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Date: March 14, 2006
Refer to: ER2006-0206

Mr. James Bearzi
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SUBJECT: SUBMITTAL OF THE ADDENDUM TO THE ACCELERATED CORRECTIVE ACTION WORK PLAN FOR THE INVESTIGATION AND REMEDIATION OF AREA OF CONCERN 03-001(i) AND SOLID WASTE MANAGEMENT UNITS 03-029 AND 61-002

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the "Addendum to the Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002."

If you have questions, please contact Melanee Shurter (505) 667-7369 (mshurter@lanl.gov) or Tony Trujillo at (505) 845-5987 (ltrujillo@doeal.gov).

Sincerely,

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

Sincerely,

David Gregory, Federal Project Director
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JS/jk

Enclosure: Two hard copies with electronic files – "Addendum to the Accelerated Corrective Action Work Plan Addendum for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002" (ER2006-0130)

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LA-UR-06-1085
March 2006
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Addendum to the Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002

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Prepared by
Environmental Stewardship Division–
Environmental Remediation and Surveillance Program

LA-UR-06-1085
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Addendum to the Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002

March 2006

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EXECUTIVE SUMMARY

This accelerated corrective action (ACA) work plan addendum presents the approach for characterization and remediation of Solid Waste Management Unit (SWMU) 61-002, which is located within the Upper Sandia Canyon Aggregate Area at Los Alamos National Laboratory. In accordance with the terms of the March 1, 2005, Compliance Order on Consent, the investigation work plan for this aggregate area is due to the New Mexico Environment Department (NMED) in March 2008. Supplemental corrective actions are being performed at SWMU 61-002 in advance of the aggregate area work plan deliverable date because the site lies in the path of the Security Perimeter Road in Technical Area 03 and will likely be inaccessible during and after the road has been completed. The Laboratory plans to perform supplemental investigation and remediation activities related to an area of petroleum contamination that was discovered during the initial site characterization that was performed under the original ACA work plan: "Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002." The area of petroleum contamination is located near the northwest portion of SWMU 61-002 and extends north and west (under Building 61-23) and just outside the formal SWMU boundary. Although a partial characterization and remediation of the petroleum contamination was performed, additional characterization activities are needed to define the vertical and lateral extent of contaminated soil. The additional activities proposed in this work plan will coincide with the removal of Building 61-23, which is scheduled for demolition in late spring 2006 in order to accommodate construction of the Security Perimeter Road.

The purpose of the activities described in this ACA work plan addendum is to continue corrective action activities at SWMU 61-002 that could not be completed during the initial field effort. The objectives of this ACA work plan include

- collecting soil and tuff samples, using a drill rig, to characterize the lateral and vertical extent of petroleum-contaminated soil that remains on site;
- removing petroleum-contaminated soil as identified during site characterization; and
- preparing an addendum to the original remedy completion report.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by the University of California (UC). The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons. These canyons contain ephemeral and intermittent streams that run west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft. The eastern portion of the plateau stands 300 to 900 ft above the Rio Grande valley.

The Laboratory's Environmental Stewardship Division–Environmental Remediation and Surveillance (ENV-ERS) Program (formerly the Environmental Restoration [ER] Project) is involved in a national DOE effort to reduce risk to human health and the environment at its facilities. The goal of ENV-ERS is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County. To achieve this goal, ENV-ERS is investigating and, as necessary, remediating sites that potentially have been contaminated by past Laboratory operations. ENV-ERS will perform the activities in this accelerated corrective action (ACA) work plan addendum to complete an investigation and remediation of a portion of Solid Waste Management Unit (SWMU) 61-002.

SWMU 61-002 is located within the Upper Sandia Canyon Aggregate Area. In accordance with the terms of the March 1, 2005, Compliance Order on Consent (Consent Order) signed by the New Mexico Environment Department (NMED), DOE, and the UC, the investigation work plan for this aggregate area is due to NMED in March 2008. The Laboratory initiated investigation and remediation activities at SWMU 61-002 in advance of the work plan deliverable date because the site lies in the path of Technical Area (TA) 03 Security Perimeter Road construction activities and may be inaccessible during and after the road's construction. This ACA work plan addendum presents the approach for additional characterization and remediation activities at SWMU 61-002. The original ACA work plan, "Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002," was submitted to NMED in November 2004 (LANL 2004, 87474).

Under the terms of the Consent Order, NMED may issue Certificates of Completion for corrective actions as either "complete without controls" or "complete with controls." The Laboratory plans to complete corrective actions at SWMU 61-002 to the levels required for NMED to issue a Certificate of Completion for corrective actions, complete with controls. The Laboratory will assume responsibility for the controls specified for the site by NMED. The Laboratory expects that such controls will be limited to institutional/administrative controls to ensure that land use remains consistent with residual contamination at the site.

1.1 General Site Information

SWMU 61-002 is situated on a mesa top of the Pajarito Plateau within TA-61 (Figure 1.1-1). The area is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon. Historical investigations of the sites are discussed in Section 2.5.

SWMU 61-002 is a former storage area located on the east side of the Radio Repair Shop (Building 61-23) on East Jemez Road (Figure 1.1-2). The northern portion of the SWMU was historically used as a storage area for capacitors, transformers, and other unmarked containers. Before 1985, oil contaminated with polychlorinated biphenyls (PCBs) was stored in containers on the soil surface within the storage area. The containers were known to have leaked. Historical site characterization and remediation activities were conducted in 1986, 1994, and 1997 and included the collection of numerous soil samples

and the removal of PCB-contaminated soils. Details of these activities are included in Section 2.0 of the original approved ACA work plan (LANL 2004, 87474). More recent characterization and remediation activities were conducted in the summer of 2005 because of impending construction activities associated with the Security Perimeter Road Project. Details of the 2005 ACA are included in the "Remedy Completion Report for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002" (LANL 2005, 91150), which was submitted to NMED in December 2005.

During the 2005 ACA investigation, an area of petroleum-contaminated soil and buried fuel lines was discovered near the northeast portion of Building 61-23. There are no records that indicate a petroleum storage tank or fueling facility was ever located in this area. Although it was beyond the scope of the original ACA work plan, additional characterization and remediation efforts were conducted to address this area of petroleum-contaminated soil. Because the extent of soil contamination extended into a major utility corridor and East Jemez Road to the north and to the west beneath Building 61-23, it was determined that a supplemental ACA investigation will be conducted once Building 61-23 has been removed.

1.2 Investigation Objectives

The objective of this ACA work plan addendum is to complete the investigation and remediation activities in support of obtaining an NMED Certificate of Completion for SWMU 61-002. To meet this objective, ENV-ERS will conduct the following activities:

- using a drill rig, collect soil and tuff samples to characterize the lateral and vertical extent of petroleum-contaminated soil that remains on site (five borings)
- remove petroleum-contaminated soil as identified during site characterization
- prepare an addendum to the original remedy completion report

The investigation and remediation of SWMU 61-002 will be conducted in accordance with the requirements contained in the Consent Order. Appendix A includes a list of acronyms and abbreviations and defines the terms used in this work plan addendum, and Appendix B describes how investigation-derived waste will be managed.

2.0 BACKGROUND

2.1 Operational History

SWMU 61-002 is located within TA-61 and was created during the Laboratory TA redesignations in 1989. With the exception of a 1-mi^2, privately owned residential trailer park, the few buildings at TA-61 were previously part of TA-03. A major feature at TA-61 is the municipal landfill. Established in 1974, the landfill is still in use and is operated by the County of Los Alamos. A portion of SWMU 61-002 extends into the northern portion of the landfill.

