FLOURANTHENE	0.00000118	to	0.00000618	%
	ISOPROPYLTOLUENE[4]	0.000000028	to	0.000000037	%
	METHYL-2-PENTANONE[4]	0.00000013	to	0.00000031	%

Additional Information
(Use additional sheet if necessary.)

If additional information is available on the chemical, physical, or radiological character of the waste not covered on this form, provide it below:

Section 6 - Work Control Documentation (answer all questions)

Do the procedures for this process cover how to manage this waste? ☒ Yes ☐ No

Do the procedures for this process cover controls to prevent changes to waste constituents and concentrations or addition or removal of waste? ☒ Yes ☐ No

Section 7 - Package and Storage Control

Describe how the waste will be packaged in according to the applicable WAC:

THE 55-GALLON DRUMS ARE LINED WITH HDPE LINER. (DURMS ARE LOCKED IN FENCE AREA.

Identify the storage management controls that will be used for this waste stream: (check all that apply)

☐ Tamper indication devices:
☐ Locked cabinet or building
☐ Limited use locks with log-in for waste
☒ Other (describe)

Section 8 - Waste Certification Statements (check only one)

☒ Waste appears to meet WAC of:

CH.5

☐ Waste needs exception/exemption for treatment, storage, or disposal at:

WASTE GENERATOR CERTIFICATION: Based on my knowledge of the waste and/or chemical/physical analysis, I certify that the waste characterization information on this form is correct and that it meets the requirements of the applicable waste acceptance criteria. I understand that this available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature   Date

WASTE CERTIFYING OFFICIAL: I have reviewed this form and any associated attachments and the characterization information provided appears to be complete and accurate. I certify, to the best of my knowledge, that the waste characterization information provided by the waste generator meets the requirements of the applicable WAC.

Signature   Date

WASTE PROFILE FORM
WPF #: 39013

Section 5 - Additional Constituents (continued)

CAS No.	Name of constituent	Minimum	Maximum
	OCTACHLORODIBENZODIOXIN[1,2,3,4,6,7,8,9-]	0.0000000000252	0.0000000000346
85-01-8	PHENANTHRENE	0.00000158	0.00000575
129-00-0	PYRENE	0.0000011	0.00000685
108-88-3	TOLUENE	0.000000033	0.000000064
	TRICHLORO-1,2,2-TRIFLOUROETHANE[1,1,2-]	0	0.00000014
	TRIMETHYLBENZENE[1,2,4-]	0	0.000000063
	XYLENE[1,3-] + XYLENE[1,4-]	0.000000028	0.000000057
7429-90-5	ALUMINUM	0.609	1.87
7440-41-7	BERYLLIUM	0	0.000176
	CALCIUM	0.259	798
7440-50-8	COPPER	0	0.000545
	CYANIDE (TOTAL)	0.0000137	0.0000188
	IRON	0.407	0.474
	MAGNESIUM	0.0795	0.246
7440-02-0	NICKEL	0	0.000797
	NITRATE	0	0.0000745
	PERCHLORATE	0.000000058	0.00000199

Total of ranges from this section 96.3624 905.6018 %

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA: 21 Building: outside Room: n/a ☐ Security Area ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ________)

☐ Satellite Accumulation Area (Approx. vol. ________)
☐ PCB Waste (Start Date: ________)
☐ NM Special Waste (<90 days) (Start Date: ________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________)

☐ Rad Dumpster
(No:__ ________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
10010232	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010233	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010234	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010235	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010236	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010237	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010238	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010240	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010241	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010242	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010243	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010244	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010245	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010246	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010247	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **04**-Plastic Bottle or Container **07**-Fiber or Plastic Box **10**-Portable Tank **13**-Other (**specify in description**)
02-Metal Drum **05**-Glass Bottle or Container **08**-Wooden Box **11**-Cylinder **14**-Compactor Box
03-Fiber or Plastic Drum **06**-Plastic Bag **09**-Metal Box **12**-Shield Cask **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters
L-Liters **O**-Fluid Ounce
F-Cubic Feet **P**-Pint
Q-Quart

Units for Weight
P-Pound **O**-Ounce
K-Kilograms **T**-Tons
G-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010232	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010233	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010234	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010235	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information		Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010236	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010237	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010238	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010240	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
[1]S = Surface, V = Volume, B = Both Surtace and Volume				[2]C = Compactible, NC = Non-compactable				**Units for Activity** **C**-curies **M** - grams **L**- curies/liter		

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
			Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010241	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010242	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1] S = Surface, V = Volume, B = Both Surtace and Volume [2] C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010243	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010244	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable **Units for Activity** **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information: Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Package Surface Contamination (DPM/100) sq. cm: Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010245	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010245	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010247	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA 21 | Building outside | Room n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ______________)

☐ Satellite Accumulation Area (Approx. vol. ____________)
☐ PCB Waste (Start Date: ____________)
☐ NM Special Waste (<90 days) (Start Date: __________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________________)

☐ Rad Dumpster
(No:__ ________________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
10010248	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010249	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010250	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010251	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010252	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010253	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010254	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010255	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010256	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010257	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010258	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010259	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010260	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010261	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010262	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **02**-Metal Drum **03**-Fiber or Plastic Drum **04**-Plastic Bottle or Container **05**-Glass Bottle or Container **06**-Plastic Bag **07**-Fiber or Plastic Box **08**-Wooden Box **09**-Metal Box **10**-Portable Tank **11**-Cylinder **12**-Shield Cask **13**-Other **(specify in description)** **14**-Compactor Box **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters **L**-Liters **O**-Fluid Ounce **F**-Cubic Feet **P**-Pint **Q**-Quart

Units for Weight
P-Pound **O**-Ounce **K**-Kilograms **T**-Tons **G**-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010248	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010249	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010250	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010251	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable | **Units for Activity** **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010252	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010253	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010254	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010255	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
[1]S = Surface, V = Volume, B = Both Surtace and Volume				[2]C = Compactible, NC = Non-compactable				**Units for Activity**		**C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010256	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010257	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surface and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010258	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010259	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010260	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010261	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume   [2]C = Compactible, NC = Non-compactable   **Units for Activity** C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010262	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA: 21 | Building: outside | Room: n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ________)

☐ Satellite Accumulation Area (Approx. vol. ________)
☐ PCB Waste (Start Date: ________)
☐ NM Special Waste (<90 days) (Start Date: ________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________)

☐ Rad Dumpster
(No:__ ________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
10010263	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010264	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010265	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010266	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010267	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010268	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010269	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010270	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10010271	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **02**-Metal Drum **03**-Fiber or Plastic Drum **04**-Plastic Bottle or Container **05**-Glass Bottle or Container **06**-Plastic Bag **07**-Fiber or Plastic Box **08**-Wooden Box **09**-Metal Box **10**-Portable Tank **11**-Cylinder **12**-Shield Cask **13**-Other (**specify in description**) **14**-Compactor Box **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters **L**-Liters **O**-Fluid Ounce **F**-Cubic Feet **P**-Pint **Q**-Quart

Units for Weight
P-Pound **O**-Ounce **K**-Kilograms **T**-Tons **G**-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010263	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010264	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010265	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010266	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable | **Units for Activity** C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information					Amount	Unit	Uncertainty
			Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Package Surface Contamination (DPM/100) sq. cm Alpha	Beta-Gamma	Radionuclide			
10010267	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010268	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010269	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10010270	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10010271	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA 21 | Building outside | Room n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ________)

☐ Satellite Accumulation Area (Approx. vol. ________)
☐ PCB Waste (Start Date: ________)
☐ NM Special Waste (<90 days) (Start Date: ________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________)

☐ Rad Dumpster
(No:__ ________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
10011541	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011542	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011543	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011544	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011545	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011546	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011547	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011548	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011549	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011550	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011551	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011552	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011553	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011554	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011555	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **04**-Plastic Bottle or Container **07**-Fiber or Plastic Box **10**-Portable Tank **13**-Other **(specify in description)**
02-Metal Drum **05**-Glass Bottle or Container **08**-Wooden Box **11**-Cylinder **14**-Compactor Box
03-Fiber or Plastic Drum **06**-Plastic Bag **09**-Metal Box **12**-Shield Cask **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters
L-Liters **O**-Fluid Ounce
F-Cubic Feet **P**-Pint
Q-Quart

Units for Weight
P-Pound **O**-Ounce
K-Kilograms **T**-Tons
G-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011541	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011542	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information: Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Package Surface Contamination (DPM/100) sq. cm: Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011543	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011544	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable | **Units for Activity** **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011545	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011546	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011547	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011548	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011549	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011550	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011551	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011552	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

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Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011553	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011554	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

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Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011555	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA 21 | Building outside | Room n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ________)

☐ Satellite Accumulation Area (Approx. vol. ________)
☐ PCB Waste (Start Date: ________)
☐ NM Special Waste (<90 days) (Start Date: ________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________)

☐ Rad Dumpster
(No:__ ________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
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10011557	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011558	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011559	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011560	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011561	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011562	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011563	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011564	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011565	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011566	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011567	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011568	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011569	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011570	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **04**-Plastic Bottle or Container **07**-Fiber or Plastic Box **10**-Portable Tank **13**-Other (**specify in description**)
02-Metal Drum **05**-Glass Bottle or Container **08**-Wooden Box **11**-Cylinder **14**-Compactor Box
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Units for Volume
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L-Liters **O**-Fluid Ounce
F-Cubic Feet **P**-Pint
Q-Quart

Units for Weight
P-Pound **O**-Ounce
K-Kilograms **T**-Tons
G-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
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Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
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							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011557	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011558	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011559	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1] S = Surface, V = Volume, B = Both Surtace and Volume [2] C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011560	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011561	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information: Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Package Surface Contamination (DPM/100) sq. cm: Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011562	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011563	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011564	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011565	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011566	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011567	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
[1]S = Surface, V = Volume, B = Both Surtace and Volume				[2]C = Compactible, NC = Non-compactable				**Units for Activity** **C**-curies **M** - grams **L**- curies/liter		

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011568	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011569	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011570	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA 21 | Building outside | Room n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ______)

☐ Satellite Accumulation Area (Approx. vol. ______)
☐ PCB Waste (Start Date: ______)
☐ NM Special Waste (<90 days) (Start Date: ______)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ______)

☐ Rad Dumpster
(No:__ ______)

☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information					Waste Information				*S=Solid L=Liquid G=Gas P=Powder	Description
		Type	Volume	Unit	Tare Weight	Unit	Volume	Unit	Weight	Unit		
10011571	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011572	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011573	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011574	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011575	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011576	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10011577	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **04**-Plastic Bottle or Container **07**-Fiber or Plastic Box **10**-Portable Tank **13**-Other **(specify in description)**
02-Metal Drum **05**-Glass Bottle or Container **08**-Wooden Box **11**-Cylinder **14**-Compactor Box
03-Fiber or Plastic Drum **06**-Plastic Bag **09**-Metal Box **12**-Shield Cask **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters
L-Liters **O**-Fluid Ounce
F-Cubic Feet **P**-Pint
Q-Quart

Units for Weight
P-Pound **O**-Ounce
K-Kilograms **T**-Tons
G-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011571	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011572	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011573	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011574	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable | **Units for Activity** C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011575	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10011576	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity C-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10011577	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Los Alamos
National Laboratory

Chemical Waste Disposal Request

Waste Services Use Only

This form is used to request disposal of chemical and low-level radioactive wastes. Mail completed form to Waste Services at **MS J595.**

Account Information	Z Number	Name (Print)	Telephone	Date
7H20MR8A0225MD00	192466	Douglas Hopinkah	661-5274	1/23/06

Waste Pick-up Location and Storage Type: TA 21 | Building outside | Room n/a | ☐ Security Area | ☐ Direct Off-Site Shipment

☐ < 90 Day Accumulation Area
☐ Universal Waste Area
(Start Date ________)

☐ Satellite Accumulation Area (Approx. vol. ________)
☐ PCB Waste (Start Date: ________)
☐ NM Special Waste (<90 days) (Start Date: ________)

☐ Rad Staging Area (<90 days)
☐ Rad Storage Area (<1 year)
(Start Date: ________)

☐ Rad Dumpster
(No:__ ________)
☒ Other (describe in description)

Item Id	Waste Profile Number	Shipping Container Information: Type	Volume	Unit	Tare Weight	Unit	Waste Information: Volume	Unit	Weight	Unit	*S=Solid L=Liquid G=Gas P=Powder	Description
10014407	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014408	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014409	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014410	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014411	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014412	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014413	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014414	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014415	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum
10014416	39013	02	55	G	50	P	55	G	640	P	S	drill cuttings in 55 gallon metal drum

Container Types
01-Bulk (Unpackaged) **04**-Plastic Bottle or Container **07**-Fiber or Plastic Box **10**-Portable Tank **13**-Other (**specify in description**)
02-Metal Drum **05**-Glass Bottle or Container **08**-Wooden Box **11**-Cylinder **14**-Compactor Box
03-Fiber or Plastic Drum **06**-Plastic Bag **09**-Metal Box **12**-Shield Cask **15**-Aerosol Can

Units for Volume
G-Gallon **M**-Cubic Meters
L-Liters **O**-Fluid Ounce
F-Cubic Feet **P**-Pint
Q-Quart

Units for Weight
P-Pound **O**-Ounce
K-Kilograms **T**-Tons
G-Grams

CERTIFICATION STATEMENT: To the best of my knowledge, I certify that the information on this form is correct. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Printed Name	Signature	Z Number	Date
Douglas Hopinkah	[signature]	192466	1/23/06

*For new and unused chemicals
FMU64-F286, R.0 (5/01)

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10014407	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10014408	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable **Units for Activity** **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10014409	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10014410	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume   [2]C = Compactible, NC = Non-compactable   **Units for Activity** C-curies **M** - grams L- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10014411	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10014412	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
[1]S = Surface, V = Volume, B = Both Surtace and Volume				[2]C = Compactible, NC = Non-compactable				**Units for Activity**	**C**-curies	**M** - grams **L**- curies/liter

Low- level Radiological Information

Item ID	S/V/B[1]	C/NC[2]	Health Physics Container/Package Information					Amount	Unit	Uncertainty
			Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Package Surface Contamination (DPM/100) sq. cm					
					Alpha	Beta-Gamma	Radionuclide			
10014413	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10014414	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable

Units for Activity **C**-curies **M** - grams **L**- curies/liter

Low- level Radiological Information

			Health Physics Container/Package Information							
					Package Surface Contamination (DPM/100) sq. cm					
Item ID	S/V/B[1]	C/NC[2]	Conter Surface (mrem/hr)	1 Meter Dose (mrem/hr)	Alpha	Beta-Gamma	Radionuclide	Amount	Unit	Uncertainty
10014415	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07
10014416	V	NC	<0.1	<.2	NDA	NDA	Am-241	1.17E-08	C	1.17E-09
							Cs-137	4.91E-08	C	4.91E-09
							Pu-239	2.17E-07	C	2.17E-08
							Sr-90	2.46E-07	C	2.46E-08
							Th-228	1.04E-06	C	1.04E-07
							Th-230	5.28E-07	C	5.28E-08
							Th-232	8.88E-07	C	8.88E-08
							U-234	5.89E-06	C	5.89E-07
							U-235	3.89E-07	C	3.89E-08
							U-238	1.29E-06	C	1.29E-07

[1]S = Surface, V = Volume, B = Both Surtace and Volume [2]C = Compactible, NC = Non-compactable **Units for Activity** **C**-curies **M** - grams **L**- curies/liter

Appendix H

Risk Assessments

EXECUTIVE SUMMARY

This appendix presents the screening risk assessments for human health and ecological receptors for Material Disposal Area (MDA) U at Technical Area 21. The results of historical and current sample analyses indicated a number of inorganic, organic, and radionuclide chemicals of potential concern (COPCs) in the surface and subsurface soil, sediment, and tuff at MDA U. To determine if these COPCs represent a potential risk to human or ecological receptors, exposure point concentrations (the 95% upper confidence limit of the mean or maximum detected concentrations) were compared with screening levels for exposure to humans under the industrial, construction worker, and residential scenarios and for ecological receptors potentially present at the site.

The screening assessment for human health under the industrial scenario showed a carcinogenic risk of approximately 4×10^{-6}, a hazard index (HI) of 0.06, and a dose of 0.7 mrem/yr. For the construction worker scenario, the carcinogenic risk was approximately 2×10^{-6}, the HI was approximately 0.9, and the dose was 1.3 mrem/yr. All these values are below the applicable target levels for risk, HI, and dose. The results of the screening assessment indicate no potential unacceptable risk, hazard, or dose under an industrial or a construction worker scenario at MDA U.

An ecological screening assessment was also conducted for MDA U. Based on the assessment, several chemicals of potential ecological concern (COPECs), including some COPECs without ecological screening levels, were identified. All of the COPECs were eliminated by analyzing a number of factors including potential effects to populations (individuals for threatened and endangered species), the area of contamination, the relative toxicity of related compounds, the background concentrations, and the infrequency of detection. The results of the ecological risk screening assessment do not indicate a potential risk to ecological receptors at MDA U.

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H-1.0 INTRODUCTION

Material Disposal Area (MDA) U, an inactive solid waste management unit (SWMU), is located on the northeastern section of Delta Prime (DP) Mesa within Technical Area (TA) 21. As shown in Figure 1.1-1 of the investigation report, the fenceline around MDA U encloses an area approximately 300 ft by 75 ft, which lies atop the mesa between an active industrial area and the edge of the slope of DP Canyon. Previously, absorption beds at the site were used to retain liquid waste from processes at Los Alamos National Laboratory (the Laboratory). Currently, no active operations take place at the site, which consists of an open area covered with native vegetation. Sampling results indicate that concentrations of inorganic and organic chemicals and radionuclides are present in soil and tuff at the site; therefore, screening-level human health and ecological risk assessments were conducted for MDA U.

H-2.0 BACKGROUND

H-2.1 Site Description

From 1945 to 1978, TA-21 was used primarily for plutonium research, metal production, and related activities. Since 1978, administrative and chemical research activities have been conducted at TA-21. The DP East area began operation in 1945 at Buildings 21-152, 21-153, and 21-155 (Figure 1.1-2 of the investigation report). These facilities were used to process polonium and actinium and to produce weapon components. Process wastes from the various research and production activities consisted of both solids and liquids.

In the late 1940s, it was determined that the natural soils and clays at TA-21 were effective in separating radioactive contaminants from waste liquids (Merrill 1990, 11721). Absorption beds consisting of excavated trenches filled with cobbles, gravel, and fine sand were constructed at several locations within TA-21 in an effort to use the natural soil and clay characteristics for treating process effluents (LASL 1945, 01093). MDA U is one of the areas where absorption beds were used for disposing of liquid wastes. Liquid effluent from Buildings 21-152, 21-153, and 21-155, which later became the Tritium Systems Test Assembly facility, was discharged to the MDA U absorption beds. In addition, oil from precipitrons used to remove dust, dirt, smoke, soot, and other solids from ventilating air (Francis 1996, 76137) was disposed of at MDA U (Drager 1946, 01562).

During their operational lifetime, the absorption beds may not always have performed as designed. The TA-21 Resource Conservation and Recovery Act facility investigation work plan states that oil and water may have remained at the surface (LANL 1991, 07529, p. 16-198).

Disposal of liquid effluent at MDA U from Buildings 21-152 and 21-153 ceased in 1968 (Hakonson 1987, 07422). The western absorption bed continued to receive water from the cooling tower associated with Building 21-155 until approximately 1976 (Purtymun 1976, 01107), but the site has been inactive since. In 1985, removal activities and site stabilization of the absorption beds were conducted (Merrill 1990, 11721, p. 11). As described in Section 2.1 of the investigation report, the absorption beds were not completely excavated. Some material from within the absorption beds, the distribution box and iron pipes within the absorption beds, and a portion of the line from the cooling tower were excavated (LANL 1991, 07529, p. 16-199). Material above the iron pipes was stockpiled and later used to backfill the trench. The absorption bed excavation (walls and bottom) was marked with plastic sheeting and covered with fill. The area between the top of the absorption beds and the embankments surrounding them was backfilled with uncontaminated tuff, covered with 6 in. of topsoil, regraded to address potential drainage problems, and revegetated.

In 1987, additional site-stabilization activities were conducted. A ditch was constructed on the south side to divert surface water runoff from upslope. Within the MDA U fence, more topsoil was added, and the area was reseeded. Four brass markers were placed to mark the corners of the MDA. In 1990, additional controls were emplaced to prevent runoff from the surrounding area from flowing across MDA U.

In 2001, one north-south trench was excavated in each absorption bed (LANL 2001, 70230) to find the plastic liner placed over the excavated areas when the drain line and absorption bed material were removed in 1985. In the western absorption bed, black plastic was found at a depth of 3.5 to 4 ft. Large cobbles (up to 20 in. in diameter) were observed under the liner. Two plastic liners were found in the eastern absorption bed. A clear liner was found at approximately 3 ft below ground surface (bgs), and a black liner at 7 ft bgs was found immediately above a cobble layer.

H-2.2 Sampling Results and Determination of Chemicals of Potential Concern

A review of the sampling results is provided in Appendix B; this section summarizes those results. Samples from three media collected at MDA U were used in the risk screening assessments. Soil, tuff, and sediment samples were collected from outside the fence surrounding the site. Inorganic chemicals and radionuclides were retained as chemicals of potential concern (COPCs) for the risk assessments if they were above background or detected but no background value (BV) or fallout value (FV) is available or applicable. All detected organic chemicals were retained as COPCs for the risk assessment. A number of inorganic chemicals were retained as COPCs for each of the media, but the specific inorganic chemicals differed between the soil, sediment, and tuff samples. As explained in Section B-2.1.1, calcium, potassium, magnesium, and sodium were not retained as COPCs because they are essential nutrients. The COPCs at MDA U are summarized in Table B-3.0-1 by media (soil, sediment, or tuff) and by chemical class (organic, inorganic, or radionuclide).

Inorganic chemicals retained as COPCs and evaluated in the risk screening for human health for the industrial, construction worker, and residential scenarios include arsenic, cadmium, chromium, cobalt, copper, lead, mercury, perchlorate, selenium, silver, thallium, and uranium. Additional inorganic chemicals retained only for the construction worker and residential human health risk screening (which included subsurface soil/tuff) are aluminum, antimony, barium, and zinc.

Several organic chemicals, primarily polycyclic aromatic hydrocarbons (PAHs), were retained as COPCs and evaluated in the human health risk screening for the industrial, construction worker, and residential scenarios. These organic chemicals are acenaphthene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dichlorobenzidine[3,3'-], indeno(1,2,3-cd)pyrene, methylphenol[4-], pyridine, benzo(g,h,i)perylene, dibenzofuran, fluoranthene, fluorene, methylnaphthalene[2-], naphthalene, phenanthrene, and pyrene. Additional organic COPCs retained only for the construction worker and residential scenarios for the human health risk screening include acetone, anthracene, butylbenzylphthalate, diethyl phthalate, and methyl-2-pentanone[4-].

