Los Alamos
NATIONAL LABORATORY
EST. 1943
Los Alamos National Laboratory/University of California
Environmental Stewardship (ENV)
Environmental Remediation & Surveillance Program (ERS), MS M992
Los Alamos, New Mexico 87545
(505) 667-0469/FAX (505) 665-4747

National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-7203/FAX (505) 665-4504

Date: May 3, 2006
Refer to: ER2006-0404

Mr. James Bearzi
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

RECEIVED
MAY 2006
NMED Hazardous
Waste Bureau

SUBJECT: RESPONSE TO THE NOTICE OF DISAPPROVAL FOR THE INVESTIGATION WORK PLAN FOR THE MIDDLE LOS ALAMOS CANYON AGGREGATE AREA

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the "Response to the Notice of Disapproval (NOD) for the Investigation Work Plan for the Middle Los Alamos Canyon Aggregate Area" and the "Investigation Work Plan for the Middle Los Alamos Canyon Aggregate Area, Revision 1."

As verbally requested on April 19, 2006, information on hexavalent chromium analyses has been added to the Section 4.0 introduction. A table detailing the revisions to the original work plan that cross-references the New Mexico Environment Department's comments is also included.

If you have questions, please contact Mark S. Thacker at (505) 665-5342 (mthacker@lanl.gov) or Lance A. Woodworth at (505) 665-5820 (lwoodworth@doeal.gov).

Sincerely,

David McInroy, Deputy Program Director
Environmental Remediation & Surveillance
Los Alamos National Laboratory

Sincerely,

David Gregory, Federal Project Director
Department of Energy
Los Alamos Site Office

MT/jk

Enclosures: 1) Two hard copies with electronic files – Response to the Notice of Disapproval for the Investigation Work Plan for the Middle Los Alamos Canyon Aggregate Area (ER2006-0275)
2) Two hard copies with electronic files – Investigation Work Plan for the Middle Los Alamos Canyon Aggregate Area, Revision 1 (ER2006-0387)

Cy: (w/enc):
M. Thacker, ENV-ECR, MS M992 (with CD)
D. Gregory, DOE LASO, MS A316 (with CD)
L. Woodworth, DOE LASO, MS A316 (with CD)
E. Day (with CD)
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A. Dorries, ENV-ECR, MS M992
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LA-UR-06-3015
May 2006
ER2006-0387

Investigation Work Plan for Middle Los Alamos Canyon Aggregate Area, Revision 1

Los Alamos
NATIONAL LABORATORY
EST. 1943

Prepared by
Environmental Stewardship Division–
Environmental Remediation and Surveillance Program

LA-UR-06-0387
ER2006-3015

Investigation Work Plan for Middle Los Alamos Canyon Aggregate Area, Revision 1

May 2006

Responsible project leader:

Mark Thacker	Mark S. Thacker	Project Leader	ENV-ECR	5-2-06 MST
Printed Name	Signature	Title	Organization	Date

Responsible UC representative:

David McInroy	David McInroy	Deputy Program Director	ENV-ERS	5/3/06
Printed Name	Signature	Title	Organization	Date

Responsible DOE representative:

David Gregory	David R Gregory	Federal Project Director	DOE-LASO	5/03/06
Printed Name	Signature	Title	Organization	Date

EXECUTIVE SUMMARY

The Middle Los Alamos Canyon Aggregate Area consists of 79 sites, 30 of which have been addressed in other reports. These 30 sites include 21 that have been approved for no further action, 8 sites that have undergone a voluntary corrective action that has been approved with modifications, and one site that has also undergone a voluntary corrective action and is awaiting approval. This investigation work plan identifies and describes the activities needed to complete the investigation of the remaining 49 solid waste management units and areas of concern within the aggregate area. These sites are located within the northern portion of the Laboratory, south of State Highway 502 and generally south and east of the Los Alamos townsite in Technical Areas 2, 21, 26, and 61.

The 49 sites presented in this work plan have been placed into two categories. The first category consists of nine sites for which investigations are being proposed for deferred action until collocated active buildings, processes, and/or utilities are removed and/or taken out of service. These sites include Consolidated Units 21-004(b)-99 and 21-022(b)-99 and Solid Waste Management Unit 21-011(b). The second category consists of the remaining 40 sites that are accessible and for which investigations can proceed. This work plan briefly describes the operational history of all 49 sites, evaluates existing analytical data, and proposes characterization activities.

The first objective of this work plan is to characterize the nature and extent of contamination associated with the 49 sites, including conducting sampling and analysis of sampling results to evaluate the potential need for corrective action. The second objective is to remove identified inactive infrastructure related to solid waste management units and areas of concern where appropriate. Confirmation samples will be collected after removal activities are completed.

Radiological and geophysical surveys have been prescribed for the sites to aid in determining sampling locations and removal activities. The review of historical sampling data indicates nature and extent have not been defined at any of the sites previously sampled. Therefore, additional data are needed for all of the 49 sites addressed in this work plan.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by the University of California (UC). The Laboratory (Figure 1.0-1) is located in north-central New Mexico, approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above sea level. The Middle Los Alamos Canyon Aggregate Area is shown in Figure 1.0-2.

The Laboratory's Environmental Stewardship–Environmental Remediation and Surveillance (ENV-ERS) Program, formerly the Environmental Restoration (ER) Project, is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the ENV-ERS Program 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 ENV-ERS Program investigates sites potentially contaminated by past Laboratory operations.

The sites addressed in this work plan contain hazardous and radioactive constituents. Depending on the type of contaminant(s) and the history of a site, the New Mexico Environment Department (NMED) or DOE has administrative authority over work performed by the Laboratory's ENV-ERS Program at each site. NMED has authority under the New Mexico Hazardous Waste Act (NMHWA) over cleanup of sites with hazardous waste or certain hazardous constituents, including the hazardous waste portion of mixed waste (i.e., waste contaminated with both radioactive and hazardous constituents). DOE has authority over cleanup of sites with radioactive contamination. Radionuclides are regulated under DOE Order 5400.5, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management."

A Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit was issued to the Laboratory by the Environmental Protection Agency (EPA) in 1989. Under the Hazardous and Solid Waste Amendments (HSWA) Act, EPA issued Module VIII to the Permit in 1990 (EPA 1990, 01585) and revised it in 1994 (EPA 1994, 44146). The HSWA Module VIII listed individual sites to be investigated and specified conditions and requirements for cleanup activities. In 1996, regulatory authority for Laboratory cleanup activities was conveyed to NMED, which assumed enforcement of HSWA Module VIII. On March 1, 2005, a Compliance Order on Consent (the Consent Order) was signed by NMED, DOE, and the Regents of UC that addresses corrective action activities at the Laboratory. Pursuant to the Consent Order, the Laboratory has requested a permit modification to remove all corrective action requirements from the HSWA module of the Permit. The Consent Order is the controlling document for corrective action activities at the Laboratory. Historical documents reference some sites as HSWA solid waste management units (SWMUs) or areas of concern (AOCs) or non-HSWA SWMUs or AOCs, and the same convention is used in this report.

Appendix A includes a list of acronyms and abbreviations, a glossary, and a metric conversion table. Appendix B describes the management of investigation-derived waste (IDW). The historical investigation report (HIR) for the Middle Los Alamos Canyon Aggregate Area (LANL 2005, 90631) presents a detailed summary of historical operations, investigations, and available data for the sites addressed in this work plan. Appendix C contains the data source statements for the figures in this work plan.

1.1 General Site Information

The Middle Los Alamos Canyon Aggregate Area consists of 79 sites, 30 of which have been addressed elsewhere (Tables 1.1-1 and 1.1-2). These 30 sites include 21 that have been approved for no further action (NFA) (NMED 2001, 72820; NMED 2003, 78138; EPA 2005, 88464), eight sites that have undergone a voluntary corrective action that has been approved with modifications (NMED 2004, 89379), and one site that has also undergone a voluntary corrective action and is awaiting approval (LANL 2005, 89311). These 30 sites are not discussed further in this work plan, and details are provided in the HIR (LANL 2005, 90631).

This work plan addresses 25 areas of concern (AOCs), 9 solid waste management units (SWMUs), and 4 consolidated units (consisting of 13 SWMUs and 2 AOCs) (Table 1.1-1) The sites are located within Technical Areas (TAs) 02, 21, 26, and 61 (Figure 1.0-2).

The sites addressed in this work plan fall into two categories:

- The first category consists of nine sites whose investigations are proposed for deferred action until collocated active buildings, processes, and/or utilities are removed and/or taken out of service. These include Consolidated Units 21-004(b)-99 and 21-022(b)-99, and SWMU 21-011(b). Once these conditions have been met, the Laboratory will investigate these sites.
- The second category includes the remaining 40 sites not listed above that are accessible and investigation can proceed.

This work plan provides available information from previous field investigations or removal actions, which are described in the Middle Los Alamos Canyon Aggregate Area HIR, and uses this information to evaluate current conditions at the site. The evaluation is used to determine whether the nature and extent of site contamination have been defined where possible and to identify additional field activities needed to meet the investigation objectives.

1.2 Investigation Objectives

The work described in this plan has two objectives. The first is to characterize the nature and extent of contamination associated with the sites. Characterization includes conducting sampling and analysis of sampling results to evaluate the potential need for corrective action. The second is to remove identified SWMU/AOC-related inactive infrastructure where appropriate. Confirmation samples will be collected after removal activities are completed.

To accomplish the objectives, this plan

- presents historical and background information on the sites;
- describes the rationale for proposed data collection activities; and
- identifies and proposes appropriate methods and protocols for collecting, analyzing, and evaluating data to finalize characterization at these sites.

Characterization and, if necessary, excavation are proposed to determine the nature and extent of any potential contamination and whether the levels of residual contamination pose a potential unacceptable risk to human health and the environment for the intended land use.

2.0 BACKGROUND

The following sections briefly describe the operational histories, data collected at each site, and a summary of analyses performed at each of the sites addressed in this work plan. Background information needed to address the sites is also provided. The HIR for the Middle Los Alamos Canyon Aggregate Area contains additional information and data analyses on previous investigations (LANL 2005, 90631). Although one SWMU [02-006(a)] is physically located in TA-61, it was part of the operations at TA-02 and is therefore addressed in the following discussion.

TA-02 Background

TA-02 is located at the western end of the Middle Los Alamos Canyon Aggregate Area. The canyon is approximately 1350 ft wide at the top and varies in depth from 350 to 360 ft deep in the vicinity of TA-02. The bottom of the canyon is relatively flat for a width of approximately 600 ft. A small stream (Los Alamos Creek) passes through the bottom of the canyon. The stream is intermittent near TA-02, with variable flow.

TA-02 was used to house a series of research reactors (Bunker 1985, 36231) from 1943 through 2003. TA-02-001, the main reactor building, was constructed in 1943. It housed five separate nuclear reactors; three iterations of water-boiler-type reactors located on the east side of the building; and one plutonium-fueled reactor followed by an enriched uranium reactor the Omega West Reactor (OWR). A number of facilities were constructed over the years to support the TA-02 research activities. The facility was active from 1943 through 1993.

TA-02 began operations in 1943 with the Water Boiler Reactor (WBR), a homogeneous liquid-fueled reactor fueled by an enriched uranyl-salt compound. This reactor design was modified three times to generate increased output up to 25 kW. The final modified WBR operated from 1951 through 1974, when it was placed in safe shutdown mode. The WBR and associated bioshield were dismantled, removed, and disposed of in 1989 (Montoya 1991, 06997, pp. 1–2).

At peak operation, the WBR generated approximately 0.25 L/min excess gas containing some fission products. These gases were managed through the WBR gaseous effluent vent line system (LANL 1993, 15314, p. E-8). The gaseous effluent vent system associated with the WBR was decommissioned, removed, and disposed of in 1985–1986 (Elder and Knoell 1986, 06670, p. 2).

A fourth reactor, “Clementine,” was a 25-kW fast-neutron research reactor that used a plutonium fuel source surrounded by mercury coolant. The reactor was self-contained and operated from 1946 to 1953 (LANL 1993, 15314, p. E-8). Clementine was decommissioned, dismantled, and disposed of in 1954 (LANL 2003, 82646, p. 2).

The fifth and final reactor at TA-02 was the OWR. It was built above the former Clementine site in the western third of TA-02-001. The OWR was an 8-MW, water-cooled tank-type research reactor fueled by enriched solid uranium. The OWR was put online in 1956 and operated until 1993. It experienced a cooling system water leak in January 1993. The reactor was put on standby status in 1993 and remained inactive until it was decommissioned, removed, and disposed of in 2003 (LANL 2003, 82646, p. 2). In 2000, several support structures, for example the cooling tower and effluent storage tanks, were decommissioned, removed, and disposed of (LANL 2000, 90087).

The remaining TA-02 facilities on-site were decontaminated and decommissioned (D&D) in September 2003. The site was cleared, material was disposed of in an appropriate off-site disposal facility, and the land was returned to its original contour and reseeded (LANL 2003, 82646, p. 1-2). Two concrete surface water flumes, their associated catch basins, the main paved road, bridges, and Los Alamos Creek's northern retaining wall adjacent to the former facility are all that remain at the site. The former reactor site is fenced, and access is controlled by the Laboratory.

Surface water, sediments, and groundwater have been previously sampled at locations downcanyon (east) from TA-02 to measure the potential impacts from SWMUs and AOCs (LANL 2004, 87390, pp. 3-7 through 3-10). The results of these investigations are presented in the Los Alamos and Pueblo Canyons investigation report (LANL 2004, 87390). Therefore, surface water and groundwater data are not addressed in this report.

TA-21 Background

TA-21 is located on Delta Prime (DP) Mesa on the northern boundary of the Laboratory and is immediately east-southeast of the Los Alamos townsite. It extends from the mesa top to the stream channels in two adjacent canyons, DP Canyon to the north and Los Alamos Canyon to the south (Figure 1.0-2).

During World War II, the Laboratory was established for the research, development, and testing of the first deliverable nuclear weapon. In 1945, the operations for establishing the chemical and metallurgical properties of the nuclear material necessary to achieve and sustain the required nuclear fission reaction were transferred to the newly built facilities at TA-21.

DP West operations began in September 1945, primarily to produce metal and alloys of plutonium from the nitrate solution feedstock provided by other production facilities. This procedure involved several acid dissolution and chemical precipitation steps to separate the plutonium and other valuable actinides from the feedstock. A major research objective at DP West was the development of new purification techniques that would increase the efficiency of the separation processes (Christensen 1968, 04779). Details of the purification techniques are discussed in the operable unit (OU) work plan for TA-21 (LANL 1991, 07529). Other operations performed at DP West included nuclear fuel reprocessing. In 1977, a transfer of work to the new plutonium facility at TA-55 began, and much of the DP West complex was vacated.

DP East operations also began in September 1945. These facilities were used to process polonium and actinium and to produce initiators (a nuclear weapons component). In 1964, TA-21-209 was built to house research into high-temperature and actinide chemistry. Currently, TA-21-155 houses the Tritium Systems Test Assembly (TSTA) for developing and demonstrating effective technology for handling and processing deuterium and tritium fuels used in fusion reactors.

TA-21 includes five material disposal areas (MDAs): A, B, T, U, and V. Process wastes, transuranic wastes, and liquid wastes were disposed of at the MDAs from the early 1940s until the late 1970s; details of the disposal methods are presented in the TA-21 operable unit work plan (LANL 1991, 07529). The major contributors to waste streams at TA-21 were plutonium-processing activities. However, because plutonium was scarce, waste-stream recycling became a common practice, and as much plutonium as possible was removed from the waste stream. Numerous other chemicals were used for separation techniques and were present in the waste stream. Airborne emissions, including tritium, were released from some of the buildings at DP West and DP East; these releases are also discussed in the TA-21 operable unit work plan (LANL 1991, 07529).

TA-26 Background

TA-26 is situated toward the east end of Los Alamos Mesa and is bounded by Los Alamos Canyon on the south and Pueblo Canyon to the north at an approximate elevation of 7015 ft above sea level. This area is within the boundaries of TA-73 (Figure 1.0-2).

TA-26 comprises D-Site where the East Gate vault was situated. The area consisted of several structures, including the East Gate vault (TA-26-001), Guard Tower A (TA-26-002), Guard Tower B (TA-26-003), a guard building (TA-26-004), east room septic system (TA-26-005), and a sump system (TA-26-006). Construction at D-Site began on April 1, 1946. The storage vault was initially used to store radioactive materials (Shipman 1957, 06349) and later was used to store high explosives (HE) (IT Corporation 1991, 01904). By the mid-1960s, TA-26 was no longer used and all structures were removed from the area.

2.1 Site Descriptions and Operational Histories

The following are operational histories of the sites addressed in this work plan. The remaining 30 sites not addressed here are described in the Middle Los Alamos Canyon Aggregate Area HIR (LANL 2005, 90631).

2.1.1 TA-02

AOC 02-003(a), Stack-Gas Valve House and Gaseous Effluent Vent Lines

AOC 02-003(a) was the site of the stack-gas valve house (TA-02-019) and associated stainless-steel gaseous effluent vent lines (Line 117 and Line 118) as shown on engineering drawing C-1718 (LASL 1947, 89677). The system was installed in 1944 and received off-gas from the WBR (Figure 2.1-1). The off-gas contained gaseous fission products including cesium-137, strontium-90, technicium-99, and iodine-131 (LANL 1993, 15314, p. 7.4-1).

The stack-gas valve house was primarily aboveground and constructed of reinforced concrete, 11 ft by 9 ft by 10 ft high, with 18-in.-thick walls (Elder and Knoell 1986, 06670, p. 4). Gaseous effluent entered TA-02-019 from Line 117 and was directed via Line 118 to the southeast from 1944 to 1948. Line 118 was used as a temporary gas vent up until July 1948 when the condensate trap and Line 119 became operational [AOC 02-003(b)]. Line 118 was left in place from 1948 until it was removed in 1985 (Elder and Knoell 1986, 06670, pp. 8, 29, and 43). Line 117 and the stack-gas valve house remained in use through 1974 when the units became inactive (1974 through 1985). Line 117 and the stack-gas valve house were removed and disposed during D&D efforts in 1985 (Elder and Knoell 1986, 06670, pp. 22–29 and 43).

AOC 02-003(b), Condensate Trap and Gaseous Effluent Vent Line

AOC 02-003(b) consisted of the condensate trap (TA-02-048) and associated stainless-steel line (Line 119). The WBR off-gas system consisted of the stack-gas valve house, condensate trap, mesa top vent located above TA-02 at TA-61, and associated lines. The system was installed in 1948 (Figure 2.1-1). The off-gas contained gaseous fission products including cesium-137, strontium-90, technicium-99, and iodine-131 (LANL 1993, 15314, p. 7.4-1).

The condensate trap was a concrete manhole superstructure and a small-diameter standpipe. It was located at the lowest point of Line 119 between the stack-gas valve house [TA-02-019, AOC 02-003(a)] and the delay tanks [TA-02-131, AOC 02-003(c)] as shown in engineering drawing C-1718 (LASL 1947, 89677; Elder and Knoell 1986, 06670, p. 29).

Line 119 was an east-west trending pipe section approximately 78 ft long, from the stack-gas valve house (TA-02-019) to the condensate trap (TA-02-048), and a 205-ft-long north-south trending section from the condensate trap (TA-02-048) to the delay tanks [TA-02-131, AOC 02-003(c)]. Line 119 continued from the delay tanks (TA-02-131) to the junction with the main OWR gaseous effluent vent line and then up the mesa-top stack (TA-02-009) and French drain [AOC 02-006(a)] located at TA-61 (Elder and Knoell 1986, 06670, pp. 6 and 8). The upper portion of the gaseous effluent vent line (Line 119) from the delay tanks to the mesa-top stack is addressed under AOC 02-003(d). The line was buried 6 ft deep within the canyon bottom and under a minimum of 3 ft of cover on the mesa slope to TA-61 where it was buried approximately 6 ft below grade, terminating at the mast (LASL 1948, 90083).

The condensate trap (TA-02-048) and Line 119 from the stack-gas valve house (TA-02-019) to the delay tanks remained in use through 1974. The units became inactive from 1974 through 1985 and were removed and disposed of during D&D efforts in 1985 (Elder and Knoell 1986, 06670, pp. 22-29 and 43).

AOC 02-003(c), Delay System

AOC 02-003(c) consisted of the location of two parallel underground stainless-steel gaseous effluent delay tanks (each 1 ft in diameter by 20 ft long and buried 4 ft deep). The tanks were part of the gaseous effluent vent line system associated with the WBR (Figure 2.1-1). The system was in place by 1951 and received off-gas from the WBR. The off-gas contained gaseous fission products including cesium-137, strontium-90, technicium-99, and iodine-131 (LANL 1993, 15314, p. 7.4-1).

It is unclear when the tanks were installed. The as-built drawing of the condensate trap and Line 119 (LASL 1947, 89677) dated 1948 (the original as-built drawing) does not show the delay tank system. The tanks appear to have been installed in 1951 when other modifications to the gaseous effluent vent line system were made (Montoya 1991, 06997, p. 2); however, no installation record is available.

The November 1990 SWMU report (LANL 1990, 07511) describes the tanks as “in series”; however, excavation of the tanks during the 1985 D&D indicated that they were in parallel, oriented east to west (Elder and Knoell 1986, 06670, p. 8).

The delay tanks remained in use through 1974. The tanks were inactive from 1974 through 1985. They were removed and disposed during D&D efforts in 1985 (Elder and Knoell 1986, 06670, pp. 22–29 and 43).

AOC 02-003(d), Garden Hose Discharge Area and Gaseous Effluent Vent Line from Delay System to Mesa-top Stack

AOC 02-003(d) consists of two distinct areas. The first area is the potential contamination associated with a temporary gaseous effluent vent, the garden hose that reportedly served as a temporary vent line for the WBR during initial operations (LANL 1993, 15314, p. 7.4-3). The garden hose was used until the stack on the mesa top (TA-02-009, located at TA-61) was built in 1948 (Figure 2.1-1) (LANL 1993, 15314, p. 7.4-3).

The second and primary area of AOC 02-003(d) is the gaseous effluent vent line from the delay tanks (TA-02-131) to the mesa-top stack [TA-02-009, SWMU 02-006(a)] (Figure 2.1-1). This 1200-ft segment of the vent line received gaseous effluent from the WBR from 1948 through 1974 and from the OWR from 1953 through 1993 (Elder and Knoell 1986, 06670, p. 8). Off-gases from the WBR contained low levels of cesium-137, iodine-131, strontium-90, and technetium-99 (LANL 1993, 15314, p. 7.4-1). The primary gaseous contaminant discharged from operation of the OWR was argon-41; no fission products were discharged from the OWR (LANL 1993, 15314, pp. 3-10).

The temporary garden hose vent system was reportedly in use from 1943 through 1948. The mesa-top stack remained in use from 1948 through 1993. The system received waste from the WBR only, from 1948 through 1956 when the OWR was brought on-line. The stack received waste from both the WBR and the OWR from 1956 through 1974. The stack received effluent from only the OWR from 1974 through 1993. The stack became inactive in 1993 and was removed and disposed of in November 2002 (LANL 2003, 90089, p. 2); Line 119 was removed in April 2003 (LANL 2003, 82646, p. 2).

AOC 02-003(e), WBR Holding Tank

AOC 02-003(e) is the location of an 800-L stainless-steel holding tank (TA-02-062) installed in approximately 1944 and associated with operation of the WBR (Figure 2.1-1). The holding tank was adjacent to the stack-gas valve house (TA-02-019) and was designed to collect WBR cooling water in the event of a cooling coil breach. The tank was removed and disposed during D&D activities in 1985. During D&D, the tank showed no sign of ever having been used, however reports of a “surge tank” running over indicate the original tank may have been used and perhaps replaced during its active life (DOE 1987, 08661; Elder and Knoell 1986, 06670, p. 2).

AOC 02-004(a), OWR

AOC 02-004(a) is the OWR facility (TA-02-001) that housed the OWR.

To facilitate this discussion, AOC 02-004(a) is grouped into the following areas:

- the reactor, fuel-handling area, cooling-liquid recirculation piping, and gaseous effluent vent line
- the OWR material storage area
- the WBR

OWR and Fuel-Handling Area

The OWR was a light-water cooled, uranium-enriched, plate-type reactor system contained in an 8 ft-diameter by 24 ft-high closed stainless-steel tank. The reactor was housed in the western third of the OWR building (TA-02-001), which was a rectangular and measured approximately 220 ft by 110 ft (Figure 2.1-1). A fuel transfer pit was located within the main reactor room and used to prepare OWR spent fuel rods for off-site shipping/recycling. The OWR and fuel pit system became operational in 1956 (LANL 2003, 82646, p. 2).

The fuel transfer pit operated within a closed recirculation system, separate from the main reactor cooling system. The fuel transfer pit system had a small chiller and filtration system located in TA-02-090 on the north wall of the reactor room. In 2003, the OWR, fuel pit, and associated equipment were removed and disposed of (LANL 2003, 82646, p. 2).

OWR Material Storage Area

Operation of the OWR included the temporary storage of material (isotope columns, throughput port metal sleeves, etc.) that became activated from contact in the reactor neutron flux field. The material was stored in a structure adjacent to TA-02-004, located south of the reactor, awaiting final disposition (LANL 2000, 90087). The structure at the material storage area was present on an as-built engineering drawing R-391 in 1958 (LASL 1958, 90085). The OWR was shut down in 1993 (LANL 2003, 82646, p. 2). The structure at the material storage area was decommissioned and removed in 2000 (LANL 2000, 90087).

OWR Cooling Liquid Recirculation Piping

The reactor operated with a cooling liquid recirculation system that consisted of a series of closed loop pipes in a 100-ft-long corridor that extended from the OWR west to Reactor Facility Equipment Building [TA-02-044, AOC 02-004(f)] (Figure 2.1-1). The water was routed through pumps, filters, and chillers in the Reactor Facility Equipment Building and back to the reactor. The cooling tower (TA-02-049) was added in 1959 to supplement the TA-02-044 chillers in this closed system. The recirculation system was active from 1956 through 1993 when the OWR was shut down. In 2002, the equipment in the recirculation liquid system was removed and disposed of (LANL 2000, 90087). In 2003, the OWR and all remaining lines and structures associated with TA-02-001 were removed and disposed of (LANL 2003, 82646, p. 2).

OWR Gaseous Effluent Vent Line

Off-gas from the OWR was routed through the gaseous effluent vent line to a connection into Line 119 on the east side of TA-02, where the effluent continued up to the mesa-top stack [TA-02-009 SWMU 02-006(a)] (Figure 2.1-1). The OWR gaseous effluent vent line teed off of the piping corridor between the OWR and Reactor Facility Equipment Building (TA-02-044), as shown in engineering drawing C-10473 (LASL 1957, 90082).

WBR

The WBR was the name used for a series of three small research reactors, LOPO (low power), HYPO (high power), and SUPO (super power), located in the eastern third of TA-02-001. The reactors were each progressively stronger in power output, consisting of generally a 1-ft-diameter sphere filled with liquid fuel, surrounded with neutron-reflecting blocks sitting on a graphite base. The LOPO reactor became functional in May 1944 (Montoya 1991, 06997, p. 5) and was dismantled, removed, and disposed of in September 1944. The HYPO reactor became operational in December 1944. It was upgraded to SUPO and became operational in 1951. The SUPO water boiler reactor was decommissioned, removed, and disposed in 1990 (Montoya 1991, 06997, p. 2).

The reactors were surrounded by a 15-ft by 15-ft by 11-ft aboveground concrete biological shield. A shallow sand pit and utility trench were present beneath the reactor sphere and were used to house piping that collected liquids and gases from the reactor and transported them to support structures on the east side of TA-02-001. In 1986, the external structures and underground piping associated with the gaseous effluent vent line system were dismantled, removed and disposed of (Elder and Knoell 1986, 06670, p. 43), including six concrete structures and 435 ft of contaminated underground piping. Cesium-137 soil contamination was encountered within TA-02-001 near the sand pit and utility trench during D&D activities. The soil was removed and disposed of during D&D activities (Montoya 1991, 06996, p. 5).

AOC 02-004 (b, c, and d), OWR Effluent Storage Tanks

AOCs 02-004 (b, c, and d) are the individual waste liquid storage tanks in a three-tank system (Figure 2.1-1). The system contained three underground 1200-gal. stainless-steel effluent storage tanks (TA-02-054, TA-02-055, and TA-02-056) with rubberized liners (Figure 2.1-1), approximately 150-ft west of TA-02-001. The tanks received waste liquid, which was primarily flushed effluent from the ion exchange system, associated with the OWR [AOC 02-004(a)]. They also received any spills or leaks collected from the floor of the Reactor Facility Equipment Building [TA-02-044, AOC 02-004(f)], as shown in engineering drawing C-29861 (LASL 1962, 90055).

The tanks were cylindrical and approximately 5 ft high and 6 ft in diameter situated with approximately 2-ft spacing between them within a single reinforced concrete vault. The vault was rectangular and approximately 8 ft by 23 ft. The top of the vault was approximately 4 ft belowground, as shown in engineering drawing C-29861 (LASL 1962, 90055). The bottom of the vault was approximately 10 ft underground. It was adjacent to the reactor facility acid pit/transfer sump [TA-02-053, AOC 02-004(e)] and aligned perpendicular to Los Alamos Creek. TA-02-054 [AOC 02-004(b)] was the southernmost tank; TA-02-055 [AOC 02-004(c)] was the center tank; TA-02-056 [AOC 02-004(d)] was the northernmost tank. Lines from the tanks to the reactor facility acid pit/transfer sump [(AOC 02-004(e)] were approximately 8 ft in length. The tanks were used to temporarily store ion-exchange resin regenerant liquid until it was transferred to the liquid acid waste line [no structure number addressed by AOC 02-004(f)] leading to TA-50 or to the aboveground portable tank [no structure number, AOC 02-004(g)] for temporary storage before disposal.

The tanks, vault, transfer sump, and lines were installed in 1962 according to engineering drawing C-29861, (LASL 1962, 90055). Leaks in the OWR cooling liquid system led to the shutdown in 1993, when all systems were put on standby status. In 1995, all lines and tanks were drained and the liquids disposed of (LANL 2000, 90087). In 2000, the tanks, vault, and transfer sump were removed and disposed of (LANL 2000, 90087). The lines connecting the tanks to the vault [TA-02-053, AOC 02-004(e)], Reactor Facility Equipment Building [TA-02-044, AOC 02-004(f)], the liquid acid waste line (no structure number) leading to TA-50, and the outfall [AOC 02-011(d)] were removed and disposed of in 2003 (LANL 2003, 82646, p. 2).

AOC 02-004(e), OWR Acid Pit/Transfer Sump

AOC 02-004(e) was a liquid transfer system that consisted of a series of valves and pumps that transferred waste from the OWR equipment building (TA-02-044) to either TA-02-054, TA-02-055, TA-02-056 tanks, the portable aboveground tank (no structure number), or the liquid acid waste line (no structure number) leading to TA-50 (Figure 2.1-1). The equipment was housed in a partially belowground transfer sump, referred to as the acid pit/transfer sump (TA-02-053). The acid pit/transfer sump was operational in 1963. The unit was a reinforced-concrete pit 7 ft by 11 ft by 7 ft deep. Approximately 1 ft of the pit was aboveground as indicated on engineering drawing C-29861 (LASL 1962, 90055). The system transferred liquid wastes from the OWR equipment building to three storage tanks [AOCs 02-004(b), 02-004(c), and 02-004(d)]. The tanks were used to temporarily store the ion-exchange resin regenerant liquid until it was transferred to the liquid acid waste line (no structure number) leading to TA-50 or to the portable aboveground tank [no structure number, AOC 02-004(g)].

The liquid waste line entered the sump from the OWR equipment building [TA-02-044, AOC 02-004(f)] at approximately 5 ft below ground surface (bgs) and connected to the tanks at 8 ft bgs.

Use of the acid pit/transfer sump was discontinued in 1993 when the OWR was shut down (LANL 2003, 82646, p. 2). All liquid waste was drained from system in 1995, and in 2000 the structure and equipment were decommissioned, removed, and disposed of (LANL 2000, 90087). In 2003, all remaining buried pipes and drains were removed and disposed of (LANL 2003, 82646, p. 2).

AOC 02-004(f), OWR Equipment Building

AOC 02-004(f) was a 49 ft by 26 ft equipment building (TA-02-044) that contained several pumps, including the main circulating pump for the OWR's cooling water, a buffalo chiller (a cooling system), and an ion-exchange filter system to maintain the OWR cooling liquids system (Figure 2.1-1). TA-02-044 became operational in 1954. The OWR equipment building (TA-02-044) had floor drains, which discharged to Los Alamos Creek through an outfall located at AOC 02-008(a). At a later date, it was also connected to TA-50 by a liquid acid waste line.

Modifications to the cooling water system were made in 1959, namely the addition of the cooling tower (TA-02-049) and associated outfall, as shown in engineering drawing C-21327 (LASL, 1959, 90058). The drain from TA-02-044 was connected to the cooling tower outfall in 1959, as shown in engineering drawing C-48768 (LASL, no date, 90056). The OWR equipment building (TA-02-044) and the cooling tower (TA-02-049) outfalls in Los Alamos Creek were physically in the same location of AOC 02-008(a). When the acid pit/transfer sump and effluent storage tanks (TA-02-054, -055, and -056) were added in 1962, the wastewater discharge from the OWR equipment building (TA-02-044) was routed through TA-02-053, minimizing direct discharge to Los Alamos Creek from TA-02-044, as noted in engineering drawing C-29861 (LASL 1962, 90055).

Lines associated with TA-02-044 were present at approximately 4 ft bgs. Discharge associated with TA-02-044 operations from 1954 to 1962 is addressed under the cooling tower AOC 02-008(a) outfall. Discharge from 1962 to 1993 is addressed under the OWR equipment building outfall [AOC 02-011(d)].

The equipment building was operational into 1993 when the OWR was shut down. All liquid waste was removed from the system and disposed in 1995 (LANL 2000, 90087). In 2000, the structure and equipment were removed and disposed of (LANL 2000, 90087), and the remaining buried pipes and drains were removed and disposed of (LANL 2003, 82646, p. 2).

AOC 02-004(g), Portable Aboveground Storage Tank

AOC 02-004(g) was a 300-gal. portable storage tank. The tank was located on a platform near the guard station (TA-02-012) (Figure 2.1-1) and was used as temporary liquid storage to supplement the three effluent storage tanks [AOCs 02-004(b), 02-004(c), and 02-004(d)]. The portable aboveground storage tank was installed and began operations in 1962 (Bunker 1985, 36231). The platform and portable aboveground storage tank were removed by 1993; however, removal and disposal details are not available (LANL 1993, 15314, p. 7.5-4).

SWMU 02-005, Cooling Tower Drift Loss

SWMU 02-005 consists of an area potentially affected by airborne drift of potassium dichromate used to inhibit corrosion in the OWR cooling tower (TA-02-049) (Figure 2.1-1). The cooling tower was installed and became operational in 1957. The cooling tower was constructed with aluminum heat exchangers that were prone to corrosion. Potassium dichromate was added to the make-up water to inhibit corrosion of the heat exchangers. Stainless-steel heat exchangers were installed to eliminate the use of potassium dichromate in 1975 (LANL 1993, 15314, p. 7.6-1).

The cooling tower operated until the OWR was shut down in 1993. All liquid was drained from the system in 1995 (LANL 2003, 82646, p. 2). In 2000, the cooling tower structure and equipment were removed and disposed of (LANL 2000, 90087). Remaining buried pipes and drains were removed and disposed in 2003 (LANL 2003 82646, p. 2).

The potential blowdown area was determined by prevailing canyon winds. Based upon meteorological records, winds tend to be northwesterly in the daytime and northeasterly in the evenings (Bowen 1990, 06899).

SWMU 02-006(a), French Drain Associated with Mesa-top Stack

SWMU 02-006(a) was an 8-ft-deep French drain system designed to catch condensate that collected as reactor exhaust gases cooled while venting through the tower exhaust stack (TA-02-009) (Figure 2.1-1). The French drain was installed in 1948 (designed as TA-02-009, also known as TA-61-026 according to engineering drawing C-1716 [LASL 1948, 90083]). The stack system consisted of the exhaust stack and French drain system, all located on the mesa top above TA-02 on the south rim of Los Alamos Canyon in TA-61. The stack system was the termination point of the gaseous effluent vent line (Line 119) from the OWR and water boiler reactors at TA-02. The vent stack and French drain system were active from its installation in 1948 through the OWR shutdown in 1993. The French drain system and contaminated soils were removed and disposed of during D&D activities in 2003 (LANL 2003, 90089).

SWMU 02-006(b), OWR Acid Waste Line

SWMU 02-006(b) was an acid waste line that carried effluent from several laboratory rooms in the center of the OWR Building (TA-02-001) south to a discharge point into Los Alamos Creek (Figure 2.1-1). Construction of the TA-02-001 and associated laboratory rooms, sinks, and waste line [SWMU 02-006(b)] was completed in 1946 (engineering drawing C-1703, LASL 1946, 89678). The OWR became operational in 1956. The acid waste line was reportedly taken out of service in the 1960s; however, no record of its removal is available (DOE 1987, 08661).

A 1990 Environmental Safety and Health (ES&H) Group memorandum indicates that the OWR acid waste line was proposed for connection to a new drain line. This line would connect the south side drains from TA-02-001 directly to the reactor facility acid pit/transfer sump [TA-02-053, AOC 02-004(e)] for disposal via the liquid acid waste line leading to TA-50 (Heineman 1990, 89739). In 1993, all SWMU 02-006(b) lines and connections were removed and disposed of (LANL 2003, 82646, p. 2).

AOC 02-006(c), Sewer Line

AOC 02-006(c) was a waste line that extended from the office areas in TA-02-001 to the septic tank (TA-02-043, SWMU 02-007) (Figure 2.1-1). AOC 02-006(c) was identified in the 1990 SWMU report (LANL 1990, 07513) as a drain line that was connected to the chemical room in TA-02-001 and several OWR laboratories (Figure 2.1-1). A closer review of the available engineering drawings [C-1703 (LASL 1946, 89678) and C-1750 (LASL 1949, 89680)] provides the following clarification on the connection and use of AOC 02-006(c).

AOC 02-006(c) was the drain line that served the office or central portion of the OWR Building, TA-02-001. As indicated on engineering drawing C-1750 (LASL 1949, 89680), the line was separate from AOC 02-006(b), the OWR acid waste line that connected to the chemical laboratories. The AOC 02-006(c) waste line received wastewater from the evaporative cooler, backflow preventer valve, and drinking fountain associated with the control room, restrooms, and office areas. The sanitary service provided by AOC 02-006(c) was transferred to TA-41 in the mid-1970s (DOE 1987, 08661). However, the AOC 02-006(c) drain line continued to convey basement seepage to the AOC 02-008(c)(i and ii) outfalls installed in 1985 and 1988. The AOC 02-006(c) sewer line was removed and disposed during D&D activities in 2003 (LANL 2003, 82646, p. 2).

AOC 02-006(d), OWR Wash Line (Duplicate of AOC 02-006[c])

AOC 02-006(d) was identified in the 1990 SWMU Report (LANL 1990, 07511) as a drain line that received effluent from the TA-02-001 reactor control room air conditioner, sink, backflow preventer valve, and drinking water fountain (Figure 2.1-1). According to the SWMU report, the drain line discharged to Los Alamos Creek; however, no outlet for the drain line has been found on available engineering drawings C-1750 or C-1703 (LASL 1949, 89680; LASL 1946, 89678), nor has a location of the drain line been found at the site (LANL 15314, pp. 7.7-1 and 7.7-2). The available as-built drawing (LASL 1946, 89678) and the details of removal efforts during the 2003 D&D (LANL 2003, 82646, p. 17) indicate that there was no drain line specific to the reactor control room air conditioner, sink, backflow preventer valve, and water fountain; rather, these units were connected to the AOC 02-006(c) drain line leading to the septic system (TA-02-043). Therefore, all potential releases associated with AOC 02-006(d) are addressed under AOC 02-006(c) (Section 2.5).

AOC 02-006(e), OWR Floor Drain and Waste Sump

AOC 02-006(e) was a sump (TA-02-026) and drain line that received effluent from the TA-02-001 reactor room floor drains and mezzanine (Figure 2.1-1). The AOC 02-006(e) drain line was connected to floor drains in the main reactor room and became operational in 1944. A second collection sump (TA-02-082) was added to the AOC 02-006(e) drain line in 1990, as shown in engineering drawing C-45924 (LANL 1990, 89679). A drain line from the second sump was connected directly to the acid pit/transfer sump [TA-02-053, AOC 02-004(e)], possibly replacing the AOC 02-006(e) direct discharge to Los Alamos Creek; however, the sump (TA-02-026) and the original drain line remained in place until they were removed and disposed of in 2003 during D&D activities, along with TA-02-082 and the drain line to TA-02-053 (LANL 2003, 82646, p. 6).

Consolidated Unit 02-007-00

Consolidated Unit 02-007-00 consists of the following SWMUs: 02-007, a septic tank and outfall; 02-009(a), a radioactively contaminated soil area behind the storage building; 02-009(b), a radioactively contaminated soil area north of the stack-gas valve house; and 02-009(c), a leach field and a radioactively contaminated soil area associated with the condensate trap removal (Figure 2.1-1). The sites have been investigated separately in the past, and in this plan, the sites are discussed individually, in numeric order.

SWMU 02-007, Septic Tank and Outfall

SWMU 02-007 is a septic tank (TA-02-043) and outfall installed in 1944 and removed in 1985. The septic tank was constructed of reinforced concrete and measured 13 ft by 8 ft by 6 ft deep. Overflow from the tank discharged to the stream channel through a 6-in. vitrified clay pipe (VCP). However, the location of the outfall discharge is unknown (Elder and Knoell 1986, 06670, p. 26). Laboratory wastes were discharged into the septic system. The chemical waste shack (TA-02-003, AOC 02-010) was connected to the septic system, as shown in engineering drawing C-1683 (LASL 1944, 90081) in 1947 and remained connected until the chemical shack was decommissioned in 1971 (LASL no date, 34172). In 1986, the septic tank and overflow outfall and surrounding soils were removed and disposed (Elder and Knoell 1986, 06670, pp. 26–41).

SWMU 02-008(a), National Pollutant Discharge Elimination System-Permitted Cooling Tower Outfall

SWMU 02-008(a) is a former National Pollutant Discharge Elimination System (NPDES)-permitted outfall (EPA 03A020) that discharged cooling water from the OWR cooling tower (TA-02-049) (Figure 2.1-1). The cooling tower became an operational component of the OWR system in 1957. The cooling tower facility began using potassium dichromate to control aluminum heat exchanger corrosion in 1959. The aluminum heat exchangers were replaced by stainless steel in 1975 eliminating the use of potassium dichromate. Shutdown of the OWR in 1993 placed the cooling tower on stand-by status, and in 1995 all the liquid waste was drained from the system. In 2000, the structure and equipment were decommissioned and removed (LANL 2000, 90087). In 2003, the remaining buried pipes and drains were removed and disposed of (LANL 2003, 82646, p. 2). NPDES outfall Environmental Protection Agency (EPA) 03A020 was removed from Laboratory's NPDES permit in July 1995 (LANL 1990, 07511).

The SWMU 02-008(a) outfall was also called AOC 02-011(e), NPDES-permitted outfall EPA 03A020. All discussions regarding outfall EPA 03A020 are addressed under SWMU 02-008(a) (LANL 1990, 07511). Therefore, all potential releases associated with AOC 02-011(e) are addressed under SWMU 02-008(a).

AOC 02-008(c), OWR Basement Drain Lines and Outfalls

AOC 02-008(c) is composed of two specific drains: AOC 02-008(c)(i) and AOC 02-008(c)(ii). These drains are two unpermitted outfalls that received TA-02-001 basement groundwater seepage from 1985 through 1988 and 1988 through 2003, respectively (Figure 2.1-1).

In 1985, the AOC 02-008(c)(i) outfall was created to discharge groundwater seepage from the basement of the TA-02-001 basement sump to Los Alamos Creek per engineering drawing C-39551 (LASL 1971, 89682). In 1988, the 02-008(c)(i) pipe became plugged and was left in place. A second drain was installed, and outfall 02-008(c)(ii) was created approximately 70 ft west of AOC 02-008(c)(i) (LANL 1993, 15314, p. 7.9-1). The AOC 02-006(c) sewer line connected the 02-008(c)(ii) drain line to TA-02-001. Both drain pipes were removed and disposed of during TA-02 D&D activities in 2003 (LANL 2003, 82646, p. 2).

SWMU 02-009(a), Radioactively Contaminated Soil Area behind Storage Building

SWMU 02-009(a) is an area of beta/gamma radioactive soil contamination located around a boulder, south of the southeast fence corner east of the Omega-50 storage building (TA-02-050). SWMU 02-009(a) was identified in 1986 during D&D of the WBR (Elder and Knoell 1986, 06670, p. 40). No other information regarding the origin of contamination in this SWMU is available (LANL 1990, 07512). A limited amount of soil was removed and disposed of in 1986 (Elder and Knoell 1986, 06670, pp. 26–41).

SWMU 02-009(b), Radioactively Contaminated Soil Area North of the Stack-Gas Valve House

SWMU 02-009(b) is an area of radioactive soil contamination located north of the stack-gas valve house (TA-02-019) and the east bridge at TA-02. Detectable beta/gamma radioactivity was identified in 1986 during D&D of the WBR when this area was used for D&D truck staging (Elder and Knoell 1986, 06670, p. 40). A limited amount of soil was removed and disposed of in 1986 (Elder and Knoell 1986, 06670, pp. 26–41).

SWMU 02-009(c), Leach Field and Radioactively Contaminated Soil Area Identified during Condensate Trap Removal

SWMU 02-009(c) is composed of a leach field and an area of alpha-, beta-, and gamma-emitting radioactively contaminated soil south of the condensate trap [TA-02-048, AOC 02-003(b)]. SWMU 02-009(c) was identified during 1985–1986 D&D activities associated with the condensate trap (Elder and Knoell 1986, 06670, pp. 36–40).

Two sections of contaminated 6-in.-diameter VCP, one 34 ft long and one 20 ft long and lying parallel to the septic tank overflow pipe, were uncovered during D&D activities at the condensate trap. The pipes were approximately 5 ft below and to either side of the septic tank overflow pipe (Elder and Knoell 1986, 06670, pp 29–40). The purpose of the pipes is unknown. The pipes were present at depths of 3 to 8 ft bgs (Elder and Knoell 1986, 06670, pp. 26–41). All structures and adjacent soil down to the saturated zone were removed and disposed of during the 1985–1986 D&D activities (Elder and Knoell 1986, 06670, pp. 36–40).

AOC 02-009(d), Soil Contamination East of Reactor Building

AOC 02-009(d) is an area of radioactive soil contamination located near the east end of TA-02-001 (Figure 2.1-1). Beta and gamma radioactivity were identified above local background during decommissioning and removal of inactive WBR structures at TA-02 during 1985 and 1986. The source of contamination at AOC 02-009(d) is unknown (LANL 1990, 07511).

AOC 02-009(e), Leach Field and Radioactively Contaminated Soil Area Identified during Condensate Trap Removal (Duplicate of SWMU 02-009[c])

AOC 02-009(e) is a duplicate of SWMU 02-009(c) and addressed in Consolidated Unit 02-007-00 (LANL 1990, 07511). Therefore, all potential releases associated with AOC 02-009(e) are addressed under SWMU 02-009(c).

AOC 02-010, Residual Soil Contamination Associated with the Chemical Waste Shack

AOC 02-010 is residual soil contamination associated with a small chemical handling building (the chemical waste shack, TA-02-003) that contained a small underground chamber (e.g., hot cell) for working with various radioactive and chemical materials (Figure 2.1-1). The chemical waste shack was built in 1944 according to engineering drawing C-1686 (LASL1944, 90084) and was decommissioned, removed and disposed in 1971 (LASL no date, 34172). It is not known if soils were along with the AOC 02-010 structures (LASL no date, 34172).

AOC 02-011(a), Storm Drains Associated with the OWR

AOC 02-011(a) consists of 11 drain segments and associated outfalls across TA-02 [AOC 02-011(a)(i) to (xi)]. These individual segments drain either directly or indirectly to Los Alamos Creek (Figure 2.1-1).

The following drains are associated with this AOC:

(i) An approximately 50-ft-long concrete storm drain (e.g., concrete flume), located northwest of TA-02-001, that drains into a drop inlet/catch basin (TA-02-36), as shown in engineering drawing R-5102, (LANL 1983, 90086). There is no information that the drain handled anything but storm water.

(ii) A 24-in.-diameter, 8 ft-long underground corrugated metal pipe (CMP) between two catch basins (TA-02-036 and TA-02-027), as shown in engineering drawing R-5102 (LANL 1983, 90086). There is no information that the drain handled anything but storm water.

(iii) An 85 ft-long concrete storm drain (e.g., concrete flume) located northwest of TA-02-001 that drains into a catch basin (TA-02-027), as shown in engineering drawing R-5102 (LANL 1983, 90086). The drain was reportedly used periodically for discharge of water from the fuel transfer pit (DOE 1987, 08661).

(iv) A 15-in.-diameter, 15 ft-long concrete storm drain west of TA -02-001 that drains into a catch basin (TA-02-028), as shown in engineering drawing R-5102 (LANL 1983, 90086). There is no information that the drain handled anything but storm water.

(v) A 24-in.-diameter, 10-ft-long concrete storm drain between TA-02-027 and TA-02-028 as shown on engineering drawing R-5102 (LANL 1983, 90086). This drain may have handled the fuel transfer pit water coming from the concrete flume, with associated contaminated aluminum shards.

(vi) A 30-in.-diameter, 30-ft-long CMP between a catch basin (TA-02-028) and Los Alamos Creek, as shown in engineering drawing R-5102 (LANL 1983, 90086). This drain may have handled the fuel transfer pit water coming from the concrete flume, with associated contaminated aluminium shards.

(vii) A 6-in.-diameter, 18 ft-long pipe between TA-02-001 and the salvage basin (TA-02-026) and Los Alamos Creek. AOC 02-011(a)(vii) is a duplicate of AOC 02-006(e), as noted in the 1990 SWMU report (LANL 1990, 07511). This drain is addressed as AOC 02-006(e) throughout this work plan.

(viii) An 18-in.-diameter, 18-ft-long CMP between TA-02-001 catch basin (within the building) and Los Alamos Creek, as shown in engineering drawing C-1699 (LASL 1946, 90070). There is no information that this drain handled anything but storm water.

(ix) A 3-in.-diameter, 25-ft-long pipe between TA-02-001 and outfall to Los Alamos Creek. Wastewater design memos (Heineman 1990, 89739) indicate that floor drains from the eastern side of TA-02-001 (WBR area) drained to this outfall before 1990.

(x) A 12-in.-diameter, 12-ft-long drain northeast of TA-02-001 that discharged to Los Alamos Creek through a series of concrete ditches and CMP along the east side of the OWR building, as shown in engineering drawing C-1718 (LASL1947, 89677). The drains and concrete ditches remained in place until they were removed during D&D activities in 2003 (LANL 2003, 82646, p. 2). There is no information that this drain handled anything but storm water.

(xi) A 4-in.-diameter, 13-ft-long pipe between TA-02-001 and Los Alamos Creek. AOC 02-011(a)(xi) is a duplicate of the OWR acid waste line [SWMU 02-006(b)]. AOC 02-011(a)(xi) is addressed as SWMU 02-006(b) throughout this work plan.

D&D operations were conducted at the OWR site in 2003 (LANL 2003, 82646, p. 2). The SWMU 02-011(a) storm drain systems iv and viii through x were removed and disposed of during these D&D operations. The remaining five storm drain segments remain in place on the west side of TA-02-001 to catch runoff from the hillside north of the site and direct it to the stream channel. The structures serve as erosion control.