SWMU 61-002 is located adjacent to the Radio Shop, Building 61-23 (Figure 1.1-2). Building 61-23 (formerly Building 03-282) was built in 1951 for the Reynolds Electric Company and purchased by the Laboratory in 1966. The building lies 58 ft south of the centerline of East Jemez Road and approximately 1200 ft east of Diamond Drive. The area east of the Radio Shop was previously used for storage of capacitors and transformers, unmarked drums, and other oil-filled vessels, some of which contained PCBs. Storage operations were discontinued in 1992. Building 61-23 is scheduled for demolition in late spring of 2006.

2.2 Contaminant Transport Mechanisms and Potential Receptors

The primary mechanisms of petroleum hydrocarbon releases at SWMU 61-002 appear to be leaks and spills related to petroleum fueling/storage operations, which were apparently conducted at the facility. Although contaminated soil is not exposed at the surface, storm water runoff may be a mechanism of contaminant transport if this material is brought to the surface (i.e., during excavation). The only materials that are likely to exhibit petroleum contamination at this site are subsurface soil, tuff, and concrete debris.

Laboratory land use at TA-61 has historically been industrial and will remain industrial for the foreseeable future. SWMU 61-002 is located in a developed, industrial area; site workers are potential receptors. For ecological receptors, pathways from subsurface contamination to potential surface-dwelling animals would be complete if contaminated soil or tuff were exposed at the surface. The potential pathways would then be similar to those of a surface soil release (i.e., dermal contact, inhalation of vapors or particulates, incidental ingestion of soil, uptake by plants, and food-web transport). Pathways from subsurface releases may be complete for plants and burrowing animals. These pathways include the uptake of contaminants by plant roots and the exposure of burrowing animals through dermal contact, inhalation of vapors or particulates, incidental ingestion of soil, and food-web transport. No evidence of burrowing animals was observed during site visits.

The potential pathways for human exposure to contaminated soil, tuff, and debris are dermal contact, inhalation of vapors and particulates, and incidental soil ingestion. Pathways from subsurface contamination to potential human receptors would be complete only if contaminated soil, tuff, or concrete debris were exposed at the surface. The potential pathways would then be similar to those of a surface soil release (i.e., dermal contact, inhalation of vapors or particulates, and incidental soil ingestion).

Downward migration of contaminants in the vadose zone is limited by a lack of hydraulic gradient. The lack of saturated conditions in the area restricts vertical migration; however, horizontal migration through storm water runoff is possible. No perched alluvial aquifers have been identified in the area of SWMU 61-002, nor are there springs or seeps nearby that would indicate the presence of perched alluvial aquifers. Therefore, a complete pathway to the groundwater, including the regional aquifer which is located approximately 1000 ft below ground surface (bgs), is unlikely.

2.3 Waste Inventory

The waste inventories for SWMU 61-002 may contain hazardous components related to historical operations. Radiological materials were not used at this site. Sample analyses performed during previous investigations of SWMU 61-002 detected PCB concentrations above the soil screening levels (SSLs) (NMED 2004, 85615). Trace concentrations of various volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals have also been detected (LANL 2005, 91150). Material exhibiting PCB concentrations above SSLs has been removed and transported off-site to a permitted PCB waste disposal facility. An unknown amount of petroleum-contaminated soil remains on-site, the majority of which likely extends away from the actual SWMU boundary toward the north and west.

2.4 Historical Releases

Potential releases related to historical activities at SWMU 61-002 include those to surface and subsurface soil and tuff. All potential historical releases are related to Laboratory historical operations (underground fuel storage and distribution activities).

2.5 Summary of Historical Investigations

The origin of soil contamination within the main portion of SWMU 61-002 was PCB-containing equipment stored in the area. Surface runoff allowed trace amounts of PCBs to migrate south into the adjacent landfill property (Figure 2.5-1). At least three separate characterization/remediation efforts have been performed at SWMU 61-002. Each of these events was performed to characterize and/or remediate PCB-contaminated soil east and southeast of Building 61-23. During these historical investigations, approximately 100 soil samples were collected for characterization and confirmation purposes. Additionally, the top 6 in. of soil at the site were removed in an effort to remediate. Complete details of these previous site investigations are included in Section 2.0 of the original approved ACA work plan (LANL 2004, 87474) and the Operable Unit 1114 Resource Conservation and Recovery Act facility investigation (RFI) work plans (LANL 1995, 57590; LANL 1993, 20947).

2.5.1 2005 ACA Activities

In the summer of 2005, the Laboratory initiated an ACA at SWMU 61-002 in advance of construction activities associated with the installation of a new Security Perimeter Road. The goal was to establish the nature and extent of PCB-contaminated soil and to remove any contaminated media at the site that exceeded preestablished target cleanup goals. ACA investigation and remediation activities were performed in accordance with the original approved ACA work plan (LANL 2004, 87474).

During the initial execution of the ACA investigation, a total of 61 characterization and confirmation samples were collected from 28 locations to determine the vertical and lateral extent of PCB contamination. All samples were submitted to an off-site laboratory for analysis of VOCs, SVOCs, PCBs, and target analyte list (TAL) metals.

Remediation activities at SWMU 61-002 included the removal of PCB-contaminated soil along the north edge of the SWMU to a depth of approximately 4 ft bgs. The excavated area measured approximately 20 ft wide by 140 ft long. A total of 424 yd^3 of contaminated soil were removed and disposed of off-site at a permitted disposal facility.

While excavating the northwest portion of the SWMU (the area closest to Building 23), an area of petroleum-contaminated soil was encountered along with a set of abandoned steel fuel lines. There are no historic records that indicate that a fueling facility or fuel-storage facility existed in this area. Although it was beyond the scope of the approved ACA work plan, approximately 45 yd^3 of petroleum-contaminated soil were removed from the area. Additionally, four soil borings were installed adjacent to Building 61-23 in an attempt to define the vertical and lateral extent of petroleum-contaminated soil (Figure 2.5-2).

Based on analytical results collected from borehole samples, it was determined that the petroleum-contaminated soil likely extends under the foundation slab of Building 23. Contaminated soil also extends north toward East Jemez Road; however, numerous utilities in this area prohibited extensive excavation in this direction. The eastern and southern extent of contamination has been defined through the collection of clean soil samples from soil borings installed in these locations. Figure 2.5-2 shows the primary petroleum constituents detected during the 2005 ACA investigation. Complete analytical results are included in the remedy completion report (LANL 2005, 91150).

3.0 SITE CONDITIONS

The characterization and remediation activities proposed in this ACA work plan addendum will be located near the northwest portion of the SWMU, just beyond the formal SWMU boundary. The geology previously observed in this area consists of fine-grained fluvial and colluvial deposits that overlie the Tshirege Member of the Bandelier Tuff. The unconsolidated deposits in this portion of the SWMU are approximately 15 ft thick. The Bandelier Tuff in the area is slightly to moderately welded to a depth of at least 20 ft. Below this depth, the degree of welding is unknown. The investigation area is currently unvegetated and is partially paved with asphalt. Ongoing activities related to the construction of the Security Perimeter Road have disturbed much of the area. The construction activities associated with the removal of Building 61-23 will cause additional disturbances.