The same radionuclide COPCs were evaluated in the risk screening for the industrial, construction worker, and residential scenarios. The radionuclide COPCs included americium-241, cesium-137, plutonium-238, plutonium-239, strontium-90, tritium, uranium-234, and uranium-235.

Inorganic chemicals retained as chemicals of potential ecological concern (COPECs) include arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, selenium, silver, thallium, and zinc. Organic chemicals retained as COPECs include acenaphthene, Aroclor-1254, benzoic acid, and naphthalene. No radionuclides were retained as COPECs.

H-3.0 CONCEPTUAL SITE MODEL

H-3.1 Receptors and Exposure Pathways

Discharge of liquid waste effluent from the Laboratory to the absorption beds was the original source of contamination at MDA U. Some contamination was removed during previous remediation activities, and much of the soil, tuff, and sediment was redistributed. In addition, clean fill was added to the site. All these activities contributed to the surface and subsurface distribution of COPCs found at the site. Figure H-3.0-1 shows the conceptual site model for human and ecological receptors at MDA U.

The primary exposure pathway for human receptors is surface soil and subsurface soil/tuff that may be brought to the surface through on-site activities. Migration of contamination to groundwater through the vadose zone is unlikely, given the distance to groundwater at the site. Human receptors may be exposed through direct contact with soil or suspended particulates by ingestion, inhalation, dermal contact, and external irradiation pathways. Based on the current and reasonably foreseeable future land use of the site, these exposure pathways apply to industrial workers. The construction worker scenario is evaluated in case construction activity occurs in the future at the site; no construction activity is currently planned. The residential scenario is evaluated for informational purposes only.

The industrial screening consisted of surface soil (0- to 1-ft depth) because this exposure scenario does not include exposure to subsurface soil. The residential screening consisted of surface and subsurface soil/tuff (0 to 10 ft) because the residential scenario incorporates potential exposure to subsurface soil/tuff. The 0–10 ft range of surface and subsurface soil/tuff used for the residential screening was also used for screening the construction worker scenario. Although no construction activity is planned for this site, the 0–10 ft depth was deemed appropriate for evaluating potential risks to construction workers because the excavation depth for future construction is unlikely to exceed 10 ft below ground. This depth range includes the former absorption beds and therefore contains the highest COPC concentrations. The ecological risk assessment included the 0- to 5-ft depth. Because different depth ranges were used for each assessment, the COPCs included in the risk screening assessments vary depending on the depth at which the COPC was detected.

Several terrestrial exposure pathways are considered in the conceptual site model of ecological exposure for MDA U COPECs. Plants may be exposed through root uptake and through rain splashing soil onto aboveground plant tissues. Dermal contact and external irradiation are exposure pathways for invertebrates, but less so for wildlife, which are generally protected by fur and feathers. Dietary exposures include soil ingestion and food-web transport and are the primary exposure pathways for wildlife. Inhalation of airborne COPECs is also a potential pathway for animals.

H-3.2 Environmental Fate and Transport

The evaluation of environmental fate addresses the chemical processes affecting the persistence of a chemical in the environment, and the evaluation of transport addresses the physical processes affecting mobility along a migration pathway. Transport through soil and tuff depends on soil pH, the precipitation or snowmelt, soil moisture, and soil hydraulic properties. Joints and fractures in the tuff may provide additional pathways for moisture and chemicals to enter the subsurface.

MDA U lies on a dry mesa top approximately 1300 ft above the regional aquifer. As described in Section 4.6, saturated conditions currently do not exist in the soil and tuff below MDA U, though these conditions may have existed prior to 1976 when wastewater discharge at the site ceased. Current measurements of the gravimetric water content (see Section 4.6) in the upper 75 ft of the soil column indicate that soils on the mesa are relatively dry and that there is no evidence of a saturated subsurface zone. Downward migration in the vadose zone is also limited by a lack of hydrostatic pressure and by the lack of a source for the continued release of contamination. Without sufficient moisture and a source, little or no potential migration occurs through the vadose zone to groundwater.

The nature and extent of contamination at MDA U have been defined. The results from the deepest samples collected showed either no detected concentrations of COPCs or low- or trace-level concentrations of only a few inorganic, radionuclide, and/or organic COPCs in tuff. Also, no source(s) continues to release contamination into the subsurface beneath the site. Because vertical extent is defined for MDA U, no migration to groundwater is apparent. The limited extent of contamination is related to the absence of the key factors that contribute to migration, as discussed above.

Inorganic Chemicals

Physical and chemical factors that determine the distribution of inorganic COPCs within the soil and tuff at MDA U are the soil-water partition coefficient (K_d) of the inorganic chemical, the pH of the soil, soil characteristic (such as sand or clay content), and redox potential. The interaction of these factors is complex, but the K_ds can provide a general assessment of the potential for migration through the subsurface; chemicals with higher K_ds are less likely to be mobile than those with lower K_ds. Table H-3.1-1 presents the K_ds for the inorganic COPCs at MDA U (NMED 2005, 90802); these values match the EPA K_ds recommended for the default pH of 6.8 for evaluation of Superfund sites (EPA 1996, 59902). These K_ds represent conservative values applicable to a wide range of sites. Chemicals with K_ds greater than 40 are very unlikely to migrate through soil towards the water table (Kincaid et al. 1998, 93270). Based on this K_d criterion, aluminum, antimony, barium, beryllium, cadmium, cobalt, chromium, lead, mercury, nickel, thallium, vanadium, and zinc have a very low potential for migration to groundwater at MDA U.

The K_d values in Table H-3.1-1 for arsenic, copper, nitrate, selenium, and silver indicate that these inorganic chemicals may be relatively mobile in soil. Other factors besides the K_d values, such as speciation in soil and oxidation/reduction (Eh) potential, also play a role in the likelihood that inorganic chemicals will migrate. Information about the fate and transport properties of inorganic chemicals was obtained from individual chemical profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR 1997, 56531). The information for these organic chemicals is also available from the ATSDR website at atsdr.cdc.gov/toxprofiles.

Because many arsenic compounds tend to partition to soil or sediment under oxidizing conditions, leaching usually does not result in the transport of arsenic to any great depth. Most copper deposited in soil is strongly adsorbed and remains in the upper few centimeters of soil. In general, the copper adsorbs to organic matter, carbonate minerals, clay minerals, or hydrous iron and manganese oxides. Soils at MDA U are close to neutral pH and do not exhibit a high rate of leaching for copper. Selenium is not often found in the environment in its elemental form but is usually combined with sulfide minerals or with silver, copper, lead, and nickel minerals. In soils, pH and Eh are determining factors in the transport and partitioning of selenium. In soils with pH greater than 7.5, selenates, which have high solubility and a low tendency to adsorb onto soil particles, are the major selenium species and are very mobile. The soil pH at MDA U is much lower than this value and indicates that selenium is not likely to migrate in these soils. Silver sorbs onto soil and sediments and tends to form complexes with inorganic chemicals and humic substances in soils. The presence of organic matter complexes with silver and reduces its mobility. Silver compounds tend to leach from well-drained soils so potentially they may migrate into the subsurface. However, the extent of silver has been defined to a depth of 120 ft bgs and migration to groundwater has not occurred. Perchlorate and nitrate are highly soluble in water and may migrate with water molecules in saturated soils. As described in Section B-3.2.1, the extent of both perchlorate and nitrate has been defined; neither COPC was detected in the deepest samples from the boreholes (120–360 ft bgs). In addition, subsurface soils below MDA U have a low moisture content, which causes silver, nitrate, and perchlorate to be relatively immobile.

Radionuclides

For radionuclides, an examination of K_d values also provides an assessment of whether a radionuclide is likely to be mobile in the subsurface at MDA U. K_d values for radionuclide COPCs at MDA U in Table H-3.1-2 are from EPA Superfund Chemical Data Matrix (EPA 1996, 64708). Radionuclides with K_ds greater than 40 are very unlikely to migrate to groundwater (Kincaid et al. 1998, 93270). Based on K_d values, cesium-137, plutonium-238, plutonium-239, and radium-223 have a very low potential to migrate towards groundwater at MDA U.

Despite its relatively low K_d value (8.2), americium-241 deposited on soil strongly attaches to soil particles and does not migrate very far into the subsurface. Ultimately, most americium ends up in soil or sediment. Americium-241 released into water adsorbs to particulate matter in the water or sediment. Radon-219 exists as a gas and migrates up through soil to the surface rather than toward groundwater. A major portion of stable and radioactive strontium in soil dissolves in water, so it may move deeper into the subsurface. However, the K_d value of 35 indicates that strontium-90 is not likely to migrate readily in the subsurface. In addition, strontium-90 was detected in only one borehole to a depth of 50 ft bgs. MDA U is therefore not a major source of strontium-90, and the extent of strontium-90 indicates little migration towards groundwater. In most cases, thorium is strongly sorbed to soil and its mobility is very low. Most thorium compounds commonly found in the environment do not dissolve easily in water. Thorium is present in suspended matter and sediment and concentration of soluble thorium in water is low. Thorium-227 was detected in one borehole from 1998 at 55 ft bgs but not in the bottom of the borehole. Thorium-228 was detected in three boreholes at concentrations slightly above the BV (BV = 2.52 pCi/g versus 2.61 pCi/g to 2.72 pCi/g), indicating naturally occurring levels.

Tritium's initial behavior in the environment is determined by the source. If it is released as a gas or vapor to the atmosphere, substantial dispersion may be expected, and the rapidity of deposition is dependent on climatic factors. If tritium is released in liquid form, the tritium is diluted in surface waters and is subject to physical dispersion, percolation, and evaporation (Whicker and Schultz 1982, 58209, p. 147). Tritium concentrations in the subsurface at MDA U are low (<1 pCi/g), indicating that MDA U is not a significant source of tritium, although this radionuclide is relatively mobile. Because tritium migrates in association with moisture, the low moisture content of the subsurface limits the potential for tritium to migrate to groundwater.

Natural uranium is mainly a mixture of three isotopes: uranium-234, uranium-235, and uranium-238. All three isotopes behave the same chemically, but they are different radioactive materials with different radioactive properties. The half-lives of uranium isotopes are very long (244,000 yr for uranium-234; 710 million yr for uranium-235; and 4.5 billion yr for uranium-238). Uranium-234 and uranium-235 were detected frequently in tuff at MDA U and showed decreasing trends in concentration with depth. Because the concentrations of uranium-234 and uranium-235 at the bottom of the boreholes were similar to background (either below BV or slightly above the BV), isotopic uranium is present at naturally occurring levels at depth and is not migrating to groundwater.

Organic Chemicals

Table H-3.1-3 presents the physical/chemical properties (K_{oc}, log K_{ow}, and solubility) of the organic COPCs at MDA U. The physical/chemical properties of organic chemicals are important when evaluating fate and transport. The K_{oc} and solubility values were obtained from Table B-1 of NMED's technical background document (NMED 2005, 90802), from EPA Region 6 guidance (EPA 2005, 91002), or from the Risk Assessment Information System (RAIS) database (http://rais.ornl.gov/). Log K_{ow} values were obtained from the RAIS database. Other information is presented to illustrate some aspects of the fate and transport tendencies of the COPCs (Ney 1995, 58210).

Water solubility is an important chemical characteristic to indicate the mobility of organic chemicals. The higher the water solubility of a chemical, the more likely it is to be mobile and the less likely it is to accumulate, bioaccumulate, volatilize, or persist in the environment. A highly soluble chemical (water solubility greater than 1000 mg/L) is prone to biodegradation and metabolism that may detoxify the parent chemical. Acetone, benzo(g,h,i)perylene, benzoic acid, butylbenzylphthalate, diethyl phthalate, 2-methylnaphthalene, and pyridine all have solubilities greater than 1000 mg/L.

The remaining organic MDA U COPCs, except naphthalene, have solubilities less than 10 mg/L (i.e., they are relatively insoluble). Naphthalene solubility is 31 mg/L and is relatively soluble but was not detected in the tuff. The lower the water solubility of a chemical (especially lower than 10 mg/L) the more likely it will be immobilized by adsorption. Chemicals with lower water solubilities tend to be more likely to accumulate or bioaccumulate and persist in the environment, to be slightly prone to biodegradation, and may be metabolized in plants and animals.

Chemicals with high vapor pressures (>0.01 mmHg) are likely to volatilize, and therefore concentrations at the site are reduced over time; the vapors of these chemicals are more likely to travel toward the atmosphere and not migrate towards groundwater. Acetone and naphthalene are volatile compounds.

The soil organic carbon-water partition coefficient (K_{oc}) measures the tendency of a chemical to adsorb to organic carbon in soil. K_{oc} values greater than 500 cm^3/g indicate a strong tendency to adsorb to soil (NMED 2005, 90802*)*. Table H-3.1-3 provides the K_{oc} values for organic COPCs at MDA U. Only four COPCs have K_{oc} values less than 500 cm^3/g: acetone, benzoic acid, diethyl phthalate, and pyridine. Benzo(g,h,i) perylene, butylbenzylphthalate, and 2-methylnaphthalene, which have relatively high solubilities, have K_{oc} values greater than 500 cm^3/g. None of these three compounds were detected in the tuff (see Table 6.3-10). Based on the sample data and the high K_{oc} values, these organic chemicals have a very low potential to migrate toward groundwater.

The octanol water partition coefficient (K_{ow}) is an indicator of a chemical's potential to bioaccumulate or bioconcentrate in the fatty tissues of living organisms. The unitless K_{ow} value is an indicator of water solubility, mobility, sorption and bioaccumulation. The higher the K_{ow} value above 1000 (equal to a log K_{ow} of 3), the greater the affinity the chemical has for bioaccumulation/bioconcentration in the food chain, the greater its potential for sorption in the soil, and the lower its mobility (Ney 1995, 58210). Table H-3.1-3 shows the log K_{ow} for organic COPCs at MDA U. All the chemicals, except acetone, benzoic acid, diethyl phthalate, and pyridine, have a log K_{ow} greater than 3, indicating that the majority of the organic COPCs likely sorb to soil and are relatively immobile. The partitioning of acetone, benzoic acid, diethyl phthalate, and pyridine is controlled by their solubility (benzoic acid, diethyl phthalate, and pyridine are relatively insoluble). In addition, acetone and benzoic acid were detected within subsurface tuff, but at concentrations near their respective estimated quantitation limits (EQLs) (Section B-3.2.3), and diethyl phthalate and pyridine were each detected in a surface soil sample (see Table 6.3-8) but not detected in tuff. Therefore, these trace level concentrations, along with their physical/chemical properties, indicate a limited extent and a very low potential to migrate to groundwater for acetone, benzoic acid, diethyl phthalate, and pyridine.

Summary

Saturation is the primary factor in determining the potential for COPCs to migrate to groundwater. Based on investigation results, saturated conditions are not present within the MDA U site. Downward migration in the vadose zone is also limited by a lack of hydrostatic pressure and by the lack of a source for the continued release of contamination. Without sufficient moisture and a source, little or no potential migration of materials occurs through the vadose zone to groundwater.

The nature and extent of contamination at MDA U is defined, and no source(s) continues to release contamination into the subsurface beneath the site. The results from the deepest samples collected showed either no detected concentrations of COPCs or low/trace level concentrations of only a few inorganic, radionuclide, and/or organic COPCs in tuff. Because vertical extent is defined and limited for MDA U, no migration to groundwater is apparent. The lack of saturated conditions and hydrostatic pressure severely limits the movement of contamination toward groundwater at MDA U. The relative solubilities and/or the partitioning properties also limits the mobility of the COPCs at MDA U. As a result, the potential for COPC migration to groundwater is very low, based on the site conditions, the physical/chemical properties of the COPCs, the distance to the regional aquifer below the site, and the absence of a source for continued releases into the subsurface.

H-4.0 RISK SCREENING LEVELS

H-4.1 Soil-Screening Levels

For nonradionuclide COPCs, soil screening levels (SSLs) from New Mexico Environment Department (NMED) guidance (NMED 2005, 90802) were used. The NMED SSLs are based on a target noncarcinogenic hazard quotient (HQ) of 1.0 and a target carcinogenic risk of 1×10^{-5} (NMED 2005, 90802). For those COPCs for which no NMED value is available, U.S. Environmental Protection Agency (EPA) Region 6 screening levels (EPA 2005, 91002) were used. The EPA screening levels for carcinogens were multiplied by 10 to adjust to the NMED target carcinogenic risk of 1×10^{-5}. The SSLs used are presented in Table H-4.1-1 for residential, construction worker, and industrial exposures. Radionuclide screening action levels (SALs) are used for comparison with radionuclide COPC concentrations and are derived using the residual radioactive (RESRAD) model, Version 6.21 (LANL 2005, 88493). The radionuclide SALs are based on a 15 mrem/yr dose per DOE guidance (DOE 2000, 67153). The SALs used are provided in Table H-4.1-2 for residential, construction worker, and industrial exposures. For COPCs without screening values, surrogate chemicals were used based on structural similarity or because the COPC is a breakdown product (NMED 2003, 81172). Exposure parameters used to calculate the SSLs and SALs are provided in Table H-4.1-3 (SSLs for chemicals), Table H-4.1-4 (industrial SALs for radionuclides), Table H-4.1-5 (residential SALs for radionuclides), and Table H-4.1-6 (construction worker for radionuclides). The ESLs for terrestrial receptors were obtained from the ECORISK Database, Version 2.2 (LANL 2005, 90032).

Several other COPCs from the site have NMED SSLs based on a maximum allowed concentration of 100,000 mg/kg (NMED 2005, 90802). This value is not a risk-based SSL, and the assignment of a maximum allowed concentration indicates that the toxicity of the COPC is negligible. The COPCs with industrial, construction worker, and/or residential SSLs based on the maximum allowable concentration are nitrate, zinc, anthracene, benzoic acid, butylbenzylphthalate, and diethyl phthalate.

Approximately 45 organic chemicals for which NMED publishes SSLs have one or more SSLs that are based on soil saturation limits (C_{sat}) rather than chemical-specific toxicological effects (NMED 2005, 90802). However, the EPA guidelines are quite specific and limit this recommendation for setting an SSL to C_{sat} only when the organic chemical is a liquid at ambient soil temperatures (EPA 1996, 59902). Eight of these chemicals were detected at this site; all eight are solids at ambient temperatures (approximately 15 to 20°C). The EPA has stated that soil screening decisions for chemicals that are solids at ambient soil temperatures should be based "on the appropriate SSLs for other pathways of concern" and "the inhalation route is not likely to be of concern for those chemicals with (calculated) SSLs exceeding C_{sat} concentrations" (EPA 1996, 59902, Section 2.4.4). Consistent with this guidance, SSLs were calculated for the following chemicals: acenaphthene, anthracene, benzo(g,h,i)perylene, butylbenzylphthalate, chrysene, dibenzofuran, fluorene, and pyrene (Table H-4.1-6). These SSLs were developed using the equations and exposure parameters (Table H-4.1-3), toxicity data (Table H-4.1-7), and the physical and chemical parameters (Table H-4.1-8) provided in NMED guidance (NMED 2004, 85615; NMED 2005, 90802) but without the inhalation pathway.

For seven COPCs, NMED construction worker SSLs are not available: benzoic acid, butylbenzylphthalate, mercury (inorganic), 4-methylphenol, perchlorate, pyridine, and uranium. The construction worker SSLs for these COPCs were calculated using the construction worker exposure parameters and equation in NMED guidance (NMED 2005, 90802). The toxicity values for benzoic acid, butylbenzylphthalate, mercury (inorganic), 4-methylphenol, perchlorate, and pyridine were obtained from the EPA Region 6 medium-specific screening level table (EPA 2005, 91002) because these chemicals are not included in the NMED SSL guidance. Toxicity value for uranium was obtained from the 2004 EPA Region 9 preliminary remediation goal (PRG) table (epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf) for the same reason.

H-4.2 Representative Concentrations

H-4.2.1 Human Health Screening Assessment

As described in Section H-3.0, each exposure scenario included a different depth of sample results to estimate exposure: 0 to 1 ft for the industrial scenario and 0 to 10 ft for the construction worker and residential scenarios (the same representative concentrations calculated for the residential scenario were used for the construction worker scenario). Across the applicable depth range, a representative concentration was determined for each COPC based on all the data for each COPC from soil, sediment, and tuff samples within that depth range. A 95% upper confidence limit (UCL) of the arithmetic mean concentration was used as the representative concentration for all COPCs for which a valid 95% UCL could be calculated. For COPCs for which too few analytical results were available to generate a 95% UCL (e.g., acetone and methyl-2-pentanone-[4] in the construction worker and residential scenarios), the maximum detected concentration was used as the representative concentration. In addition, if the 95% UCL exceeded the maximum detected concentration for a COPC, the maximum detected concentration was used as the representative concentration.

Calculation of the UCL is based on EPA guidance (EPA 2002, 85640), which is also the basis for the EPA software ProUCL. The choice of UCL calculation method is based on the distribution of the data. If the p-value indicates that the untransformed data are not significantly different from normal ($p>0.05$), then the normal distribution is assumed. If the p-value is less than 0.05, then normality is rejected and lognormality is considered. If the log transformed data are not significantly different from normal ($p>0.05$), then lognormality is assumed. If the p-value is less than 0.05, then lognormality is rejected and a nonparametric (distribution free) UCL is used. For normal data, the UCL is based on the Student t-statistic. For lognormal data, the Land method using the H-statistic (H-UCL) is used, unless the sample size and skewness of the data indicate that the Land method would not be appropriate. In that case, the Chebyshev inequality using minimum variance unbiased estimates of the lognormal parameters is used. If the distribution is neither normal nor lognormal, then a nonparametric estimate based on the Chebyshev inequality using the mean and standard deviation is used. In calculating the UCL values, nondetects were included in the data set as a value of one-half the detection limit for that sample. The representative concentrations for all COPCs (95% UCLs or maximum detected concentrations) are shown in Table H-4.2-1 for the industrial scenario and in Table H-4.2-2 for the construction worker and residential scenarios. The screening assessment tables in Section H-5.1 show the representative concentration for each COPC and whether that value is a UCL or a maximum detected concentration.

H-4.2.2 Ecological Screening Assessment

The 95% UCLs for ecological risk screening were calculated using the same methods for determining distributions and calculating 95% UCLs as were used for the human health screening assessment (EPA 2002, 85640). However, representative concentrations for ecological risk were calculated for the 0- to 5-ft depth range. The representative concentrations for ecological risk screening are shown in Table H-4.2-3.