AOC 02-011(b), Two Drains and Outfalls Associated with the Stack-Gas Valve House

AOC 02-011(b) consisted of two drains and outfalls associated with the stack-gas valve house (TA-02-019) (Figure 2.1-1). One drain was a 9-ft-long by 15-in.-diameter CMP between the stack-gas valve house and a catch basin (TA-02-035). The second drain was a 9-ft-long by 24-in.-diameter CMP that drained from a catch basin (TA-02-035) to Los Alamos Creek outside the east fence. The drains and structures are shown in engineering drawing C-1718 (LASL 1947, 89677); the drains remained in place until they were removed and disposed of during D&D activities in 2003 (LANL 2003, 82646, p. 2).

AOC 02-011(c), Storm Drain Associated with OWR Equipment Building

AOC 02-011(c) was a storm drain associated with the OWR equipment building [TA-02-044, AOC 02-004(f)] (Figure 2.1-1). The drain line was a 4-in.-diameter VCP approximately 12 ft long that drains to the surface west of the west fence. The drain line was installed in 1954, as shown in engineering drawing C-14930 (LASL 1954, 90076), and removed and disposed of in 2003 (LANL 2003, 82646, p. 2).

AOC 02-011(d), NPDES-Permitted OWR Equipment Building Outfall

AOC 02-011(d) is a NPDES-permitted outfall that discharged effluent from the OWR equipment building [TA-02-044, AOC 02-004(f)] (Figure 2.1-1). Discharge consisted primarily of regenerant water from the ion-exchange system. Outfall AOC 02-011(d) discharged to Los Alamos Creek, south of the OWR Equipment Building (TA-02-044). The line was adjacent to the western edge of the cooling tower, as shown in engineering drawing C-14930 (LASL 1954, 90076).

Outfall AOC 02-011(d) became operational in 1949. In 1963, the discharge was routed through the waste storage tanks and disposed of through the liquid acid waste line to TA-50. The outfall was removed from the NPDES permit in 1995 (NMED 2001, 72820).

AOC 02-011(e), NPDES-Permitted Cooling Tower Outfall (Duplicate of SWMU 02-008[a])

AOC 02-011(e) is a duplicate of SWMU 02-008(a), the former NPDES-permitted outfall from the OWR cooling tower (TA-02-049) (Figure 2.1-1) (LANL 1990, 07511). Therefore, all potential releases associated with AOC 02-011(e) are addressed under SWMU 02-008(a).

AOC 02-012, Soils Associated with Underground Fuel Storage Tanks

AOC 02-012 consists of the potential soil contamination associated with two removed underground fuel storage tanks (TA-02-029 and TA-02-067, NMED-registered tank TA-02-1) (Figure 2.1-1). In approximately 1944, a 1000-gal. fuel-oil storage tank (TA-02-029) was installed along the south wall of the OWR building. The tank was removed in 1950 (LANL 1996, 55226, pp. 5–15).

In 1982, a 517-gal. diesel tank (TA-02-067, NMED-registered tank TA-02-1) was installed on the north side of TA-02-001. In 1994, underground storage tank (UST) tightness tests were performed on the diesel tank and its associated lines. The results indicated that the tank system was intact. The diesel tank and associated lines were removed and disposed of in 1998 in accordance with NMED requirements (LANL 2000, 90023).

2.1.2 TA-21

Consolidated Unit 21-004(b)-99, Drain Line and Aboveground Storage Tanks

Consolidated Unit 21-004(b)-99 consists of SWMU 21-004(b), SWMU 21-004(c), and AOC 21-004(d) (Figure 2.1-2). SWMUs 21-004(b) and (c) are two aboveground stainless-steel tanks (TA-21-346) that were installed in 1979. They are used as overflow holding tanks for liquid waste from cooling towers, and laboratory and radionuclide experimental operations in the TSTA facility (TA-21-155). Each tank is 9 ft high and 8 ft in diameter and has a capacity of 3000 gal. (LANL 1990, 07512). Both tanks are currently mounted on steel legs above the surface of an asphalt-bermed area. The bermed area is 36 ft long by 18 ft wide and has a capacity of approximately 9600 gal. AOC 21-004(d) is the drain line connected to these tanks, as well as an outfall area, that was present in 1965 before the tanks were installed. The outfall discharge area was located where the headwall is situated today (Figure 2.1-2).

Consolidated Unit 21-006(e)-99, Seepage Pits

Consolidated Unit 21-006(e)-99 consists of SWMU 21-006(e), a seepage pit, and AOC 21-006(f), a gravel seepage pit (Figure 2.1-3). SWMU 21-006(e) is a seepage pit that may be located south of TA-21-004, but its location is uncertain (LANL 1990, 07512). This pit may be the same seepage pit as AOC 21-006(f) (LANL 1991, 03636, p. 18-13).

AOC 21-006(f) has been described as a gravel seepage pit located on the south side of the DP West complex (Tribby 1947, 01404, p. 1). This seepage pit may have received up to 4000 L per day of hydrogen fluoride wastewater effluent from a hydrofluorination process located in Room 413, the southernmost room of TA-21-004 (Tribby 1947, 01404, p. 1). The period of operation is not known. During repair work on the drain system under Room 413, a hole in the ground was identified under the drain lines. It was evident that acid waste had escaped and drained into the ground (Meyer 1978, 00526). This hole may be the same as one of the seepage pits.

SWMU 21-011(b), Acid-Waste Sump and Lines

SWMU 21-011(b) is a sump (TA-21-223) located approximately 400 ft east of the TA-21 waste treatment plant (TA-21-257) and 65 ft northwest of the TSTA (Figure 2.1-2). In 1965, the sump was installed to transport acid waste from TA-21-152, TA-21-155, and TA-21-209 through 6-in.-diameter drain lines to the sump (TA-21-223) and from the sump through a 3-in. waste line to the old waste treatment plant (TA-21-35) (Francis 1997, 76126). The sump also connected to a 6-in.-diameter VCP overflow pipe (LASL 1968, 89722). Later, in 1967 and 1968, the old waste treatment plant (TA-21-35) was removed and the sump outlet line was extended to the new waste treatment plant (TA-21-257) (LASL 1968, 89723; LASL 1975, 89724). In 1979, the sump overflow pipe was connected to aboveground stainless-steel storage tanks [TA-21-346, Consolidated Unit 21-004(b)-99] (LASL 1979, 89721). In the mid- to late 1980s, two new 4-in.-diameter acid waste lines were connected from TA-21-155 to manhole TA-21-222 to be pumped by the sump (LASL 1977, 89726).

Consolidated Unit 21-022(b)-99, Industrial Waste Sumps and Drain Lines

Consolidated Unit 21-022(b)-99 consists of SWMUs 21-022(b), 21-022(c), 21-022(d), 21-022(e), and 21-022(g) (Figure 2.1-4). The consolidated unit consists of industrial waste lines and their underground liquid waste sumps: TA-21-81 [SWMU 21-022(b)], TA-21-84 [SWMU 21-022(c)], TA-21-87 [SWMU 21-022(d)], TA-21-89 [SWMU 21-022(e)], and TA-21-189 [SWMU 21-022(g)].

Sump structures TA-21-81, TA-21-84, TA-21-87, and TA-21-89 [SWMUs 21-022(b)-(e)] were constructed of brick and concrete in 1945 to receive liquid wastes before draining to MDA T for disposal (LASL 1946, 89727). These sumps were located adjacent to the northeast corners of TA-21-002, TA-21-003, TA-21-004, and TA-21-005 and received all of the liquid waste discharges, including the floor drains, janitor sinks, and chilled water overflows, from the associated buildings (Maraman 1987, 01453, p. 5). Each sump was approximately 5 ft 4 in. in diameter and 10 ft deep. Construction drawings show a 2-ft-diameter, 5-ft-deep steel catch basin within each sump (LASL 1946, 89727). Pipelines connecting the sumps to the buildings were constructed of 6-in.-diameter cast iron, and outlets to MDA T disposal pits were constructed of 6-in.-diameter steel pipes (LASL 1946, 89727). In 1952, the waste treatment plant (TA-21-35) was constructed and a 4-in.-diameter extra heavy cast iron (EHCI) waste line was installed north of the old 6-in.-diameter iron pipe, which was left in place (LANL 1990, 07512). The sumps were connected to the new line through 4-in.-diameter EHCI pipes (LASL 1957, 89733). TA-21-002, TA-21-003, and TA-21-005 had additional 1.5-in.-diameter stainless-steel raffinate waste lines (for liquid remaining after extraction) or citrate waste lines that connected directly to the waste treatment plant (LASL 1957, 89733; LASL 1975, 89729; LASL 1975, 89724; LASL 1975, 89730; LASL 1975, 89731). In 1963, plastic liners were placed inside and grouted to the walls of sump TA-21-81, TA-21-84, TA-21-87, and TA-21-89 (LANL 1991, 03636, p. 18-37). In the late 1960s, TA-21-35 was removed, and all wastes lines (4-in.- and 1.5-in.-diameter) were extended to the new waste treatment plant (TA-21-257) (LASL 1968, 89723).

In the early 1960s, a sump [TA-21-189, SWMU 21-022(g)] was constructed of concrete with dimensions of 5.3 ft by 11.08 ft. It was located off the northwest corner of TA-21-150, the plutonium fuel storage building. The sump was connected to the plutonium fuel storage building by 2-in.- and 4-in. -diameter EHCI pipes. The sump outlet pipe connected to the waste treatment plant (TA-21-35) was constructed of 4-in.-diameter cast iron (LASL 1962, 89732).

In 1979 and 1980, all sumps were removed and disposed at TA-54 (LANL 1991, 03636, p. 18-40; Blackwell 1980, 85470, p. 2). The building lines were extended to form a direct connection to the main lines to MDA T.

AOC 21-028(c), Satellite Container Storage Areas

AOC 21-028(c) consists of four satellite container storage areas that were located around TA-21-003 (Figure 2.1-3). The four container storage areas were located at the door to Room 301 on the north dock, at the outer door to Room 360, at the northeast side of the fan Room 3N, and inside a chemical safety cabinet in Room 362. The period of operation is not available but probably began in 1945, when the building was constructed (LANL 1991, 03636, p. 18-21), and they were in use as late as 1990 (LANL 1991, 03636, pp. 18-23 and 18-24). These areas have stored a wide variety of chemicals including depleted uranium salts, metal salts, organic chemicals, inorganic chemicals, and other reagents (LANL 1991, 03636, p. 18-23 and 18-24). Room 362 was also the location of a removed septic tank [TA-21-142, SWMU 21-023(b)]. The septic tank was addressed in the revised DP Site Aggregate Area work plan (LANL 2005, 90225).

2.1.3 TA-26

SWMU 26-001, Surface Disposal Area

SWMU 26-001 is a surface disposal area on the south-facing slope of Los Alamos Canyon that contains debris from a five-room concrete storage vault (TA-26-001, Figure 2.1-5). The vault was constructed in 1946 and was decommissioned and dismantled in 1966 (LASL 1949, 00696). Although the vault was constructed for storing radioactive materials, documentation describing the specific type and quantity of radioactive materials is not available. One document states that the vault "stored friable containers which now contain, or have contained radioactive material" (Maddy 1957, 06439). The vault was later used for storing HE (IT Corporation 1991, 01904). Before the vault was dismantled, the contaminated contents that were removable, including shelving, drain lines, the sump, and ductwork, were disposed in MDA C (Blackwell 1973, 00619). The remains of the vault were bulldozed onto the south-facing slope of Los Alamos Canyon. In the 1970s, most of the vault debris rested on the bench below the mesa top; however, some debris may have fallen as far as the canyon floor (Buckland 1978, 00496). The debris on the ledge was covered with approximately 3 ft of soil (Blackwell 1973, 00619). In 1985, a Phoswich radioactivity survey was conducted on the mesa at the location of the storage vault, and revealed gamma radiation levels 20% to 25% higher than local background levels on the west side of the site (LANL 1992, 07667, p. 5-160). The source of the contamination is unclear, and the extent of contamination beyond the vault site, on the ledge, and in the canyon is not known. No formal survey of the refuse on the canyon ledge has been performed; however, no alpha activity was detected on the mesa top after the structures were demolished (Buckland 1978, 00496). In 1986, the Comprehensive Environmental Assessment and Response Program (CEARP) field survey team observed pipe and other materials projecting from the material on the bench below the mesa top (DOE 1987, 08661). Currently, a small amount of reinforced concrete debris and a pipe are visible on the bench below the mesa top.

SWMU 26-002(a), Acid Sump System

SWMU 26-002(a) is the acid sump system that served the concrete storage vault at TA-26 from 1946 to 1965 (TA-26-006, Figure 2.1-5). The sump system consisted of a 6-in. VCP floor drain in the south center room of the vault. The drain connected to a collection sump and outfall that discharged to Los Alamos Canyon. The collection sump was located outside the vault. Engineering records note the sump as having a 4-ft internal diameter and a depth of 10 ft (LANL 1990, 07513). Laboratory personnel assumed that the sump system was contaminated with radioactivity because of the contamination found in the storage vault (Buckland 1965, 00628). According to the Laboratory personnel who were involved, the sump and its drain lines were moved to MDA C (Blackwell 1973, 00619). However, no specific document on the removal is available (Blackwell 1973, 00619).

SWMU 26-002(b), Drainage System

SWMU 26-002(b) was the equipment room drainage system constructed in 1946 for the concrete storage vault at TA-26 (no structure number, Figure 2.1-5). It carried effluent through a 4-in. VCP floor drain that discharged directly to the south-facing slope. The drain lines may still be in place because no specific records are available describing their removal. Currently, a concrete wall is visible on the canyon rim.

SWMU 26-003, Septic System

SWMU 26-003 is the septic system that served sanitary facilities in the east room of the concrete storage vault at TA-26 (TA-26-005, Figure 2.1-5). The septic system was installed in August 1948 (LASL no date, 00675).

The septic system consists of a 4-in.-diameter VCP drain line connected to a 250-gal. steel septic tank. Effluent was discharged to Los Alamos Canyon. Laboratory personnel assumed that the septic tank was free from radioactive contamination because the tank served the toilet and sink in the least contaminated room of the storage vault (Buckland 1965, 00628). The septic tank was thought to have handled only sanitary waste; however, because radioactive contamination was found in the vault, it is possible contamination was introduced into the system. Documentation of the septic tank removal is not available, but the tank may have been removed at the same time as the sump system [SWMU 26-002(a)] in the mid-1960s, or it may still be in the ground and backfilled with soil (Blackwell 1973, 00619). The SWMU report stated that the tank was disposed of in the canyon (LANL 1990, 07513).

2.2 Land Use

Currently, TA-02 and TA-26 are in industrial areas that are occasionally used for recreational purposes (e.g., hiking). TA-21 is in an industrial area.

2.3 Conceptual Site Model

The sampling proposed in this work plan uses a conceptual site model to predict additional areas of potential contamination and allows for adequate characterization of these areas. A conceptual site model describes potential contaminant sources, transport mechanisms, and receptors.

2.3.1 Potential Contaminant Sources

Releases at the sites occurred as a result of Laboratory operations (production and research), reactor processes, chemical storage, and waste disposal practices. Those sites previously sampled indicate inorganic chemicals, organic chemicals, and radionuclides are present, but further sampling is necessary to determine the nature and extent of contamination.

2.3.2 Potential Contaminant Transport Mechanisms

Potential transport mechanisms that may lead to exposure of potential receptors include the following:

- vaporization and gaseous diffusion and advection of volatile organic compounds (VOCs) and tritium in air (TA-02 and TA-21),
- dissolution and/or particulate transport of surface contaminants during precipitation and runoff events (all three TAs),
- transport within the shallow saturated zone (TA-02 only),
- airborne transport of contaminated surface soils (all three TAs),
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock (all three TAs), and
- disturbance and uptake of contaminants in shallow soil by plants and animals (all three TAs).

2.3.3 Current and Future Contaminant Potential Receptors

Potential receptors of possible contaminants include the following:

- site workers (TA-02 and TA-21),
- trail users on the mesas (TA-26) and in the canyons (TA-02), and
- plants and animals both on-site and in areas immediately surrounding the sites (all three TAs).

2.4 Previous Site Investigations

Figures 2.4-1 and 2.4-2 show the locations of samples previously collected at TA-02 and TA-21 sites, respectively, that are addressed in this work plan. TA-26 has not been investigated previously. The HIR for the Middle Los Alamos Canyon Aggregate Area contains the investigation details and sampling results for these sites (LANL 2005, 90631).

2.5 Data Evaluation

TA-02 has been excavated, regraded, and backfilled extensively over the past 10 to 20 yr. As such, most of the data collected 10 or more yr ago is not useful for characterizing the current site conditions. Therefore, only a portion of these data is discussed to identify data gaps. The results from soil, sediment, and tuff samples analyzed at off-site fixed laboratories with available supporting quality assurance/quality control (QA/QC) information are discussed below. These data, which are only from sites in TA-02, are presented in their entirety in the Middle Los Alamos Canyon Aggregate Area HIR (LANL 2005, 90631).

In the HIR, usable site data from previous investigations were compared to background values (BVs) and the maximum value in the background concentrations for inorganic chemicals, naturally occurring BVs or fallout values (FVs), the maximum value in the background/fallout concentrations for radionuclides (LANL 1998, 59730), and analytical estimated quantitation limits (EQLs) for organic chemicals (LANL 2000, 71233). Americium-241, cesium-137, plutonium-238/239, strontium-90, and tritium are fallout radionuclides. These were compared to their corresponding soil/fill FVs (0.5-ft surface interval) and sediment FVs (all depths); tuff FVs do not exist. All detections of these radionuclides at depths greater than 0.5-ft in surface soil/fill were carried forward. Uranium-234/235/238 are naturally occurring and were compared to their respective soil/fill, sediment, and tuff BVs (LANL 1998, 59730). The HIR contains the data tables (LANL 2005, 90631, Tables 4.1-1 through 4.1-48) and full data evaluation (LANL 2005, 90631, Section 4).

Based on the evaluation in the HIR, the inorganic chemicals, organic chemicals, and radionuclides for which extent is not defined are presented below. Only those analytes were detected above the range of the background concentrations, above the range of the fallout concentrations, at depths where FVs do not apply, or that do not have a complete background concentrations for comparison are discussed.

2.5.1 TA-02

AOC 02-003(a), Stack-Gas Valve House and Gaseous Effluent Vent Lines

Fourteen soil, fill, and tuff samples were collected from three locations at AOC 02-003(a) (LANL 2005, 90631, Figures 4.1-1 and 4.1-2). These samples were analyzed for inorganic chemicals and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

All inorganic chemicals detected either were within the range of the background concentrations or decreased with depth (LANL 2005, 90631, Figure 4.1-1, Table 4.1-1).

Americium-241 activities increased with depth in the only depth sampled at one location (02-01241) in the center of the stack-gas valve house (LANL 2005, 90631, Figure 4.1-2, Table 4.1-2). Cesium-137 activities stayed essentially the same with depth at one location (02-01242) west of the stack-gas valve house. Tritium activities stayed essentially the same with depth (02-01042 and 02-01241) in the center and west of the stack-gas valve house.

Samples have not been collected to the north or south of the stack-gas valve house. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent was defined for inorganic chemicals at the locations sampled. Vertical extent has not been defined for radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and semivolatile organic compound (SVOC) data are not available for this site.

AOC 02-003(b), Condensate Trap and Gaseous Effluent Vent Line

Five soil and tuff samples were collected from two locations at AOC 02-003(b) (LANL 2005, 90631, Figures 4.1-1 and 4.1-2). These samples were analyzed for SVOCs and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Di-n-butylphthalate was detected at one location (02-01104) north of the condensate trap (LANL 2005, 90631, Figure 4.1-1, Table 4.1-3). The concentrations were below the EQL.

Tritium activities stayed essentially the same with depth at one location (02-01104) north of the condensate trap (LANL 2005, 90631, Figure 4.1-2, Table 4.1-4).

Samples have not been collected to the south of the condensate trap. Therefore, lateral extent has not been defined for SVOCs and radionuclides. SVOC vertical extent has been defined at the locations sampled. Vertical extent has not been defined for tritium. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, inorganic chemical data, including perchlorate, cyanide, and VOC data, are not available for this site.

AOC 02-003(c), Delay System

Eight soil and tuff samples were collected from five locations at AOC 02-003(c) (LANL 2005, 90631, Figures 4.1-1 and 4.1-2). These samples were analyzed for inorganic chemicals and radionuclides (those found using gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Mercury was detected in the only depth sampled at one location (02-01237) south of the delay tanks (8.0 to 8.75 ft bgs) (LANL 2005, 90631, Figure 4.1-1, Table 4.1-5). Samples have not been analyzed for inorganic chemicals to the north or east of the mercury detection, or in deeper intervals at this location (02-01237).

Americium-241 and cesium-137 were detected in the only depth sampled at two locations (02-1237 and 02-01238) south of the delay tanks (LANL 2005, 90631, Figure 4.1-2, Table 4.1-6). Strontium-90 and uranium-235 were detected in the only depth sampled at one location (02-01144) north of the delay tanks. Tritium activities stayed essentially the same with depth at two locations (02-01043 and 02-01145) and it was detected in the only depth sampled at two locations (02-01144 and 02-01238) around and within the area of the delay tanks.

Samples have not been collected to the north, east, or west of the area sampled. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-003(d), Garden Hose Discharge Area and Gaseous Effluent Vent Line

Six soil and fill samples were collected from three locations at the garden hose discharge area at AOC 02-003(d) (LANL 2005, 90631, Figures 4.1-3 and 4.1-4). These samples were analyzed for inorganic chemicals and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

All inorganic chemicals detected either were below the range of the background concentrations or decreased with depth (LANL 2005, 90631, Figures 4.1-3 and 4.1-4, Table 4.1-7).

Cesium-137 was detected in the deepest interval sampled at two locations (02-01255 and 02-01256) north and south of the garden hose discharge area (LANL 2005, 90631, Figure 4.1-8, Table 4.1-8). Plutonium-239 and tritium activities remained unchanged with depth at one location (02-01255) south of the garden hose discharge area. Plutonium-239 activities stayed essentially the same with depth at one location (02-01256) also south of the area. Tritium was detected in the deepest interval sampled at one location (02-01254) on the east side of the AOC.

Samples have not been collected to the north, east, or west of the area sampled. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has been defined for inorganic chemicals at the locations sampled. Vertical extent has not been defined for radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-003(e), WBR Holding Tank

Seven soil and tuff samples were collected from one location at AOC 02-003(e) (LANL 2005, 90631, Figures 4.1-1 and 4.1-2). These samples were analyzed for inorganic chemicals and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Selenium was not detected but its detection limit was above the range of the background concentrations at one location (02-01240) (LANL 2005, 90631, Figure 4.1-1, Table 4.1-9). All inorganic chemicals detected either were within the range of the background concentrations or decreased with depth.

Americium-241 activities increased with depth at the only location sampled (02-01240) (LANL 2005, 90631, Figure 4.1-2, Table 4.1-10). Uranium-234 and uranium-238 were detected in the deepest sample collected. Tritium activities stayed essentially the same with depth.

Samples have not been collected to the north or south of the holding tank. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent for inorganic chemicals was defined at the one location sampled. Vertical extent has not been defined for radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC and SVOC data are not available for this site.

AOC 02-004(a), OWR

OWR and Fuel-Handling Area

Eight soil samples were collected from four locations at AOC 02-004(a) (LANL 2005, 90631, Figure 4.1-5 and 4.1-6). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Mercury concentrations increased with depth at one location (02-22359) at the northwest corner of the OWR excavation area and stayed essentially the same with depth at the remaining two locations (02-22369 and 02-22370) at the south corners of the OWR excavation area (LANL 2005, 90631, Figure 4.1-5, Table 4.1-11). Hexavalent chromium concentrations were essentially the same with depth at three locations (02-22359, 02-22369, and 02-22371) at the northwest, northeast, and southwest corners of the OWR excavation area.

Radionuclide activities were greatest to the northwest of the OWR, at 9.5 to 11.0 ft bgs (LANL 2005, 90631, Figure 4.1-6, Table 4.1-12). Cobalt-60, plutonium-239, and tritium activities increased with depth at one location (02-22369) at the southwest corner of the OWR excavation area. Plutonium-239 activities increased with depth at one location (02-22359) at the northwest corner of the OWR excavation area. Tritium activities were essentially the same with depth at three locations (02-22359, 02-22370, and 02-22371).

Samples have not been collected to the north, west, or south of the OWR reactor. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-004(a), OWR Cooling Liquid-Recirculation Piping

Samples have not been collected to evaluate the cooling liquid recirculation system.

AOC 02-004(a), WBR Area

Samples have not been collected to evaluate the WBR area.

AOC 02-004(a), Gaseous Effluent Vent Line

Samples have not been collected to evaluate the gaseous effluent vent line.

AOC 02-004(a), OWR Material Storage Area

Samples have not been collected to evaluate the material storage area.

AOC 02-004(b, c, and d), OWR Effluent Storage Tanks

Samples with spatial coordinate data are not available to evaluate AOC 02-004 (b, c, or d).

AOC 02-004(e), OWR Acid Pit/Transfer Sump

Samples with spatial coordinate data are not available to evaluate AOC 02-004(e).

AOC 02-004(f), OWR Equipment Building and Liquid Acid Waste Line

AOC 02-004(f) OWR Equipment Building

Eight soil samples were collected from four locations at AOC 02-004(f) (LANL 2005, 90631, Figure 4.1-7 and 4.1-8). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Mercury concentrations increased with depth at one location (02-22376) at the south end of the OWR equipment building (LANL 2005, 90631, Figure 4.1-7, Table 4.1-13). Hexavalent chromium concentrations stayed essentially the same with depth at two locations (02-22377 and 02-22379) in the center of the OWR equipment building and near the line connecting the OWR equipment building to the surge tank.

Cesium-137 was detected in the deepest interval sampled at one location (02-22378) east of the OWR equipment building (LANL 2005, 90631, Figure 4.1-8, Table 4.1-14). Tritium activities increased with depth at one location (02-22379) near the line connecting the OWR equipment building to the surge tank and were essentially the same at three locations (02-22376, 02-22377, and 02-22378) inside and to the east of the OWR equipment building.

Samples have not been collected to the north of the equipment building. Therefore, lateral and extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-004(f) OWR Liquid Acid Waste Line

Samples have not been collected to evaluate the liquid acid waste line area.

AOC 02-004(g), Portable Aboveground Storage Tank

Eight soil samples were collected from five locations at AOC 02-004(g) (LANL 2005, 90631, Figures 4.1-7 and 4.1-8). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Hexavalent chromium concentrations increased with depth at one location (02-22385) east of the tank area and it was detected in the only depth sampled at one surface location (02-22386) north of the tank area (LANL 2005, 90631, Figure 4.1-7, Table 4.1-15).

Plutonium-239 activities increased with depth at one location (02-22385) to the east of the former tank location, and it was detected in the only depth sampled at one surface location (02-22386) north of the tank area (LANL 2005, 90631, Figure 4.1-8, Table 4.1-16). Strontium-90 activities increased with depth at two locations (02-22383 and 02-22385) at the approximate center and east of the former tank area. Tritium activities stayed essentially the same with depth at three locations (02-22383 through 02-22385) at the approximate center and to the east and south of the former tank location.

Samples have not been collected to the north or west of the former tank site. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides at one or more of the locations sampled to the north or east of the former tank site. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

SWMU 02-005, Cooling Tower Drift Loss

Data are not available for SWMU 02-005.

SWMU 02-006(a), French Drain

Thirty-two soil and tuff samples were collected from eight locations at SWMU 02-006(a) (LANL 2005, 90631, Figures 4.1-3 and 4.1-4). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Aluminum concentrations increased with depth at three locations (02-22055, 02-22057, and 02-22059) around the French drain and stayed essentially the same at one location (02-22056) on the east side of the French drain (LANL 2005, 90631, Figure 4.1-3, Table 4.1-17). Barium concentrations increased with depth at two locations (02-22055 and 02-22059) west of the French drain and essentially stayed the same with depth at two locations (02-22056 and 02-22057) east of the French drain. Calcium concentrations increased with depth at three locations (02-22056, 02-22057, and 02-22059) around the

French drain. Hexavalent chromium concentrations increased at one location (02-22059) southwest of the French drain. Lead concentrations increased with depth at two locations (02-22056 and 02-22059) around the French drain. Magnesium concentrations increased with depth at one location (02-22059) southwest of the French drain. Nickel concentrations increased with depth at two locations (02-22055 and 02-22059) west of the French drain. Selenium was not detected, but its detection limits were above the range of the background concentrations in samples from five locations (02-22055 through 02-22059).

Cesium-137 activities increased with depth at two locations (02-22055 and 02-22058) on the west side of the French drain (LANL 2005, 90631, Figure 4.1-4, Table 4.1-18). Strontium-90 activities increased with depth at three locations (02-22052, 02-22055, and 02-22058) west of the French drain and stayed essentially the same with depth at two locations (02-22053 and 02-22056) east of the French drain. Tritium activities increased with depth at five locations (02-22053 through 02-22057) around the French drain. The highest tritium activity at TA-02 (33.8 pCi/g) was detected at this site beneath the French drain structure (location 02-22057).

Only three near-surface soil samples were collected around the French drain. Therefore, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

SWMU 02-006(b) OWR Acid Waste Line

Four soil and sediment samples were collected from three locations at SWMU 02-006(b) (LANL 2005, 90631, Figures 4.1-5 and 4.1-6). These samples were analyzed for inorganic chemicals (including hexavalent chromium), VOCs, SVOCs, polychlorinated biphenyls (PCBs), and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Lead, mercury, selenium, and zinc were detected in the only depth sampled at two locations (02-01094 and 02-01251) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-5; Table 4.1-19). Silver was detected in the only depth sampled at one location (02-01251) in the surface at the outfall area.

SVOCs acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis-2-ethylhexylphthalate, dibenzofuran, fluorene, and indeno(1,2,3,-cd)pyrene decreased with depth and were detected below their EQLs (LANL 2005, 90631, Figure 4.1-5, Table 4.1-20).

Aroclor-1260, benzo(b)fluoranthene, and chrysene were detected in the only depth sampled at two locations (02-01094 and 02-01251) in the surface at the outfall area. Diethylphthalate was detected in the only depth sampled at one location (02-01094) in the surface at the outfall area. Fluoranthene and pyrene concentrations were above the EQL in the only depth sampled (0 to 0.5 ft bgs) at one location (02-01251) in the surface at the outfall area.

Samples from two locations were analyzed for VOCs, and none were detected.

Plutonium-239 was detected in the only depth sampled at two locations (02-01094 and 02-01251) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-6, Table 4.1-21). Strontium-90 activities increased with depth at one location (02-22345) north of the retaining wall. Tritium was detected in the only depth sampled at one location (02-01094) in the surface at the outfall area. Uranium-234 and uranium-235 each were detected in the only depth sampled at one location (02-01094) in the surface at the outfall area.

Only three locations were sampled; therefore, lateral extent has not been defined for inorganic chemicals, SVOCs, VOCs, PCBs, and radionuclides. Vertical extent was defined for VOCs at the locations sampled. Only one of the three locations was sampled at multiple depths (02-22345); thus, vertical extent has not been defined for inorganic chemicals, SVOCs, PCBs, and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate and cyanide data are not available for this site.

AOC 02-006(c), Sewer Line

Samples have not been collected from AOC 02-006(c).

AOC 02-006(e), OWR Floor Drains and Waste Sump

Nine soil and sediment samples were collected from five locations at AOC 02-006(e) (LANL 2005, 90631, Figures 4.1-5 and 4.1-6). These samples were analyzed for inorganic chemicals (including hexavalent chromium), VOCs, SVOCs, PCBs, and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Hexavalent chromium concentrations increased with depth at one location (02-22357) and stayed essentially the same with depth at one location (02-22358) (LANL 2005, 90631, Figure 4.1-5, Table 4.1-22). Lead, mercury, selenium, silver, and zinc were each detected in the only depth sampled at one location (02-01250) in the surface at the outfall area. The highest concentration of mercury at TA-02 (17.2 mg/kg) was detected in the deepest sample collected at one location (02-22356) north of the retaining wall; therefore, extent has not been defined. Mercury concentrations also increased with depth at one location (02-01095) in the outfall area and stayed essentially the same with depth at one location (02-22357) halfway between the OWR building and Los Alamos Creek.

Aroclor-1260 concentrations increased with depth at one location (02-01095) in the outfall area (LANL 2005, 90631, Figure 4.1-5, Table 4.1-23). Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, Benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene phenanthrene, and pyrene were detected in the only depth sampled at one location (02-01250) in the surface at the outfall area.

Samples from one location were analyzed for VOCs, and none were detected.

Cesium-137 activities stayed essentially the same with depth at one location (02-22356) north of the retaining wall (LANL 2005, 90631, Figure 4.1-6, Table 4.1-24). Cobalt-60 activities increased with depth at one location (02-22357) halfway between the OWR building and Los Alamos Creek. Plutonium-239 and tritium were detected in the only depth sampled at one location (02-01250) in the surface at the outfall area. Tritium activities stayed essentially the same with depth at two locations (02-22356 and 02-22357) north of the retaining wall.

Lateral extent has not been defined for inorganic chemicals, VOCs, SVOCs, PCBs, and radionuclides because of the limited number of samples. Vertical extent was defined for VOCs at the locations sampled. Vertical extent has not been defined for inorganic chemicals, SVOCs, PCBs, and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate and cyanide data are not available for this site.

SWMU 02-007 Septic Tank and Outfall

Samples have not been collected from the septic tank (TA-02-043) area.

AOC 02-008(a) NPDES-Permitted Cooling Tower Outfall

One sediment sample was collected from AOC 02-008(a) at 0 to 0.5 ft bgs (location 02-01249) in the outfall area (LANL 2005, 90631, Figures 4.1-7 and 4.1-8). This sample was analyzed for inorganic chemicals and radionuclides (gamma spectroscopy, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Chromium, copper, silver, and zinc were detected in the only depth sampled in the surface at the outfall (LANL 2005, 90631, Figure 4.1-7, Table 4.1-25).

Plutonium-239 and tritium were detected in the only depth sampled in the surface at the outfall (LANL 1998, 59730) LANL 2005, 90631, Figure 4.1-8, Table 4.1-26).

Because only one sample was collected, lateral and vertical extent have not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, VOC, and SVOC data are not available for this site.

AOC 02-008(c)(i) and 02-008(c)(ii), OWR Basement Drain Lines and Outfalls

AOC 02-008(c)(i)

Samples have not been collected at 02-008(c)(i).

AOC 02-008(c)(ii)

Three soil and sediment samples were collected from three locations at AOC 02-008(c)(ii) (LANL 2005, 90631, Figures 4.1-9 and 4.1-10). These samples were analyzed for inorganic chemicals, SVOCs, and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Copper, mercury, silver, and vanadium were detected in the only depth sampled at one location (02-01253) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-9, Table 4.1-27).

Fluoranthene and pyrene were detected in one sample (02-01253) between 0 and 0.5 ft bgs (LANL 2005, 90631, Figure 4.1-9, Table 4.1-28); however, concentrations were below their respective EQLs.

Plutonium-239 was detected in the only depth sampled at three locations (02-01154, 02-01252, 02-01253) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-10, Table 4.1-29). Tritium was detected in the only depth sampled at one location (02-01154) in the surface at the outfall area.

A sample was collected from one depth at each location. Lateral extent has not been defined for inorganic chemicals, SVOCs, and radionuclides. Vertical extent has not been defined for inorganic chemicals, SVOCs, and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, and VOC data are not available for this site.

SWMU 02-009(a) Radioactively Contaminated Soil Area behind Storage Building

Ten soil samples were collected from four locations at SWMU 02-009(a) (LANL 2005, 90631, Figures 4.1-3 and 4.1-4). These samples were analyzed for inorganic chemicals and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Zinc concentrations increased with depth at one location (02-01263) east of the boulder and were the same with depth at one location (02-01259) north of the boulder (LANL 2005, 90631, Figure 4.1-3, Table 4.1-30).

Cesium-137 was detected in the deepest interval sampled at one location (02-01263) east of the boulder (LANL 2005, 90631, Figure 4.1-4, Table 4.1-31). Strontium-90 was detected at two locations (02-01260 and 02-01264) in the deepest intervals sampled north and east of the boulder. Tritium activities increased with depth at one location (02-01260) north of the boulder and stayed essentially the same at three locations (02-01259, 02-01263, and 02-01264) north and east of the boulder.

Lateral extent has not been defined for inorganic chemicals and radionuclides because of the limited number of locations sampled previously. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

SWMU 02-009(b), Radioactively Contaminated Soil Area North of the Stack-Gas Valve House

Five soil and tuff samples were collected from two locations at SWMU 02-009(b) (LANL 2005, 90631, Figures 4.1-9 and 4.1-10). These samples were analyzed for inorganic chemicals and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Antimony was detected in the deepest interval sampled at one location (location 02-01243) (LANL 2005, 90631, Figure 4.1-9, Table 4.1-32).

Americium-241 activities increased with depth at one location (02-01243) in the southern portion of the SWMU (LANL 2005, 90631, Figure 4.1-10, Table 4.1-33). Tritium and uranium-235 activities increased with depth at one location (02-01244) in the southern portion of the SWMU.

Samples have not been collected to the north, east, or west of the area sampled. Lateral extent has not been defined for inorganic chemicals and radionuclides because of the limited number of locations sampled previously. Vertical extent has not been defined for inorganic chemicals and radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, VOC and SVOC data are not available for this site.

SWMU 02-009(c), Leach Field and Radioactively Contaminated Soil Area

Sixty-one soil, tuff, sediment, and fill samples were collected from 17 locations at SWMU 02-009(c) (LANL 2005, 90631, Figures 4.1-11 and 4.1-12). These samples were analyzed for inorganic chemicals, SVOCs, and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

Aluminum was detected in the deepest interval sampled at four locations (02-01228, 02-01229, 02-01230, and 02-01232) throughout the central to eastern portion of the leach field and stayed essentially the same with depth at one location (02-01226) (LANL 2005, 90631, Figure 4.1-11, Table 4.1-34). Barium was detected in the deepest interval sampled at three locations throughout the central to eastern portion of the leach field (02-01228, 02-01230, and 02-01232). Mercury concentrations stayed essentially the same with depth at one location (02-01234) east of the condensate trap [AOC 02-003(b)].

All SVOCs detected were below their respective EQLs (LANL 2005, 90631, Figure 4.1-11, Table 4.1-35).

Americium-241 activities increased with depth at three locations (02-01225, 02-01229, and 02-01230) throughout the eastern portion of the leach field (LANL 2005, 90631, Figure 4.1-12, Table 4.1-36). Cesium-137 activities increased with depth at four locations (02-01143, 02-01147, 02-01232, and 02-01234) throughout the leach field. Plutonium-239 activities increased with depth at two locations (02-01148 and 02-01234) at the east and west ends of the leach field and essentially stayed the same with depth at four locations (02-01140, 02-01147, 02-01231, and 02-01232) throughout the central to eastern portions of the leach field. Strontium-90 activities increased with depth at five locations (02-01147, 02-01148, 02-01228, 02-01230, and 02-01234) throughout the leach field, and essentially stayed the same with depth at two locations (02-01146 and 02-01227) at the eastern end of the leach field. Tritium activities increased with depth at four locations (02-01142, 02-01227, 02-01229, and 02-01233), stayed essentially the same at six locations (02-01143, 02-01147, 02-01225, 02-01228, 02-01230, and 02-01232), and was detected at one location (02-01141) in the only depth sampled. Uranium-234 and uranium-238 activities increased with depth at two locations (02-01225 and 02-01226) at the eastern end of the leach field. Uranium-238 activities increased with depth at one location (02-01230) at the eastern end of the leach field.

Samples have not been collected to the north, east, or south of previous sampling locations with concentrations/activities above background. Because of the absence of previously sampled locations outside of the leach field, lateral extent has not been defined for inorganic chemicals, SVOCs, and radionuclides. The vertical extent was defined for SVOCs at the locations sampled. Vertical extent has not been defined for inorganic chemicals and radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, and VOC data are not available for this site.

AOC 02-009(d), Soil Contamination East of Reactor Building

Four soil and tuff samples were collected from one location at AOC 02-009(d) (LANL 2005, 90631, Figures 4.1-9 and 4.1-10). These samples were analyzed for inorganic chemicals, SVOCs, and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Chromium and selenium were detected in the deepest interval (LANL 2005, 90631, Figure 4.1-9, Table 4.1-37) at the only location sampled (02-01245) north of the chemical waste shack (LANL 2005, 90631, Figure 4.1-9, Table 4.1-37).

Samples were analyzed for SVOCs, and none were detected.

Tritium activities stayed essentially the same with depth (LANL 2005, 90631, Figure 4.1-10, Table 4.1-38).

Only one location was sampled at this AOC. Lateral extent has not been defined for inorganic chemicals, SVOCs, and radionuclides. The vertical extent was defined for SVOCs at the only location sampled. Vertical extent has not been defined for inorganic chemicals and radionuclides at the only location sampled. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, and VOC data are not available for this site.

AOC 02-010, Soil Associated with Chemical Waste Shack

Thirteen soil and tuff samples were collected from five locations at AOC 02-010 (LANL 2005, 90631, Figures 4.1-9 and 4.1-10). These samples were analyzed for inorganic chemicals (including hexavalent chromium and perchlorate), SVOCs, and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, tritium and technetium-99) (Table 2.5-1).

Aluminum and barium were detected in the deepest interval sampled at one location (02-01246) at the northeast corner of the chemical waste shack (LANL 2005, 90631, Figure 4.1-9, Table 4.1-39). Hexavalent chromium concentrations stayed essentially the same with depth at one location (02-22350) at the southwest corner of the chemical waste shack. Perchlorate concentrations stayed essentially the same with depth at one location (02-22391) in the center of the chemical waste shack. Selenium was not detected but its detection limit was elevated above the range of the background concentrations at one location (02-01246).

All concentrations of SVOCs detected were below EQLs with the exception of bis(2-ethylhexyl)phthalate at one location (02-01246); however, its concentration decreased with depth (LANL 2005, 90631, Figure 4.1-9, Table 4.1-40).

Americium-241 activities increased with depth at one location (02-01246) at the northeast corner of the chemical waste shack (LANL 2005, 90631, Figure 4.1-10, Table 4.1-41). Cesium-137 and strontium-90 were detected in the deepest interval sampled at one location (02-22389) at the north side of the chemical waste shack. Plutonium-239 and tritium activities remained essentially the same with depth at one location (02-22391) in the center of the chemical waste shack. Uranium-234 and uranium-238 were detected in the deepest intervals sampled at one location (02-01246) at the northeast corner of the chemical waste shack.

Samples have not been collected at appropriate depths to the north, south, east or west to adequately define lateral extent for inorganic chemicals, SVOCs, perchlorate, and radionuclides. The vertical extent was defined for SVOCs at the locations sampled. Vertical extent has not been defined for inorganic chemicals, perchlorate, and radionuclides at one or more of the locations sampled. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, cyanide and VOC data are not available for this site.

AOC 02-011(a), 11 Storm Drains Associated with the OWR

AOC 02-011(a)(i), Storm Drain

One soil sample was collected from one location at AOC 02-011(a)(i) (LANL 2005, 90631, Figure 4.1-12). This sample was analyzed for radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Tritium was detected (02-01157) inside the catch basin (TA-02-036) in the only depth sampled (LANL 2005, 90631, Figure 4.1-8, Table 4.1-42).

Lateral and vertical extents have not been defined for radionuclides at this site because of the limited number of locations sampled previously. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, inorganic chemical data, including perchlorate and cyanide, VOC, and SVOC data, are not available for this site.

AOC 02-011(a)(iii), Storm Drain

One soil sample was collected from one location at AOC 02-011(a)(iii) (LANL 2005, 90631, Figure 4.1-8). This sample was analyzed for radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) only.

Tritium was detected (02-01158) inside the catch basin (TA-02-027) in the only depth sampled (LANL 2005, 90631, Figure 4.1-8, Table 4.1-42).

Lateral and vertical extents have not been defined for radionuclides at this site because of the limited number of locations sampled previously. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, inorganic chemical data, including perchlorate and cyanide, VOC, and SVOC data, are not available for this site.

AOC 02-011(a)(iv), Storm Drain

One soil sample was collected from one location at AOC 02-011(a)(iv) (LANL 2005, 90631, Figure 4.1-8). This sample was analyzed for radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Cobalt-60 and tritium were detected (02-01159) inside the catch basin (TA-02-028) in the only depth sampled (LANL 2005, 90631, Figure 4.1-8, Table 4.1-42).

Lateral and vertical extent have not been defined for radionuclides at this site because of the limited number of locations sampled previously. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, inorganic chemical data, including perchlorate and cyanide, VOC, and SVOC data, are not available for this site.

AOC 02-011(a)(vi), Storm Drain Outfall

One soil sample was collected from one location at AOC 02-011(a)(vi) (LANL 2005, 90631, Figure 4.1-8). This sample was analyzed for radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Plutonium-239 and tritium were detected (02-01149) at the storm drain outfall in the only depth sampled (LANL 2005, 90631, Figure 4.1-8, Table 4.1-42).

Lateral and vertical extents have not been defined for radionuclide at this site due to the limited number of locations sampled previously. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, inorganic chemical data, including perchlorate and cyanide, VOC, and SVOC data, are not available for this site.

AOC 02-011(a)(viii), Storm Drain and Outfall

Twelve soil and sediment samples were collected from six locations at AOC 02-011(a)(viii) (LANL 2005, 90631, Figure 4.1-13). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Cadmium, chromium, copper, lead, mercury, and zinc were detected in the only depth sampled at one location (02-01152) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-13, Table 4.1-43). Hexavalent chromium concentrations increased with depth at two locations (02-22351 and 02-22374) inside the OWR building and near the retaining wall outside the OWR building. Mercury concentrations increased with depth at one location (02-22374) inside the OWR building.

Cobalt-60, plutonium-239, and tritium were detected in the only depth sampled at one location (02-01152) in the surface at the outfall area during two separate sampling events (LANL 2005, 90631, Figure 4.1-13, Table 4.1-42). Tritium activities increased with depth at one location (02-22352) along the drain line.

Because of the limited number of locations sampled previously and the lack of multiple sample depths at some locations, lateral and vertical extents have not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-011(a)(ix), Storm Drain and Outfall

Seven soil and sediment samples were collected from three locations from AOC 02-011(a)(ix) (LANL 2005, 90631, Figure 4.1-12). These samples were analyzed for inorganic chemicals (including hexavalent chromium) and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Mercury and chromium concentrations increased with depth at one location (02-01150) in the outfall area (LANL 2005, 90631, Figure 4.1-13, Table 4.1-43). Zinc concentrations increased with depth at two locations (02-01150 and 02-22367) in the outfall area.

Plutonium-239 and tritium were detected in the only depth sampled at one location (02-01150, first sampling event) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-12, Table 4.1-42). Plutonium-239 activities increased with depth at one location (02-22349) east of the drain line. Tritium activities increased with depth at one location (02-22367) in the outfall area and stayed the same with depth at one location (02-22349) east of the drain line. Uranium-234 was detected at one location (02-01150, second sampling event) in the outfall area; activities increased with depth.

Because of the limited number of locations sampled previously, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-011(a)(x), Storm Drains and Outfalls

Thirteen soil and sediment samples were collected from six locations (LANL 2005, 90631, Figures 4.1-9 and 4.1-10). These samples were analyzed for inorganic chemicals (including hexavalent chromium), PCBs, VOCs, total petroleum hydrocarbons–diesel range organics (TPH-DRO), and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, and tritium) (Table 2.5-1).

Chromium, copper, and zinc concentrations increased with depth at one location (02-01153) in the outfall area (LANL 2005, 90631, Figure 4.1-9, Table 4.1-43). Mercury and silver concentrations remained the same with depth at one location (02-01153) in the outfall area. Hexavalent chromium concentrations increased with depth at one location (02-22346) east of the drain line and stayed essentially the same at another location (02-22347) east of the drain line.

Samples collected at one location were analyzed for PCBs, and none were detected. Toluene was detected below the EQL at one location (02-01162) (LANL 2005, 90631, Figure 4.1-9, Table 4.1-44). TPH-DRO was also detected at this location (LANL 2005, 90631, Figure 4.1-9, Table 4.1-44); its concentrations decreased with depth.

Cesium-137 activities increased with depth at one location (02-22347) east of the drain line (LANL 2005, 90631, Figure 4.1-10; Table 4.1-42). Plutonium-239 and tritium were detected in the only depth sampled at one location (02-01153, first sampling event) in the surface at the outfall area. Tritium activities increased with depth at one location (02-22368) west of the drain line and stayed the same or essentially the same at two locations (02-22346 and 02-22348) east and west of the drain line.

Because of the limited number of locations sampled previously, lateral extent has not been defined for inorganic chemicals, SVOCs, VOCs, PCBs, pesticides, TPH-DRO, and radionuclides. Vertical extent was defined for SVOCs, VOCs, PCBs, pesticides, and TPH-DRO at the only location analyzed for these suites. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, and SVOC data are not available for this site.

AOC 02-011(b), Storm Drains and Outfalls Associated with the Stack-Gas Valve House

Eleven soil, sediment, and tuff samples were collected from three locations at the eastern outfall pipe at AOC 02-011(b) (LANL 2005, 90631, Figures 4.1-1 and 4.1-2). These samples were analyzed for inorganic chemicals and radionuclides (gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, tritium, and technetium-99) (Table 2.5-1).

All inorganic chemicals detected above the range of the background concentrations decreased with depth. Selenium was not detected, but its detection limit was above the range of the background concentrations at one location (02-01239) in the deepest interval sampled (LANL 2005, 90631, Figure 4.1-1, Table 4.1-45).

Cesium-137, plutonium-239, and tritium were detected in the only depth sampled at one location (02-01107) in the surface at the outfall area (LANL 2005, 90631, Figure 4.1-2, Table 4.1-46). Tritium activities increased with depth at one location (02-01110) near the bend in the outfall pipe and stayed essentially the same with depth at one location (02-01239) near the bend in the outfall pipe.

Samples have not been collected to the north of the eastern outfall pipe, or to the east or west laterally. Additionally, samples have not been collected at the western outfall area near the eastern bridge. Lateral and vertical extents have not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in these areas. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-011(c), Storm Drain Associated with OWR Equipment Building

Samples have not been collected from the AOC 02-011(c) area.

AOC 02-011(d), NPDES-Permitted OWR Equipment Building Outfall

Five soil and sediment samples were collected from four locations at the outfall pipe at AOC 02-011(d) (LANL 2005, 90631, Figures 4.1-7 and 4.1-8). Soil samples were analyzed for radionuclides only while the sediment samples were analyzed for radionuclides (gamma-emitting and isotopic plutonium, isotopic uranium, and tritium) and inorganic chemicals (Table 2.5-1).

Arsenic, cadmium, calcium, chromium, copper, lead, and zinc were detected in the only depth sampled at one location (02-01247) east of the outfall area (LANL 2005, 90631, Figure 4.1-7, Table 4.1-47). Chromium, silver, and zinc were detected in the only depth sampled at another location (02-01248) east of the outfall area.

Cesium-137, cobalt-60, plutonium-239, tritium, and uranium-234 were detected in the only depth sampled at one location (02-01151) in the surface east of the outfall area (LANL 2005, 90631, Figure 4.1-8, Table 4.1-48). Cobalt-60, plutonium-239, and uranium-234 were detected in the only depth sampled at one location (02-01247) in the surface east of the outfall area. Cobalt-60 and plutonium-239 were detected at one location in the only depth sampled (02-01248) in the surface east of the outfall area. Cesium-137 was detected in the deepest interval sampled at one location (02-01155) east of the outfall area. Plutonium-239 and tritium activities stayed essentially the same with depth at one location (02-01155) east of the outfall area.

Because of the limited number of locations sampled previously, lateral extent has not been defined for inorganic chemicals and radionuclides. Vertical extent has not been defined for inorganic chemicals and radionuclides. Therefore, additional locations will be sampled and at deeper intervals in this area. In addition, perchlorate, cyanide, VOC, and SVOC data are not available for this site.

