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Date: September 30, 1997
Refer to: EM/ER:97-395

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Steve / Terri
need to do fatal flaw review on these documents + then remand to LANL/DOE or assign to appropriate staff — please let me know by memo your result of fatal flaw review — Benito 10/3/97

Mr. Benito Garcia
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: SUBMITTAL OF RFI REPORTs FOR PRSs IN TAs 0, 1, 3, 10, 11, 13, 15, 16, 19, 33, 36, AND 73

Dear Mr. Garcia:

Enclosed are two copies of each of the Los Alamos National Laboratory's Resource Conservation and Recovery Act Facility Investigation Reports for Potential Release Sites in Technical Areas 0, 1, 3, 10, 11, 13, 15, 16, 19, 33, 36, and 73. One copy of each report is for your information and the second copy of each should go to your technical branch. The list of reports submitted is itemized on the following page.

If you have any questions, please contact Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/ss

Enclosures (1) RFI Reports for PRSs in TAs 0, 1, 3, 10, 11, 13, 15, 16, 19, 33, 36, and 73
(2) Certifications

TV

2340

Reports
RFI RPT TA 0: PRS 0-003, 0-012
NFA RPT TAs 0, 73: PRS 0-034(a,b), 73-001(b), 73-004(c,d)
RFI RPT TA 1: PRS 1-001(s,u), 1-007(l)
RFI RPT TA 3: PRS 3-004(c,d),3-007, 3-014(o), 3-049(b), 3-052(b), 3-056(k), C-03-014, 3-014(k,l,m)
RFI RPT TA 3, PRS 3-054(e), C-3-006, CMR
RFI RPT TA 10: 10-008
Addendum RFI RPT TA 15: PRS C-15-001, C-15-007
RFI RPT TA 19: 19-001, 19-003, C-19-001
Addendum RFI RPT TA 36: PRS 36-005
RFI RPT TA 16: 16-024(c,d,f,g,k,m,o,p-s) 16-025(b2,d,g,h,j,k,m,n,o,y), 16-034(c,d,e,f,l,m), C-16-005, C-16-017
RFI RPT TAs 11, 13, 16: PRSs 11-012(a,b), 13-003(a), 16-006(c,d), 16-010(a), 16-021(a), 16-026(c,d,v), 16-028(a), 16-030(g)
RFI RPT TA 33: PRSs 33-002(b,c), 33-003(b), 33-004(k), 33-006(a), 33-008(a,b), 33-011(d), 33-013, 33-017

Cy (w/ encs.):
G. Allen, CST-7, MS E525
M. Gilgosch, LAAO, MS A316
G. Gould, EES-15, MS J495
D. Griswold, AL-ERD, MS A906
J. Harry, EES-5, MS M992
B. Koch, LAAO, MS A316
D. Krier, EES-1, MS D462
R. Michelotti, CST-7, MS E525
J. Mose, LAAO, MS A316
D. Neleigh, EPA, R.6, 6PD-N
C. Rodriguez, CIO/ER, MS M769
T. Taylor, LAAO, MS A316
J. White, ESH-19, MS K490
S. Dinwiddie, NMED-HRMB
M. Leavitt, NMED-GWQB
J. Parker, NMED-OB
G. Saums, NMED-SWQB
S. Yanicak, NMED-AIP, MS J993
RPF, MS M707

Information Copy:
T. Baca, EM, MS J591
D. Bradbury, EM/ER, MS M992
J. Canepa, EM/ER, MS M992
T. Glatzmaier, DDEES/ER, MS M992
T. Longo, DOE-HQ, EM-453
D. McInroy, EM/ER, MS M992
J. Plum, LAAO, MS A316
S. Rae, ESH-18, MS K497
G. Rael, AL-ERD, MS A906
J. Vozella, LAAO, MS A316
EM/ER File, MS M992

CERTIFICATION

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation.

Document Title: Addendum RFI Report for PRS 36-005 in TA-36

Name: _____ Date: 9-30-97

Jorg Jansen, Program Manager
Environmental Restoration Project
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or

Tom Baca, Program Director
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Joseph Vozella,
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Theodore J. Taylor, Program Manager
Environmental Restoration Program
DOE-Los Alamos Area Office

Addendum RFI Report for Potential Release Site

ENTERED

36-005
Surface Disposal Site

Field Unit 2

Environmental Restoration Project

September 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-97-XXXX

HSWA LANL 2/1130/36

97-375

EXECUTIVE SUMMARY

Potential Release Site (PRS) 36-005, known as the Boneyard, is a surface storage area located across the road from Building TA-36-7, near Minie Firing Site and other active firing sites. It is an undeveloped area, measuring approximately 500 ft by 300 ft. It is located in Technical Area (TA)-36, a remote explosives-testing area in Los Alamos County in north-central New Mexico. TA-36 is bordered by TA-15 to the west, New Mexico Highway 4 to the east, Pajarito Canyon to the north, and Fence Canyon to the south.

This addendum to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for TA-36 describes additional Phase I sampling conducted at PRS 36-005.

The objective of the initial Phase I investigation conducted in 1994 was to determine the presence of contaminants at PRSs located within TA-36, including PRS 36-005. Sampling results were evaluated to determine whether they provided enough information to make decisions regarding the need for cleanup, no further action, or if a Phase II investigation was warranted. Additional Phase I sampling was conducted at PRS 36-005 in 1997 to determine the vertical extent of contamination found during the 1994 sampling and to decide whether additional investigation was necessary, e.g., Phase II or a voluntary corrective action (VCA).

The initial sampling at PRS 36-005 involved the collection of surface soil samples from four areas: areas currently in use; areas indicating recent or former use; the drainage channel; and the area outside of the PRS but within the radii of two adjacent active firing sites. Samples were analyzed in accordance with EPA-approved procedures for radionuclides, semivolatile and volatile organics (SVOCs and VOCs), inorganics, and high explosives. Because of trace concentrations of VOCs detected in surface soils, additional site investigation was conducted to determine the vertical extent of the contamination. The additional sampling of the subsurface soil involved analysis for VOCs only.

Based on the results of the Phase I sampling (both from 1994 and 1997), PRS 36-005 has been recommended for no further action (NFA) based on human health risk according to NFA Criterion 5 (NMED et al. 1995, 1328).

TABLE ES-1

		PROPOSED ACTION			
PRS No.	**HSWA**	**NFA Criteria**	**Further Action**	**Rationale**	**Section No.**
36-005	Yes	5	NFA for Human Health	Site has been characterized and no COPCs are present	5.1

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1.0 INTRODUCTION

1.1 GENERAL SITE HISTORY

Technical Area (TA)-36 was included in the formerly designated Operable Unit (OU) 1130. OU 1130 consisted of TAs -36, -68, and -71 at Los Alamos National Laboratory (the Laboratory) in Los Alamos, New Mexico (NM) (Figure 1.1-1). These TAs are contiguous and cover a total of about 7 mi^2. TAs-68 and -71 are buffer areas, and no Laboratory activities were conducted in these TAs. TA-36 is a remote explosives-testing area consisting of five active firing sites that are used to conduct a total of approximately 1,500 explosives tests annually. Other activities include storage and assembly of prefabricated metal and explosives components, detonators, cables, and instrumentation for the shots.

Potential Release Site (PRS) 36-005, known as the Boneyard, is a surface storage area located in the southwestern portion of TA-36 (Figure 1.1-2), across from Building 36-7, and near the Minie Firing Site [PRS 36-004(c)]. Mesita del Potrillo, where the Boneyard is located, gently slopes into the drainage that enters Fence Canyon from the firing point at Minie. The Boneyard is an undeveloped area measuring approximately 500 ft by 300 ft and covered with ponderosa pine and grass. Throughout its history, the Boneyard has served as a storage area for a variety of non-waste and waste items. From the 1950s until the late 1970s, the Boneyard was used as a parking area for trailers and other large non-waste items. From the late 1970s until the late 1980s, the area was used for surface storage of large waste items that had been exposed to explosives testing (Kelkar 1992, 13-0058).

Waste stored at the Boneyard has included metal drums, cans, and cylinders, as well as scrap metals such as lead sheets, copper, uranium-contaminated steel, and iron. These items served as test targets (EG&G 1989, 13-0045). As a consequence of the 1986 Comprehensive Environmental Assessment and Response Program (CEARP) Report (DOE 1986, 13-0042), the Boneyard underwent a major cleanup. Cans labeled isopentane, uranium-contaminated iron and steel, and unmarked drums and cylinders were removed from the site and disposed of in accordance with established policy (LANL 1990, 0145). The site itself is peppered with many small fragments of metal, plastic, bolts, and other materials that lie on its surface or are embedded in the ground among the natural vegetation (Stauffer 1992, 13-0080). The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan (LANL 1993, 1088) reports chemicals potentially present at the Boneyard as metals, including chromium, silver, zinc, beryllium, copper, lead, and uranium, as well as explosives and explosive residues. Organic compounds in soils and sediments were also listed as chemicals potentially present at the Boneyard.

Currently the site serves as a surface storage area for usable non-waste items, including transportainers and corrugated aluminum sheets (Kelkar 1992, 13-0058 and 13-0051).

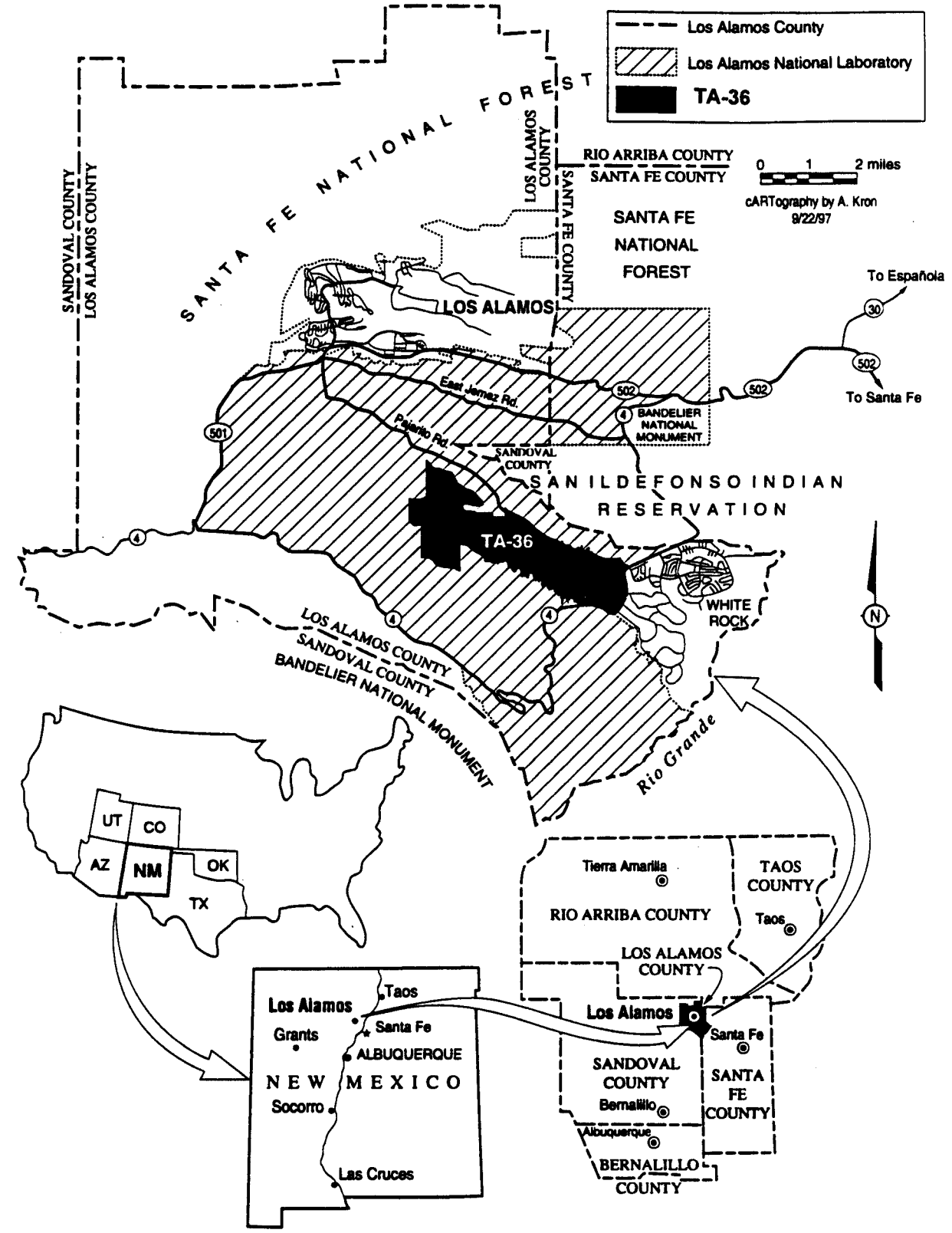

Figure 1.1-1. Location map of TA-36 within Los Alamos National Laboratory, Los Alamos County, New Mexico