H-5.0 RISK ASSESSMENT RESULTS

H-5.1 Human Health Risk Screening Assessment

H-5.1.1 Screening Evaluation

The representative concentration of each COPC in soil was compared with the SSLs for industrial, construction worker, and residential exposures. For carcinogenic chemicals, representative concentrations were divided by the SSL and then multiplied by 1×10^{-5}. The sum of the carcinogenic risks was compared with the NMED target carcinogenic risk of 10^{-5}. For noncarcinogenic chemicals, an HQ was generated for each COPC by dividing the representative concentration by the SSLs. The HQs were summed to generate a hazard index (HI). The HI was compared with the NMED target hazard of 1.0. For radionuclides, the representative concentration was divided by the SAL and multiplied by 15 mrem/yr to calculate the dose. The total dose was compared with the U.S. Department of Energy (DOE) target dose of 15 mrem/yr.

As stated in the conceptual site model described in Section H-3.0, the industrial scenario is the current and future land use of this site. Table H-5.1-1 shows the carcinogenic risk from COPCs under an industrial exposure scenario. The total risk of approximately 4×10^{-6} is below the NMED target risk of 10^{-5}. Table H-5.1-2 shows the HQs and HI for the industrial exposure scenario: the HI of 0.06 is below the NMED target of 1.0. Table H-5.1-3 shows the dose from radionuclide COPCs at the site. The total dose of approximately 0.7 mrem/yr is below the DOE target dose of 15 mrem/yr.

MDA U was also evaluated for the residential scenario for informational purposes only. Table H-5.1-4 shows the carcinogenic risk, Table H-5.1-5 shows the HQs and HI for noncarcinogens, and Table H-5.1-6 shows the total dose from radionuclide COPCs.

Although MDA U was also evaluated for the construction worker, this scenario is not a decision scenario because no construction activity is planned for the foreseeable future. The construction worker carcinogenic risk was approximately 2×10^{-6} (Table H-5.1-7), the HI was approximately 0.9 (Table H-5.1-8), and the dose was 1.3 mrem/yr (Table H-5.1-9). The results are below the risk, HI, and dose target levels.

H-5.1.2 Uncertainty Analysis

The analysis in this human health screening assessment is subject to the uncertainties associated with the data evaluation, exposure assessment, and toxicity assessment. Each or all of these uncertainties may affect the assessment results.

H-5.1.2.1 Data Evaluation and COPC Identification Process

Data evaluation uncertainties may include errors in sampling, laboratory analysis, and data analysis. Because the concentrations used in this risk screening assessment include values less than the estimated quantitation limits, data evaluation uncertainties are expected to have little effect on the assessment results. The J (estimated) qualification of detected concentrations of some COPCs does not affect the assessment.

Another data evaluation uncertainty relates to the use of the 95% UCL as the representative concentration for each COPC. Use of the 95% UCL may result in an overestimation of risk for analytes that have elevated detection limits. Use of the maximum detected concentration for some COPCs also overestimates the exposure to contamination. Receptors would not be exposed to this concentration across the site.

H-5.1.2.2 Exposure Assessment

The following exposure assessment uncertainties were identified for the risk assessment: (1) the applicability of the standard exposure scenarios, (2) the assumptions underlying the exposure pathways, and (3) the depth over which screening levels based on the industrial scenario were applied.

The receptor used in the assessment (site worker) is subject to exposures in a different manner than the exposure assumptions used to derive the industrial SSLs. The assumptions for the SSLs are that the potentially exposed individual is an industrial worker who is outside on-site for 8 hr/day for 225 day/yr (NMED 2005, 90802). Most Laboratory workers are not outside and on-site for 8 hr/day, particularly at an area as small as MDA U. Also, these workers would probably not spend 225 day/yr at this site. By using the industrial scenario, the exposure and risk/dose are overestimated, and this scenario is protective of a Laboratory worker.

The exposure parameters used to develop the construction worker SSLs assume a level of exposure likely greater than the actual exposure at a small site such as MDA U. The NMED construction worker SSLs are based on an exposure frequency of 250 days per yr and an exposure duration of 1 yr, which is likely longer than construction workers would be present at MDA U. The particulate emission factor (PEF) used in the development of the construction worker scenario is based on a Q/C value (a measure of air dispersion in units of g/m^2-s per kg/m^3), which assumes substantial vehicle traffic crossing the site (NMED 2005, 90802); the PEF is higher than would occur at MDA U in the event of construction activities. By using the construction worker exposure parameters, the exposure and risk/dose are overestimated, and this scenario is protective of construction workers.

The assumptions underlying the exposure pathways for parameter, route of exposure, amount of contaminated media available for exposure, and intake rates for routes of exposure are consistent with EPA-approved parameters and default values (EPA 2005, 91002). In the absence of site-specific data, several upper-bound values for the assumptions may be combined to estimate exposure for any one pathway, and the resulting risk estimate can exceed the 99th percentile. As a result, uncertainties in the assumptions underlying the exposure pathways may contribute to risk assessments that exceed the reasonable expected range.

Analytical data from 0 to 1 ft bgs were used in the screening assessment for the industrial scenario, but exposure to COPCs in the samples from deeper than 4 in. only occurs if excavation occurs at the site. Thus, using the analytical data from 0 to 1 ft bgs overestimates the potential exposure and risk to a typical industrial receptor.

H-5.1.2.3 Toxicity Assessment

The primary uncertainty associated with the screening values relates to derivation of screening values from EPA toxicity values (reference doses [RfDs] and slope factors [SFs]) (EPA 2001, 70109; EPA 1997, 58968). Uncertainties were identified in seven areas with respect to the toxicity values: (1) extrapolation from animals to humans, (2) extrapolation from one route of exposure to another route of exposure, (3) interindividual variability in the human population, (4) the derivation of RfDs and SFs, (5) the chemical form of the COPC, (6) the use of surrogate chemicals, and (7) the use of C_{sat} values.

Extrapolation from animals to humans. The SFs and RfDs are often determined by extrapolation from animal data to humans, which may result in uncertainties in toxicity values because differences exist in chemical absorption, metabolism, excretion, and toxic response between animals and humans. The EPA takes into account differences in body weight, surface area, and pharmacokinetic relationships between animals and humans to minimize the potential to underestimate the dose-response relationship. However, more conservatism is usually incorporated.

Extrapolation from one route of exposure to another route of exposure. The SFs and RfDs often contain extrapolations from one route of exposure to another. The extrapolation from the oral route to the inhalation and/or the dermal route is used in the derivation of some screening values. Differences in chemical absorption and/or toxicity between the two exposure routes may result in an over- or underestimation of risk or hazard.

Interindividual variability in the human population. For noncarcinogenic effects, the amount of human variability in physical characteristics is important in determining the risks that can be expected at low exposures and in determining the no-observed-adverse-effect level (NOAEL). The NOAEL/uncertainty factor approach incorporates a factor of 10 to reflect the possible interindividual variability in the human population; it is generally considered a conservative estimate.

Derivation of RfDs and SFs. The RfDs and SFs for different chemicals are derived from experiments conducted by different laboratories that may have different accuracy and precision that could lead to an over- or underestimation of the risk.

The uncertainty associated with the toxicity factors for noncarcinogens is measured by the uncertainty factor, the modifying factor, and the confidence level. For carcinogens, the weight of evidence classification indicates the likelihood that a contaminant is a human carcinogen. Toxicity values with high uncertainties may change as new information is evaluated.

Chemical form of the COPC. COPCs may be bound to the environment matrix and not available for absorption into the human body. However, it is assumed that the COPCs are bioavailable. This assumption can lead to an overestimation of the total risk.

Use of surrogate chemicals. The use of surrogates for chemicals that do not have EPA-approved or provisional toxicity values also contributes to uncertainty in risk assessment. In this assessment, surrogates were used to establish toxicity values for benzo(g,h,i)perylene and 2-methylnaphthalene because of structural similarity (NMED 2003, 81172).

Radium-223, radon-219, and thorium-227 have no published SALs. Exclusion of these COPCs from the screening evaluation could potentially underestimate the dose. However, these radionuclides were only detected in one, four, and three samples, respectively, with 95% UCLs less than 1 pCi/g. If the SALs for radium-226 and thorium-228 (5 pCi/g and 2.3 pCi/g residential SALs, respectively) are used as surrogates for radium-223 and thorium-227 (LANL 2005, 88493), the dose contributions are approximately 1.5 and 2.5 mrem/yr, respectively. Radon-119 has a half-life of 3.96 seconds short, which precludes it as a contributor to dose.

Use of C_{sat} *values.* The use of C_{sat} values in the screening assessment to compare with representative concentrations does not accurately reflect the potential risk to receptors. If used as the screening value in a risk-based assessment, the C_{sat} value substantially underestimates the potential risk to receptors (often by orders of magnitude). For the organic COPCs with C_{sat} values at MDA U, none are liquid at ambient temperature. Therefore, a risk-based SSL was calculated, absent the inhalation pathway. This pathway is a minor contributor to potential risk because the COPCs are solid at ambient temperatures and does not substantially affect the SSL. The risk-based SSLs calculated using this approach may slightly underestimate the potential risk.

H-5.1.2.4 Additive Approach

For noncarcinogens, the assumption that the effects of different chemicals are additive may result in an overestimate or underestimate of potential risk to receptors. For noncarcinogens, the effects of a mixture of chemicals generally are not known, and possible interactions could be synergistic or antagonistic. Additionally, the RfDs for different chemicals are not based on the same severity, effect, or target organ. As a result, the potential for occurrence of noncarcinogenic effects may be overestimated for chemicals that are addressed additively but that act by different mechanisms and on different target organs.

H-5.1.3 Interpretation

MDA U was evaluated for potential risk using SSLs and SALs for the industrial and construction worker scenarios. The cancer risk for the industrial exposure was approximately 4×10^{-6}, the HI was 0.06, and the total dose was approximately 0.7 mrem/yr, while the construction worker cancer risk was approximately 2×10^{-6}, the HI was approximately 0.9, and the total dose was 1.3 mrem/yr. These values are below the applicable target levels for risk and hazard (NMED 2005, 90802), and dose (DOE 2000, 67153). In addition, the total dose corresponds to a radiological risk of approximately 9×10^{-6} based on a comparison to EPA radionuclide PRGs for an outdoor worker (epa-prgs.ornl.gov/radionuclides/download.shtml). The equivalent total risk for a construction worker is not provided because there are no EPA radionuclide PRGs for this activity, and it is not a decision scenario for MDA U. The human health screening assessment indicates that no potential unacceptable risk or dose exists at MDA U based on the industrial and construction worker scenarios.

H-5.2 Ecological Risk Screening Assessment

H-5.2.1 Introduction

The approach for conducting ecological assessments is described in the “Screening Level Ecological Risk Assessment Methods Revision 2” (LANL 2004, 87630). The assessment consists of the following four parts: (1) a scoping evaluation, (2) a screening evaluation, (3) an uncertainty analysis, and (4) an interpretation of the results.

H-5.2.2 Scoping Evaluation

The scoping evaluation establishes the breadth and focus of the screening assessment. The ecological scoping checklist, which is included as Attachment H-1, is a useful tool for organizing existing ecological information. The information is used to determine whether ecological receptors might be affected, identify the types of receptors that might be present, and develop the ecological site conceptual model for MDA U.

MDA U is located in a relatively flat area and is vegetated with grasses and forbs commonly found in disturbed soils. Stabilization of the absorption beds began in 1985 when the beds were partially excavated and removed; material above the distribution lines was stockpiled and later used to backfill the trench. The outlines of the absorption beds are no longer visible at the surface because a layer of topsoil had been placed at the site (in 1985 and again in 1987), and the vegetation is dense around the areas where the beds were located. Chamisa (*Chrysothamnus nauseosus*) and wormwood (*Artemesia vulgaris*) are in the area. The center of the site was characterized by bare patches of ground that probable resulted from heavy-equipment damage that occurred during the recent sampling activities. MDA U abuts a potential Mexican spotted owl nesting habitat and is more than 6 mi from potential bald eagle habitat. The bald eagle can be conservatively assumed to forage at a low frequency at this site. The Mexican spotted owl can be conservatively assumed to forage at a high frequency at this site; however, the considerable industrial development of the mesa-top limits the value of the area as foraging grounds.

Several potential off-site transport mechanisms were evaluated. Biotic transport of buried waste to the surface appears to be a minor transport pathway because signs of fossorial (burrowing) activity were limited. While air may be a potential transport mechanism for volatile chemicals emanating from the subsurface absorption beds, exposure is primarily relevant for organisms living in the subsurface where dilution of vapors is considerably less than dilution in the surface atmosphere. Inhalation risks to organisms inhabiting the subsurface should be minimal, however, given the low concentrations of volatile organic chemicals (Attachment H-1) and the limited (single burrow) evidence of fossorial activity on-site. Considering surface water runoff, several best management practices contribute to the currently low transport potential for this pathway. For example, site-stabilization activities completed included a run-on channel that has been cut above the site to direct run-on to the northeast around MDA U towards DP Canyon. Within the MDA U fence, topsoil was added and the area reseeded. Hay bales are also located in the northwestern corner of the site where it slopes most steeply toward DP Canyon. Historical transport has occurred, however, as evidenced by COPCs detected beyond the MDA U fenceline indicating the influence of past operations (LANL 2004, 87454, Figure 3.4-2). Transport to groundwater is not feasible because of the depth to the regional aquifer (approximately 1300 ft bgs), and the semiarid environment of this region provides minimal hydrologic head. The potential contact with contaminants is by root uptake, food-web transport, soil ingestion, external irradiation, dermal contact, and inhalation.

The scoping portion of the assessment indicated that terrestrial receptors were appropriate for evaluating the concentrations of COPECs in soil and tuff samples. Aquatic receptors were not evaluated because no aquatic communities are present at TA-21**.** This process evaluated the following eight terrestrial receptors representing several trophic levels:

- a plant,
- soil-dwelling invertebrates (represented by the earthworm),
- the deer mouse (mammalian omnivore),
- the Montane shrew (mammalian insectivore),
- the desert cottontail (mammalian herbivore),

- the red fox (mammalian carnivore),
- the American robin (avian insectivore, avian omnivore, and avian herbivore), and
- the American kestrel (avian insectivore and avian carnivore (surrogate for threatened and endangered [T&E] species).

The rationale for these receptors is presented in “Screening Level Ecological Risk Assessment Methods Revision 2” (LANL 2004, 87630). The ESLs are derived for each of these receptors where information was available. The ESLs are based on similar species and derived from experimentally determined NOAELs, lowest-observed-adverse-effect levels, or doses lethal to 50% of the population. Relevant information necessary to calculate ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values (TRVs) are presented in the ECORISK Database, Version 2.2 (LANL 2005, 90032).

H-5.2.3 Assessment Endpoints

An assessment endpoint is an explicit expression of the environmental value to be protected. These endpoints are ecologically relevant and help sustain the natural structure, function, and biodiversity of an ecosystem or its components (EPA 1998, 62809). In a screening-level assessment, assessment endpoints are attributes of ecological receptors that may be adversely affected by exposure to hazardous wastes from past operations (EPA 1997, 59370), wherein receptors are populations and communities (EPA 1999, 70086).

The ecological screening assessment is designed to protect populations and communities of biota rather than individual organisms, except for listed or candidate T&E species or treaty-protected species (EPA 1999, 70086). The protection of individual organisms within these designated protected species could also be achieved at the population level; the populations of these species tend to be small, and the loss of an individual adversely affects the species.

In accordance with this guidance, the Laboratory developed generic assessment endpoints to ensure that values at all levels of the food chain are considered in the ecological screening process (LANL 1999, 64137). These general assessment endpoints can be measured using impacts on reproduction, growth, and survival to represent categories of effects that may adversely impact populations. In addition, specific receptor species were chosen to represent each functional group. The receptor species were chosen because of their presence at the site, their sensitivity to the COPECs, and their potential for exposure to those COPECs. These categories of effects and the chosen receptor species were used to select the types of effects seen in toxicity studies considered in the development of the TRVs. Toxicity studies used in the development of TRVs included only those in which the adverse effect evaluated affected reproduction, survival, and/or growth.

The selection of receptors and assessment endpoints are designed to be protective of both the representative species used as screening receptors and the other species within their feeding guilds and the overall food web for the terrestrial and aquatic ecosystems. Focusing the assessment endpoints on the general characteristics of species that affect populations (rather than the biochemical and behavioral changes that may affect only the studied species) also ensures applicability to the ecosystem of concern.

H-5.2.4 Screening Evaluation

Representative concentrations were determined from samples collected between 0 and 5 ft bgs (LANL 2004, 87630). Tuff was included in the screening assessment because some plant roots are able to extend into the tuff and break up small sections, thereby gradually allowing easier access for ecological receptors to this material.

The purpose of the ecological screening evaluation is to identify COPECs for MDA U. The evaluation involves the calculation of HQs for all COPCs and all screening receptors (LANL 2004, 87630). The HQs are the ratios of the representative concentrations to the ESLs. Representative concentrations consisted of 95% UCLs or maximum detected concentrations. The COPCs with HQs greater than 0.3 are identified as COPECs and are evaluated further. The ESLs for terrestrial receptors were obtained from the ECORISK Database, Version 2.2 (LANL 2005, 90032).

The ESLs for each terrestrial receptor and COPC combination are presented in Table H-5.2-1. Perchlorate, 3,3'-dichlorobenzidine, diethyl phthalate, 4-methylphenol, pyridine, and radon-219 have no ESLs. As a result, these analytes are retained as COPECs and discussed in the uncertainty section.

Comparisons of the COPC representative concentrations with the final (minimum) soil ESLs for MDA U are shown in Tables H-5.2-2, H-5.2-3, and H-5.2-4 for inorganic chemicals, organic chemicals, and radionuclides, respectively. The COPCs with HQs greater than 0.3 include arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, selenium, silver, thallium, zinc, acenaphthene, Aroclor-1254, benzoic acid, and naphthalene and are retained as COPECs.

Potential ecological risks associated with aluminum in soils are based on soil pH in accordance with EPA guidance (EPA 2003, 85645). Aluminum is identified as a COPEC only in those soils with pH lower than 5.5. Because the soil pH at the 0- to 5-ft depth ranges from 5.71 to 8.9 at MDA U, aluminum is not retained as a COPEC.

The COPECs are evaluated further in Table H-5.2-5. The HQs for each COPEC/receptor combination as well as the HIs for each receptor were calculated. The HI is the sum of HQs for chemicals with common toxicological endpoints for a given receptor. For the purposes of ecological screening, it is assumed that nonradionuclides have common toxicological effects. An HI greater than 1.0 is an indication of potential adverse impacts. The HI analysis provides a clearer picture of potential adverse impacts by determining how many receptors may be affected and provides information on T&E species. The HI for the red fox is less than 1.0 and this receptor is not evaluated further.

Evidence of animal burrowing can be seen near MDA U. As a result, exposure of burrowing animals to volatile organic compounds (VOCs) in the subsurface was assessed. The VOC pore-gas data from the shallowest depth interval (approximately 25 ft bgs) were used in the assessment. The inhalation ESLs were obtained from the ECORISK Database, Version 2.2 (LANL 2005, 90032) and are based on Botta's pocket gopher. The maximum detected pore-gas concentration from the designated depth interval was assumed to be in equilibrium in an animal burrow and was used as the representative concentration for those VOCs with inhalation ESLs. The HI for the inhalation VOC assessment was 0.02, which indicates no potential risk to burrowing animals from pore-gas VOCs (Table H-5.2-6).

H-5.2.5 Uncertainty Analysis

The uncertainty analysis describes the key sources of uncertainty related to the screening assessment. This analysis can result in either adding or removing chemicals from the list of COPECs for MDA U. This section presents a qualitative uncertainty analysis of the issues relevant to evaluating the potential ecological risk at MDA U.

H-5.2.5.1 Chemical Form

The assumptions used in the ESL derivations were conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum bodyweight, and additive effects of multiple COPECs. Most of these factors tend to result in conservative ESLs, which may lead to an overestimation of the potential risk. The assumption of additive effects for multiple COPECs may result in an over- or underestimation of the potential risk to receptors.

The chemical form of the individual COPECs was not determined as part of the investigation, which is largely a limitation of analytical quantitation for individual chemical species. Toxicological data are typically based on the most toxic and bioavailable chemical species, which are not often found in the environment. The inorganic, radionuclide, and organic COPECs are generally not 100% bioavailable to receptors in the natural environment because of the adsorption of chemical constituents to matrix surfaces (e.g., soils), or oxidation/reduction changes that render harmful chemical forms unavailable to biotic processes. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2004, 87630), and the values were biased toward overestimating the potential risk to receptors.

H-5.2.5.2 Exposure Pathways

The concentrations used in the calculations of HQs were the 95% UCL or the maximum detected concentration to a depth of 5 ft bgs, thereby allowing a conservative estimate of the representative concentration of each COPEC. As a result, the exposure of individuals within a population was evaluated using this specific concentration, which was assumed constant throughout the exposure area, resulting in an overestimation of the potential exposure and risk.

H-5.2.5.3 Background Concentrations

The ecological screening is based on the exposure of ecological receptors to contamination to a depth of 5 ft. Table H-5.2-7 presents the representative concentrations for inorganic COPECs and the range of soil and tuff background concentrations (LANL 1998, 59730). Based on a comparison of the representative concentrations and the range of background concentrations, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, selenium, silver, thallium, and zinc were eliminated as COPECs because exposure is similar to background across the site and is not likely to pose a potential ecological risk.

H-5.2.5.4 Area Use Factors

In addition to the direct comparison of the representative concentration with the ESLs, area use factors (AUFs) are used to account for the amount of time that a receptor is likely to spend within the contaminated areas based on the size of the receptor's home range. The AUFs for individual organisms were developed by dividing the size of the site by the home range for that receptor. The area of MDA U is approximately 0.4 hectare (ha), which includes the fenced area and sampling locations within 50 to 100 ft of the fence. This area includes historical sampling locations from the 1994 and 2001 investigations (LANL 2004, 87454, Figure 3.4-2), with the exception of three sediment locations (21-01865, 21-02570, and 21-02571). The home range (HR) for the Mexican spotted owl is 366 ha; therefore, the AUF for the Mexican spotted owl is 0.001 (Table H-5.2-8). Based on the application of the AUF for the Mexican spotted owl to the HI for the carnivorous kestrel, which is a surrogate for the owl, no potential for ecological risk to the Mexican spotted owl (HI=0.003) exists.