AOC 02-012, Soils Associated with Underground Fuel Storage Tank Areas

Six fill samples were collected from three locations across the northern UST TA-02-067 site (LANL 2005, 90631, Figures 4.1-5 and 4.1-6). Samples were analyzed for uranium and TPH-DRO from 3.5 to 5.5 ft bgs (Table 2.5-1).

Because of the limited number of previously sampled locations did not address the fuel line and tank excavation area, lateral extent has not been defined for uranium and TPH-DRO. TPH-DRO was not detected. Uranium concentrations were below the range of the background concentrations. Therefore, vertical extent for these analytes was defined in the area sampled. However, inorganic chemical, including perchlorate and cyanide, VOC, SVOC, and radionuclide data are not available for this site.

2.5.2 TA-21

Samples collected at the TA-21 sites addressed in this work plan do not provide usable (e.g., adequate QA/QC information, recorded sample depths) data for evaluation. Therefore, the data gaps for each site are addressed below.

Consolidated Unit 21-004(b)-99, Drain Line and Aboveground Storage Tanks

Samples were collected near the drain line and storage tanks approximately ten years ago. These samples were not analyzed at off-site fixed laboratories with available QA/QC information. Therefore, no usable analytical data are available to evaluate this consolidated unit.

Consolidated Unit 21-006(e)-99, Seepage Pits

Samples were collected during D&D activities from areas near the seepage pits; however, sampling depths were not recorded during sampling activities. Therefore, no usable analytical data are available to evaluate this AOC.

SWMU 21-011(b), Acid-Waste Sump and Lines

Samples have not been collected to address the sump or under the associated lines. Therefore, no usable analytical data are available to evaluate for this SWMU.

Consolidated Unit 21-022(b)-99, Industrial Waste Sumps and Drain Lines

Samples have not been collected to address the sumps or their associated lines. Therefore, no usable analytical data are available to evaluate for this SWMU.

AOC 21-028(c), Satellite Container Storage Areas

Samples were collected during D&D activities from areas near the satellite storage areas; however, the sampling depths were not recorded during sampling activities. Therefore, no usable analytical data are available to evaluate this AOC.

2.5.3 TA-26

Samples have not been collected to evaluate TA-26.

3.0 SITE CONDITIONS

For environmental investigation purposes, the Consent Order subdivided the larger Los Alamos Canyon watershed into Upper, Middle, and Lower Los Alamos Canyon Aggregate Areas. The Middle Los Alamos Canyon Aggregate Area is located in the middle portion of Los Alamos Canyon, an east-west trending canyon that dissects the Pajarito Plateau on the eastern flank of the Jemez Mountains (Figure 3.0-1). Los Alamos Canyon is approximately 16 mi long and extends from the Jemez Mountains eastward to the Rio Grande. This section describes the physical setting, surface features, and subsurface conditions of the Middle Los Alamos Canyon Aggregate Area.

3.1 Physical Setting

The Middle Los Alamos Canyon Aggregate Area comprises the middle 2-mi portion of Los Alamos Canyon and part of DP Canyon, a northern tributary to Los Alamos Canyon (Figure 1.0-2). The western boundary of the aggregate area is located west of the DP Site Aggregate Area (TA-21) and the headwaters of DP Canyon. The eastern boundary is approximately 1500 ft east of the confluence of DP Canyon with Los Alamos Canyon. Middle Los Alamos Canyon Aggregate Area surrounds DP Mesa, and extends from the DP Canyon channel to the mesa top to the north and from the Los Alamos Canyon channel to the mesa top to the south.

Elevations in the Middle Los Alamos Canyon Aggregate Area range between approximately 7220 ft on the mesa tops to 6680 ft in the canyon bottoms. The topography is varied, ranging from steep canyon walls or cliffs adjacent to DP and Los Alamos Canyons to gently sloping mesa tops to the north and south, respectively.

Climate: Pajarito Plateau has a semiarid mountain climate characterized by relatively low precipitation and relatively high evapotranspiration rates. Temperatures range from lows of approximately 15°F during the winter to highs in the 80s in the summer. Rainfall averages approximately 19 in. (including the water content from snowfall) and the area receives roughly 60 in. of snow annually as reported in the 2004 Environmental Surveillance Report (LANL 2005).

Flora and Fauna: The steep sided and narrow upper part of Los Alamos Canyon is relatively moist and cool and supports a ponderosa pine and mixed conifer series with grasses and forbs such as western wheat grass, Canada bluegrass, bottlebrush squirrel tail, cheat grass, sand dropseed, summer cypress, prickly lettuce, and horseweed. As the canyon widens, the pine-fir overstory thins, supporting shrub species such as Gambel's oak and mountain mahogany. It is also characterized by numerous grasses (brome grass, mountain muhly, and bluegrass), upland sedges, and a variety of forbs (Biggs 1993, 48979). The canyon bottom supports numerous ponderosa pine trees. Ponderosa pine gives way to a piñon-juniper woodland on the drier south-facing slope (Ferenbaugh 1982, 06293)

The mesa tops provide limited habitat for biota and do not contain sensitive habitats. The canyon bottoms provide ample habitat for various biota; however, they are not know to contain sensitive habitats. Threatened or endangered species are not present on the mesa tops or in Los Alamos or DP Canyons (Bennett 1996, 58236).

Land Use: Currently, residential and commercially owned properties that are part of the town of Los Alamos are located along the northern border of the aggregate area; DOE-owned land comprises the remainder of the Middle Los Alamos Canyon Aggregate Area.

3.2 Surface Conditions

This section describes the surficial characteristics of the Middle Los Alamos Canyon Aggregate Area, including sediment and surface water features.

3.2.1 Sediment

Sediments in Los Alamos Canyon were characterized and mapped in 1994 (Drakos and Inoue 1994, 48850). The effort identified discrete stratigraphic units within the alluvium and colluvium and associated geomorphic surfaces in the Middle Los Alamos Canyon Aggregate Area. The characterization identified channel alluvium, terrace deposits along the main Los Alamos Creek channel, fan deposits from side drainages, and colluvium and talus along the valley-side slopes. The study identified at least two cycles of incision and aggradation followed by a third period of incision during the last several hundred years. The results indicate that up to 3 ft of sedimentation has occurred throughout the study area over the past 50 years (Drakos and Inoue 1994, 48850, pp. 21–22). The sediments tend to be poorly sorted fluvial gravel (80%) consisting of rounded dacite, subangular tuff that is deposited onto one of three-stepped terrace deposits along the main drainage (Drakos and Inoue 1994, 48850, pp. 7–11).

3.2.2 Surface Water

Most Los Alamos Canyon surface water occurs as ephemeral, intermittent, or interrupted (perennial, ephemeral, and intermittent stretches) streams in canyons cut into the Pajarito Plateau. Ephemeral streams flow in response to precipitation; intermittent streams flow in response to the availability of snowmelt or groundwater discharge; and perennial streams flow at all times except during extreme drought. Springs within or adjacent to the Middle Los Alamos Canyon Aggregate Area are shown in Figure 3.0-1.

Overflow of water from the Los Alamos reservoir during spring snowmelt results in nearly continuous surface water flow between the western Laboratory boundary and the western TA-02 boundary for several weeks to several months each year (LANL 1995, 50290). Perched water in the Bandelier Tuff and Tschicoma Formation within the canyons discharges at rates from 2 gal./min to 135 gpm (Abeele et al. 1981, 06273). The volume of flow maintains natural perennial reaches of varying lengths in the canyons. Surface water in Los Alamos Canyon rarely flows across the length of the Laboratory. Surface waters infiltrate the canyon alluvium, creating saturated zones of seasonally variable extent (LANL 1995, 50290). All surface water drainage and groundwater discharge from the plateau ultimately arrives at the Rio Grande (Figure 3.2-1).

Los Alamos Canyon has stretches of riverine and palustrine wetlands. There is a palustrine wetland immediately south of the west end of MDA B and a riverine wetland immediately south of MDA V. Floodplain terraces exist throughout Los Alamos Canyon.

3.3 Subsurface Conditions

This section presents a summary of stratigraphy, soil development, seismic features, and hydrogeology of the Middle Los Alamos Canyon.

3.3.1 Stratigraphy

The stratigraphy of the Middle Los Alamos Canyon Aggregate Area is summarized from Baltz, Purtymun, Broxton and Reneau's work from 1963 through 1995 (Figure 3.3-1) (Baltz et al. 1963, 08402; Purtymun 1995, 45344; LANL 1998, 59599; Broxton and Reneau 1995, 49726). Additional information on the geologic setting of the Pajarito Plateau can be found in the Environmental Restoration (ER) Project Installation Work Plan (LANL 1998, 62060) and the hydrogeologic work plan (LANL 1998, 59599). The descriptions begin with the oldest and proceed to the youngest and are applicable to TAs 02, 21, 26, and 61.

Santa Fe Group

The Santa Fe Group consists of predominantly fluvial, slightly consolidated sedimentary rocks that crop out in the lower reaches of Los Alamos Canyon, along White Rock Canyon and in extensive areas east of the Rio Grande. Galusha and Blick (1971, 21526) subdivided the Santa Fe Group into formations and members based on geologic mapping and faunal assemblages of late tertiary mammals. Manley (1979, 11714) refined their stratigraphy based on additional mapping and dates on interbedded volcanic ash layers, lava flows, and dikes. Cavazza (1989, 21501) proposed changes in stratigraphic nomenclature based on sedimentary facies patterns. In the vicinity of the Pajarito Plateau, the Santa Fe Group consists of the Tesuque Formation and overlying Chamita Formation.

Tesuque Formation: The Tesuque Formation is a massive unit consisting of arkosic sediments, derived primarily from Precambrian basement and Tertiary volcanic sources to the east and northeast. This unit is a light pink to buff siltstone and silty sandstone with a few lenses of pebbly conglomerate and clay. It is poorly to moderately consolidated and has an age range of about 7 to 21 mil yr (Manley 1979, 11714; Cavazza 1989, 21501). This formation exists in deep well boreholes under the Pajarito Plateau and is the primary aquifer for municipal and industrial water supply in Los Alamos County. Regional cross sections indicate that it does not exist beneath the Middle Los Alamos Canyon Aggregate Area.

Chaquehui Formation: Purtymun (1995, 45344) describes a trough of late Miocene coarse-grained sediments at the top of the Santa Fe Group that postdate the Chamita Formation. Purtymun called these deposits the Chaquehui Formation, and they are important for the development of high-yield, low-drawdown municipal and industrial water supply wells for the Los Alamos area. The trough is 3 to 4 mi wide and extends 7 to 8 mi from the northeast to the southwest. It is filled with up to 1500 ft of gravels, cobbles, and boulders derived from highlands to the north and east. Regional cross sections indicate that it exists beneath the Middle Los Alamos Canyon Aggregate Area and most of the Laboratory (Purtymun 1995, 45344).

Puye Formation

The Puye Formation is a fanglomerate deposit consisting of poorly sorted boulders, cobbles, and coarse sands made up of dacitic to latitic debris eroded from the contemporaneous Tschicoma Formation (Turbeville et al. 1989, 21587; Spell et al. 1990, 21586). In the lower reaches of Los Alamos Canyon and along the Rio Grande, the Puye Formation also contains basaltic debris derived from contemporaneous volcanism and erosion of the Cerros del Rio volcanic field. Regional cross sections show this deposit under the Middle Los Alamos Canyon Aggregate Area.

Bandelier Tuff

The Bandelier Tuff under the Middle Los Alamos Canyon Aggregate Area consists of the Otowi and Tshirege Members, which are stratigraphically separated in many places by the tephras and volcaniclastic sediments of the Cerro Toledo interval. The Bandelier Tuff was emplaced during cataclysmic eruptions of the Valles Caldera between 1.61 and 1.22 mil yr ago. The tuff is composed of pumice, minor rock fragments, and crystals supported in an ashy matrix. It is a prominent cliff-forming unit because of its generally strong consolidation. Basal units, the Tsankawi Pumice Bed and the Guaje Pumice Bed, are important in terms of potential to store, transmit, and discharge perched water in Los Alamos Canyon. The Bandelier Tuff is the most prominent rock type on the Pajarito Plateau (Broxton and Reneau 1995, 49726).

Certain minerals present in Bandelier Tuff are important in terms of sorption of chemical species from water. Among them are alkali feldspar and a combination of three silica polymorphs (i.e., quartz, cristobalite, and tridymite). These minerals are found throughout the Bandelier Tuff, and their abundance throughout the tuff can have a significant effect on the retardation of several constituents in the Middle Los Alamos Canyon Aggregate Area. Less important in terms of transport are organic materials, which can react with certain constituents to form relatively mobile chemicals. The organic content of geologic materials on the Pajarito Plateau mesas is typically less than 1 wt%; however, fractures can contain higher organic concentrations than the tuff matrix.

In addition, clay minerals are found in abundance in fractures and interbeds in the Bandelier Tuff. The primary clay minerals are smectites, with lesser amounts of kaolinite. The clay minerals have high sorptive capacity for many of the Middle Los Alamos Canyon Aggregate Area contaminant inventory constituents. Hematite (i.e., iron oxide) coatings are also found but with less frequency than clay coatings. Hematite has a very large surface area for binding certain metals and is therefore also important to transport in fractures.

3.3.2 Soil

Soils in the canyon bottoms are derived from the Otowi Member and Tshirege Member of the Bandelier Tuff (Figure 3.3-1) (Nyhan et al. 1978, 05702). The surface layers of the Typic Ustorthents soil complex are generally a pale brown stony or gravelly, sandy loam approximately 2 in. (5 cm) thick. The substratum is approximately 59.1 in. (150 cm) thick and generally consists of a very pale brown or light gray gravelly, loamy sand or sand. The complex has moderate to very high permeability and very low available capacities; the clay content is also low. The alluvium varies in thickness and is underlain by either the Tshirege Member or the Otowi Member of the Bandelier Tuff or the Tschicoma Formation (Nyhan et al. 1978, 05702).

The soils on the slopes between the mesa tops and canyon floors have been mapped as mostly steep rock outcrops consisting of approximately 90% bedrock outcrop and patches of shallow, undeveloped colluvial soils. South-facing canyon walls are steep and usually have little or no soil material or vegetation; in contrast, the north-facing walls generally have areas of very shallow dark-colored soils and are more heavily vegetated (Nyhan et al. 1978, 05702).

Soils on the mesa tops of TA-21, -26 and -61 are typical of those across the Pajarito Plateau; they are generally poorly developed, derived from Bandelier Tuff bedrock, and were formed in a semiarid climate. The mesa top soils are mainly shallow, well-drained, sandy loams of the Hackroy series. The depth to bedrock and the effective rooting depth is 7.9 to 19.7 in. (20 to 50 cm) (Nyhan et al. 1978, 05702). Hackroy soils are classified as Alfisols, in part reflecting the clayey subsurface horizons. Intermixed with the Hackroy soils on the mesa tops are small areas of deeper loams of the Nyjack series and patches of bedrock. The Nyjack soils are texturally similar to Hackroy soils and are distinguished by thicknesses of 7.9 in. (50 cm) to 40.2 in. (102 cm) and by the common presence of pumice fragments in the lower soil (Nyhan et al. 1978, 05702).

3.3.3 Seismic Features

Three major faults are considered significant with respect to seismic potential across the Laboratory complex: the Pajarito, the Guaje Mountain, and the Rendija Canyon faults. The Pajarito fault system has experienced recent movement and historical seismicity (Gardner 1987, 06682; Gardner 1990, 48813). Characterized by north-trending normal faults that intertwine along their traces, the Pajarito fault system shows dominantly down-to-the-east movement and produces a series of prominent fault scarps west of the Laboratory. The vertical throw on this fault system is several hundred feet south and west of the Laboratory but decreases northward where the fault system is less prominent.

The Rendija Canyon and Guaje Mountain faults are also normal faults downthrown to the west and are considered secondary faults within the Pajarito fault system. The Rendija Canyon fault is located 3 mi east of the Pajarito fault, and the Guaje Mountain fault is located about 1.2 mi east of the Rendija Canyon fault. The Rendija Canyon fault crosses Pueblo Canyon near its confluence with Acid Canyon and Los Alamos Canyon near TA-41 but does not have clear surface expression south of Sandia Canyon. The Guaje Mountain fault parallels the Rendija Canyon fault and is projected to cross Los Alamos Canyon near TA-02, although no clear offset of the Tshirege Member occurs south of North Mesa. North of the Laboratory, both faults have zones of gouge and breccia up to several meters wide and produce visible offset of stratigraphic horizons and recognizable scarps. However, these features are not apparent within the Middle Los Alamos Canyon Aggregate Area.

Geologic evidence indicates that the Pajarito fault has ruptured within the past 1.2 mil yr, perhaps as recently as 50,000 yr ago. Field investigations show that the Rendija Canyon fault has ruptured within the past 10,000 yr, and that the Guaje Mountain fault has ruptured within the past 6000 yr. The recurrence interval of seismic events along the Rendija Canyon and Guaje Mountain faults is estimated to be between 10,000 and 150,000 yr (Gardner 1999, 63492).

3.3.4 Hydrogeology

Groundwater occurs across the Laboratory as (1) water in shallow alluvium in some of the larger canyons (e.g., Los Alamos Canyon), (2) intermediate perched groundwater (a perched groundwater body lies above a less permeable layer and is separated from the underlying aquifer by an unsaturated zone), and (3) the regional aquifer of the Los Alamos area. Numerous wells have been installed over the past several decades at the Laboratory and in the surrounding area to investigate the presence of groundwater in these zones and to monitor groundwater quality. Groundwater monitoring wells from the Environmental

Remediation and Surveillance Program in the Middle Los Alamos Canyon Aggregate Area are shown in Figure 3.3-2.

The hydrogeologic conceptual model (LANL 2004, 87390, Section 7.2) indicates that, under natural conditions, relatively small volumes of water infiltrate mesa tops because of low rainfall, high evaporation, and efficient water use by vegetation. Atmospheric evaporation may extend deeper into mesas, further inhibiting downward flow. However, in areas where mesa tops have been disturbed, larger volumes of water can move through the subsurface.

The Laboratory formulated a comprehensive groundwater protection plan (LANL 1995, 50124) for monitoring activities. The hydrogeologic work plan (LANL 1998, 59599) details the implementation of extensive groundwater characterization across the Pajarito Plateau within an area potentially affected by past and present Laboratory operations, such as in the Middle Los Alamos Canyon Aggregate Area. Groundwater monitoring will be conducted for the Middle Los Alamos Canyon Aggregate Area as described in the interim facility-wide monitoring plan (LANL 2005, 88789). The current monitoring network and other observation wells associated with the Middle Los Alamos Canyon Aggregate Area are presented in Figure 3.3-2.

Alluvial Groundwater

Ephemeral runoff in some canyons infiltrates through the surficial alluvium until downward movement is impeded by the less permeable tuff and sediments resulting in the accumulation of shallow alluvial groundwater. Depletion by evapotranspiration and movement into the underlying rocks limit the horizontal and vertical extent of the alluvial water (Purtymun 1977, 11846). The limited saturated thickness and extent of the alluvial groundwater preclude its use as a viable source of water for municipal and industrial needs. Lateral flow of the alluvial perched groundwater is in an easterly, downcanyon direction (Purtymun 1977, 11846).

Alluvial aquifer wells are located between the Los Alamos Canyon reservoir and the confluence with DP Canyon and have been used to monitor water levels in alluvium in Los Alamos and Pueblo Canyons (LANL 2004, 87930) (Figure 3.3-2). The observations indicate that groundwater levels generally rise rapidly in response to summer and fall precipitation events. Groundwater rises immediately and generally correlates well with stream flow at gauging stations, indicating that recharge from the streambed to the alluvial aquifer occurs during precipitation events. Groundwater levels decline following the recharge events; however, the rates are variable and are thought to be associated with variations in aquifer hydraulic conductivity.

In middle and upper Los Alamos Canyon, the saturated thickness in the alluvium varies seasonally from the winter months to the spring and summer months when recharge is the greatest (ESP 1994, 45363).

Intermediate Perched Groundwater

Intermediate perched groundwater forms mainly at horizons where stratigraphic changes occur, such as at paleosol horizons of clay or caliche found in basalt and volcanic rock sequences. The Cerro Toledo interval, Guaje Pumice Bed, and Puye Formation are local examples.

Intermediate perched zones have been encountered in the Middle Los Alamos Canyon Aggregate Area between TA-02 and the confluence with DP Canyon. The upper intermediate perched zone occurs within the Guaje Pumice Bed. The saturated thickness of this zone decreases from west to east, ranging from 5 ft to 22 ft (Broxton et al. 1995, 50119; Longmire et al. 1996, 54168).

A deeper intermediate perched zone has been encountered in the Puye Formation from approximately 253 to about 317 ft bgs on DP Mesa. Saturated conditions were not encountered in the Guaje Pumice Bed in this area, indicating this intermediate perched zone does not extend northward under DP Mesa. The infiltration pathways, continuity, and chemical quality of groundwater in these known intermediate perched zones are not well characterized (Purtymun and Stoker 1988, 06879).

Regional Groundwater

The surface of the regional aquifer extends from beneath the Pajarito Plateau eastward to the Rio Grande. The regional wells are shown in Figure 3.3-2. The general direction of groundwater flow in the regional aquifer is to the east in the vicinity of Los Alamos Canyon (LANL 1998, 59599).

4.0 SCOPE OF ACTIVITIES

The AOCs and SWMUs in TA-02 have been arranged into eight groups on the basis of spatial proximity (Figure 4.0-1). The proposed samples for each group of AOCs/SWMUs are presented on eight maps and eight corresponding tables (Figures and Tables 4.1-1 through 4.1-8). In some cases, it may be necessary to review multiple maps to discern the proposed sampling for adjacent AOCs/SWMUs. Figure 4.0-2 shows the sampling locations proposed for PCB analyses. Figure 4.0-3 shows the sampling locations proposed for VOC/SVOC analyses. The activities proposed for each group are described in Sections 4.1.1 through 4.1.8. The activities proposed for AOCs and SWMUs in TA-21 and TA-26 are described in Sections 4.2 and 4.3, respectively.

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At TA-02, hexavalent chromium will be analyzed for select AOCs/SWMUs based on previous total chromium sampling results above background, lack of previous sampling data, and/or known chromium in the waste stream. Samples collected during this field effort that exceed background for total chromium will also be analyzed for hexavalent chromium.

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4.1 TA-02

4.1.1 Proposed Activities for AOCs 02-003(a), 02-003(b), 02-003(c), 02-003(e), 02-008(c)(i), and 02-011(b)

The proposed sample locations at these six sites are shown in Figure 4.1-1. Table 4.1-1 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to range from approximately 10 to 15 ft bgs in the area of these sites. The saturated zone is expected to be approximately 10 ft bgs; however, its depth is highly dependent upon seasonal precipitation conditions and when it is investigated.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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AOC 02-003(a), Stack-Gas Valve House (TA-02-019) and Gaseous Effluent Vent Lines (Lines 117 and 118)

Samples will be collected from the following locations (Figure 4.1-1): at the connection of Line 117 to the reactor building and to the stack-gas valve house (locations BH3a-1 and BH3a-2); 20 ft north and south of previous sampling location 02-01241 (locations BH3a-3 and BH3a-4); at the connection of Line 118 with the stack-gas valve house (BH3a-5); in the vicinity of Line 118; halfway between the stack-gas valve house and its connection to the OWR gaseous effluent vent line (location BH3a-6); and at the connection of Line 118 with the OWR gaseous effluent vent line (location BH3a-7).

At location BH3a-1, samples will be collected from the 0- to 0.5-ft, 9.5- to 10.0-ft (Line 117 was 7 ft bgs), and 14.5- to 15.0-ft depth intervals as well as at the soil/tuff interface, if encountered. At locations BH3a-2 through BH3a-4, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (the stack-gas valve house was aboveground), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. At locations BH3a-5, BH3a-6, and BH3a-7, samples will be collected from the 0- to 0.5-ft (Line 118 was buried just below the surface), 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0-ft bgs since Line 118 was just below the surface.

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Samples from locations BH3a-1 through BH3a-7 will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, target analyte list (TAL) metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will be analyzed for VOCs and SVOCs because the area north of Los Alamos Creek has potentially commingled contaminants from other nearby sources (i.e., a sewer line). The sampling locations for SWMU 02-009(b), AOC 02-009(d), and AOC 02-010 offer additional sampling coverage for Line 117 (Figure 4.1-8).

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Samples will not be analyzed for dioxins/furans because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661).

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AOC 02-003(b), Condensate Trap (TA-02-048) and Gaseous Effluent Vent Line (portion of Line 119)

Samples will be collected from the following locations (Figure 4.1-1): at the connection of Line 119 to the condensate trap, immediately west of previous sampling location 02-01102 (location BH3b-1), in the center of the condensate trap (location BH3b-2); at the connection of Line 119 to the south end of the condensate trap (location BH3b-3); along Line 119 before it crosses under Los Alamos Creek (location BH3b-4); and south of Los Alamos Creek, approximately halfway between BH3b-3 and previous sampling location 02-01145 (location BH3b-5). At all locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5.0-ft (Line 119 was 2 to 9 ft bgs), and 9.5- to 10-ft depth intervals (contamination around 7 ft bgs and deeper), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will be analyzed for VOCs and SVOCs because the area north of Los Alamos Creek has potentially commingling contaminants from other nearby sources (i.e., a septic tank). Samples will not be analyzed for dioxins/furans because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661).

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AOC 02-003(c), Delay System (TA-02-131)

Samples will be collected from the following locations (Figure 4.1-1): north of previous sampling location 02-01237 (location BH3c-1); 20 ft east of BH3c-1 (location BH3c-2); 20 ft southeast of BH3c-1 (location BH3c-3); at the connection of Line 119 to the OWR gaseous effluent vent line (location BH3c-4); 20 ft west of BH3c-1 (location BH3c-5); 20 ft west of BH3c-5 (location BH3c-6); 20 ft northwest of BH3c-5 (location BH3c-7); 20 ft north of BH3c-1 (location BH3c-8); 20 ft west of BH3c-8 (BH3c -9); and north of BH3c-8 as close to Los Alamos Creek as possible (location BH3c-10, which will be determined by a geomorphologist and will be outside the main stream channel). At all locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (the tanks were 4 ft bgs), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661). Samples will be analyzed for VOCs, SVOCs, and PCBs at location BH3c-1 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs, SVOCs, or PCBs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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AOC 02-003(e), WBR Holding Tank (TA-02-062)

Samples will be collected from the following locations (Figure 4.1-1): immediately east of previous sampling location 02-01240 at Line 119 (location BH3e-1); 20 ft south of BH3e-1 (location BH3e-2); 20 ft southeast of previous sampling location 02-01240 (location BH3e-3); and 20 ft northeast of previous sampling location 02-01240 (location BH3e-4). At all locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5.0-ft (was above ground), and 9.5- to 10.0-ft depth intervals (previous sampling highest contamination), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will be analyzed for VOCs and SVOCs because the area north of Los Alamos Creek has potentially commingling contaminants from other nearby sources (i.e., a leach field). Samples will not be analyzed for dioxins/furans because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661).

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AOC 02-008(c)(i), OWR (TA-02-001), Basement Drain Line and Outfall

Samples will be collected from a location [location BH8c(i)-1] situated immediately south of BH11b-5 at the outfall within the Los Alamos Creek floodplain (Figure 4.1-1). Samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. VOCs and SVOCs are included to determine contamination from potential upstream sources. Samples will not be analyzed for dioxins/furans because they would not be present in the seepage that collected in the reactor building basement based upon process and operations knowledge (DOE 1987, 08661).

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AOC 02-011(b), Two Drains and Outfalls Associated with the Stack-Gas Valve House (TA-02-019)

Samples will be collected from the following locations (Figure 4.1-1): downslope of the outlet pipes along Los Alamos Creek, 10 ft east of these locations (locations BH11b-1 through -4, collected within the Los Alamos Creek floodplain), and immediately east of previous sampling location 02-01239 at the bend in the discharge pipe (location B11b-5). At all locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. VOCs and SVOCs are included to determine contamination from potential upgradient sources. Dioxins/furans will not be analyzed for because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661).

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4.1.2 Proposed Activities for AOC 02-003(d), SWMU 02-006(a), and SWMU 02-009(a)

The proposed sample locations at these three sites are shown in Figure 4.1-2. Table 4.1-2 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to range from approximately 10 to 15 ft bgs in the area of these sites. The saturated zone is expected to be approximately 10 ft bgs. On the mesa top at SWMU 02-006(a) the saturation zone is much deeper. It is not anticipated that saturation will be encountered at SWMU 02-006(a).

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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AOC 02-003(d), Garden Hose Discharge Area and Gaseous Effluent Vent Line (Portion of Line 119) from Delay Tanks (TA-02-131) to Mesa-top Stack (TA-02-009)

Samples will be collected from the following locations in the garden hose discharge area (Figure 4.1-2): 20 ft north of previous sampling location 02-01256 (location BH3d-1); 20 ft north of previous sampling location 02-01254 (location BH3d-2); 20 ft east of previous sampling location 02-01254 (location BH3d-3); in the center of the AOC (location BH3d-4); 40 ft west of BH3d-4 (location BH3d-5); 20 ft north of BH3d-5 (location BH3d-6); 20 ft east of BH3d-5 (location BH3d-7); 20 ft south of BH3d-5 (location BH3d-8); 20 ft west of BH3d-5 (location BH3d-9); immediately south of previous sampling location 02-01255 (BH3d-10); 20 ft west of BH3d-10 (location BH3d-11); and 20 ft east of BH3d-10 (location BH3d-12).

Samples will be collected from the following locations along the gaseous effluent vent line (Figure 4.1-2) (Line 119) as it runs up to the stack on the mesa top: 20 ft south of the connection of Line 119 and the OWR gaseous effluent vent line (location BH3d-13) and every 200, 400, and 600 ft south (locations BH3d-14, -15, and -16, respectively). At all locations, samples will be collected from the 0- to 0.5-ft, 2.0- to

2.5-ft, and 4.5- to 5.0-ft (Line 119 was 4 ft bgs) depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0 ft bgs because the garden hose discharged to the surface, and the buried pipe depth was 4 ft bgs. The connection of Line 119 and the OWR gaseous effluent vent line will be sampled in connection with AOC 02-003(c) (Figure 4.1-1, location BH3c-4).

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Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans and PCBs because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661). Samples will be analyzed for VOCs, SVOCs, and PCBs at location BH3d-4 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs, SVOCs, and PCBs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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SWMU 02-006(a), French Drain Associated with Mesa-top Stack (TA-02-009), Located on the Mesa Top

Samples will be collected from the following locations (Figure 4.1-2): adjacent to previous sampling locations 02-22052 through 02-22059 (locations BH6a-1 through BH6a-8) and approximately 20 ft northwest, northeast, southeast, and southwest of locations BH6a-5, -6, -7, and -8, respectively (locations BH6a-9 through BH6a-12). At all locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5.0-ft, 9.5- to 10.0-ft, 14.5- to 15.0-ft, and 19.5- to 20.0-ft depth intervals as well as the soil/tuff interface when encountered.

Samples will be analyzed for TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans because they were not present in the gaseous effluent vent discharge from the operation of the reactor (DOE 1987, 08661). Samples will be analyzed for VOCs, SVOCs, and PCBs at location BH6a-3 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs, SVOCs, or PCBs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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SWMU 02-009(a), Radioactively Contaminated Soil Area behind Storage Building (TA-02-050)

Samples will be collected from the following locations (Figure 4.1-2):

- immediately adjacent to, 10 ft north of, 20 ft south of, and 20 ft west of previous sampling location 02-01259 (locations BH9a-1 through BH9a-4, respectively);
- 40 ft south of BH9a-4 (BH9a-5) and 20 ft north, east, south, and west of this location (locations BH9a-6 through BH9a-9, respectively);
- immediately adjacent to, 20 ft north of, 20 ft east of, 20 ft south of, and 20 ft west of previous sampling location 02-01263 (locations BH9a-10 through BH9a-14, respectively);
- 20 ft north and south of BH9a-14 (locations BH9a-15 and BH9a-16, respectively); and
- 20 ft east and south of location BH9a-13 (locations BH9a-17 and BH9a-18, respectively).

The roped-off radiological area or area determined by the prescribed radiological survey will be sampled in the center, and along the northern, eastern, southern, and western boundaries to determine extent (Figure 4.1-2, locations BH9a-19 through -23). At all locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0 ft bgs because this is a surface contamination area.

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Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site (DOE 1987, 08661). Samples will be analyzed for PCBs at locations BH9a-9 (east side) and BH9a-19 (west side) to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for PCBs. Where possible, the locations will be sampled from low spots, drainage areas, and/or native material.

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4.1.3 Proposed Activities for AOC 02-004(a) OWR and Fuel Area, AOC 02-004(a) WBR Area, SWMU 02-006(b), AOC 02-006(e), AOCs 02-011(a)(i, ii, iii, v, viii, and ix), and AOC 02-012

The proposed sample locations at these 11 sites are shown in Figure 4.1-3. Table 4.1-3 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to be approximately 15 ft bgs in the area of these sites. The saturated zone is expected to be approximately 15 to 20 ft bgs.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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AOC 02-004(a), OWR (TA-02-001) and Associated Structures

OWR and Fuel Area

Samples will be collected from the following locations (Figure 4.1-3): within the footprint of the western third of the reactor building where the OWR was housed on an approximate 20-ft grid biased towards the reactor structure, piping, and drains (locations BH4a-1 through BH4a-7), and two locations positioned 10 and 25 ft south of the OWR portion of the reactor building to evaluate the area between the building and Los Alamos Creek (locations BH4a-8 and BH4a-9).

At all locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5.0-ft (locations are outside the area excavated during D&D activities), 9.5- to 10.0-ft (the base of the OWR) and 14.5- to 15.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH. Dioxins/furans and PCBs are being analyzed because of their potential presence in the fuel pit circulating pump system and the close proximity of the reactor to drains associated with that system. VOCs and SVOCs are included in the analyses, not because they were process-related to the operation of the OWR but because of the OWR's close proximity to the laboratory spaces to the east and the diesel fuel line to the north. TPH-DRO will be analyzed for in BH4a-1 through BH4a-5 because of their proximity to the former fuel line [AOC 02-012].

WBR Area

Samples will be collected from ten locations (BH4a-10 through BH4a-16) spaced 10 to 20 ft apart across the WBR area (Figure 4.1-3). At all locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (structures were 4 ft bgs), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

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Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will not be analyzed for dioxins/furans since they were not used or generated during the operation of the reactor. Samples will be analyzed for VOCs and SVOCs at location BH4a-13 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs or SVOCs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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SWMU 02-006(b), OWR Acid Waste Line

Samples will be collected from the following locations (Figure 4.1-3): along and/or offset from the acid waste drain line (locations BH6b-1 through BH6b-16) and one location south of the retaining wall in the Los Alamos Creek floodplain (location BH6b-17). Engineering drawings have been used to identify laboratory rooms and sink locations plumbed into the OWR acid waste line. Sampling locations are biased toward these connections within the reactor building. Locations are spaced approximately 35 to 40 ft apart along the main sewer line toward Los Alamos Creek. Offset locations are situated east and west of the drain. One location (BH6b-17) will be sampled at the outfall south of the retaining wall.

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Locations north of the retaining wall will be sampled from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (depth below the drain line), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. Location BH6b-17 (south of the retaining wall) will be sampled from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

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Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples collected in BH6b-5 through BH6b-7 and BH 6b-10 will be analyzed for TPH-DRO because of the proximity of these locations to the former fuel line and UST (TA-02-067) [AOC 02-012]. TPH-DRO will be analyzed in BH6b-2 because of its proximity to the former UST (TA-02-029)[AOC 02-012]. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site based upon available process information (DOE 1987, 08661).

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AOC 02-006(e), OWR Floor Drains Waste Sump

Samples will be collected from eleven locations (locations BH6e-1 through BH6e-11) along and/or offset from the drain line (Figure 4.1-3). Sampling locations are placed at tees or bends in the drain line and at the sump (TA-02-082) and salvage basin (TA-02-026). In general, the locations are spaced 15 to 20 ft apart along the drain line.

At all locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (depth of the drain line), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. In addition, locations BH6e-1, BH6e-3, BH6e-5, and BH6e-11 will be sampled from the 9.5- to 10-ft depth interval to characterize the salvage basin (TA-02-026), sump (TA-02-082), and the base of the reactor room floor drain, respectively.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site based upon available process information (DOE 1987, 08661).

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AOC 02-011(a)(i), (ii), (iii), (v), (viii), and (ix), Storm Drains

AOC 02-011(a)(i), Storm Drain and Catch Basin (TA-02-036)

This storm drain is the northernmost east-west trending concrete drain north of the reactor building that drains into a drop inlet structure (TA-02-036). Samples will be collected from three locations [locations BH11a(i)-1 through BH11a(i)-3] along the concrete storm drain (Figure 4.1-3). The locations are approximately 25 ft apart along the drain. At all locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft (approximate depth of the base of the concrete structure), and 4.5- to 5.0-ft depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0 ft bgs because the base of the concrete structure is approximately 2 ft bgs.

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Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(a)(ii), Storm Drain Between Catch Basins (Structures TA-02-036 and TA-02-027)

This storm drain is a short, north-south trending concrete pipe that extends between two catch basins (TA-02-036 and TA-02-027) northwest of the reactor building. Samples will be collected from one location [location BH11a(ii)-1] along the western side of the discharge pipe from the catch basin (TA-02-036) (Figure 4.1-3). The location will be sampled from the 0- to 0.5-ft, 2.0- to 2.5-ft (approximate depth of the base of the catch basin and discharge pipe), and 4.5- to 5.0-ft depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0 ft bgs because the base of the catch basin and pipe are approximately 2 ft bgs.

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Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(a)(iii), Storm Drain and Catch Basin (TA-02-027)

This storm drain is an east-west trending concrete drain that discharges into a catch basin (TA-02-027) northwest of the reactor building. Samples will be collected from three locations [locations BH11a(iii)-1 through BH11a(iii)-3] along the southern side of the southernmost east-west concrete drain from the catch basin to the eastern end of the drain (Figure 4.1-3). At all locations, samples will be collected from the 0- to 0.5-ft and 4.5 to 5.0-ft depth intervals (approximate depth of the base of the concrete structure), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH. Samples from locations BH11a(iii)-1 through BH11a(iii)-3 will be analyzed for TPH-DRO because of their proximity to the former fuel line and tank (TA-02-067) [AOC 02-012].

AOC 02-011(a)(v), Storm Drain Between Catch Basins (Structures TA-02-027 and TA-02-028)

This storm drain is a north-south trending concrete pipe that extends between two catch basins (TA-02-027 and TA-02-028) west of the reactor building. Samples will be collected from two locations [locations BH11a(v)-1 and BH11a(v)-2] one at the beginning and one at the end of the north-south segment of the drain line from catch basin TA-02-027 to catch basin TA-02-028 (Figure 4.1-3). At both locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (approximate depth of the base of the concrete structure), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(a)(viii), Storm Drain

This storm drain is a north-south-trending concrete pipe that extends south along the eastern side of the OWR earthen berm inside the reactor building. Samples will be collected from two locations [locations BH11a(viii)-1 and BH11a(viii)-2] to confirm vertical extent of contamination along the drain line on the east side of the OWR earthen barrier (Figure 4.1-3). Both locations will be sampled from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (approximate depth of the base of the concrete drain), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

All samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(a)(ix), Storm Drain

This drain is a north-south trending concrete pipe that extends between the WBR area to Los Alamos Creek on the east side of the reactor building. Samples will be collected from 13 locations [locations BH11a(ix)-1 through BH11a(ix)-12 and BH11a(ix)-18] along the drain line, at bends and tees of the floor trenches, east and west of the outfall drain on the north side of the retaining wall, and in the WBR area of the reactor building (Figure 4.1-3). Samples will be collected from BH11a(ix)-13 south of the retaining wall within the Los Alamos Creek floodplain. Samples will also be collected around previous sampling location 02-01162 [BH11a(ix)-14 through -17].

Location BH11a(ix)-13 will be sampled from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Location BH11a(ix)-13 is within the Los Alamos Creek floodplain, and large cobbles restrict sample collection below approximately 5 ft bgs. All remaining locations will be sampled from the 0- to 0.5-ft and

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7.5- to 8.0-ft depth intervals (depth of the base of the drain), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

At all locations, samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs.

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TPH-DRO will be analyzed at BH11a(ix)-2 because of its proximity to the former UST (TA-02-029 [AOC 02-012] and at BH11a(ix)-11 and BH11a(ix)-13) to evaluate the preferential migration pathway along the drain near the former UST.

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Samples from all locations will not be analyzed dioxins/furans because they were not used or generated during the operation of the reactor (DOE 1987, 08661).

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AOC 02-012, Soils Associated with Underground Storage Tank Areas (TA-02-067 and TA-02-029)

Samples will be collected from four locations (locations BH12-1 through BH12-4) to evaluate the former UST (TA-02-067) fuel line (Figure 4.1-3). The sampling locations are biased towards bends and connections.

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Samples will be collected from three locations (locations BH12-5 through BH12-7) to address the former UST (TA-02-067). The sampling locations will be spaced approximately 20 ft apart across the former tank location, with BH12-7 in the approximate center of the former tank.

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Samples will be collected from four locations (locations BH12-8 through BH12-11) to address the former UST (TA-02-029) located south of the reactor building. The sampling locations will be spaced approximately 20 ft apart across the former tank location, with BH12-11 in the approximate center of the former tank. At all locations, samples will be collected from the 0- to 0.5-ft, 4.5 to 5.0-ft (fuel line depth), and 14.5 to 15.0-ft depth intervals (to address the base of the tank), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TPH-DRO, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. The tanks stored diesel; therefore, samples will not be analyzed for dioxins/furans and PCBs.

4.1.4 Proposed Activities for AOC 02-004(a) OWR Cooling Liquid Recirculation Piping and Material Storage Area, AOCs 02-004(b, c, d, e, f and g), SWMU 02-008(a), AOCs 02-011(a)(iv and vi), and AOCs 02-011(c and d)

The proposed sample locations at these 12 sites are shown in Figure 4.1-4. Table 4.1-4 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to be approximately 15 ft bgs in the area of these sites. The saturated zone is expected to be approximately 12 to 15 ft bgs.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to

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define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

AOC 02-004(a), OWR Facility and Associated Structures

OWR Cooling Liquid Recirculation Piping

Samples will be collected from nine locations (locations BH4a-20 through BH4a-28) situated beside and downgradient of the OWR cooling liquid recirculation piping (Figure 4.1-4). Specifically, samples will be collected at both ends and at the approximate center of the piping. Samples will also be collected across an approximate 20-ft grid south of the line towards Los Alamos Creek to identify and define the southern extent of release identified in previous sampling location 02-22379 along the OWR cooling liquid pipeline. At all locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (the approximate base of the cooling piping), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans because they would not be present in the cooling water from the closed system. Samples will be analyzed for VOCs, SVOCs, and PCBs at location BH4a-24 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs, SVOCs, or PCBs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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OWR Material Storage Area

Samples will be collected from four locations (locations BH4a-29 through BH4a-32). The locations are spaced 15 to 30 ft apart across the location of the former material storage area (Figure 4.1-4). Location BH4a-29 is 4 ft southeast of the southeastern corner of the western bridge. At all locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (approximate depth of footing of the former unnumbered structure), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will not be analyzed for dioxins/furans because they would not be present in the activated throughput metal sleeves and similar materials stored in the unit. Samples will be analyzed for VOCs and SVOCs at location Bh4a-31 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs or SVOCs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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AOCs 02-004(b, c, and d), OWR (TA-02-001) Effluent Storage Tanks (TA-02-053, TA-02-054, and TA-02-055)

Samples will be collected from the following locations (Figure 4.1-4): the center of the footprint of each tank location (locations BH4b-1, BH4c-1 and BH4d-1), approximately 10 ft south of the tanks on a 10-ft spacing along the southern edge of the tank area, parallel to the north side of the retaining wall (locations BH4b-2 through BH4b-4), and approximately 20 ft west of the tank vault, spaced 10 ft apart in a line to the northeast, parallel to the axis of the tank vault (locations BH4c-2, BH4d2 and BH4d-3). At all locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (below the base of the tanks), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-004(e), OWR (TA-02-001) Acid Pit/Transfer Sump (TA-02-053)

Samples will be collected from the piping entrance to the sump and at the piping exit from the sump structure (Figure 4.1-1, locations BH4e-1 and BH4e-2). At all locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (base of the sump was approximately 7 ft bgs), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-004(f), OWR Equipment Building (TA-02-044)

Samples will be collected from the following locations (Figure 4.1-4): within and around the OWR equipment building to determine the extent of contamination reported in previous investigations (locations BH4f-1 through BH4f-8) along the piping from the equipment building to the cooling tower (TA-02-049) (locations BH4f-9 through BH4f-12). At all locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (deeper than existing sample data), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-004(g), Portable Aboveground Storage Tank

Samples will be collected from nine locations (locations BH4g-1 through BH4g-9) (Figure 4.1-4) to determine the extent of contamination identified in previous investigations. Samples will be collected from locations placed approximately 25 ft apart, south of Los Alamos Creek, near the guard station (TA-02-012). At all locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

SWMU 02-008(a), NPDES-Permitted Cooling Tower Outfall

Samples will be collected from the following locations (Figure 4.1-4): 10 ft east of the outfall pipe (location BH8a-1), at the outfall pipe (location BH8a-2), 10 ft east of BH8a-2 (location BH8a-3), and 10 ft downstream of the mouth of the outfall pipe (location BH8a-4, collected within the Los Alamos Creek floodplain). The origin of the discharge pipe is addressed by sampling at location BH4f-12 [AOC 02-004(f)]. Locations BH8a-1 through BH8a-3 will be sampled from the 0- to 0.5-ft depth interval, 4.5- to 5.0-ft depth interval (depth interval at the base of the drain line), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. Location BH8a-4, in the Los Alamos Creek floodplain, will be sampled from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone, if conditions allow. The Los Alamos Creek floodplain contains large cobbles that restrict sample collection below approximately 5 ft bgs.

Samples will be analyzed for TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Dioxins/furans are not likely contaminants in the cooling water from the closed system and will not be analyzed at these locations. Samples will be analyzed for VOCs and SVOCs at location BH8a-4 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs or SVOCs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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AOC 02-011(a)(iv) and (vi), Storm Drains

AOC 02-011(a)(iv), Storm Drain

Storm drain AOC 02-011(a)(iv) is the east-west storm drain and catch basin (TA-02-028) located to the west of the reactor building. Samples will be collected from one location [location BH11a(iv)-1] at the center of the unnumbered catch basin west of TA-02-028 (Figure 4.1-4). This location will be sampled from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (approximate depth of the base of the concrete structure), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(a)(vi), Storm Drain

Storm drain AOC 02-011(a)(vi) is the concrete pipe segment that extends from the catch basin (TA-02-028), through the retaining wall to Los Alamos Creek. Samples will be collected from the following locations (Figure 4.1-4): at the mouth of the outfall within the Los Alamos Creek floodplain [location BH11a(vi)-1], in the middle of the north-south segment of the drain line from the catch basin (TA-02-028) to the outfall at Los Alamos Creek [location BH11a(vi)-2], and north of the retaining wall to the west [Location BH11a(vi)-3].

Locations BH11a(vi)-2 and BH11a(vi)-3 will be sampled from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (approximate depth of the base of the concrete structure), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. Location BH11a(vi)-1 will be sampled from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(c), Storm Drain Associated with OWR Equipment Building (TA-02-044)

Samples will be collected from one location (location BH11c-1) (Figure 4.1-4) at the storm drain off of the southwest corner of the OWR equipment building. The point of origin of the drain is addressed by sampling at location BH4f-1. Samples will be collected from the 0- to 0.5-ft, ft, 4.5- to 5.0-ft, and 9.5- to 10.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

AOC 02-011(d), NPDES-Permitted OWR Equipment Building (TA-02-044) Outfall

AOC 02-011(d) is the original outfall for the OWR equipment building. Samples will be collected from one location (location BH11d-1) in the outfall area and one location east of the outall pipe near former sampling location 02-01151 (Figure 4.1-4). Samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

4.1.5 Proposed Activities for SWMU 02-005, AOC 02-004(a)-Gaseous Effluent Vent Line, and AOC 02-004(f) Liquid Acid-Waste Line

The proposed sample locations at these three sites are shown in Figure 4.1-5. Table 4.1-5 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to be approximately 15 ft bgs in the area of these sites. The saturated zone is expected to be approximately 12 to 15 ft bgs.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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SWMU 02-005, Cooling Tower Drift Loss

The potential blowdown area proposed for sampling is within the canyon bottom. Sampling will be conducted on a 200-ft grid, in an elongated shape along the long axis of the canyon. The grid is intended to provide coverage of the overall area where potassium dichromate containing mist was potentially distributed 30 to 45 years ago and areas where that impacted surface soil may have washed down towards Los Alamos Creek. Because much of the area has been disturbed and regraded, SWMU 02-005 specific sampling locations are located outside of the main TA-02 former operating area in relatively undisturbed areas.

Samples will be collected from 16 locations across TA-02 on an approximate 200-ft grid (locations BH5-1 through BH5-16) (Figure 4.1-5). Samples will not be collected in areas investigated under other AOCs or SWMUs. At all locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Unless field screening indicates it is necessary to do so, samples will not be collected any deeper than 5.0 ft bgs because the drift loss was deposited on the ground surface.

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Samples will be analyzed for TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Dioxins/furans are not proposed for analysis because these compounds were not used in the cooling water. Samples will be analyzed for VOCs and SVOCs at location BH5-1 north of the reactor area to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs or SVOCs. At a separate location along the creek (BH5-13), samples will be analyzed for PCBs to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for PCBs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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AOC 02-004(a), OWR

OWR Gaseous Effluent Vent Line

Samples will be collected from seven locations along the gaseous effluent vent line (Figure 4.1-5): at the OWR gaseous effluent vent line condensate trap area located at the low point in Los Alamos Creek crossing (Figure 4.1-5, location BH4a-35), at bends in the OWR gaseous effluent vent line (Figure 4.1-5, locations BH4a-36 and 37), and at the southwest corner of the reactor building and south along the line (Figure 4.1-5, locations BH4a-33 and BH4a-34). The locations will address the junctions or bends in the line and at the low spots where condensate may have formed. Two tees present at the connections to Lines 118 and 119 will be addressed by samples from locations BH3a-6 and BH3c-4. At all BH4a locations, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (below the base of the structures), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. BH4a-35 will also be sampled from the 14.5- to 15.0-ft depth interval to address the base of the condensate trap. The connection of Line 119 and the OWR gaseous effluent vent line will be sampled in connection with AOC 02-003(c) (Figure 4.1-1, location BH3c-4).

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Samples will be analyzed for TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH. Samples will not be analyzed for dioxins/furans because they would not be present in the gaseous effluent vent discharge from the operation of the OWR (DOE 1987, 08661). PCBs are analyzed at the connection of Line 118 with the OWR gaseous effluent vent line (location BH3a-7, Figure 4.1-1, Table 4.1-1). Samples will be analyzed for VOCs and SVOCs at location Bh4a-36 to confirm their presence. If present, detected concentrations will be discussed with NMED to determine the need for further sampling. If not detected, additional locations will not be sampled for VOCs or SVOCs. Where possible, the location will be sampled from a low spot, drainage area, and/or native material.

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AOC 02-004(f), OWR Equipment Building (TA-02-044)

OWR Liquid Acid Waste Line

Samples will be collected from ten locations (Figure 4.1-5): at a bend in the OWR liquid acid waste line (Figure 4.1-5, location BH4f-17), every 150 ft along the OWR liquid acid-waste line (Figure 4.1-5, locations BH4f-18 through BH4f-20), at the OWR liquid acid-waste line connection to the main waste line leading to the TA-50 treatment plant (Figure 4.1-5, location BH4f-21), and where the line crosses Los Alamos Creek within the north side of the floodplain (Figure 4.1-5, location BH4f-16). Four locations (BH4f-1 and BH4f-13 through -15) address the tee connection at the OWR equipment building. At all locations except for BH4f-16, samples will be collected from the 0- to 0.5-ft and 9.5- to 10.0-ft depth intervals (below the approximate depth of the line), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. Samples will be collected from location BH4f-16 at the 0- to 0.5-ft depth interval, 14.5- to 15.0-ft depth interval (below the approximate creek bottom), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

All AOC 02-004(f) samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, dioxins/furans, PCBs, moisture, and pH.