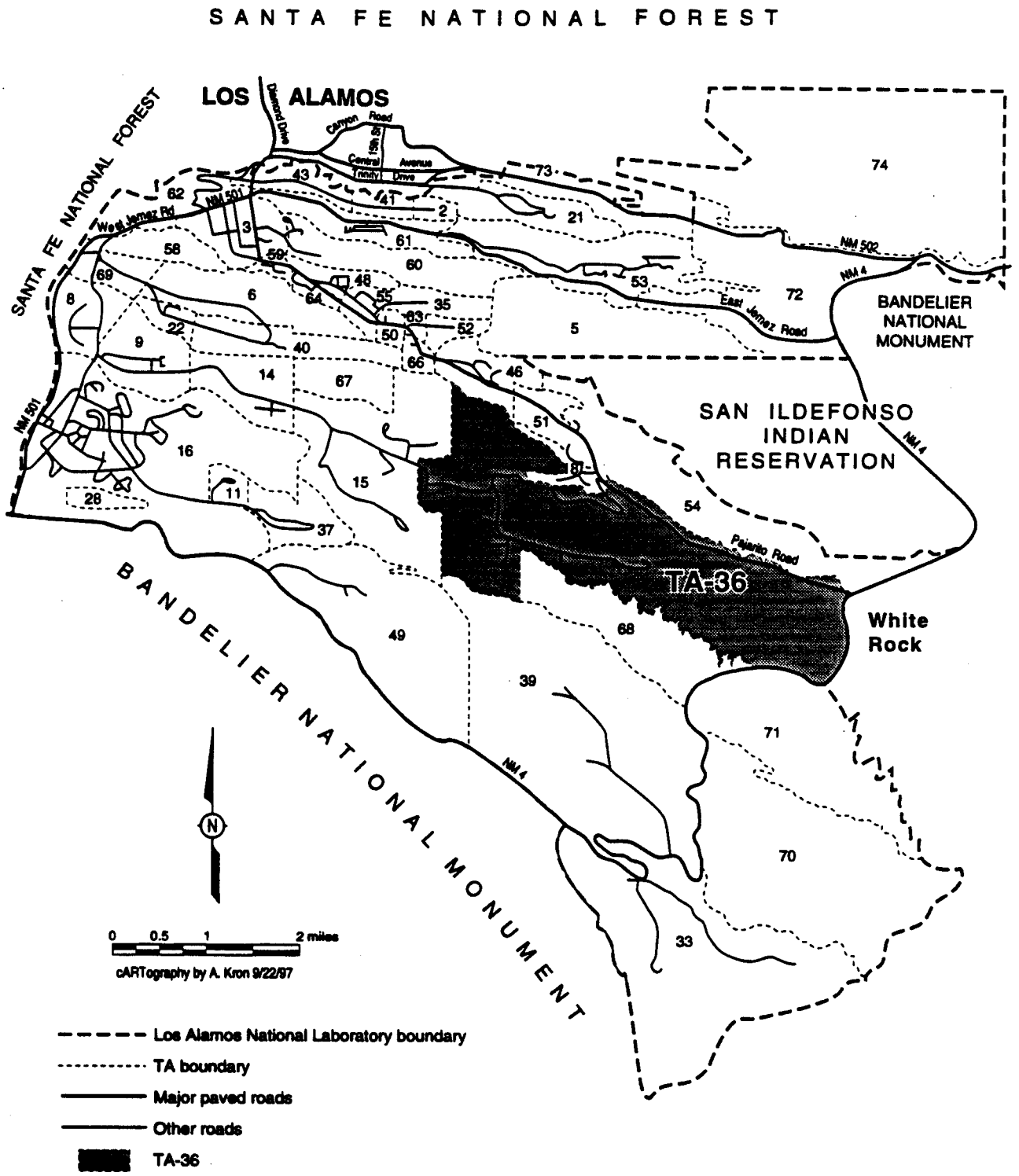

Figure 1.1-2. Location of TA-36 with respect to Laboratory TAs and surrounding landholdings

1.2 RFI OVERVIEW

The overall objectives of field investigations at TA-36 were (1) to determine the nature and extent of releases of hazardous and/or radioactive constituents from PRSs; and (2) to determine whether corrective actions are warranted due to these releases.

PRS 36-005 is listed in Table A of the Hazardous and Solid Waste Amendments (HSWA) Module of the Laboratory's RCRA permit. A Phase I investigation was conducted to determine the presence, concentration, and potential migration of potential contaminants at the site. The conceptual model presented in the RFI Work Plan indicated that contamination from items stored at the Boneyard might discharge into the surrounding soils and potentially migrate from the site via surface water runoff and wind. The analytical results from the RFI Phase I sampling, designed to address the mechanisms outlined in the conceptual model, revealed low concentrations of volatile organic compounds (VOCs) in the surface soils at concentrations below screening action levels (SALs). Additional Phase I investigation consisted of sampling the subsurface soils to determine if VOCs were present in concentrations exceeding SALs. Had VOC concentrations exceeded SALs, a Phase II sampling effort would have been implemented to determine the extent of contamination sufficiently to conduct a risk assessment. Analytical results from this Phase I sampling effort are presented in Chapter 5.0 of this addendum.

1.3 PHASE I ADDENDUM (1997) FIELD ACTIVITIES

Four subsurface soil samples from three sample locations were collected in 1997 from the Boneyard in accordance with the revised sampling and analysis plan (Attachment 1). The selected sample locations were the sites at which the maximum concentrations of each VOC had been detected during the 1994 Phase I surface soil sampling. Pre-fieldwork activities included locating these former sample locations using the 1994 survey coordinates. Sample collection was conducted using a drill rig equipped with a split spoon sampler. The samples were submitted to an offsite fixed laboratory for VOC analysis by EPA SW-846, Method 8260 (EPA 1992, 1207). All applicable LANL ER SOPs (LANL, 0875) were followed, unless otherwise noted in Chapter 5.

2.0 ENVIRONMENTAL SETTING

The environmental setting of the Laboratory is described in Section 2.4 of the Installation Work Plan (IWP) for Environmental Restoration (LANL 1995, 1275). A detailed discussion of the environmental setting for PRS 36-005, including climate, geology, and hydrology, is presented in the RFI Work Plan for OU 1130 (LANL 1993,1088). A summary is presented in the following sections.

2.1 CLIMATE

Los Alamos County is a semiarid, temperate mountain climate. Summers are generally sunny with moderate, warm days and cool nights. The high altitude, light winds, clear skies, and dry atmosphere allow summer temperatures to range from 45° to 95° F.

During the winter, temperatures typically range from 15° to 50° F. The average annual rainfall in the area of PRS 36-005 is estimated to range from 14 to 16 inches. Of this total, 40% occurs as brief, intense thunderstorms during July and August. Streamflow in canyons can occur as a result of these storms. Spring snowmelt runoff may also induce streamflow in the area canyons.

2.2 GEOLOGY

2.2.1 General Geology

A detailed discussion of the geology in the Los Alamos area can be found in Section 2.5.1 of the IWP (LANL 1995,1275). A summary of that material specific to PRS 36-005 is presented below.

PRS 36-005 is situated on a mesa top in the north-central section of LANL. The generalized stratigraphy of the area, as described in the RFI Work Plan for OU 1130 (LANL 1993, 1088), consists of the youngest formation, the Bandelier Tuff, progressing downward to the Tschichoma Formation, the Puye Formation, and the Chino Mesa basalts (Cerros del Rio volcanic field). The Bandelier Tuff is composed of the Tshirege Member followed in depth by the Otowi member (Figure 2.2.1-1). As inferred from deep wells in adjacent TAs, the Tschirege Member underlies the site (Figures 2.2.1-2). Additional correlation from these wells indicates that the main aquifer occurs within the Chino Mesa basalts, approximately 875 ft. to 1000 ft. beneath the site.

2.2.2 Soils

A detailed discussion of the soils in the Los Alamos area can be found in Section 2.5.1.3 of the IWP (LANL 1995,1275). A summary of that material specific to PRS 36-005 is presented below.

The Nyjack loam is present in areas of PRS 36-005. The soil is moderately deep (20 in. to 40 in.) and well drained. Generally, the surface layer of the Nyjack loam consists of approximately 2 in. of either a sandy loam or a very fine sandy loam. The subsurface soil is comprised of approximately 20 in. of clay loam, and the substratum is comprised of approximately 16 in. of gravelly, sandy loam that may contain up to 39% pumice. Permeability of this soil is moderate and the surface slope generally ranges from 1 to 5%; surface water runoff is moderately slow (Figure 2.2.2-1) (Nyhan et al. 1978, 0161). Subsurface soil samples collected during this Phase I addendum were located within the relatively flat, vegetated storage areas of the PRS. The drilling effort revealed that the surface soil layer consists of a silty, sandy loam (approximately 12 to 16 in deep) followed by weathered to moderately welded tuff.

2.3 HYDROLOGY

The hydrology of the Pajarito Plateau is addressed in detail in Section 2.5.2 of the IWP (LANL 1995, 1275). A brief description of surface water and groundwater hydrology at PRS 36-005 is presented below.