H-5.2.5.5 Population Area Use Factors

The EPA guidance is to manage ecological risk on a population basis rather than on an individual basis, except in the case of T&E species (EPA 1999, 70086) such as the Mexican spotted owl. As discussed in Section H-5.2.5.4, potential risk to the Mexican spotted owl is negligible considering the small fraction of its HR represented by MDA U. One approach to addressing the potential effects on populations associated with MDA U is to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. This calculation is based on the individual receptor HR and its dispersal distance (Bowman et al. 2002, 73475). Bowman et al. (2002, 73475) estimate that the median dispersal distance for mammals is seven times the linear dimension of the HR (i.e., the square root of the home range area). If only the dispersal distances for the mammals with HRs within the range of the screening receptors are used (Bowman et al. 2002, 73475), the median dispersal distance becomes 3.5 times the square root of the HR (R^2=0.91). If it is assumed that the receptors can disperse the same distance in any direction, the population area is circular and the dispersal distance is the radius of the circle. As a result, the population area can be derived by $\pi[3.5\sqrt{HR}]^2$ or approximately 40 times HR (40HR).

Home range information, calculated population areas, and population area use factors (PAUFs) are shown in Table H-5.2-8 (except for the red fox). The PAUFs for each receptor are estimated by dividing the MDA U-related area by the population area of each receptor population. The resulting PAUF is multiplied by the receptor HI to determine if there is a potential impact on the receptor population.

The HIs are recalculated minus the inorganic COPECs eliminated based on similarity to background and adjusted by the PAUFs (Table H-5.2-9). The HIs for the plant and earthworm are not adjusted by PAUFs because these receptors do not have readily definable home ranges. Based on the reassessment, the adjusted HIs for MDA U are less than 1.0 for the remaining wildlife (vertebrate) receptors, the plant, and the earthworm.

H-5.2.5.6 DOE Tier I Bioconcentration Guides

The DOE Tier I bioconcentration guide (BCG) is a lower value for cesium-137 (20.8 pCi/g) than the ECORISK Database final ESL (680 pCi/g). If the DOE Tier I BCG is used, the HQ increases to 0.033 for the wildlife receptors. The DOE BCG incorporates bioaccumulation factors that are orders of magnitude higher than those in the ECORISK Database. Environmental surveillance and monitoring at the Laboratory indicate that bioaccumulation factors are not as high as those used by DOE (Bennett 1996, 56035). Therefore, the ESL comparison is more representative than the BCG comparison.

The DOE Tier I BCG is a lower value for strontium-90 (22.5 pCi/g) than the ECORISK Database final ESL (560 pCi/g). If the DOE Tier I BCG is used, the HQ increases to 0.01 for the wildlife receptors. The DOE BCG incorporates bioaccumulation factors that are orders of magnitude higher than those in the ECORISK Database. Environmental surveillance and monitoring at the Laboratory indicate that bioaccumulation factors are not as high as those used by DOE (Bennett et al. 1994, 56035). Therefore, the ESL comparison is more representative than the BCG comparison.

H-5.2.5.7 Chemicals without ESLs

Perchlorate, 3,3'-dichlorobenzidine, diethyl phthalate, 4-methylphenol, pyridine, and radon-219 have no ESLs.

Because perchlorate has no ESL, it cannot be assessed quantitatively for potential ecological risk. This chemical was detected in 3 of 12 samples from 0 to 5 ft bgs, with a maximum detected concentration of

0.000742 mg/kg. The EPA Region 6 residential SSL is 55 mg/kg, which is many orders of magnitude above the maximum detected concentration and indicates relatively low potential toxicity from this chemical. Therefore, perchlorate does not pose a potential ecological risk to receptors at this site.

Because 3,3'-dichlorobenzidine has no ESL, it cannot be assessed quantitatively for potential ecological risk. This chemical was detected in 1 of 93 samples at a concentration of 0.36 mg/kg. The NMED residential SSL is 10.8 mg/kg, which is more than an order of magnitude higher than the maximum detected concentration and indicates relatively low potential toxicity from this chemical. Therefore, 3,3'-dichlorobenzidine does not pose a potential ecological risk to receptors at this site.

Because diethyl phthalate has no ESL, it cannot be assessed quantitatively for potential ecological risk. This chemical was detected in 1 of 93 samples from 0 to 5 ft bgs, with a maximum detected concentration of 8.1 mg/kg. If dimethyl phthalate is used as a surrogate, the lowest dimethyl phthalate ESL (10 mg/kg) results in an HQ of 0.8 for the earthworm and less than 0.3 for the wildlife receptors, indicating that diethyl phthalate does not pose a potential risk to receptors.

Because 4-methylphenol has no ESL, it cannot be assessed quantitatively for potential ecological risk. This chemical was detected in 1 of 94 samples from 0 to 5 ft bgs, at a maximum detected concentration of 0.11 mg/kg. If phenol is used as a surrogate, the lowest phenol ESL (0.79 mg/kg) results in an HQ of 0.1, indicating that 4-methylphenol does not pose a potential risk to receptors.

Because pyridine has no ESL, it cannot be assessed quantitatively for potential ecological risk. This chemical was detected in 1 of 12 samples from 0 to 5 ft bgs, at a maximum detected concentration of 0.0781 mg/kg. If benzene is used as a surrogate, the lowest benzene ESL (24 mg/kg) results in an HQ of 0.003, indicating that pyridine does not pose a potential risk to receptors.

Because radon-219 has no ESL, it cannot be assessed quantitatively for potential ecological risk. This radionuclide is a decay product of uranium-235. Although it is present in one sample at an activity of 0.762 pCi/g at MDA U, its short half-life, 3.96 seconds, precludes it as a contributor to dose.

H-5.2.5.8 Pore-Gas COPECs

Several of the VOCs (butanone[2-], carbon disulfide, cyclohexane, ethanol, ethylbenzene, ethyltoluene[4-], hexane, heptane[n-], propylene, styrene, trichloro-1,2,2-trifluoroethane[1,1,2-], and trimethylbenzene[1,2,4-]) detected in pore gas do not have inhalation ESLs. If benzene and toluene are used as surrogates for ethylbenzene and trimethylbenzene[1,2,4-], and ethyltoluene[4-], respectively, the HI increases by only 0.001. These VOCs are relatively less toxic than those with ESLs based on human health screening values (EPA 2005, 91002). Therefore, these VOCs from the screening assessment probably would not substantially underestimate the potential risk. Tritium was also detected in pore-gas samples at a maximum concentration of 6.5 pCi/m^3. An inhalation ESL for tritium is not available, but the lowest soil ESL for tritium is 48,000 pCi/g for the earthworm. Thus, this level of tritium is not a potential risk to burrowing animals.

H-5.2.6 Interpretation

Based on the ecological screening assessment for MDA U, several COPECs (including some COPECs without ESLs) were identified. All of the COPECs were eliminated by analyzing a number of factors including background concentrations, the analysis for potential effects to populations (individuals for T&E species), the area of contamination, the relative toxicity of related compounds, and the infrequency of detection.

H-6.0 CONCLUSIONS AND RECOMMENDATIONS

MDA U was evaluated for potential risk to human health using industrial and construction worker SSLs. The risk of 4×10^{-6}, hazard of 0.06, and dose of 0.7 mrem/yr for an industrial exposure are below the applicable risk, hazard, and dose targets. The risk, hazard, and dose for a construction worker are also below the applicable target levels. In addition to the dose comparison, radionuclide representative concentrations were used to calculate a cancer risk using EPA radionuclide PRGs for outdoor workers (epa-orgs.ornl.gov/radionuclides/download.shtml). The total cancer risk from radionuclides under the industrial scenario is approximately 9×10^{-6}. The human health screening assessment indicates no potential unacceptable risk or dose for an industrial and a construction worker receptor, and further investigation or corrective action at MDA U is not warranted based on risk/dose.

Based on ecological screening assessment, COPECs were identified and evaluated further. All the COPECs were eliminated in the uncertainty analysis by analyzing the following factors: background concentrations, the analysis for potential effects to populations (individuals for T&E species), the area of contamination, the relative toxicity of related compounds, and the infrequency of detection. The results of the ecological risk screening assessment indicate no potential risk to ecological receptors at the site, and further investigation or corrective action is not warranted based on ecological risk.

H-7.0 REFERENCES

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Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau; the U.S. Department of Energy–Los Alamos Site Office; the U.S. Environmental Protection Agency, Region 6; and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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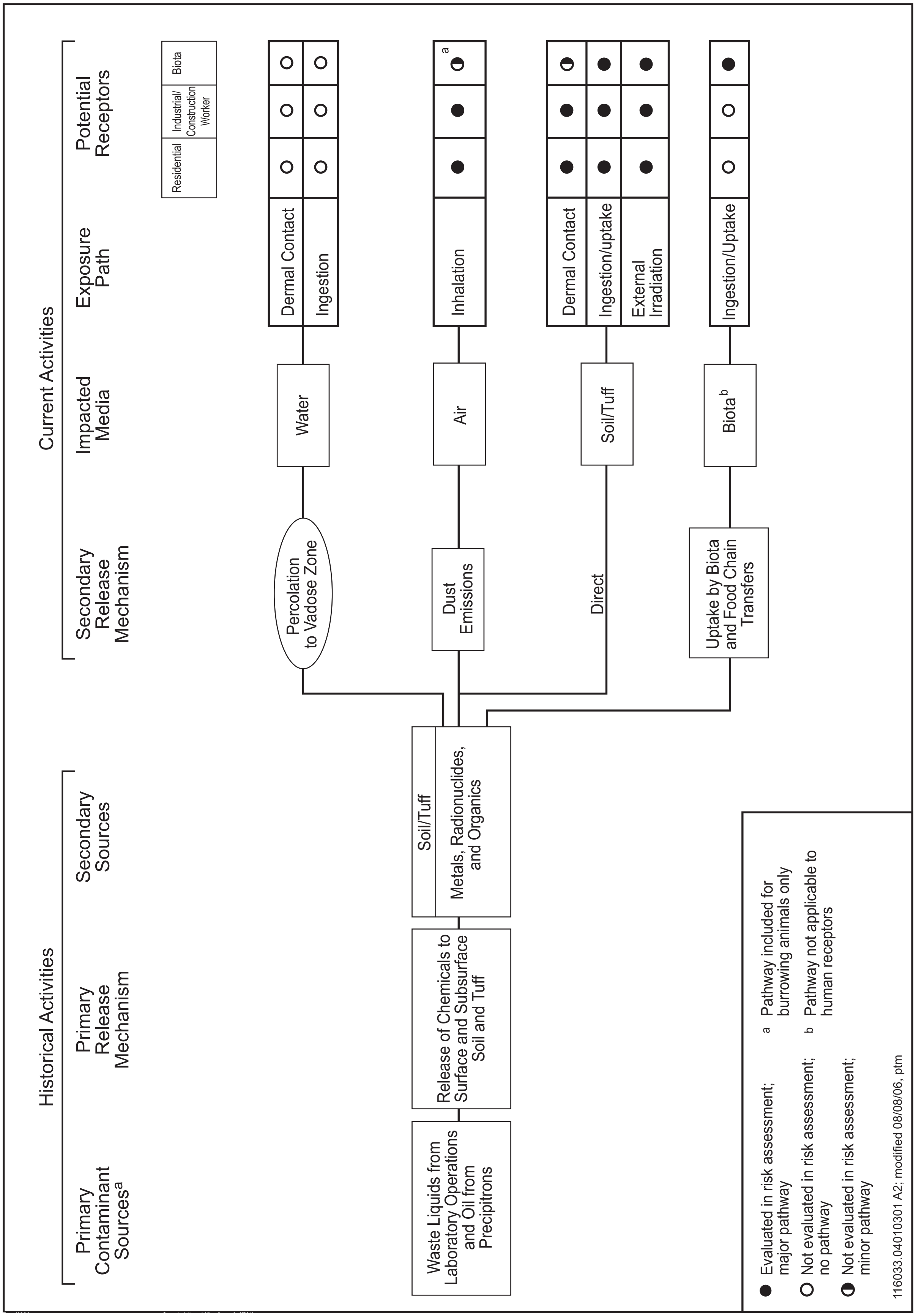

Figure H-3.0-1. Conceptual site model flow diagram for MDA U

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Table H-3.1-1
K_d Values for Inorganic COPCs at MDA U

COPCs	K_d[a] (cm3/g)
Arsenic	29
Chromium[b]	1800000
Lead	900
Uranium	na
Aluminum	1500
Antimony	45
Barium	41
Cadmium	75
Cobalt	45
Copper	35
Mercury	52
Nickel	65
Nitrate	0.0356
Selenium	5
Silver	8.3
Thallium	71
Zinc	62
Beryllium	790
Vanadium	1000

[a] Kd values from NMED 2005, 90802.

[b] Kd value for chromium(III), the predominant species for chromium, used.

Table H-3.1-2
K_d Values for Radionuclide COPCS at MDA U

COPCs	K_d* (cm^3/g)
Americium-241	8.2
Cesium-137	1000
Plutonium-238	4500
Plutonium-239	4500
Strontium-90	35
Uranium-234	0.4
Uranium-235	0.4
Radium-223	450
Radon-219	9.9
Thorium-227	20

*K_d values from EPA 1996, 64708.

Table H-3.1-3
Physical and Chemical Properties of Organic COPCs at MDA U

COPCs	K_{oc}[a] (cm^3/g)	Solubility[a] (mg/L)	Log K_{ow}[b] (Unitless)
Benzo(a)anthracene	3.98E+05	9.40E-03	5.76E+00
Benzo(a)pyrene	1.02E+06	1.62E-03	6.13E+00
Benzo(b)fluoranthene	1.23E+06	1.50E-03	5.78E+00
Benzo(k)fluoranthene	1.23E+06	8.00E-04	6.11E+00
Dibenz(a,h)anthracene	3.80E+06	2.49E-03	6.54E+00
Dichlorobenzidine[3,3'-]	7.24E+02	3.11E+00	3.51E+00
Indeno(1,2,3-cd)pyrene	3.47E+06	2.20E-05	6.70E+00
Chrysene	3.98E+05	1.60E-03	5.81E+00
Acetone	5.80E-01	1.00E+06	2.40E-01
Acenaphthene	4.90E+03	4.24E+00	3.92E+00
Anthracene	2.95E+04	4.34E-02	4.45E+00
Aroclor-1242	4.48E+04	2.77E-01	6.3E+00
Aroclor-1254	5.30E+05	2.77E-01	6.8E+00
Aroclor-1260	5.30E+05	2.77E-01	8.3E+00
Benzo(g,h,i)perylene	2.68E+06[b]	2.60E-04[b]	6.63E+00
Benzoic acid	1.45E+01[b]	3.40E+03[b]	1.87E+00
Butylbenzylphthalate	1.38E+04[c]	2.90E+00[c]	4.73E+00
Dibenzofuran	7.76E+03	3.10E+00	4.12E+00
Diethyl phthalate	2.88E+02	1.08E+03	2.42E+00
Fluoranthene	1.07E+05	2.06E-01	5.16E+00
Fluorene	1.38E+04	1.90E+00	4.18E+00
Methyl-2-pentanone[4-]	na[d]	na	na
Methylnaphthalene[2-]	2.98E+03[b]	2.46E+01[b]	3.86E+00
Mehtylphenol [4-]	na	na	na
Naphthalene	2.00E+03	3.10E+01	3.30E+00
Phenanthrene	1.40E+04	1.15E+00	4.46E+00
Pyrene	1.05E+05	1.35E-01	4.88E+00
Pyridine	3.30E+01[b]	1.00E+05[b]	6.50E-01

[a] NMED Revision 3.0 value (NMED 2005, 90802), unless otherwise noted.

[b] RAIS database value.

[c] EPA Region 6 value (EPA 2005, 91002).

[d] na = Not available.

Table H-4.1-1
Chemical SSLs for MDA U

Chemical	Residential SSLs (mg/kg)	Endpoint	Industrial SSLs (mg/kg)	Endpoint	Construction Worker SSLs (mg/kg)	Endpoint
Acenaphthene	3.19E+01	C_{sat}[a]	3.19E+01	C_{sat}	3.19E+01	C_{sat}
Aluminum	7.78E+04	nc[b]	1.00E+05	max	1.44E+04	nc
Anthracene	1.93E+00	C_{sat}	1.93E+00	C_{sat}	1.93E+00	C_{sat}
Antimony	3.13E+01	nc	4.54E+02	nc	1.24E+02	nc
Aroclor 1242	2.2E+00[c]	c[d]	8.26E+00	c	No value[e]	n/a
Aroclor 1242	1.12E+00	nc	No value[e]	n/a[f]	4.28E+00	nc
Aroclor 1254	1.12E+00	nc	1.2E+01[c]	nc	4.28E+00	nc
Aroclor 1254	2.2E+00[c]	c	8.26E+00	c	No value[e]	n/a
Aroclor 1260	2.2E+00[c]	c	8.26E+00	c	No value[e]	n/a
Aroclor 1260	1.12E+00	nc	No value[e]	n/a	4.28E+00	nc
Arsenic	3.90E+00	c	1.77E+01	c	8.52E+01	nc
Barium	5.45E+03	nc	7.83E+04	nc	1.44E+03	nc
Benzo(a)anthracene	6.21E+00	c	2.34E+01	c	2.12E+02	c
Benzo(a)pyrene	6.21E-01	c	2.34E+00	c	2.12E+01	c
Benzo(b)fluoranthene	6.21E+00	c	2.34E+01	c	2.12E+02	c
Benzo(g,h,i)perylene[g]	2.13E+01	C_{sat}	2.13E+01	C_{sat}	2.13E+01	C_{sat}
Benzo(k)fluoranthene	6.21E+01	c	2.34E+02	c	2.12E+03	c
Benzoic acid	1.0E+05[c]	max	1.0E+05[c]	max	1.0E+05[h]	max
Butylbenzylphthalate	2.4E+02[c]	C_{sat}	2.4E+02[c]	C_{sat}	4.66E+03[h]	nc
Cadmium	3.90E+01	nc	5.64E+02	nc	1.54E+02	nc
Chromium (total)	2.1E+03[c]	c	5.0E+03[c]	c	1.83E+02[i]	c
Chrysene	9.55E-01	C_{sat}	9.55E-01	C_{sat}	9.55E-01	C_{sat}
Cobalt	1.52E+03	nc	2.05E+04	nc	6.1E+01	nc
Copper	3.13E+03	nc	4.54E+04	nc	1.24E+04	nc
Dibenz(a,h)anthracene	6.21E-01	c	2.34E+00	c	2.12E+01	c
Dibenzofuran	3.66E+01	C_{sat}	3.66E+01	C_{sat}	3.66E+01	C_{sat}
Diethyl phthalate	4.89E+04	nc	1.00E+05	max	1.00E+05	max
Fluoranthene	2.29E+03	nc	2.44E+04	nc	8.73E+03	nc
Fluorene	3.97E+01	C_{sat}	3.97E+01	C_{sat}	3.97E+01	C_{sat}
Indeno(1,2,3-c,d)pyrene	6.21E+00	c	2.34E+01	c	2.12E+02	c
Lead	4.00E+02	nc	8.00E+02	nc	8.00E+02	nc
Mercury	2.3E+01[c]	nc	3.4E+02[c]	nc	9.30E+01[h]	nc
2-Methylnaphthalene[j]	2.52E+01	nc	9.25E+01	nc	8.25E+01	nc
4-Methylphenol	3.1E+02[c]	nc	3.4E+03[c]	nc	1.17E+03[h]	nc
Naphthalene	2.52E+01	nc	9.25E+01	nc	8.25E+01	nc
Nitrate	1.00E+05	max	1.00E+05	max	1.00E+05	max

Table H-4.1-1 (continued)

Chemical	Residential SSLs (mg/kg)	Endpoint	Industrial SSLs (mg/kg)	Endpoint	Construction Worker SSLs (mg/kg)	Endpoint
Perchlorate	5.5E+01[c]	nc	7.9E+02[c]	nc	3.1E+00[h]	nc
Phenanthrene	1.83E+03	nc	2.05E+04	nc	6.99E+03	nc
Pyrene	2.13E+01	C_{sat}	2.13E+01	C_{sat}	2.13E+01	C_{sat}
Pyridine	6.1E+01[c]	nc	6.8E+02[c]	nc	2.33E+02[h]	nc
Selenium	3.91E+02	nc	5.68E+03	nc	1.55E+03	nc
Silver	3.91E+02	nc	5.68E+03	nc	1.55E+03	nc
Thallium	5.16E+00	nc	7.49E+01	nc	2.04E+01	nc
Uranium	1.6E+01[k]	nc	2.0E+02[k]	nc	6.20E+01[h]	nc
Zinc	2.35E+04	nc	1.00E+05	max	9.29E+04	nc

Note: SSLs from NMED 2005, 90802, unless otherwise noted.

[a] C_{sat} = Saturation limit.

[b] nc = Noncarcinogen.

[c] Values from EPA Region 6 (EPA 2005, 91002).

[d] c = Carcinogen.

[e] No screening levels available from NMED and EPA Region 6.

[f] n/a = Not applicable.

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

[h] SSL calculated using NMED construction worker parameters and EPA Region 6 toxicity values.

[i] NMED chromium(VI) carcinogenic endpoint for construction worker multiplied by 7 used (to match EPA 1:6 ratio for chromium VI:III).

[j] Naphthalene used as surrogate based on structural similarity.

[k] Values obtained from EPA Region 9 (epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf).

Table H-4.1-2
Radionuclide SALs for MDA U

Radionuclide	Residential SAL (pCi/g)	Industrial SAL (pCi/g)	Construction Worker SAL (pCi/g)
Americium-241	30	180	34
Cesium-137+D	5.6	23	18
Tritium	750	4.4E+05	3.2E+05
Iodine-129	44	1800	580
Plutonium-238	37	240	40
Plutonium-239	33	210	36
Strontium-90+D*	5.7	1900	800
Thorium-228+D	2.3	9	6.8
Uranium-234	170	1500	220
Uranium-235+D	17	87	43
Uranium-238+D	86	430	160

Note: SALs from LANL 2005, 88493.

*+D = Plus daughters.