4.1.6 Proposed Activities for AOC 02-006(c), Sewer Line

The proposed sample locations at SWMU 02-006(c) are shown in Figure 4.1-6. Table 4.1-6 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. In the area of the sewer line, the soil/tuff interface is expected to be approximately 15 ft bgs. The saturated zone is expected to be approximately 10 to 15 ft bgs.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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Samples will be collected from the following locations under the sewer line approximately every 30 to 40 ft at connections and bends in the pipe (Figure 4.1-6, locations BH6c-1 through B6c-7).

At all locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (depth of the drain line), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Locations BH6c-4 and BH6c-5 will also be analyzed for TPH/DRO to evaluate the preferential migration pathway along the sewer line near the former UST. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not conveyed in the sewer line (LANL 1990, 90013).

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4.1.7 Proposed Activities for SWMUs 02-007 and 02-009(c)

The proposed sample locations at these two sites are shown in Figure 4.1-7. Table 4.1-7 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. The soil/tuff interface is expected to be approximately 11 to 18 ft bgs in the area of these sites. The saturated zone is expected to be approximately 10 to 15 ft bgs.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field- All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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SWMU 02-007, Septic Tank (TA-02-043) and Outfall

Samples will be collected from the following locations (Figure 4.1-7): the inlet pipe connection to the septic tank (location BH7-1), in the approximate center of the septic tank (location BH7-2), and near the outlet pipe connection to the septic tank (location BH7-3). Samples will also be collected from locations 20 ft north, northwest, and northeast of BH7-2 (locations BH7-4 through BH7-6). At all locations, samples will be collected from the 0- to 0.5-ft depth interval, 4.5- to 5.0-ft depth interval (previous sampling contamination), 9.5- to 10.0-ft depth interval (previous sampling contamination, septic tank bottom at approximately 7 ft bgs), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at this site (LANL 1990, 90013).

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SWMU 02-009(c), Leach field and Radioactively Contaminated Soil Area Identified during Condensate Trap (TA-02-048) Removal

Samples will be collected from locations in and around the leach field (Figure 4.1-7) (locations BH9c-1 through BH9c-19). Samples will be collected from the following locations: north of the condensate trap near previous sampling location 02-01104 (location BH9c-1), north of and oriented parallel to Los Alamos Creek (locations BH9c-2 through BH9c-8), along the middle of the leach field oriented parallel to Los Alamos Creek (locations BH9c-9 through BH9c-13), and along the south end of the leach field outside of the main creek channel, as determined by a geomorphologist (locations BH9c-14 through BH9c-19).

Samples will be collected from the following locations at the radioactively contaminated area south of Los Alamos Creek: in the center of the contamination area (Figure 4.1-7, location BH9c-20); 20 ft north, east, south, and west of location BH9c-20 (Figure 4.1-7, locations BH9c-21 through BH9c-24); and near Los Alamos Creek (Figure 4.1-7, locations BH9c-25 and BH9c-26; locations will be determined by a geomorphologist to be outside the main creek channel).

At all locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5.0-ft (previous sampling highest contamination), and 9.5- to 10.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples collected from locations BH9c-1 through BH9c-19 will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples collected from locations BH9c-20 through BH9c-26 are located south of the creek in a radioactive contamination area and will not be analyzed for PCBs or hexavalent chromium. No samples will be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site (DOE 1987, 08661).

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4.1.8 Proposed Activities for AOC 02-010, AOC 02-011(a)(x), SWMU 02-009(b), AOC 02-009(d) and AOC 02-008(c)(ii)

The proposed sample locations at these five sites are shown in Figure 4.1-8. Table 4.1-8 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site. In the area of these sites, the soil/tuff interface is variable, ranging from 5 to 35 ft bgs. The saturated zone is also variable, ranging from 5 to 35 ft bgs. The saturated zone is deeper (20 to 35 ft bgs) in the vicinity of AOC 02-010 and the AOC 02-003(a) region. The locations within the Los Alamos Creek floodplain tend to encounter the saturated zone at approximately 5 ft bgs and generally have not been extended to the soil/tuff interface because of drilling limitations within the floodplain cobbles. The soil/tuff interface and the shallow saturated zone tend to be encountered at 12 to 18 ft across the remainder of the Figure 4.1-8 area.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected or the saturated zone is reached. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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AOC 02-008(c)(ii), OWR (TA-02-001) Basement Drain Line and Outfall

Samples will be collected from the following locations (Figure 4.1-8): at the drain line tee from the sewer adjacent to the chemical waste shack (TA-02-003) [location BH8c(ii)-1] and at the southern end of the drain pipe [location BH8c(ii)-2]. At both locations, samples will be collected from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals (drain line depth), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. Samples will also be collected from location BH8c(ii)-3 at the outfall in the Los Alamos Creek floodplain. At this location, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals, the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Dioxins/furans are not likely contaminants in the water

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source and will not be analyzed for at these locations. VOCs and SVOCs are included to determine contamination from potential upstream sources.

AOC 02-009(b), Radioactively Contaminated Soil Area North of the Stack-Gas Valve House (TA-02-019)

Samples will be collected from the following locations (Figure 4.1-8): 20 ft west of and immediately adjacent to previous sampling location 02-01243 (locations BH9b-1 and BH9b-2, respectively); 20 ft east of BH9b-2 (location BH9b-3); 20 ft north of BH9b-1 (location BH9b-4); immediately adjacent to previous sampling location 02-01244 (location BH9b-5); 20 ft east of BH9b-5 (location BH9b-6); 20 ft east of BH9d-8 (location BH9b-7); 20 ft east of BH9d-10 (location BH9b-8); and 20 ft north of BH9b-5 (location BH9b-9). The southern boundary of AOC 02-009(b) is adjacent to the stack gas valve house, AOC 02-003(a). The purpose of the sample depths proposed in this area (locations BH9b-1 through BH9b-3) is to address possible surface contamination at AOC 02-009(b) and to define extent at AOC 02-003(a). Samples at locations BH9b-1 through BH9b-3 will be collected from the 0 to 0.5-ft and 1.5 to 2.0-ft depth intervals (previous screening highest contamination before regrading), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. The remaining sampling north of this area (locations BH9b-4 through BH9b-9) is proposed to address the surface contamination associated with AOC 02-009(b) only. At locations BH9b-4 through BH9b-9, samples will be collected from the 0- to 0.5-ft, 1.5- to 2.0-ft, and 11.5- to 12.0-ft depth intervals.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site (DOE 1987, 08661).

AOC 02-009(d), Soil Contamination of Unknown Source Near Reactor Building (TA-02-001)

Samples will be collected from the following locations (Figure 4.1-8): 45 ft west of and immediately adjacent to previous sampling location 02-01245 (locations BH9d-1 and BH9d-2, respectively); 60 ft east of BH9d-1 (location BH9d-3); 20 ft north of BH11a(x)-3 (location BH9d-4); 20 ft east of BH9d-4 (location BH9d-5); 20 ft north of location BH9d-3 (location BH9d-6); 20 ft east of location BH9d-6 (location BH9d-7), 12 ft northeast of location BHd-6 (location, BH9d-8); 20 ft north of BH9d-5 (location BH9d-9); 20 ft north of location BH9d-6 (location BH9d-10); and 20 ft north of location BH9d-10 (location BH9d-11). The southern boundary of AOC 02-009(d) is adjacent to the chemical waste shack, AOC 02-010. The purpose of the sample depths proposed in this area (locations BH9d-1 through BH9d-3) is to address possible surface contamination at AOC 02-009(d) and to define extent at AOC 02-010. Samples at locations BH9d-1 through BH9d-3 will be collected from 0 to 0.5 ft, 1.5 to 2.0 ft (previous screening highest contamination before regrading), and 11.5- to 12.0-ft depth intervals (previous sampling highest contamination near the chemical waste shack), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone. The remaining sampling north of this area (locations BH9d-4 through BH9d-11) is proposed to address the surface contamination associated with AOC 02-009(d). At locations BH9d-4 through BH9d-11, samples will be collected from the 0- to 0.5-ft, 1.5- to 2.0-ft, and 11.5- to 12.0-ft depth intervals.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. Samples from locations BH9d-1 through BH9d-3 will also

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be analyzed for hexavalent chromium because of the previous chromium detection in tuff at location 02-01245 (Figure 4.1-9, HIR). Samples will not be analyzed for dioxins/furans because they were not used during known site operations and were not generated as waste at the site.

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AOC 02-010, Residual Soil Contamination Associated with Chemical Waste Shack (TA-02-003)

Samples will be collected from the following locations (Figure 4.1-8): within the footprints of the former chemical waste shack (TA-02-003), boiler house (TA-02-063), and chamber (TA-02-032) (locations BH10-6, BH10-8, and BH10-9); to the west, south, and east of these structures approximately 25 ft apart (locations BH10-5, BH10-7, BH10-10 and BH10-11); and in the area between these structures and Los Alamos Creek (locations BH10-1 through BH10-4, and BH10-12 through BH10-14). At all locations, samples will be collected from the 0 to 0.5 ft, 4.5 to 5.0 ft (depth of shallow structures such as drain lines associated with the AOC), and 19.-5 to 20.0-ft depth intervals (if groundwater saturation is not encountered) to sample the depth potentially impacted by the chemical shack underground chamber. Samples will also be collected from the soil/tuff interface and at the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. There is no evidence that dioxins/furans were used in the processing of uranyl nitrate. Dioxins/furans are not likely contaminants at the AOC; therefore, they are not included in the analyses in this AOC (DOE 1987, 08661).

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AOC 02-011(a)x, Storm Drain

Samples will be collected from the following locations (Figure 4.1-8): along the drain line on the east side of the reactor building (TA-02-001) [locations BH11a(x)-2 through BH11a(x)-5] and on north side of the retaining wall [locations BH11a(x)-1 and BH11a(x)-6]. At these locations, samples will be collected from the 0- to 0.5-ft, 4.5- to 5-ft (depth of the drain structures), and 19.5- to 20-ft depth intervals (if groundwater saturation is not encountered) to sample the horizon potentially impacted by the chemical shack chamber (TA-02-032).

One location [location BH11a(x)-7] will be sampled at the outfall within the Los Alamos Creek floodplain. At this location, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals (depth of the shallow drain structures), the soil/tuff interface, and the depth of the first encounter with the shallow saturated zone.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, hexavalent chromium, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, pH, and PCBs. There is no evidence that dioxins/furans were used in the surface area drained by this ditch, and they are probably not contaminants found at the AOC; thus, they are not included in the analyses.

At location BH11a(x)-6, samples will be analyzed for TPH-DRO in addition to all of the above. This location serves to define extent near previous sampling location 02-01162.

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4.2 TA-21

The investigations of the TA-21 sites will be coordinated with other investigations and remediation at TA-21 (i.e., those outlined in the DP Site Aggregate Area investigation work plan [LANL 2005, 90225]). Specifically, the proposed activities at Consolidated Unit 21-006(e)-99 and AOC 21-028(c) will be performed concurrently with the approved planned investigations at the sites in the DP Site Aggregate Area. The approach described below for these sites is the same as that for similar sites addressed in the approved DP Site Aggregate Area at TA-21 work plan (LANL 2005, 90225).

Field-screening instruments will determine the sample(s) with the highest radionuclide and/or organic contamination. If field-screening instruments cannot determine which sample(s) contains the highest levels of radionuclides or organic compounds, samples will be collected from the location where contamination would most likely be present as indicated by site history (e.g., sump, outfall). The selected sample(s) will be sent to an off-site fixed laboratory for quick turnaround analysis of PCBs, HE, dioxins, and furans (NMED 2005, 89314). The sample results will be transmitted to NMED, via fax, for review. Within one week of receipt of the results, NMED will contact the LANL project leader to discuss the results. If PCBs, HE, dioxins and/or furans are not detected or are detected at low levels that reflect anthropogenic activity, the remaining samples will not be analyzed for these analytes per the agreement with NMED. If PCBs, HE, dioxins and/or furans are detected at levels that may be attributed to the site, the remaining stored aliquots will be submitted to the analytical laboratory for additional analyses.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east, and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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4.2.1 Consolidated Unit 21-004(b)-99, Drain Line and Aboveground Storage Tanks

Investigation of this site is being proposed for deferred action until nearby utilities are no longer in use and/or are removed and the buildings limiting access have been removed (Figure 2.1-2). Currently, active utilities (i.e., water lines) are collocated with the drain line associated with this consolidated unit. The proposed future activities at Consolidated Unit 21-004(b)-99 are described below; however, they are not presented in a figure or a table because of the uncertainty associated with future remedial actions that may include part of this consolidated unit. Once the basis for the deferred action is resolved, a supplemental investigation work plan will be submitted that may include the following proposed actions.

- *Drain line excavation and sampling:* When surrounding utilities and infrastructure are no longer active and/or removed and it is safe to do so, the drain line connecting the sump (TA-21-223) and the aboveground storage tanks (TA-21-346) will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) before removal. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., break in the pipe), samples will be collected immediately beneath the removed pipe. If no field screening evidence or no visible evidence of a leak is found, samples will be collected from locations beneath the removed pipe at the sump outlet connection to the pipe, at pipe joints, and pipe bends. At each location, samples will be collected from the 0-

to 1.0-ft and 2.0 to 3.0-ft depth intervals. The 0-ft depth is defined as immediately beneath the pipe.

- *Former outfall investigation:* One location will be sampled in the center of the former outfall, 0.5 ft downslope from the mouth of the headwall. Samples will be collected from the 0- to 0.5-ft, 2.0- to 3.0-ft, and 5.0- to 6.0-ft depth intervals. Samples will be collected 5 ft to the west and east of the outfall mouth location (two locations). One location will be sampled 10 ft directly downslope from the outfall mouth location, as well as one location 10 ft to the east and west of this center location (three locations). Samples will be collected at these five outfall locations from the 0- to 0.5-ft and 2.0- to 3.0-ft depth intervals.
- *Aboveground storage tanks (TA-21-346):* The storage tanks will be carefully removed and inspected for evidence of leaks (e.g., field screening, stained soil). After removal, confirmation samples will be collected from the footprint of each tank (two locations total) as well as any apparent infiltration pathways (cracks in the asphalt). At these locations, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals. The 0-ft depth is defined as 0.5-ft below the asphalt layer of the containment area.

Samples will be analyzed for VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH.

4.2.2 Consolidated Unit 21-006(e)-99, Seepage Pits

The proposed sample locations at Consolidated Unit 21-006(e)-99 are shown in Figure 4.2-1. Table 4.2-1 provides a summary of the proposed sample locations, sample depths, and analytical suites for each sample.

The locations of the seepage pits have not been identified; therefore, a geophysical survey will be conducted. Before the survey is conducted, the rubble covering the area will be removed in order to obtain the best results possible. If no evidence of the seepage pits is found, exploratory trenching will be conducted to determine whether they exist and, if so, to identify their location(s). Two trenches will be excavated in the possible area of the pits, one south of Room 413 within TA-21-004, and one 30 ft south of this trench, both oriented east-west (Figure 4.2-1). Trenching will be conducted with a backhoe and will progress from the surface to approximately 5 ft bgs. The trench will be visually logged for evidence of nonnative materials, disturbed bedding horizons, and areas of visible staining. Elevated radiological or organic vapor field-screening results will be documented. Trenching will continue in the historically identified areas until the pits are located and their boundaries have been determined, evidence of a pit is found, or the absence of a pit in each area has been verified. All seepage pit structures that can be located by the geophysical survey and/or trenching will be excavated and removed for disposal. Field screening will help to determine areas for excavation. Confirmation samples will be collected under the excavated area. A minimum of two sample depths (5-ft intervals) will be collected, including the soil/tuff interface, if encountered. Samples will be spaced on a 20-ft grid to determine lateral extent around contaminated sampling locations until uncontaminated areas are identified.

If pit structures or evidence of pit structures are not identified during field activities, confirmation samples will be collected from locations where the structures were probably located using the proposed sampling map as a guide (Figure 4.2-1). Samples will be collected from locations within the TA-21-004 footprint in the approximate area of pipes in Room 413 (Figure 4.2-1, locations BH6e-1, BH6e-2, BH6e-4, BH6e-7, and BH6e-8). Samples will also be collected from locations around the perimeter of TA-21-004 (Figure 4.2-1, locations BH6e-3, BH6e-5, BH6e-6, BH6e-9, and BH6e-10 through BH6e-15). The

TA-21-004 footprint was previously excavated and backfilled; therefore, the 0-ft depth is defined as the depth of undisturbed soil/tuff beneath the backfill. At these locations, samples will be collected from the 2.0- to 3.0-ft, 7.0- to 8.0-ft, and 12.0- to 13.0-ft depth intervals.

Samples will be analyzed for VOCs , SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH.

4.2.3 SWMU 21-011(b), Acid-Waste Sump and Lines

Investigation of this site is being deferred until nearby utilities are no longer in use and buildings limiting access have been removed. Currently, active utilities (i.e., water lines) are collocated with the lines associated with the sump (TA-21-223), and active buildings are connected to and restrict access to these lines (Figure 2.1-2). During the investigation, it may not be possible to remove or sample some portions of the pipelines because of their proximity to MDA A and their location within MDA T. Accordingly, investigation activities will need to be coordinated with the corrective measures evaluation for MDA A and MDA T before they begin. The proposed future activities at SWMU 21-011(b) are described below; however, they are not presented on a figure or in a table because of the uncertainty associated with future remedial actions that may include part of this consolidated unit. Once the basis for the deferred action is resolved, a supplemental investigation work plan will be submitted that may include the following proposed actions.

- *Acid waste sump excavation and sampling:* When surrounding utilities and infrastructure are no longer active and/or removed and it is safe to do so, the sump and associated shack will be carefully removed and area underneath inspected for evidence of leaks (e.g., field screening, stained soil). Samples will be collected from one location in the center of the excavation. Samples will be collected from the 0- to 1.0-ft, 5.0- to 6.0-ft, and 10.0- to 11.0-ft depth intervals, with 0-ft depth defined as the floor of the excavation.
- *Pipeline excavation and sampling:* When surrounding utilities and infrastructure are no longer active and/or removed and it is safe to do so, the following pipelines may be excavated, removed, and samples collected beneath the lines:
    - ♦ *The pipeline that runs from the sump (TA-21-223) west to MDA:* The pipeline will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) prior to removal. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., a break in the pipe), samples will be collected immediately beneath the removed pipe to define vertical extent. If no field-screening evidence or no visible evidence of a leak is found, samples will also be collected from locations beneath the removed pipe at the sump outlet connection to the pipe, at pipe joints, and pipe bends. At each location, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals. The 0-ft depth is defined as immediately beneath the pipe.
    - ♦ *The pipelines that run from TSTA Buildings TA-21-155 and -152 to the sump (TA-21-223):* The pipeline will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) prior to removal. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., a break in the pipe), samples will be collected immediately beneath the removed pipe to define vertical extent. If no field-screening evidence or no visible evidence of a leak is found, samples will be collected from beneath

the removed pipe at the sump inlet connection to the pipe, pipe bends, and at the pipe connections with manholes and the TSTA Buildings TA-21-155 and -152. At each location, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals. The 0-ft depth is defined as immediately beneath the pipe.

All samples will be analyzed for VOCs, SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH.

4.2.4 Consolidated Unit 21-022(b)-99, Industrial Waste Sumps and Drain Lines

Investigation of this site is being deferred until nearby utilities are no longer in use and buildings limiting access have been removed. Currently, active utilities (i.e., water lines) are located in close proximity to this consolidated unit. In addition, associated buildings limit access needed to characterize this site fully. During the investigation, it may not be possible to remove or sample some portions of the pipelines because of their location within MDA T. Accordingly, investigation activities will need to be coordinated with the corrective measures evaluation for MDA T before they begin. The proposed future activities at Consolidated Unit 21-022(b)-99 are discussed below; however, they are not presented in a figure or in a table because of the uncertainty associated with future remedial actions that may include part of this consolidated unit. Once the basis for the deferred action is resolved, a supplemental investigation work plan will be submitted that may include the following proposed actions.

- *Sump sampling:* In 1979 and 1980, all sumps were excavated and removed and disposed at TA-54 (LANL 1991, 03636, pp. 18–40; Blackwell 1980, 85470, p. 2). The lines were extended to form a direct connection from the buildings to the main waste lines to MDA T. Contaminated soil was removed around the sumps until further excavation jeopardized the buildings. Some of the removed soils had retrievable levels of plutonium (Blackwell 1980, 85470, p. 2). The removal of additional soil was deferred to a later date when the buildings or waste lines were decommissioned. All excavated surfaces were sprayed with asphalt undercoating and backfilled with clean soil (LANL 1991, 03636, p. 18-40).

  Samples will be collected starting 2 ft under the asphalt from the 0- to 1.0-ft, 5.0- to 6.0-ft, and 10.0- to 11.0-ft depth intervals.

- *Drain line excavation and sampling:* When surrounding utilities and infrastructure are no longer active and/or removed and it is safe to do so, the following pipelines may be excavated, removed, and samples collected underneath (Figure 2.1-4):

  - *The drain lines that run from the sumps east to MDA T:* The drain lines will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) prior to removal. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., a break in the pipe), samples will be collected immediately beneath the removed pipe to define vertical extent. Samples will also be collected from locations beneath the removed pipe at the sump outlet connection to the pipeline, pipeline joints, and pipeline bends. At each location, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals. The 0-ft depth is defined as immediately beneath the pipe.

  - The drain lines that run from former (Buildings TA-21-003 and TA-21-004) and present buildings (Buildings TA-21-002, TA-21-005, and TA-21-150) to the sumps: The drain lines will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) prior to removal. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., a break in the pipe), samples will be collected immediately beneath the removed pipe to define vertical extent. Samples will also be collected from beneath the removed pipe at the sump inlet connection to the pipe, pipe joints, pipeline bends, and at the pipe connections with buildings TA-21-002, TA-21-003, TA-21-004, TA-21-005, and TA-21-150. At each location, samples will be collected from the 0- to 1.0-ft and 2.0- to 3.0-ft depth intervals. The 0-ft depth is defined as immediately beneath the pipe.

Samples will be analyzed for VOCs, SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH.

4.2.5 AOC 21-028(c), Satellite Container Storage Areas

The proposed sample locations at AOC 21-028(c) are shown in Figure 4.2-1. Additionally, sample locations proposed for nearby SWMUs (Figure 5.2-2, of the DP Site Aggregate Area investigation work plan, [LANL 2005, 90225]) that provide coverage of the satellite container storage areas are shown in Figure 4.2-1. Table 4.2-2 provides a summary of the proposed sample locations, sample depths, and analytical suites for each sample.

Samples will be collected from the approximate locations of the door to Room 301 on the north dock, north end of Room 362, south end of Room 362, at the outer door to Room 360, and at the northeast side of the fan Room 3N (Figure 4.2-1, locations BH28c-1, BH28c-6, BH28c-7, and BH28c-13). Samples will also be collected from 10 ft laterally around these locations to define lateral extent (Figure 4.2-1, locations BH28c-2 through BH28c-5, BH28c-8 through BH28c-12, and BH28c-14 through BH28c-17). TA-21-003 footprint was previously excavated and backfilled. Samples will be collected from the 2.0- to 3.0-ft, 7.0- to 8.0-ft, and 12.0- to 13.0-ft depth intervals. The 0-ft depth is defined as the depth of undisturbed soil/tuff.

Samples will be analyzed for VOCs, SVOCs, TAL metals, cyanide, nitrates, perchlorate, gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, moisture, and pH.

4.3 TA-26

SWMU 26-002(a), the acid sump system, SWMU 26-002(b), the equipment room drainage system, and SWMU 26-003, the septic system, are closely located on the mesa top. SWMU 26-001, the disposal area, is located on the hillside below the outfalls of the three mesa-top SWMUs. Because of their proximity, sampling and excavation activities are proposed for the entire TA-26 site. The proposed sample locations at the TA-26 site are shown in Figure 4.3-1. Table 4.3-1 provides a summary of the proposed sample locations, sample depths, and analytical suites for each site.

Recent visual inspection of the site indicated no evidence of any structure on the mesa top at the original location of the vault. The site is well vegetated with grass and bushes. The only remaining structure is a concrete barrier wall on the canyon rim.

No specific documentation is available confirming the removal of the sump system, the drain line, and the septic tank system. Therefore, these structures may still be in place. Exploratory trenching will be performed to identify structure locations or excavated former locations. One exploratory trench will be located along the north side of the concrete barrier wall oriented east-west. Trenching will be conducted with a backhoe and will progress from ground surface to approximately 5 ft bgs. The trench will be visually logged for evidence of nonnative materials, disturbed bedding horizons, and areas of visible staining. Elevated field-screening results of radionuclides and/or VOCs will be documented.

Three small openings in the concrete barrier wall may or may not be indicative of the previous locations of drain lines. These openings will be used as a guide to trace back the former locations of the pipelines. If the trench does not provide sufficient information on the former structures, a second trench will be located approximately 25 ft north of the concrete barrier wall (oriented east-west), where the former vault was located. Trenching will be conducted with a backhoe and will progress from ground surface to approximately 5 ft bgs. Trenching will continue in the historically identified areas until all the structures are located and their boundaries have been determined, evidence of the former structures is found, or the absence of the structures in the area has been verified.

Located structures will be excavated and removed for disposal. Any visible or extruding foreign objects on the bench (metal bars, etc.) will be removed. The pipelines, tank, and sump will be carefully excavated and inspected for evidence of leaks (e.g., field screening, stained soil) before they are removed. Where elevated levels of VOCs and/or radionuclides are present, as determined by field screening, or where visible evidence of a leak is found (e.g., a break in the pipe), samples will be collected immediately beneath the structures, in addition to the samples prescribed below. If the septic tank is still in place, the contents will be sampled using a sludge or residual wipe sampler and will be field screened for VOCs and radionuclides.

If the structures or evidence of the former structures are not identified during field activities on the mesa top, confirmation samples will be collected from the two exploratory trenches. Samples will be collected every 5 ft laterally along the bottom of each trench from the 0- to 0.5-ft and 4.5- to 5.0-ft depth intervals. Sampling activities on the hillside bench at SWMU 26-001 will follow the proposed sampling map (Figure 4.3-1).

After removing the existing structures and/or locating the boundaries of excavated structures, samples will be collected on the mesa top at the former locations of the excavated structures and along the excavated pipelines. For the sump system [SWMU 21-002(a)], each of the eight floor drains inside the vault will be sampled (Figure 4.3-1, locations 1 through 8). Samples will be collected at the inlet, the bottom, and the outlet of the sump (Figure 4.3-1, locations 9, 10, and 11, respectively). Another location will be at the south end of the pipeline (Figure 4.3-1, location 12). These samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. The zero depth is defined as the bed of excavated sump or pipeline. To define lateral extent, samples will be collected 5 ft to the west and east of location 12 (Figure 4.3-1, locations 13 and 14, respectively). At these two locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. The 0-ft depth is defined as the mesa-top ground surface.

The drain line will be sampled at the two floor drains inside the vault (Figure 4.3-1, locations 15 and 16), and at the south end of the pipeline (Figure 4.3-1, location 17). At these locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. The 0-ft depth is defined as the bed of the excavated pipeline. To define lateral extent, samples will be collected 5 ft (or where accessible) to the west of location 17 (Figure 4.3-1, location 18). Extent to the east will be defined by sampling at the septic system described below. Samples at location 18 will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. The 0-ft depth is defined as the mesa-top ground surface.

The septic system (SWMU 02-003) will be sampled at the origin of the pipeline (Figure 4.3-1, location 19); at the inlet, the bottom, and the outlet of the septic tank (Figure 4.3-1, locations 20, 21 and 22, respectively); and at the south end of the pipeline (Figure 4.3-1, location 23). At these locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Zero depth is defined as the bed of excavated tank or pipeline. To define lateral extent, samples will be collected at 5 ft (or where accessible) to the east of location 23 (Figure 4.3-1, location 24). Samples at this location will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals. Zero depth is defined as the mesa-top ground surface.

Because of the steep slope of the canyon wall, it is impractical from a safety perspective to sample the outfall areas on the face of the cliff. Additionally, the steepness of the cliff precludes the accumulation and retention of any potential contamination. Sample locations will be situated on the topographical bench beneath the cliff. These locations form a grid pattern with the first row of sample locations at the north edge of the bench, immediately below the cliff (Figure 4.3-1, locations 25 through 29), and the third row of sample locations at the south edge of the bench, immediately above the next cliff (Figure 4.3-1, locations 35 through 40). The second row of sample locations is situated between the other two rows of sample locations (Figure 4.3-1, locations 30 through 34). Sample locations are 20 ft apart in a row, and the three rows are also approximately 20 ft apart. At these locations, samples will be collected from the 0- to 0.5-ft, 2.0- to 2.5-ft, and 4.5- to 5.0-ft depth intervals.

All material brought to the surface will be field screened for radionuclides and VOCs. Where field-screening instruments and/or visual inspection indicate potential contamination, additional samples will be collected and sent for off-site laboratory analysis. Samples will be collected 10 ft below contaminated intervals as determined by field screening until an uncontaminated sampling interval is collected. Field screening will also determine the need for collecting step-out samples (e.g., 20 ft laterally to the north, south, east and west if proposed sampling locations cannot be used to define extent). The step-out samples will be collected from the same depth intervals as their corresponding contaminated sample location until field-screening results indicate no measurable contamination.

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Because the site history specifically indicated that only radioactive materials and HE were stored in the vault, which is the sole potential source of contamination at TA-26, samples collected will be analyzed for the following analytes: VOCs (in samples deeper than 0.5 ft bgs), SVOCs, TAL metals, perchlorate, HE, radionuclides (gamma-emitting radionuclides, americium-241, isotopic plutonium, isotopic uranium, strontium-90, and tritium), moisture, pH, and PCBs. The following analytes will not be analyzed because they are not related to the operational history of the site: cyanide, nitrates, dioxins, and furans.

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5.0 INVESTIGATION METHODS

The current versions of Environmental Stewardship–Environmental Characterization and Remediation (ENV-ECR) standard operating procedures (SOPs) and quality procedures (QPs) listed below are applicable to the investigation methods proposed in this plan.

- ENV-ECR SOP-01.01, General Instructions for Field Investigations
- ENV-ECR SOP-01.02, Sample Containers and Preservation
- ENV-ECR SOP-01.03, Handling, Packaging, and Shipping of Samples
- ENV-ECR SOP-01.04, Sample Control and Field Documentation
- ENV-ECR SOP-01.05, Field Quality Control Samples
- ENV-ECR SOP-01.06, Management of Environmental Restoration Project Waste
- ENV-ECR SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- ENV-ECR SOP-01.10, Waste Characterization

- ENV-ECR SOP-03.11, Coordination and Evaluating Geodetic Surveys
- ENV-ECR SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples
- ENV-ECR SOP-06.10, Hand Auger and Thin-Wall Tube Sampler
- ENV-ECR SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials
- ENV-ECR SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials
- ENV-ECR SOP-15.09, Chain of Custody for Analytical Data Packages
- ENV-ECR QP-02.2, Personnel Training Management
- ENV-ECR QP-03.4, Corrective Action Process
- ENV-ECR QP-04.4, Records Transmittal to the Records Processing Facility
- ENV-ECR QP-05.3, Readiness Planning and Review
- ENV-ECR QP-05.7, Notebook Documentation for Environmental Restoration Technical Activities
- ENV-ECR QP-05.12, Integrating Work with Other Organizations
- ENV-ECR QP-07.1, Procurement
- ENV-ECR QP-07.2, Supplier Evaluation
- ENV-ECR QP-10.5, Planning, Performing, and Managing Surveillances

Table 5.0-1 provides a summary of the key investigation methods.

5.1 Drilling

Boreholes 10 or more ft deep will be drilled with a drill rig capable of core retrieval using a hollow-stem auger. Core samples will be field-screened for radioactivity and organic vapors, visually inspected, and geologically logged. Samples will be biased towards fractures if found in core samples. Fractures will be described on the borehole logs and photographed. Additional samples may be collected for analysis at additional depths as necessary based on field-screening results. All drilling activities will refer to the appropriate SOPs, QPs, Laboratory guidance documents, and protocols to ensure health and safety issues are reviewed and addressed during field operations.

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5.2 Collecting Soil and Rock Samples

The most common method for surface and shallow subsurface sampling is the spade-and-scoop method, described in LANL-ECR-0SOP-6.09. Stainless-steel shovels, spades, scoops, and bowls will be used because they are easily decontaminated. Disposable tools made of polystyrene or Teflon may also be used. In some cases, hand-augering tools may be used to collect shallow subsurface samples if geologic material conditions permit. The use of tools and their applicability are described in ENV-ECR SOP-6.10. If a surface sample location is in bedrock, an axe or hammer and chisel may be used to collect samples.

Samples will be field screened for radioactivity and organic vapors, photographed, then placed in Ziploc bags and/or sample jars as grab samples collected with hand augers, scoops, or chiseling devices in accordance with the sampling guidance document and appropriate SOPs (ENV-ECR SOP-01.01–01.08 series). If field screening detects radioactivity at a depth beyond the reach of standard surface methods, drilling will be conducted.

Core samples will be collected per ENV-ECR-SOP-6.26, examined for lithologic and structural features, field-screened for radioactivity and organic vapors and photographed, after which they will be removed from the split-barrel sampler and placed into seam-sealed plastic sleeves or protec-core heat-sealed bags to preserve the moisture content of the core. The moisture content samples will be collected and placed in glass sample jars. Sample jars and/or Ziploc bags will be filled with discrete segments of the core.

All samples (surface and subsurface) will be shipped through the Sample Management Office (SMO) to off-site fixed laboratories for analysis. Samples will be sent to laboratories that are on the ENV-ERS approved suppliers list. All samples will be collected and handled in compliance with ENV-ECR SOP-15.09, Chain of Custody for Analytical Data Record Packages. The analytical suites for each borehole and surface sample location are described in the sections pertaining to the individual site and listed in Tables 4.1-1 through 4.1-8.

Quality assurance/quality control samples will include field duplicate samples collected in accordance with ENV-ECR SOP-01.05. Field duplicate samples will be collected as directed by ENV-ECR SOP-01.05. Rinsate blanks will also be collected to confirm decontamination of sampling equipment.

Auger holes will be continuously cored to total depth and geologically logged, (i.e., the lithology, apparent moisture, structural features, specifically the occurrence of fractures, orientation, and density), and core recovery compared to the footage drilled per ENV-ECR SOP-12.01 and ENV-ECR SOP-04.01. Backfilling of the investigation auger hole and placement of backfill materials, such as bentonite and cement, will be documented with regard to volume (calculated and actual), intervals of placement, and additives used to enhance backfilling.

5.3 Field Screening

Samples will be field screened for gross alpha radiation using a Model 139 rate meter and for beta/gamma radiation using an Eberline Smart Portable-1. Samples will be field-screened for organic vapors using a photoionization detector. Cores collected by split-spoon core barrel will be screened immediately upon opening the core barrel, and any visibly stained or discolored zones, fractures, or clay-rich weathered zones will be noted. Samples collected by spade-and-scoop or hand-auger methods will be screened in the collection bowl or sample container soon after the sample is collected. Screening values will be recorded in the appropriate spaces on the corresponding sample collection logs at the time of sample collection. If field-screening results are used to change the planned sample interval or to collect additional samples, the modification will be recorded in the appropriate sample collection log and in the field notebook. Field-screening instruments will be checked at least daily for proper operation and checked at least daily against calibration standards as appropriate.

Because the concentrations of metals detected in the historical samples at most sites are low (near or below background), the X-ray fluorescence (XRF) instrument is not a useful guide to planned sample-collection activities because of the high XRF detection limits for target metals. Therefore, the XRF instrument will not be used to field-screen surface and subsurface soil/rock samples.

5.4 Collection of Geotechnical Data

All boreholes will be cored continuously to total depth and will be geologically logged in accordance with the current ENV-ECR SOP-12.01; American Society for Testing and Materials (ASTM) D2487, "Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)"; and ASTM D2488, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)," which includes logging the lithology apparent moisture, structural features, and core recovery compared to the interval drilled.

5.5 Equipment Decontamination

Following investigation activities, project personnel will decontaminate all equipment. Residual material adhering to the equipment will be removed using dry decontamination methods, including wire-brushing and scraping (ENV-ECR SOP-01.08). If equipment cannot be free-released following dry decontamination, a high-pressure sprayer, along with long-handled brushes and rods, will be used to remove contaminated material from equipment more effectively. Pressure washing of equipment will be performed on a temporary wash pad with a high-density polyethylene liner. Cleaning solutions and wash water will be collected and contained for proper disposal. Decontamination solutions will be sampled to determine final disposition. All parts of the equipment, including the undercarriage, wheels, tracks, chassis, and cab, will be thoroughly cleaned. Air filters on equipment operating in the exclusion zone will be considered contaminated and will be removed and replaced before the equipment leaves the site. Equipment ready for demobilization will be surveyed by a Health, Safety, and Radiation protection radiation control technician before being released from the site.

5.6 Borehole Abandonment

All boreholes will be abandoned by filling the borehole with a bentonite/concrete mixture. The boreholes will be pressure grouted from the bottom of the borehole to the surface in accordance with Section X.D of the Consent Order. All cuttings will be managed as investigation-derived waste (IDW), as described in Appendix B of this work plan. All borehole abandonment information will be provided in the investigation report to follow.

5.7 Radiological Survey

A radiological survey will be conducted encompassing each of the investigation sites to identify any areas of elevated radiological contamination. Surveys of outfalls and other areas where drain lines have terminated or discharged will provide a means of quickly identifying areas requiring verification sampling.

Radiological survey instruments will include gamma (2x2 sodium iodide or latest technology) for high-energy emitters, field instruments for the detection of low-energy radiation (Field Instrument Detectors for Measuring Low Energy Radiations or the latest technology), and in situ screening of soil, as appropriate, to identify classes (alpha, beta, gamma) of radiological contaminants.

The radiological survey data will be evaluated in conjunction with existing sample data to ascertain potential data needs and the need for additional sampling, to identify the location and extent of potential areas of elevated radioactivity, and to refine the areas of proposed sampling.

5.8 Geophysical Surveys

Geophysical surveys will be performed to verify the presence of current or former underground structures. The surveys will identify previously unknown or undocumented structure locations and confirm previous D&D removal. Specifically, a geophysical survey will be completed to confirm D&D removal activities at TA-02 and to locate the seepage pits at TA-21.

Geophysical methods used will include electromagnetic (EM-61, EM-31 instruments) to detect metallic objects (cast iron or steel pipes), ground-penetrating radar to detect nonmetallic structures (e.g., cobblelined pits, clay pipes), or a combination of the methods, based on consultation with the geophysical subcontractor.

The geophysical survey data will be presented in a report and evaluated before sampling begins to confirm or establish locations of underground structures to aid in determining sampling locations.

5.9 Excavations and Trenching

Excavations will be completed using a standard backhoe. The structures will be exposed and inspected for cracks or other signs of potential release to the environment, and then disposed in accordance with Laboratory procedures. Excavation methods will vary among locations, but the primary method employed will be to advance from the ground surface to remove material in lifts until the structure is unearthed and removed.

Trenching will be completed using the same methods and equipment as the excavations. Trenching will assist in locating subsurface structures where geophysical surveys were inconclusive or could not be completed. Trenching will be conducted to remove lifts of soil in areas of suspected subsurface features to allow identification of disturbed soil or nonnative material. Trenching will be conducted with a backhoe and will progress from the surface to approximately 5 ft bgs in the area of the suspected structure. The trench will be visually logged for evidence of nonnative materials, disturbed bedding horizons, and areas of visible staining. Elevated radiological or organic vapor field-screening results will be documented. Trenching will continue in the historically identified area until the structure is located, evidence of a former structure is found, or the absence of a structure at that location has been verified.

5.10 Excavation Backfilling and Trench Cover Replacement

Excavations and trenches will be backfilled and compacted and clean certified soil fill material or soil that can be reused will be placed over the affected area. The clean fill material will be obtained from off-site. All affected surfaces will be restored to original grade and condition, patched for paved areas, or reseeded with a native seed mix for unpaved areas.

6.0 MONITORING AND SAMPLING PROGRAM

Groundwater monitoring is currently performed downgradient of TA-02 as part of interim facility-wide monitoring (LANL 2005, 88789).

In the investigation report to follow, additional sampling and/or remediation may be recommended.

7.0 SCHEDULE

Investigation activities (drilling 376 boreholes and collecting approximately 1524 samples) are scheduled to begin in early fiscal year 2008 and will require approximately 12 months to complete. Data analysis, performing screening assessments, data reporting, peer review, and document preparation will require approximately 10 months.Therefore, the planned submittal date for the investigation report is June 19, 2009.

The sites proposed for deferred action [Consolidated Unit 21-004(b)-99, SWMU 21-011(b), and Consolidated Unit 21-022(b)-99] may or may not be investigated concurrently depending on the schedule

Deleted: Following approval of this work plan by NMED, the readiness review and site preparation activities can begin. Preparation activities, implementation of the fieldwork (376 boreholes and approximately 1524 samples), and demobilization are anticipated to require at least 18 12 months. Sample submittals to the SMO will be completed by this time. ¶
An investigation report will be submitted one year after receipt of final analytical data, on October 31, 2008. ¶

for TA-21 site shutdown. Although these sites are proposed for deferred action, the August 31, 2011, Consent Order deadline for cleanup will still be met.

8.0 REFERENCES

The following list includes all documents cited in this work plan. 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 ENV-ERS Program Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the ENV-ERS Program 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 ENV-ERS Program. 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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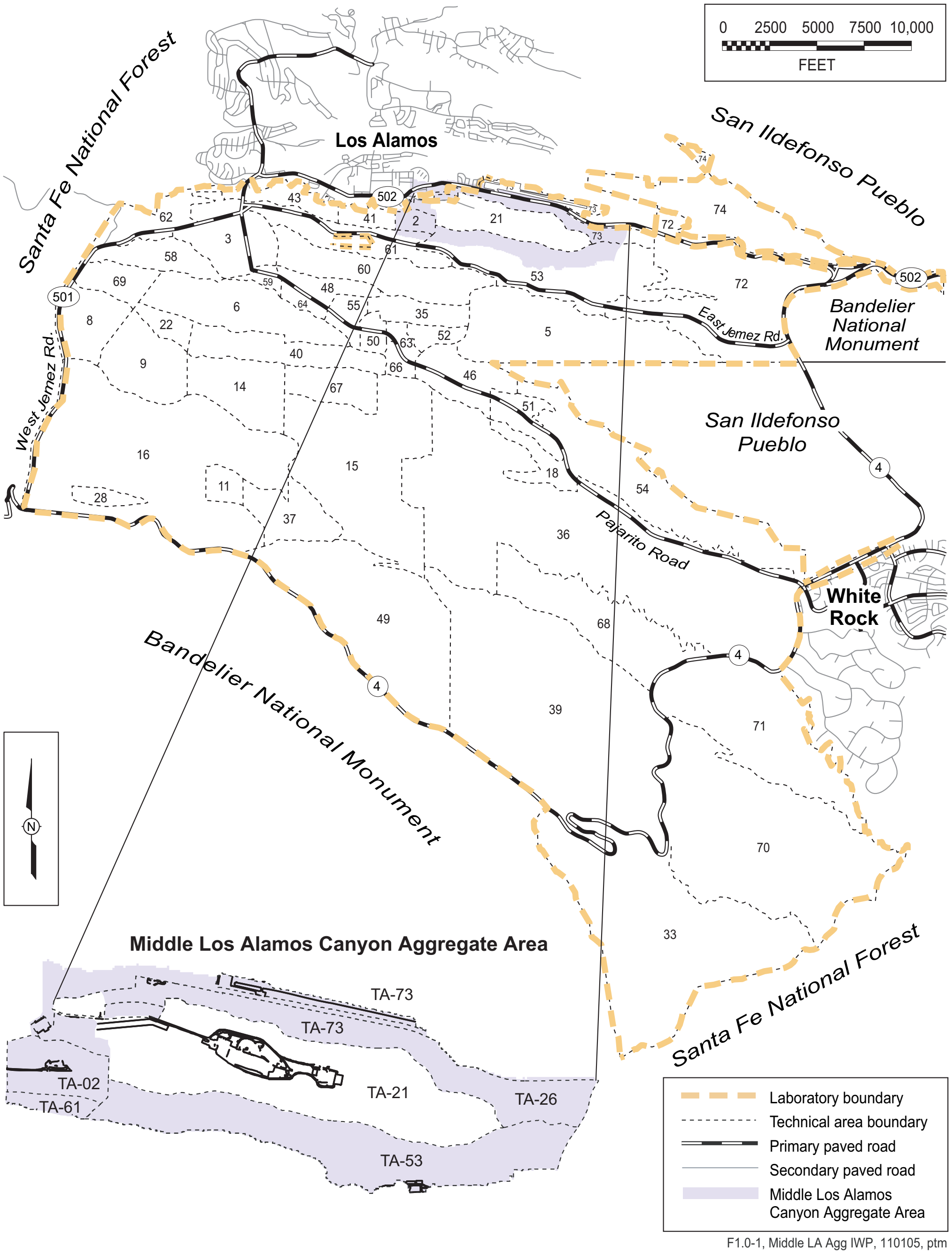

Figure 1.0-1. Locations of TA-02, TA-21, and TA-26 within the Middle Los Alamos Canyon Aggregate Area

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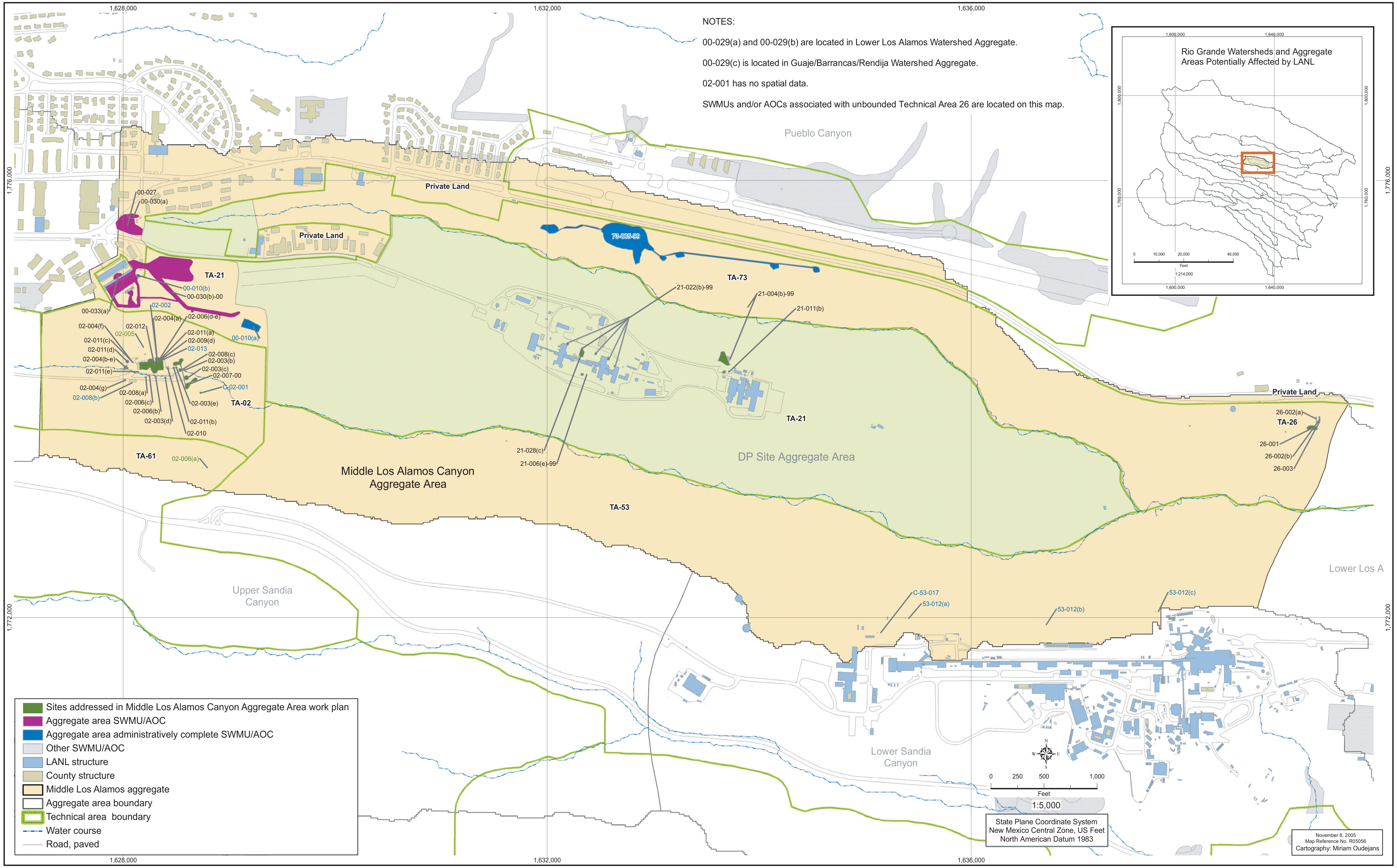