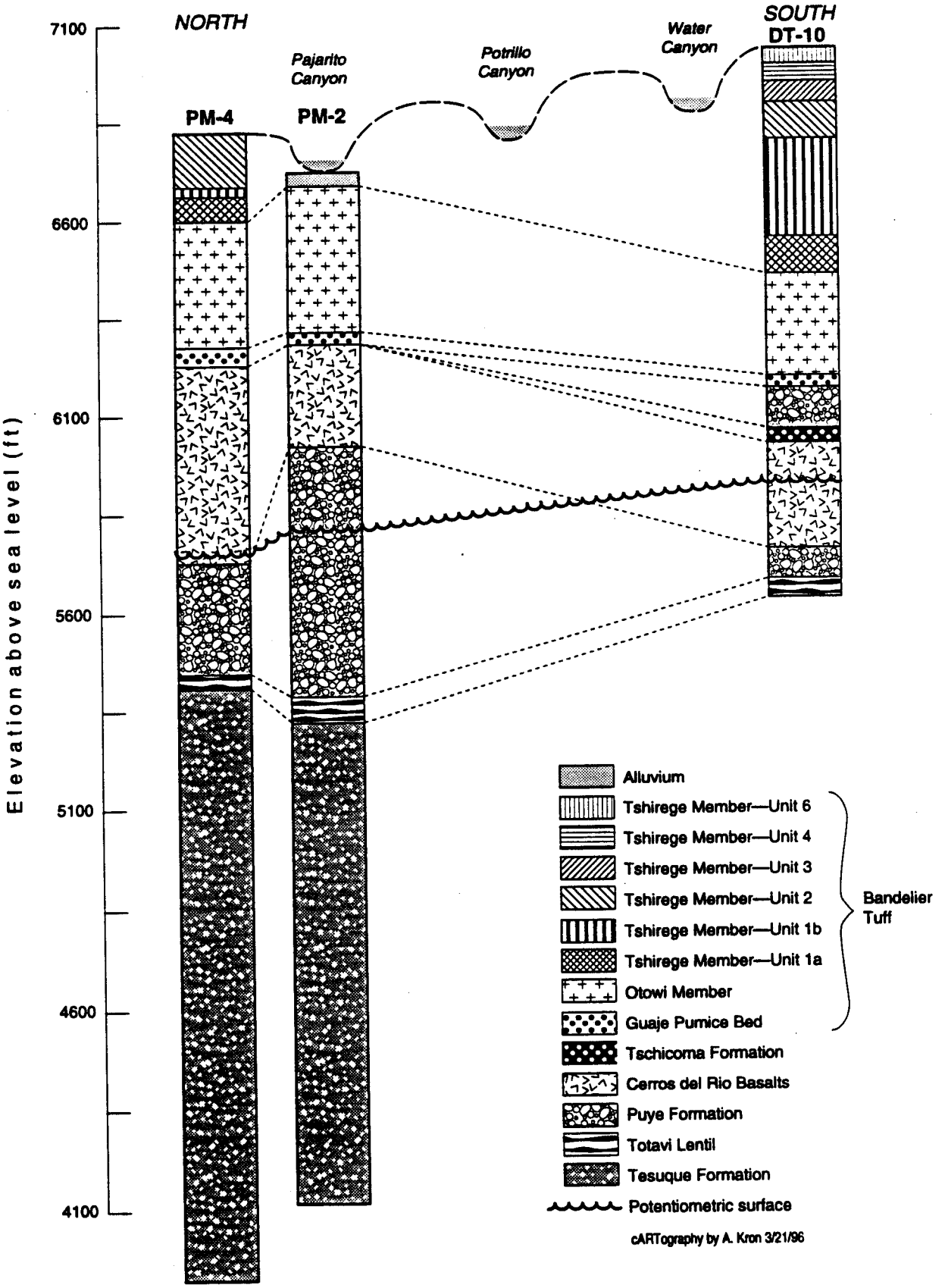

Figure 2.2.1-1 Geologic Setting at TA-36

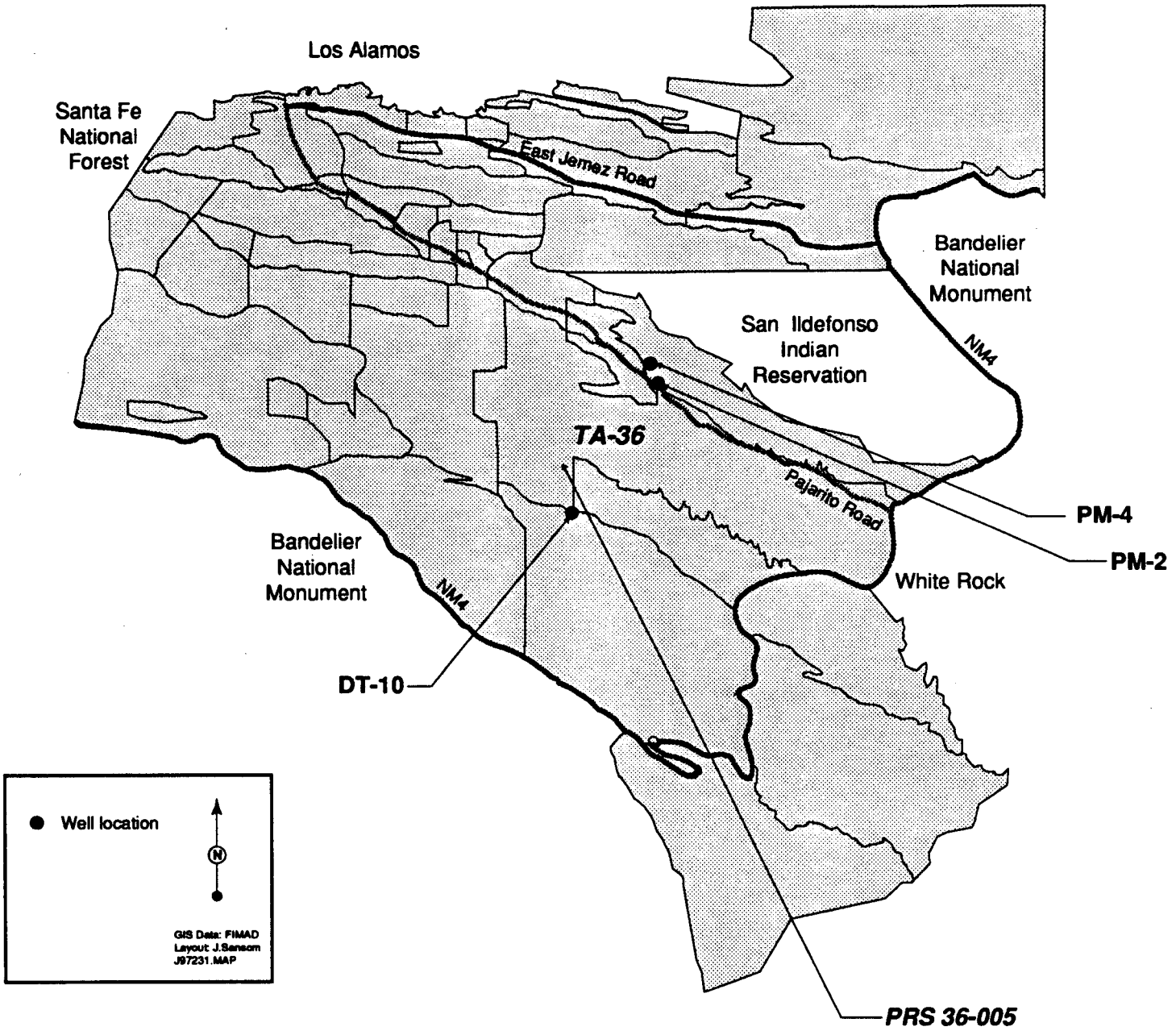

Figure 2.2.1-2 Wells at TA-36 and adjacent TAs

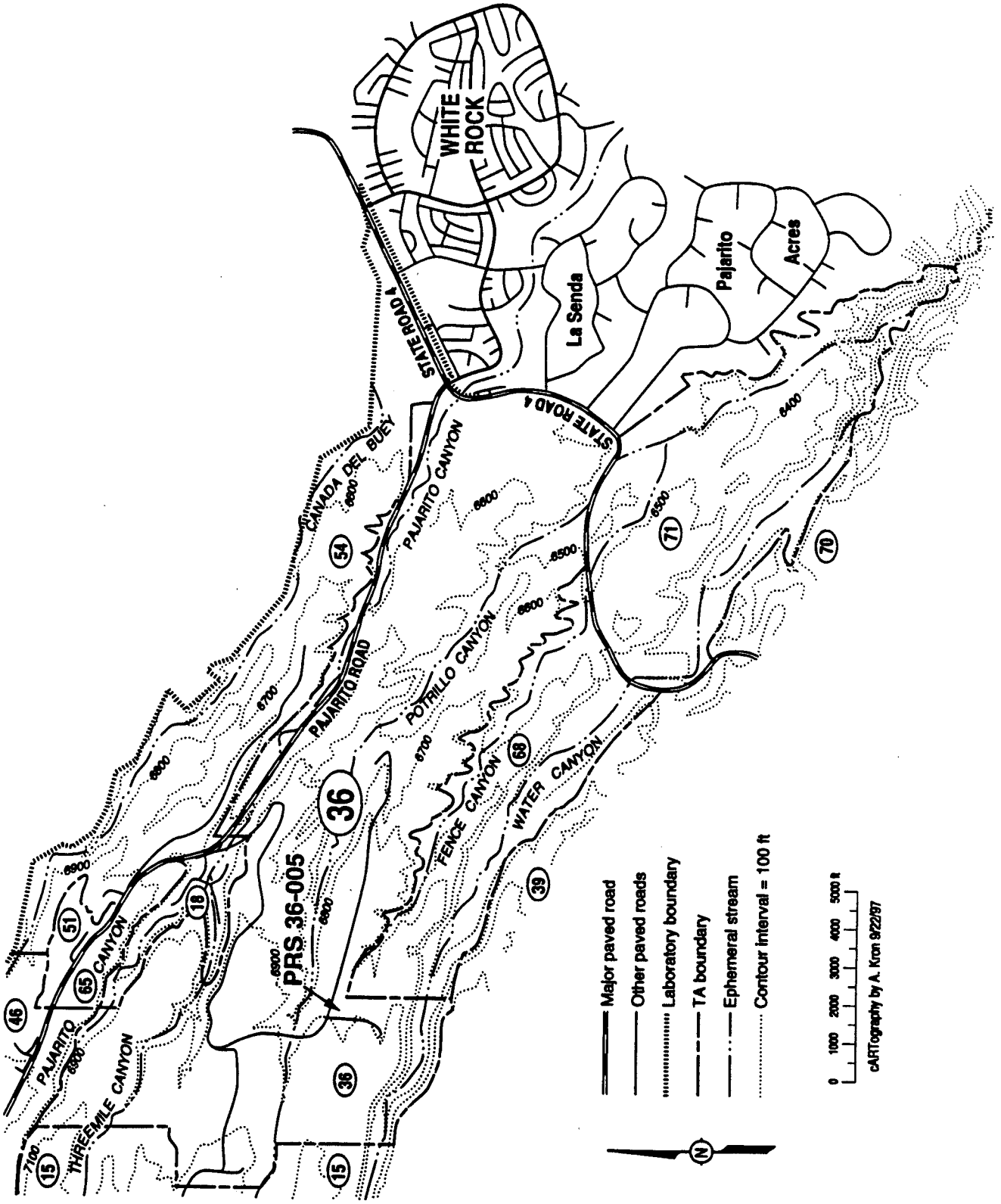

Figure 2.2.2-1 Surface slope at TA-36

2.3.1 Surface Water

PRS 36-005 is situated on a gently sloping mesa top, approximately 100 yards from a drainage pathway generally contributing to the Fence Canyon watershed (Figure 2.2.2-1). The approximate distance from PRS 36-005 to Fence Canyon is ½ mile, as measured along the primary runoff channel. Occasionally, surface water runoff from the site occurs from intense summer thunderstorms and spring snowmelt. At PRS 36-005, historical use has disturbed the surface soils, which has generally accelerated erosion (Graf 1975, 0847; Nyhan & Lane 1986, 0159). There are no streams or springs located in the immediate vicinity of the site. PRS 36-005 is on the list of PRSs in or near watercourses.

2.3.2 Groundwater

Groundwater typically occurs in two modes at TA-36 mesa-top locations: as isolated perched horizons, and as the main aquifer underlying the entire plateau. Deep boreholes or monitoring wells have not been installed in the immediate vicinity of the site. Therefore, it is not known if perched aquifers are present beneath PRS 36-005. The depth to the main aquifer, as inferred by supply wells in adjacent TAs, is approximately 875 to 1000 ft below ground surface (bgs) at TA-36 (Figure 2.2.1-2) (LANL 1993, 1088).

2.4 BIOLOGICAL SURVEYS

Biological resource field surveys have been conducted at OU 1130 for compliance with the Federal Endangered Species Act of 1973; the New Mexico Wildlife Conservation Act; the New Mexico Endangered Plant Species Act; Executive Order 11990, "Protection of Wetlands"; Executive Order 11988, "Floodplain Management"; 10 CFR 1022; Compliance With Floodplain/Wetlands Environmental Review Requirements (DOE 1979, 0633); and DOE Order 5400.1, General Environmental Protection Program (DOE 1988, 0075).

The surveys performed at PRS 36-005 indicated that there were no biological sites at or near the PRSs (ER Project 1995, 1335). Therefore, no special precautions regarding biological resources were required during sampling activities.

2.5 CULTURAL SURVEYS

A cultural survey has also been conducted in the area of PRS 36-005, as required by the National Historic Preservation Act (amended). The survey indicated that there are no cultural sites in the immediate vicinity of the site (ER Project 1995, 1335).

3.0 APPROACH TO SAMPLE ANALYSIS AND DATA ASSESSMENT

The approach to data assessment used by the Environmental Restoration (ER) Project is described in the policy document "Risk-Based Corrective Action Process" (Dorries 1996, 1297). The approach includes

- sampling and analysis design;
- field investigation and collection of field and QA samples;
- chemical and radiochemical analyses of samples and reporting of analytical data;
- baseline verification and validation of analytical data;
- organization of field and analytical data into PRS-specific data set(s);
- exploratory data analysis;
- focused validation when necessary to further assess questionable data;
- comparison of validated analytical results with LANL background data;
- comparison of validated analytical results with SALs;
- evaluation of sufficiency of data set(s) to support the site decisions; and
- assessment of human health risk.

The following subsections provide overviews of the methods used to complete the steps listed above for PRS 36-005.

3.1 SAMPLE ANALYSES

Samples were collected in accordance with the sampling plan suggested by EPA Region 6 (Neleigh 1995, ER ID No. 52333) and provided in Attachment 1. All samples requiring chemical analyses and chain-of-custody documentation were submitted to the Sample Management Office (SMO) for shipment to an offsite laboratory.

3.1.1 Analytical Methods

The following analytical suites were used for the sample analyses during the initial sampling at this site: inorganics, VOCs, semi-volatile organic compounds (SVOCs), high explosives (HE), uranium, isotopic uranium, and analysis by gamma spectroscopy. The additional Phase I sampling presented in this addendum included only VOC analysis. The analytical results for the additional sampling are presented in Appendix A.

All samples were analyzed by contract analytical laboratories using methods specified in ER SMO analytical subcontracts (LANL 1995, 1278). The allowed methods are current EPA SW-846 and Contract Laboratory Program (CLP) methods or equivalent for inorganic chemicals, VOCs, SVOCs, HE, total uranium, isotopic uranium, and by gamma spectroscopy. Analytical method selection is described in Appendix IV of the ER Project Quality Assurance Project Plan Requirements for Sampling and Analysis (QAPP) (LANL 1996, 1292). For each analyte, quantitation or detection limits are specified as contract-required estimated quantitation limits (EQLs) for organic chemicals and radionuclides and estimated detection limits (EDLs) for inorganic chemicals. These limits are included in Appendix III of the ER Project QAPP (LANL 1996, 1292) along with the target analytes for each analytical suite.

3.1.2 Data Validation

Data verification and baseline validation procedures were used to determine whether data packages received from the analytical laboratory were generated according to specifications and contain the information necessary to determine data sufficiency for decision-making. For analytical data used for decisions discussed in this RFI report, baseline data validation under the ER protocol was performed as described in the QAPP (LANL 1996, 1292).

This process produced validation reports, with data qualifiers designating potential deficiencies for affected results. Each data qualifier is accompanied by a reason code that provides information about the deficiency that led to qualification of the data. The validation reports were used in the decision-making process and to direct the focused validations required to evaluate the usability of the data for this report.