Table H-4.1-3
Parameters Used to Calculate Chemical SSLs

Parameters	Residential Values	Industrial Worker Values	Construction Worker Values
Target HQ	1	1	1
Target cancer risk	10^{-5}	10^{-5}	10^{-5}
Averaging time (carcinogen)	70 yr x 365 days	70 yr x 365 days	1 yr x 365 days
Averaging time (noncarcinogen)	ED[b] x 365 days	ED x 365 days	1 yr x 365 days
Skin absorption factor	SVOC = 0.1	SVOC = 0.1	SVOC = 0.1
	Chemical-specific	Chemical-specific	Chemical-specific
Adherence factor–child	0.2 mg/cm^2	n/a[a]	n/a[a]
Body weight–child	15 kg (0–6 years of age)	n/a	n/a
Cancer slope factor–oral (chemical-specific)	mg/kg-day^{-1}	mg/kg-day^{-1}	mg/kg-day^{-1}
Cancer slope factor–inhalation (chemical-specific)	mg/kg-day^{-1}	mg/kg-day^{-1}	mg/kg-day^{-1}
Exposure frequency	350 day/yr	225 day/yr	250 day/yr
Exposure duration–child	6 yr (0–6 years of age)	n/a	n/a
Age-adjusted ingestion factor	114 mg-yr/kg-day	n/a	n/a
Age-adjusted inhalation factor	11 m^3-yr/kg-day	n/a	n/a
Inhalation rate–child	10 m^3/day	n/a	n/a
Soil ingestion rate–child	200 mg/day	n/a	n/a
Particulate emission factor	6.61 x 10^9 m^3/kg	6.61 x 10^9 m^3/kg	2.12 x 10^6 m^3/kg
Reference dose–oral (chemical-specific)	mg/kg-day	mg/kg-day	mg/kg-day
Reference dose–inhalation (chemical-specific)	mg/kg-day	mg/kg-day	mg/kg-day
Exposed surface area–child	2800 cm^2/day (head, hands, forearms, lower legs, feet)	n/a	n/a
Age-adjusted skin contact factor for carcinogens	361 mg-yr/kg-day	n/a	n/a
Volatilization factor for soil (chemical-specific)	m^3/kg	m^3/kg	m^3/kg
Body weight–adult	70 kg	70 kg	70 kg
Exposure duration[c]	30 yr	25	1
Adherence factor–adult	0.07 mg/cm^2	0.2 mg/cm^2	0.3 mg/cm^2
Soil ingestion rate–adult	100 mg/day	100 mg/day	330 mg/day
Exposed surface area–adult	5700 cm^2/day (head, hands, forearms, lower legs)	3300 cm^2/day (head, hands, forearms)	3300 cm^2/day (head, hands, forearms)
Inhalation rate–adult	20 m^3/day	20 m^3/day	20 m^3/day

Note: Parameter values from NMED 2005, 90802.

[a] n/a = Not applicable.

[b] ED = Exposure duration.

[c] Exposure duration for lifetime resident is 30 yr. For carcinogens, the exposures are combined for child (6 yr) and adult (24 yr).

Table H-4.1-4
Parameters Used in the SAL Calculations for Radionuclides, Industrial

Parameters	Industrial, Adult
Inhalation rate (m^3/yr)	19,481[a]
Mass loading (g/m^3)	1.5 x 10^{-7} [b]
Outdoor time fraction	0.2053[c]
Indoor time fraction	0
Soil ingestion (g/yr)	97.4[d]

[a] Calculated as [20 m^3/day x 225 day/yr] / [indoor + outdoor time fractions], where 20 m^3/day is the daily inhalation rate of an adult and 225 days/yr is the exposure frequency (NMED 2005, 90802).

[b] Calculated as [1/ 6.6 x 10^{+9} m^3/kg) x 1000 g/kg, where 6.6 x 10^{+9} m^3/kg is the particulate emission factor (NMED 2005, 90802).

[c] Calculated as [8 hr/day x 225 day/yr] / 8766 hr/yr, where 8 hr/day is an estimate of the average length of the work day.

[d] Calculated as [0.1 g/day x 225 day/yr] / [indoor + outdoor time fractions], where 0.1 g/day is the adult soil ingestion rate (NMED 2005, 90802).

Table H-4.1-5
Parameters Used in the SAL Calculations for Radionuclides, Residential

Parameters	Residential, Child	Residential, Adult
Inhalation rate (m^3/yr)	3652.5[a]	7305[b]
Mass loading (g/m^3)	1.5 x 10^{-7}[c]	1.5 x 10^{-7}[c]
Outdoor time fraction	0.2236[d]	0.0599[e]
Indoor time fraction	0.7347[f]	0.8984[g]
Soil ingestion (g/yr)	73[h]	36.5[i]

[a] Calculated as [10 m^3/day x 350 day/yr] / [indoor + outdoor time fractions], where 10 m^3/day is the daily inhalation rate of a child (NMED 2005, 90802).

[b] Calculated as [20 m^3/day x 350 day/yr] / [indoor + outdoor time fractions], where 20 m^3/day is the daily inhalation rate of an adult (NMED 2005, 90802).

[c] Calculated as [1/ 6.6 x 10^{+9} m^3/kg) x 1000 g/kg, where 6.6 x 10^{+9} m^3/kg is the particulate emission factor (NMED 2005, 90802).

[d] Calculated as [5.6 hr/day x 350 day/yr] / 8766 hr/yr, where 5.6 hr/day is an estimate of time spent outdoors for a 3-11 yr old child (EPA 1997, 66598, Section 15.4-1).

[e] Calculated as [1.5 hr/day x 350 day/yr] / 8766 hr/yr, where 1.5 hr/day is an estimate of time spent outdoors for an adult 12 yr and older (EPA 1997, 66598, Section 15.4-1).

[f] Calculated as [(24-5.6 hr/day x 350 day/yr] / 8766 hr/yr.

[g] Calculated as [(24-1.5 hr/day x 350 day/yr] / 8766 hr/yr.

[h] Calculated as [0.2 g/day x 350 day/yr] / [indoor + outdoor time fractions], where 0.2 g/day is the child soil ingestion rate (NMED 2005, 90802).

[i] Calculated as [0.1 g/day x 350 day/yr] / [indoor + outdoor time fractions], where 0.1 g/day is the adult soil ingestion rate (NMED 2005, 90802).

Table H-4.1-6
Parameters Used in the SAL Calculations for Radionuclides, Construction Worker

Parameters	Construction Worker, Adult
Inhalation rate (m^3/yr)	19,478[a]
Mass loading (g/m^3)	0.0004[b]
Outdoor time fraction	0.2567[c]
Indoor time fraction	0
Soil ingestion (g/yr)	321[d]

[a] The inhalation rate compensates for the time-based occupancy factor applied by RESRAD in calculating exposure from the inhalation pathway. Per the NMED calculation, the (daily) inhalation rate is not modified by any assumed daily time fraction on-site. Calculated as [20 m^3/day × 250 day/yr] / [indoor + outdoor time fractions], where 20 m^3/day is the daily inhalation rate of an adult and 250 days/yr is the exposure frequency (NMED 2004, 85615).

[b] Calculated as (1 / 2.1 × 10^{+6} m^3/kg) × 1000 g/kg, where 2.1 × 10^{+6} m^3/kg is the particulate emission factor (NMED 2004, 85615).

[c] Calculated as (9 hr/day × 250 day/yr) / 8766 hr/yr, where 9 hr/day is an estimate of the average length of the work day, including a 1-hr break.

[d] The soil-ingestion rate compensates for the time-based occupancy factor applied by RESRAD in calculating exposure from the soil ingestion pathway. Calculated as [0.33 g/day × 250 day/yr] / [indoor + outdoor time fractions], where 0.33 g/day is the soil ingestion rate for a construction worker (NMED 2004, 85615).

Table H-4.1-7
Melting Points and Risk-Based SSLs for Solid-Phase Organic Chemicals

Analyte	Melting Point (°C)	Residential C_{sat} SSL[a] (mg/kg)	Industrial C_{sat} SSL[a] (mg/kg)	Construction Worker C_{sat} SSL[a] (mg/kg)	Residential SSL-No Inhalation (mg/kg)	Industrial SSL-No Inhalation (mg/kg)	Construction Worker SSL-No Inhalation (mg/kg)
Acenaphthene	93.4[b]	31.9	31.9	31.9	4690[c]	68100	14100
Anthracene	215[b]	1.93	1.93	1.93	23500[c]	341000 (100000)[d]	86000
Benzo(g,h,i)perylene[e]	278[f]	21.3	21.3	21.3	2350	34100	9010
Butylbenzylphthalate	61[f]	240[g]	240[g]	n/a[h]	12000	140000 (100000)[d]	4660
Chrysene	258.2[b]	0.955	0.955	0.955	620[c]	2340[c]	21400
Dibenzofuran	86.5[f]	36.6	36.6	36.6	313[c]	4540	552
Fluorene	114.8[b]	39.7	39.7	39.7	313[c]	45400	10200
Pyrene	151.2[b]	21.3	21.3	21.3	2350[c]	34100	9010

Note: NMED does not tabulate an SSL for benzo(g,h,i)perylene, but it is commonly reported in analytical suites that include polyaromatic hydrocarbons.

[a] C_{sat} values from NMED 2005, 90802, unless noted otherwise.

[b] Melting point from Table 4 of EPA 1996, 59902.

[c] The calculated value, absent the inhalation pathway, is identical to the NMED SSL (NMED 2004, 85615), which was not a C_{sat} value.

[d] SSL exceeds maximum allowed concentration of 100,000 mg/kg; therefore, 100,000 mg/kg was used as the industrial SSL.

[e] Pyrene used as a surrogate based on structural similarity.

[f] Melting point from “PhysProp” database by Syracuse Research Corporation (http://www.syrres.com/esc/physdemo.htm).

[g] C_{sat} from EPA Region 6 (EPA 2005, 91002).

[h] n/a = Not available.

Table H-4.1-8
Toxicity Values for COPCs for which SSLs Were Calculated

Chemical	Oral Slope Factor (mg/kg-day)$^{-1}$	Reference	Reference Dose Oral (mg/kg-day)	Reference	Reference Dose Inhalation (mg/kg-day)	Reference	Reference Dose Dermal (mg/kg-day)
Acenaphthene	na[a]	n/a[b]	6.00E-02	IRIS[c]	6.00E-02	r-r[d]	6.00E-02
Anthracene	na	n/a	3.00E-01	IRIS	3.00E-01	r-r	3.00E-01
Benzo(g,h,i)perylene[e]	na	n/a	3.00E-02	IRIS	3.00E-02	r-r	3.00E-02
Butylbenzylphthalate	na	n/a	2.0E-01	IRIS	2.0E-01	r-r	na
Chrysene	7.30E-03	NCEA[f]	na	n/a	na	n/a	na
Dibenzofuran	na	n/a	4.00E-03	NCEA	4.00E-03	r-r	4.00E-03
Fluorene	na	n/a	4.00E-02	IRIS	4.00E-02	r-r	4.00E-02
Mercury (inorganic)	na	n/a	3.00E-04	IRIS	3.00E-04	r-r	3.00E-04
Methylphenol[4-]	na	n/a	5.00E-03	IRIS	5.00E-03	r-r	5.00E-03
Perchlorate	na	n/a	1.00E-04	IRIS	1.00E-04	r-r	1.00E-04
Pyrene	na	n/a	3.00E-02	IRIS	3.00E-02	r-r	3.00E-02
Pyridine	na	n/a	1.00E-03	IRIS	1.00E-03	r-r	1.00E-03
Uranium	na	n/a	2.00E-04	NCEA	2.00E-04	r-r	2.00E-04

[a] na = Not available.
[b] n/a = Not applicable.
[c] IRIS = Integrated Risk Information System.
[d] r-r = route-to-route extrapolation.
[e] Pyrene used as surrogate based on structural similarity.
[f] NCEA = National Center for Environmental Assessment.

Table H-4.1-9
Physical and Chemical Parameters for Solid Phase Chemicals

Contaminant	H' Unitless	Molecular Wt (g/mol)	K_{oc} (cm^3/g)	K_d (cm^3/g)	D_a (cm^2/s)	D_w (cm^2/s)	Solubility (mg/L-water)	ABS[a]
Acenaphthene	0.00636	154.21	4900	7.35	0.0421	7.69E-06	4.24	0
Anthracene	0.00267	178	29500	n/a[b]	0.0324	7.74E-06	0.0434	0
Benzo(g,h,i)perylene[c]	0.000451	200	105000	n/a	0.0272	7.24E-06	0.135	0
Butylbenzylphthalate	0.00008	312.37	13804	82.8	0.01740	4.8E-06	2.9	0.10
Chrysene	0.00388	228.28	398000	n/a	0.0248	6.21E-06	0.0016	0.13
Dibenzofuran	0.000533	284.8	7760	11.64	0.0601	0.00001	3.1	0
Fluorene	0.00261	166.21	13800	20.7	0.0363	7.88E-06	1.9	0
Pyrene	0.000451	200	105000	n/a	0.0272	7.24E-06	0.135	0

[a] Absorption factors for skin (ABS) for solid-phase C_{sat} chemicals were confirmed in Table C-1 of NMED 2004 SSL technical background document (NMED 2004, 85615), except butylbenzylphthalate value is from EPA Region 6 (EPA 2005, 91002).

[b] n/a = Not applicable.

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

Table H-4.2-1
Representative Concentrations for the Industrial Scenario (0–1 ft depth)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Inorganic Chemicals (mg/kg)									
Arsenic	84	84	1.4	5.2	2.78	0.848	logN	2.96	H-UCL
Cadmium	42	20	0.07	1.2	0.330	0.288	logN	0.635	Chebyshev
Chromium	84	84	3.3	77.3	12.2	11.9	Nonparametric	17.8	Chebyshev
Cobalt	84	78	1.3	8.1	3.72	1.38	logN	4.00	H-UCL
Copper	84	84	1.7	84.3	6.08	9.08	Nonparametric	10.4	Chebyshev
Lead	84	84	3.8	47.5	13.6	6.63	Nonparametric	16.7	Chebyshev
Mercury	85	47	0.0131	1.2	0.108	0.208	Nonparametric	0.249	Chebyshev
Perchlorate*	9	2	0.00058	0.00058	0.000921	0.000193	Nonparametric	0.00103	Chebyshev
Selenium	84	4	0.67	1.5	0.395	0.208	Nonparametric	0.493	Chebyshev
Silver*	84	44	0.0578	0.59	0.362	0.387	Nonparametric	0.626	Chebyshev
Thallium	84	10	0.0966	1.1	0.303	0.139	Nonparametric	0.369	Chebyshev
Uranium	73	73	0.957	37.5	2.92	4.75	Nonparametric	5.34	Chebyshev
Zinc	84	84	18.1	509	50.1	67.3	Nonparametric	82.1	Chebyshev
Organic Chemicals (mg/kg)									
Acenaphthene	83	4	0.11	0.45	0.172	0.062	Nonparametric	0.201	Chebyshev
Anthracene	83	5	0.077	0.88	0.180	0.099	Nonparametric	0.227	Chebyshev
Aroclor-1242*	30	1	0.0078	0.0078	0.008	0.004	Nonparametric	0.011	Chebyshev
Aroclor-1254*	30	3	0.006	0.0115	0.014	0.006	Nonparametric	0.019	Chebyshev
Aroclor-1260*	30	2	0.0019	0.0058	0.014	0.006	Nonparametric	0.019	Chebyshev
Benzo(a)anthracene	83	6	0.0155	0.66	0.180	0.086	Nonparametric	0.221	Chebyshev
Benzo(a)pyrene	83	7	0.12	0.81	0.179	0.099	Nonparametric	0.227	Chebyshev
Benzo(b)fluoranthene	83	8	0.0237	0.61	0.176	0.088	Nonparametric	0.218	Chebyshev
Benzo(g,h,i)perylene	83	5	0.086	0.62	0.173	0.074	Nonparametric	0.209	Chebyshev
Benzo(k)fluoranthene	83	7	0.11	0.72	0.176	0.087	Nonparametric	0.218	Chebyshev

Table H-4.2-1 (continued)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Benzoic acid	84	2	0.85	1.6	0.866	0.218	Nonparametric	0.970	Chebyshev
Butylbenzylphthalate	83	3	0.1	0.36	0.191	0.060	Nonparametric	0.220	Chebyshev
Chrysene	83	8	0.091	0.73	0.178	0.091	Nonparametric	0.221	Chebyshev
Dibenz(a,h)anthracene*	83	2	0.12	0.17	0.168	0.053	Nonparametric	0.193	Chebyshev
Dibenzofuran*	83	3	0.078	0.2	0.189	0.058	Nonparametric	0.217	Chebyshev
Dichlorobenzidine[3,3'-]	83	1	0.36	0.36	0.195	0.061	Nonparametric	0.224	Chebyshev
Diethyl phthalate	83	1	8.1	8.1	0.286	0.870	Nonparametric	0.702	Chebyshev
Fluoranthene	83	17	0.0118	2.9	0.239	0.357	Nonparametric	0.410	Chebyshev
Fluorene	83	4	0.081	0.42	0.171	0.060	Nonparametric	0.200	Chebyshev
Indeno(1,2,3-cd)pyrene	83	5	0.13	0.56	0.174	0.073	Nonparametric	0.209	Chebyshev
Methylnaphthalene[2-]*	83	1	0.095	0.095	0.167	0.053	Nonparametric	0.193	Chebyshev
Methylphenol[4-]*	84	1	0.11	0.11	0.189	0.056	Nonparametric	0.216	Chebyshev
Naphthalene	83	2	0.13	0.25	0.169	0.054	Nonparametric	0.194	Chebyshev
Phenanthrene	83	12	0.0158	2.9	0.234	0.360	Nonparametric	0.407	Chebyshev
Pyrene	83	17	0.011	1.8	0.210	0.227	Nonparametric	0.319	Chebyshev
Pyridine*	9	1	0.0781	0.0781	0.217	0.176	Nonparametric	0.473	Chebyshev
Radionuclides (pCi/g)									
Americium-241	93	6	0.031	0.84	0.011	0.183	Nonparametric	0.094	Chebyshev
Cesium-137	66	57	0.09	2.779	0.520	0.536	Nonparametric	0.808	Chebyshev
Plutonium-238	82	21	0.005	2.516	0.040	0.277	Nonparametric	0.173	Chebyshev
Plutonium-239	79	69	0.004	4.136	0.341	0.621	Nonparametric	0.645	Chebyshev
Strontium-90	94	16	0.125	1.34	0.132	0.242	Nonparametric	0.240	Chebyshev
Tritium	89	79	0.022	8.11	0.658	1.27	Nonparametric	1.24	Chebyshev
Uranium-234	30	30	0.791	20.3	2.06	3.64	Nonparametric	4.96	Chebyshev
Uranium-235	59	25	0.025	1.34	0.150	0.177	Nonparametric	0.251	Chebyshev

*Maximum detected concentration used in the industrial screening evaluations.

Table H-4.2-2
Representative Concentrations for the Construction Worker and Residential Scenarios (0–10 ft depth)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Inorganic Chemicals (mg/kg)									
Aluminum	95	95	450	24100	9164	4811	Normal	9984	Student-t
Antimony	78	20	0.134	0.87	0.483	1.16	Nonparametric	1.05	Chebyshev
Arsenic	95	95	1.4	5.2	2.75	0.851	LogN	2.91	H-UCL
Barium	95	95	13	199	92.3	38.7	Normal	98.9	Student-t
Cadmium	53	20	0.07	1.2	0.316	0.257	Nonparametric	0.470	Chebyshev
Chromium	95	95	1	77.3	11.3	11.5	Nonparametric	16.5	Chebyshev
Cobalt	95	88	0.296	8.1	3.47	1.55	Normal	3.73	Student-t
Copper	95	95	1.16	84.3	5.72	8.61	Nonparametric	9.57	Chebyshev
Lead	95	95	1.53	47.5	12.6	6.82	Nonparametric	15.7	Chebyshev
Mercury	96	51	0.0077	1.2	0.100	0.197	Nonparametric	0.226	Chebyshev
Nitrate	13	1	0.745	0.745	0.533	0.067	Nonparametric	0.614	Chebyshev
Perchlorate*	13	3	0.00058	0.000742	0.001	0.0002	Nonparametric	0.001	Chebyshev
Selenium	95	4	0.67	1.5	0.421	0.213	Nonparametric	0.516	Chebyshev
Silver	95	46	0.0477	0.59	0.401	0.413	Nonparametric	0.666	Chebyshev
Thallium	95	12	0.0851	1.1	0.330	0.220	Nonparametric	0.429	Chebyshev
Uranium	73	73	0.957	37.5	2.92	4.75	Nonparametric	5.34	Chebyshev
Zinc	95	95	16.5	509	47.8	63.6	Nonparametric	76.2	Chebyshev
Organic Chemicals (mg/kg)									
Acenaphthene	94	4	0.11	0.45	0.166	0.066	Nonparametric	0.195	Chebyshev
Anthracene	94	5	0.077	0.88	0.173	0.099	Nonparametric	0.217	Chebyshev
Aroclor-1242*	41	1	0.0078	0.0078	0.008	0.004	Nonparametric	0.010	Chebyshev
Aroclor-1254*	41	3	0.006	0.0115	0.013	0.006	Nonparametric	0.018	Chebyshev
Aroclor-1260*	41	2	0.0019	0.0058	0.013	0.007	Nonparametric	0.018	Chebyshev
Benzo(a)anthracene	94	6	0.0155	0.66	0.172	0.087	Nonparametric	0.212	Chebyshev

Table H-4.2-2 (continued)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Benzo(a)pyrene	94	7	0.12	0.81	0.172	0.099	Nonparametric	0.216	Chebyshev
Benzo(b)fluoranthene	94	8	0.0237	0.61	0.169	0.088	Nonparametric	0.209	Chebyshev
Benzo(g,h,i)perylene	94	5	0.086	0.62	0.167	0.077	Nonparametric	0.201	Chebyshev
Benzo(k)fluoranthene	94	7	0.11	0.72	0.169	0.088	Nonparametric	0.209	Chebyshev
Benzoic acid	95	2	0.85	1.6	0.910	0.333	Nonparametric	1.059	Chebyshev
Butylbenzylphthalate	94	3	0.1	0.36	0.189	0.057	Nonparametric	0.215	Chebyshev
Chrysene	94	8	0.091	0.73	0.171	0.092	Nonparametric	0.212	Chebyshev
Dibenz(a,h)anthracene*	94	2	0.12	0.17	0.162	0.058	Nonparametric	0.188	Chebyshev
Dibenzofuran*	94	3	0.078	0.2	0.187	0.054	Nonparametric	0.212	Chebyshev
Dichlorobenzidine[3,3'-]	94	1	0.36	0.36	0.206	0.071	Nonparametric	0.237	Chebyshev
Diethyl phthalate	94	1	8.1	8.1	0.273	0.818	Nonparametric	0.640	Chebyshev
Fluoranthene	94	17	0.0118	2.9	0.225	0.339	Nonparametric	0.377	Chebyshev
Fluorene	94	4	0.081	0.42	0.164	0.065	Nonparametric	0.194	Chebyshev
Indeno(1,2,3-cd)pyrene	94	5	0.13	0.56	0.167	0.075	Nonparametric	0.201	Chebyshev
Methylnaphthalene[2-]*	94	1	0.095	0.095	0.162	0.059	Nonparametric	0.188	Chebyshev
Methyl-2-pentanone[4-]*	4	1	0.0029	0.0029	0.0031	0.00017	Not applicable	Not applicable	Not applicable
Methylphenol[4-]*	95	1	0.11	0.11	0.188	0.053	Nonparametric	0.211	Chebyshev
Naphthalene	94	2	0.13	0.25	0.163	0.059	Nonparametric	0.189	Chebyshev
Phenanthrene	94	12	0.0158	2.9	0.221	0.341	Nonparametric	0.374	Chebyshev
Pyrene	94	17	0.011	1.8	0.200	0.217	Nonparametric	0.297	Chebyshev
Pyridine*	13	1	0.0781	0.0781	0.203	0.146	Nonparametric	0.379	Chebyshev
Radionuclides (pCi/g)									
Americium-241	117	7	0.031	0.84	0.009	0.164	Nonparametric	0.075	Chebyshev
Cesium-137	90	61	0.051	2.779	0.394	0.509	Nonparametric	0.628	Chebyshev
Plutonium-238	98	21	0.005	2.516	0.033	0.254	Nonparametric	0.145	Chebyshev
Plutonium-239	95	76	0.004	4.136	0.291	0.577	Nonparametric	0.549	Chebyshev

Table H-4.2-2 (continued)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Radium-223	53	1	3.82	3.82	0.097	0.665	Nonparametric	0.495	Chebyshev
Radon-219	40	4	0.762	3.85	0.198	0.719	Nonparametric	0.694	Chebyshev
Strontium-90	110	16	0.125	1.34	0.114	0.235	Nonparametric	0.212	Chebyshev
Thorium-227	52	3	0.503	4.41	-0.393	1.28	Nonparametric	0.379	Chebyshev
Tritium	108	98	0.022	8.11	0.640	1.16	Nonparametric	1.13	Chebyshev
Uranium-234	54	54	0.549	22.5	2.69	4.68	Nonparametric	5.47	Chebyshev
Uranium-235	83	44	0.025	1.45	0.169	0.246	Nonparametric	0.287	Chebyshev

*Maximum detected concentration used in the screening evaluations.