Figure 1.0-2. Middle Los Alamos Canyon Aggregate Area SWMUs and AOCs

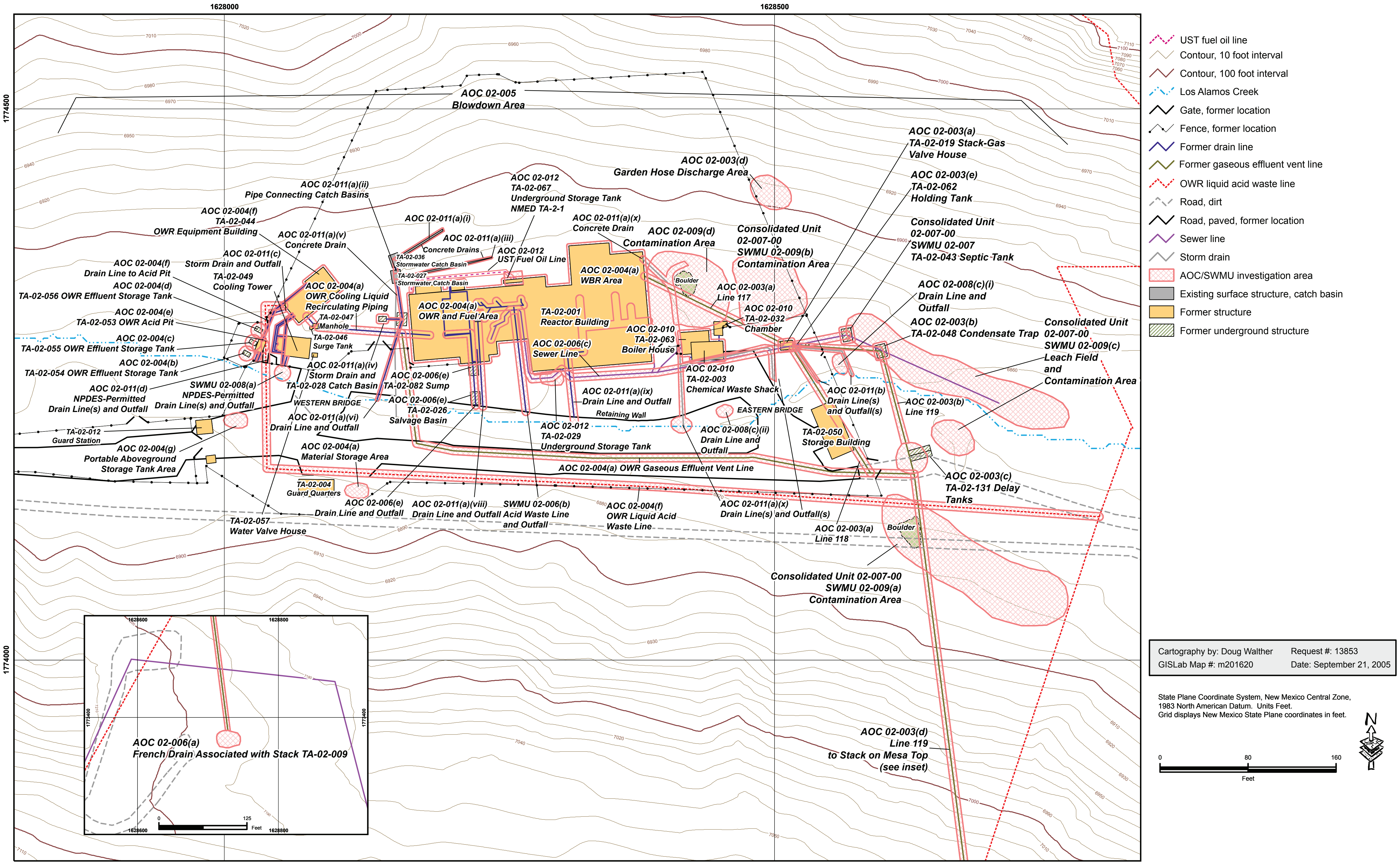


Figure 2.1-1. Site features for TA-02 SWMUs/AOCs

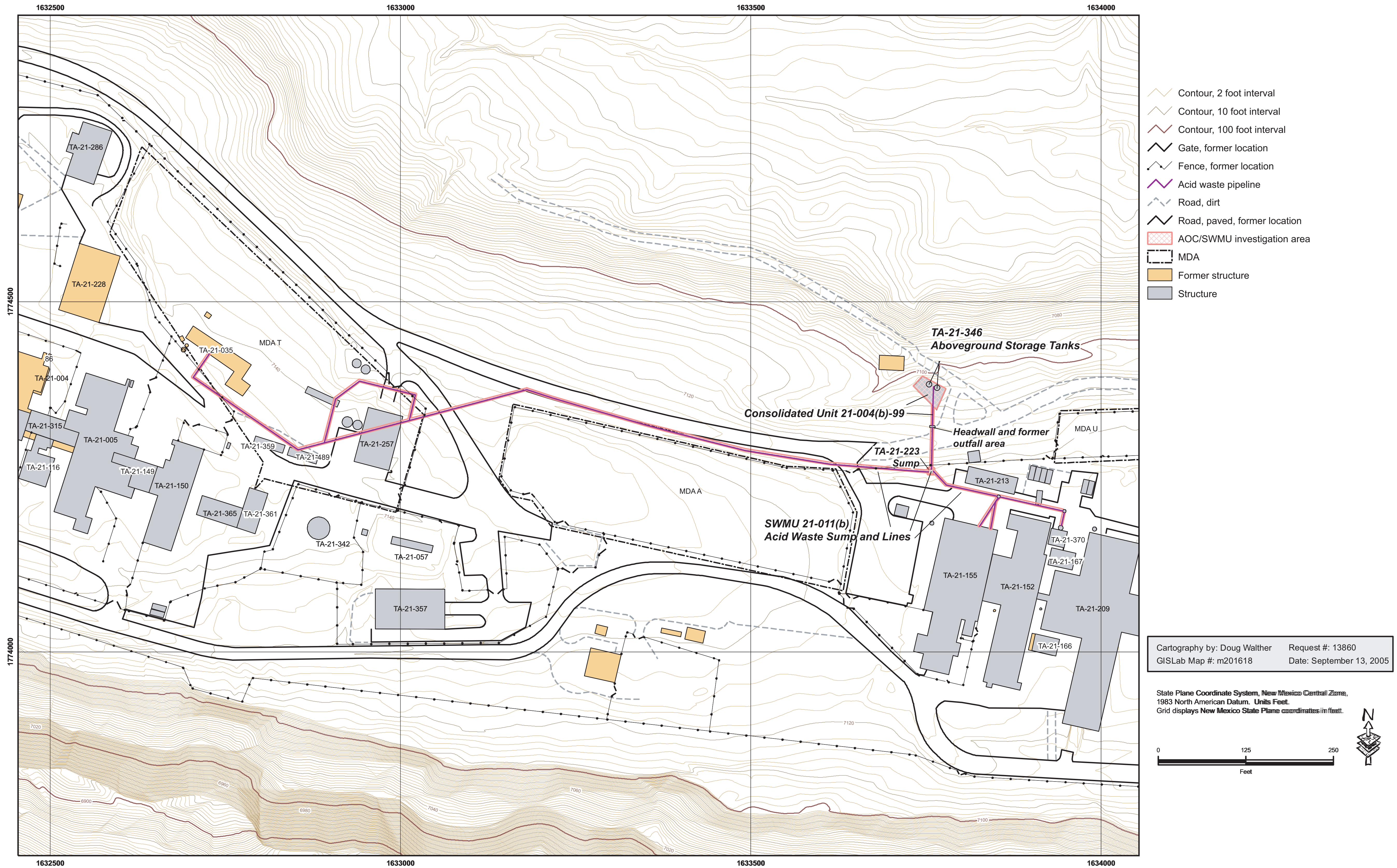


Figure 2.1-2. Consolidated Unit 21-004(b)-99 and SWMU 21-011(b) site features

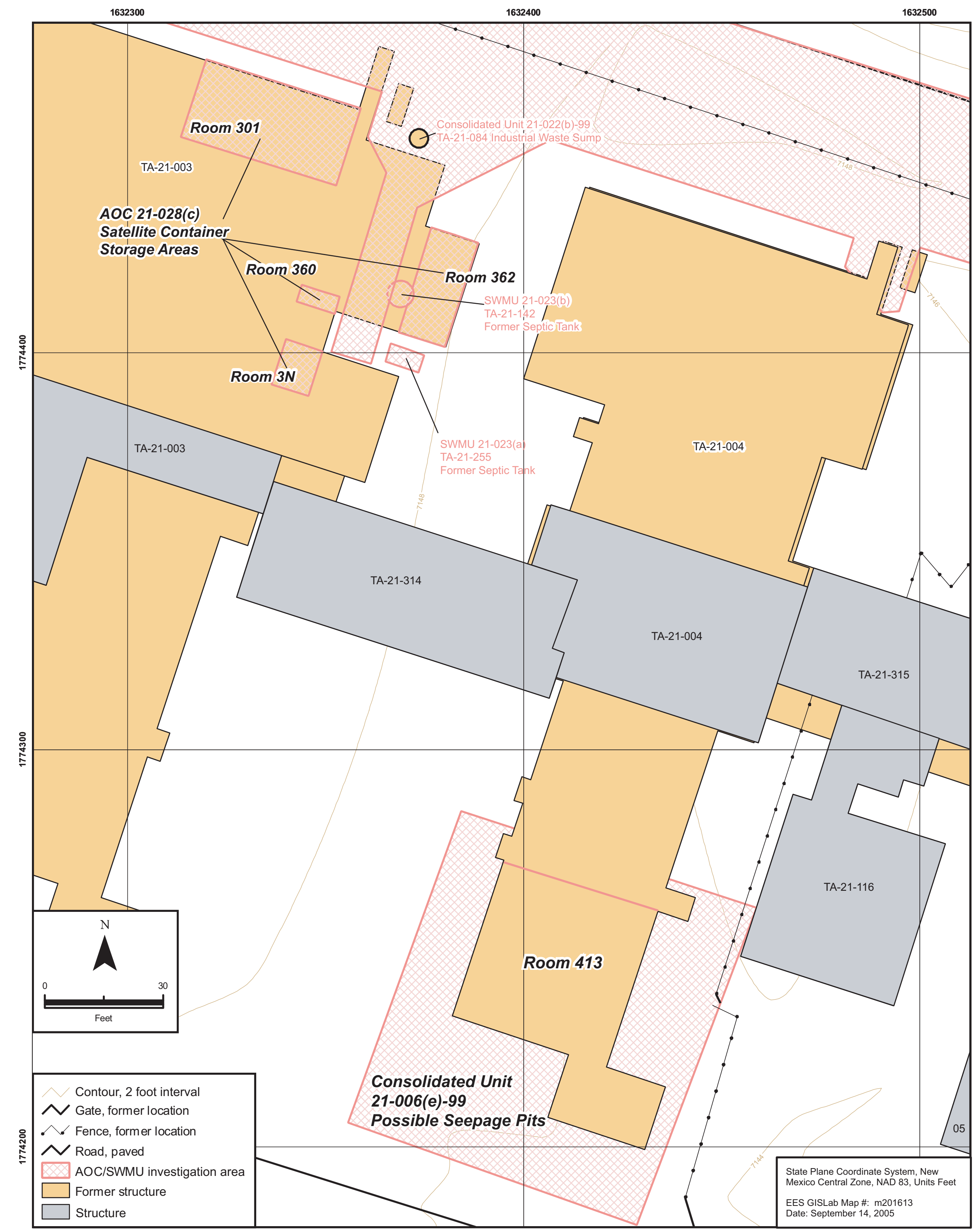


Figure 2.1-3. Consolidated Unit 21-006(e)-99 and AOC 21-028(c) site features

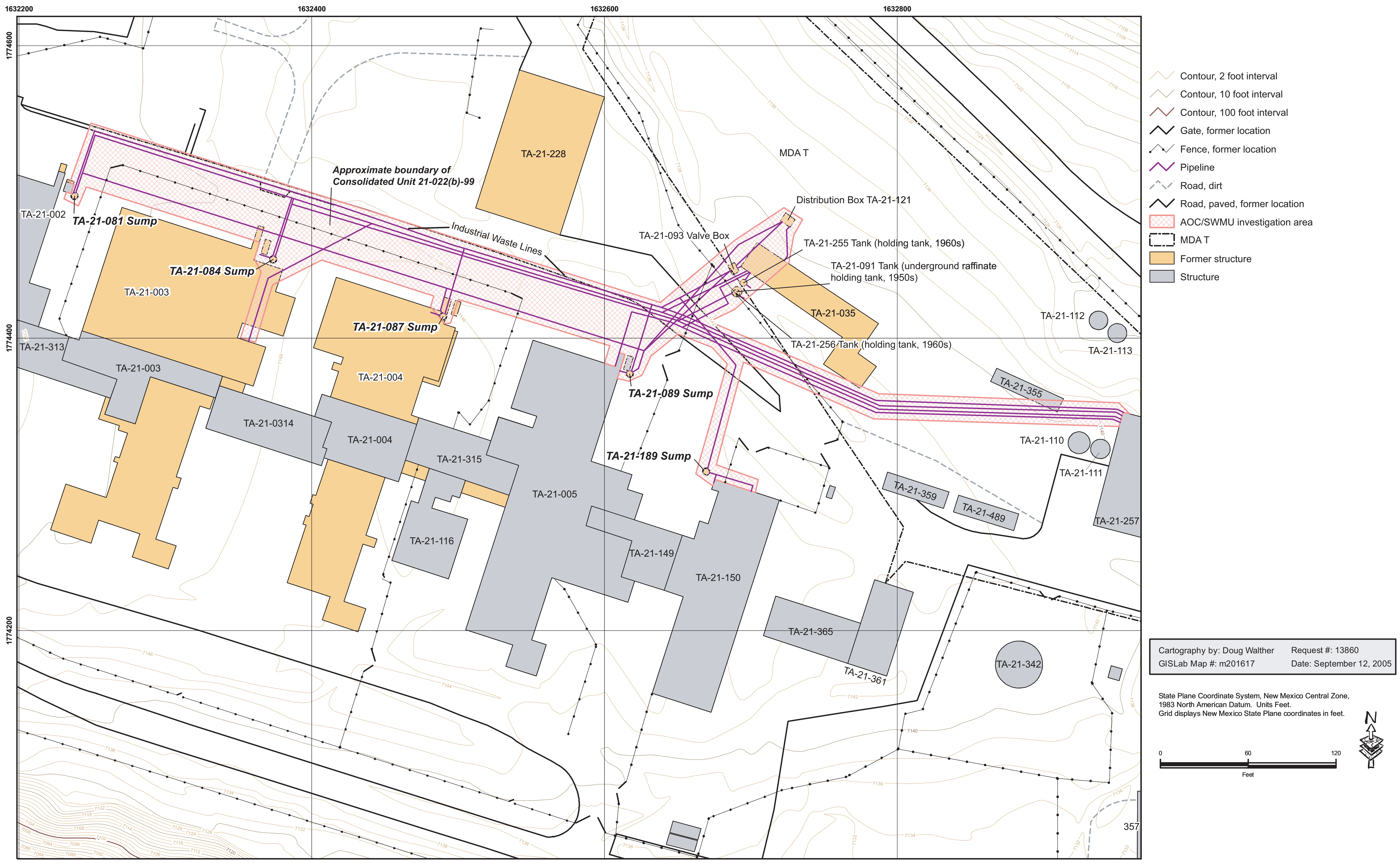


Figure 2.1-4. Consolidated Unit 21-022(b)-99 site features

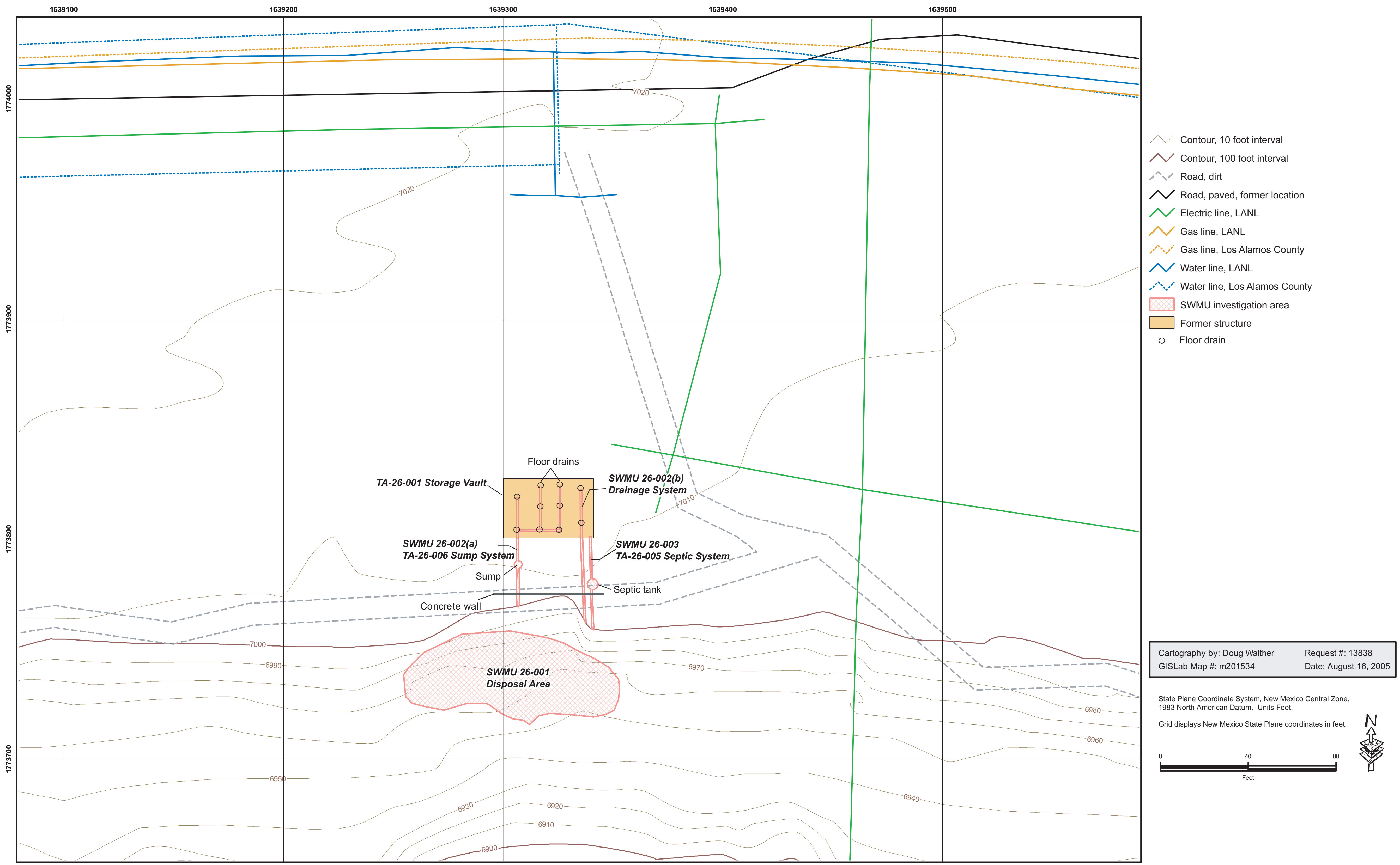


Figure 2.1-5. Site features for TA-26 SWMUs

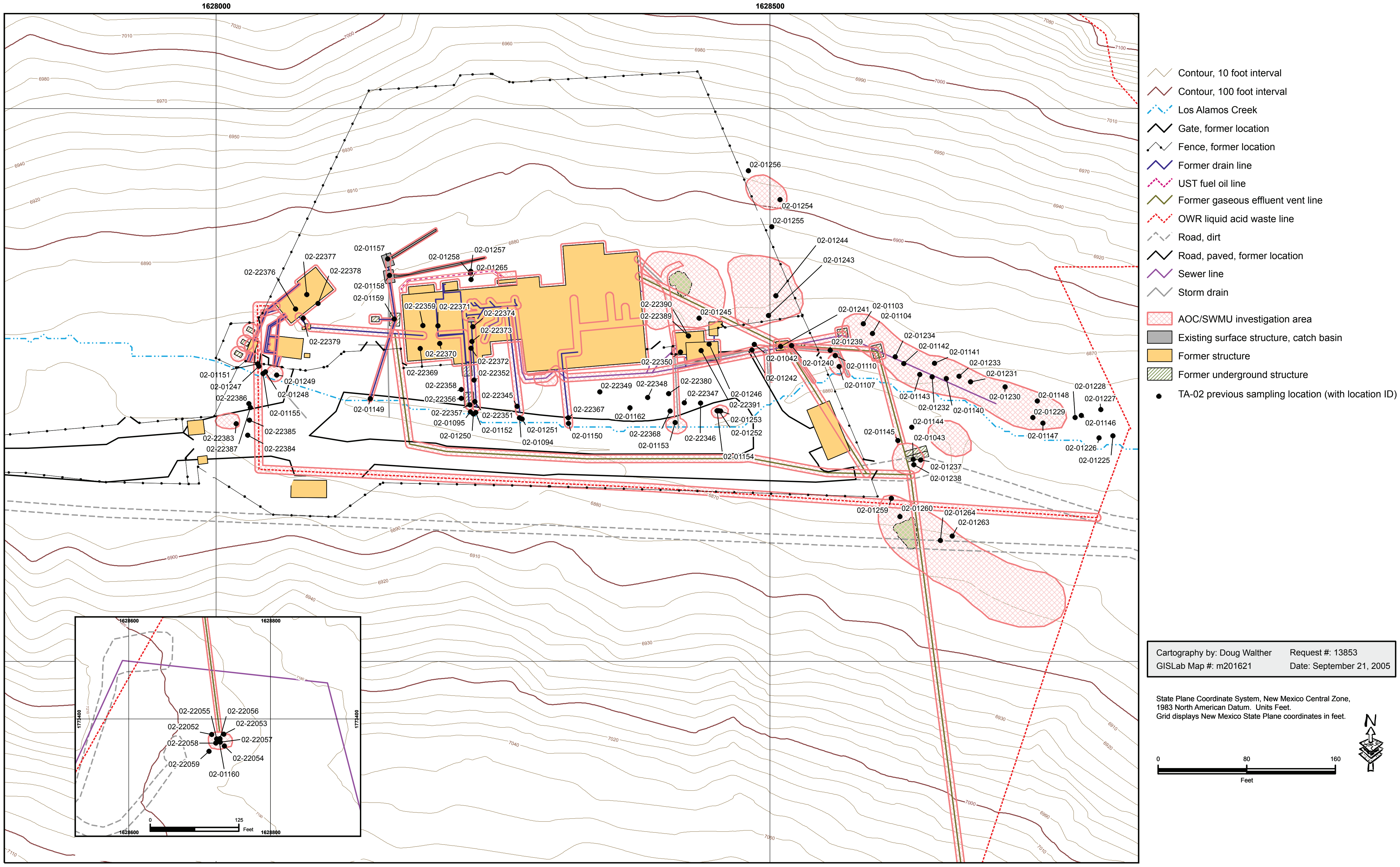


Figure 2.4-1. Previous sampling locations in TA-02

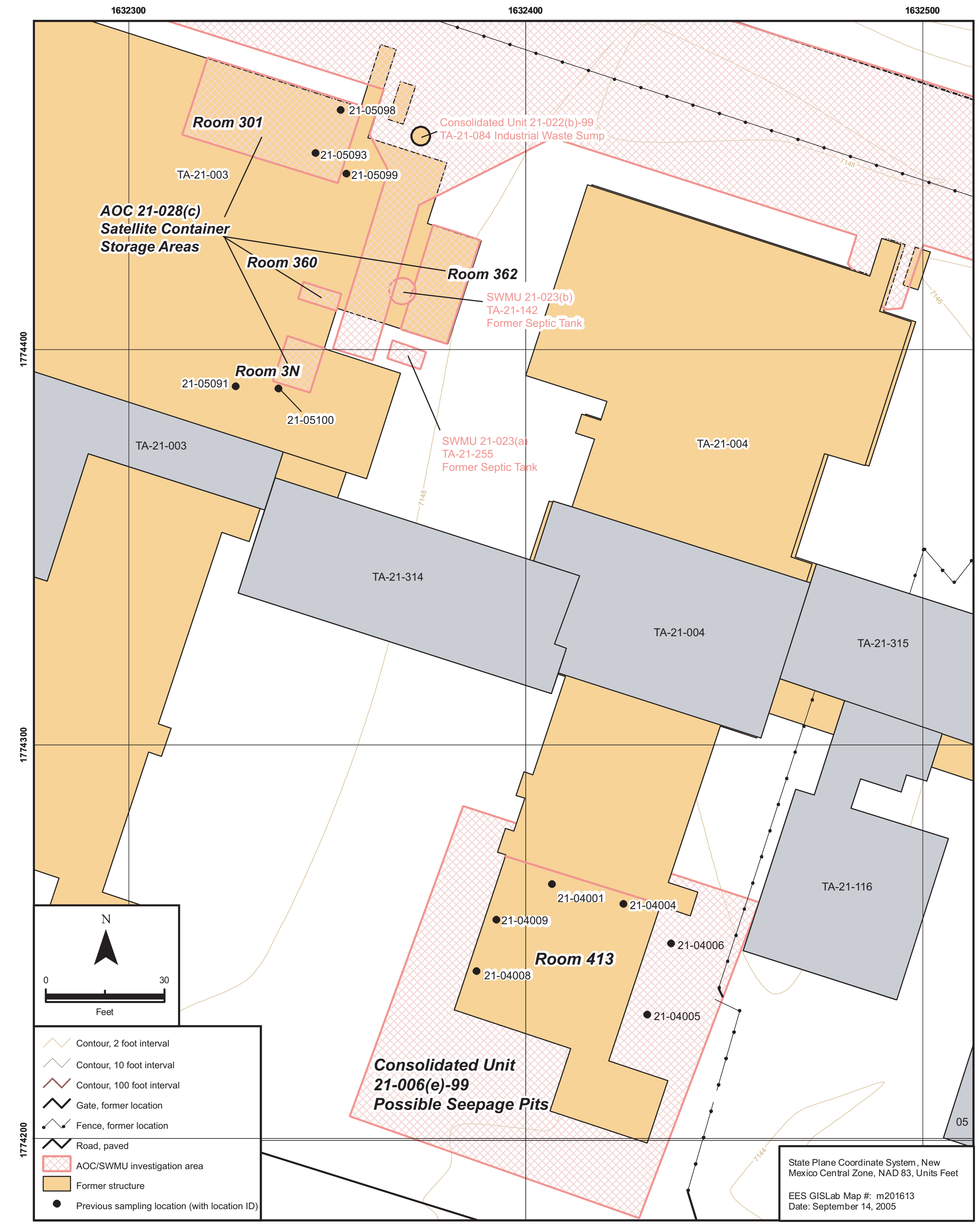


Figure 2.4-2. Previous sampling locations for Consolidated Unit 21-006(e)-99 and AOC 21-028(c)

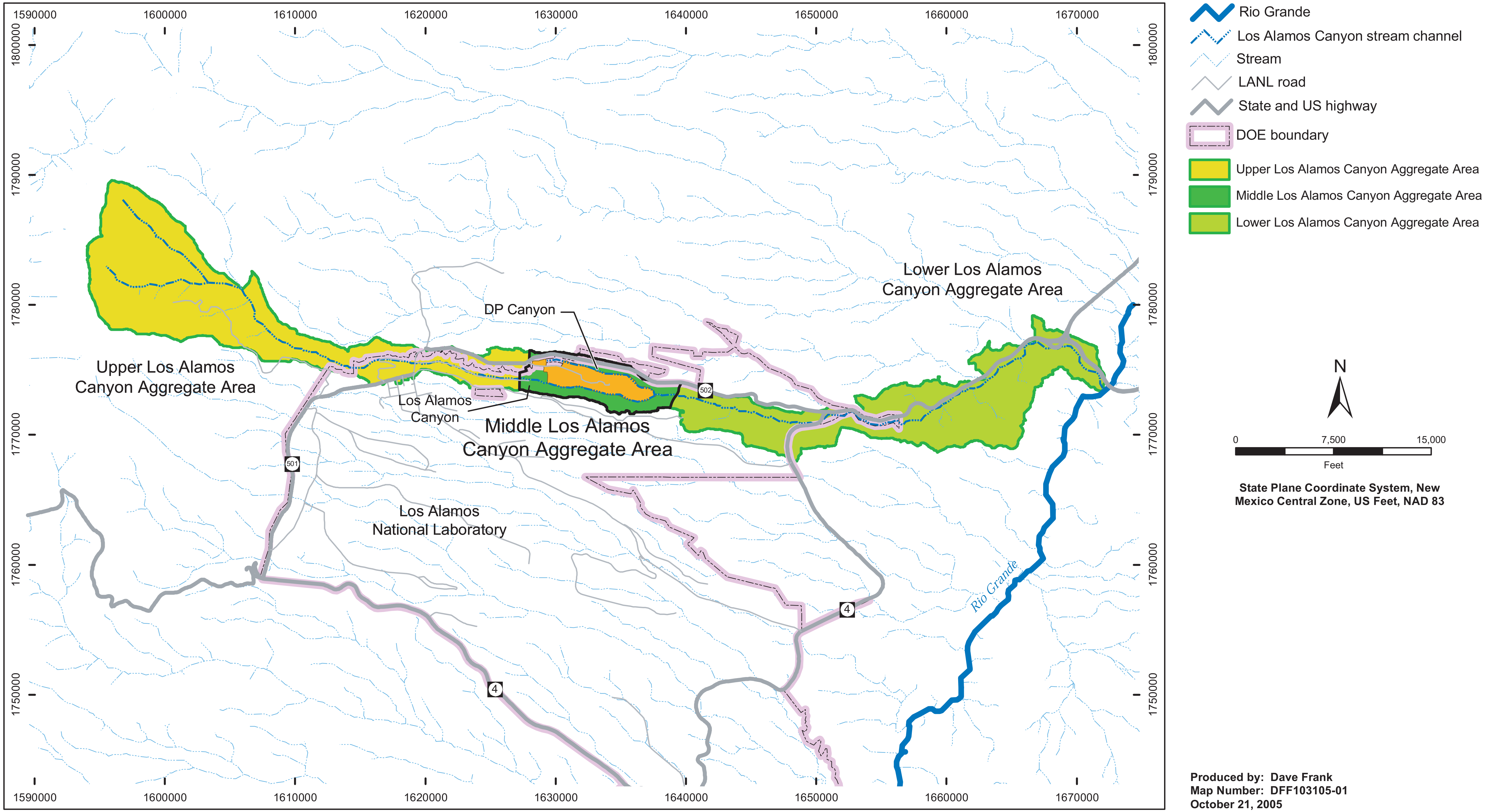
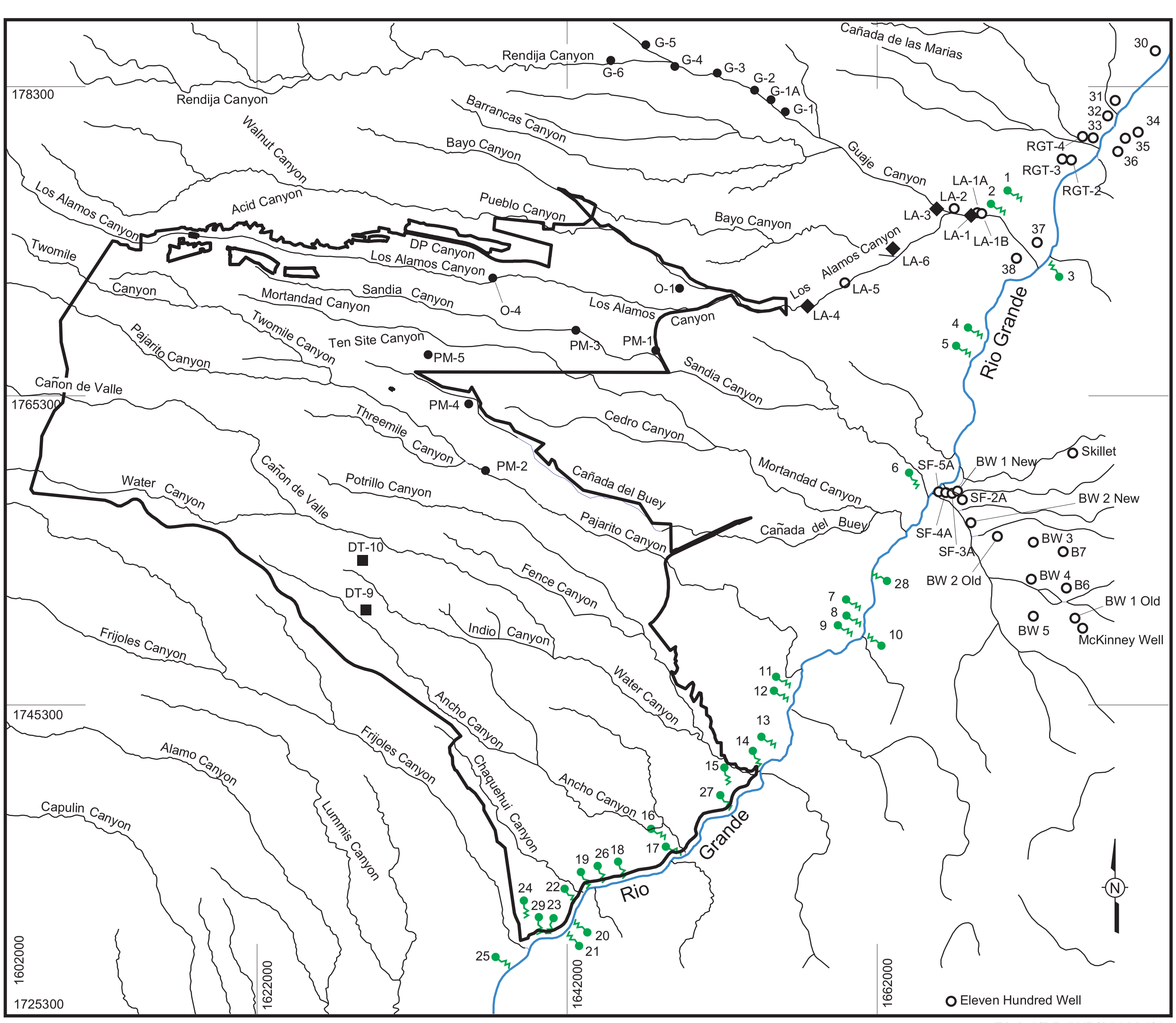


Figure 3.0-1. Los Alamos Canyon and aggregate areas



Key to spring and well locations

Map reference number	Spring ID
1	Sacred Spring
2	Indian Spring
3	La Mesita Spring
4	Spring 1
5	Spring 2
6	Sandia Spring
7	Spring 3
8	Spring 3A
9	Spring 3AA
10	Spring 3B
11	Spring 4
12	Spring 4A
13	Spring 5
14	Spring 5A
15	Spring 5AA
16	Ancho Spring
17	Spring 6
18	Spring 6A
19	Spring 8A
20	Spring 7
21	Spring 8
22	Spring 9
23	Spring 9A
24	Doe Spring
25	Spring 10
26	Spring 8B
27	Spring 5B
28	Spring 2A
29	Spring 9B
30	Westside Artisian
31	Pajarito Wells Pumps 1&2
32	Sanchez House
33	Martinez House
34	New and Old Community
35	Don Juan Playhouse
36	Eastside Artesian
37	Otowi House
38	Halladay House

- LANL boundary
- Drainage
- Rio Grande
- Main aquifer supply well
- Main aquifer test well
- Plugged well
- Non-Laboratory well
- Spring

0 4000 8000
Feet
Coordinates are NM State Plane NAD 83

Figure 3.2-1. Surface water drainage to the Rio Grande

Bandelier Tuff	Tshirege Member	Qbt 4	Ash-flow units
		Qbt 3	
		Qbt 2	
		Qbt 1v	
		Qbt 1g	
		Tsankawi Pumice Bed	
Cerro Toledo interval		Volcaniclastic sediments and ash-falls	
Bandelier Tuff	Otowi Member	Ash-flow units	
		Guaje Pumice Bed	
Puye Formation and intercalated volcanic rocks	Fanglomerate	Fanglomerate facies includes sand, gravel, conglomerate, and tuffaceous sediments	
	Volcanic rocks	Cerros del Rio basalts intercalated within the Puye Formation, includes up to four interlayered basaltic flows. Andesites of the Tschicoma Formation present in western part of plateau	
	Fanglomerate	Fanglomerate facies includes sand, gravel, conglomerate, and tuffaceous sediments; includes "old alluvium"	
	Axial facies deposits of the ancestral Rio Grande	Totavi Lentil	
Santa Fe Group	Coarse sediments	Coarse-grained upper facies (called the "Chaquehui Formation" by Purtymun 1995, 45344)	
	Basalt		
	Coarse sediments		
	Basalt		
	Coarse sediments		
	Basalt		
	Coarse sediments		
	Basalt		
	Coarse sediments		
	Arkosic clastic sedimentary deposits	Undivided Santa Fe Group (includes Chamita[?] and Tesuque Formations)	

Source: Baltz et al. 1963, 8402; Purtymun 1995, 45344; LANL 1998, 59599; Broxton and Reneau 1995, 49726.

Figure 3.3-1. Generalized stratigraphy of bedrock geologic units of the Pajarito Plateau

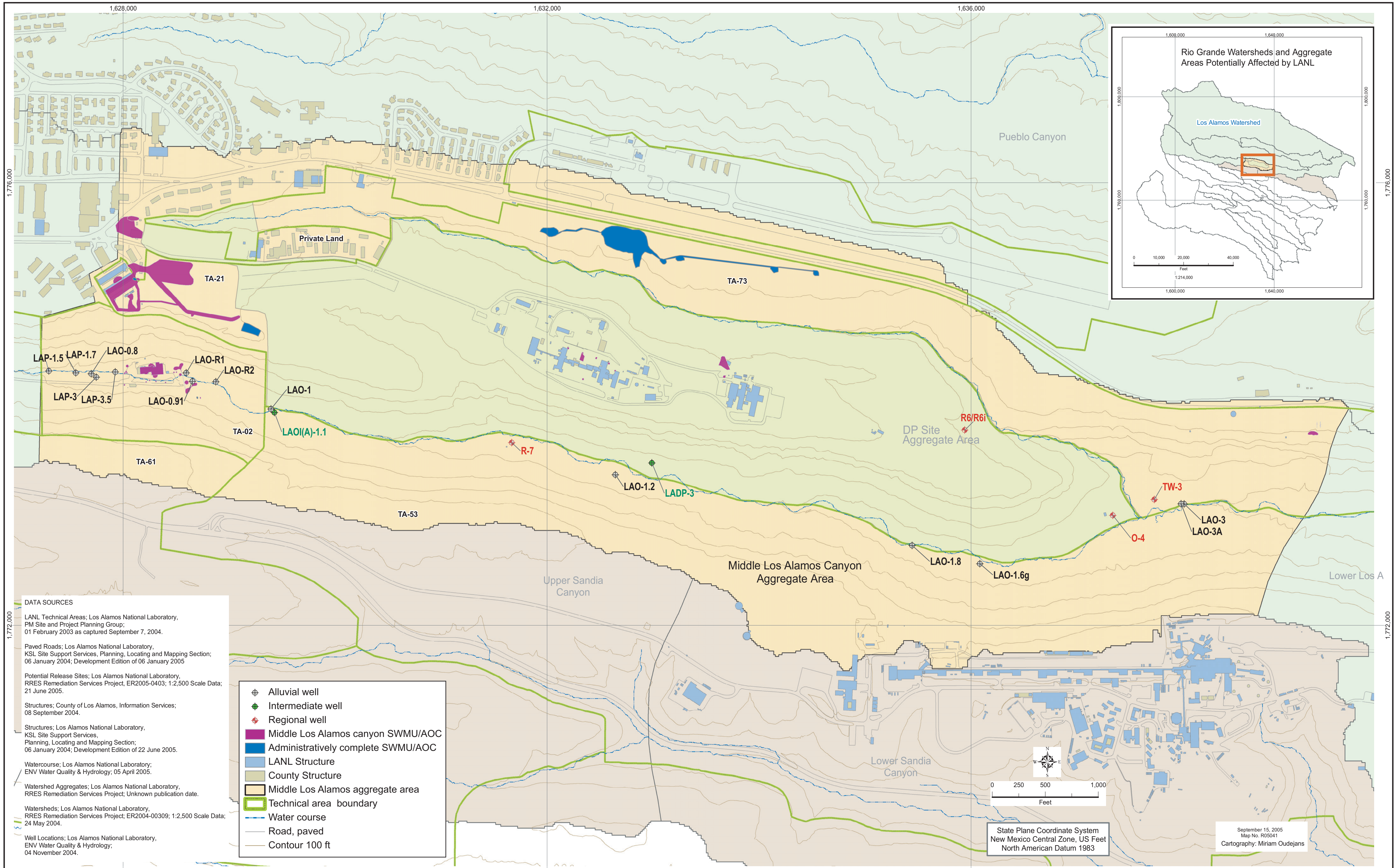


Figure 3.3-2. Groundwater monitoring wells in Middle Los Alamos Canyon Aggregate Area

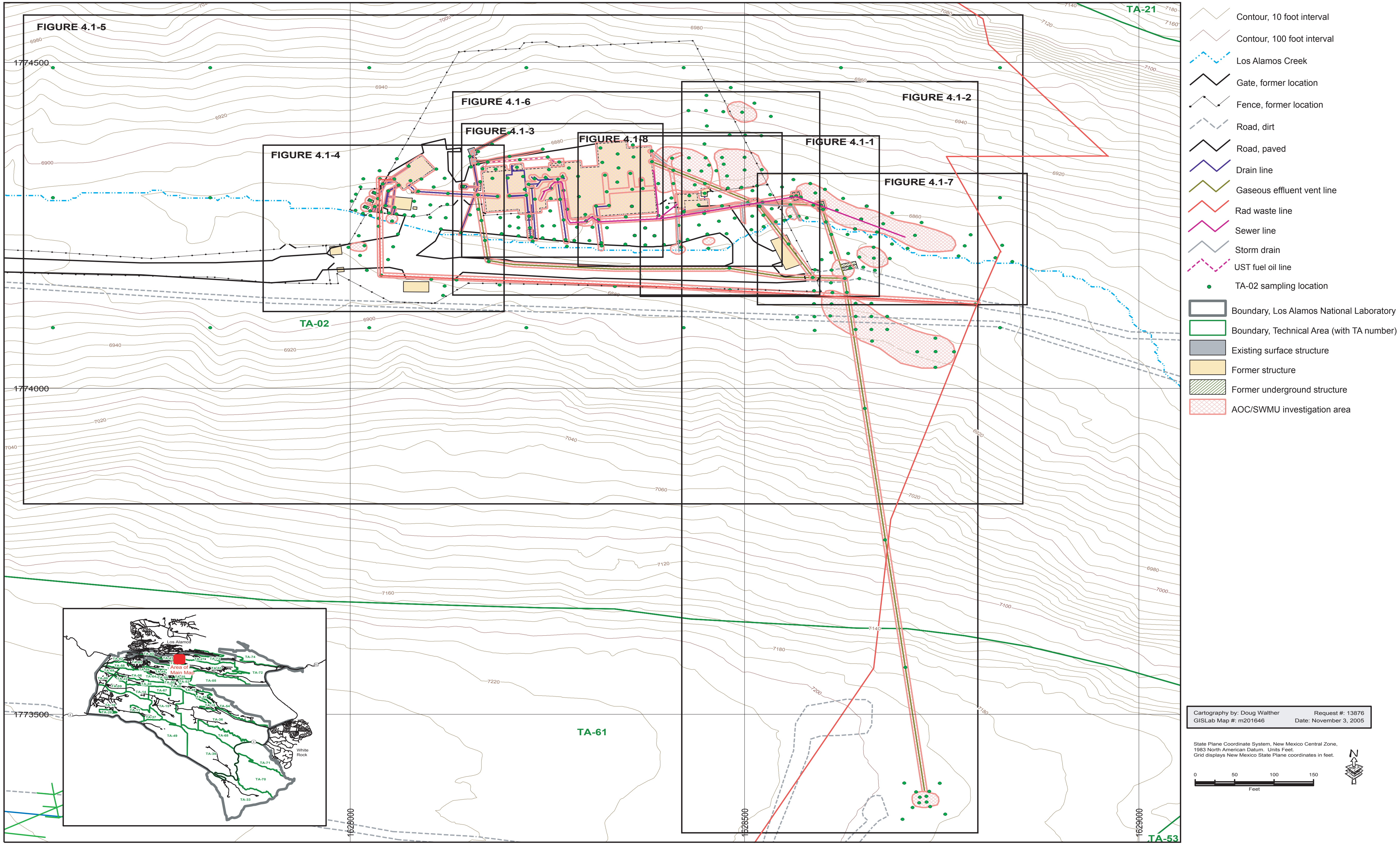


Figure 4.0-1. Proposed sampling locations at TA-02

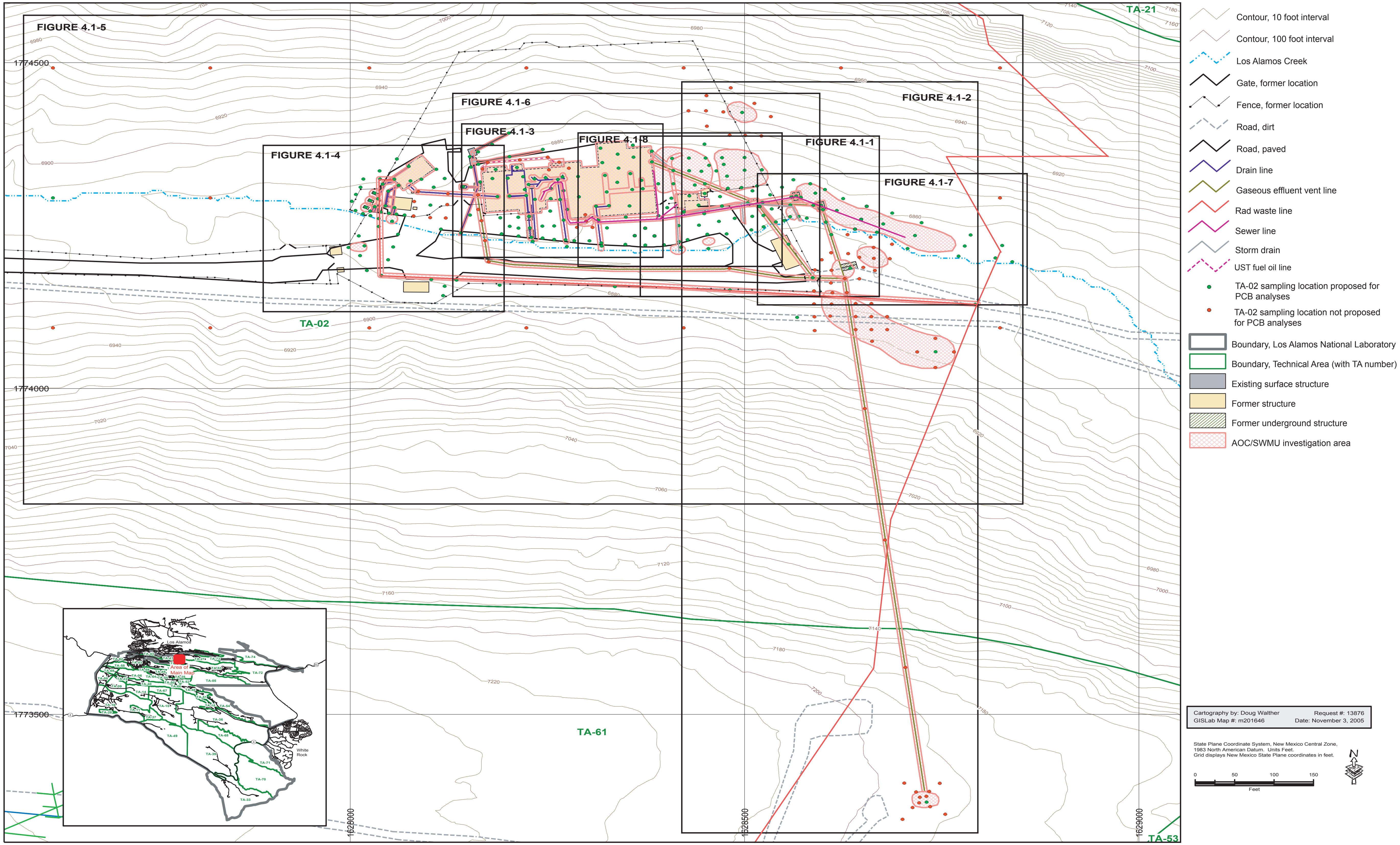


Figure 4.0-2. Sampling locations proposed for PCB analyses at TA-02

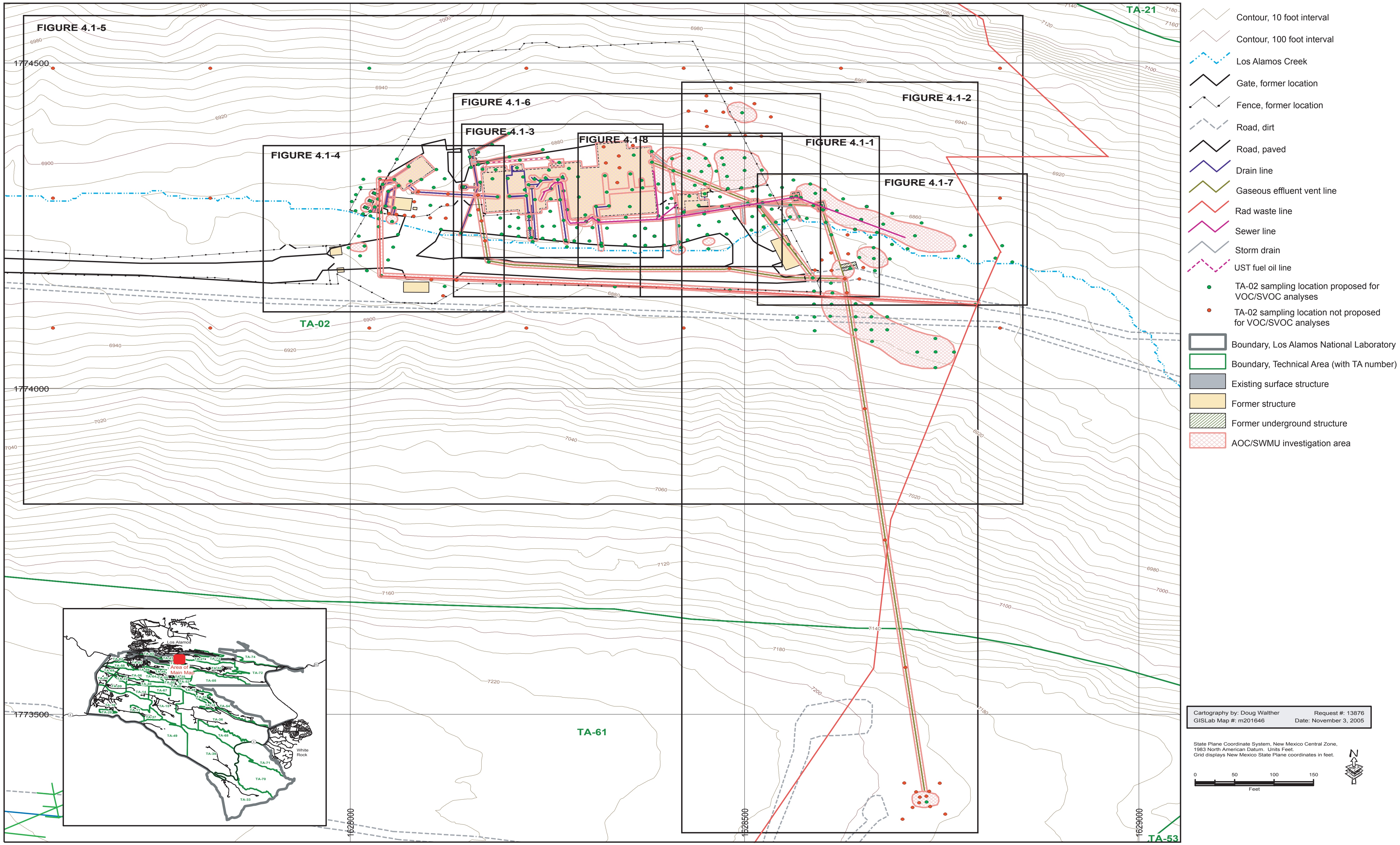


Figure 4.0-3. Sampling locations proposed for VOC/SVOC analyses at TA-02

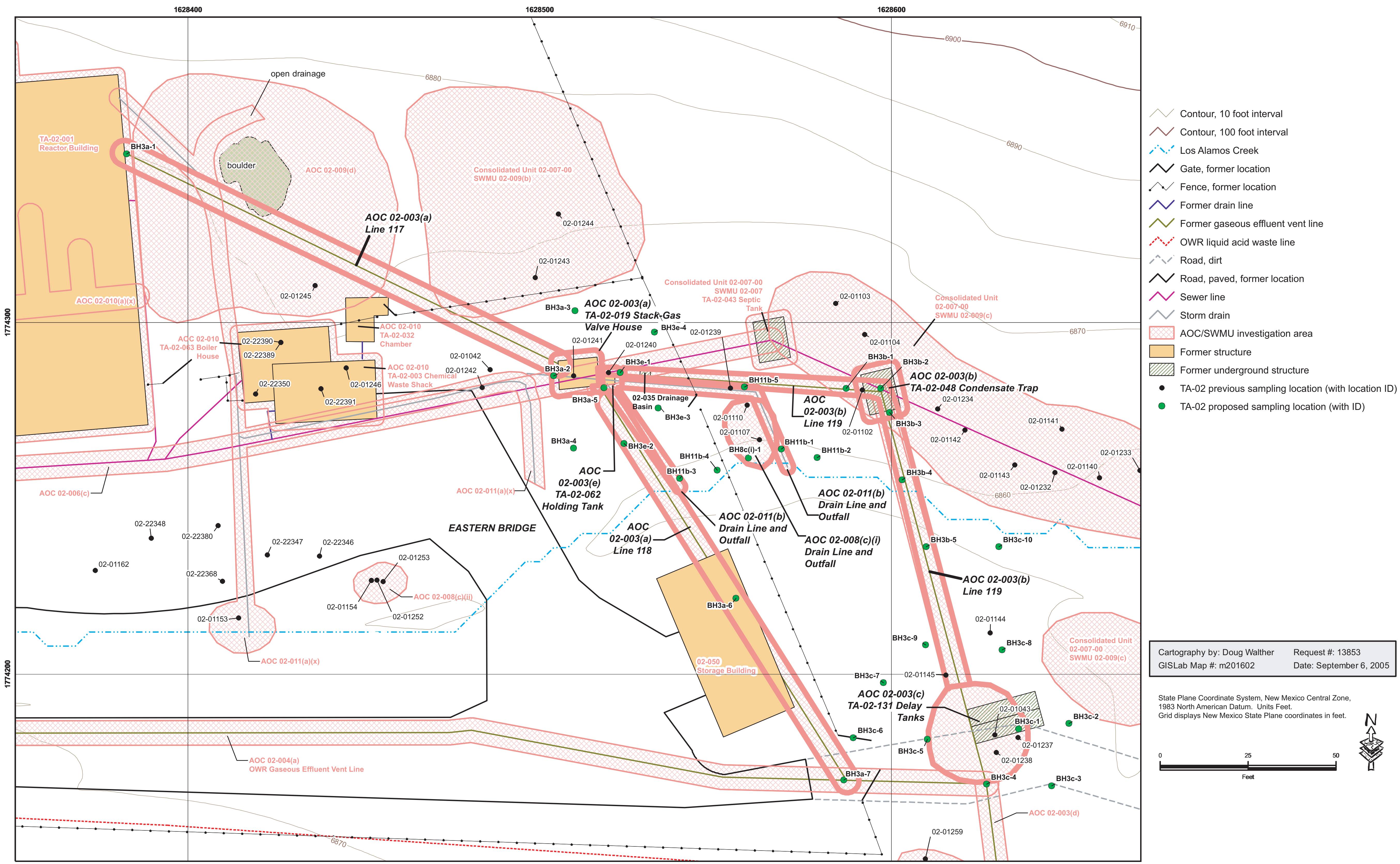


Figure 4.1-1. Proposed sampling locations for AOCs 02-003(a), 02-003(b), 02-003(c), 02-003(e), 02-008(c)(i), and 02-011(b)