Data were qualified (i.e., a marker was attached to the data results) for a variety of reasons during the baseline validation process. The baseline validation procedure used for routine analytical services provides information about the reason the qualifier was applied and its potential impact on the affected data. The purpose is not to reject data but rather to ensure that the relative quality of the data is understood so that the data may be used appropriately.

Data qualifiers used in the LANL ER Project baseline validation process are

A The data required for data review and evaluation are not available.

U The analyte was not positively identified in the sample, and the associated value is the sample-specific EQL/EDL.

J The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.

J+ The analyte was positively identified, and the result is likely to be biased high.

J- The analyte was positively identified, and the result is likely to be biased low.

UJ The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific EQL/EDL.

RPM Without further review of the raw data, the sample results are unusable due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. Presence or absence cannot be verified. NOTE: Any results qualified as RPM must be evaluated for relevance to data use.

P Professional judgment should be applied to using the data in decision-making.

PM Professional judgment should be applied to using the data in decision-making. A manual review of raw data is recommended to determine if the defect affects data use for decision-making.

A focused data validation may be required as a follow-up to the baseline validation. The purpose of a focused validation is to determine the technical adequacy of measurement data when

- The data are qualified as deficient or as requiring professional judgment during the verification/baseline validation process. For example, when holding times are exceeded or interferences are present, a focused validation may be required to assist in determining data adequacy for the intended use.

- The data quality assessment process requires additional information about the

  - variability or uncertainty of the reported data or
  - data quality prior to making a data use decision because of anomalies detected in a data set.

Details of quality assurance/quality control (QA/QC) activities are presented in Chapter 4 of this RFI Report. Qualifiers resulting from baseline and focused validation are shown in the analytical results tables included in Chapter 5 of this report. Summaries of data quality evaluations of analytical data relevant to this report are given in Appendix B. The RPM, P, and PM qualifiers do not appear in Chapter 5 data tables because they are replaced during focused validation according to the data use.

3.2 PROCESS FOR THE IDENTIFICATION OF COPCS

3.2.1 Inorganic Chemicals

Inorganics were not analyzed for part of this Phase I addendum sampling. The inorganics section is presented in the original RFI Report for this PRS (Environmental Restoration Project 1995, 1335).

3.2.2 Radionuclides

Radionuclides were not analyzed for part of this Phase I addendum sampling. The radionuclide section is presented in the original RFI Report for this PRS (Environmental Restoration Project 1995, 1335).

3.2.3 Organic Chemicals

Background data are not available for organic chemicals. Organic chemicals positively identified in one or more samples have been carried forward in the screening assessment process for PRS 36-005 in this addendum to the RFI Report. Chemicals not detected in any sample have been removed from further consideration.

3.2.4 Risk-Based Screening Assessment

Organic chemicals positively identified in one or more samples require further evaluation if they also exceed SALs. SALs for nonradioactive chemicals are based on EPA Region 9 preliminary remediation goals (PRGs) for residential soil. The decision to identify a chemical as a chemical of potential concern (COPC) when a SAL is not available is made on a case-by-case basis, taking into account the availability of process knowledge and toxicological information.

If more than one COPC is present at the site at concentrations less than SALs, a multiple chemical evaluation (MCE) is performed to determine if the potentially additive effect of chemicals detected below SALs warrants additional investigation. The method for performing an MCE is summarized in the policy document "Risk-Based Corrective Action Process" (Dorries 1996, 1297). These comparisons are the last quantitative steps in the screening assessment process for human health concerns. If COPCs remain after this step, then further evaluation is required. If no COPCs remain after this step and the data set is sufficient to support the decision, a no further action (NFA) recommendation may be proposed based on human health concerns.

If COPCs remain after the screening assessment, several options exist for the PRS. A further site-specific evaluation may lead to eliminating a COPC without going into a formal risk assessment. The site may be proposed for further sampling to more completely characterize the site, or for remediation if it is cost-effective to proceed without a risk assessment. A risk assessment may be conducted to determine if the remaining COPCs present an unacceptable human health risk.

3.3 HUMAN HEALTH ASSESSMENT

No human health risk assessment was performed for PRS 36-005 because no COPCs were identified.

3.4 ECOLOGICAL ASSESSMENT

In cooperation with the New Mexico Environmental Department and EPA Region 6, the ER Project is developing an approach for ecological risk assessment. Further discussion of ecological risk assessment methodology will be deferred until the methodology being developed has been approved.

4.0 RESULTS OF QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

Samples were collected, processed, and analyzed in accordance with the ER Project Quality Assurance Project Plan Requirements for Sampling and Analysis (QAPP) (LANL 1996, 1292). The QA/QC samples used to determine the quality and usability of the soil sample data included method blanks, initial and continuing calibrations, surrogates, matrix spikes, laboratory control samples, and internal standards. These samples were analyzed according to the frequency outlined in EPA's functional guidelines for organic data review (EPA 1994, 1205). A review of the technical quality of the data (baseline validation) requires that the data be compared to numerical acceptance criteria established either by the analytical laboratory or EPA for the QA samples mentioned above. The data that do not meet these criteria are qualified to indicate to the data user those sample results that have issues associated with sample handling and analysis.

The QA/QC data associated with this investigation indicated that 100% of the data are acceptable and defensible. Less than 1% of the data are qualified as estimated (J); none of the data are qualified as estimated undetected (UJ) or unusable (R). The qualification of the data because of QA/QC problems did not affect the sufficiency of the data for decision-making purposes because the QA/QC problems did not affect the usability of the data. The qualified data represent data of good quality, reasonable confidence, and suitable for decision-making purposes (EPA 1989, ER ID No. 56023). The QA/QC mechanisms were effective in ensuring the reliability of measured data within expected limits of sampling and analytical error.

This chapter summarizes the results of the data quality evaluation performed on the sample results associated with this report. Four soil samples from three sample locations were collected at this PRS in accordance with the sampling plan. These samples were analyzed for VOCs only. The QA/QC problems for the soil data are summarized in Appendix B (Table B-1) according to request number, sample ID, and analytical suite, respectively.

4.1 ORGANIC ANALYSES

Volatile Organic Compounds

Two samples had acetone, a common laboratory contaminant, detected in the associated laboratory blank. The sample values were less than 10X the blank value, indicating that the detection of this compound may be due to laboratory contamination. Based on the blank contamination, the sample values are qualified as undetected (U).

One sample had acetone detected at a concentration below the estimated quantitation limit (EQL), resulting in the sample value being qualified as J. The sample result for acetone has a high degree of uncertainty because it cannot be accurately distinguished from the instrument "noise" levels. As a result, the datum is usable as an estimated value, but should be used with caution in the screening assessment because it cannot be accurately quantified (see Section 5.1.7).

5.0 SPECIFIC RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 PRS 36-005, BONEYARD

PRS 36-005, the Boneyard, is a surface storage area located in the southwestern portion of TA-36 (Figure 5.1-1). Trace levels of VOCs were detected in surface soils during the 1994 RFI Phase I investigation. Under this 1997 Phase I addendum, the VOCs were further investigated. Results of the sampling effort determined that VOCs are not present in the subsurface soils at levels of concern for human health risk. PRS 36-005 is proposed for no further action (NFA) based on human health risk-based standards.

5.1.1. History

PRS 36-005 is discussed in detail in the RFI Work Plan for OU 1130 (LANL 1993, 1088) and the RFI Report for Potential Release Sites 36-003(a), 36-003(b), 36-005, and C-36-003 (Environmental Restoration Project 1995, 1335). The site has been used for the storage of various waste and nonwaste items since the 1950s. Waste at the Boneyard has included metal drums, cans, and cylinders, as well as scrap metal.

5.1.2 Description

The environmental setting of PRS 36-005 is described in Section 2.0 of this report. Additional information regarding the environmental setting at former OU 1130 is found in the RFI Work Plan for OU 1130 (LANL 1993, 1088) and the Installation Work Plan for Environmental Restoration (IWP) (LANL 1992, 0768).

5.1.3 Previous Investigations

PRS 36-005, the Boneyard, was previously investigated under the 1986 CEARP (DOE 1986,13-0042). The investigation led to a major cleanup of the area which consisted of the removal of containers and debris (LANL 1990, 0145). Soil sampling was not conducted as part of this effort.

Under the Laboratory's Environmental Restoration Program, PRS 36-005 was identified as a potential solid waste management unit (SWMU) and included in Table A of the HSWA Module of the Laboratory's RCRA Permit. RCRA Phase I investigation was initiated in 1994. The objective of the Phase I RFI sampling was to obtain data to determine whether potential contaminants were present at levels above SALs in surface soils within the storage areas. This investigation was also designed to determine whether contaminants had migrated to drainages leading from the PRS. Measured concentrations of potential contaminants at the Boneyard were compared with SALs to determine if there were any COPCs.

The following four areas at the Boneyard requiring investigation were identified in the RFI Work Plan:

1. drainage channels that carry surface water runoff during snowmelt or heavy rainstorms,
2. areas with elevated radioactivity (two or more times the background average),
3. areas currently used for storage or showing signs of recent use, including areas with stained soil, and
4. remainder of the site.

Field activities were conducted at PRS 36-005 on July 28, August 3, and August 4, 1994. Work accomplished during this period included performing geomorphic, radiological, and visual surveys to locate biased sample locations and surface water migration pathways. Using the results of these surveys, 24 biased surface soil samples were collected in the current storage area, from the Boneyard drainage channel, and outside PRS 36-005 but within the hazardous radii of Meenie and Minie firing sites. Nine additional soil samples were collected from random locations in the Boneyard (Table 5.1.3-1).

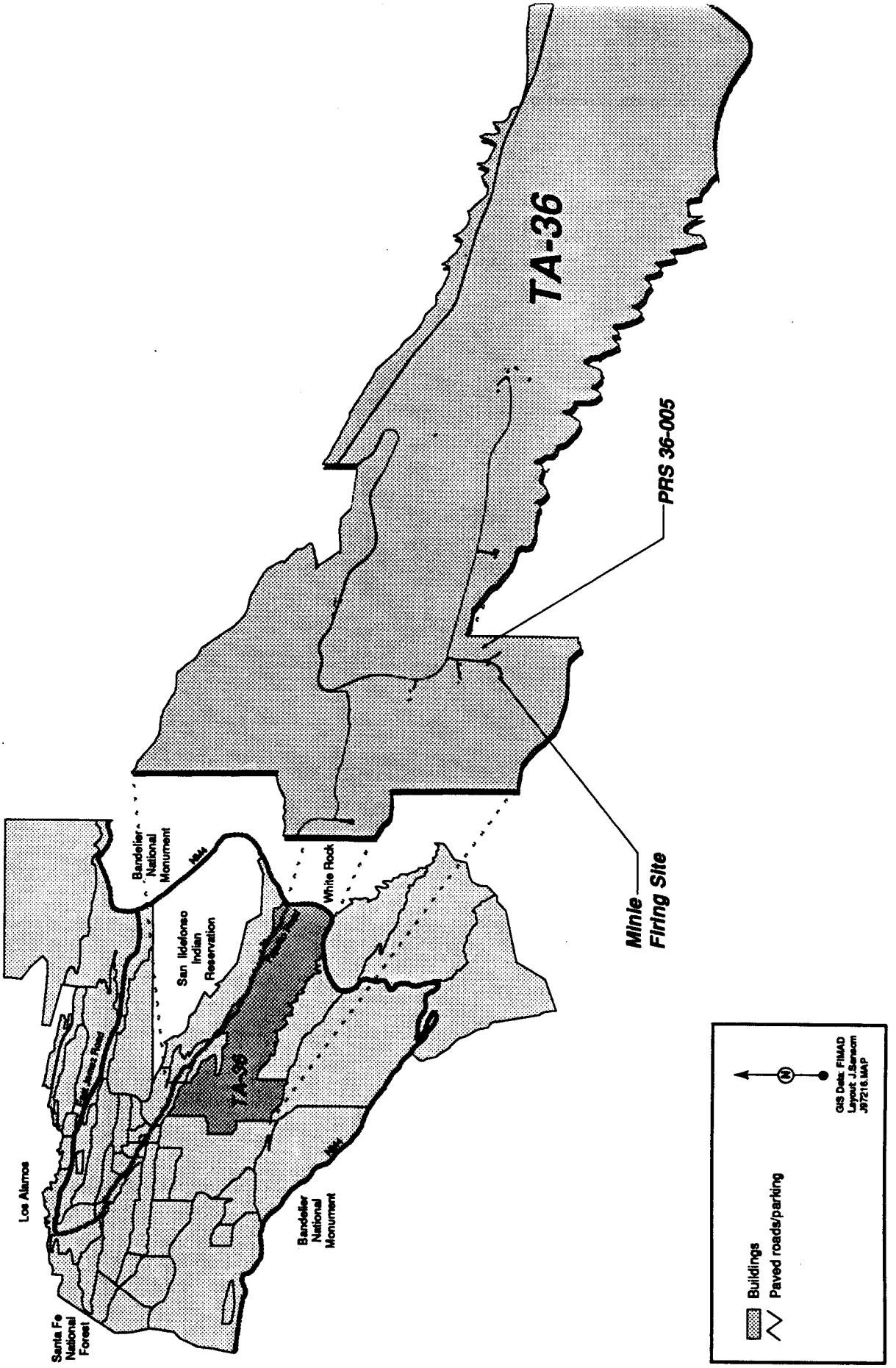

Figure 5.1-1 Location of PRS 36-005, the Boneyard

All 1994 soil samples were surface soil samples taken at depths between 0-6 in., collected in accordance with protocols established in LANL-ER-SOP-6.09, Spade and Scoop Method for Collection of Soil Samples (LANL, 0875). Samples were labeled and packaged according to standard ER practices and procedures, and submitted for analyses under chain-of-custody procedures.