Table H-4.3-3
Representative Concentrations for Ecological Risk (0–5 ft depth)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Inorganic Chemicals (mg/kg)									
Aluminum	94	94	450	24100	9242	4775	Normal	10060	Student-t
Arsenic	94	94	1.4	5.2	2.76	0.846	LogN	2.93	H-UCL
Barium	94	94	13	199	93.1	38.1	Normal	99.7	Student-t
Beryllium	94	84	0.11	1.4	0.555	0.206	Nonparametric	0.648	Chebyshev
Cadmium	52	20	0.07	1.2	0.317	0.260	Nonparametric	0.474	Chebyshev
Chromium	94	94	1	77.3	11.4	11.6	Nonparametric	16.6	Chebyshev
Cobalt	94	87	0.439	8.1	3.50	1.52	Normal	3.76	Student-t
Copper	94	94	1.4	84.3	5.77	8.65	Nonparametric	9.65	Chebyshev
Iron	94	94	1200	16000	8778	3091	Normal	9308	Student-t
Lead	94	94	1.94	47.5	12.7	6.76	Nonparametric	15.8	Chebyshev
Mercury	95	50	0.0077	1.2	0.101	0.198	Nonparametric	0.228	Chebyshev
Nitrate	12	1	0.745	0.745	0.535	0.069	Nonparametric	0.622	Chebyshev
Perchlorate*	12	3	0.00058	0.000742	0.001	0.000	Nonparametric	0.001	Chebyshev
Selenium	94	4	0.67	1.5	0.417	0.211	Nonparametric	0.512	Chebyshev
Silver*	94	45	0.0578	0.59	0.405	0.413	Nonparametric	0.671	Chebyshev
Thallium	94	11	0.0966	1.1	0.333	0.220	Nonparametric	0.432	Chebyshev
Uranium	73	73	0.957	37.5	2.92	4.75	Nonparametric	5.34	Chebyshev
Vanadium	94	94	0.99	27	15.0	6.03	Normal	16.1	Student-t
Zinc	94	94	18.1	509	48.1	63.9	Nonparametric	76.8	Chebyshev
Organic Chemicals (mg/kg)									
Acenaphthene	93	4	0.11	0.45	0.167	0.065	Nonparametric	0.196	Chebyshev
Anthracene	93	5	0.077	0.88	0.174	0.098	Nonparametric	0.218	Chebyshev
Aroclor-1242*	40	1	0.0078	0.0078	0.008	0.004	Nonparametric	0.010	Chebyshev
Aroclor-1254*	40	3	0.006	0.0115	0.014	0.006	Nonparametric	0.018	Chebyshev

Table H-4.3-3 (continued)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Aroclor-1260*	40	2	0.0019	0.0058	0.014	0.007	Nonparametric	0.018	Chebyshev
Benzo(a)anthracene	93	6	0.0155	0.66	0.174	0.086	Nonparametric	0.213	Chebyshev
Benzo(a)pyrene	93	7	0.12	0.81	0.174	0.098	Nonparametric	0.218	Chebyshev
Benzo(b)fluoranthene	93	8	0.0237	0.61	0.171	0.087	Nonparametric	0.210	Chebyshev
Benzo(g,h,i)perylene	93	5	0.086	0.62	0.168	0.076	Nonparametric	0.203	Chebyshev
Benzo(k)fluoranthene	93	7	0.11	0.72	0.171	0.087	Nonparametric	0.210	Chebyshev
Benzoic acid	94	2	0.85	1.6	0.916	0.329	Nonparametric	1.06	Chebyshev
Butylbenzylphthalate	93	3	0.1	0.36	0.190	0.057	Nonparametric	0.215	Chebyshev
Chrysene	93	8	0.091	0.73	0.172	0.091	Nonparametric	0.214	Chebyshev
Dibenz(a,h)anthracene*	93	2	0.12	0.17	0.163	0.057	Nonparametric	0.189	Chebyshev
Dibenzofuran*	93	3	0.078	0.2	0.187	0.055	Nonparametric	0.212	Chebyshev
Dichlorobenzidine[3,3'-]	93	1	0.36	0.36	0.206	0.071	Nonparametric	0.238	Chebyshev
Diethyl phthalate	93	1	8.1	8.1	0.274	0.822	Nonparametric	0.646	Chebyshev
Fluoranthene	93	17	0.0118	2.9	0.227	0.340	Nonparametric	0.381	Chebyshev
Fluorene	93	4	0.081	0.42	0.166	0.063	Nonparametric	0.195	Chebyshev
Indeno(1,2,3-cd)pyrene	93	5	0.13	0.56	0.169	0.074	Nonparametric	0.202	Chebyshev
Methylnaphthalene[2-]*	93	1	0.095	0.095	0.163	0.057	Nonparametric	0.189	Chebyshev
Methylphenol[4-]*	94	1	0.11	0.11	0.188	0.053	Nonparametric	0.212	Chebyshev
Naphthalene	93	2	0.13	0.25	0.164	0.057	Nonparametric	0.190	Chebyshev
Phenanthrene	93	12	0.0158	2.9	0.223	0.343	Nonparametric	0.378	Chebyshev
Pyrene	93	17	0.011	1.8	0.202	0.217	Nonparametric	0.300	Chebyshev
Pyridine*	12	1	0.0781	0.0781	0.206	0.152	Nonparametric	0.397	Chebyshev
Radionuclides (pCi/g)									
Americium-241	107	7	0.031	0.84	0.009	0.171	Nonparametric	0.081	Chebyshev
Cesium-137	80	58	0.09	2.779	0.432	0.523	Nonparametric	0.687	Chebyshev
Plutonium-238	93	21	0.005	2.516	0.035	0.260	Nonparametric	0.153	Chebyshev

Table H-4.3-3 (continued)

Analyte	Number of Samples	Number of Detects	Minimum Detect	Maximum Detect	Overall Mean	Standard Deviation	Distribution	UCL	UCL Method
Plutonium-239	90	71	0.004	4.136	0.301	0.591	Nonparametric	0.573	Chebyshev
Radon-219	31	1	0.762	0.762	0.038	0.411	Normal	0.163	Student-t
Strontium-90	105	16	0.125	1.34	0.120	0.237	Nonparametric	0.221	Chebyshev
Thorium-228	16	12	1.4	2.11	2.37	1.34	Nonparametric	3.83	Chebyshev
Tritium	99	89	0.022	8.11	0.658	1.21	Nonparametric	1.19	Chebyshev
Uranium-234	44	44	0.581	20.3	2.42	4.12	Nonparametric	5.13	Chebyshev
Uranium-235	73	36	0.025	1.45	0.163	0.228	Nonparametric	0.280	Chebyshev
Uranium-238	44	44	0.579	1.88	0.996	0.258	Nonparametric	1.17	Chebyshev

*Maximum detected concentration used in the industrial screening evaluations.

Table H-5.1-1
Risk Screening Calculations for Carcinogens for the Industrial Scenario

Analyte	Representative Concentrations[a] (mg/kg)	Industrial SSL[b] (mg/kg)	Cancer Risk
Arsenic	2.96	17.7	1.67E-06
Aroclor-1242	0.0078[c]	8.26	9.40E-09
Aroclor-1254	0.0115[c]	8.26	1.40E-08
Aroclor-1260	0.0058[c]	8.26	7.00E-09
Benzo(a)anthracene	0.221	23.4	9.40E-08
Benzo(a)pyrene	0.227	2.34	9.70E-07
Benzo(b)fluoranthene	0.218	23.4	9.30E-08
Benzo(k)fluoranthene	0.218	234	9.30E-09
Chromium	17.8	5000[d]	3.56E-08
Chrysene	0.221	2340[e]	9.50E-10
Dibenz(a,h)anthracene	0.17[c]	2.34	7.3E-07
Dichlorobenzidine[3,3'-]	0.224	42.6	5.30E-08
Indeno(1,2,3-cd)pyrene	0.209	23.4	8.90E-08
		Total Excess Cancer Risk	**4E-06**

[a] Concentration is the 95% UCL, unless otherwise indicated.

[b] SSLs from NMED 2005, 90802, unless otherwise indicated.

[c] Maximum detected concentration used.

[d] SSL from EPA Region 6 (EPA 2005, 91002).

[e] Value from Table H-4.1-6.

Table H-5.1-2
Comparison to Screening Levels for Noncarcinogens for the Industrial Scenario

Analyte	Representative Concentrations[a] (mg/kg)	Industrial SSL[b] (mg/kg)	HQ
Cadmium	0.635	564	0.0011
Cobalt	4.00	20500	0.00020
Copper	10.4	45400	0.00023
Lead	16.7	800	0.021
Mercury	0.249	340[c]	0.000732
Perchlorate	0.00058[d]	790[c]	0.00000059
Pyridine	0.0781[d]	680[c]	0.00011
Selenium	0.493	5680	0.000087
Silver	0.59[d]	5680	0.0001
Thallium	0.369	74.9	0.0049
Uranium	5.34	200[e]	0.026
Zinc	82.1	100000[f]	0.00082
Acenaphthene	0.201	68100[g]	0.0000030
Anthracene	0.227	100000[f]	0.0000023
Aroclor-1254	0.0115[d]	12[c]	0.000958
Benzo(g,h,i)perylene[h]	0.209	34100[g]	0.0000061
Benzoic acid	0.97	100000[f]	0.0000097
Butyl benzyl phthalate	0.22	100000[f]	0.0000022
Dibenzofuran	0.2[d]	4540[g]	0.000044
Diethyl phthalate	0.702	100000[f]	0.000007
Fluoranthene	0.410	24400	0.000017
Fluorene	0.200	45400[g]	0.0000044
Methylnaphthalene[2-][i]	0.095[d]	92.5	0.0010
Methylphenol[4-]	0.11[d]	3400[c]	0.000032
Naphthalene	0.194	92.5	0.0021
Phenanthrene	0.407	20500	0.000020
Pyrene	0.319	34100[g]	0.0000094
		HI	**0.06**

[a] Concentration is the 95% UCL, unless otherwise indicated.

[b] SSLs from NMED 2005, 90802, unless otherwise indicated.

[c] SSL from EPA Region 6 (EPA 2005, 91002).

[d] Maximum detected concentration used.

[e] SSL from EPA Region 9 (epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf.)

[f] Maximum allowable concentration used as SSL per NMED guidance (NMED 2005, 90802).

[g] Value from Table H-4.1-6.

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

[i] Naphthalene used as surrogate based on structural similarity.

Table H-5.1-3
Comparison to Screening Levels for Radionuclides for the Industrial Scenario

Analyte	Representative Concentration[a] (pCi/g)	Industrial SAL[b] (pCi/g)	Dose (mrem/yr)
Americium-241	0.094	180	0.0078
Cesium-137	0.808	23	0.525
Plutonium-238	0.173	240	0.0108
Plutonium-239	0.645	210	0.0465
Strontium-90	0.240	1900	0.00195
Tritium	1.24	440000	0.000045
Uranium-234	4.96	1500	0.0495
Uranium-235	0.251	87	0.0435
		Total Dose	**0.7**

[a] Concentration is the 95% UCL.

[b] SALs from LANL 2005, 88493.

Table H-5.1-4
Risk Screening Calculations for Carcinogens for the Residential Scenario

Analyte	Representative Concentration[a] (mg/kg)	Residential SSL[b] (mg/kg)	Cancer Risk
Aroclor-1242	0.0078[c]	2.2[d]	3.54E-08
Aroclor-1254	0.0115[c]	2.2[d]	5.22E-08
Aroclor-1260	0.0058[c]	2.2[d]	2.64E-08
Arsenic	2.91	3.9	7.50E-06
Benzo(a)anthracene	0.212	6.21	3.40E-07
Benzo(a)pyrene	0.216	0.621	3.50E-06
Benzo(b)fluoranthene	0.209	6.21	3.30E-07
Benzo(k)fluoranthene	0.209	62.1	3.30E-08
Chromium	16.5	2100[d]	7.86E-08
Chrysene	0.212	620	3.00E-09
Dibenz(a,h)anthracene	0.17[c]	0.621	2.70E-06
Dichlorobenzidine[3,3'-]	0.237	10.8	2.20E-07
Indeno(1,2,3-cd)pyrene	0.201	6.21	3.20E-07
		Total Excess Cancer Risk	**2E-05**

[a] Concentration is the 95% UCL, unless otherwise indicated.

[b] SSLs from NMED 2005, 90802, unless otherwise indicated.

[c] Maximum detected concentration used.

[d] SSL from EPA Region 6 (EPA 2005, 91002).

Table H-5.1-5
Comparison to Screening Levels for Noncarcinogens for the Residential Scenario

Analyte	Representative Concentration[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Aluminum	9984	77800	0.13
Antimony	1.05	31.3	0.033
Barium	98.9	5450	0.018
Cadmium	0.469	39	0.012
Cobalt	3.73	1520	0.0024
Copper	9.57	3130	0.0031
Lead	15.7	400	0.039
Mercury	0.226	23[c]	0.0098
Nitrate	0.614	100000[d]	0.0000061
Perchlorate	0.000742[e]	55[c]	0.000013
Selenium	0.516	391	0.0013
Silver	0.666	391	0.0017
Thallium	0.429	5.16	0.083
Uranium	5.34	16[f]	0.33
Zinc	76.2	23500	0.0032
Acetone[g]	0.0057[e]	12600	0.00000045
Acenaphthene	0.195	4690[h]	0.000042
Anthracene	0.217	2350[h]	0.000009
Aroclor-1242	0.0078[e]	1.12	0.0070
Aroclor-1254	0.0115[e]	1.12	0.010
Aroclor-1260	0.0058[e]	1.12	0.0052
Benzo(g,h,i)perylene[i]	0.201	2350	0.000086
Benzoic acid	1.06	100000[d]	0.000011
Butylbenzylphthalate	0.215	12000[c]	0.000018
Dibenzofuran	0.2[e]	313	0.00064
Diethyl phthalate	0.640	48900[c]	0.000013
Fluoranthene	0.377	2290	0.00017
Fluorene	0.194	3130[h]	0.000062
Methyl-2-pentanone[4-][g]	0.0029[e]	4360	0.000001
Methylnaphthalene[2-][j]	0.095[e]	25.2	0.0038
Methylphenol[4-]	0.11[e]	310[c]	0.00035
Naphthalene	0.189	25.2	0.0075

Table H-5.1-5 (continued)

Analyte	Representative Concentration[a] (mg/kg)	Residential SSL[b] (mg/kg)	HQ
Phenanthrene	0.374	1830	0.00021
Pyrene	0.297	2350[h]	0.00013
Pyridine	0.0781[e]	61[c]	0.0013
		HI	**0.70**

[a] Concentration is the 95% UCL, unless otherwise indicated.
[b] SSLs from NMED 2005, 90802, unless otherwise indicated.
[c] SSL from EPA Region 6 (EPA 2005, 91002).
[d] Maximum allowable concentration used as SSL per NMED guidance (NMED 2005, 90802).
[e] Maximum detected concentration used.
[f] SSL from EPA Region 9 (epa.gov/region9/waste/sfund/prg/files/04prgtable.pdf).
[g] Maximum detected concentrations used because too few samples available to calculate 95% UCL.
[h] Value from Table H-4.1-6.
[i] Pyrene used as surrogate based on structural similarity.
[j] Naphthalene used as a surrogate based on structural similarity.

Table H-5.1-6
Comparison to Screening Levels for Radionuclides for the Residential Scenario

Analyte	Representative Concentration[a] (pCi/g)	Residential SAL[b] (pCi/g)	Dose (mrem/yr)
Americium-241	0.075	30	0.0375
Cesium-137	0.628	5.6	1.65
Plutonium-238	0.145	37	0.0585
Plutonium-239	0.549	33	0.255
Strontium-90	0.212	5.7	0.555
Tritium	1.13	750	0.0225
Uranium-234	5.47	170	0.48
Uranium-235	0.287	17	0.255
		Total Dose	**3.3**

[a] Concentration is the 95% UCL.
[b] SALs from LANL 2005, 88493.

Table H-5.1-7
Risk Screening Calculations for Carcinogens for the Construction Worker Scenario

Analyte	Representative Concentration[a] (mg/kg)	Construction Worker SSL[b] (mg/kg)	Cancer Risk
Arsenic	2.91	85	3.4E-07
Benzo(a)anthracene	0.212	212	1.0E-08
Benzo(a)pyrene	0.216	21	1.0E-07
Benzo(b)fluoranthene	0.209	212	9.6E-09
Benzo(k)fluoranthene	0.209	2120	9.6E-10
Chromium[c]	16.5	182.7	9.0E-07
Chrysene	0.212	21400	1.0E-10
Dibenz(a,h)anthracene	0.17[d]	21	8.0E-08
Dichlorobenzidine[3,3'-]	0.237	363	6.5E-09
Indeno(1,2,3-cd)pyrene	0.201	212	9.5E-09
		Total Excess Cancer Risk	**1.50E-06**

[a] Concentration is the 95% UCL, unless otherwise indicated.

[b] SSLs from NMED 2005, 90802.

[c] Chromium(VI) NMED carcinogenic endpoint for construction worker multiplied by 7 used (to match EPA 1:6 ratio for chromium VI:III).

[d] Maximum detected concentration used because too few samples available to calculate 95% UCL.

Table H-5.1-8
Comparison to Screening Levels for Noncarcinogens for the Construction Worker Scenario

Analyte	Representative Concentration[a] (mg/kg)	Construction Worker SSL[b] (mg/kg)	HQ
Aluminum	9984	14400	0.693
Antimony	1.05	124	0.0085
Barium	98.9	60200	0.0016
Cadmium	0.469	154	0.003
Cobalt	3.73	61	0.061
Copper	9.57	12400	0.00077
Lead	15.7	800	0.019
Mercury	0.226	93	0.0025
Nitrate	0.614	100000[c]	0.000006
Perchlorate	0.000742[d]	31[e]	0.000024
Selenium	0.516	1550	0.00033
Silver	0.666	1550	0.00043
Thallium	0.429	20.4	0.021
Uranium	5.34	62[e]	0.086
Zinc	76.2	92900	0.00082
Acetone	0.0057[d]	98500	0.000000058
Acenaphthene	0.195	14100	0.000014
Anthracene	0.217	86000	0.0000025
Aroclor-1242	0.0078[d]	4.28	0.00182
Aroclor-1254	0.0115[d]	4.28	0.0027
Aroclor-1260	0.0058[d]	4.28	0.0014
Benzo(g,h,i)perylene[f]	0.201	9010	0.000022
Benzoic acid	1.06	100000[c]	0.000011
Butylbenzylphthalate	0.215	4660[e]	0.000046
Dibenzofuran	0.2[d]	552	0.00036
Diethyl phthalate	0.640	100000[c]	0.0000064
Fluoranthene	0.377	8730	0.000043
Fluorene	0.194	10200	0.000019
Methyl-2-pentanone[4-]	0.0029[d]	7010	0.00000041
Methylnaphthalene[2-][g]	0.095[d]	262	0.00036
Methylphenol[4-]	0.11[d]	1170[e]	0.000094
Naphthalene	0.189	262	0.00072
Phenanthrene	0.374	6990	0.000054

Table H-5.1-8 (continued)

Analyte	Representative Concentration[a] (mg/kg)	Construction Worker SSL[b] (mg/kg)	HQ
Pyrene	0.297	9010	0.000033
Pyridine	0.0781[d]	233[e]	0.00033
		HI	**0.91**

[a] Concentration is the 95% UCL, unless otherwise indicated.

[b] SSLs from NMED 2005, 90802.

[c] Maximum allowable concentration used as SSL per NMED guidance (NMED 2005, 90802).

[d] Maximum detected concentration used because too few samples available to calculate 95% UCL.

[e] SSL calculated (see Section H-4.1).

[f] Pyrene used as a surrogate based on structural similarity.

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

Table H-5.1-9
Comparison to Screening Levels for Radionuclides for the Construction Worker Scenario

Analyte	Representative Concentration[a] (pCi/g)	Construction Worker SAL[b] (pCi/g)	Dose (mrem/yr)
Americium-241	0.075	34	0.033
Cesium-137	0.628	18	0.52
Plutonium-238	0.145	40	0.054
Plutonium-239	0.549	36	0.23
Strontium-90	0.212	800	0.0040
Tritium	1.13	320000	0.000053
Uranium-234	5.47	220	0.37
Uranium-235	0.287	43	0.10
		Total Dose	**1.3**

[a] Concentration is the 95% UCL.

[b] SALs from LANL 2005, 88493.