A discussion of surface and subsurface conditions (including the geology and hydrogeology of the area) is included in Section 3.0 of the original approved ACA work plan (LANL 2004, 87474).

4.0 SCOPE OF ACTIVITIES

The ACA work plan addendum for SWMU 61-002 includes the following activities:

- develop planning and health and safety documents for the implementation of the work plan
- mobilize to the site after the Building 61-23 slab has been removed
- install at least five additional soil borings to define the vertical and lateral extent of petroleum-contaminated soil
- collect characterization and/or confirmation samples from the borings
- use field screening to identify areas of gross contamination
- submit samples for fixed analytical laboratory analysis
- based on site-characterization sampling (field screening and analytical), excavate petroleum-contaminated soil and transport to a Laboratory-approved disposal facility
- collect additional confirmation samples from the excavated area
- conduct postsampling geodetic surveys
- backfill the excavated area with clean fill
- restore and demobilize from the site
- prepare a remedy completion report addendum, which will include a presentation and analysis of all data collected and details of the work performed

Methods for performing investigation activities are provided in Section 5.0. The schedule for the planned activities is provided in Section 7.0.

5.0 INVESTIGATION METHODS

Activities described in this work plan will be performed in accordance with the applicable quality assurance (QA) requirements addressed in the ENV Division–Environmental Characterization and Remediation (ECR) Quality Management Plan; quality procedures (QPs) and standard operating procedures (SOPs); and Laboratory requirement documents (e.g., Laboratory Implementation

Requirements and Laboratory Performance Requirements), or equivalent Laboratory-approved subcontractor documents (statements of work, field implementation plans, etc.). Table 5.0-1 presents a summary of the field-investigation methods that will be used for this project. The SOPs that correspond to these methods are available at http://erproject.lanl.gov/documents/procedures.html.

5.1 Mobilization and Site Preparation

Mobilization to SWMU 61-002 will include the delivery and inspection of heavy equipment and, as appropriate, the use of ropes, postings, or construction fencing to establish site work areas and control public and untrained worker access to the site. As required by the Laboratory Storm Water Pollution Prevention Plan, erosion-control best management practices (BMPs) (e.g., silt fences and straw wattles) will be installed before any soil-disturbing activities are performed.

5.2 Site Characterization and Remediation

Subsurface soil and tuff sampling will be conducted at four locations north and west of the area of known petroleum contamination. An additional boring will be installed in the central portion of the contaminated area to define the vertical extent of contamination (Figure 5.2-1). Subsurface samples will be collected using a hollow-stem auger drill rig capable of drilling through consolidated tuff. Analytical samples will be collected from at least two intervals from each soil boring to define the vertical and lateral extent of contamination. The planned sampling depth intervals include

- the 2-ft interval exhibiting the highest field headspace reading, and
- the 2-ft interval that represents the bottom of the boring.

Samples will not be collected from surface intervals because most of the area is covered by an asphalt parking lot, which typically contributes to low-level VOC and SVOC detections that may, or may not, be related to the contamination of this SWMU. In addition to the intervals listed above, other intervals may be selected for sampling based on field observations (e.g., staining, hydrocarbon odor).

5.3 Drilling and Characterization Sampling

Characterization samples will be collected using a hollow-stem auger drill rig equipped with a continuous core barrel sampler. Sample core material will be logged and sampled at the intervals specified above using SOP 12.01, Field Logging, Handling and Documentation of Borehole Materials. Headspace screening for VOCs will be conducted using a photoionization detector (PID) at two intervals per 5-ft run using the methods described in SOP-06.33. Headspace screening, along with field observations (i.e., odor and staining), will be used to determine which sampling intervals will be submitted for laboratory analysis. Each borehole will be advanced until background PID readings are obtained or until drill rig refusal has been met. To define the vertical extent, the boring located in the center of the impacted area will be drilled to a depth that corresponds to 25 ft below the deepest PID detection. As a result, it is anticipated that the depth of at least one boring will exceed 45 ft.

The determination of the lateral extent of contamination may require offsetting some of the proposed borings laterally outward until the area has been bounded. Boreholes installed in areas that have obviously been impacted and that may require future in-situ remediation may be completed as a soil vapor extraction (SVE) well using a polyvinyl chloride (PVC) screen and riser. All boreholes not completed as a potential SVE well will be abandoned by filling the borehole to within 2 ft of the surface with hydrated bentonite chips (unless the boreholes are within or near parking areas or roads). Native top soil from the surrounding area will be used to complete the abandonment. Boreholes installed within, or near, parking areas or roads will be abandoned using a grout mixed with approximately 5% bentonite. All drill cuttings will be placed in roll-off waste containers for transport to a disposal facility.

Quality assurance/quality control (QC) samples will include trip blanks for VOC analysis, field duplicates to evaluate the reproducibility of the sampling technique, and rinsate blanks to evaluate decontamination procedures. These samples will be collected according to SOP-01.05, Field Quality Control Samples.

Headspace vapor screening for VOCs (SOP-06.33) will be conducted using a PID capable of measuring concentrations as low as 1 ppm. Screening samples will be placed in resealable plastic baggies and allowed to equilibrate in a warm area for not less than five minutes. The headspace gas will then be screened using a PID equipped with a 10.6-eV bulb. A 10.6-eV bulb will be used because it is less sensitive to moisture and will therefore produce accurate field-screening results. To ensure compliance with U.S. Department of Transportation regulations, all samples will be field screened for alpha- and beta-gamma radiation before being transported to an off-site laboratory. Alpha screening will be conducted using a Ludlum model 139 rate meter with an air proportional probe. Beta-gamma radiation screening will be performed using an Eberline ESP-1 rate meter equipped with an HP-260 Geiger-Mueller probe. Only a technician with a current Health Physics Operations Group (HSR-1) radiation screening authorization agreement, or an HSR-1 radiological control technician, will perform the screening of the samples to be transported. Measuring and test equipment will be controlled in accordance with the ENV-ECR QP 5.2, Control of Measuring and Test Equipment.

All samples will be submitted to the Laboratory's Sample Management Office (SMO). The SMO will ship samples to an off-site analytical laboratory that is qualified according to QP-7.2, Supplier Evaluation, and is on the ENV-Division-approved suppliers list. The fixed-laboratory analyses will include SVOCs, VOCs, total petroleum hydrocarbon (TPH)–gasoline range organics (GRO), TPH–diesel range organics (DRO), PCBs, TAL metals, and methyl tertiary butyl ether (MTBE). The field team will coordinate sample collection and analysis with the SMO. Once samples have been collected, they will be stored and transported to the SMO in accordance with SOP-01.03, Handling, Packaging, and Shipping of Samples.

SVE well installation, if implemented, will consist of installing a section of 2-in. PVC well screen and riser in the specified characterization borehole. The extraction well will consist of a PVC bottom cap, slotted PVC spanning the impacted zone, and a blank PVC riser from the top of the impacted zone to the aboveground surface. Depending on the location, the PVC riser will be left as a 2-ft stick-up and sealed with a PVC slip cap; otherwise, it will be capped and buried with the precise location recorded. The annulus around the screened interval will be filled with silica sand and topped with at least 5 ft of hydrated bentonite. The option of installing a vapor extraction well during the characterization phase of the corrective action process will save time if it is determined that SVE is the most feasible remediation alternative for the site. If at a later time it is determined that vapor extraction wells are not needed, they will be abandoned using the same protocol as borehole abandonment.