Sample material for VOC analysis was placed directly into the appropriate laboratory-supplied jars and analyzed according to EPA SW-846 Method 8260 (EPA 1992, 1207). The remaining material was homogenized using a stainless steel bowl and spoon. Sample material was then placed in sample containers for laboratory analyses for SVOCs, HE, radionuclides, and metals. Samples for SVOCs were collected and analyzed according to EPA SW-846 Method 8270, HE according to USATHAMA methods, metal according to EPA SW-846 Method 6010, and uranium according to ASTDM D5174-91 and GAMMA SPEC HASL 901.1 (EPA 1992, 1207).

TABLE 5.1.3-1
SUMMARY OF 1994 SAMPLES COLLECTED

Location Id	Sample ID	Depth (inches)	Media	VOCs	Metals	SVOCs	HE	Uranium	GAMMA SPEC
36-3018	AAB 1834	0-6	SOIL	18345[a]	18757[a]	18345[a]	18393[a]	19211[a]	19211[a]
36-3018	AAB 1835	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3019	AAB 1836	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3020	AAB 1837	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3021	AAB 1838	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3022	AAB 1839	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3023	AAB 1840	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3024	AAB 1841	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3025	AAB 1842	0-6	SOIL	18345	18757	18345	18393	19211	19211
36-3026	AAB 1843	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3034	AAB 1852	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3034	AAB 1853	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3035	AAB 1854	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3036	AAB 1855	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3037	AAB 1856	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3038	AAB 1857	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3039	AAB 1858	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3040	AAB 1859	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3041	AAB 1860	0-6	SOIL	18304	18494	18304	18308	19204	19204
36-3042	AAB 1861	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3042	AAB 1862	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3043	AAB 1863	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3044	AAB 1864	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3045	AAB 1865	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3046	AAB 1866	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3047	AAB 1867	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3048	AAB 1868	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3049	AAB 1869	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3050	AAB 1870	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3050	AAB 1871	0-6	SOIL	18390	18759	18390	18392	19514	19514
36-3051	AAB 1872	0-6	SOIL	18390	18759	18390	18392	19514	19514

[a] Number is the request number for this sample batch.

The analytical results from the 1994 RFI sampling effort indicated that the Boneyard contained trace concentrations of VOCs in the surface soils, which included acetone, trichloroethene, 1,2,4-trimethylbenzene, and xylenes. Concentrations of VOCs are commonly lower in surface soils than in underlying material because of volatilization to the air. Subsurface soils were not sampled in the initial Phase I investigation. Additional Phase I sampling was proposed for this site in the RFI Report to investigate the subsurface soil and the results are reported in this addendum. The revised sampling and analysis plan for Phase I and Phase II sampling is presented in Attachment 1. This revised plan was suggested by EPA Region 6 as part of a Notice of Deficiency (NOD) for the RFI report for PRS 36-005 (Neleigh 1995, ER ID No. 52333). The results of the initial Phase I sampling are presented in the RFI Report (Environmental Restoration Project 1995, 1335) and are summarized in Figure 5.1.3-1. The volatile organic results are presented in Table A2-1 in Attachment 2.

- Three inorganic chemicals—silver, thallium, and uranium—were detected in the surface soil samples at concentrations greater than their respective natural background UTLs. Statistical comparisons of the site data sets to the background distributions using the Gehan, Quantile, and Slippage Tests indicated that uranium was not statistically different from background (p-values = 1.0, 0.9, and 0.2, respectively). The remaining two inorganics—silver and thallium—had concentrations that exceeded the statistical background data sets, and were carried forward to the SAL comparison stage. The other inorganics were either undetected or had detected concentrations less than the background UTLs and were eliminated from further evaluation.

- Silver and thallium were detected below their SALs and were submitted to the MCE for noncarcinogenic effects.

- One radionuclide isotope—uranium-235—was detected at concentrations above the background UTL of 0.084 pCi/g and was carried forward to the SAL comparison stage.

- Uranium-235 was detected below its SAL of 10 pCi/g. It was not submitted to the MCE because it was the only analyte in the radionuclide effects category and was, therefore, not evaluated further.

- Eight organics — acetone, methylene chloride, 4-methyl-2-pentanone, RDX, toluene, trichloroethene, 1,2,4-trimethylbenzene, and xylenes — were detected in the surface soil and were carried forward to the SAL comparison stage. The organics that were undetected were eliminated from further evaluation.

- All of the organics were detected below their SALs and were submitted to the MCE for carcinogenic or noncarcinogenic effects.

- The MCE included seven analytes in the noncarcinogenic effects category. The sum of the normalized concentrations of these analytes was 0.2, which was less than the target value of 1, indicating that the potential for an unacceptable risk to human health from combined effects was unlikely. Therefore, these analytes were eliminated from further evaluation.

- The MCE included three analytes in the carcinogenic effects category. The sum of the normalized concentrations of these analytes was 0.5, which is less than the target value of 1, indicating that the potential for an unacceptable risk to human health from combined effects was unlikely. Therefore, these two organics were eliminated from further evaluation.

No COPCs were identified by the initial Phase I sampling at PRS 36-005.

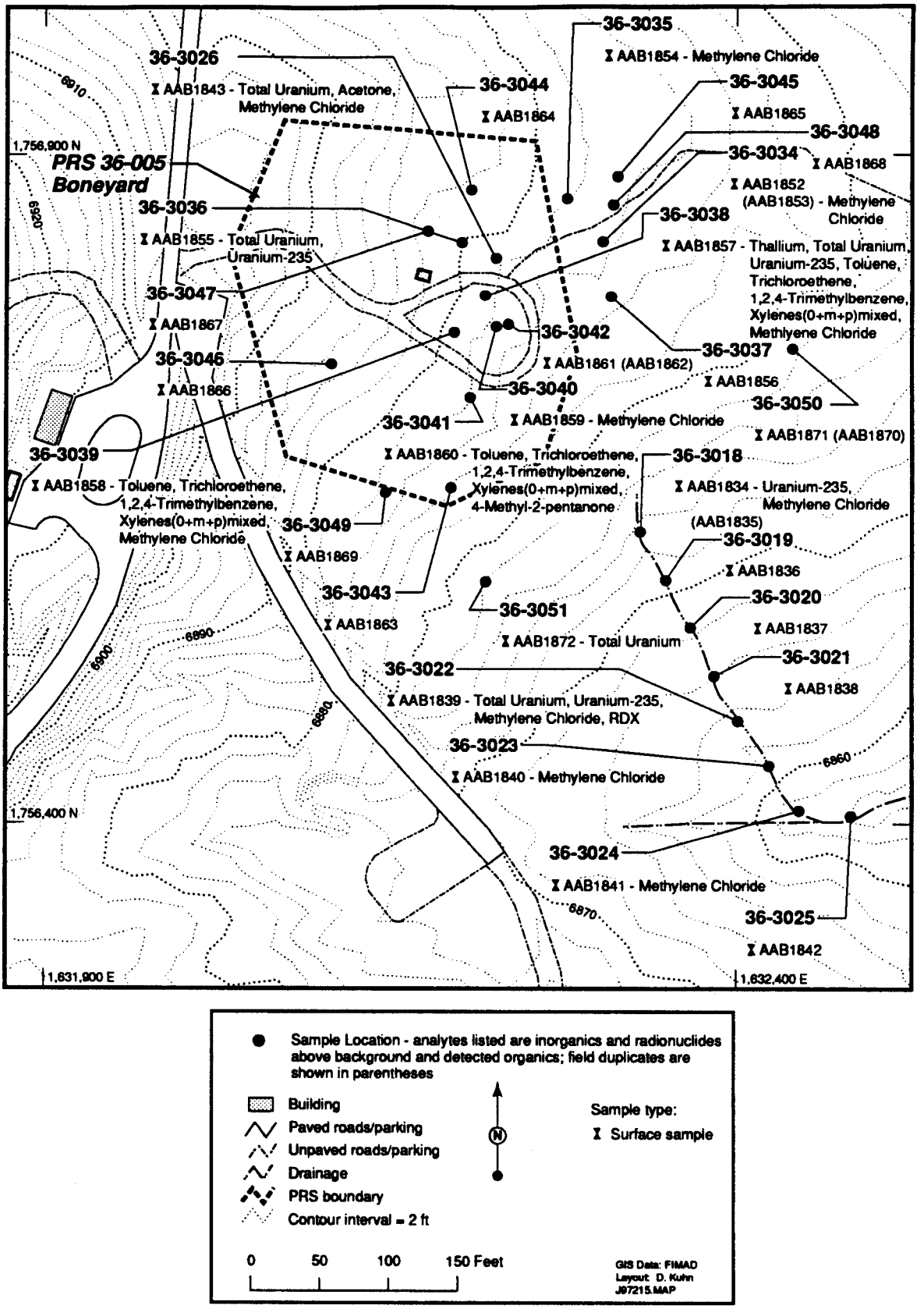

Figure 5.1.3-1 PRS 36-005 Initial sampling locations

5.1.4 Field Investigation

The additional Phase I sampling effort was conducted on April 22, 1997 to address the trace levels of VOCs detected in the 1994 sampling effort. The activities were conducted in accordance with the revised sampling plan (Attachment 1) suggested by EPA Region 6 in the response to the Notice of Deficiency received for the RFI Report for Potential Release Sites 36-003(a), 36-003(b), 36-005, and C-36-003 (Jansen and Taylor 1996, ER ID No. 52912). Attachment 1 contains the revised sampling and analysis plan for PRS 36-005.

Four subsurface soil samples were collected from three sample locations that contained the maximum concentrations of each VOC detected in the surface soil during the initial Phase I sampling (Figure 5.1.4-1 and Table 5.1.4-1). These former sample locations, 36-3026, 36-3038, and 36-3039, were identified using the 1994 survey coordinates. Subsurface samples were obtained from each location using a drill rig equipped with a split spoon sampler. Borehole cuttings and core were continuously monitored for organic vapors using a photoionizing detector (PID). An additional sample was collected from location 36-3039 as elevated PID readings were reported. Borehole material was also monitored for radioactivity. All radioactivity readings were at background levels. Sample intervals and core descriptions from each location are presented in Attachment 3.

Samples were submitted for laboratory analysis for VOCs only. Sample material was collected from the split spoon sampler and placed directly into the appropriate laboratory-supplied jars, and analyzed according to EPA SW-846 Method 8260 (EPA 1992, 1207). Duplicate samples were not collected due to the poor core recovery at the designated location. Sample depths were adjusted from those specified in the SAP because tree roots were encountered at the designated collection depth, forcing samples to be collected slightly deeper than the 12-inch depth called out in the SAP.

TABLE 5.1.4-1
SUMMARY OF THE 1997 SAMPLES COLLECTED

Location ID	Sample ID	Depth (in)	Media	VOCs
35-3026	0236-97-0023	20-22	subsurface soil	3076R[a]
36-3038	0236-97-0024	12-14	subsurface soil	3076R
36-3039	0236-97-0026	16-18	subsurface soil	3076R
36-3039	0236-97-0027	39-40	subsurface soil	3076R

[a] Number is the request number for this sample batch.

5.1.5 Evaluation of Inorganic Chemicals

Inorganics were not analyzed as part of the additional sampling conducted at this PRS. Available inorganic data are presented in the RFI Report (Environmental Restoration Project 1995, 1335) and summarized in Section 5.1.3 of this addendum.

5.1.6 Evaluation of Radionuclides

Radionuclides were not analyzed as part of the additional sampling conducted at this PRS. Available radionuclide data are presented in the RFI Report (Environmental Restoration Project 1995, 1335) and summarized in Section 5.1.3 of this addendum.