Table H-5.2-1
Ecological Screening Levels for Terrestrial Receptors and COPCs at MDA U

COPC	Plant	Earthworm	Deer Mouse	Montane Shrew	Cottontail Rabbit	Robin Herbivore	Robin Insectivore	Robin Omnivore	Red Fox	Kestrel Intermediate Carnivore	Kestrel Top Carnivore
Arsenic	18	6.8	32	15	160	42	18	26	810	160	1100
Barium	110	330	1800	1300	3300	820	1000	930	41000	11000	37000
Beryllium	2.5	40	56	18	170	na*	na	na	420	na	na
Cadmium	32	140	0.51	0.27	9.9	4.4	0.29	0.54	510	2	580
Chromium	2.4	2.3	1900	750	13000	1900	830	1100	30000	7700	37000
Cobalt	13	na	400	160	1800	170	96	120	5400	930	3500
Copper	10	13	59	34	250	28	11	16	3500	88	1200
Lead	120	1700	120	72	370	21	14	16	3700	120	810
Mercury	34	0.05	3	1.7	22	0.013	0.022	0.013	46	0.08	0.07
Selenium	0.1	7.7	1.1	0.92	3	1.5	1.1	1.3	110	8.5	140
Silver	0.05	na	77	44	490	30	7.2	11	13000	52	2200
Thallium	0.1	na	0.068	0.032	2.8	9.2	0.9	1.6	2.8	6.6	75
Uranium	25	na	750	220	2000	1900	1600	1700	4800	21000	39000
Zinc	10	190	290	160	3000	200	27	48	10000	180	1400
Acenaphthene	0.25	na	160	120	490	na	na	na	6200	na	na
Acetone	na	na	1.2	15	1.4	7.5	170	14	2900	1200	30000
Anthracene	na	na	310	210	1100	na	na	na	5800	na	na
Aroclor-1242	na	na	0.76	0.38	30	1	0.041	0.079	16	0.26	1.4
Aroclor-1254	160	na	0.88	0.44	52	1.3	0.041	0.08	0.15	0.17	0.22
Aroclor-1260	na	na	20	10	3000	46	0.88	1.7	0.14	3.7	4.6
Benzo(a)anthracene	18	na	3.4	3	6.2	na	na	na	45	na	na
Benzo(a)pyrene	na	na	15	9.6	50	na	na	na	68	na	na
Benzo(b)fluoranthene	18	na	52	38	130	na	na	na	250	na	na
Benzo(k)fluoranthene	na	na	100	62	350	na	na	na	400	na	na

Table H-5.2-1 (continued)

COPC	Plant	Earthworm	Deer Mouse	Montane Shrew	Cottontail Rabbit	Robin Herbivore	Robin Insectivore	Robin Omnivore	Red Fox	Kestrel Intermediate Carnivore	Kestrel Top Carnivore
Benzoic acid	na	na	1.3	1	4.2	na	na	na	350	na	na
Butylbenzylphthalate	na	na	160	90	2300	na	na	na	1900	na	na
Chrysene	na	na	3.1	2.4	6.5	na	na	na	46	na	na
Dibenz(a,h)anthracene	na	na	22	12	95	na	na	na	54	na	na
Dibenzofuran	6.1	na	na	na	na	na	na	na	NA	na	na
Fluoranthene	na	38	38	22	260	na	na	na	360	na	na
Fluorene	na	4.1	340	250	1100	na	na	na	9300	na	na
Indeno(1,2,3-cd)pyrene	na	na	110	62	590	na	na	na	270	na	na
Methylnaphthalene[2-]	na	na	3.8	2.5	16	na	na	na	130	NA	NA
Naphthalene	1	na	0.34	0.96	0.45	37	170	61	42	1100	6300
Phenanthrene	na	34	15	10	59	na	na	na	290	na	na
Pyrene	na	18	32	22	110	na	na	na	360	na	na
Americium-241	21000	44	32000	31000	32000	13000	4000	4000	26000	35000	62000
Cesium-137	2300	1700	2400	2400	2300	4200	3800	3700	680	3700	2900
Plutonium-238	1E+05	44	110000	92000	1E+05	8300	2000	2100	30000	32000	130000
Plutonium-239	2E+05	47	150000	1E+05	2E+05	8600	2100	2100	33000	34000	160000
Strontium-90	1300	1200	1700	1700	1300	600	1500	930	560	2400	1900
Thorium-228	810	43	830	830	830	1500	1300	1300	820	1600	1600
Tritium	36000	48000	330000	3E+05	2E+05	300000	600000	440000	190000	630000	580000
Uranium-234	14000	51	91000	94000	96000	48000	14000	14000	45000	120000	190000
Uranium-235	4000	55	5100	5100	5100	9000	6400	6400	4800	10000	10000
Uranium-238	1800	55	2100	2100	2100	3900	3400	3400	2000	4100	4200

Notes: All values are in units of mg/kg. ESLs from ECORISK Database, Version 2.2 (LANL 2005, 90032).
*na = Not available.

Table H-5.2-2
Comparison of Inorganic COPC Concentrations with the Minimum ESLs

COPC	95% UCL (mg/kg)	Minimum ESL* (mg/kg)	Receptor	HQ
Arsenic	2.9	6.8	Earthworm	**0.43**
Barium	99.7	110	Plant	**0.91**
Beryllium	0.7	2.5	Plant	0.26
Cadmium	0.5	0.27	Montane shrew	**1.74**
Chromium	16.6	2.3	Earthworm	**7.23**
Cobalt	3.8	13	Plant	0.29
Copper	9.7	10	Plant	**0.97**
Lead	15.8	14	Robin–insectivore	**1.13**
Mercury	0.2	0.013	Robin–insectivore	**17.7**
Selenium	0.5	0.1	Plant	**5.1**
Silver	0.7	0.05	Plant	**13.4**
Thallium	0.4	0.032	Montane shrew	**13.4**
Uranium	5.3	25	Plant	0.21
Zinc	76.8	10	Plant	**7.68**

Note: Bold indicates HQ exceeds 0.3, thus qualifying as a COPEC.
*ESLs from ECORISK Database, Version 2.2 (LANL 2005, 90032).

Table H-5.2-3
Comparison of Organic COPC Concentrations with the Minimum ESLs

COPC	95% UCL (mg/kg)	Minimum ESL* (mg/kg)	Receptor	HQ
Acenaphthene	0.196	0.25	Plant	**0.78**
Acetone	0.0057	1.2	Deer mouse	<0.01
Anthracene	0.218	210	Montane shrew	<0.01
Aroclor-1242	0.01	0.041	Robin–insectivore	0.24
Aroclor-1254	0.018	0.041	Robin–insectivore	**0.44**
Aroclor-1260	0.018	0.14	Robin–insectivore	0.13
Benzo(a)anthracene	0.213	3	Montane shrew	0.07
Benzo(a)pyrene	0.218	9.6	Montane shrew	0.02
Benzo(b)fluoranthene	0.21	18	Plant	0.01
Benzo(g,h,i)perylene	0.202	24	Montane shrew	0.01
Benzo(k)fluoranthene	0.21	62	Montane shrew	<0.01
Benzoic acid	1.06	1	Montane shrew	**1.06**
Butylbenzylphthalate	0.215	90	Montane shrew	<0.01
Chrysene	0.213	2.4	Montane shrew	0.09
Dibenz(a,h)anthracene	0.189	12	Montane shrew	0.02
Dibenzofuran	0.212	6.1	Plant	0.03
Fluoranthene	0.38	22	Montane shrew	0.02
Fluorene	0.195	4.1	Earthworm	0.05
Indeno(1,2,3-cd)pyrene	0.202	62	Montane shrew	<0.01
Methylnaphthalene[2-]	0.189	2.5	Montane shrew	0.08
Naphthalene	0.19	0.34	Deer mouse	**0.56**
Phenanthrene	0.377817	10	Montane shrew	0.04
Pyrene	0.299629	18	Earthworm	0.02

Note: Bold indicates HQ exceeds 0.3, thus qualifying as a COPEC.
*ESLs from ECORISK Database, Version 2.2 (LANL 2005, 90032).

Table H-5.2-4
Comparison of Radionuclide COPC Concentrations with the Minimum ESLs

COPC	95% UCL[a] (pCi/g)	Minimum ESL[b] (pCi/g)	Receptor	HQ
Americium-241	0.081	44	Earthworm	<0.01
Cesium-137	0.687	680	Red fox	<0.01
Plutonium-238	0.153	44	Earthworm	<0.01
Plutonium-239	0.573	47	Earthworm	0.01
Strontium-90	0.22	560	Red fox	<0.01
Thorium-228	3.83	43	Earthworm	0.09
Tritium	1.19	36000	Plant	<0.01
Uranium-234	5.13[c]	51	Earthworm	0.10
Uranium-235	1.45	55	Earthworm	0.03
Uranium-238	1.17[c]	55	Earthworm	0.02

[a] 95% UCL used as representative concentration, unless otherwise noted.

[b] ESLs from ECORISK Database, Version 2.2 (LANL 2005, 90032).

[c] Maximum detected concentration used as representative concentration.

Table H-5.2-5
HI Analysis for Ecological Receptors at MDA U

COPEC	95% UCL (mg/kg)	Plant	Earthworm	Deer Mouse	Montane Shrew	Cottontail Rabbit	Robin Herbivore	Robin Insectivore	Robin Omnivore	Red Fox	Kestrel Intermediate Carnivore	Kestrel Top Carnivore
Arsenic	2.9	0.2	0.4	0.1	0.2	0.02	0.1	0.2	0.1	0.004	0.02	0.003
Barium	99.7	0.9	0.3	0.1	0.1	0.03	0.1	0.1	0.1	0.002	0.01	0.003
Cadmium	0.5	0.01	0.003	0.9	1.7	0.05	0.1	1.6	0.9	0.001	0.2	0.001
Chromium	16.6	6.9	7.2	0.01	0.02	0.001	0.01	0.02	0.02	0.001	0.002	0.0004
Cobalt	3.8	0.3	na*	0.01	0.02	0.002	0.02	0.04	0.03	0.001	0.004	0.001
Copper	9.7	1.0	0.7	0.2	0.3	0.04	0.3	0.9	0.6	0.003	0.1	0.01
Lead	15.8	0.1	0.01	0.1	0.2	0.04	0.8	1.1	1.0	0.004	0.1	0.02
Mercury	0.2	0.01	4.6	0.1	0.1	0.001	17.7	10.5	17.7	0.01	2.9	3.3
Selenium	0.5	5.1	0.1	0.5	0.6	0.2	0.3	0.5	0.4	0.005	0.1	0.004
Silver	0.7	13.4	na	0.01	0.02	0.001	0.02	0.1	0.1	0.0001	0.01	0.0003
Thallium	0.4	4.3	na	6.3	13.4	0.2	0.05	0.5	0.3	0.2	0.1	0.01
Zinc	76.8	7.7	0.4	0.3	0.5	0.03	0.4	2.8	1.6	0.01	0.4	0.1
Acenaphthene	0.196	1.8	na	0.003	0.004	0.001	na	na	na	0.0001	na	na
Aroclor-1254	0.018	0.0001	na	0.02	0.04	0.003	0.01	0.4	0.2	0.1	0.1	0.1
Benzoic acid	1.06	na	na	0.8	1.1	0.3	na	na	na	0.003	na	na
Naphthalene	0.19	0.2	na	0.6	0.2	0.4	0.01	0.001	0.003	0.005	0.0002	0.00003
	HI	**41.9**	**13.8**	**9.9**	**18.5**	**1.2**	**19.9**	**18.7**	**23.0**	0.3	**4.1**	**3.5**

Note: Bold indicates HI exceeded 1.0.
*na = Not available.

Table H-5.2-6
Comparison of VOC Pore-Gas Concentrations with Inhalation ESLs

Analyte	Representative Concentration (µg/m^3)	Inhalation ESL (µg/m^3)	HQ
Acetone	120	530000	2.3E-04
Benzene	59	25000	2.4E-03
Chloroform	15.6	20000	7.8E-04
Chloromethane	13.8	21000	6.6E-04
Dichlorodifluoromethane	2.97	2600000	1.1E-06
Tetrachloroethene	8.8	73000	1.2E-04
Toluene	603	60000	1.0E-02
Trichloroethane[1,1,1-]	98.2	240000	4.1E-04
Trichloroethene	50	19000	2.6E-03
Xylene[1,2-]	12	87000	1.4E-04
Xylene[1,3-]+Xylene[1,4-]	34.7	87000	4.0E-04
		HI	**0.02**

Table H-5.2-7
Comparison of Representative Concentrations to Background Concentrations

COPECs	95% UCL (mg/kg)	Soil Background Concentrations (mg/kg)	Sediment Background Concentrations (mg/kg)	Tuff Background Concentrations (mg/kg)
Arsenic	2.9	0.3–9.3	0.25–3.6	0.25–5
Barium	99.7	21–410	8–127	1.4–51.6
Cadmium	0.5	0.2–2.6	0.05–0.18	0.1–1.5
Chromium	16.6	1.9–36.5	0.8–9.2	0.25–13
Cobalt	3.8	1.0–9.5	0.6–4.2	3.14*
Copper	9.7	0.25–16	0.77–12	0.25–6.2
Lead	15.8	2–28	2–25.6	1.6–15.5
Mercury	0.2	0.05–0.1	0.1*	0.1*
Selenium	0.5	0.1–1.7	0.3*	0.3*
Silver	0.7	1.0*	1.0*	0.2–1.9
Thallium	0.4	0.063–1.0	0.73	0.05–1.7
Zinc	76.8	14–75.5	9–56.2	5.5–65.6

Note: Background concentrations from LANL 1998, 59730.
*No background data set; value is the BV.

Table H-5.2-8
PAUFs for Terrestrial Receptors Potentially Associated with MDA U

Receptors	Home Range[a] (ha)	Population Area (ha)	PAUF[b] (Unitless)
Deer mouse	0.077	3.08	0.130
Montane shrew	0.39	15.6	0.026
Cottontail rabbit	3.1	124	0.003
Robin	0.42	16.8	0.024
Kestrel	106	4240	0.000094
Mexican spotted owl	366	na[c]	0.001[d]

[a] Home ranges from EPA 1993, 59384.

[b] PAUF calculated as the MDA U area (0.4 ha) divided by the population area for each receptor.

[c] na = Not available.

[d] Value for the Mexican spotted owl is the AUF based on individual HR.

Table H-5.2-9
Adjusted HI Analysis for Ecological Receptors at MDA U

Receptors	95% UCL (mg/kg)	Plant	Earthworm	Deer Mouse	Montane Shrew	Cottontail Rabbit	Robin Herbivore	Robin Insectivore	Robin Omnivore	Kestrel	Kestrel (top carnivore)
Acenaphthene	0.196	0.78	na[a]	0.003	0.004	0.001	na	na	na	na	na
Aroclor-1254	0.018	0.0001	na	0.02	0.04	0.003	0.01	0.4	0.2	0.1	0.1
Benzoic acid	1.06	na	na	0.8	1.1	0.3	na	na	na	na	na
Naphthalene	0.19	0.2	na	0.6	0.2	0.4	0.01	0.001	0.003	0.0002	0.00003
	HI	**1.0**	na	**1.4**	**1.3**	**0.7**	**0.02**	**0.4**	**0.2**	**0.1**	**0.1**
	PAUF-adjusted HI	n/a[b]	n/a	**0.2**	**0.03**	**0.002**	**0.0005**	**0.01**	**0.005**	**0.000009**	**0.000009**

Note: Bold values show HI of greater than one.

[a] na = Not available.

[b] n/a = Not applicable.

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Attachment H-1

Ecological Scoping Checklist

H1-1.0 PART A—SCOPING MEETING DOCUMENTATION

Site ID	
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected <u>mechanisms</u> of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential <u>areas</u> of release. Reference locations on a map as appropriate.	The DP East area (TA-21) began operation in 1945 and associated facilities were used to process polonium and actinium and to produce weapon components. MDA U received liquid effluent from the Tritium Systems Test Assembly facility as well as effluent from earlier operations. Specifically, process waste was discharged to MDA U (i.e., the Consolidated Unit 21-017(a)-99), from buildings 21-152 and 21-370. Liquid effluents were channeled through a drain line and distribution box (SWMU 21-017(c); removed in 1985) to absorption beds to the west (SWMU 21-017(a)) and east (SWMU 21-017(b)). MDA U absorption beds consisted of excavated trenches filled with cobbles, gravel, and fine sand. In addition, oil from precipitrons (air filters used to remove smoke, soot, and other solids from ventilating air) was disposed of at MDA U.
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** n/a **Subsurface –** Yes **Groundwater –** n/a **Other, explain –** none
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water** – n/a **Bare Ground/Unvegetated** – X **Spruce/fir/aspen/mixed conifer** – n/a **Ponderosa pine –** n/a **Piñon juniper/juniper savannah** – n/a **Grassland/shrubland** – X **Developed** – X **Burned –** n/a
Is T&E Habitat Present? **If applicable, list species known or suspected of using the site for breeding or foraging.**	SWMU location information maintained by the Facility for Information Management and Display was intersected with T&E species habitat using GIS databases maintained by the Ecology Group, ESH-20. The SWMU 21-017 (a, b, c) are in the vicinity of potential T&E species habitat. SWMU 21-017 (a, b, c) abuts potential Mexican spotted owl nesting habitat and is over 6 mi from potential bald eagle habitat. The Mexican spotted owl can be conservatively assumed to forage at a high frequency at this site. The bald eagle can be conservatively assumed to forage at a low frequency at this site.
Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. **(Use this information to evaluate the need to aggregate sites for screening.)**	SWMU 21-022(f) is a sump (TA-21-173) located off the NE corner of TA-21-152. A 6 in. drain line (since removed) led from the sump to the distribution box [SWMU 21-017(c)] in MDA U to the NE. Bordering the site to the west, SWMU 21-024(n) is an active drainline that exits Building 21-155 and discharges onto a gravel road adjacent to MDA U. The SWMU 21-024(n) effluent flows north to the ditch paralleling the north perimeter road. From there, it flows east to a culvert that passes under the north perimeter road and into DP Canyon.
Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the total score and the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	MDA U generally slopes to the north. The NE and NW corners steepen to 15-20% to the north towards DP Canyon. The middle of the site has <10% slope to the north. The three SWMUs comprising MDA U, SWMUs 21-017(a), (b), and (c), were given a surface water erosion score of 8.8 in 1999, indicating a low erosion potential, and the surface water runoff and run-on subscores for all three SWMUs are zero.

H1-2.0 PART B—SITE VISIT DOCUMENTATION

Site ID	MDA U (Consolidated Unit 21-017(a)-99 = SWMUs 21-017 a, b and c)
Date of Site Visit	14 October 2005
Site Visit Conducted by	Jim Markwiese and Kirby Olson, Neptune and Company, Inc.

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = high (ca. 80% covered) **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc., cover (high, medium, low, none)** = none
Field notes on the GIS vegetation class to assist in verifying the Arcview information	MDA U is a relatively flat area and is densely vegetated with grasses and forbs commonly found in disturbed soils. Chamisa (*Chrysothamnus nauseosus*) and wormwood (*Artemesia vulgaris*) are abundant site-wide (Figure H1-1). The outlines of the absorption beds are no longer visible at the surface because fill had been placed at the site (in 1985 and again in 1987) and the vegetation is dense around the areas where the beds were located. Bare patches of ground characterized the center of the site, probably the result of heavy equipment damage from the recent sampling activities (Figure H1-2).
Are ecological receptors present at the site? **(yes/no/uncertain)** **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	Yes. Scoping activities revealed invertebrates and abundant plant life. Examples of subsurface biotic activity (mammalian burrow entrances and burrow spoils and ant mounds) were evident. Specifically, burrow spoils were observed at one location (north-central) on-site (Figure H1-3) and an active *Pogonomyrmex* ant mound was observed in the northeast portion of the site. No aquatic community exists on-site.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Based on the surface water erosion assessment (SOP 2.01), there is low potential for surface water transport. However, there may be evidence of historical run-off discharging from the site. Movement of COPECs outside the fenced area has occurred historically as indicated by inorganic chemicals detected above background levels in samples collected to the north and downslope of the fenced area (LANL 2004, 87454).
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	Biotic transport of buried waste to the surface appears to be a minor transport pathway because signs of fossorial activity were evident (one example of a burrow spoil and ant mound observed). While air may be a potential transport mechanism for volatile chemicals emanating from the subsurface absorption beds, inhalation risks to organisms inhabiting the subsurface should be minimal, given the low concentrations of VOCs and limited burrowing activity. Considering surface water runoff, several best management practices contribute to the low transport potential for this pathway. For example, site-stabilization activities completed include a run-on channel has been cut above the site directing run-on to the NE around the MDA towards DP Canyon; within the MDA U fence, topsoil was added and the area was reseeded. Hay bales are also located in the northwest corner of the site where the site sloped most steeply towards DP Canyon. As noted above, there is evidence of historical surface water runoff.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	At TA-21, natural surface soil cover had been disturbed as a result of Laboratory operations, such as waste disposal, building construction, and demolition. The present-day mesa surface in the area of MDA U is consists of fill and native soil. Disturbance from the recent (2005) borehole sampling effort is apparent (Figure H1-2). This impact aside, the floral community has re-established from earlier disturbances.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	There are no obvious signs of contaminants having overt effects. On a qualitative basis, the vegetation appears to be abundant and healthy (Figure H1-1). Evidence of an active ant mound was observed onsite.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport. Not applicable.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Further sampling is not warranted.
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should be aggregated to characterize potential ecological risk.)**	Yes.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.
MDA U is inactive, and no operations are currently being conducted at the site. It is surrounded by a chainlink fence and posted as an underground radioactive materials site.
MDA U is covered with patches of grass and bare ground in the center of the sites and abundant vegetation (grass/shrubs) elsewhere throughout the site. Two small trees are located on-site: one small ponderosa pine and a one-seed juniper were observed. Grasses and forbs, primarily *Chamisa* and *Artemesia* are present and particularly abundant along the site's northern and southern borders, and represent most ground cover. Signs of fossorial activity were noted on-site.

H1-3.0 PART C—ECOLOGICAL PATHWAYS CONCEPTUAL EXPOSURE MODEL

Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model

<u>Question A:</u>

Could soil contaminants reach receptors through vapors?

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >10^{-5} atm-m^3/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Several VOCs, including acetone, benzene, chloroform, chloromethane, dichlorodifluoromethane, tetrachloroethene, toluene, trichloroethane[1,1,1-], trichloroethene, and xylenes, as well as tritium were detected at low or trace levels in pore-gas samples at MDA U.

<u>Question B:</u>

Could the soil contaminants reach receptors through fugitive dust carried in air?

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Inorganic chemicals are not generally elevated above background levels. In addition, the potential for dust entrainment on the mesa top is negligible due to dense coverage of rooted vegetation. Bare patches of ground at the center of the site are probably the result of recent sampling activities and are expected to be filled in by vegetative growth pending no further disturbance.