5.4 Excavation and Confirmation Sampling

The excavation of contaminated soil to a depth of at least 10 ft is anticipated. After soil removal is conducted, confirmation samples will be collected from the site. The collection of approximately twelve samples is proposed; however, this number is highly dependant on the final size of the excavated area.

An attempt will be made to excavate the area to a point at which all petroleum-contaminated soil has been removed. If contaminated soil is found to be laterally widespread or extends to a depth that exceeds the limits of excavation equipment, in situ treatment may be the preferred method of remediation. Because the site has not been completely characterized, this decision will be made in the field. After excavation activities have been completed, clean fill will be brought in and graded to match the original topography.

Confirmation samples within the excavated area will be collected following SOP-06.09, Spade-and-Scoop Method for the Collection of Soil Samples, with the assistance of a backhoe or similar equipment, or by following SOP-06.10, Hand Auger and Thin-wall Tube Sampler, as appropriate. The number of confirmation samples required will depend on the size of the excavation. Confirmation samples will be from each sidewall and from the bottom of the excavation. The number of confirmation samples collected will be appropriate for the final size of the excavation and will adequately represent soil conditions that remain on site. Actual confirmation sampling locations will be biased toward the areas where characterization sampling indicated elevated concentrations or at locations with high field-screening results. QA/QC samples will include trip blanks for VOC analysis, field duplicates to evaluate the reproducibility of the sampling technique, and rinsate blanks to evaluate decontamination procedures. These samples will be collected according to SOP-01.05, Field Quality Control Samples.

Headspace vapor screening for VOCs, radiation screening and fixed-laboratory analyses will be similar to the borehole characterization sampling previously described in Section 5.3.

Additional excavation-related activities include the establishment of site work areas. Ropes, postings, or construction fencing will be used as appropriate to control public and untrained-worker access to the site work areas. Erosion-control BMPs will be installed in accordance with the Laboratory's "Storm Water Pollution Prevention Plan, Environmental Restoration Construction Activities, Revision 0," (LANL 2004, 87464) as needed, and before any soil-disturbing activities begin.

5.5 Fixed-Laboratory Analytical Methods

All samples will be submitted to the SMO. The SMO will ship samples to a qualified off-site analytical laboratory for analysis of VOCs (including MTBE), SVOCs, PCBs, TPH-DRO, TPH-GRO and TAL metals, with a request for a 30-day turnaround of analytical results. A request for a 7-day turnaround time will be placed on the TPH samples in order to have results available while excavation equipment is on-site. Toxicity characteristic leaching procedure analysis for waste characterization will be requested in accordance with the Waste Characterization Strategy Form (WCSF). The field team will coordinate sample collection and analysis with the SMO. After collection, samples will be stored and transported to the SMO in accordance with SOP-01.03, Handling, Packaging, and Transporting Field Samples. Specific analytical methods are described in the U.S. Environmental Protection Agency (EPA) document, "Test Methods for Evaluating Solid Wastes," (EPA 1997, 57589) and are listed in Table 5.5-1.

5.6 Site Restoration, Decontamination, and Demobilization Activities

Site restoration will include importing clean fill to backfill all excavated areas to the surrounding grade of the ground surface. BMPs to control storm water run-on and run-off will be installed or maintained, as needed. Because security perimeter road construction activities are scheduled to take place at the site shortly after sampling and soil-removal activities are completed, backfilling and the installation and maintenance of BMPs are the only restoration activities currently planned for the site. The site BMPs will be left in place and upgraded as needed to prevent the erosion of site soils. The Laboratory will inspect BMPs as part of the existing BMP maintenance and inspection program for ENV Division.

Stainless-steel sampling equipment will be decontaminated daily and between uses at sampling locations. To minimize or eliminate liquid-waste generation, decontamination of equipment will be accomplished using dry methods whenever possible. If required, an Alconox/water solution decontamination technique may be used to decontaminate sampling equipment. Wet or dry decontamination techniques will be conducted in accordance with SOP-01.08, Field Decontamination of Drilling and Sampling Equipment.

Each phase of ACA activities will be documented, including photographs, with descriptive annotations, of site field work (drilling, excavation, sampling, etc.) and restoration activities. The investigation-derived waste management plan for wastes generated during the ACA field activities is presented in Appendix B.

5.7 Postsampling Geodetic Survey

A postinvestigation geodetic survey will be conducted at the site to confirm the exact sampling locations; any deviations from the proposed sample design will be documented. The postinvestigation geodetic survey will be performed in accordance with SOP-03.11, Coordinating and Evaluating Geodetic Surveys.

6.0 MONITORING

No ongoing monitoring activities are planned at SWMU 61-002. The Laboratory anticipates that the ACA activities for investigation and remediation of SWMU 61-002 will be the final remedy for the site. If in situ remediation of contaminated coil is performed, periodic vapor monitoring may be required. This monitoring will be coordinated through NMED.

7.0 SCHEDULE

Field activities associated with implementation of this ACA work plan are expected to begin in March 2006. A remedy completion report addendum for the ACA will be prepared and submitted to the NMED Hazardous Waste Bureau 90 days after ACA activities are completed through a final site inspection as identified in the work plan addendum schedule included as Table 7.0-1.

8.0 REFERENCES

The following list includes all documents cited in this work plan. Parenthetical information following each reference provides the author, publication date, and ER ID number. This information is also included in text citations. ER ID numbers are assigned by the ENV-ERS Records Processing Facility (RPF) and are used to locate the document at the RPF.

Copies of complete reference sets are maintained at the NMED Hazardous Waste Bureau; the DOE Los Alamos Site Office; EPA, Region 6 offices; and ENV-ERS project library. The sets were developed to ensure that the administrative authority has all material needed to review this document and are updated periodically as needed.

EPA (U.S. Environmental Protection Agency) May, 1997, “Test Methods for Evaluating Solid Waste Laboratory Manual, Physical/Chemical Methods: SW-846 Third Edition, Update III,” Washington D.C. (EPA 1997, 57589)

LANL (Los Alamos National Laboratory), July 1993. “RFI Work Plan for Operable Unit 1114,” Los Alamos National Laboratory document LA-UR-93-1000, Los Alamos, New Mexico. (LANL 1993, 20947)

LANL (Los Alamos National Laboratory), July 1995. “RFI Work Plan for Operable Unit 1114, Addendum 1,” Los Alamos National Laboratory document LA-UR-95-731, Los Alamos, New Mexico. (LANL 1995, 57590)

LANL (Los Alamos National Laboratory), November 2004. "Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002", Los Alamos National Laboratory document LA-UR-04-07879, Los Alamos, New Mexico (LANL 2004, 87474)

LANL (Los Alamos National Laboratory), December 1, 2003. "2004 Pollution Prevention Roadmap, December 2004," Los Alamos National Laboratory document LA-UR-04-8973, Los Alamos, New Mexico. (LANL 2004, 88465)

LANL (Los Alamos National Laboratory) October 2004. "2004 Storm Water Pollution Prevention Plan, Revision 0," Los Alamos, New Mexico. (LANL 2004, 87464)

LANL (Los Alamos National Laboratory), December 2005, "Remedy Completion Report for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002," Los Alamos National Laboratory document LA-UR-05-8863, Los Alamos, New Mexico. (LANL 2005, 91150)