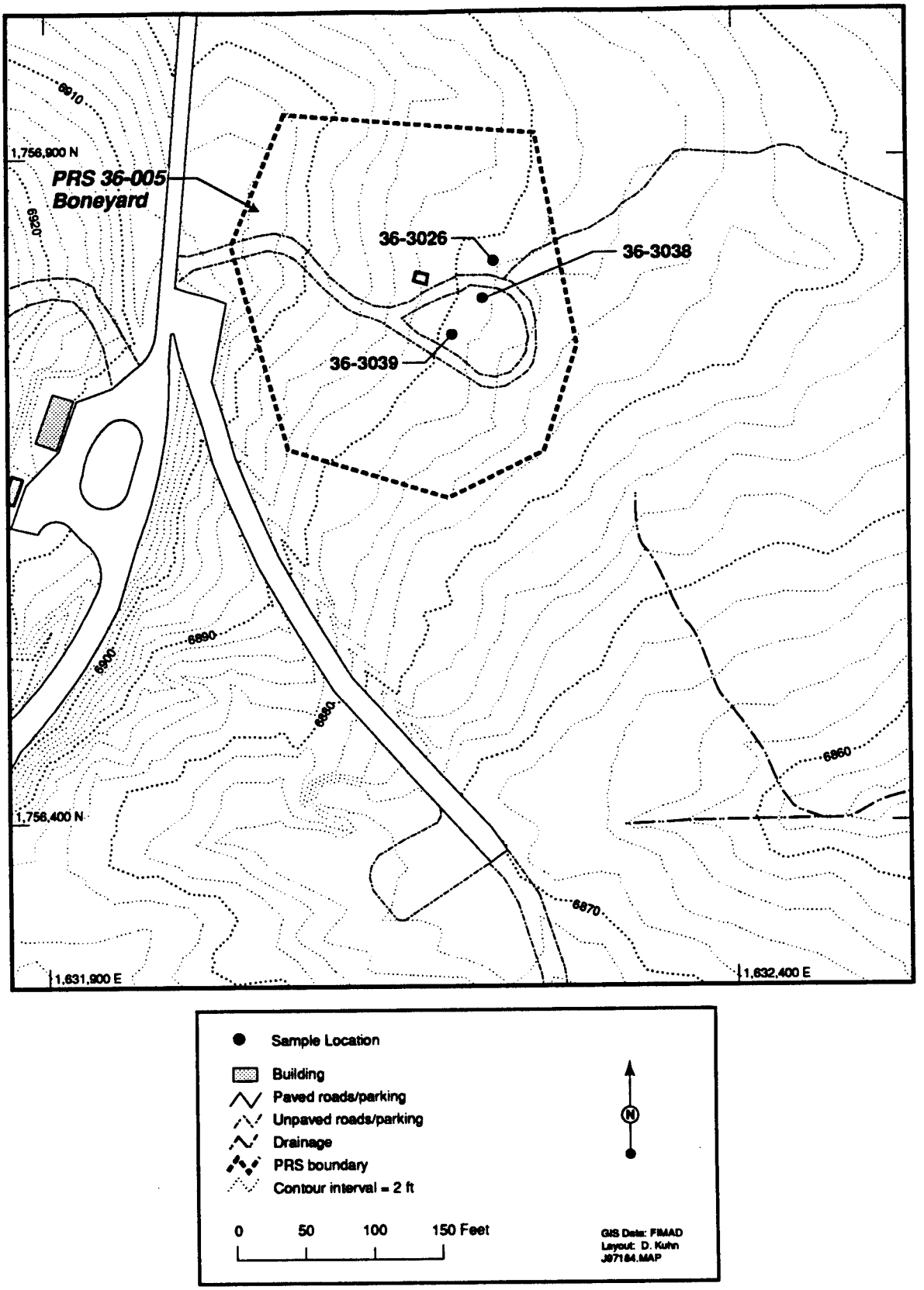

Figure 5.1.4-1 PRS 36-005 Addendum sampling locations

5.1.7 Evaluation of Organic Chemicals

Acetone was detected in one subsurface soil sample (Sample ID 0236-97-0027) at a concentration of 0.003 (J) mg/kg (Figure 5.1.7-1). This concentration was several orders of magnitude below the concentration detected (0.5 mg/kg) in the initial Phase I sampling. No other volatile organic compounds were detected in the samples collected during this sampling effort. The organic data from the initial sampling are presented in the RFI Report (Environmental Restoration Project 1995, 1335), summarized in Section 5.1.3 of this addendum, and presented in Attachment 2.

5.1.8 Risk-Based Screening Assessment

Acetone was the only organic detected in the subsurface samples collected from this PRS. The detected concentration (0.003 mg/kg) was more than five orders of magnitude below the SAL for acetone (2100 mg/kg). It was not submitted to an MCE because it was the only analyte detected. Therefore, based on the comparison to SAL, acetone was not retained as a COPC and was eliminated from further evaluation.

5.1.9 Human Health Risk Assessment

No human health risk assessment was performed at this PRS because the analytical data and risk-based screening assessments indicated that there were no COPCs present at this site that would result in an unacceptable risk to human health.

5.1.9.1 Review of COPCs and Extent of Contamination

The 1994 Phase I sampling results presented in the RFI Report indicated that the surface soil in the Boneyard contained low levels of VOCs. The area outside of the Boneyard, including the drainage area, also contained low levels of organics (<0.5 mg/kg and orders of magnitude below SALs) and/or inorganics below or slightly above background. The additional Phase I sampling was conducted to determine whether the VOCs were present in the subsurface soil at the locations that had detected concentrations. The sampling plan, which was suggested by EPA Region 6 (Neleigh 1995, ER ID No. 52333) and included in the NOD response (Jansen and Taylor 1996, ER ID No. 52912), involved collecting samples from three locations. The results of the additional sampling indicated that, except for one low-level detection of acetone (see Section 5.1.8), no VOCs were detected in the subsurface soil. The sampling conducted at this PRS has determined that the levels of contamination in the surface and subsurface soil within the Boneyard and the surface soil outside of the Boneyard are not at concentrations that may result in an unacceptable risk to human health.

5.1.10 Preliminary Ecological Assessment

The PRS has not been evaluated for the potential for ecological risk. The PRS will be evaluated when the ecological risk assessment methodology is implemented by the Laboratory.

5.1.11 Conclusions and Recommendations

The Boneyard, PRS 36-005, has been sampled and evaluated for human health risk. The sampling indicates that low-level VOCs are present in the surface soil within the storage area. Although no VOCs are present in the surface soils at concentrations that would result in concerns for human health, additional sampling was conducted in 1997 to determine whether the same held true for subsurface soils. The VOCs detected during the 1994 Phase I sampling—methylene chloride, toluene, trichloroethene, 1,2,4-trimethylbenzene, and mixed xylenes—were not detected at a detection limit of 0.006 mg/kg in the subsequent subsurface soil samples. 4-Methyl-2-pentanone was also not detected at a detection limit of

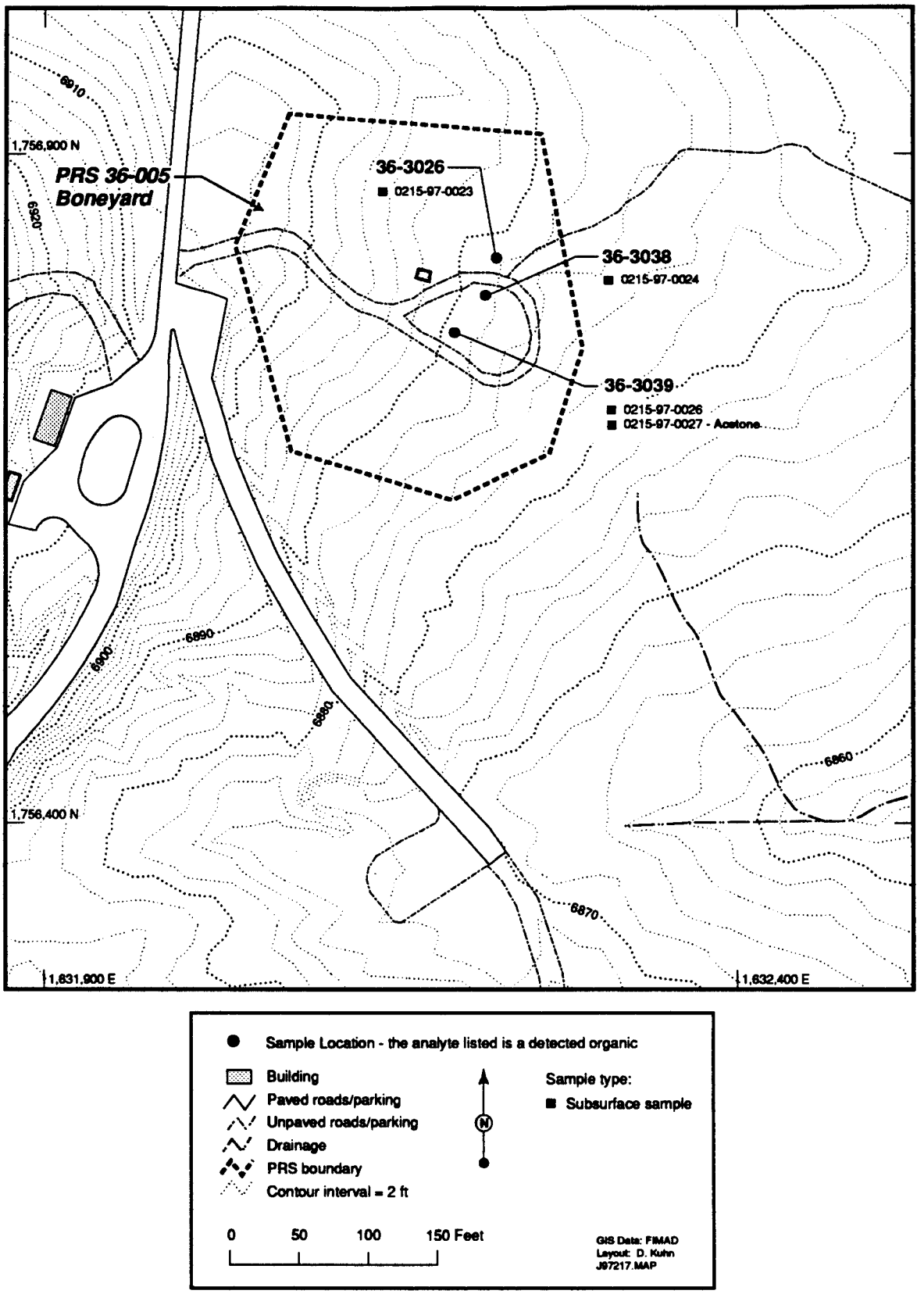

Figure 5.1.7-1 PRS 36-005 Addendum sampling locations with analyte detections

0.02 mg/kg. All of the detection limits are several orders of magnitude below the respective SALs for these organic compounds. Although acetone was detected, it was present at a concentration that is five orders of magnitude below its SAL. Based on the analytical data and the results of the risk-based screening assessment, PRS 36-005 is recommended for no further action (NFA) based on human health risk according to DOU Criterion 5, Annex B (NMED et al. 1995, 1328).

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APPENDIX A ANALYTICAL RESULTS

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Ethylbenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Ethylbenzene	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Ethylbenzene	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Styrene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Styrene	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Styrene	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropene[cis-1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropene[cis-1,3-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropene[cis-1,3-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloropropene[trans-1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropene[trans-1,3-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropene[trans-1,3-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Propylbenzene[1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Propylbenzene[1-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Propylbenzene[1-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butylbenzene[n-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Butylbenzene[n-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butylbenzene[n-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chlorotoluene[4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chlorotoluene[4-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chlorotoluene[4-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichlorobenzene[1,4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichlorobenzene[1,4-]	54	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichlorobenzene[1,4-]	56	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dibromoethane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dibromoethane[1,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dibromoethane[1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloroethane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloroethane[1,2-]	66	UG/KG				VOAGCMSN	MS

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Dichloroethane[1,2-]	62	UG/KG				VOAGCMSN	MSD
0236-97-0023	Methyl-2-pentanone[4-]	23	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Methyl-2-pentanone[4-]	23	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Methyl-2-pentanone[4-]	23	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Trimethylbenzene[1,3,5-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trimethylbenzene[1,3,5-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trimethylbenzene[1,3,5-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Bromobenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Bromobenzene	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromobenzene	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Toluene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Toluene	103	%				VOAGCMSN	MS
0236-97-0023	Toluene	100	%				VOAGCMSN	MSD
0236-97-0023	Chlorobenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chlorobenzene	107	%				VOAGCMSN	MS
0236-97-0023	Chlorobenzene	99	%				VOAGCMSN	MSD
0236-97-0023	Chlorodibromomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chlorodibromomethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chlorodibromomethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Tetrachloroethene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Tetrachloroethene	55	UG/KG				VOAGCMSN	MSD
0236-97-0023	Tetrachloroethene	60	UG/KG				VOAGCMSN	MS
0236-97-0023	Xylene (Total)	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Xylene (Total)	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Xylene (Total)	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Butylbenzene[sec-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Butylbenzene[sec-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butylbenzene[sec-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropane[1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropane[1,3-]	6	UG/KG		U		VOAGCMSN	MSD