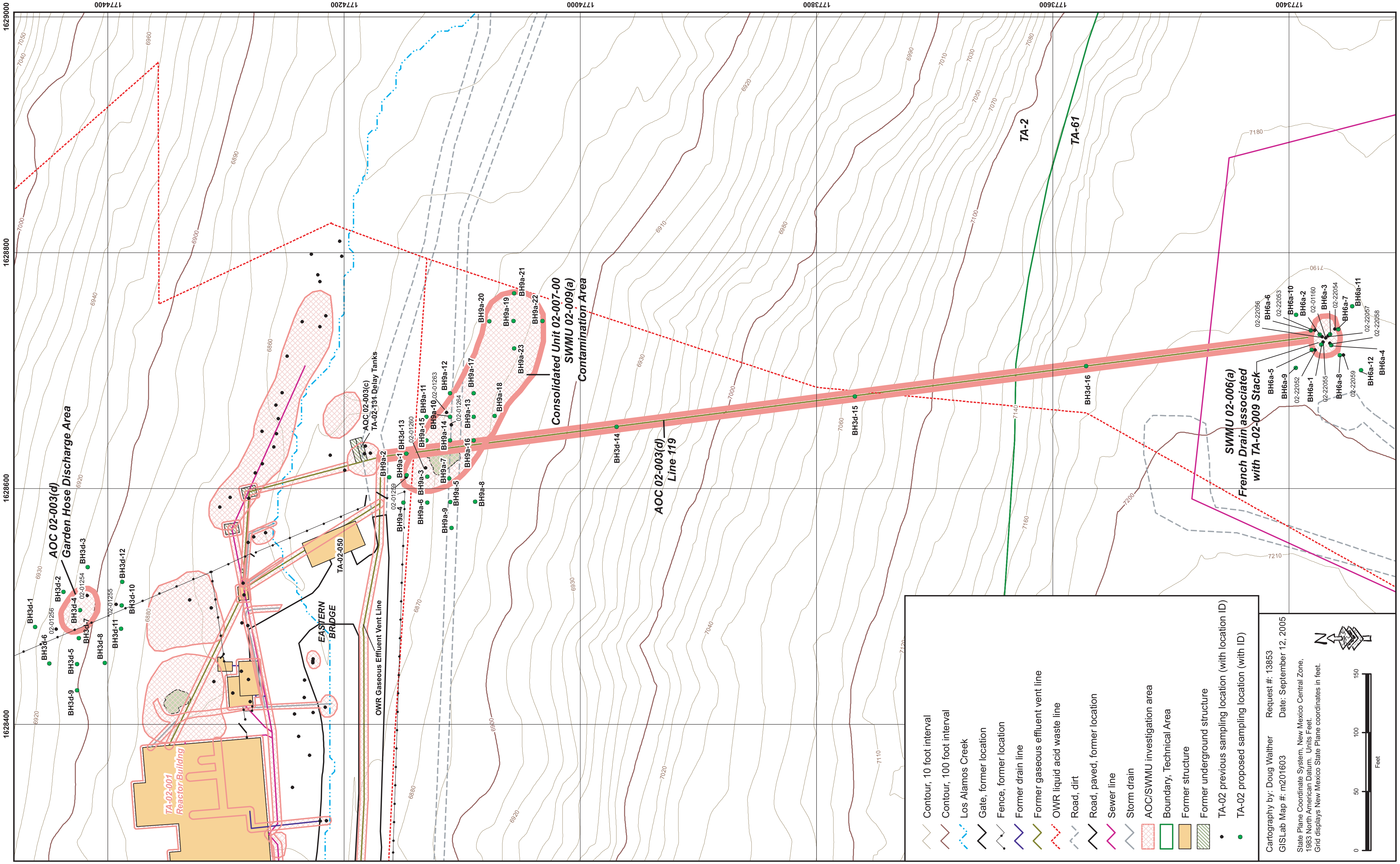


Figure 4.1-2. Proposed sampling locations for AOC 02-003(d) and SWMUs 02-006(a) and 02-009(a)

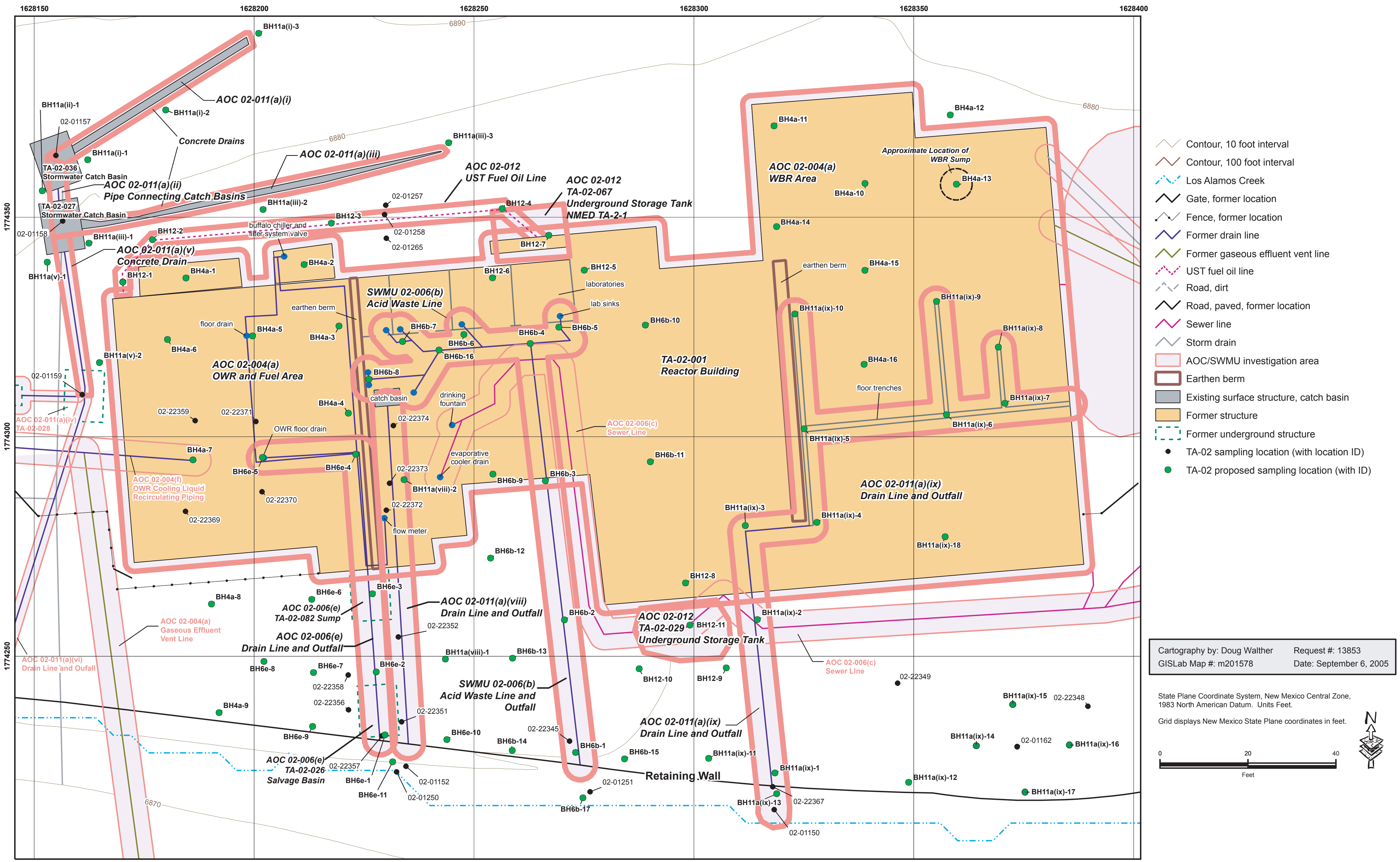


Figure 4.1-3. Proposed sampling locations for AOC 02-004(a) (OWR and Fuel Area), AOC 02-004(a) (WBR Area), SWMU 02-006(b), and AOCs 02-006(e), 02-011a(i, ii, iii, v, viii, and ix), and 02-012

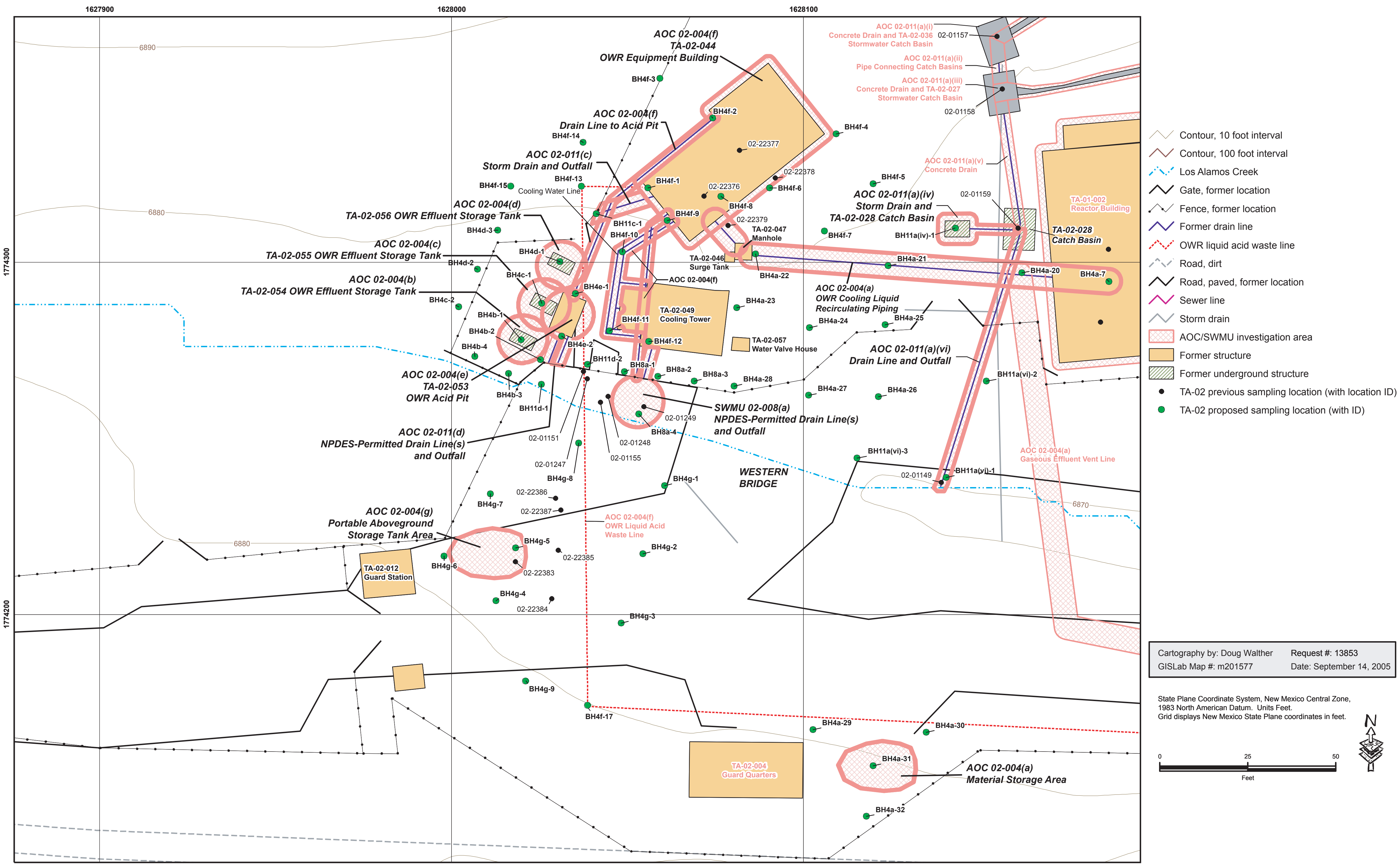


Figure 4.1-4. Proposed sampling locations for AOC 02-004(a) (Material Storage Area and OWR Cooling Liquid Recirculation Piping), SWMU 02-008(a), and AOCs 02-004(b, c, d, e, f, and g), 02-011(a) (iv and vi), and 02-011(c and d)

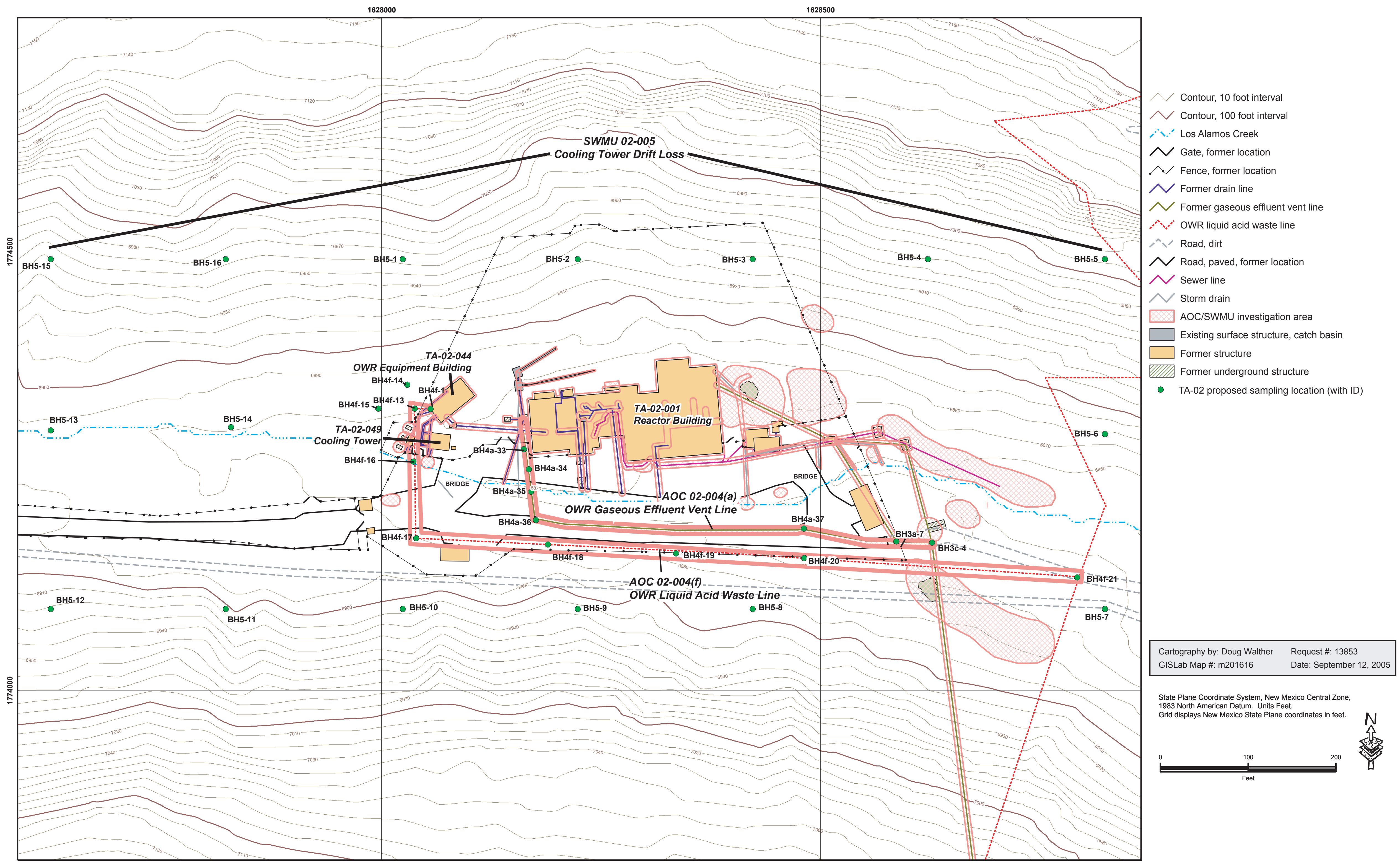


Figure 4.1-5. Proposed sampling locations for AOC 02-004(a) (OWR Gaseous Effluent Vent Line), AOC 02-004(f) (Liquid Acid Waste Line), and SWMU 02-005

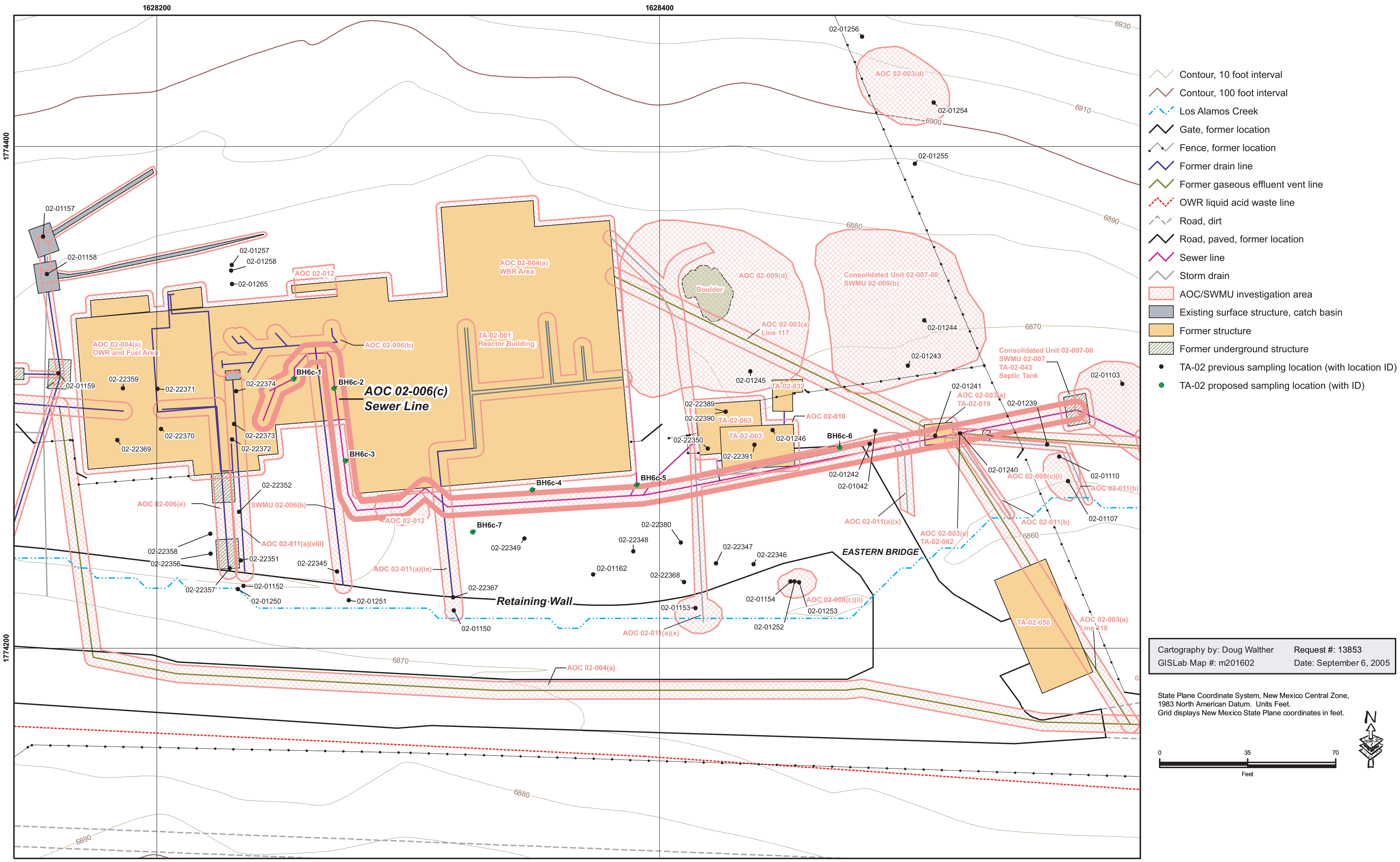


Figure 4.1-6. Proposed sampling locations for AOC 02-006(c)

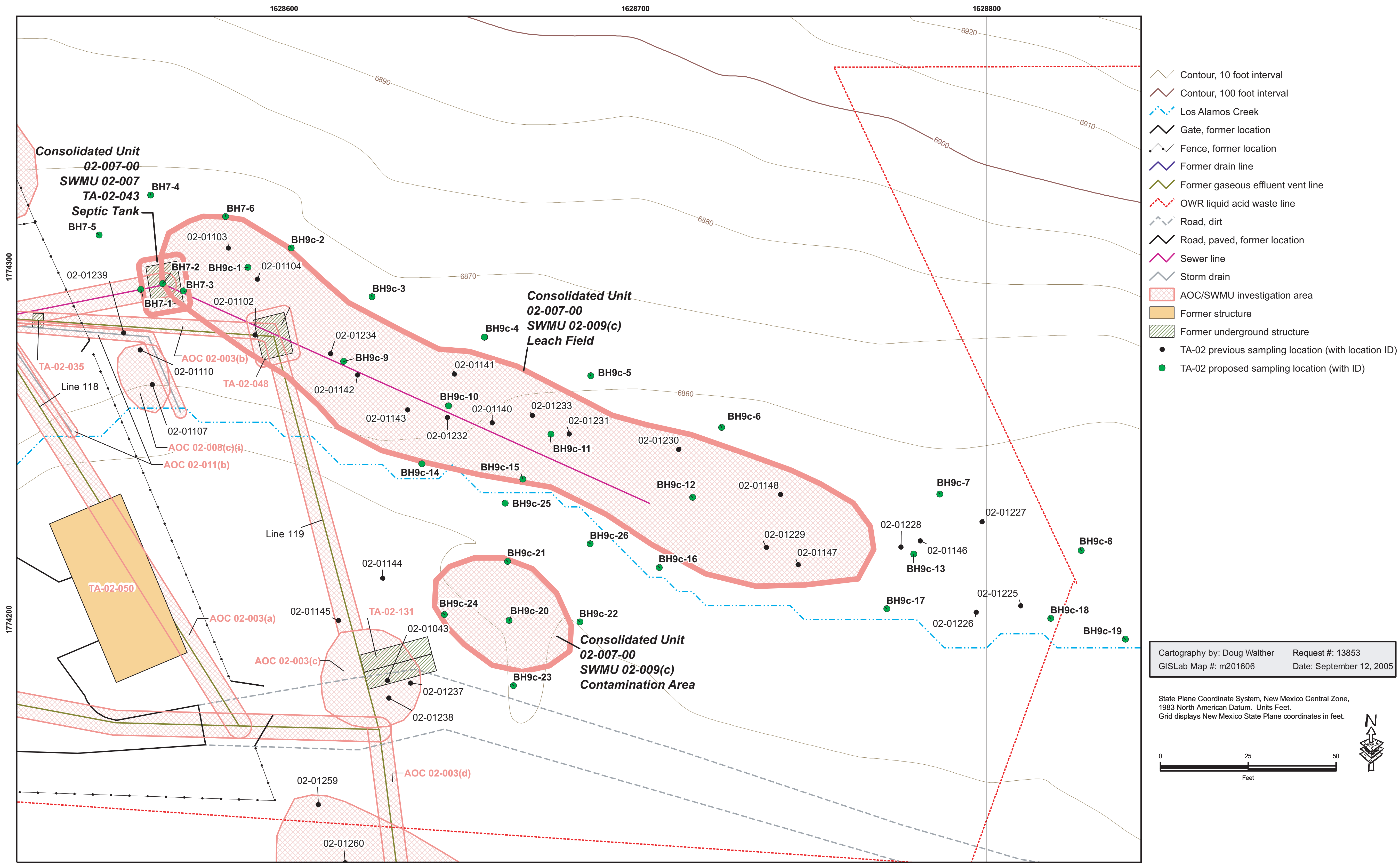


Figure 4.1-7. Proposed sampling locations for SWMUs 02-007 and 02-009(c)

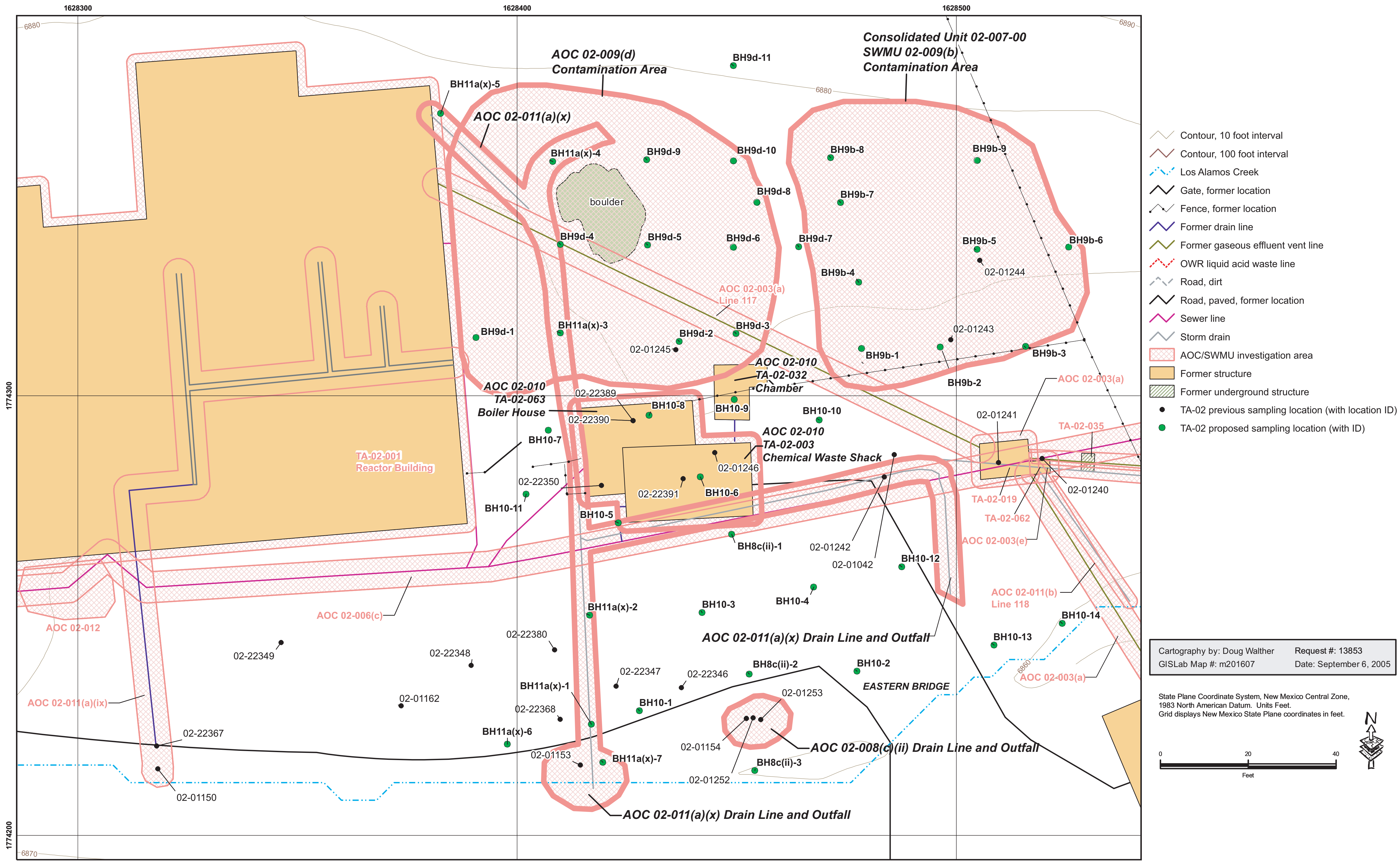


Figure 4.1-8. Proposed sampling locations for AOCs 02-008(c)(ii), 02-009(d), 02-010, and 02-011(a)(x) and SWMU 02-009(b)

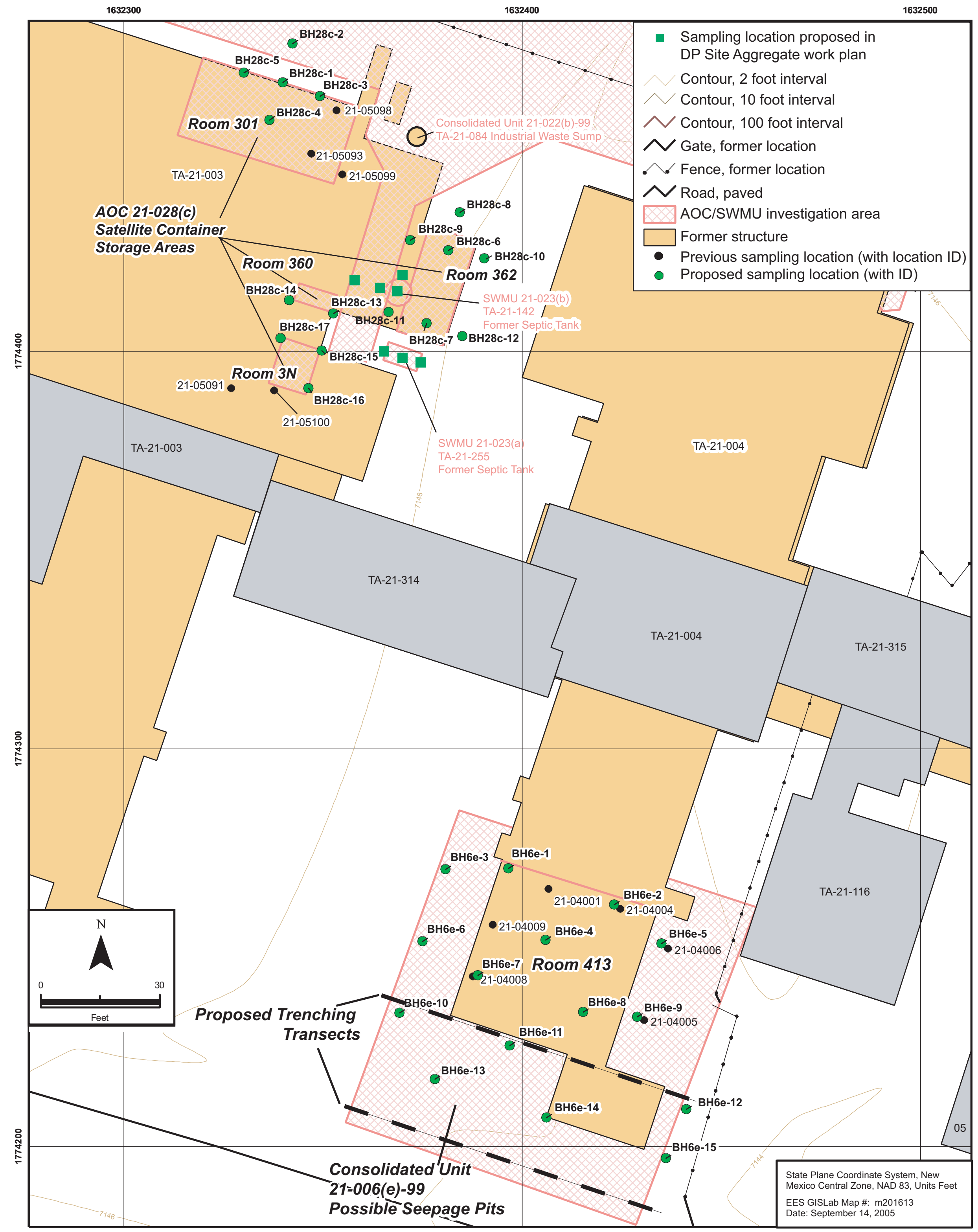


Figure 4.2-1. Proposed sampling locations for Consolidated Unit 21-006(e)-99 and AOC 21-028(c)

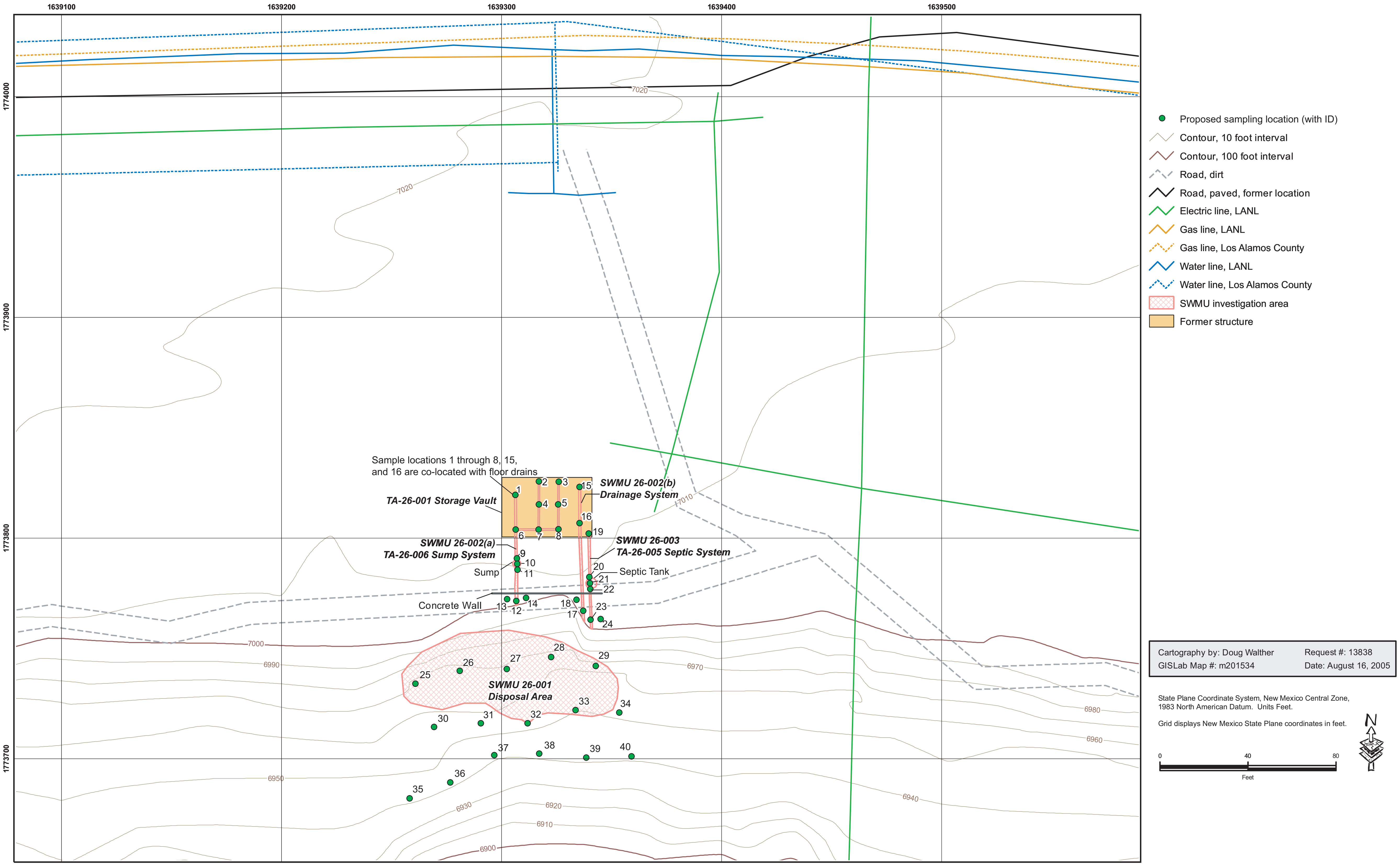


Figure 4.3-1. Proposed sampling locations for TA-26

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Table 1.1-1
Middle Los Alamos Canyon Aggregate Area Sites and Their Status

Consolidated Unit	SWMU/AOC Number	Site Description	Site in This Work Plan?	Site Status
	SWMU 00-010(b)	Landfill	No	Approval with modifications (NMED 2004, 89379)
	AOC 00-027	Storage area	No	Ongoing monitoring (LANL 2003, 87635)
	SWMU 00-030(a)	Septic system	No	Approval with modifications (NMED 2004, 89379)
00-030(b)-00	AOC 00-004	Container storage area	No	Approval with modifications (NMED 2004, 89379)
	SWMU 00-030(b)	Septic system	No	Approval with modifications (NMED 2004, 89379)
	SWMU 00-030(l)	Septic system	No	Approval with modifications (NMED 2004, 89379)
	SWMU 00-030(m)	Septic system	No	Approval with modifications (NMED 2004, 89379)
	AOC 00-033(b)	Soil contamination	No	Approval with modifications (NMED 2004, 89379)
	SWMU 00-033(a)	Underground storage tank	No	Approval with modifications (NMED 2004, 89379)
	AOC 02-003(a)	Stack-gas valve house and gaseous effluent vent lines	Yes	Investigation
	AOC 02-003(b)	Condensate trap and gaseous effluent vent line	Yes	Investigation
	AOC 02-003(c)	Delay system	Yes	Investigation
	AOC 02-003(d)	Garden hose discharge area and gaseous effluent vent line (line 119) from delay tanks mesa top stack	Yes	Investigation
	AOC 02-003(e)	Water Boiler Reactor (WBR) holding tank	Yes	Investigation
	AOC 02-004(a)	Omega West Reactor (OWR) OWR and fuel area WBR area OWR cooling liquid re-circulating piping OWR material storage area OWR gaseous effluent vent line	Yes	Investigation
	AOC 02-004(b)	OWR effluent storage tank	Yes	Investigation
	AOC 02-004(c)	OWR effluent storage tank	Yes	Investigation
	AOC 02-004(d)	OWR effluent storage tank	Yes	Investigation
	AOC 02-004(e)	OWR acid pit/transfer sump	Yes	Investigation
	AOC 02-004(f)	OWR equipment building OWR liquid acid waste line	Yes	Investigation
	AOC 02-004(g)	Portable aboveground storage tank	Yes	Investigation
	SWMU 02-005	Cooling tower drift loss	Yes	Investigation
	SWMU 02-006(a)	French drain associated with mesa top stack	Yes	Investigation
	SWMU 02-006(b)	OWR acid waste line	Yes	Investigation
	AOC 02-006(c)	Sewer line	Yes	Investigation

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC Number	Site Description	Site in This Work Plan?	Site Status
	AOC 02-006(d)	Duplicate of AOC 02-006(c)	Yes	Investigation
	AOC 02-006(e)	OWR floor drains and waste sump	Yes	Investigation
02-007-00	SWMU 02-007	Septic tank and outfall	Yes	Investigation
	SMWU 02-009(a)	Radioactively contaminated soil area behind storage building	Yes	Investigation
	SWMU 02-009(b)	Radioactively contaminated soil area north of the stack-gas valve house	Yes	Investigation
	SWMU 02-009(c)	Leach field and radioactively contaminated soil area identified during condensate trap removal	Yes	Investigation
	AOC 02-009(e)	Duplicate of SWMU 02-009(c)	Yes	Investigation
	SWMU 02-008(a)	National Pollutant Discharge Elimination System (NPDES)-permitted cooling tower outfall	Yes	Investigation
	AOC 02-008(c)	OWR basement drain lines and outfalls	Yes	Investigation
	AOC 02-009(d)	Soil contamination east of reactor building	Yes	Investigation
	AOC 02-010	Residual soil contamination associated with chemical waste shack	Yes	Investigation
	AOC 02-011(a)	11 storm drains associated with the OWR	Yes	Investigation
	AOC 02-011(b)	Two drains and outfalls associated with the stack-gas valve house	Yes	Investigation
	AOC 02-011(c)	Storm drain associated with OWR equipment building	Yes	Investigation
	AOC 02-011(d)	NPDES-permitted OWR equipment building outfall	Yes	Investigation
	AOC 02-011(e)	Duplicate of SWMU 02-008(a)	Yes	Investigation
	AOC 02-012	Soils associated with underground fuel storage tank areas	Yes	Investigation
21-004(b)-99	SWMU 21-004(b)	Acid waste storage tank	Yes	Investigation
	SWMU 21-004(c)	Acid waste storage tank	Yes	Investigation
	AOC 21-004(d)	Drain line and previous outfall area	Yes	Investigation
21-006(e)-99	SWMU 21-006(e)	Seepage pit	Yes	Investigation
	AOC 21-006(f)	Seepage pit	Yes	Investigation
	SWMU 21-011(b)	Acid waste sump and lines	Yes	Investigation
21-022(b)-99	SWMU 21-022(b)	Industrial waste sump and lines	Yes	Investigation
	SWMU 21-022(c)	Industrial waste sump and lines	Yes	Investigation
	SWMU 21-022(d)	Industrial waste sump and lines	Yes	Investigation
	SWMU 21-022(e)	Industrial waste sump and lines	Yes	Investigation
	SWMU 21-022(g)	Industrial waste sump and lines	Yes	Investigation
	AOC 21-028(c)	Satellite container storage areas	Yes	Investigation
	SWMU 26-001	Disposal area	Yes	Investigation
	SWMU 26-002(a)	Acid sump system	Yes	Investigation
	SWMU 26-002(b)	Equipment room drainage system	Yes	Investigation
	SWMU 26-003	Septic system	Yes	Investigation

Table 1.1-2
Middle Los Alamos Canyon Aggregate Area Sites Approved for No Further Action

Consolidated Unit	SWMU/AOC Number	Site Description	ER ID Number of Request or Approval Document
	AOC 00-010(a)	Surface disposal site	EPA 2005, 88464
	AOC 00-029(a)	Transformer	EPA 2005, 88464
	AOC 00-029(b)	Transformer	EPA 2005, 88464
	AOC 00-029(c)	Transformer	EPA 2005, 88464
	AOC 02-001	Open burning ground	EPA 2005, 88464
	AOC 02-002	Storage area	EPA 2005, 88464
	SWMU 02-008(b)	Outfall	NMED 2001, 72820
	AOC 02-013	Storage area	EPA 2005, 88464
	AOC C-02-001	Metal nugget pile	EPA 2005, 88464
	AOC 53-012(a)	Outfall	EPA 2005, 88464
	AOC 53-012(b)	Outfall	EPA 2005, 88464
	AOC 53-012(c)	Outfall	EPA 2005, 88464
	AOC C-53-017	One-time spill	EPA 2005, 88464
73-005-99	SWMU 73-005	Surface disposal site	NMED 2003, 78138
	AOC 73-007	Septic tank, drain lines	NMED 2003, 78138
	AOC C-73-005(a)	Excavation	NMED 2003, 78138
	AOC C-73-005(b)	Excavation	NMED 2003, 78138
	AOC C-73-005(c)	Excavation	NMED 2003, 78138
	AOC C-73-005(d)	Excavation	NMED 2003, 78138
	AOC C-73-005(e)	Excavation	NMED 2003, 78138
	AOC C-73-005(f)	Excavation	NMED 2003, 78138