NMED (New Mexico Environment Department), February 2004. "Technical Background Document for Development of Soil Screening Levels," Rev. 2, Volume I, Tier 1: Soil Screening Guidance Technical Background Document, NMED Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2004, 85615)

Figure 1.1-1. Location of TA-61 with respect to the Laboratory TAs and surrounding land holdings

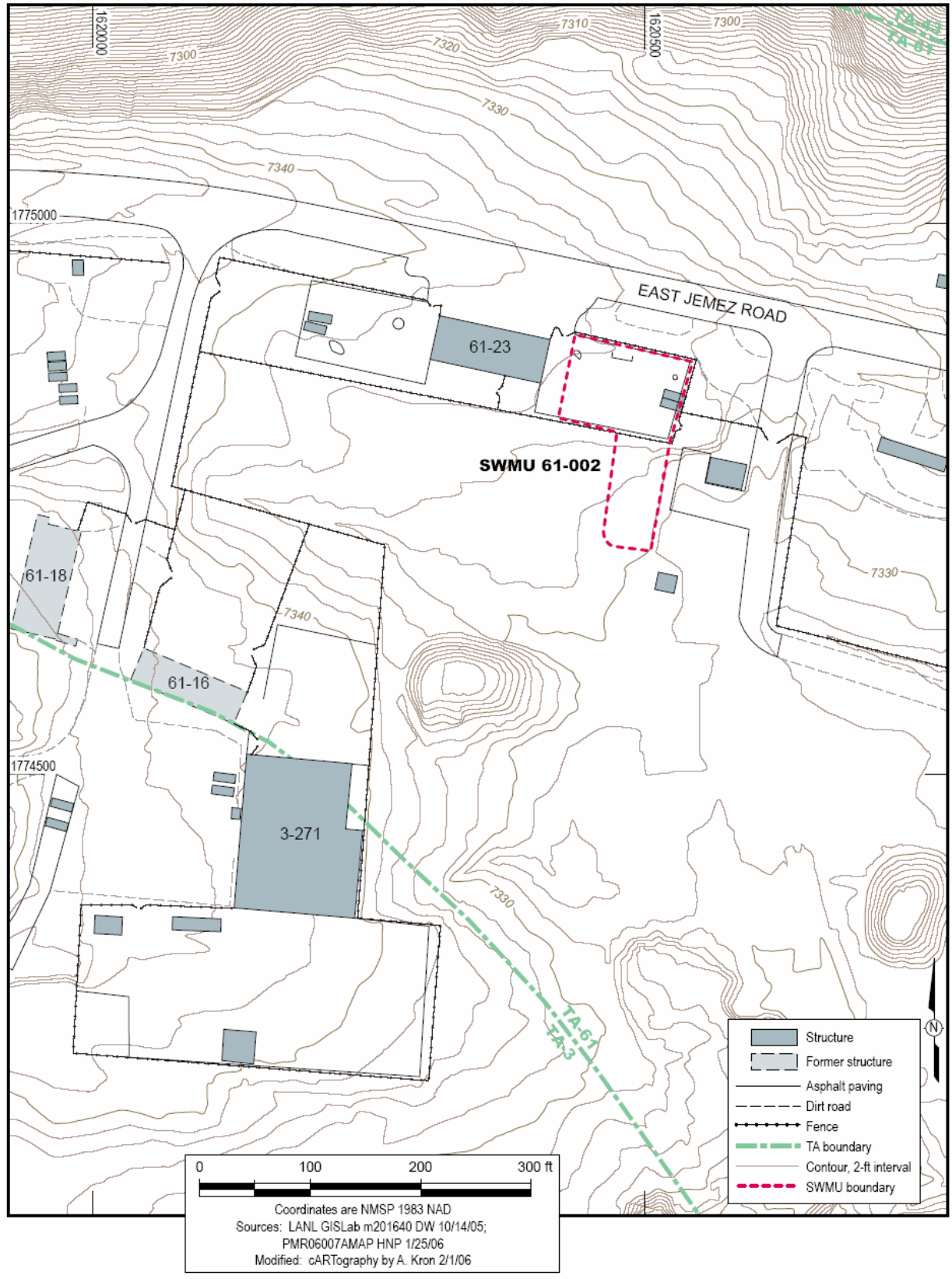

Figure 1.1-2. Location of SWMU 61-002

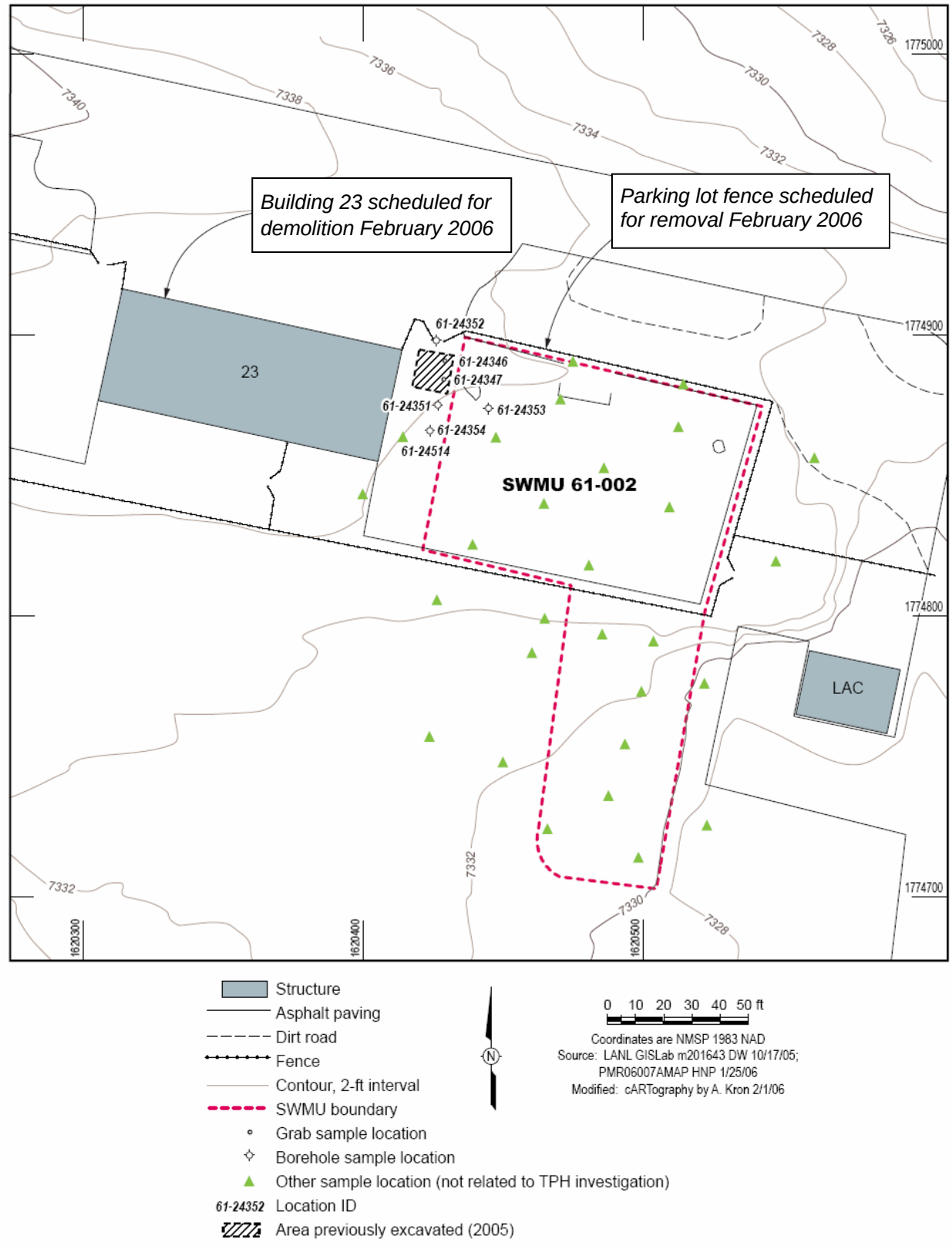

Figure 2.5-1. Site map and sampling locations at SWMU 61-002

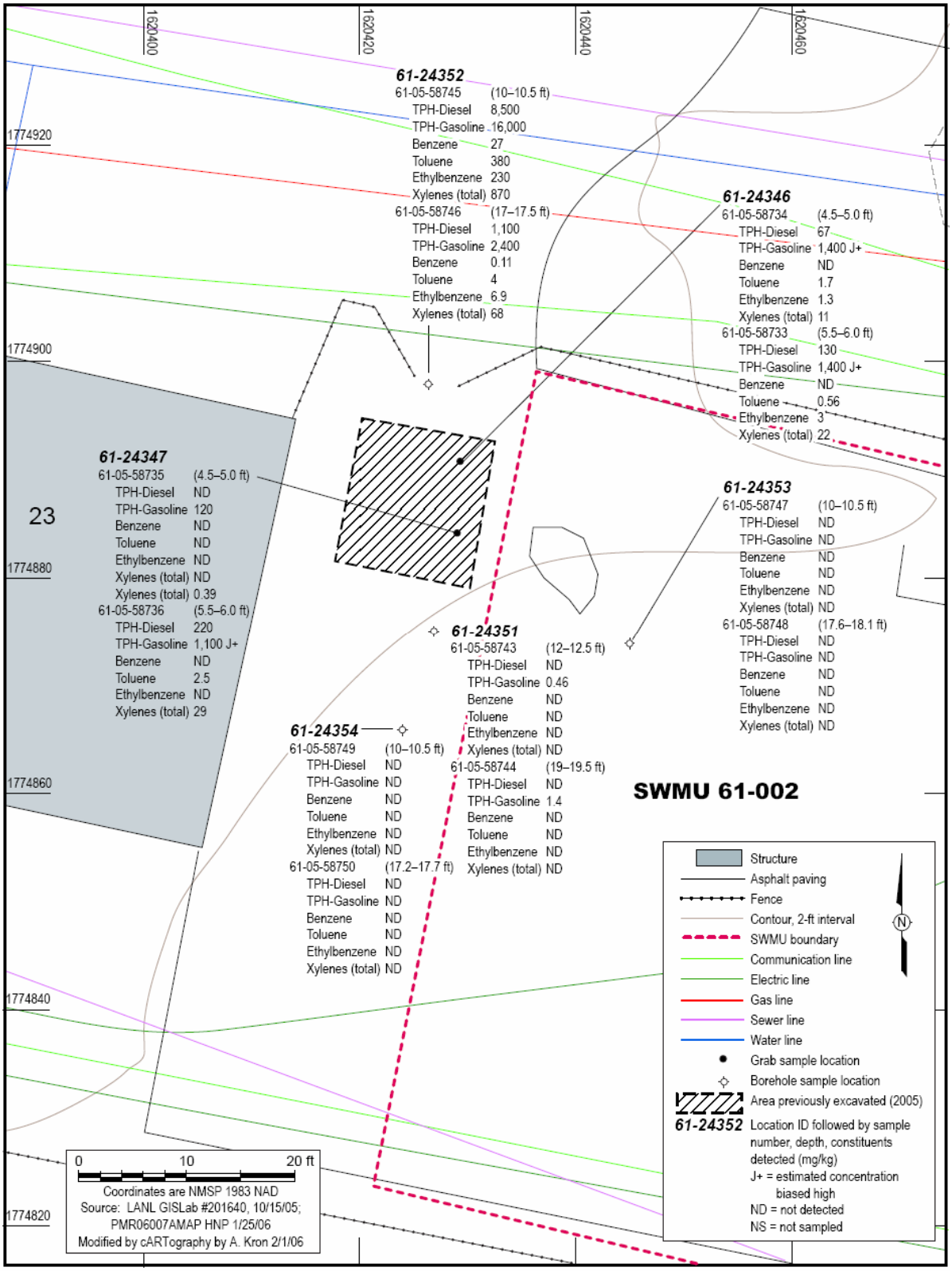

Figure 2.5-2. Petroleum hydrocarbon constituents detected during the 2005 ACA investigation