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Dichloropropane[1,3-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dibromofluoromethane	109	%				VOAGCMSN	SAMPLE
0236-97-0023	Dibromofluoromethane	115	%				VOAGCMSN	MS
0236-97-0023	Dibromofluoromethane	112	%				VOAGCMSN	MSD
0236-97-0023	Toluene-d8	101	%				VOAGCMSN	SAMPLE
0236-97-0023	Toluene-d8	105	%				VOAGCMSN	MS
0236-97-0023	Toluene-d8	104	%				VOAGCMSN	MSD
0236-97-0023	Bromofluorobenzene[4-]	84	%				VOAGCMSN	SAMPLE
0236-97-0023	Bromofluorobenzene[4-]	85	%				VOAGCMSN	MSD
0236-97-0023	Bromofluorobenzene[4-]	85	%				VOAGCMSN	MS
0236-97-0023	Dichloroethene[cis/trans-1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloroethene[cis/trans-1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloroethene[cis/trans-1,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichlorobenzene[1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichlorobenzene[1,3-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichlorobenzene[1,3-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Carbon Tetrachloride	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Carbon Tetrachloride	61	UG/KG				VOAGCMSN	MSD
0236-97-0023	Carbon Tetrachloride	65	UG/KG				VOAGCMSN	MS
0236-97-0023	Dichloropropene[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropene[1,1-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropene[1,1-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Hexanone[2-]	23	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Hexanone[2-]	23	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Hexanone[2-]	23	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropane[2,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropane[2,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloropropane[2,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Tetrachloroethane[1,1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Tetrachloroethane[1,1,1,2-]	6	UG/KG		U		VOAGCMSN	MSD

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Tetrachloroethane[1,1,1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Acetone	6	UG/KG		BJ	U	VOAGCMSN	SAMPLE
0236-97-0023	Acetone	6	UG/KG		BJ		VOAGCMSN	MS
0236-97-0023	Acetone	23	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chloroform	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chloroform	59	UG/KG				VOAGCMSN	MS
0236-97-0023	Chloroform	57	UG/KG				VOAGCMSN	MSD
0236-97-0023	Benzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Benzene	101	%				VOAGCMSN	MSD
0236-97-0023	Benzene	105	%				VOAGCMSN	MS
0236-97-0023	Trichloroethane[1,1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichloroethane[1,1,1-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trichloroethane[1,1,1-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Bromomethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Bromomethane	11	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromomethane	11	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Chloromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chloromethane	11	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chloromethane	11	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Iodomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Iodomethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Iodomethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dibromomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dibromomethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dibromomethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromochloromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Bromochloromethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromochloromethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Chloroethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chloroethane	11	UG/KG		U		VOAGCMSN	MSD

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Chloroethane	11	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Vinyl Chloride	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Vinyl Chloride	73	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Vinyl Chloride	74	UG/KG				VOAGCMSN	MS
0236-97-0023	Methylene Chloride	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Methylene Chloride	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Methylene Chloride	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Carbon Disulfide	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Carbon Disulfide	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Carbon Disulfide	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromoform	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Bromoform	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Bromoform	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromodichloromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Bromodichloromethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Bromodichloromethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloroethane[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloroethane[1,1-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloroethane[1,1-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloroethene[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloroethene[1,1-]	124	%				VOAGCMSN	MS
0236-97-0023	Dichloroethene[1,1-]	117	%				VOAGCMSN	MSD
0236-97-0023	Trichlorofluoromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichlorofluoromethane	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trichlorofluoromethane	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichlorodifluoromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichlorodifluoromethane	11	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichlorodifluoromethane	11	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Trichloro-1,2,2-trifluoroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichloro-1,2,2-trifluoroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	MSD

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Trichloro-1,2,2-trifluoroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichloropropane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichloropropane[1,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dichloropropane[1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butanone[2-]	23	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Butanone[2-]	63	UG/KG				VOAGCMSN	MSD
0236-97-0023	Butanone[2-]	78	UG/KG				VOAGCMSN	MS
0236-97-0023	Trichloroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichloroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Trichloroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trichloroethene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichloroethene	109	%				VOAGCMSN	MS
0236-97-0023	Trichloroethene	105	%				VOAGCMSN	MSD
0236-97-0023	Tetrachloroethane[1,1,2,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Tetrachloroethane[1,1,2,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Tetrachloroethane[1,1,2,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Chlorotoluene[2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Chlorotoluene[2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Chlorotoluene[2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichlorobenzene[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dichlorobenzene[1,2-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dichlorobenzene[1,2-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trimethylbenzene[1,2,4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trimethylbenzene[1,2,4-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Trimethylbenzene[1,2,4-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Dibromo-3-chloropropane[1,2-]	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Dibromo-3-chloropropane[1,2-]	11	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Dibromo-3-chloropropane[1,2-]	11	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Trichloropropane[1,2,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Trichloropropane[1,2,3-]	6	UG/KG		U		VOAGCMSN	MSD

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0023	Trichloropropane[1,2,3-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butylbenzene[tert-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Butylbenzene[tert-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Butylbenzene[tert-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Isopropylbenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Isopropylbenzene	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0023	Isopropylbenzene	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Isopropyltoluene[4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0023	Isopropyltoluene[4-]	6	UG/KG		U		VOAGCMSN	MS
0236-97-0023	Isopropyltoluene[4-]	6	UG/KG		U		VOAGCMSN	MSD
0236-97-0024	Ethylbenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Styrene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloropropene[cis-1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloropropene[trans-1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Propylbenzene[1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Butylbenzene[n-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chlorotoluene[4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichlorobenzene[1,4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dibromoethane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloroethane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Methyl-2-pentanone[4-]	25	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trimethylbenzene[1,3,5-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Bromobenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Toluene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chlorobenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chlorodibromomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Tetrachloroethene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Xylene (Total)	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Butylbenzene[sec-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloropropane[1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0024	Dibromofluoromethane	113	%				VOAGCMSN	SAMPLE
0236-97-0024	Toluene-d8	103	%				VOAGCMSN	SAMPLE
0236-97-0024	Bromofluorobenzene[4-]	87	%				VOAGCMSN	SAMPLE
0236-97-0024	Dichloroethene[cis/trans-1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichlorobenzene[1,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Carbon Tetrachloride	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloropropene[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Hexanone[2-]	25	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloropropane[2,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Tetrachloroethane[1,1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Acetone	25	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chloroform	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Benzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichloroethane[1,1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Bromomethane	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chloromethane	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Iodomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dibromomethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Bromochloromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chloroethane	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Vinyl Chloride	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Methylene Chloride	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Carbon Disulfide	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Bromoform	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Bromodichloromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloroethane[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichloroethene[1,1-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichlorofluoromethane	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichlorodifluoromethane	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichloro-1,2,2-trifluoroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0024	Dichloropropane[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Butanone[2-]	25	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichloroethane[1,1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichloroethene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Tetrachloroethane[1,1,2,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Chlorotoluene[2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dichlorobenzene[1,2-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trimethylbenzene[1,2,4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Dibromo-3-chloropropane[1,2-]	12	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Trichloropropane[1,2,3-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Butylbenzene[tert-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Isopropylbenzene	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0024	Isopropyltoluene[4-]	6	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Ethylbenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Styrene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropene[cis-1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropene[trans-1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Propylbenzene[1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Butylbenzene[n-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chlorotoluene[4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichlorobenzene[1,4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dibromoethane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloroethane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Methyl-2-pentanone[4-]	22	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trimethylbenzene[1,3,5-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Bromobenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Toluene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chlorobenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chlorodibromomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Tetrachloroethene	5	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0026	Xylene (Total)	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Butylbenzene[sec-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropane[1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dibromofluoromethane	113	%				VOAGCMSN	SAMPLE
0236-97-0026	Toluene-d8	105	%				VOAGCMSN	SAMPLE
0236-97-0026	Bromofluorobenzene[4-]	86	%				VOAGCMSN	SAMPLE
0236-97-0026	Dichloroethene[cis/trans-1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichlorobenzene[1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Carbon Tetrachloride	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropene[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Hexanone[2-]	22	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropane[2,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Tetrachloroethane[1,1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Acetone	8	UG/KG		BJ	U	VOAGCMSN	SAMPLE
0236-97-0026	Chloroform	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Benzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trichloroethane[1,1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Bromomethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chloromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Iodomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dibromomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Bromochloromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chloroethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Vinyl Chloride	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Methylene Chloride	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Carbon Disulfide	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Bromoform	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Bromodichloromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloroethane[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloroethene[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0026	Trichlorofluoromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichlorodifluoromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trichloro-1,2,2-trifluoroethane[1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichloropropane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Butanone[2-]	22	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trichloroethane[1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trichloroethene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Tetrachloroethane[1,1,2,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Chlorotoluene[2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dichlorobenzene[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trimethylbenzene[1,2,4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Dibromo-3-chloropropane[1,2-]	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Trichloropropane[1,2,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Butylbenzene[tert-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Isopropylbenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0026	Isopropyltoluene[4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Ethylbenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Styrene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropene[cis-1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropene[trans-1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Propylbenzene[1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Butylbenzene[n-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Chlorotoluene[4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichlorobenzene[1,4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dibromoethane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloroethane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Methyl-2-pentanone[4-]	21	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trimethylbenzene[1,3,5-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Bromobenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Toluene	5	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0027	Chlorobenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Chlorodibromomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Tetrachloroethene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Xylene (Total)	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Butylbenzene[sec-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropane[1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dibromofluoromethane	115	%				VOAGCMSN	SAMPLE
0236-97-0027	Toluene-d8	106	%				VOAGCMSN	SAMPLE
0236-97-0027	Bromofluorobenzene[4-]	92	%				VOAGCMSN	SAMPLE
0236-97-0027	Dichloroethene[cis/trans-1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichlorobenzene[1,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Carbon Tetrachloride	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropene[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Hexanone[2-]	21	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropane[2,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Tetrachloroethane[1,1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Acetone	3	UG/KG		J		VOAGCMSN	SAMPLE
0236-97-0027	Chloroform	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Benzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichloroethane[1,1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Bromomethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Chloromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Iodomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dibromomethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Bromochloromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Chloroethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Vinyl Chloride	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Methylene Chloride	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Carbon Disulfide	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Bromoform	5	UG/KG		U		VOAGCMSN	SAMPLE

VOC RESULTS FOR 36-005

Sample ID	Analyte Code Description	Results	Units	Uncertainty	Lab Qualifier	LANL Qualifier	Suite Name	Sample Type Code
0236-97-0027	Bromodichloromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloroethane[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloroethene[1,1-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichlorofluoromethane	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichlorodifluoromethane	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichloro-1,2,2-trifluoroethane[1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichloropropane[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Butanone[2-]	21	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichloroethane[1,1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichloroethene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Tetrachloroethane[1,1,2,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Chlorotoluene[2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dichlorobenzene[1,2-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trimethylbenzene[1,2,4-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Dibromo-3-chloropropane[1,2-]	11	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Trichloropropane[1,2,3-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Butylbenzene[tert-]	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Isopropylbenzene	5	UG/KG		U		VOAGCMSN	SAMPLE
0236-97-0027	Isopropyltoluene[4-]	5	UG/KG		U		VOAGCMSN	SAMPLE

APPENDIX B DATA VALIDATION

TABLE B-1
DATA QUALITY EVALUATION OF SOIL SAMPLES FROM PRS 36-005

Request Number	Sample ID	Suite	Comments
3076R	0236-97-0023, -0026	VOCs	Acetone was detected in the associated laboratory blank. The sample values were less than 10X the blank value, indicating that the detection of this compound may be due to laboratory contamination. The sample values are qualified as U (undetected).
	0236-97-0027		Acetone was detected at a concentration below the estimated quantitation limit (EQL) resulting in the sample value being qualified as J. The sample result for acetone has a high degree of uncertainty because it cannot be accurately distinguished from the instrument "noise" levels. As a result, the datum is usable as an estimated value, but should be used with caution in the screening assessment because it cannot be accurately quantified.

ATTACHMENT 1
SAMPLING AND ANALYSIS PLAN (SAP) FOR PRS 36-005

1.0 DATA NEEDS AND DATA QUALITY OBJECTIVES

Analytical results of samples from the RFI Phase I investigation revealed low levels of VOCs in surface soil samples within the Boneyard. No subsurface samples were collected in the Phase I investigation. The presence of VOCs in surface soils (where VOCs are expected to dissipate into the atmosphere) identifies the new data quality objective of determining if VOCs are present in concentrations exceeding SALs in the subsurface. If VOC concentrations at the Boneyard exceed SALs, an additional data quality objective will be to characterize VOC contamination at the Boneyard sufficiently to conduct a risk assessment.

The data quality objective of determining the presence of VOCs in the subsurface soils will be met by a continuation of the Phase I investigation. If necessary, the data quality objective of characterizing the extent of VOC contamination will be conducted under a Phase II type investigation.