<u>**Question C:**</u>

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No streams occur on-site and storm water and snowmelt generally run off the mesa as sheet flow or in small drainages off the mesa sides. Because of the dense vegetative cover and the relatively flat topography of MDA U, which slopes gently to the north towards DP Canyon, surface runoff generation is minimal. Best management practices (hay bales and wattles) also restrict runoff from and run-on onto the site. These factors contribute to the SOP-02.01 run-off score of zero for each of the three MDA U SWMUs, indicating that erosion is not a major transport pathway.

<u>**Question D:**</u>

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

Known or suspected presence of contaminants in groundwater.

- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The regional aquifer was encountered in deep wells proximal to MDA U at 5870 ft asl (R-7), 5850 ft asl (Otowi-4), and 5835 ft asl (R-8, downgradient of MDA U) (Figure 3.2-3; LANL 1998, 59599). The regional aquifer is approximately 1300 ft below MDA U. Given the depth to groundwater and the lack of moisture, there is no transport mechanism to the regional aquifer.

<u>**Question E:**</u>

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

- **The potential for contaminants to migrate to groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**

- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Contaminants are unlikely to migrate to the regional aquifer given the depth to groundwater (approximately 1300 ft bgs; see response to Question D). The lack of any significant hydraulic driver (e.g., no ponded water on the surface) facilitating infiltration also mitigates the potential for contaminants reaching groundwater.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: MDA U is not located near the mesa edge.

Question G:

Could airborne contaminants interact with receptors through the respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway**.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Fossorial mammals may receive exposure from subsurface vapors; this pathway is minor given the low concentrations of detected vapors.

Question H:

Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement**.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 1

Terrestrial Animals: 1

Provide explanation: Entrainment of fugitive dust is minimal because of the dense vegetative cover on the site soils.

<u>Question I:</u>

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Provide explanation: Root uptake is likely to influence the load of contaminants that are acquired by plants. Grasses and shrubs are the prevalent vegetation; there are no trees within the MDA U fenced area. Root uptake is a minor pathway. Surface soil contamination is low; thus, rain splash is expected to be a minor pathway.

<u>Question J:</u>

Could contaminants interact with receptors through food-web transport from surficial soils?

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Surface soil contains metals at low concentrations that may be ingested.

<u>Question K:</u>

Could contaminants interact with receptors through the incidental ingestion of surficial soils?

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Mercury was identified in surficial soils at levels above background and may be ingested.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Given the current nature of surface soils (largely fill) and little evidence of biotic transport of subsurface soils, ecological risks associated with dermal contact are expected to be minimal. In addition, the pelage of mammals, the scales of reptiles, the exoskeletons/dermis of invertebrates and the feathers of birds offer substantial protection from dust and water penetration to the skin. However, lipophilic COPECs, including Aroclor-1254 and acenaphthene, were detected and thus this exposure route may be a minor pathway.

Question M:

Could contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 1

Terrestrial Animals: 1

Provide explanation: The potential for external irradiation from gamma-emitting radionuclides is low because wastes were largely deposited below the surface. Gamma-emitting radionuclides were not retained as COPECs.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**

- **Contaminants in sediment may partition into soil solution, making them available to roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

<u>**Question O:**</u>

Could contaminants interact with receptors through food-web transport from water and sediment?

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

<u>**Question P:**</u>

Could contaminants interact with receptors through the ingestion of water and suspended sediments?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

<u>**Question Q:**</u>

Could contaminants interact with receptors through dermal contact with water and sediment?

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

Question R:

Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

Question S:

Could contaminants bioconcentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

Question T:

Could contaminants bioconcentrate in sedimentary or water-column organisms?

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**

- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

<u>**Question U:**</u>

Could contaminants bioaccumulate in sedimentary or water column organisms?

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

<u>**Question V:**</u>

Could contaminants interact with aquatic plants or animals through external irradiation?

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

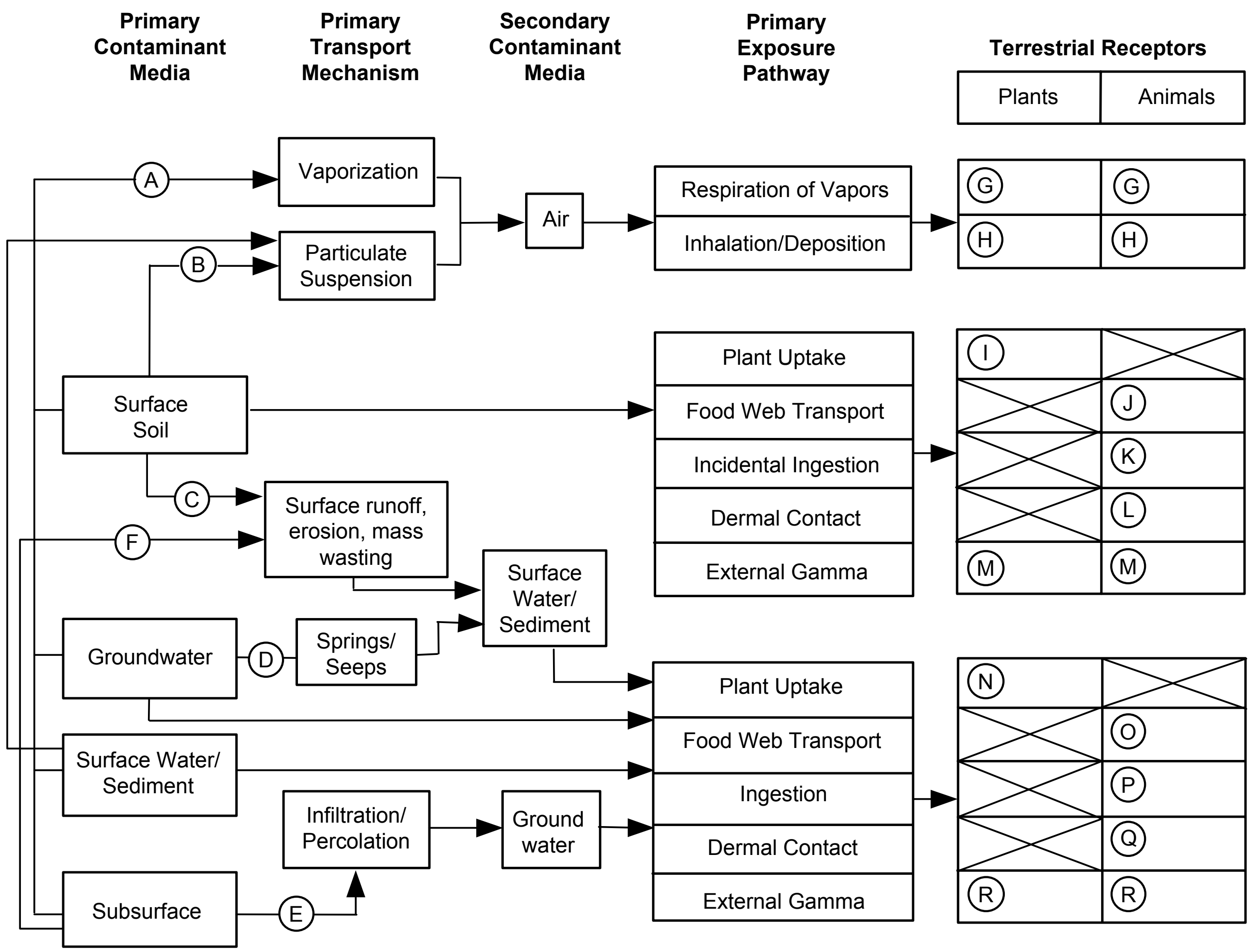
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no aquatic environments on-site, and there are no pathways to aquatic environments located off-site.

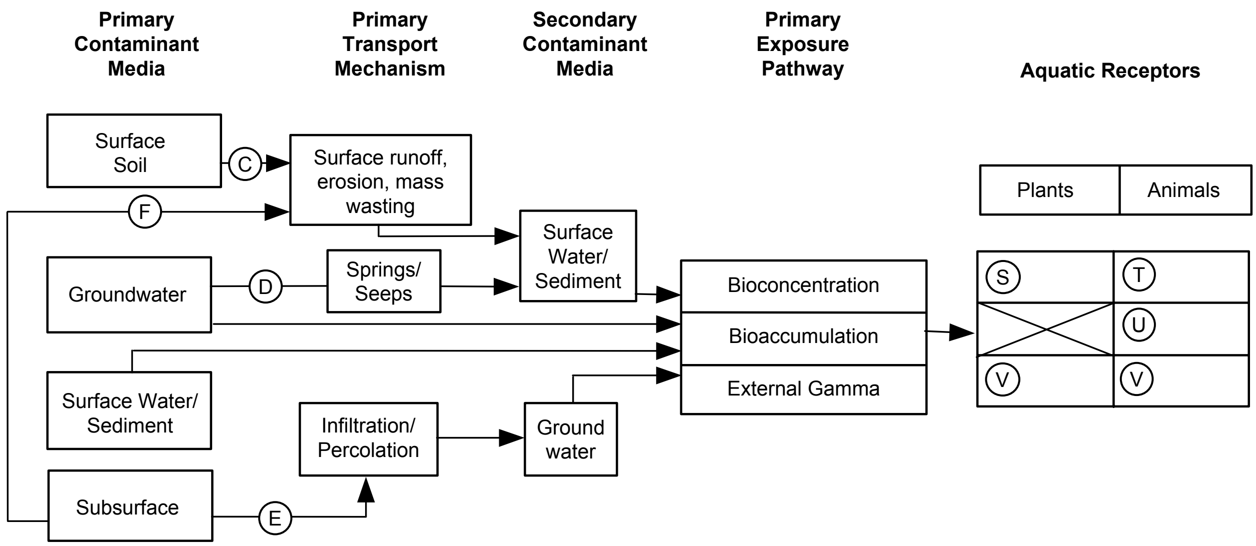
Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE:
Letters in circles refer to questions on the Scoping Checklist



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): James T. Markwiese, Ph.D.

Name (signature): [signature]

Organization: Neptune and Company, Inc.

Phone number: (505)662-0707 ext 24

Date completed:

Verification by another party (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.

Name (signature): [signature]

Organization: Los Alamos National Laboratory

Phone number: (505)665-6953

Figure H1-1. MDA U is characterized by wormwood (*Artemesia vulgaris,* foreground) and chamisa (*Chrysothamnus nauseosus*, background). Photograph taken October 14, 2005.

Figure H1-2. Bare patches of ground are characteristic of the site's central area and are probably a result of the recent (2005) borehole sampling activity. Photograph taken on October 14, 2005.

Figure H1-3. Animal burrow spoils observed at one location (north-central) on-site. Photograph taken on October 14, 2005.

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Appendix I

Surface Water Site Assessments

Surface Water Site Assessment

Site Information

Site ID:	PRS ID:	Nearest Struct:
1165	21-017(a)	21-152

Setting

Topography

On Mesa Top: Yes **On Bench in Canyon:** No **On Canyon Floor, Not Channel:** No **In Channel in Canyon Floor:** No

Topography Explanation:
MDA-U is located on the north side of DP Mesa and covers an area of approximately .2 acres. It contains tw o absorption beds (21-017(a&b)) and a sump 21-017(c).

Ground/Canopy Cover

Sparse (<25%): No **Medium (25-75%):** No **Thick (>75%):** Yes

Ground/Canopy Cover Explanation:
MDA-U is covered w ith 90% thick grasses and sage.

Slope at Area Impacted

Flat (<10%): No **Gradual (10-30%):** Yes **Steep (>30%):** No

Slope Explanation:
MDA-U generally slopes to the north. The NE and NW corners steepen to 15-20% to the north tow ards DP Canyon. The middle of the site is <10% slope to the north.

Run-off

Is There Visible Evidence of Run-off Discharging from Site:
No

Surface Water Site Assessment

PRS ID: 21-017(a)

Run-off (Continued)

Is Run-off Channelized: No

Channel Type:

Channelization Explanation:

Where Does Evidence of Runoff Terminate:

Terminus Explanation

Has Run-off Caused Visible Erosion: No

Erosion Type:

Erosion Explanation:

Run-on

Structural Run On. Are Structures Creating Run-on to the Site: No

Structural Run-on Explanation:
A run-on channel has been cut above the site, and directs run-on to the NE around the MDA towards DP Canyon.

Surface Water Site Assessment

PRS ID: 21-017(a)

Run-on (Continued)

Natural Run-on. Is Natural Drainage Creating Run-on to the Site:
No

Natural Run-on Explanation:
Run-on is diverted around and aw ay from MDA-U

Current Operations Run-on. Are Current Operations Creating Run-on to the Site:
No

Current Operations Run-on Explanation:
Fire hydrant +/- 100' south of MDA-U. A sw ale/depression, and run-on channel divert run-on aw ay from site.

Assessment Finding

Based on the Above Criteria and the Assessment of this Site, Does Soil Erosion Potential Exist:
No

Sign Off

Site Not Found:	Revision of Earlier Assessment:	
No	No	
Name of Assessment Author: Jeff Walterscheid		**Assessment Date:** 06/18/1998

Surface Water Site Assessment

PRS ID: 21-017(a)

Additional Information

Trash and Debris Notes

Is there Visible Trash and Debris on the Site:	Is there Visible Trash and Debris In a Watercourse:
No	No

Trash and Debris Explanation:

General Notes

Assessment Comments:

Best Management Practice Notes

Are Permanent BMPs in Place:	Permanent BMPs in Place:
No	

Surface Water Site Assessment

PRS ID: 21-017(a)

Erosion Matrix

Erosion/Sediment Transport Potential Scoring Criteria	Max Score Poss	Score Modifers for Transport Potential			Resulting Score
		Low (max * 0.1)	Med (max * 0.5)	High (max * 1.0)	
Setting Group (Max Total 43)					
Topography - On Mesa Top:	1	For these four criteria, use the single highest score from the criteria that received a "Yes" answer.			1.0
Topography - On Bench in Canyon:	4				
Topography - On Canyon Floor, Not in Channel:	13				
Topography - In Channel in Canyon Floor:	17				
Ground/Canopy Cover (Percent):	13	>75%	25-75%	<25%	1.3
Slope at Area Impacted:	13	<10%	10-30%	>30%	6.5
Run-off Group (Max Total 46)					
Visible Evidence of Run-off:	5	"Yes" = 5. "No" = 0 here and for two scores below.			0.0
Where Run-off Terminates:	19	"Other"	"Bench"	"Drainage/Canyon"	0.0
Visible Erosion:		"No" = 0. If "Yes", score by Erosion Type.			0.0
Erosion Type:	22	"Sheet"	"Rill"	"Gully"	
Run-on Group (Max Total 11)					
Structural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Natural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Current Operations Run-on:	4	"No" = 0. "Yes" = 4.			0.0
Maximum Possible Total Score:	**100**			*** Actual Total Score:**	**8.8**

Revision of Earlier Assessment: No

*** No permanent BMPs are in place. Score could be lower with them.**

Surface Water Site Assessment

Site Information

Site ID:	PRS ID:	Nearest Struct:
1166	21-017(b)	21-152

Setting

Topography

On Mesa Top: Yes **On Bench in Canyon:** No **On Canyon Floor, Not Channel:** No **In Channel in Canyon Floor:** No

Topography Explanation:
MDA-U is located on the north side of DP Mesa and covers an area of approximately .2 acres. It contains two absorption beds (21-017(a&b)) and a sump 21-017(c).

Ground/Canopy Cover

Sparse (<25%): No **Medium (25-75%):** No **Thick (>75%):** Yes

Ground/Canopy Cover Explanation:
MDA-U is covered with 90% thick grasses and sage.

Slope at Area Impacted

Flat (<10%): No **Gradual (10-30%):** Yes **Steep (>30%):** No

Slope Explanation:
MDA-U generally slopes to the north. The NE and NW corners steepen to 15-20% to the north towards DP Canyon. The middle of the site is <10% slope to the north.

Run-off

Is There Visible Evidence of Run-off Discharging from Site:
No

Surface Water Site Assessment

PRS ID: 21-017(b)

Run-off (Continued)

Is Run-off Channelized: No

Channel Type:

Channelization Explanation:

Where Does Evidence of Runoff Terminate:

Terminus Explanation

Has Run-off Caused Visible Erosion: No

Erosion Type:

Erosion Explanation:

Run-on

Structural Run On. Are Structures Creating Run-on to the Site: No

Structural Run-on Explanation:
A run-on channel has been cut above the site, and directs run-on to the NE around the MDA towards DP Canyon.

Surface Water Site Assessment

PRS ID: 21-017(b)

Run-on (Continued)

Natural Run-on. Is Natural Drainage Creating Run-on to the Site:
No

Natural Run-on Explanation:
Run-on is diverted around and aw ay from MDA-U

Current Operations Run-on. Are Current Operations Creating Run-on to the Site:
No

Current Operations Run-on Explanation:
Fire hydrant +/- 100' south of MDA-U. A sw ale/depression, and run-on channel divert run-on aw ay from site.

Assessment Finding

Based on the Above Criteria and the Assessment of this Site, Does Soil Erosion Potential Exist:
No

Sign Off

Site Not Found:	Revision of Earlier Assessment:	
No	No	
Name of Assessment Author: Jeff Walterscheid		**Assessment Date:** 06/18/1998

Surface Water Site Assessment

PRS ID: 21-017(b)

Additional Information

Trash and Debris Notes

Is there Visible Trash and Debris on the Site:	**Is there Visible Trash and Debris In a Watercourse:**
No	No

Trash and Debris Explanation:

General Notes

Assessment Comments:

Best Management Practice Notes

Are Permanent BMPs in Place:	**Permanent BMPs in Place:**
No	

Surface Water Site Assessment

PRS ID: 21-017(b)

Erosion Matrix

Erosion/Sediment Transport Potential Scoring Criteria	Max Score Poss	Score Modifers for Transport Potential			Resulting Score
		Low (max * 0.1)	Med (max * 0.5)	High (max * 1.0)	
Setting Group (Max Total 43)					
Topography - On Mesa Top:	1	For these four criteria, use the single highest score from the criteria that received a "Yes" answ er.			1.0
Topography - On Bench in Canyon:	4				
Topography - On Canyon Floor, Not in Channel:	13				
Topography - In Channel in Canyon Floor:	17				
Ground/Canopy Cover (Percent):	13	>75%	25-75%	<25%	1.3
Slope at Area Impacted:	13	<10%	10-30%	>30%	6.5
Run-off Group (Max Total 46)					
Visible Evidence of Run-off:	5	"Yes" = 5. "No" = 0 here and for tw o scores below .			0.0
Where Run-off Terminates:	19	"Other"	"Bench"	"Drainage/Canyon"	0.0
Visible Erosion:		"No" = 0. If "Yes", score by Erosion Type.			0.0
Erosion Type:	22	"Sheet"	"Rill"	"Gully"	
Run-on Group (Max Total 11)					
Structural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Natural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Current Operations Run-on:	4	"No" = 0. "Yes" = 4.			0.0
Maximum Possible Total Score:	**100**			*** Actual Total Score:**	**8.8**

Revision of Earlier Assessment: No

*** No permanent BMPs are in place. Score could be lower with them.**

Surface Water Site Assessment

Site Information

Site ID:	PRS ID:	Nearest Struct:
1167	21-017(c)	21-152

Setting

Topography

On Mesa Top: Yes **On Bench in Canyon:** No **On Canyon Floor, Not Channel:** No **In Channel in Canyon Floor:** No

Topography Explanation:
MDA-U is located on the north side of DP Mesa and covers an area of approximately .2 acres. It contains two absorption beds (21-017(a&b)) and a sump 21-017(c).

Ground/Canopy Cover

Sparse (<25%): No **Medium (25-75%):** No **Thick (>75%):** Yes

Ground/Canopy Cover Explanation:
MDA-U is covered with 90% thick grasses and sage.

Slope at Area Impacted

Flat (<10%): No **Gradual (10-30%):** Yes **Steep (>30%):** No

Slope Explanation:
MDA-U generally slopes to the north. The NE and NW corners steepen to 15-20% to the north towards DP Canyon. The middle of the site is <10% slope to the north.

Run-off

Is There Visible Evidence of Run-off Discharging from Site:
No

Surface Water Site Assessment

PRS ID: 21-017(c)

Run-off (Continued)

Is Run-off Channelized:	Channel Type:
No	

Channelization Explanation:

Where Does Evidence of Runoff Terminate:

Terminus Explanation

Has Run-off Caused Visible Erosion:	Erosion Type:
No	

Erosion Explanation:

Run-on

Structural Run On. Are Structures Creating Run-on to the Site:
No

Structural Run-on Explanation:
A run-on channel has been cut above the site, and directs run-on to the NE around the MDA towards DP Canyon.

Surface Water Site Assessment

PRS ID: 21-017(c)

Run-on (Continued)

Natural Run-on. Is Natural Drainage Creating Run-on to the Site:
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Natural Run-on Explanation:
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Current Operations Run-on Explanation:
Fire hydrant +/- 100' south of MDA-U. A sw ale/depression, and run-on channel divert run-on aw ay from site.

Assessment Finding

Based on the Above Criteria and the Assessment of this Site, Does Soil Erosion Potential Exist:
No

Sign Off

Site Not Found:	Revision of Earlier Assessment:	
No	No	
Name of Assessment Author: Jeff Walterscheid		**Assessment Date:** 06/18/1998

Surface Water Site Assessment

PRS ID: 21-017(c)

Additional Information

Trash and Debris Notes

Is there Visible Trash and Debris on the Site:	Is there Visible Trash and Debris In a Watercourse:
No	No

Trash and Debris Explanation:

General Notes

Assessment Comments:

Best Management Practice Notes

Are Permanent BMPs in Place:	Permanent BMPs in Place:
No	

Surface Water Site Assessment

PRS ID: 21-017(c)

Erosion Matrix

Erosion/Sediment Transport Potential Scoring Criteria	Max Score Poss	Score Modifers for Transport Potential			Resulting Score
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Run-off Group (Max Total 46)					
Visible Evidence of Run-off:	5	"Yes" = 5. "No" = 0 here and for tw o scores below .			0.0
Where Run-off Terminates:	19	"Other"	"Bench"	"Drainage/Canyon"	0.0
Visible Erosion:		"No" = 0. If "Yes", score by Erosion Type.			0.0
Erosion Type:	22	"Sheet"	"Rill"	"Gully"	
Run-on Group (Max Total 11)					
Structural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Natural Run-on:	7	"No" = 0. "Yes" = 7.			0.0
Current Operations Run-on:	4	"No" = 0. "Yes" = 4.			0.0
Maximum Possible Total Score:	**100**			*** Actual Total Score:**	**8.8**

Revision of Earlier Assessment: No

*** No permanent BMPs are in place. Score could be lower with them.**