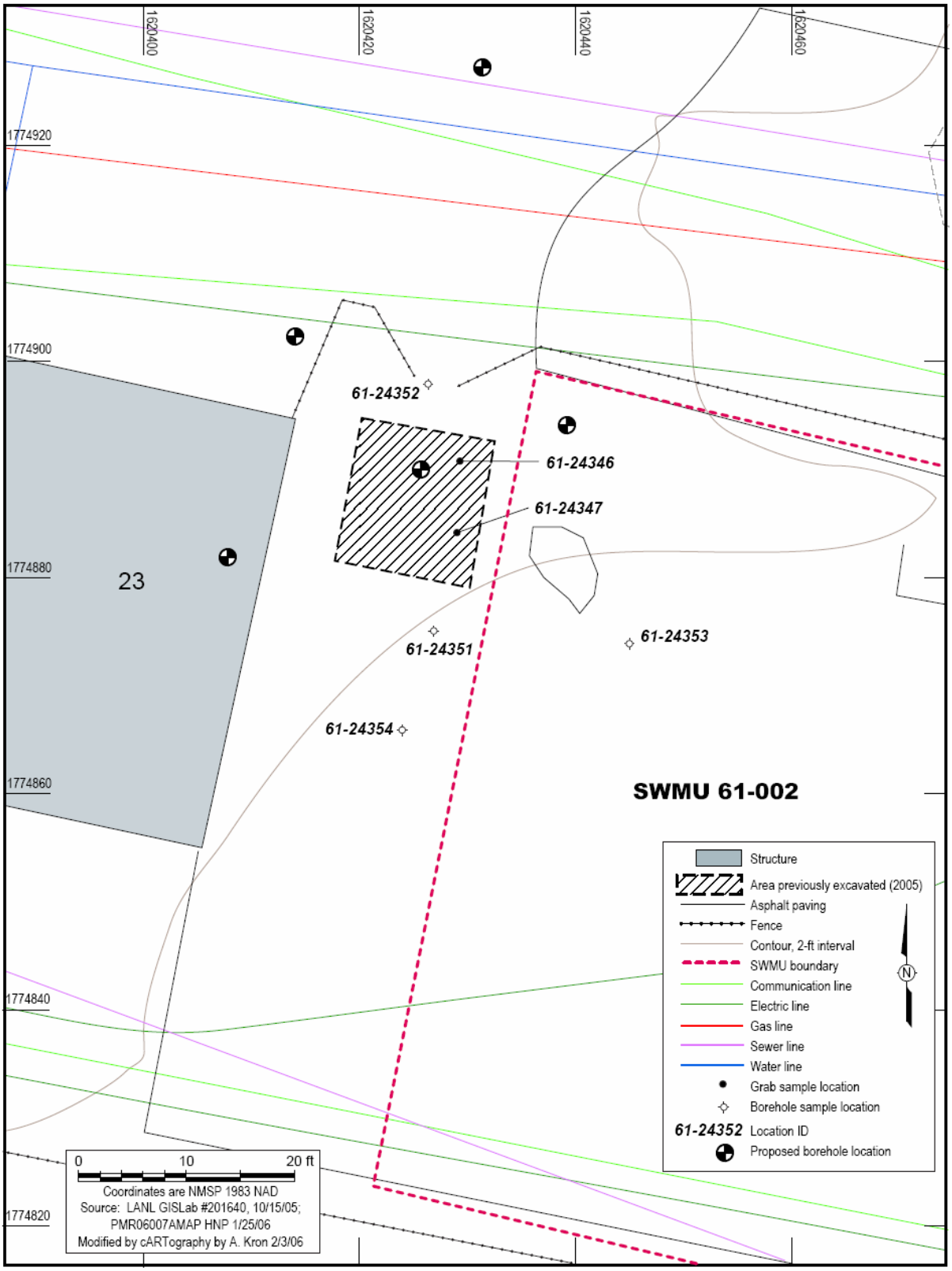

Figure 5.2-1. Proposed borehole locations

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Table 5.0-1
Brief Description of Field Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used for the collection of shallow (i.e., approximately 0 to 12 in.) 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 to 15 ft, but may in some cases be used for collecting samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3- to 4-in. inner diameter) and creating a vertical hole that 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-in. inner diameter and 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock that can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so 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 min. The sample is then screened by inserting a photoionization detector (PID) probe into the container and measuring and recording any detected vapors.
Portable XRF Field Screening	A portable x-ray fluorescence (XRF) analyzer may be used in the field to measure metals content in soils to provide screening data and guide sampling for determining the extent of metals contamination. The instrument includes sealed radioactive sources and can identify and quantify 26 elements. The instrument must be properly warmed and calibrated according to the manufacturer's directions before use. Soil samples should be homogenized and have large rocks, vegetation, and any foreign objects removed (samples may be sieved). The sample surface should be flattened or smoothed with a trowel or similar tool. For quantitative work, reference standard materials should be analyzed and the precision of the instrument determined at least once per day or once for every 20 samples. Precision may be determined by performing multiple analyses of certified reference standard materials.
Sample Control and Field Documentation	The collection, screening, and transport of samples is documented on standard forms generated by the Sample Management Office. 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.

Table 5.0-1 (continued)

Method	Summary
Field Quality Control Samples	Field quality control samples are collected as directed in the March 1, 2005, Compliance Order on Consent as follows: Field Duplicate: At a frequency of 10%; collected at the same time as a regular sample and submitted for the same analyses. Equipment Rinsate Blank: At a frequency of 10%; collected by rinsing sampling equipment with deionized water and submitting the rinsate for laboratory analysis. Trip Blanks: Required for all field events that include the collection of samples for volatile organic compound analysis. Trip blanks are 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 the removal of soil or other material adhering to the sampling equipment, followed by the use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes. Dry decontamination may be followed by wet decontamination if necessary. Wet decontamination may include washing with a nonphosphate 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 U.S. Environmental Protection Agency guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample are printed on the sample collection logs provided by the SMO (size and type of container, e.g., glass, amber glass, polyethylene, preservative). All samples are preserved by placing them in insulated containers with ice to maintain a temperature of 4˚C. Other requirements, such as the use of nitric acid or other preservatives, may apply to different media or analytical requests.
Management of Environmental Restoration Project Waste	Wastes are characterized based on a review of historical site information, existing site data, and/or waste analysis. Means to store, control, and transport potential wastes are identified prior to the start of field operations. Wastes are segregated by classification and compatibility to prevent cross-contamination and are packaged to meet on-site and/or off-site waste acceptance criteria. Disposal is coordinated with an approved disposal facility or through Los Alamos National Laboratory's waste operations group. Wastes are managed in accordance with U.S. Department of Energy orders, state, and federal regulations, and specific project policies.
Waste Characterization	Project wastes are characterized by the field waste management coordinator, field team leader, or other member of the project team using a Waste Characterization Strategy Form (WCSF). The waste characterization strategy involves a review of existing analytical data or documentation for the waste stream, development of a sampling strategy, and verification of facility waste acceptance criteria. The WCSF includes site characteristics; site activities; responsible parties; waste stream characterization information; and storage, treatment, and disposal options. The WCSF is reviewed, and waste management documentation is prepared.

Table 5.0-1 (continued)

Method	Summary
Collection of Soil and Water Samples in Explosive Areas	The collection, handling, and transport of samples potentially contaminated with high explosives (HE) require prior visual examination and field analytical screening to characterize the level of HE contamination. Contamination characterization is completed before sample collection and involves identification of homogeneous and heterogeneous soil sample areas within the site, visual examination of the areas, and quantitative field screening of homogeneous soil mixtures with an HE spot test kit or other field test. Based on characterization results, the sampling site is categorized according to the level of HE contamination. The sample collection method specifies the use of equipment that does not produce heat, open flames, or sparks. Samples collected from areas determined to be positively contaminated are packaged and transported to the Materials Dynamics Group (DX-2) or a host-group-approved laboratory with written approval for removal from the HE corridor.
Coordination and Evaluation of Geodetic Surveys	A designated project participant determines the type of survey to be performed. This consists of either a "stakeout" survey, used for surveying previously defined locations, or an "unknown location survey," when the surveying of unknown locations is performed using existing coordinates. Survey personnel who perform control, property, easement, or boundary surveys must be registered professional land surveyors. Preparation for survey activities includes communication of expectations and requirements (e.g., degree of accuracy, locations, type of survey) to survey personnel. Survey personnel must chronologically document all survey activities and mark, identify, and record all survey locations, as instructed. Survey personnel prepare geodetic survey data for quality assurance review. The survey data are submitted to the project team leader and the quality program project leader for review. When the data are determined to be acceptable, they are finalized (i.e., assigned point labels), uploaded to a survey location template, and saved to a local disk or hard drive. The final files are archived by submitting them to ERLocationUpload@lanl.gov.

Table 5.5-1
Proposed Samples and Analytical Suites

SWMU Activity	Estimated Number of Samples	Type of Sampling	Methods	Analytical Suite Type
Characterization Sampling	10 planned 2 duplicates 12 total	Characterization sampling by SOP-06.09 or SOP-06.10. Headspace vapor screening by SOP-06.33	8082, 8270C, and 8260B, 8015 and TAL metals by 6010B, 6020, and 7471A.	PCBs, SVOCs, VOCs (+MTBE), TPH-GRO, TPH-DRO and TAL metals
Excavation/ Confirmation Sampling	12 planned 3 duplicates 15 total	Confirmation sampling by SOP-06.09 or SOP-06.10. Headspace vapor screening by SOP-06.33	8082, 8270C, and 8260B, 8015 and TAL metals by 6010B, 6020, and 7471A.	PCBs, SVOCs, VOCs (+MTBE), TPH-GRO, TPH-GRO and TAL metals
TOTAL	22 planned 5 duplicates 27 total			