2.0 FIELD SCREENING

Field screening of all samples will be performed in order to define potential hazards and health and safety conditions for onsite workers. A portable field instrument will be used for detecting alpha-, beta-, and gamma-emitters, and a portable field organic vapor analyzer will be used for detecting VOCs. All surface sample locations will be screened for high explosives (HE) using a field spot-test kit.

3.0 SAMPLING

Phase I Sampling

Subsurface samples will be collected by drilling at the locations where the maximum concentrations of each of the 7 VOC compounds were detected during the initial Phase I sampling (locations 36-3026, 36-3038, and 36-3039 -- see Table A2-1). One sample will be collected at each location at a depth of one foot or the soil-tuff interface, whichever is shallower. If VOCs are detected by the portable field organic vapor analyzer, additional samples will be collected at one foot depth intervals until the final sample to be submitted screens negative for organic vapors. The proposed continuation of Phase I sampling and analysis for the Boneyard is summarized in Table 3-1.

Proposed sampling locations are presented in Figure 3.1.

Phase II Sampling

If any of the Phase I samples reveal concentrations of VOCs above SALs, Phase II sampling will be initiated to characterize the nature of subsurface contamination at the Boneyard. Subsurface samples will be collected at 7 random locations within the Boneyard. At each location one sample will be collected at a depth of one foot or the soil-tuff interface, whichever is shallower. If VOCs are detected by the portable field organic vapor analyzer, additional samples will be collected at one foot intervals until the final sample to be submitted screens negative for organic vapors. The proposed Phase II sampling and analysis for the Boneyard is summarized in Table 3-2. All sampling locations will be surveyed so that the sampling points can be accurately located on the FIMAD map.

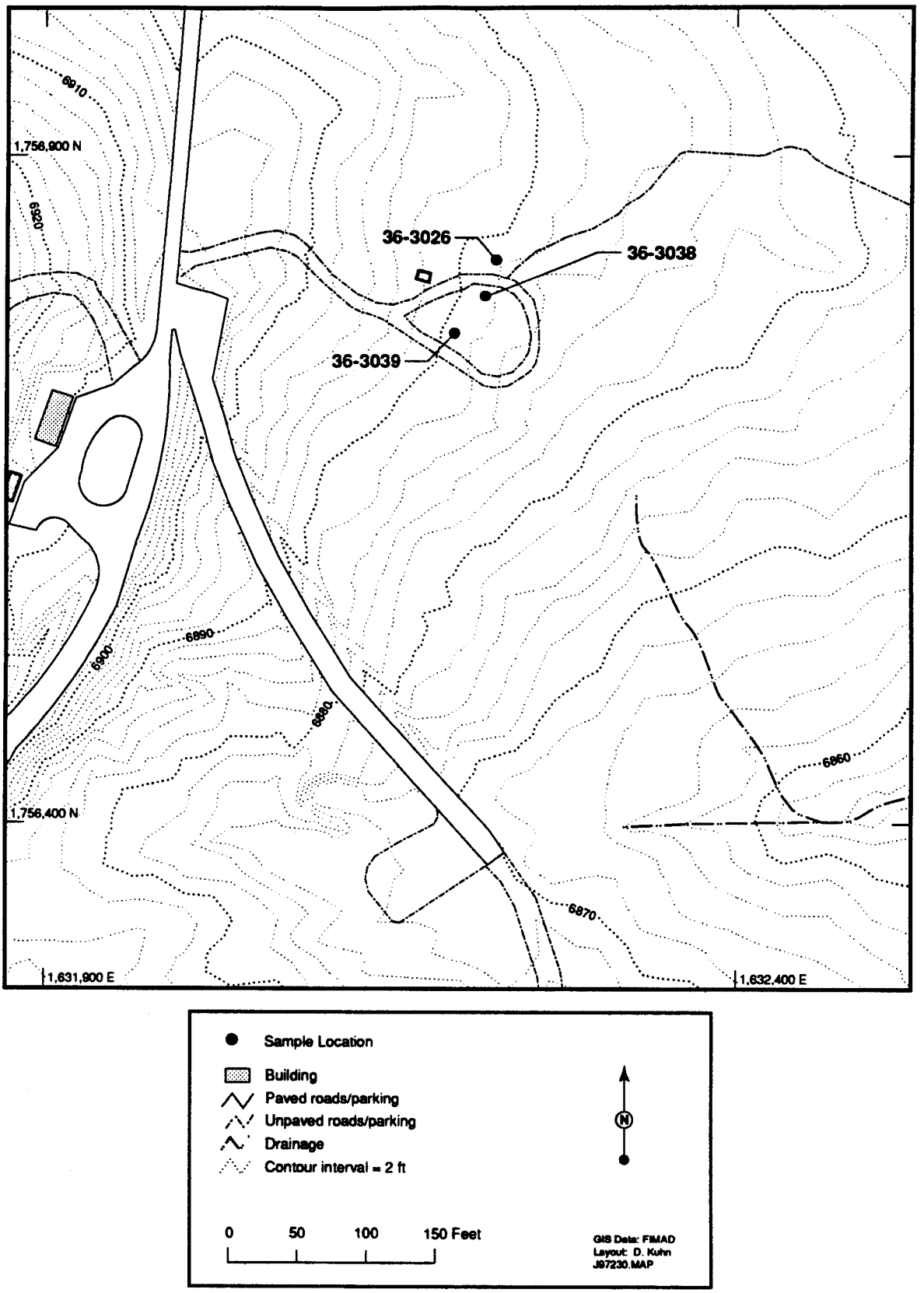

Figure 3-1 PRS 36-005, Site map of sample locations

4.0 Laboratory Analyses

All samples will be analyzed for VOCs (in accordance with EPA SW-846 guidance). If any sample screens positive for radiation, a sample will also be submitted for gamma spectroscopy analysis. These samples will be analyzed on site. Otherwise, an offsite analytical laboratory will be used.

Table 3-1

Phase I Sampling and Analyses for PRS 36-005, Boneyard

Unit	Description	Sampled Media			Samples: Sample Type			Field Screening				Laboratory Analyses					
		soil/tuff	soil	sediments	Screening	Surface	Subsurface	Beta-gamma	Alpha	Organic Vapor	Explosives (Spot Test)	Metals (SW 6010/7000)	Total Uranium	Mercury	VOCs (SW 8260)	SVOCs (SW 8270)	Gamma spectroscopy
PRS 36-005	Boneyard	x	x		3*		3*	x	x	x	x				x		

x : All samples
* : Additional samples will be collected from within the boreholes if VOC screening results are positive.

Table 3-2

Phase II Sampling and Analyses for PRS 36-005, Boneyard

Unit	Description	Sampled Media			Samples: Sample Type			Field				Laboratory					
		soil/tuff	soil	sediments	Screening	Surface	Subsurface	Beta-gamma	Alpha	Organic Vapor	Explosives (Spot Test)	Metals (SW 6010/7000)	Total Uranium	Mercury	VOCs (SW 8260)	SVOCs (SW 8270)	Gamma spectroscopy
PRS 36-005	Boneyard	x	x		7		7*	x	x	x	x				x		

x : All samples
* : Additional samples will be collected from within the boreholes if VOC screening results are positive.

ATTACHMENT 2
VOLATILE ORGANICS RESULTS FOR PRS 36-005

TABLE A2-1
PRS 36-005 SOIL CONCENTRATIONS OF ORGANIC ANALYTES WITH VALUES GREATER THAN EQL

Sample ID	Depth (in.)	Acetone (mg/kg)	4-Methyl-2-pentanone (mg/kg)	Methylene Chloride (mg/kg)	RDX (mg/kg)
SAL	NA	**2100**	**770**	**7.8**	**4**
EQL	NA	10	10	10	0.176
AAB1834	0-6	ND	ND	0.011	ND
AAB1839	0-6	ND	ND	0.012	1.72
AAB1840	0-6	ND	ND	0.007	ND
AAB1841	0-6	ND	ND	0.008	ND
AAB1843	0-6	0.52	ND	0.13 (J)	ND
AAB1853	0-6	ND	ND	0.008	ND
AAB1854	0-6	ND	ND	0.01	ND
AAB1857	0-6	ND	ND	0.016	ND
AAB1858	0-6	ND	0.02	ND	ND
AAB1859	0-6	ND	ND	0.01	ND
AAB1860	0-6	ND	ND	0.01	ND

NA = Not applicable ND = Not detected

Sample ID	Depth (in.)	Toluene (mg/kg)	Trichloroethene (mg/kg)	1,2,4-Trimethylbenzene (mg/kg)	Xylenes (o + m + p) mixed (mg/kg)
SAL	NA	**790**	**3.2**	**8**	**320**
EQL	NA	10	10	0.33	10
AAB1834	0-6	ND	ND	ND	ND
AAB1839	0-6	ND	ND	ND	ND
AAB1840	0-6	ND	ND	ND	ND
AAB1841	0-6	ND	ND	ND	ND
AAB1843	0-6	ND	ND	ND	ND
AAB1853	0-6	ND	ND	ND	ND
AAB1854	0-6	ND	ND	ND	ND
AAB1857	0-6	0.009	0.035	0.07	0.061
AAB1858	0-6	0.028	0.11	0.12	0.143
AAB1859	0-6	ND	ND	ND	ND
AAB1860	0-6	0.008	0.031	0.055	0.055

NA = Not applicable ND = Not detected

ATTACHMENT 3
BOREHOLE LOGS FOR PRS 36-005

ICF KAISER

Borehole # 36-3026

Date(s) Drilled	April 22, 1997	Rig Type	Acker
Geologist/Engineer	Catherine Goetz	PRS	36-005
Supervising Geologist		Borehole Diameter	8 inch
Drilling Subcontractor	LANL/ICF	Total Depth of Hole	4 feet

Depth (ft.)	% Recovery	Meter Reading	Sample ID	Samples	General Lithology	Materials Description	Remarks
0							
1	60%	1 -2 ppm (background)	0236-97 -0023		OL	Silty, sandy loam (OL); brown; numerous roots; dry	Tree roots at designated sample interval. Forced to collect below roots in same sample drive.
2					OL/ Qbt	Tuff; yellowish red, (5yr,5/6); very weathered; pinon roots; damp	
3	60%				Qbt	as above - less weathered	
4					Qbt	Tuff; reddish yellow to strong brown ,(7.5yr,6/6 to 7.5yr,5/6); shoe pink (7.5yr,7/4); slight welded damp to dry	
5						T.D. 48 inches	
6							Note: Advanced borehole with 8" OD hollow stem auger (HA). Continuous core and sample recovery conducted with 2.25" ID split spoon
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14							

Job Number_____

ICF KAISER

Borehole # 36-3038

Date(s) Drilled	April 22, 1997	Rig Type	Acker
Geologist/Engineer	Catherine Goetz	PRS	36-005
Supervising Geologist		Borehole Diameter	8 inch
Drilling Subcontractor	LANL/ICF	Total Depth of Hole	4 Feet

Depth (ft.)	% Recovery	Meter Reading	Sample ID	Samples	General Lithology	Materials Description	Remarks
0					OL	Silty, sandy loam (OL); brown(7.5yr,4/4); numerous roots;dry	Note: Advanced borehole with 8" OD hollow stem auger (HA). Continuous core and sample recovery conducted with 2.25" ID split spoon
1	50%	0 ppm	0236-97 0024		OL/ Qbt	Tuff;brown(7.5yr,4/4) very weathered;rootlets; damp	
2					Qbt	Tuff; lt.brown (7.5yr,6/4) mod.welded;dry	
3	50%	0 ppm			Qbt	as above; reddish yellow, (7.5yr,7/6)	
4						as above; pink (7.5yr,7/3)	
5						T.D. 48 inches	
6							
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14							

Job Number_____

ICF KAISER

Borehole # 36-3039

Date(s) Drilled	April 22, 1997	Rig Type	Acker
Geologist/Engineer	Catherine Goetz	PRS	36-005
Supervising Geologist		Borehole Diameter	8 inch
Drilling Subcontractor	LANL/ICF	Total Depth of Hole	40 inches

Depth (ft.)	% Recovery	Meter Reading	Sample ID	Samples	General Lithology	Materials Description	Remarks
0					OL	Silty, sandy loam (OL); brown; large roots; dry to damp	
1	40%	210 ppm	0236-97-0026		OL/Qbt	Tuff; strong brown, (7.5yr,4/6); very weathered; pinon roots; damp	Tree roots at designated sample interval. Forced to collect below roots in same sample drive - Insufficient material for duplicate.
2					Qbt		
3	40%	1 -2 ppm	0236-97-0027			Tuff; lt.brown (7.5yr,6/4) mod.welded;dry	
4						T.D.40 inches	Refusal at 40 inches
5							Note: Advanced borehole with 8" OD hollow stem auger (HA). Continuous core and sample recovery conducted with 2.25' ID split spoon
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Job Number_____