Table 2.5-1
Middle Los Alamos Canyon Aggregate Area – Analytical Summary

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
AOC 02-003(a)																						
	02-01042	QBT2	04/14/95	0402-95-0294	0–1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01042	QBT2	04/14/95	0402-95-0295	3.5–4.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01042	QBT2	04/14/95	0402-95-0296	7.5–8.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01042	QBT2	04/14/95	0402-95-0393	7.5–8.5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
	02-01042	QBT2	04/14/95	0402-95-0297	10–15	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01241	FILL	09/07/00	CA02-00-0140	3–4	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01241	FILL	09/07/00	CA02-00-0141	7.5–8.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01241	ALLH	09/08/00	CA02-00-0142	11.5–12.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01241	ALLH	09/08/00	CA02-00-0143	15–16.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01242	ALLH	09/08/00	CA02-00-0144	0–1	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01242	ALLH	09/08/00	CA02-00-0145	2.5–4	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01242	ALLH	09/08/00	CA02-00-0146	6–7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01242	ALLH	09/08/00	CA02-00-0147	10.5–14.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01242	ALLH	09/08/00	CA02-00-0148	15–16	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-003(b)																						
	02-01103	ALLH	04/11/95	0402-95-0274	0–1	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01104	QBT2	04/11/95	0402-95-0278	4–5	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01104	QBT2	04/11/95	0402-95-0279	9-10	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01104	QBT2	04/11/95	0402-95-0280	13-14	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01104	QBT2	04/11/95	0402-95-0394	13-14	—		—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
AOC 02-003(c)																						
	02-01043	QBT2	04/13/95	0402-95-0291	7.5-8.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01043	QBT2	04/13/95	0402-95-0292	14-15	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01144	QBT2	04/12/95	0402-95-0029	14-15	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01145	QBT2	04/13/95	0402-95-0033	9-10	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01145	QBT2	04/13/95	0402-95-0397	9-10	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
	02-01145	QBT2	04/13/95	0402-95-0034	12.5-13.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01237	ALLH	09/06/00	CA02-00-0125	8-8.75	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01238	ALLH	09/06/00	CA02-00-0128	14-14.75	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-003(d)																						
	02-01254	ALLH	09/15/00	CA02-00-0281	0-0.5	—	1	—	—	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01254	ALLH	09/15/00	CA02-00-0282	2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01255	ALLH	09/15/00	CA02-00-0283	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01255	ALLH	09/15/00	CA02-00-0284	2.2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01256	FILL	09/18/00	CA02-00-0285	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01256	FILL	09/18/00	CA02-00-0286	2-2.75	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
AOC 02-003(e)																						
	02-01240	ALLH	09/07/00	CA02-00-0132	3-4	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	ALLH	09/07/00	CA02-00-0133	6-7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	ALLH	09/07/00	CA02-00-0134	8.5-10	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	ALLH	09/07/00	CA02-00-0135	11.5-12.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	ALLH	09/07/00	CA02-00-0136	15-16	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	ALLH	09/07/00	CA02-00-0137	18.5-19.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01240	QBT3	09/07/00	CA02-00-0138	21.5-22.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-004(a)																						
	02-22359	ALLH	07/21/03	RE02-03-51840	9-9.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22359	ALLH	07/21/03	RE02-03-51841	10.5-11	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22369	ALLH	07/21/03	RE02-03-51860	9-9.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22369	ALLH	07/21/03	RE02-03-51861	10.5-11.03	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22370	ALLH	07/21/03	RE02-03-51862	8-8.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22370	ALLH	07/21/03	RE02-03-51863	9.5-10	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22371	ALLH	07/21/03	RE02-03-51864	9-9.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22371	ALLH	07/21/03	RE02-03-51865	10.5-11	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
AOC 02-004(f)																						
	02-22376	ALLH	06/24/03	RE02-03-51874	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-22376	ALLH	06/24/03	RE02-03-51875	1.5-2	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22377	ALLH	06/24/03	RE02-03-51876	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22377	ALLH	06/24/03	RE02-03-51877	1.5-2	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22378	ALLH	06/24/03	RE02-03-51878	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22378	ALLH	06/24/03	RE02-03-51879	1.5-2	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22379	ALLH	06/24/03	RE02-03-51880	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22379	ALLH	06/24/03	RE02-03-51881	1.5-2	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
AOC 02-004(g)																						
	02-22383	ALLH	07/14/03	RE02-03-51888	1-1.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22383	ALLH	07/14/03	RE02-03-51889	2.5-3	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22384	ALLH	07/15/03	RE02-03-51890	0.5-1	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22384	ALLH	07/15/03	RE02-03-51891	2-2.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22385	ALLH	07/15/03	RE02-03-51892	1-1.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22385	ALLH	07/15/03	RE02-03-51893	2.5-3	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22386	ALLH	07/15/03	RE02-03-51894	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22387	ALLH	07/15/03	RE02-03-51896	0-0.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
SWMU 02-006(a)																						
	02-22052	ALLH	04/02/03	RE02-03-51142	1-1.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22052	ALLH	04/02/03	RE02-03-51143	1-1.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22052	ALLH	04/02/03	RE02-03-51168	2.5-3	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-22052	ALLH	04/02/03	RE02-03-51169	2.5-3	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22053	ALLH	04/02/03	RE02-03-51144	1-1.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22053	ALLH	04/02/03	RE02-03-51145	1-1.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22053	ALLH	04/02/03	RE02-03-51170	2.5-3	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22053	ALLH	04/02/03	RE02-03-51171	2.5-3	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22054	ALLH	04/03/03	RE02-03-51146	1-1.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22054	ALLH	04/03/03	RE02-03-51147	1-1.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22054	ALLH	04/03/03	RE02-03-51172	2.5-3	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22054	ALLH	04/03/03	RE02-03-51173	2.5-3	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22055	QBT3	04/03/03	RE02-03-51148	10-10.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22055	QBT3	04/03/03	RE02-03-51149	10-10.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22055	QBT3	04/03/03	RE02-03-51174	11.5-12	—	1	1	1	—	1	1	1		—	—	1	—	1	—	—	—
	02-22055	QBT3	04/03/03	RE02-03-51175	11.5-12	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22056	QBT3	04/03/03	RE02-03-51150	10-10.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22056	QBT3	04/03/03	RE02-03-51151	10-10.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22056	QBT3	04/03/03	RE02-03-51176	11.5-12	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22056	QBT3	04/03/03	RE02-03-51177	11.5-12	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22057	QBT3	04/03/03	RE02-03-51152	10-10.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22057	QBT3	04/03/03	RE02-03-51153	10-10.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	02-22057	QBT3	04/03/03	RE02-03-51178	11.5-12	—	1	1	1		1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-22057	QBT3	04/03/03	RE02-03-51179	11.5-12	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22058	QBT3	04/03/03	RE02-03-51154	10-10.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22058	QBT3	04/03/03	RE02-03-51155	10-10.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22058	QBT3	04/03/03	RE02-03-51180	11.5-12	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22058	QBT3	04/03/03	RE02-03-51181	11.5-12	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22059	QBT3	04/03/03	RE02-03-51156	6-6.5	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22059	QBT3	04/03/03	RE02-03-51157	6-6.5	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
	02-22059	QBT3	04/03/03	RE02-03-51182	7.5-8	—	1	1	1	—	1	1	1	—	—	—	1	—	1	—	—	—
	02-22059	QBT3	04/03/03	RE02-03-51183	7.5-8	—		—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
SWMU 02-006(b)																						
	02-01094	SED	09/14/00	CA02-00-0157	0-0.5	1	1	—	1	—	1	1	1	1	—	—	1	1	—	—	—	1
	02-01251	SED	09/15/00	CA02-00-0161	0-0.5	1	1	—	1	—	1	—	1	1	—	—	1	1	—	—	—	1
	02-22345	ALLH	07/14/03	RE02-03-51812	3.5-4	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22345	ALLH	07/14/03	RE02-03-51813	5-5.5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
AOC 02-006(e)																						
	02-01095	SED	09/14/00	CA02-00-0155	0-0.5	1	1	—	1	—	1	1	1	1	—	—	1	1	—	—	—	1
	02-01095	SED	09/14/00	CA02-00-0156	1.9-2.2	1	1	—	1	—	1	1	1	1	—	—	1	1	—	—	—	1
	02-01250	SED	09/15/00	CA02-00-0162	0-0.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-22356	ALLH	07/14/03	RE02-03-51834	9-9.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22356	ALLH	07/14/03	RE02-03-51835	10.5-11	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-22357	ALLH	07/14/03	RE02-03-51836	5-5.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22357	ALLH	07/14/03	RE02-03-51837	6.5-7	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22358	ALLH	07/14/03	RE02-03-51838	5-5.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
	02-22358	ALLH	07/14/03	RE02-03-51839	6.5-7	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
SWMU 02-008(a)																						
	02-01249	SED	09/13/00	CA02-00-0321	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-008(c)																						
	02-01154	ALLH	04/26/95	0402-95-0319	0-1	—		—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01252	SED	09/15/00	CA02-00-0167	0-0.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01253	SED	09/15/00	CA02-00-0168	0-0.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
SWMU 02-009(a)																						
	02-01259	ALLH	09/29/00	CA02-00-0186	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01259	ALLH	10/02/00	CA02-00-0187	2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01260	ALLH	09/29/00	CA02-00-0188	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01260	ALLH	10/02/00	CA02-00-0189	2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01263	ALLH	10/05/00	CA02-00-0208	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01263	ALLH	10/05/00	CA02-00-0209	2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01263	ALLH	10/05/00	CA02-00-0211	5-5.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01264	ALLH	10/05/00	CA02-00-0213	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01264	ALLH	10/05/00	CA02-00-0214	2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01264	ALLH	10/05/00	CA02-00-0215	5-5.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
SWMU 02-009(b)																						
	02-01243	ALLH	09/08/00	CA02-00-0176	5-7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01243	ALLH	09/08/00	CA02-00-0177	11.5-12.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01243	QBT3	09/08/00	CA02-00-0178	13-14	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01244	ALLH	09/08/00	CA02-00-0181	6-7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01244	QBT3	09/08/00	CA02-00-0182	12.5-13.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
SWMU 02-009(c)																						
	02-01140	QBT2	04/06/95	0402-95-0005	8.5-9.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01140	QBT2	04/06/95	0402-95-0006	12.5-13.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01141	QBT2	04/07/95	0402-95-0011	7.5-8.5	—		—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01142	QBT2	04/07/95	0402-95-0015	4-5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01142	QBT2	04/07/95	0402-95-0016	9-10	—		—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01142	QBT2	04/07/95	0402-95-0017	16.5-17.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01143	QBT2	04/10/95	0402-95-0021	3-5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01143	QBT2	04/10/95	0402-95-0022	9-10	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01143	QBT2	04/10/95	0402-95-0023	14-15	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01146	ALLH	04/05/95	0402-95-0038	7.5-8.5	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01146	SED	04/05/95	0402-95-0396	7.5-8.5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
	02-01146	ALLH	04/05/95	0402-95-0039	11.5-12.5	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01147	FILL	04/05/95	0402-95-0044	7.5-8.5	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01147	ALLH	04/05/95	0402-95-0045	12.5-14	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01148	QBT2	04/06/95	0402-95-0049	8-9	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01148	QBT2	04/06/95	0402-95-0050	12.5-13.5	—	1	—	1	—	1	1	—	—	—	—	1	1	—	—	—	—
	02-01225	FILL	08/29/00	CA02-00-0021	5-7	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01225	ALLH	08/29/00	CA02-00-0022	8-9	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01225	ALLH	08/29/00	CA02-00-0023	10-11.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01225	QBT2	08/29/00	CA02-00-0024	12.5-15	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01226	QBT2	08/29/00	CA02-00-0026	5-6.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01226	QBT2	08/29/00	CA02-00-0027	10-12	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01226	QBT2	08/29/00	CA02-00-0028	12.5-14	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01227	FILL	08/30/00	CA02-00-0031	5-7.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01227	ALLH	08/30/00	CA02-00-0032	7.5-9	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01227	ALLH	08/30/00	CA02-00-0033	10-12	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01227	ALLH	08/30/00	CA02-00-0034	12.5-14	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01228	ALLH	08/30/00	CA02-00-0035	0-2.5	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01228	SED	10/02/00	CA02-00-0216	0-0.5	—	1	—	1		1	1	1	—	—	—	1		—	—	—	—
	02-01228	ALLH	08/30/00	CA02-00-0036	2.5-4.5	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01228	FILL	08/30/00	CA02-00-0037	5.5-7.5	—	1	—	1		1	1	1	—	—	—	1	1	—	—	—	—
	02-01228	ALLH	08/30/00	CA02-00-0038	7.5-10	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01228	ALLH	08/30/00	CA02-00-0039	10-12.3	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01228	QBT2	08/30/00	CA02-00-0040	12.5-14.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01229	FILL	08/30/00	CA02-00-0043	5-7.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01229	ALLH	08/30/00	CA02-00-0044	7.5-8.3	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01229	ALLH	08/30/00	CA02-00-0045	10.5-12	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01229	QBT2	08/30/00	CA02-00-0046	12.5-15	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01230	FILL	08/31/00	CA02-00-0049	5-7	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01230	ALLH	08/31/00	CA02-00-0050	8-10	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01230	ALLH	08/31/00	CA02-00-0051	10-11.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01230	ALLH	08/31/00	CA02-00-0052	12.5-14	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01230	QBT2	08/31/00	CA02-00-0053	15-17.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01231	FILL	08/31/00	CA02-00-0056	5-6.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01231	ALLH	08/31/00	CA02-00-0057	7.5-10	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01231	ALLH	08/31/00	CA02-00-0058	10-12	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01231	ALLH	08/31/00	CA02-00-0059	12.5-13	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01231	QBT2	08/31/00	CA02-00-0060	13-15	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01232	FILL	08/31/00	CA02-00-0063	5-7	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01232	ALLH	08/31/00	CA02-00-0064	7.5-10	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01232	ALLH	08/31/00	CA02-00-0065	10-11	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01232	QBT2	08/31/00	CA02-00-0066	12.5-15	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01233	FILL	09/01/00	CA02-00-0077	5-7.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01233	ALLH	09/01/00	CA02-00-0070	7.5-10	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01233	ALLH	09/01/00	CA02-00-0071	11-12.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01233	ALLH	09/01/00	CA02-00-0072	12.5-13.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01233	ALLH	09/01/00	CA02-00-0073	14-15	—	1	—	1	—	1	1	1	—	—	—	1		—	—	—	—
	02-01233	QBT2	09/01/00	CA02-00-0074	15-17.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01234	FILL	09/01/00	CA02-00-0080	5-7	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01234	ALLH	09/01/00	CA02-00-0081	7.5-9.25	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01234	ALLH	09/01/00	CA02-00-0082	10-11.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
AOC 02-009(d)																						
	02-01245	ALLH	09/11/00	CA02-00-0290	4-5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01245	ALLH	09/11/00	CA02-00-0291	5-8	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01245	ALLH	09/11/00	CA02-00-0292	10-11.5	—	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01245	QBT3	09/11/00	CA02-00-0293	14.5-15.5		1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
AOC 02-010																						
	02-01246	ALLH	09/11/00	CA02-00-0300	0-1	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01246	ALLH	09/11/00	CA02-00-0301	7.5-9.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01246	ALLH	09/11/00	CA02-00-0302	17.5-18.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01246	ALLH	09/11/00	CA02-00-0303	34.5-36.5	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—
	02-01246	QBT3	09/11/00	CA02-00-0304	37.5-39	1	1	—	1	—	1	1	1	—	—	—	1	1	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-22350	ALLH	07/22/03	RE02-03-51822	0-0.5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22350	ALLH	07/22/03	RE02-03-51823	1.5-2	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22389	ALLH	07/22/03	RE02-03-51900	0-0.5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22389	ALLH	07/22/03	RE02-03-51901	1.5-2	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22390	ALLH	07/28/03	RE02-03-51902	3-3.5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22390	ALLH	07/28/03	RE02-03-51903	4.5-5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22391	ALLH	07/28/03	RE02-03-51904	0-0.5	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
	02-22391	ALLH	07/28/03	RE02-03-51905	1.5-2	1	1	—	1	1	1	1	1	—	—	—	1	1	1	—	—	—
AOC 02-011(a)																						
02-011(a)(i)	02-01157	ALLH	04/26/95	0402-95-0314	0-0.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(iii)	02-01158	ALLH	04/26/95	0402-95-0315	0-0.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(iv)	02-01159	ALLH	04/26/95	0402-95-0316	0-0.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(vi)	02-01149	ALLH	04/26/95	0402-95-0309	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(viii)	02-01152	SED	04/26/95	0402-95-0313	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(viii)	02-01152	SED	09/14/00	CA02-00-0192	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
02-011(a)(viii)	02-22351	ALLH	07/11/03	RE02-03-51824	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22351	ALLH	07/11/03	RE02-03-51825	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22352	ALLH	07/11/03	RE02-03-51826	3-3.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22352	ALLH	07/11/03	RE02-03-51827	4.5-5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22372	ALLH	07/21/03	RE02-03-51866	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
02-011(a)(viii)	02-22372	ALLH	07/21/03	RE02-03-51867	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22373	ALLH	07/21/03	RE02-03-51868	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22373	ALLH	07/21/03	RE02-03-51869	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22374	ALLH	07/21/03	RE02-03-51870	3-3.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(viii)	02-22374	ALLH	07/21/03	RE02-03-51871	4.5-5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(ix)	02-01150	SED	04/26/95	0402-95-0310	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(ix)	02-01150	SED	09/14/00	CA02-00-0320	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
02-011(a)(ix)	02-01150	SED	09/14/00	CA02-00-0323	2.3-2.7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
02-011(a)(ix)	02-22349	ALLH	07/15/03	RE02-03-51820	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(ix)	02-22349	ALLH	07/15/03	RE02-03-51821	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(ix)	02-22367	ALLH	07/11/03	RE02-03-51856	3.5-4	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(ix)	02-22367	ALLH	07/11/03	RE02-03-51857	5-5.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-01153	SED	04/26/95	0402-95-0318	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
02-011(a)(x)	02-01153	SED	09/14/00	CA02-00-0193	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
02-011(a)(x)	02-01153	SED	09/14/00	CA02-00-0198	2.2-2.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
02-011(a)(x)	02-01162	QBT2	04/14/95	0402-95-0303	0.5-0.83	—	—	—	—	—	—	—	—	1	1	—	—	1	—	—	—	1
02-011(a)(x)	02-01162	QBT2	04/14/95	0402-95-0305	2.5-3.5	—	—	—	—	—	—	—	—	—	—	1	—	1	—	1	—	1
02-011(a)(x)	02-01162	QBT2	04/14/95	0402-95-0304	8-9	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	1
02-011(a)(x)	02-01162	QBT2	04/14/95	0402-95-0306	12.5-13.5	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	1
02-011(a)(x)	02-22346	ALLH	07/15/03	RE02-03-51814	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
02-011(a)(x)	02-22346	ALLH	07/15/03	RE02-03-51815	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22347	ALLH	07/15/03	RE02-03-51816	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22347	ALLH	07/15/03	RE02-03-51817	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22348	ALLH	07/15/03	RE02-03-51818	5.5-6	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22348	ALLH	07/15/03	RE02-03-51819	7-7.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22368	ALLH	07/11/03	RE02-03-51858	2.5-3	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22368	ALLH	07/11/03	RE02-03-51859	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22380	ALLH	07/11/03	RE02-03-51882	2.5-3	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
02-011(a)(x)	02-22380	ALLH	07/11/03	RE02-03-51883	4-4.5	—	1	—	1	1	1	1	1	—	—	—	1	—	1	—	—	—
AOC 02-011(b)																						
	02-01107	ALLH	04/11/95	0402-95-0282	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01110	QBT2	04/11/95	0402-95-0283	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01110	QBT2	04/11/95	0402-95-0284	4-5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01110	QBT2	04/12/95	0402-95-0395	4-5	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
	02-01110	QBT2	04/11/95	0402-95-0285	7.5-8.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01110	QBT2	04/11/95	0402-95-0286	11-12	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01239	SED	09/06/00	CA02-00-0308	0-1	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01239	ALLH	09/06/00	CA02-00-0309	3-4	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01239	ALLH	09/06/00	CA02-00-0310	6-7	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01239	ALLH	09/07/00	CA02-00-0311	11.5-13	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—

Table 2.5-1 (continued)

AOC Subunit	Location ID	Media	Collection Date	Sample ID	Depth Sampled (ft)	Anion	Gamma Spectroscopy	Gross Alpha/Beta	Tritium	Hexavalent Chromium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Pesticides	Pesticides/PCBs	Strontium-90	SVOCs	Technecium-9	/TPH/DRO	Total Recoverable Petroleum Hydrocarbons (TRPH)	VOCs
	02-01239	QBT3	09/07/00	CA02-00-0312	14-15	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-011(d)																						
	02-01151	ALLH	04/26/95	0402-95-0311	0-1	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01155	ALLH	04/26/95	0402-95-0320	0-0.5	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01155	ALLH	04/26/95	0402-95-0321	1-2	—	1	—	1	—	1	1	—	—	—	—	1	—	—	—	—	—
	02-01247	SED	09/13/00	CA02-00-0319	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
	02-01248	SED	09/13/00	CA02-00-0324	0-0.5	—	1	—	1	—	1	1	1	—	—	—	1	—	—	—	—	—
AOC 02-012																						
	02-01257	FILL	09/19/00	CA02-00-0339	3-3.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—
	02-01257	FILL	09/19/00	CA02-00-0340	5-5.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—
	02-01258	FILL	09/19/00	CA02-00-0341	3-3.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—
	02-01258	FILL	09/19/00	CA02-00-0342	5-5.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—
	02-01265	FILL	09/19/00	CA02-00-0337	3-3.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—
	02-01265	FILL	09/19/00	CA02-00-0338	5-5.5	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—

*— = Analysis not requested for this suite.

Table 4.1-1
Summary of Proposed Soil Sampling at AOCs 02-003(a), 02-003(b), 02-003(c), 02-003(e), 02-008(c)i, and 02-011(b)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
AOC 02-003(a) Contamination Area																	
BH3a-1	At Line 117 connection to Reactor Building TA-02-001	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-2	West side of TA-02-019 at Line 117 connection	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-3	20 ft north of previous sampling location 02-01241	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-4	20 ft south of previous sampling location 02-01241	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-5	At Line 118 connection to TA-02-019	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-6	Along Line 118 halfway between structure TA-02-019 and connection to the OWR gaseous effluent vent line	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3a-7	At Line 118 connection to the gaseous effluent vent line	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-003(b)																	
BH3b-1	West side of structure TA-02-048 at Line 119 connection	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH3b-2	10 ft east of BH3b-1 in the center of structure TA-02-048	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3b-3	South side of structure TA-02-048 at Line 119 connection	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3b-4	South of BH3b-1 along Line 119 prior to crossing under the Los Alamos Creek	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3b-5	At Line 119 halfway between BH3b-3 and previous sampling location 02-01145	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-003(c)																	
BH3c-1	Immediately north of previous sampling location 02-01237	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3c-2	20 ft east of BH3c-1	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-3	20 ft southeast of BH3c-1	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+

Deleted: —
+
+
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+

Table 4.1-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH3c-4	At the connection of Line 119 to the OWR gaseous effluent vent line	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-5	20 ft west of BH3c-1	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-6	20 ft west of BH3c-5	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-7	20 ft northwest of BH3c-5	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-8	20 ft north of BH3c-1	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-9	20 ft west of BH3c-8	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
BH3c-10	North of BH3c-8 as close to the Los Alamos Creek as possible (location to be determined by a geomorphologist and will be outside the main Los Alamos Creek channel)	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+
AOC 02-003(e)																	
BH3e-1	Immediately east of previous sampling location 02-01240 at Line 119	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH3e-2	20 ft south of BH3e-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3e-3	20 ft southeast of previous sampling location 02-01240	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH3e-4	20 ft northeast of previous sampling location 02-01240	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-008(c)i																	
BH8ci-1	South of BH11b-5 at outfall as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-011(b)																	
BH11b-1	At discharge point as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH11b-2	10 ft east of BH11b-1 as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X

Deleted: along Line 118

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X
X
X
X

Deleted: X
X
X
X
X

Table 4.1-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH11b-3	At discharge point east of Line 118 as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH11b-4	10 ft east of BH11b-3 as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH11b-5	At bend in line between immediately east of previous sampling location 02-01239	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. + = This sample may be collected based on results from the one location sampled. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

Deleted: X
X
X
X
X

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X
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X

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X
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X

Deleted: field-screening

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Table 4.1-2
Summary of Proposed Soil Sampling at AOC 02-003(d), SWMU 02-006(a), and SWMU 02-009(a)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
AOC 02-003(d) Garden Hose Discharge Area																	
BH3d-1	20 ft north of previous sampling location 02-01256	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-2	20 ft north of previous sampling location 02-01254	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-3	20 ft east of previous sampling location 02-01254	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-4	In the center of the AOC	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
BH3d-5	40 ft west of BH3d-4	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-6	20 ft north of BH3d-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-7	20 ft east of BH3d-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +
BH3d-8	20 ft south of BH3d-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	+ + +

Deleted: pH

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+

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+

Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH3d-9	20 ft west of BH3d-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-10	Immediately south of previous sampling location 02-01255	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-11	20 ft west of BH3d-10	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-12	20 ft east of BH3d-10	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
AOC 02-003(d) Gaseous Effluent Vent Line (Line 119) From 02-131 to French Drain																	
BH3d-13	At Line 119 20 ft south of the connection of Line 119 and the OWR gaseous effluent vent line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-14	At Line 119 200 ft south of the connection of Line 119 and the OWR gaseous effluent vent line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-15	At Line 119 400 ft south of the connection of Line 119 and the OWR gaseous effluent vent line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH3d-16	At Line 119 600 ft south of the connection of Line 119 and the OWR gaseous effluent vent line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— + +	+ + +	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±

Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
SWMU 02-006(a)																	
BH6a-1	Adjacent to previous sampling location 02-22055	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-2	Adjacent to previous sampling location 02-22056	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-3	Adjacent to previous sampling location 02-22057	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		19.5 to 20	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH6a-4	Adjacent to previous sampling location 02-22058	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+

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Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH6a-5	Adjacent to previous sampling location 02-22052	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-6	Adjacent to previous sampling location 02-22053	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-7	Adjacent to previous sampling location 02-22054	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-8	Adjacent to previous sampling location 02-22059	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+

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Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH6a-9	20 ft northwest of BH6a-5	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-10	20 ft northeast of BH6a-6	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-11	20 ft southeast of BH6a-7	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
BH6a-12	20 ft southwest of BH6a-8	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		9.5 to 10	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		14.5 to 15	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		19.5 to 20	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+
		soil/tuff interface	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+

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Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
Consolidated Unit 02-007-00, SWMU 02-009(a)																	
BH9a-1	Adjacent to previous sampling location 02-01259	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-2	10 ft north of previous sampling location 02-01259, just south of OWR gaseous effluent vent line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-3	20 ft south of previous sampling location 02-01259	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-4	20 ft west of previous sampling location 02-01259	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-5	40 ft south of BH9a-4	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-6	20 ft north of BH9a-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-7	20 ft east of BH9a-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-8	20 ft south of BH9a-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	± ± ±
BH9a-9	20 ft west of BH9a-5	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH9a-10	Adjacent to previous sampling location 02-01263	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-11	20 ft north of previous sampling location 02-01263	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-12	20 ft east of previous sampling location 02-01263	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-13	20 ft south of previous sampling location 02-01263	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-14	20 ft west of previous sampling location 02-01263	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-15	20 ft north of BH9a-14	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-16	20 ft south of BH9a-14	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-17	20 ft east of BH9a-13	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
BH9a-18	20 ft south of BH9a-13	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	±

Table 4.1-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
SWMU 02-009(a) Roped Area																	
BH9a-19	In the approximate center of the roped boundary area	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH9a-20	Along the center of the northern roped boundary area	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
BH9a-21	Along the center of the eastern roped boundary area	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
BH9a-22	Along the center of the southern roped boundary area	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
BH9a-23	Along the center of the western roped boundary area	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. + = This sample may be collected based on results from the one location sampled. X/Cr^{6+}= This sample will be speciated for hexavalent chromium.

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Table 4.1-3
Summary of Proposed Soil Sampling at AOC 02-004(a) (OWR and fuel area; WBR area), SWMU 02-006(b), AOC 02-006(e), AOCs 02-011(a)(i, ii, iii, v, viii, and ix), and AOC 02-012

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
AOC 02-004(a) Omega West Reactor Room and Fuel Handling Area																		
BH4a-1	30 ft north of previous sampling location 02-22359, at centerline of the northwest storage area of TA-02-001	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4a-2	25 ft east of BH4a-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4a-3	10 ft east and 15 ft south of BH4a-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH4a-4	20 ft south of BH4a-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4a-5	20 ft west of BH4a-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4a-6	20 ft north and 5 ft west of previous sampling location 02-22359	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH4a-7	10 ft south of previous sampling location 02-22359	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH4a-8	20 ft south and 5 ft east of previous sampling location 02-22369	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X

Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH4a-9	25 ft west of previous sampling location 02-22356, on the north side of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-004(a) Former Water Boiler Reactor Areas																		
BH4a-10	20 ft west of BH4a-13	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH4a-11	10 ft north and 20 ft west of BH4a-10	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH4a-12	15 ft north of BH4a-13	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH4a-13	Center of the former sump, 15 ft south of BH4a-12	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH4a-14	20 ft south of BH4a-11	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH4a-15	20 ft west of BH4a-14	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH4a-16	20 ft south of BH4a-15	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
SWMU 02-006(b)																		
BH6b-1	Centerline of		—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	—
	SWMU 02-006(b) drain line	0.0 to 0.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
	at north side of retaining wall	4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone																X*
BH6b-2	30 ft north of BH6b-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH6b-3	30 ft north of BH6b-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-4	30 ft north of BH6b-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH6b-5	10 ft northeast of BH6b-4	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH6b-6	20 ft west of BH6b-5	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH6b-7	15 ft west of BH6b-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH6b-8	12 ft southwest of BH6b-7	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-9	20 ft north of BH6b-12	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-10	20 ft east of BH6b-5	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH6b-11	30 ft south of BH6b-10	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH6b-12	20 ft south of BH6b-9	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-13	45 ft south of BH6b-9	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-14	15 ft west of BH6b-1, north side of retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-15	15 ft east of BH6b-1, north of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-16	5 ft southwest of BH6b-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6b-17	5 ft south of BH6b-1, south of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
AOC 02-006(e)																		
BH6e-1	Approximate exit point of sump TA-02-026 to AOC 02-006(e) outfall, north of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-2	15 ft north of BH6e-1	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-3	30 ft north of BH6e-1 along former drain line at center of former containment structure	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-4	30 ft north of BH6e-3	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-5	20 ft west of BH6e-4	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-6	15 ft west of BH6e-3	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH6e-7	15 ft west of BH6e-2	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-8	20 ft west and 5-ft north of previous sampling location 02-22358	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-9	15 ft west of BH6e-1, north of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-10	15 ft east of BH6e-1, north of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH6e-11	5 ft south of BH6e-1, south of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		9.5 to 10.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
AOC 02-011(a)(i)																		
BH11a(i)-1	5 ft east of Structure TA-02-036, south of the northern concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH11a(i)-2	15 ft east and 10 ft north of BH11a(i)-1, along the southern edge of the northern concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(i)-3	25 ft east of BH11a(i)-2, at the end of the concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-011(a)(ii)																		
BH11a(ii)-1	5 ft west of the drain between Structures TA-02-036 and TA-02-027	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-011(a)(iii)																		
BH11a(iii)-1	5 ft east of TA-02-027, south of the southern concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH11a(iii)-2	40 ft east of BH11a(iii)-1, south of the southern concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH11a(iii)-3	45 ft east of BH11a(iii)-2, at the end of the southern concrete drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
AOC 02-011(a)(v)																		
BH11a(v)-1	West side of drain from the catch basin TA-02-027	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(v)-2	30 ft south along drain from TA-02-027, northeast of Structure TA-02-028	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-011(a)(viii)																		
BH11a(viii)-1	15 ft northeast of previous sampling location 02-22351	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(viii)-2	5 ft east of previous sampling location 02-22373, 40-ft north of BH11a(viii)-1	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-011(a)(ix)																		
BH11a(ix)-1	North of the retaining wall, adjacent to previous sampling location 02-22367	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-2	35 ft north of BH11a(ix)-1	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH11a(ix)-3	20 ft north and 5-ft west of BH11a(ix)-2	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-4	15 ft east of BH11a(ix)-3	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-5	20 ft north and 10 ft east of BH11a(ix)-4	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-6	25 ft east of BH11a(ix)-5	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-7	15 ft east of BH11a(ix)-6	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-8	15 ft north of BH11a(ix)-7	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-9	25 ft north of BH11a(ix)-6	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH11a(ix)-10	25 ft north of BH11a(ix)-5	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-11	15 ft west of BH11a(ix)-1, north of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH11a(ix)-12	30 ft east of BH11a(ix)-1, north of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-13	South of previous sampling location 02-22367, south of the retaining wall	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH11a(ix)-14	12 ft west of previous sampling location 02-01162	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-15	12 ft north of previous sampling location 02-01162	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-16	12 ft east of previous sampling location 02-01162	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH11a(ix)-17	12 ft south of previous sampling location 02-01162	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
BH11a(ix)-18	30 ft east and 5 ft south of BH11a(ix)-4	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		7.5 to 8.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X*
AOC 02-012 Former Fuel Line																		
BH12-1	15 ft west of BH4a-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-2	At the bend in the former gas line 15 ft east of BH11a(iii)-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-3	40 ft east and 5 ft north of BH12-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-4	40 ft east and 5 ft north of BH12-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
AOC 02-012 UST, TA-02-067 [NMED 02-02-1]																		
BH12-5	15 ft south and 20 ft east of BH12-4	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-6	15 ft south and 5 ft west of BH12-4	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-7	Approximate center of former tank, 10 ft northwest of BH12-5	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
AOC 02-012 UST, TA-02-029																		
BH12-8	35 ft north and 25 ft east of previous sampling location 02-22345	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-9	20 ft south and 10 ft east of BH12-8	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—

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Table 4.1-3 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	Dioxins, Furans, PCBs
BH12-10	20 ft west of BH12-9	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
BH12-11	10 ft south of BH12-8, in the approximate center of the tank	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. + = This sample may be collected based on results from the one location sampled. X* = PCB analyses only. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

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Table 4.1-4
Summary of Proposed Soil Sampling at AOC 02-004(a) (material storage area; OWR cooling liquid recirculation piping), AOCs 02-004(b, c, d, e, f and g), SWMU 02-008(a), AOCs 02-011(a)(iv and vi), and AOCs 02-011(c and d)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
AOC 02-004(a) – OWR Cooling Liquid Re-circulating Piping																	
BH4a-20	25 ft west and 5-ft north of BH4a-7	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-21	35 ft west of BH4a-20	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-22	35 ft west of BH4a-21	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-23	20 ft south of previous sampling location 02-22379	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-24	30 ft south and 5 ft west of location BH4f-7	0.0 to 0.5 only	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X*

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4a-25	20-ft south of BH4a-21	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-26	20-ft east of BH4a-27	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-27	20-ft east and 5-ft south of BH4a-28	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of-saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
BH4a-28	20-ft south of BH4a-23	0.0 to 0.5 only	—	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	+*
AOC 02-004(a) – OWR Material Storage Area																	
BH4a-29	40 ft southeast of the southeast corner of the western bridge	0.0 to 0.5	_	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
BH4a-30	30 ft east of BH4a-29	0.0 to 0.5	_	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X*

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4a-31	10 ft north of BH4a-32	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X* X* X* X*
BH4a-32	30 ft southwest of BH4a-30	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	_ + + +	+ + + +	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X* X* X* X*
AOC 02-004(b) – Storage Tank (TA-02-053)																	
BH4b-1	Approximate centerline of tank TA-02-053, southern most tank	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
AOC 02-004(c) – Storage Tank (TA-02-054)																	
BH4c-1	Approximate centerline of tank TA-02-054	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
AOC 02-004(d) – Storage Tank (TA-02-055)																	
BH4d-1	Approximate centerline of tank TA-02-055, northernmost tank	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
AOC 02-004(b, c, and d) - Overall Tank Area																	
BH4b-2	10 ft southeast of BH4b-1, adjacent to the Los Alamos Creek north of the retaining wall	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4b-3	10 ft west of BH4b-2 adjacent to the retaining wall	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4b-4	10 ft west and 5 ft north of BH4b-3	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4c-2	20 ft northwest of BH4b-1	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4d-2	5 ft east and 10 ft north of BH4c-2	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4d-3	10 ft north and 5 ft east of BH4d-2	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X

Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
AOC 02-004(e)																	
BH4e-1	10 ft east and 5 ft north of BH4c-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4e-2	10 ft east of BH4b-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4e-3	Adjacent to previous sampling location 02-01151, north of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-004(f) Reactor Facility Equipment Building (02-044) and associated piping																	
BH4f-1	20 ft north and 25 ft east BH4d-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-2	20 ft north and 20 ft east of BH4f-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-3	20 ft northwest of BH4f-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4f-4	35 ft east and 5 ft south of BH4f-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-5	15 ft south and 10 ft east of BH4f-4	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-6	30 ft west of BH4f-5	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-7	15 ft east and 10 ft south of BH4f-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-8	5 ft east of previous sampling location 02-22376	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-9	18 ft west of previous sampling location 02-22379	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-10	15 ft west and 10 ft south of BH4f-9	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4f-11	25 ft south of BH4f-10	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-12	10 ft east of BH4f-11	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-004(g)																	
BH4g-1	On the southwestern corner of the western bridge	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4g-2	20 ft south and 5 ft west of BH4g-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4g-3	20 ft south and 5 ft west of BH4g-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4g-4	35 ft west and 5 ft north of BH4g-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4g-5	5 ft north of previous sampling location 02-22383	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4g-6	20 ft west of previous sampling location 02-22383	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4g-7	20 ft west of previous sampling location 02-22386	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4g-8	25 ft west and 12 ft north of BH4g-1	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
BH4g-9	40 ft south of BH4g-5	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X
SWMU 02-008(a)																	
BH8a-1	10 ft east of BH4e-3, north of the retaining wall	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— + + +	+ + + +	X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+}	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X* X* X* X*
BH8a-2	10 ft east of BH8a-1	0.0 to 0.5 4.5 to 5.0 soil/tuff interface top 0.5-ft of saturated zone	— + + +	+ + + +	X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+}	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X* X* X* X*

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH8a-3	10 ft east of BH8a-2	0.0 to 0.5	—	+	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	+	+	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	+	+	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	+	+	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
BH8a-4	10 ft south of the former outfall, midway between BH8a-1 and BH8a-2, south of the retaining wall	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		2.0 to 2.5	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X*
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	
AOC 02-011(a)(iv)																	
BH11a(iv)-1	Approximate centerline of the former catch basin, about 15 ft west of structure TA-02-028	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-011(a)(vi)																	
BH11a(vi)-1	North of the retaining wall approx. 30 ft east of the northeastern boundary of the western bridge.	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH11a(vi)-2	25 ft northeast of BH11a(vi)-1 on the east side of the drain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH11a(vi)-3	25 ft west of BH11a(vi)-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-4 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
AOC 02-011(c)																	
BH11(c)-1	15 ft southwest of BH4f-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AOC 02-011(d)																	
BH11(d)-1	5 ft south of BH4b-2	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. + = This sample may be collected based on results from the one location sampled. X* / +* = PCB analyses only. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

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Table 4.1-5
Summary of Proposed Soil Sampling at SWMU 02-005, AOC 02-004(a) (OWR gaseous effluent vent line), and AOC 02-004(f) (liquid acid-waste line)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
SWMU 02-005																	
BH5-1	200 ft north of AOC 02-004(c) centerline	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-2	200 ft east of BH5-1	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-3	200 ft east of BH5-2	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-4	200 ft east of BH5-3	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-5	200 ft east of BH5-4	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-6	200 ft south of BH5-5	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-7	200 ft south of BH5-6	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*

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Table 4.1-5 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH5-8	400 ft west of BH5-7	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-9	200 ft west of BH5-8	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-10	200 ft west of BH5-9	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-11	200 ft west of BH5-10	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-12	200 ft west of BH5-11	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-13	200 ft north of BH5-12	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X*
BH5-14	200 ft east of BH5-13	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-15	200 ft north of BH5-13	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
BH5-16	200 ft east of BH5-15	0.0 to 0.5	—	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		2.0 to 2.5	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*
		4.5 to 5.0	+	+	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	+*

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Table 4.1-5 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
AOC 02-004(a) OWR Gaseous Effluent Vent Line (from TA-02-001 to Line 119)																	
BH4a-33	20 ft south of BH4a-21	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— + + +	+ + + +	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	— — — —
BH4a-34	20 ft south southeast of BH4a-33	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— + + +	+ + + +	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	— — — —
BH4a-35	30 ft south of BH4a-34, just south of the Los Alamos Creek	0.0 to 0.5 9.5 to 10.0 14.5 to 15.0 soil/tuff interface top 0.5-ft of saturated zone	— + + + +	+ + + + +	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	— — — — —
BH4a-36	30 ft south of BH4a-35 at bend in line	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	— — — —
BH4a-37	300 ft east of BH4a-36 at bend in line	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— + + +	+ + + +	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	— — — —
AOC 02-004(f) Liquid Acid-Waste Line																	
BH4f-13	20 ft west of BH4f-1	0.0 to 0.5 9.5 to 10.0 soil/tuff interface top 0.5-ft of saturated zone	— X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X

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14.5 to 15.0
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top 0.5-ft of saturated zone ... [74]

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Table 4.1-5 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4f-14	15 ft north of BH4f-13	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-15	20 ft west of BH4f-13	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-16	At the intersection of the line and Los Alamos Creek, north side of the floodplain	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-17	80 ft south of BH4f-16 at bend in line	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-18	150 ft east of BH4f-17	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-19	150 ft east of BH4f-18	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH4f-20	150 ft east of BH4f-19	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-5 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	Dioxins, Furans, PCBs
BH4f-21	300 ft east of BH4f-20 at connection to main rad waste line	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. + = This sample may be collected based on results from the one location sampled. X* / +* = PCB analyses only. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

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Table 4.1-6
Summary of Proposed Soil Sampling at AOC 02-006(c)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
AOC 02-006(c)																		
BH6c-1	15 ft northwest of BH6c-2	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH6c-2	30 ft north of BH6c-3	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH6c-3	42 ft north and 5 ft east of previous sampling location 02-22345	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH6c-4	45 ft west of BH6c-5	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
BH6c-5	80 ft west-southwest of BH6c-6	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X	X
BH6c-6	90 ft west-southwest of septic tank TA-02-043 along former AOC 02-006(c) drain line	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH6c-7	15 ft west and 5 ft north of previous sampling location 02-22349	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites.

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Table 4.1-7
Summary of Proposed Soil Sampling at SWMU 02-007 and AOC 02-009(c)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
Consolidated Unit 02-007-00, SWMU 02-007																	
BH7-1	Inlet pipe connection to septic tank TA-02-043	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH7-2	Approximate center of septic tank TA-02-043	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH7-3	At outlet pipe connection to former septic tank TA-02-043	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH7-4	20 ft north of BH7-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH7-5	20 ft northwest of BH7-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BH7-6	20 ft northeast of BH7-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 4.1-7 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
Consolidated Unit 02-007-00, SWMU 02-009(c)																	
BH9c-1	20 ft north of septic tank TA-02-043 previous sampling location 02-01102 near previous sampling location 02-01104	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-2	25 ft north-northeast of center of septic tank TA-02-043	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-3	20 ft north of previous sampling locations 02-01234 and 02-01142 oriented parallel to Los Alamos Creek (20 ft north of BH9c-8)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-4	35 ft east and 5 ft north of BH9c-9	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-5	20 ft north of previous sampling locations 02-01231 and 02-01233 oriented parallel to Los Alamos Creek (20 ft north of BH9c-11)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-6	40 ft east of BH9c-5 oriented parallel to Los Alamos Creek (20 ft north of BH9c-12)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-7	60 ft east of BH9c-6 oriented parallel to Los Alamos Creek (20 ft north of BH9c-13)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-7 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH9c-8	40 ft east of BH9c-7 oriented parallel to Los Alamos Creek (20 ft north of BH9c-18)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-9	Near previous sampling location 02-01234 (20 ft south of BH9c-3)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-10	25 ft east and 10 ft south of BH9c-9	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-11	Between previous sampling locations 02-01233 and 02-01231 oriented parallel to Los Alamos Creek (20 ft south of BH9c-5)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-12	40 ft east of BH9c-11 oriented parallel to Los Alamos Creek (20 ft south of Bh9c-6)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-13	Near previous sampling location 02-01228 (20 ft south of BH9c-7)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-14	10 ft south of previous sampling location 02-01143	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X

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Table 4.1-7 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH9c-15	Southwest of BH9c-11 as close to Los Alamos Creek as possible (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-16	Southwest of BH9c-12 as close to Los Alamos Creek as possible (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-17	Southwest of BH9c-13 as close to Los Alamos Creek as possible (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-18	Southwest of BH9c-8 as close to Los Alamos Creek as possible (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
BH9c-19	20 ft east of BH9c-18 as close to Los Alamos Creek as possible (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	X
SWMU 02-009(c) Contamination Area South of Los Alamos Creek																	
BH9c-20	In the center of the contamination area south of the Los Alamos Creek (outside of the main Los Alamos Creek channel as determined by a geomorphologist)	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
BH9c-21	20 ft north of BH9c-20	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—

Table 4.1-7 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
BH9c-22	20 ft east of BH9c-20	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
BH9c-23	20 ft south of BH9c-20	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
BH9c-24	20 ft west of BH9c-20	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
BH9c-25	East of BH9c-26 north of BH9c-22 as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
BH9c-26	North of BH9c-22 as close to Los Alamos Creek as possible	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		4.5 to 5	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

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Table 4.1-8
Summary of Proposed Soil Sampling at AOC 02-008(c)(ii), SWMU 02-009(b), AOC 02-009(d), AOC 02-010, and AOC 02-011(a)(x)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
AOC 02-008(c)ii																		
BH8(c)ii-1	35 ft south of BH10-9	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH8(c)ii-2	35 ft south of BH8(c)ii-1, north of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH8(c)ii-3	20 ft south of BH8(c)ii-2, south of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Consolidated Unit 02-007-00, SWMU 02-009(b)																		
BH9b-1	20 ft west of BH9b-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9b-2	Adjacent to previous sampling location 02-01243	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9b-3	20 ft east of BH9b-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9b-4	20 ft north of BH9b-1	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9b-5	Adjacent to previous sampling location 02-01244	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X

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Table 4.1-8 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
BH9b-6	20 ft east of BH9b-5	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X
BH9b-7	20 ft east of BH9d-8	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X
BH9b-8	20 ft east of BH9d-10	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X
BH9b-9	20 ft north BH9b-5	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X
AOC 02-009(d)																		
BH9d-1	45 ft west of previous sampling location 02-01245	0.0 to 0.5 1.5 to 2 11.5 to 12 soil/tuff interface top 0.5-ft of saturated zone	— X X X X	X X X X X	X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+}	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	— — — — —	X X X X X
BH9d-2	Adjacent to previous sampling location 02-01245	0.0 to 0.5 1.5 to 2 11.5 to 12 soil/tuff interface top 0.5-ft of saturated zone	— X X X X	X X X X X	X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+}	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	— — — — —	X X X X X
BH9d-3	60 ft east of BH9d-1	0.0 to 0.5 1.5 to 2 11.5 to 12 soil/tuff interface top 0.5-ft of saturated zone	— X X X X	X X X X X	X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+} X/Cr^{6+}	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	X X X X X	— — — — —	X X X X X
BH9d-4	20 ft north of BH11a(x)-3	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X
BH9d-5	20 ft east of BH9d-4	0.0 to 0.5 1.5 to 2 11.5 to 12	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	— — —	X X X

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Table 4.1-8 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
BH9d-6	20 ft north of BH9d-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9d-7	20 ft east of BH9d-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9d-8	12 ft northeast of BH9d-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9d-9	20 ft north of BH9d-5	0.0 to 0.5		X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9d-10	20 ft north of BH9d-6	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH9d-11	20 ft north of BH9d-10	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		1.5 to 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		11.5 to 12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-010																		
BH10-1	10 ft east of BH11a(x)-1, north of the retaining wall	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-2	25 ft east of BH8(c)ii-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-3	20 ft north and 5 ft east of previous sampling location 02-22346	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X

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Table 4.1-8 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
BH10-4	25 ft east and 5 ft north of BH10-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-5	40 ft north of previous sampling location 02-22347	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-6	5 ft east of previous sampling location 02-22391	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-7	20 ft west of previous sampling location 02-22390	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-8	20 ft south and 5 ft west of previous sampling location 02-01245	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-9	12 ft north and 5 ft east of previous sampling location 02-01246	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-10	40 ft east of BH10-8	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X

Table 4.1-8 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
BH10-11	20 ft west of previous sampling location 02-22350	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-12	20 ft east and 5 ft north of BH10-4	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-13	35 ft east and 5 ft north of BH10-2	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
BH10-14	15 ft east and 5 ft north of BH10-13	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—	X
AOC 02-011(a)(x)																		
BH11a(x)-1	Adjacent to the retaining wall, approx. 10 ft north of previous sampling location 02-01153	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(x)-2	25 ft north of BH11a(x)-1	0.0 to 0.5	—	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr^{6+}	X	X	X	X	X	X	X	X	X	X	X	—	X

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Table 4.1-8 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	TPH/DRO	PCBs
BH11a(x)-3	60 ft north of BH11a(x)-2	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(x)-4	40 ft north of BH11a(x)-3	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(x)-5	25 ft west and 10 ft north of BH11a(x)-4, near the northeast corner of Building TA-02-001	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		19.5 to 20	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
BH11a(x)-6	20 ft west of BH11a(x)-1, north of the retaining wall	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X	X
		19.5 to 20	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	X	X
BH11a(x)-7	10 ft south of BH11a(x)-1, south of the retaining wall	0.0 to 0.5	—	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		2.0 to 2.5	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		4.5 to 5.0	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		soil/tuff interface	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X
		top 0.5-ft of saturated zone	X	X	X/Cr6+	X	X	X	X	X	X	X	X	X	X	X	—	X

Notes: — = This sample analysis will not be requested. X = This sample will be analyzed for these suites. X/Cr^{6+} = This sample will be speciated for hexavalent chromium.

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Table 4.2-1
Summary of Proposed Soil Sampling at Consolidated Unit 21-006(e)-99

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	HE/Dioxins/Furans/ PCBs*
Suspected former seepage pits																	
BH6e-1	30 ft northeast of previous sampling location 21-04008	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-2	Adjacent to previous sampling location 21-04004	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-3	60 ft northwest of previous sampling location 21-04006	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-4	Halfway between locations BH6e-1 and BH6e-8	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-5	Adjacent to previous sampling location 21-04006	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-6	20 ft southwest of BH6e-3	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-7	Adjacent to previous sampling location 21-04008	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	

Table 4.2-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	HE/Dioxins/Furans/ PCBs*
BH6e-8	30 ft southeast of previous sampling location 21-04008 (BH6e-7)	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-9	Adjacent to previous sampling location 21-04005	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-10	20 ft southwest of BH6e-6	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-11	Halfway between locations BH6e-7 and BH6e-14	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-12	45 ft southeast of BH6e-11	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-13	30 ft southwest of previous sampling location 21-4008 (BH6e-7)	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-14	30 ft southeast of BH6e-13	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	
BH6e-15	30 ft southeast of BH6e-14 and 15 ft southwest of BH6e-12	2 to 3 7 to 8 12 to 13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	

Notes: Zero depth is the interface of fill and undisturbed tuff. X = This sample will be analyzed for these suites.

*Based on field screening results the most contaminated sample will also be analyzed for dioxins, furans, HE, and PCBs.

Table 4.2-2
Summary of Proposed Soil Sampling at AOC 21-028(c)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	HE/Dioxins/Furans/ PCB*
Former Satellite Storage Areas																	
BH28c-1	Immediately outside former door to Room 301	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-2	10 ft northeast of BH28C-1	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-3	10 ft southeast of BH28C-1	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-4	10 ft southwest of BH28C-1	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-5	10 ft northwest of BH28C-1	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-6	Approximate north end of former Room 362	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-7	Approximate south end of former Room 362	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-8	10 ft northeast of BH28c-6	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-9	10 ft northwest of BH28c-6	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	

Table 4.2-2 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Cyanide	Nitrates	Perchlorate	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	HE/Dioxins/Furans/ PCBs*
BH28c-10	10 ft southeast of BH28c-6	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-11	10 ft northwest of BH28c-7	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-12	10 ft southeast of BH28c-7	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-13	Immediately outside former door to Room 360	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-14	10 ft northwest of BH28c-13	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-15	Immediately outside former door to Room 3N	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-16	10 ft southwest of BH28c-15	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	
BH28c-17	10 ft northwest of BH28c-15	2 to 3 7 to 8	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	

Notes: Zero depth is the interface of fill and undisturbed tuff. X = This sample will be analyzed for these suites.

* Based on field screening results the most contaminated sample will also be analyzed for dioxins, furans, HE, and PCBs.

Table 4.3-1
Summary of Proposed Soil Sampling at TA-26 Site

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Perchlorate	High Explosives	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
1[a]	Floor drain, north end of the west branch pipe	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
2[a]	Floor drain, north end of the middle branch pipe	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
3[a]	Floor drain, north end of the east branch pipe	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
4[a]	Floor drain, midpoint of the middle branch pipe	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
5[a]	Floor drain, midpoint of the east branch pipe	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
6[a]	Floor drain, where the west branch and south branch intersect	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
7[a]	Floor drain, where the middle branch and south branch intersect	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
8[a]	Floor drain, where the east branch and south branch intersect	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
9[a]	At the inlet of the sump	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.3-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Perchlorate	High Explosives	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
10 [b]	At the sump bottom	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
11 [a]	At the outlet of the sump	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
12 [a]	At the south end of the pipe, south of the concrete barrier wall	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
13 [c]	5 ft west of location 12	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
14 [c]	5 ft east of location 13	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
15 [a]	Floor drain, north end of the drain line	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
16 [a]	Floor drain, approximately 15 ft south of location 15	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
17 [a]	At the south end of the drain line, south of the concrete barrier wall	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
18 [c]	5 ft west of location 17 or where accessible	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.3-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Perchlorate	High Explosives	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
19 [a]	At the inlet of the septic pipeline	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
20 [a]	At the inlet of the septic tank	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
21 [d]	At the tank bottom	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
22 [a]	At the outlet of the septic tank	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
23 [a]	At the south end of the pipe, south of the concrete barrier wall	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
24 [c]	5 ft east of location 23 or where accessible	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
25 [e]	On the north and west edge of the bench, immediately below the cliff	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
26 [e]	20 ft east of location 25, along the north edge of the bench	0.0 to 0.5 2.0 to 2.5 5 to 5.5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.3-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Perchlorate	High Explosives	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
27[e]	20 ft east of location 26, along the north edge of the bench	0.0 to 0.5 2.0 to 2.5 5 to 5.5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
28[e]	20 ft east of location 27, along the north edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
29[e]	20 ft east of location 28, along the north edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	 X X X
30[e]	In the middle area of the bench, approximately 20 ft south of location 25	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	 X X X
31[e]	20 ft east of location 30, in the middle area of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
32[e]	20 ft east of location 31, in the middle area of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
33[e]	20 ft east of location 32, in the middle area of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
34[e]	20 ft east of location 33, in the middle area of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Table 4.3-1 (continued)

Location Number	Location	Sample Depth (ft)	VOCs	SVOCs	TAL Metals	Perchlorate	High Explosives	Gamma Spectroscopy	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium	Moisture	pH	PCBs
35[e]	On the south edge of the bench, approximately 25 ft southwest of location 30	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
36[e]	20 ft east of location 35, on the south edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
37[e]	25 ft northeast of location 36, on the south edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
38[e]	20 ft east of location 37, on the south edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
39[e]	20 ft east of location 38, on the south edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X
40[e]	20 ft east of location 39, on the south edge of the bench	0.0 to 0.5 2.0 to 2.5 4.5 to 5	— X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

Note: X = This sample will be analyzed for these suites. — = This sample analysis will not be requested.

[a] Zero depth is beneath the bed of the excavated pipe.

[b] Zero depth is beneath the bed of the excavated sump.

[c] Zero depth is at the mesa top surface.

[d] Zero depth is beneath the bed of the excavated tank.

[e] Zero depth is the interface of fill and undisturbed tuff

Table 5.0-1
Summary of Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used for collection of shallow (i.e., approximately 0–12 inches) soil or sediment samples. The “spade-and-scoop” method involves digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab sample. The sample is typically placed in a clean stainless steel bowl for transfer into various sample containers.
Hand Auger Sampling	This method is typically used for sampling soil or sediment at depths of less than 10–15 ft, but may in some cases be used for collecting samples of weathered or non-welded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3-4 inch i.d.), creating a vertical hole which can be advanced to the desired sample depth. When the desired depth is reached, the auger is decontaminated before advancing the hole through the sample depth. The sample material is transferred from the auger bucket to a stainless-steel sampling bowl before filling the various required sample containers.
Split-Spoon Core-Barrel Sampling	In this method, a stainless steel core barrel (typically 4-inch i.d., 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock which can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split length-wise so that the two halves can be separated to expose the core sample. Once extracted, the section of core is typically screened for radioactivity and organic vapors, photographed, and described in a geologic log. A portion of the core may then be collected as a discrete sample from the desired depth.
Headspace Vapor Screening	Individual soil, rock, or sediment samples may be field-screened for volatile organic compounds by placing a portion of the sample in a plastic sample bag or in a glass container with a foil-sealed cover. The container is sealed and gently shaken, and allowed to equilibrate for 5 minutes. The sample is then screened by inserting a photoionization detector (PID) probe into the container and measuring and recording any detected vapors. PIDs must use lamps with voltage of 10.6 eV or higher.
Handling, Packaging, and Shipping of Samples	Field team members seal and label samples before packing, and ensure that the sample containers and the containers used for transport are free of external contamination. Field team members package all samples so as to minimize the possibility of breakage during transportation. After all environmental samples are collected, packaged, and preserved, a field team member transports them to either the Sample Management Office (SMO) or an SMO-approved radiation screening laboratory under chain-of-custody. The SMO arranges for shipping of samples to analytical laboratories. The field team member must inform the SMO and/or the radiation screening laboratory coordinator when levels of radioactivity are in the action-level or limited-quantity ranges.
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented on standard forms generated by the SMO. These include sample collection logs, chain-of-custody forms, and sample container labels. Collection logs are completed at the time of sample collection, and are signed by the sampler and a reviewer who verifies the logs for completeness and accuracy. Corresponding labels are initialed and applied to each sample container, and custody seals are placed around container lids or openings. Chain-of-custody forms are completed and assigned to verify that the samples are not left unattended. Site attributes (e.g., former and proposed soil sample locations, sediment sample locations) are located by using a global-positioning system (GPS). Horizontal locations will be measured to the nearest 0.5 ft. The survey results for this field event will be presented as part of the investigation report. Sample coordinates will be uploaded into the Environmental Restoration Database.