Table 7.0-1
ACA Field Implementation Schedule

Activity	Duration (workdays)
Preparation/readiness review	22
Field preparation: mobilize equipment, implement BMPs, establish work zones and waste management areas	1
Borehole installation/characterization sampling	3
Laboratory analysis	30
Soil removal (based on sampling results)	13
Geodetic survey	1
Site restoration and demobilization	2
Final site inspection	1
Total duration	**73**

Appendix A

Acronyms and Abbreviations

A-1.0 ACRONYMS AND ABBREVIATIONS

ACA	accelerated corrective action
AK	acceptable knowledge
bgs	below ground surface
BMP	best management practice
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRO	diesel range organic
ECR	Environmental Characterization and Remediation (Group)
ENV	Environmental Stewardship (Division)
EPA	Environmental Protection Agency
ERS	Environmental Remediation and Surveillance (Program)
ER ID	Environmental Restoration Identification (catalog number)
GRO	gasoline range organic
HE	high explosive
HSR-1	Health Physics Operations (Group)
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
LIR	Laboratory Implementation Requirement
MTBE	methyl tertiary butyl ether
NMED	New Mexico Environment Department
NMSW	New Mexico Special Waste
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QP	quality procedure
RFI	Resource Conservation and Recovery Act facility investigation
RPF	Records Processing Facility
SMO	Sample Management Office
SOP	standard operating procedure
SSL	soil screening level
SVE	soil vapor extraction
SVOC	semivolatile organic compound

SWMU	solid waste management unit
TA	technical area
TAL	target analyte list
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbon
UC	University of California
VOC	volatile organic compound
WCSF	waste characterization strategy form
XRF	x-ray fluorescence

Appendix B

Management Plan for Investigation-Derived Waste

B-1.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

This appendix to the work plan describes how investigation-derived waste (IDW) generated during the investigation of Solid Waste Management Unit (SWMU) 61-002 at Los Alamos National Laboratory (LANL or the Laboratory) will be managed. IDW is waste generated as a result of field investigation activities and may include, but is not limited to, contaminated personal protective equipment (PPE), sampling supplies, plastics, and all other wastes potentially contacting contaminants. IDW generated during the investigation of SWMU 61-002 will be managed to protect human health and the environment, comply with applicable regulatory requirements, and adhere to the Laboratory waste-minimization goals.

All IDW generated during field investigation activities will be managed in accordance with applicable Environmental Stewardship Division–Environmental Characterization and Remediation Group (ENV-ECR) standard operating procedures (SOPs). These SOPs incorporate the requirements of all applicable Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy (DOE) orders, and Laboratory Implementation Requirements (LIRs). The ENV-ECR SOPs applicable to the characterization and management of IDW are the following:

- SOP-1.06, Management of Environmental Restoration Project Waste
- SOP-1.10, Waste Characterization

These SOPs are among the SOPs applicable to the investigation at SWMU 61-002 and are available at the following URL: http://erproject.lanl.gov/documents/procedures.html.

Before the start of field investigation activities, a Waste Characterization Strategy Form (WCSF) will be prepared and approved according to the requirements of SOP-1.10. The WCSF will provide detailed information on the IDW characterization and management described in this plan. IDW characterization will be completed by using existing data and/or documentation, site characterization data from samples of the media being investigated (surface soil, subsurface soil, etc.), and/or by direct sampling of the IDW, if needed. If direct 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. Each waste container will be individually labeled as to the waste classification, item identification number, and date of generation. Waste containers will be managed in clearly marked and appropriately constructed waste accumulation areas. Waste-accumulation area postings, labeling, storage duration, and inspection requirements will be based on IDW type and classification and on regulatory and Laboratory requirements. Container and storage requirements are described in this plan and will be detailed in the WCSF and approved before the waste is generated.

The Laboratory's 2004 Pollution Prevention Roadmap (LANL 2004, 88465) will be implemented in the SWMU Accelerated Corrective Action (ACA) area to minimize waste generation. This plan is updated annually as a requirement of Module VIII of the Laboratory's Hazardous Waste Facility Permit (EPA 1994, 44146).

The IDW waste streams associated with the investigation of SWMU 61-002 are identified and described in the following paragraphs. Table B-1 also summarizes the waste type, characterization method, estimated volume, method of on-site management, and expected disposition for each of these waste streams.

Spent PPE: The spent PPE waste stream will consist of PPE that has potentially come into contact with contaminated environmental media and 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, such as drums, and stored within a locked field trailer. Characterization of this waste stream will be performed through acceptable knowledge (AK) of the waste PPE materials, the methods of generation, and the analytical results from the environmental media samples with which the PPE materials were in contact. Based on historical knowledge of the site, no radiological sampling will take place as part of the investigation and therefore, no PPE will be managed as radioactive waste. The Laboratory expects these wastes to be designated as New Mexico Special Waste (NMSW) that will be disposed of at a Laboratory-approved off-site waste facility.

Disposable sampling supplies and dry decontamination waste: 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 resulting from decontamination of sampling equipment, when possible. The dry decontamination wastes will consist primarily of paper and plastic items collected in bags at the sampling location and transferred to accumulation drums. The drums will be stored within a locked field trailer. Characterization of this waste stream will be performed through AK of the sampling and decontamination waste materials, the methods of generation, and the analytical results from environmental media samples with which the materials were in contact. Based on historical knowledge of the site, no radiological sampling will take place as part of the investigation, and, therefore, no disposable sampling supplies will be managed as radioactive waste. The Laboratory expects these wastes to be designated as NMSW that will be disposed of at a Laboratory-approved off-site industrial waste facility.

Excavated soil, debris and drill cuttings: Soil and debris (concrete, metal, etc.) generated during excavation and drilling activities will be staged in roll off containers on-site pending waste characterization data. Soil will be managed in a manner consistent with analytical results, and it is anticipated that soil samples will be classified as NMSW. The returned soil samples will be disposed of at a Laboratory-approved off-site NMSW waste 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 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), November 2004. “2004 Pollution Prevention Roadmap,” Los Alamos National Laboratory document LA-UR-04-8973, Los Alamos, New Mexico. (LANL 2004, 88465)

Table B-1
Summary of Estimated IDW Generation and Management

Waste Stream	Characterization Method	Expected Waste Type	Estimated Volume	On-Site Management	Expected Disposition
Spent PPE	AK from site characterization data and method of generation	New Mexico Special Waste	55 gal.	Accumulation in 55-gal. drums, stored on site	Waste Management Landfill, Rio Rancho, New Mexico, or other appropriate permitted off-site facility
Disposable sampling supplies	AK from site characterization data and method of generation	New Mexico Special Waste	<5 gal.	Accumulation in 55-gal. drums, stored on site	Waste Management Landfill, Rio Rancho, New Mexico, or other appropriate permitted off-site facility
Excavated debris	AK from site characterization data and method of generation	New Mexico Special Waste	1-50 yd^3	Accumulation in roll-off bins	Waste Management Landfill, Rio Rancho, New Mexico, or other appropriate permitted off-site facility
Drill cuttings	AK from sample analytical data and method of generation	New Mexico Special Waste	4 yd^3	Accumulation in roll-off bins	Waste Management Landfill, Rio Rancho, New Mexico, or other appropriate permitted off-site facility
Excavated petroleum contaminated soil	AK from sample analytical data and method of generation	New Mexico Special Waste	100–250 yd^3	Accumulation in roll-off bins	Waste Management Landfill, Rio Rancho, New Mexico, or other appropriate permitted off-site facility