Table 5.0-1 (continued)

Method	Summary
Field Quality Control Samples	Field quality control samples are collected as directed in the Order on Consent as follows: Field Duplicate: At a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses. Equipment Rinsate Blank: At a frequency of 10%; collected by rinsing sampling equipment with deionized water, which is collected in a sample container and submitted for laboratory analyis. Trip Blanks: Required for all field events that include the collection of samples for volatile organic compound (VOC) analysis. Trip blanks containers 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 is the preferred method to minimize the generation of liquid waste. Dry decontamination may include 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 (non-acid, waxless cleaners) and paper wipes. Dry decontamination may be followed by wet decontamination if necessary. Wet decontamination may include washing with a non-phosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, steam cleaning may be used.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on EPA guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample are printed on the sample collection logs provided by the SMO (size and type of container, i.e. glass, amber glass, polyethylene, preservative, etc.). All samples are preserved by placing in insulated containers with ice to maintain a temperature of 4˚C. Other requirements such as nitric acid or other preservatives may apply to different media or analytical requests.
Management, characterization, and storage of investigation-derived waste (IDW)	IDW is is managed, characterized, and stored in accordance with an approved waste characterization strategy form (WCSF) that documents site history, field activities, and the characterization approach for each waste stream managed. Waste characterization shall be adequate to comply with onsite or off-site waste acceptance criteria. All stored IDW will be marked with appropriate signage and labels, as appropriate. Drummed IDW will be stored on pallets to prevent deterioration of containers. Generators are required to reduced in volume of waste generated by as much as is technically and economically feasible. Means to store, control, and transport each potential waste type and classification shall be determined prior to the start of field operations that generate waste. A waste storage area shall be established prior to generating waste. Waste storage areas located in controlled areas of the laboratory shall be controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container o f waste generated shall be individually labeled as to waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste shall be segregated by classification and compatibility to prevent cross-contamination. See appendix B for additional information.

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		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
[illegible]	20 ft south of BH4a-15	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
[illegible]	20 ft east of BH4a-18	0.0 to 0.5	—	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		9.5 to 10.0	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		soil/tuff interface	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—
		top 0.5-ft of saturated zone	+	+	X	X	X	X	X	X	X	X	X	X	X	X	—

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0.0 to 0.5
2.0 to 2.5
4.5 to 5.0
soil/tuff interface
top 0.5-ft of saturated zone

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12 ft west of previous sampling location 02-01162

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12 ft north of previous sampling location 02-01162

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12 ft east of previous sampling location 02-01162

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12 ft south of previous sampling location 02-01162

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0.0 to 0.5
7.5 to 8.0
soil/tuff interface
top 0.5-ft of saturated zone

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	25 ft east and 5 ft south of BH12-3	0.0 to 0.5	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		4.5 to 5.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		14.5 to 15.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		soil/tuff interface	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		top 0.5-ft of saturated zone	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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0.0 to 0.5
4.5 to 5.0
9.5 to 10.0
14.5 to 15.0
soil/tuff interface
top 0.5-ft of saturated zone

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+ = This sample may be collected based on field-screening results.

Appendix A

Acronyms and Abbreviations,
Glossary, and Metric Conversion Table

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
bgs	below ground surface
BMP	Best Management Practice
BV	background value
CEARP	Comprehensive Environmental Assessment and Response Program
CMP	corrugated metal pipe
CMR	Chemistry and Metallurgical Research
D&D	decontamination and decommissioning
DOE	Department of Energy (US)
DP	Delta Prime
EHCI	extra-heavy cast iron
EM	electromagnetic
ENV-ECR	Environmental Characterization and Remediation
ENV-ERS	Environmental Remediation and Surveillance
EPA	Environmental Protection Agency (US)
ER	Environmental Restoration (as in *former ER Project*)
ES&H	Environmental Safety and Health
FIDLER	field instrument for the detection of low-energy radiation
FV	fallout value
GPR	ground-penetrating radar
GPS	global-positioning system
HE	high-explosives
HIR	historical investigation report
HSWA	Hazardous and Solid Waste Amendments
IDW	Investigation-derived waste
LANL	Los Alamos National Laboratory
LASL	Los Alamos Scientific Laboratory
MDA	material disposal area
MW	megawatt
NMED	New Mexico Environment Department
NMHWA	New Mexico Hazardous Waste Act
NPDES	National Pollutant Discharge Elimination System
OU	Operable Unit
OWR	Omega West Reactor

PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
QA/QC	quality assurance/quality control
Qbt	Bandelier Tuff
Qct	Cerro Toledo interval
RFI	Resource Conservation and Recovery Act field investigation
RPF	Records Processing Facility
SOP	standard operating procedure
SVOC	semivolatile organic compound
SMO	sample management office
SWMU	solid waste management unit
TA	technical area
TSTA	Tritium Systems Test Assembly
UC	University of California
USFS	United States Forest Service
UST	underground storage tank
VCP	vitrified clay pipe
VOC	volatile organic compound
WBR	Water Boiler Reactor
XRF	X-ray fluorescence

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).

accelerated corrective action—A cleanup process used to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered to be the final remedy for the site, and where the fieldwork will be accomplished within 180 days of the start of field activities. Accelerated corrective actions may be implemented before the approval of the accelerated corrective action work plan by the New Mexico Environment Department.

accelerated corrective measure—A cleanup process meeting the same criteria as an accelerated corrective action, except that an accelerated corrective measure cannot be implemented before New Mexico Environment Department approval of the accelerated corrective measure work plan.

accuracy—A measure of the closeness of measurements to the true value of the parameter being measured.

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.

administrative order on consent—A legal agreement signed by the U.S. Environmental Protection Agency and an individual, business, or other entity through which a violator agrees to pay for the correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

administrative record—All documents that the administrative authority considered, or relied on, when selecting the response action at a site, culminating in the record of decision for remedial action or an action memorandum for removal actions.

adsorption—The surface retention of solid, liquid, or gas molecules, atoms, or ions by a solid.

adverse condition—An all-inclusive term used to reference failures, malfunctions, defective items, and nonconformances.

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.

aliquot—A measured portion of a sample taken for analysis.

alkalinity—In water analysis, the presence of carbonates, bicarbonates, and/or hydroxides, and occasionally borates, chlorates, silicates, or phosphates.

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

alluvial fan—A fan-shaped piedmont accumulation of alluvium.

alluvium—Soil deposited by a river or other 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.

andesite—Fine-grained intermediate volcanic rock, made up chiefly of plagioclase and pyroxene.

annular seal—The material (usually cement grout or bentonite) placed in the space between a borehole wall and a well casing for zone isolation. Annular seals are most often used to prevent surface contamination from entering a borehole.

annular space (annulus)—The space between a borehole wall and a well casing, or the space between a casing pipe and a liner pipe.

anthropogenic—Of, relating to, or resulting from, the influence of human beings.

Appendix F, performance measures—The measures that define Los Alamos National Laboratory's contractual requirements as established with the U.S. Department of Energy and the University of California (specifically in Section B, Performance Objectives, Criteria, and Measures for Operations and Administration, Parts II-1 and II-2).

applicable or relevant and appropriate requirements (ARARs)—(1) Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, state environmental, or facility siting laws that specifically address a hazardous substance, pollutant, contamination, remedial action, location, or other circumstance found at a site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable (see National Contingency Plan, section 300.5). (2) Requirements promulgated under federal or state law that specifically address the circumstances at a site. (3) Requirements and environmental laws that may be either "applicable" or "relevant and appropriate," but not both. The identification of ARARs must take place on a site-specific basis.

Approved Supplier List—A roster of suppliers who are approved and qualified to provide items or services to the Environmental Remediation and Surveillance Program.

aquifer—An underground geological formation (or group of formations) containing water that is the source of groundwater for wells and springs.

aquitard—Geological formation that may contain groundwater but is not capable of transmitting significant quantities of it under normal hydraulic gradients.

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 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.

area use factor—The ratio of an organism's home range, breeding range, or feeding/foraging range to the area of the site under investigation.

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).

audit (quality)—An independent, systematic examination to determine whether quality activities and related results comply with planned arrangements, whether these arrangements are implemented effectively, and whether they are suitable for achieving objectives.

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.

basalt—A fine-grained, dark volcanic rock composed chiefly of plagioclase, augite, olivine, and magnetite.

baseline contaminant level—Anthropogenic soil concentrations of a given chemical associated with Los Alamos National Laboratory and/or with commercial activities or processes that may not be related to source material(s) or release(s) from within a solid waste management unit or area of concern.

baseline data—Data that result from samples not directly associated with, or attributed to, a site. Baseline data must be identified during planning as originating from baseline samples. They are not equivalent to Los Alamos National Laboratory background data, usually are specific to an industrial area (such as a technical area), and are not applicable to another site without approval by the administrative authority.

baseline risk assessment—A site-specific analysis of the potential adverse effects of hazardous constituents that have been released from a site in the absence of any controls or mitigating actions. A baseline risk assessment consists of the following four steps: data collection and analysis, exposure assessment, toxicity assessment, and risk characterization.

bench-scale tests—Small-scale tests of materials, methods, chemical processes, or biological processes, such as on a laboratory work table.

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.

biomass—The dry weight of living matter (including stored food) that is present in a species population. Biomass is expressed in terms of a habitat's given area or volume.

bioremediation—(1) The use of living organisms to clean up oil spills or to remove other pollutants from soil, water, or wastewater. (2) The use of organisms, such as harmless insects, to remove agricultural pests or to counteract diseases of trees, plants, and garden soil.

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.

blind sample—See single blind sample and double blind sample.

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.

breccia—A coarse-grained rock that consists of angular fragments cemented together or embedded in a fine-grained matrix.

brownfields—Abandoned, idle, or underused industrial and commercial facilities or sites where expansion or redevelopment is complicated by real or perceived environmental contamination. Brownfields can be in urban, suburban, or rural areas. The U.S. Environmental Protection Agency brownfields initiative helps communities mitigate potential health risks and restore the economic viability of such areas or properties.

calcrete—See pedogenic calcite or caliche.

caldera—A large crater formed by a volcanic explosion or by the collapse of a volcanic cone.

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.

canopy—The cover formed by the leafy upper branches of surrounding trees and shrubs.

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.

casing—A solid piece of pipe, typically steel, stainless steel, or polyvinyl chloride plastic, used to keep a well open in either unconsolidated material or unstable rock and as a means to contain zone-isolation materials, such as cement grout.

catchment—(1) A structure, such as a basin or reservoir, used for collecting or draining water. (2) The amount of water collected in such a structure. (3) A catching or collecting of water, especially rainwater.

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.

certification—A signed statement required by permits, or certain enforcement documents (e.g., a compliance order), that is submitted with reports and other information requested by the administrative authority. Certification ensures that a document and all of its attachments were prepared under the direction or supervision of an authorized person in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Known violations of certification carry significant penalties.

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 interference—A chemical or physical entity whose influence results in a decrease or increase in the response of an analytical method or other measurement system relative to the response obtained in the absence of the entity.

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.

cold vapor atomic absorption—An analytical technique used for measuring mercury that is described in U.S. Environmental Protection Agency Methods 7470A (“Mercury in Liquid Waste”) and 7471A (“Mercury in Solid or Semisolid Waste”). The technique is based on the absorption of nonionizing radiation at 253.7 nanometers (nm) by mercury vapor. The mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer. Absorbance (peak height) is measured as a function of mercury concentration.

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

colluvium—A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

combined percent breakdown (% breakdown)—The sum of the breakdown percentage of 4,4'-DDT (dichlorodiphenyltrichloroethane) and Endrin. The breakdown of 4,4'-DDT is calculated through the amount of DDD (2,2-bis[para-chlorophenyl]-1,1-dichloroethane) and DDE (dichlorodiphenylethylene) detected in a performance evaluation mixture (PEM). The breakdown of Endrin is calculated through the amount of Endrin aldehyde and Endrin ketone in the PEM. The sum of these percentage breakdown values is the combined percent breakdown.

comment period—The time provided for the public to review and comment on a regulation action or rule-making after it has been published.

communication tracker (CT) number—A unique number assigned by the Environmental Remediation and Surveillance Program office to all incoming correspondence that needs a response (e.g., a notice of disapproval or request for supplemental information).

community—In ecology, an assemblage of populations of different species within a specified location in space and time. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

comparability—A qualitative measure of the degree to which one item or data set can be compared with another.

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.

composite sample—A sample collected over a temporal or spatial range that typically consists of a series of discrete equal samples that have been combined.

conceptual hydrogeologic model—An approximation of the occurrence, movement, and quality of groundwater in a given area and the relationship of that groundwater to the surface water, soil water, and geologic framework in that area.

conceptual model—See site conceptual model. **confined**—Pertaining to groundwater in an artesian aquifer.

confluence—A place where two or more streams or canyons meet; the point where a tributary meets the main stream.

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.

construction worker scenario—A land-use condition that evaluates exposures to a human receptor throughout a construction project. The activities typically involve substantial short-term on-site exposures.

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.)

continuing calibration—A combination of calibration blank and check standards used to determine if an instrument's response to an analyte concentration is within acceptable bounds relative to its initial calibration. A continuing calibration is performed every 12 h of operation or every 10 injections, depending on the analytical test method, thus verifying the satisfactory performance of an instrument on a day-to-day basis. The continuing-calibration 12-h period assumes that the instrument has not been shut down since the initial calibration.

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

contractor-specific logging procedures (CSLPs)—The documents supplied by a logging contractor and approved by a project leader for borehole geophysics before a contract is awarded. CSLPs define the detailed procedures by which a given logging system will be calibrated and operated to achieve the objectives for the data type and quality given in the borehole logging technical specifications.

contract-required detection limit (CRDL)—The minimum reporting limits required under a contract between Los Alamos National Laboratory and a contract laboratory. The CRDLs are not necessarily intrinsically tied to instrument sensitivity; rather they are reporting limits.

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.

corrective measures implementation plan—A detailed plan and specifications to implement an approved remedy at a facility. The corrective measures implementation plan is the third step in the corrective action process and includes the design, construction, maintenance, and monitoring of the chosen remedy.

corrective measures study—A formal process for identifying and evaluating alternative remedies for releases at a facility.

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).

cutter head—An auger bit that is attached to the leading auger flight section and cuts a hole for the auger to follow. The bit may be either a coring head or a full-face bit.

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.

decision-level concentration—The concentration at which a 5% probability exists of reporting a false positive for a sample that contains no analytes.

decision peer review—A technical (subject-matter-expert) review that occurs before document writing has begun. The focus of the decision peer review is on the appropriateness of the stated objectives for the identified problem, on the adequacy of the proposed approach to address the objectives, and on the identification of concerns and necessary contingencies. Any decision that is expected to lead to the writing of a peer-reviewed document is subject to a decision peer review and falls under Quality Procedure 3.5, Peer Review Process.

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.

deferred action—The postponement of the selection and implementation of a corrective measure.

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.

detector background—The ambient signal response recorded by radioactivity-measuring instruments that is independent of radioactivity contributed by the radionuclides being measured in the sample.

dilution attenuation factor—The ratio of contaminant concentration in soil leachate to the concentration in groundwater at a receptor point. The factor is used to account for the dilution of soil leachate in an aquifer.

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.

dissolved oxygen—The amount of oxygen dissolved in water, in parts per million (ppm) by weight or in milligrams per liter (mg/L) by volume.

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.

document peer review—A technical, regulatory, and legal review of a final, professionally edited document. Before the peer review, the document should receive a Level 3 (full) edit as defined by Los Alamos National Laboratory's Communication Arts and Services (IM-1) Group. Because this review follows the decision peer review, the approach should already have been agreed upon. Thus, the primary focus of a document peer review is on content (and to a lesser extent on approach; the clarity of presentation; and a consistent, appropriate format). The document peer review may be either a panel review or a read review. Quality Procedure 4.9 (Document Development and Approval Process) lists the types of Environmental Remediation and Surveillance Program documents that require a formal peer review.

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.

double-blind sample—A performance-evaluation sample whose analyte concentrations and sample identity are unknown to the analyst (i.e., the analyst is not informed that the sample is a performance-evaluation sample).

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

drilling fluid—The fluid used to lubricate a bit and to convey drill cuttings to the surface with rotary drilling equipment. Usually composed of bentonite slurry or muddy water. The fluid can become contaminated, lead to cross-contamination, and may require special disposal.

drilling package—A document package that includes a detailed drilling plan, curation plan, sampling and analysis plan (SAP), and geophysical logging plan, as necessary, to meet the sampling requirements defined in the site-specific SAP for a given operable unit.

drilling string—The string of pipe (extending from the bit to the driving mechanism) that serves to carry mud down a borehole and to rotate a bit.

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.

duplicate measurement—An additional measurement performed on a prepared sample under identical conditions to evaluate any variance in measurement.

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.

effluent—Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

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 impact statement (EIS)—A document required of federal agencies by the National Environmental Policy Act when those agencies are considering major projects or legislative proposals that could significantly affect the environment. Designed as a decision-making tool, an EIS describes the positive and negative effects of an undertaking and cites alternative actions.

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.

eolian—Pertaining to the geological products of wind action and especially said of sediment deposition by the wind (e.g., eolian sand and eolian dunes).

ephemeral—Pertaining to a stream or spring that flows only during, and immediately after, periods of rainfall or snowmelt.

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.

estimated detection limit—A reporting limit required by a Los Alamos National Laboratory statement of work for analytical services.

estimated quantitation limit (EQL)—The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine analytical-laboratory operating conditions. The low point on a calibration curve should reflect this quantitation limit. The EQL is not used to establish detection status. Sample EQLs are highly matrix dependent, and the specified EQLs might not always be achievable.

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.

external standard calibration—A comparison of instrument responses from a sample to the responses from target compounds in the calibration standards. The sample’s peak areas (or peak heights) are compared to the standards’ peak areas (or peak heights).

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.

fallout radionuclides—Radionuclides that are present at globally elevated levels in the environment as a result of fallout from world-wide atomic weapons tests. The Los Alamos National Laboratory (the Laboratory) background data sets consist of environmental surveillance samples taken from marginal and regional locations for the following radionuclides associated with fallout: tritium, cesium-137, americium241, plutonium-238, plutonium-239/240, and strontium-90. Samples were collected from regional and marginal locations in the Laboratory’s vicinity that were (1) representative of geological media found within Laboratory boundaries, and (2) were not impacted by Laboratory operations.

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.

filter pack—Sand, gravel, or glass beads that are uniform, clean, and well rounded and are placed in the annulus of a well, between the borehole wall and the well intake, to stabilize the formation and to prevent foreign material from entering through the well intake.

flood plain—The flat, or nearly flat, land along a river or stream, or in a tidal area, that is covered by water during a flood.

fluid invasion—The migration of a drilling fluid, or one or more components of a drilling fluid, into the pores, fractures, or other openings in a formation near a borehole.

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.

geohydrology—The science that applies hydrologic methods to the understanding of geologic phenomena.

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.

gully erosion—The erosion process whereby water accumulates in narrow channels and, over short periods, removes soil from these narrow areas to considerable depths (1 ft to 50 ft).

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 samples—Samples of on-site air particulates, soil, or water and materials collected at waste sites that are known, or thought, to meet the definition of a hazard class per 49 Code of Federal Regulations 171.8. The term "hazardous samples" does not refer to Resource Conservation and Recovery Act hazardous wastes unless so stated.

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—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.

high-explosive wastes—Any waste-containing material having an amount of stored chemical energy that could start a violent reaction when initiated by impact, spark, or heat. This violent reaction would be accompanied by a strong shock wave and the potential for high-velocity particles to be propelled.

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.

"Hydrogeologic Workplan"—The document that describes the activities planned by Los Alamos National Laboratory (the Laboratory) to characterize the hydrologic setting beneath the Laboratory and to enhance the Laboratory's groundwater monitoring program.

hydrogeology—The science dealing with the occurrence of surface water and groundwater, their uses, and their functions in modifying the earth, primarily by erosion and deposition.

hypothesis—A tentative explanation that accounts for a set of data and that can be tested by further investigation.

imminent danger—Conditions or practices in the workplace that could reasonably be expected to cause immediate death or serious physical harm if they are not eliminated.

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.

inductively coupled plasma emission spectroscopy—A method that detects trace elements (including metals) in solutions by measuring characteristic emission spectra through optical spectrometry. Samples are nebulized, and the resulting aerosol is transported to a plasma torch. Element-specific emission spectra are produced by a radio-frequency, inductively coupled plasma. The spectra are dispersed by a grating spectrometer, and photosensitive devices are used to monitor the emission lines' intensities.

inductively coupled plasma mass spectrometry—A method that detects sub-microgram/liter concentrations of a large number of elements in water samples and in waste extracts or digests. When dissolved constituents are required, samples must be filtered and acid-preserved before analysis. No digestion is required before analysis for dissolved elements in water samples. The method measures ions produced by a radio-frequency, inductively coupled plasma. Analyte species originating in a liquid are nebulized, and the resulting aerosol is transported by argon gas into a plasma torch. The ions produced in the plasma gas are introduced into a mass spectrometer by means of an interface. The ions produced in the plasma are sorted according to their mass-to-change ratios and quantified with a channel electron multiplier or Faraday cup.

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.

infiltration—(1) The penetration of water through the ground surface into subsurface soil. (2) The technique of applying large volumes of wastewater to land to penetrate the surface and percolate through the underlying soil.

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.

injection well—A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

innovative technologies—New or inventive methods for effectively treating hazardous waste and reducing risk to human health and the environment.

inspection—The critical examination or measurement of an item or activity to determine its conformance to applicable quality standards or specifications.

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 drift—A systematic change in a given logging system’s output as a result of causes inherent in the logging system, such as changing tool temperature or the deterioration of an electronic component.

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.

interflow—A runoff process that involves lateral subsurface flow within the soil zone.

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.

intermittent stream—A stream that flows only in certain reaches as a result of the channel bed’s losing and gaining characteristics.

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.

interrupted stream—A stream whose flow is discontinuous as a result of human-made structures.

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.

leachate—Water that collects contaminants as it trickles through wastes, pesticides, or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, groundwater, or soil.

leaching—The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid.

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.

logging tool stack—Two or more logging tools attached together and run as a single unit to save time and to improve the depth correlation between logs.

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):

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

where BKG = the total background counts, EFF = the fraction detector efficiency,
V = the volume or unit weight,
Ts = 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.

model—A schematic description of a physical, biological, or social system, theory, or phenomenon that accounts for its known or inferred properties and may be used for the further study of its characteristics.

Module VIII—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. From 1990 to 2005, Module VIII included requirements from the Hazardous and Solid Waste Amendments. These requirements have been superceded by the March 1, 2005, Compliance Order on Consent (Consent Order).

monitoring well—(1) A well used to obtain water-quality samples or to measure groundwater levels, (2) A well drilled at a hazardous waste management facility or Superfund site to collect groundwater samples for the purpose of physical, chemical, or biological analysis and to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site.

mudcake—A layer of mud that may be deposited on a borehole wall when a drilling fluid contains mud. When the liquid component of the mud invades a formation, the solid component may be left on the borehole wall.

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.

neutralize—To render a toxic chemical agent harmless by chemical action.

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.

nonconsumable calibration standards—Standards that are not used up over a period of time and may require calibration (e.g., weight sets, thermocouples, and thermometers).

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

non-ER data—Data derived from samples collected by, and paid for by, sources other than the Environmental Remediation and Surveillance Program.

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.

out of control—A condition in which a measured quality control parameter does not meet specified control or acceptance criteria.

overpumping—Pumping a well down as low as possible and then allowing it to refill.

panel review—A type of decision peer review or document peer review that includes a face-to-face meeting between authors and reviewers for a discussion of issues.

pedogenic calcite (calcrete)—An accumulation of calcium carbonate formed by the soil-forming process; typically found in the near surface.

peer review—See decision peer review and document peer review.

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.

percolation—Gravity flow of soil water through the pore spaces in soil or rock below the ground surface.

percussion gun—A device run on a wireline to obtain samples from a borehole wall. On a single run, multiple sample tubes or hollow shells are driven into the borehole wall at various depths by explosives and are retrieved along with the samples.

perennial stream—Water in a channel or bed that flows continuously throughout the year.

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

performance evaluation—A type of audit in which quantitative data generated by a measurement system are obtained independently and then compared with routinely obtained data to evaluate the proficiency of an analyst or laboratory.

performance-evaluation sample—A sample of known composition with respect to selected analytes, which, upon analysis, is expected to yield results that fall within a prescribed range. Performance-evaluation samples are selected to mimic, as closely as possible, matrices that are representative of environmental samples from a particular location.

permit—An authorization, license, or equivalent control document issued by the U.S. Environmental Protection Agency or an approved state agency to implement the requirements of an environmental regulation.

permit modification—A change to a condition in a facility’s permit, initiated by either a request from the permittee or by the administrative authority’s action.

piedmont—An area of land formed or lying at the foot of a mountain or mountain range.

piezometer—A nonpumping well (generally of small diameter) for measuring the elevation of a water table.

piezometric surface (potentiometric surface)—The surface that represents the static head in an aquifer; applies to both confined and unconfined aquifers.

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.

population—(1) A group of interbreeding organisms occupying a particular space. (2) The number of humans or other living creatures in a designated area.

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

porphyritic—Pertaining to the texture of an igneous rock in which larger crystals (phenocrysts) are set in a finer ground mass or matrix.

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.

potentiometer—An instrument that measures an unknown potential difference by comparison to a standard potential difference.

potentiometric surface—See piezometric surface.

Precambrian—All geologic time before the beginning of the Cambrian period's Paleozoic Era which began about 600 million years ago.

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

preliminary remediation goals—Acceptable exposure levels (protective of human health and the environment) that are used as a risk-based tool for evaluating remedial alternatives.

preliminary risk assessment—A risk assessment that is conducted using conservative assumptions and scenarios and that assumes no mitigating or corrective measures beyond those already in place.

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.

privileged record—A record to which access is controlled as a result of statutory, legal, or security requirements.

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-assessment sample—A sample submitted for analysis, the data from which are used to assess the performance quality of a sampling or analysis process. May include performance-evaluation samples, field duplicates, or field blanks.

quality-assurance project plan—A formal document that describes, in comprehensive detail, the necessary quality assurance, quality control, and other technical activities that must be implemented to ensure that results of work performed will satisfy stated performance criteria.

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 indicators—Quantitative statistics and qualitative descriptors for interpreting the degree of acceptability or utility of data to the user. Indicators of quality include precision, bias, representativeness, reproducibility, comparability, and statistical confidence.

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.

quality procedure—A document that describes the process, method, and responsibilities for performing, controlling, and documenting any quality-affecting activity governed by a quality management plan.

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 tracer—A radionuclide added to, or induced in, a sample for the purpose of monitoring chemical or physical losses of target analytes. The tracer is assumed to behave in the same manner as the target analytes.

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 assessment (RFA)—Usually the first step in the Resource Conservation and Recovery Act (RCRA) corrective action process. The RFA includes the identification of potential and actual releases from solid waste management units and preliminary determinations about releases and the need for corrective action and stabilization measures.

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.

reach—A specific length of a canyon that is treated as a single unit for sampling and analysis. Reaches tend to be internally uniform with respect to geomorphic setting and land use.

read review—A review of a written document performed by a reviewer individually (without meeting as a group).

readiness planning—The process of identifying, sequencing, and scheduling the preparatory activities for fieldwork to ensure compliance with the applicable Los Alamos National Laboratory, local, state, and federal procedural requirements, standards, and regulations, including those regarding human health and safety and the environment.

readiness review—A process to ensure compliance to identified requirements, to document consensus that fieldwork may proceed, and to ensure that the associated activities are closed or scheduled appropriately.

readiness review checklist—An itemized guide for readiness planning and readiness review (Quality Procedure 5.3); this checklist is not designed to be comprehensive for all fieldwork.

reamer—A type of drill bit that is used specifically for enlarging a borehole.

receptor—A person, other animal, plant, or geographical location that is exposed to a chemical or physical agent released to the environment by human activities.

recharge—The process by which water is added to a zone of saturation, usually by percolation from the soil surface (e.g., the recharge of an aquifer).

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

recreational scenario—A land-use condition under which individuals may be exposed to contaminants for a limited amount of time as a result of outdoor activities such as hiking, camping, hunting, or fishing.

redox potential (Eh)—Chemical reactions whereby a participating element changes its valence state by losing or gaining orbital electrons. This may also be referred to as oxidation-reduction potential.

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.

regulatory standard—Media-specific contaminant concentration levels of potential concern that are mandated by federal or state legislation or regulation (e.g., the Safe Drinking Water Act, New Mexico Water Quality Control Commission regulations).

relative percent difference (RPD)—The measure used to assess the precision between parent results and their associated duplicate results. The RPD is calculated as follows:

$$|RPD| = \frac{S - R}{\left(\frac{S + R}{2}\right)100} \quad ,$$

where RPD = relative percent difference,
S = parent sample result, and
R = duplicate sample result.

The Environmental Remediation and Surveillance Program criteria for the RPD are less than 20% for aqueous samples and less than 35% for soil samples when the sample concentrations are greater than, or equal to, five times the method detection limit (MDL). For samples with concentrations less than five times the MDL, but greater than the MDL, the control is +/-MDL. No precision criterion applies to samples with concentrations less than the MDL.

release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment.

remediation—(1) The process of reducing the concentration of a contaminant (or contaminants) in air, water, or soil media to a level that poses an acceptable risk to human health and the environment. (2) The act of restoring a contaminated area to a usable condition based on specified standards.

remediation waste—All solid wastes and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris, that are managed for implementing cleanup.

repeat run—A logging run that may cover only a portion of the depth range of the main logging run and is used to help judge data repeatability, to check on instrument drift, and to detect other data quality problems. The repeat run may be performed before or after the main run.

replicate measurement—A reanalysis (remeasurement) of a prepared sample.

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.

residential scenario—The land use condition under which individuals may be exposed to contaminants as a result of living on or near contaminated sites.

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.

retardation—An act or process that reduces the rate of movement of a chemical substance in water relative to the average velocity of the water. The movement of chemical substances in water can be retarded by adsorption and precipitation reactions, and by diffusion into pore water in a given sedimentary or rock matrix.

retention time window criteria—The x-axis on a chromatogram represents retention time. A retention time window is a specified time range on this axis. If a target analyte is detected within its retention time window, it is considered detected. The retention time window criteria are the exact time windows on the chromatogram defining a given target analyte and are method-specific.

rill erosion—An erosion process in which numerous small channels several inches deep are formed by concentrated runoff that flows during and immediately after rain storms or snowmelt.

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.

risk-based end state—The post-remediation vision for the planned future land use of a specific U.S. Department of Energy property.

risk characterization—The last phase in the risk assessment process which estimates the potential for adverse health or ecological effects to occur as a result of exposure to a stressor, and which evaluates the uncertainty involved.

risk management—The process of evaluating and selecting alternative regulatory and nonregulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

root cause—The most basic causal factor(s) that, if corrected or removed, would prevent a situation’s recurrence.

root-cause analysis—A structured process for identifying the most basic causal factor(s) of a situation.

routine analysis—The analysis categories of inorganic compounds, organic compounds, metals, radiochemistry, and high explosives, as defined in a contract laboratory’s statement of work.

routine data—Data generated using analytical methods that are identified as routine methods in the current Environmental Remediation and Surveillance Program statement of work for analytical services.

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.

sediment—(1) A mass of fragmented inorganic solid that comes from the weathering of rock and is carried or dropped by air, water, gravity, or ice. (2) A mass that is accumulated by any other natural agent and that forms in layers on the earth's surface (e.g., sand, gravel, silt, mud, fill, or loess). (3) A solid material that is not in solution and is either distributed through the liquid or has settled out of the liquid.

self-study training—Training that is done on an individual basis, such as reading for comprehension, listening to an audiotape, or viewing a videotape.

sensitivity—An indication of the lowest analyte concentration that can be measured with a specified degree of confidence.

serial dilution sample—A requirement of the U.S. Environmental Protection Agency (EPA) Method 6010B (Inductively Coupled Plasma-Atomic Emission Spectroscopy). Serial dilutions are made by performing a series of dilutions on an aliquot taken from a stock solution for a target analyte. The first dilution of the original stock solution serves as the stock solution for the second dilution, and the second dilution serves as the stock solution for the third dilution, and so on. To meet the requirement of EPA Method 6010B, one serial dilution analysis must be performed for each matrix in every sample batch, with a minimum of 1 serial dilution sample per 20 samples.

Shelby tube sampler—A thin-wall tube sampler that is latched onto a lead auger while hollow-stem augering or pushed/driven ahead of the auger.

significant condition—A condition that, if uncorrected, could have a serious effect on quality, project personnel, or public safety, or which could have a major impact on project costs or schedules.

simple random sample—A sampling design in which every possible sample (sample unit) has an equal probability of being selected.

single blind sample—A performance-evaluation sample submitted for analysis whose sample identity is known to the analyst, but whose composition is known to the submitter and not to the analyst.

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 conceptual model—A qualitative or quantitative description of sources of contamination, environmental transport pathways for contamination, and receptors that may be impacted by contamination and whose relationships describe qualitatively or quantitatively the release of contamination from the sources, the movement of contamination along the pathways to the exposure points, and the uptake of contaminants by the receptors.

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).

slope—A ratio of units of elevation change to units of horizontal change, usually expressed in degrees.

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 gas—Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

soil hygrometer—An instrument that measures soil moisture.

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.

soil water—Water in the unsaturated zone, regardless of whether it occurs in soil or rock.

solid waste—Any garbage, refuse, or sludge from a waste treatment plant, water-supply treatment plant, or air-pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. Solid waste does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges that are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

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.

specific (electrical) conductance—A measure of the ease with which a conduction current flows through a substance under the influence of an applied electric field. Specific conductance is dependant upon the presence of ions (total and relative concentrations, valence, and mobility) and temperature. It is the reciprocal of resistivity and is measured in either siemens (S) or micro-ohms per centimeter (~ohm/cm) at 25°C.

specific yield—The ratio of the volume of water that a given mass of saturated rock or soil will yield by gravity to the volume of the mass expressed as a percentage (dimensionless).

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.

spring—Groundwater seeping out of the earth where the water table intersects the ground surface.

stakeholder—Any organization, governmental entity, or individual that has a stake in, or may be impacted by, a given approach to environmental regulation, pollution prevention, or energy conservation.

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

stop work—A moment in a project's lifespan when all activities that relate to specific functions are discontinued until an unacceptable condition is resolved.

storage coefficient—The volume of water an aquifer releases from, or takes into, storage per unit surface area of the aquifer per unit change in head (dimensionless).

stratification—The process of separating into layers.

stratified sample—A sample that includes one or more specimens from each of several subpopulations within a target population. (Note: If the specimens are selected from within each subpopulation using a simple random sample, the sample is called a stratified random sample.)

stratigraphy—The study of the formation, composition, and sequence of sediments, whether consolidated or not.

subsample—See aliquot.

Superfund—Another term for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The two terms are used interchangeably.

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.

surging—A well development technique wherein a surge block is alternately lifted and dropped within a borehole, above or adjacent to the screen, to create a strong inward and outward movement of water through the well intake.

surrogate (surrogate compound)—An organic compound used in the analyses of organic target analytes that is similar in composition and behavior to the target analytes but is not normally found in field samples. Surrogates are added to every blank and spike sample to evaluate the efficiency with which analytes are being recovered during extraction and analysis.

tag—A warning device approved by the Environmental Remediation and Surveillance Program that states

DANGER – UNSAFE – DO NOT USE

and has a means of attachment. The tag is employed to prohibit the use of equipment or materials.

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.

tentatively identified compound (TIC)—A chemical compound detected in a sample that is not a target analyte, internal standard, or surrogate. Up to 30 chromatographic peaks may be subject to mass spectral matching for identification as TICs.

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

total propagated uncertainty (TPU)—The range of concentrations (expressed as ± the measured concentration) that includes the theoretical or true concentration of an analyte with a specific degree of confidence. Radiochemical results are required to be accompanied by sample-specific uncertainty bounds that reflect the 67% confidence level (1-sigma TPU). The TPU includes not only the measurement or counting error but the technique-specific error term that includes uncertainty values for each contributing measurement process and a sample-specific contribution reflecting the specific chemical recoveries or detectors used. All radiochemical result uncertainties incorporate terms for technique-related and sample-specific measurement errors.

toxic pollutant—A water contaminant or combination of water contaminants in concentration(s) that, upon exposure, ingestion, or assimilation, either directly from the environment or indirectly by ingestion through food chains, will unreasonably threaten to injure the health of humans, or the health of other animals or plants that are commonly hatched, bred, cultivated, or protected for use by humans for food or economic benefit.

tracer—A substance, usually a radioactive isotope, that is added to, or induced in, a sample for the purpose of monitoring chemical or physical losses of the target analytes. The tracer is assumed to behave in the same manner as the target analytes.

transmission loss—The reduction in surface water flow by seepage into a channel bed.

transmissivity—The ability of an aquifer to transmit water.

transport (transportation)—(1) The movement of a hazardous waste by air, rail, highway, or water. (2) The movement of a contaminant from a source through a medium to a receptor.

treatment—Any method, technique, or process, including elementary neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, recover energy or material resources from the waste, or to render such waste nonhazardous or less hazardous; safer to transport, store, or dispose of; or amenable for recovery or storage; or reduced in volume.

treatment, storage, and disposal facility—An interim-status or permitted facility in which hazardous waste is treated, stored, or disposed.

tremie pipe—A small-diameter pipe used to carry sand pack, bentonite, or grouting materials to a borehole's bottom. Materials are pumped under pressure or poured to the hole bottom through the pipe. The pipe is retracted as the annular space is filled.

trend analysis—An analytical or graphical representation used to identify the changes in a variable as it is measured over a period of time.

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.

turbidity (nephelometric)—A measure of the intensity of light scattered by sample particulates relative to a standard reference suspension. The range of water turbidity is measured between 0 and 40 nephelometric turbidity units (NTU).

unconfined aquifer—An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

underflow—Groundwater flow beneath the bed of a nonflowing stream. Such water is often perched in the channel alluvium atop the bedrock surface.

underground storage tank—A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

unique identifier—A word or code that aids in the ability to trace the history, application, or location of an activity, item, datum, or sample using recorded documentation. For Environmental Remediation and Surveillance Program records, a unique identifier is an alphanumeric identifier assigned to a primary record.

unrestricted area—Any area, whose access is not controlled by a licensee for purposes of protecting individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

unsaturated hydraulic conductivity—A coefficient that describes the rate at which a fluid can potentially move through a permeable, unsaturated medium.

unsaturated zone—The area above the water table where soil pores are not fully saturated, although some water may be present.

upper acceptance limit (UAL)—The highest limit that is acceptable, based on the quality control (QC) criteria for a specific QC sample for a specific method. Any results greater than the UAL are qualified.

upper confidence limit—The statistic that represents the upper bound of the arithmetic mean (usually 95%) of the measured data and that is used in a risk assessment as the reasonable maximum exposure point concentration.

upper tolerance limit—A statistical measure of the upper end of a distribution. The 95th percentile upper tolerance limit, which is the 95% upper percentile of the 95th percentile of the data distribution, is the background value used to represent the background data distribution for an inorganic chemical or naturally occurring radionuclide.

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.

verification—A test or tests, generally performed before and after logging in lieu of a calibration, to ascertain whether the logging system is operating properly. Verification differs from calibration in that it does not provide updated system-calibration values.

water balance—The relationship between water input (precipitation) and water output (runoff, evapotranspiration, and recharge) in a hydrological system.

water content—The amount of water in an unsaturated medium, expressed as the ratio of the weight of water in a sample to the weight of the oven-dried sample (often expressed as a percentage).

watercourse—Any river, creek, arroyo, canyon, draw, wash, or other channel that has definite banks and beds and provides visual evidence of the occasional flow of water.

watershed—A region or basin drained by, or contributing waters to, a river, stream, lake, or other body of water and separated from adjacent drainage areas by a divide, such as a mesa, ridge, or other geologic feature.

water table—The top of the regional saturated zone; the piezometric surface associated with an unconfined aquifer.

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

well casing—A solid piece of pipe, typically steel or polyvinyl chloride (PVC) plastic, used to keep a well open in either unconsolidated materials or unstable rock and as a means to contain zone-isolation materials such as cement grout or bentonite.

well screen—A perforated wire-wrapped casing that allows fluids, but not solid material, to enter a well.

wireline—A logging cable used to support a logging tool and carry electrical power and signals between the tool and surface instruments.

work-performance assessment—An evaluation that determines if Environmental Remediation and Surveillance Program work is being performed in accordance with quality program requirements and identifies areas for improving the quality of work processes.

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)

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Appendix B

Management Plan for Investigation-Derived Waste

B-1.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

This appendix describes how investigation-derived waste (IDW) generated during the investigation of the Middle Los Alamos Canyon Aggregate Area sites will be managed. IDW is solid waste generated as a result of field-investigation activities and may include, but is not limited to, drill cuttings, purge water, contaminated personal protective equipment (PPE), sampling supplies and plastic, fluids from the decontamination of PPE and sampling equipment, and all other wastes potentially contacting contaminants.

IDW generated during the investigations at these sites will be managed in a way that is protective of human health and the environment, compliant with applicable regulatory requirements, and consistent with the waste-minimization goals of Los Alamos National Laboratory.

Applicable Laboratory standard operating procedures (SOPs) incorporate the requirements of all applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department regulations, U.S. Department of Energy Orders, and Laboratory Implementation Requirements. SOPs applicable to the characterization and management of IDW are as follows:

- ENV-ECR SOP-01.06, Management of Environmental Restoration Project Waste
- ENV-ECR SOP-01.10, Waste Characterization

These SOPs are available at the following: http://erproject.lanl.gov/documents/procedures.html.

Waste minimization is accomplished by implementing the requirements of the 2004 “Pollution Prevention Roadmap” (LANL 2004, 88465). The Roadmap is updated annually as a requirement of Module VIII of the Laboratory’s Hazardous Waste Facility Permit (EPA 1990, 01585; EPA 1994, 44146).

A Waste Characterization Strategy Form (WCSF) will be prepared and approved by Laboratory Environmental Stewardship-Environmental Characterization and Remediation (ENV-ECR) personnel per requirements of ENV-ECR SOP-01.10 prior to the start of field investigation activities. The WCSF will provide detailed information on IDW characterization, management, containerization, and potential volume generation. IDW characterization will be achieved through existing data and/or documentation and through direct sampling of the IDW or of the media being investigated (i.e., surface soil, subsurface soil, sediment, etc.). If waste characterization sampling is necessary, it will be described in the WCSF.

The selection of waste containers will be based on the appropriate U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately following containerization, each waste container will be individually labeled with a unique identification number and with information regarding waste classification, item(s), radioactivity (if applicable), and date generated. If wastes are pending analytical results to make a final characterization determination, the containers will be labeled as such until analytical results are available. The wastes will be contained in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements will be detailed in the WCSF and approved before the waste is generated.

Transportation and disposal requirements will be detailed in the WCSF and approved prior to the generation of waste. See Table B-1 for a summary of how wastes will be managed.

The anticipated waste streams that will be generated and managed during work plan implementation at the Middle Los Alamos Canyon Aggregate Area investigation sites include the following:

Drill cuttings: The drill cuttings waste stream will consist of cuttings from all boreholes drilled during field activities. Drill cuttings will be collected and containerized at the point of generation (i.e., at the drill rig). The drill cutting waste stream will be characterized with analytical results from core samples augmented by direct sampling of the containerized waste. The maximum detected concentrations of radionuclides will be compared with background/fallout values. If maximum concentrations exceed background/fallout values, the waste cuttings will be designated as low-level radioactive waste (LLW). Total concentrations of toxicity characteristic leaching procedure (TCLP) constituents will be compared with 20 times the TCLP regulatory level. If total concentrations are less than 20 times the TCLP regulatory level, the waste cuttings will be designated nonhazardous by characteristic. If total concentrations exceed 20 times the TCLP regulatory level, the waste cuttings will be sampled and analyzed using the TCLP to determine if it is hazardous by characteristic. If potential EPA-listed hazardous waste constituents are detected, the Laboratory will conduct a review of historical records and data to determine whether the source of each constituent was a listed hazardous waste at its point of generation. If the source is determined to be a listed hazardous waste, the cuttings will be managed as hazardous or mixed waste (depending on the levels of radioactivity). Otherwise, the cuttings will be managed as nonhazardous solid waste or LLW (depending on the levels of radioactivity). Based on the results of previous investigations, the Laboratory expects these wastes to be designated as LLW that will be disposed of at Technical Area (TA) 54 or at an off-site LLW disposal facility.

Metal, concrete, gravel, boulder, and clay pipe debris: This waste stream will consist of inactive drain lines and structures that may be removed during the site investigations. These wastes will be collected and containerized at the point of generation (i.e., at the excavation) and will be characterized based on field radiation screening, acceptable knowledge of processes associated with the debris, acceptable knowledge from site characterization sampling and, if necessary, direct sampling of the waste. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Spent PPE: The spent PPE waste stream will consist of PPE that has potentially contacted contaminated environmental media (i.e., core and/or drill cuttings) and that cannot be decontaminated. The bulk of this waste stream will consist of protective clothing such as coveralls, gloves, and shoe covers. Spent PPE will be collected in containers at personnel decontamination stations. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Disposable sampling supplies: The disposable sampling supplies waste stream will consist of all equipment and materials necessary for collecting samples that come into direct contact with contaminated environmental media and that cannot be decontaminated. This waste stream also includes wastes associated with dry decontamination activities. This waste stream will consist primarily of paper and plastic items collected in bags at the sampling location and transferred to accumulation drums. Characterization of this waste stream will be performed through acceptable knowledge of the waste materials, the methods of generation, and the analytical results from the sampling of the environmental media with which the materials were in contact. The Laboratory expects these wastes to be designated as LLW that will be disposed of at TA-54 or at an off-site LLW disposal facility.

Decontamination fluids: The decontamination fluids waste stream will consist of liquid wastes from decontamination activities (i.e., decontamination solutions and rinse waters). Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in containers at the point of generation and characterized with analytical results from direct sampling of the containerized waste. The Laboratory expects these wastes to be designated as liquid LLW that will be sent to the radioactive liquid waste treatment facility at TA-50 for disposal.

Spent HEPA Filters: This waste stream consists of spent HEPA filters generated during dust suppression activities. The spent HEPA filter characteristics will be determined using the data collected during the characterization of the borehole cuttings. The spent HEPA filters will be managed as LLW until data from the borehole cuttings are obtained. The spent HEPA filters will be stored onsite within a 55-gal. drum until final characterization. The spent HEPA filters will be disposed of at TA-54 or at an off-site Laboratory approved disposal facility.

B-2.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the ENV-ERS Program Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the ENV-ERS Program 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 ENV-ERS Program. 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), April 1990. United States Environmental Protection Agency, Region 6 Hazardous Waste Permit (Hazardous and Solid Waste Amendments). (EPA 1990, 01585)

EPA (US Environmental Protection Agency), April 1994. “Module VIII, Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA ID NM0890010515 38817,” module of EPA Hazardous Waste Facility Permit issued to Los Alamos National Laboratory, Dallas, Texas. (EPA 1994, 44146)

LANL (Los Alamos National Laboratory), December 2004. “2004 Pollution Prevention Roadmap December 2004.” Los Alamos Report LA-UR-04-8973. (LANL 2004, 88465)

Table B-1
Summary of Waste Management

Waste Stream	Expected Waste Type	On-Site Management	Expected Disposition
Drill cuttings*	LLW	B-25 boxes	Disposal at TA-54, or Laboratory-approved off-site disposal facility
Metal, concrete, gravel, boulders, and clay pipe debris	LLW	Accumulation in 55-gal. drum	Disposal at TA-54, or Laboratory-approved off-site disposal facility
Spent PPE	LLW	Accumulation in 55-gal. drum	Disposal at TA-54, or Laboratory-approved off-site disposal facility
Disposable sampling supplies	LLW	Accumulation in 55-gal. drum	Disposal at TA-54, or Laboratory-approved off-site disposal facility
Decontamination fluids	LLW	Accumulation in 55-gal. drum	Disposal at TA-54, or Laboratory-approved off-site disposal facility
Spent HEPA filters	LLW	Accumulation in 55-gal. drum	Disposal at TA-54, or Laboratory-approved off-site disposal facility

*This waste includes only those cuttings that cannot be returned to the point of origin.

Appendix C

Data Sources for Figures

GISLab Map #: m201534

Date: August 16, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Concrete Wall; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Electric Lines (LANL); Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Gas Lines (Los Alamos County); Los Alamos County; ER2004-0071; Unknown; Unknown; Provide Through the ENV Remediation Services Project through agreement with the Los Alamos County.

Gas Lines (LANL); Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Proposed Sample Locations and Boreholes; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Water Lines (Los Alamos County); Los Alamos County; ER2004-0071; Unknown; Unknown; Provide Through the ENV Remediation Services Project through agreement with the Los Alamos County.

Water Lines (LANL); Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

GISLab Map #: m201577

Date: September 14, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Catch Basins; Los Alamos National Laboratory, ENV Remediation Services Project; NA; 1:360; Unknown; data is in a draft form.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Retaining Wall; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201578

Date: September 6, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Catch Basins; Los Alamos National Laboratory, ENV Remediation Services Project; NA; 1:360; Unknown; data is in a draft form.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Drain Points; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Earthen Berms, Building 1; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Floor Trenches, Building 1; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Interior Labs, Building 1; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201602

Date: September 6, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boulders; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is in a draft form.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Catch Basins; Los Alamos National Laboratory, ENV Remediation Services Project; NA; 1:360; Unknown; data is in a draft form.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201603

Date: September 12, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boulders; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is in a draft form.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201606

Date: September 12, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boulders; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is in a draft form.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201607

Date: September 6, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boulders; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is in a draft form.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201613

Date: September 13, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; ER2004-0372; 1:2,500; July 7, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Structures; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-21 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Sumps; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201616

Date: September 12, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boulders; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is in a draft form.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Location Ids; Los Alamos National Laboratory, ENV Remediation Services Project; ER2005-0401; 1:2,500; June 16, 2005.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Catch Basins; Los Alamos National Laboratory, ENV Remediation Services Project; NA; 1:360; Unknown; data is in a draft form.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201617

Date: September 13, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; ER2004-0372; 1:2,500; July 7, 2004.

Material Disposal Areas; Alamos National Laboratory, ENV Remediation Services Project; ER2004-0221; 1:2,500; April 23, 2004.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Structures; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-21 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Pipelines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Sumps; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201618

Date: September 13, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; ER2004-0372; 1:2,500; July 7, 2004.

Material Disposal Areas; Alamos National Laboratory, ENV Remediation Services Project; ER2004-0221; 1:2,500; April 23, 2004.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Structures; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-21 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Pipelines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-21 Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

GISLab Map #: m201646

Date: November 3, 2005

Title; Owner; ID; Intended Scale; Publication Date.

1991 Hypsography (100ft); Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; 1991.

Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Site and Project Planning Group; NA; Unknown; February 1, 2003.

Boundary, Technical Areas; Los Alamos National Laboratory, Site and Project Planning Group; NA; Unknown; February 1, 2003.

Communication Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; August 8, 2002.

Drainage; Los Alamos National Laboratory, ENV-WQH; NA; Unknown; April 5, 2005; Modified for this map by GISLab per client request.

Electric Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Fences; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Gas Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Industrial Waste Lines (including Rad waste); Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Potential Release Sites; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Roads, Dirt; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Roads, Paved; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004. Modified for this map by GISLab per client request.

Roads, U.S. Major; Geographic Data Technology, Inc. and ESRI; NA, 1:50,000; December 1, 2002.

Sewer Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004. Modified for this map by GISLab per client request.

Steam Lines; Los National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

Storm Drains; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.

TA-2 Catch Basins; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is draft.

TA-2 Former Drain Lines; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is draft.

TA-2 Former Gas Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Gas Effluent Line; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Sewer; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Stormdrains; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; Data is draft.

TA-2 Former Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Former Underground Structures; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

TA-2 Proposed Sample Locations; Los Alamos National Laboratory, ENV Remediation Services Project; NA; Unknown; Unknown; data is in a draft form.

Water Lines; Los Alamos National Laboratory, UMAP-GIS; NA; Unknown; January 6, 2004.