Environmental Restoration
University of California
Environmental Restoration Project, MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

U. S. Department of Energy
Los Alamos Area Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
505-667-7203/FAX 505-665-4504

Date: August 9, 1996
Refer to: EM/ER:96-432

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

SUBJECT: SUBMITTAL OF THE RFI REPORT FOR PRS 0-031(b) AT TA-0

Dear Mr. Garcia:

Enclosed are two copies of the Los Alamos National Laboratory's Resource Conservation and Recovery Act Facility Investigation (RFI) Report concerning Potential Release Site (PRS) 0-031(b) in Technical Area 0. This document is also being transmitted to the New Mexico Environment Department (NMED) Surface Water Quality Bureau and NMED Groundwater Bureau. Groundwater was not encountered during the investigation at 0-031(b) and the site is located well within the interior of a mesa where surface water sediments are absent. The site is now paved as the result of the development of an office building. This report documents the field work performed as detailed in the approved RFI Work Plan for Operable Unit 1071 and the results of the sampling.

Please contact Garry Allen at (505) 667-6080 or Bonnie Koch at (505) 665-7202, if you have any questions.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/rfr

Enclosures: RFI Report for PRS 0-031(b) at TA-0
Certification

1433

Cy (w/ encs.):
G. Allen, CST-18, MS E525
D. Griswold, AL-ERD, MS A906
J. Harry, EES-5, MS M992
B. Hoditschek, NMED-HRMB
M. Leavitt, NMED-GWB
B. Koch, LAAO, MS A316
N. Naraine, DOE-HQ, EM-453
D. Neleigh, EPA, R.6, 6PD-N (2 copies)
J. Piatt, NMED-SWQB
M. Shaner, CIO, MS A117 (2 copies)
T. Taylor, LAAO, MS A316
N. Weber, NMED-AIP, MS J993
J. White, ESH-19, MS K498
S. Yanicak, NMED-AIP, MS J993
RPF, MS M707

Cy (w/o encs.):
T. Baca, EM, MS J591
T. Glatzmaier, DDEES/ER, MS M992
D. McInroy, EM/ER, MS M992
G. Rael, AL-ERD, MS A906
L. Soholt, EM/ER, MS M992
W. Spurgeon, DOE-HQ, EM-453
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: Submittal of RFI Report for PRS 0-031(b) at TA-0

Name: _____ Date: 8-9-96

Jorg Jansen, Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

or

Tom Baca, Program Director
Environmental Management
Los Alamos National Laboratory

Name: _____ Date: 8/12/96

Joseph Vozella,
Acting Assistant Area Manager of
Environment Projects
Environment, Safety, and Health Branch
DOE-Los Alamos Area Office

or

Theodore J. Taylor
Program Manager
Environment Restoration Program
DOE-Los Alamos Area Office

RFI Report for Potential Release Sites in TA-0

0-031(b)

Former Zia Motorpool Area

(Located in former Operable Unit 1071)

Field Unit 1

Environmental Restoration Project

August 1996

A Department of Energy Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-2746

EXECUTIVE SUMMARY

This report presents the results of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at Technical Area (TA) 0, potential release site (PRS) 0-031(b), a former service station, at Los Alamos National Laboratory (the Laboratory or LANL). A brief description of PRS 0-031(b) is provided below; a more detailed description can be found in Section 5.1 of this report.

PRS 0-031(b) is part of PRS Group 0-4, which also includes PRS 0-032, the former Zia Motorpool. The former motorpool facility, which operated from the mid 1940s through the mid 1960s, consisted of an automotive maintenance hanger and three buildings labeled Buildings 1,2, and 3. In approximately 1959, a service station was constructed adjacent to Building 3. This service station had two underground storage tanks (USTs) and associated distribution lines and pump dispensers located to the east of Building 3. The motorpool and service station property ownership was transferred to the County of Los Alamos in 1967 and later to private ownership between 1978 and 1980. In 1995, the Los Alamos National Bank purchased a majority of the property and began construction of a new bank. Currently, the area formerly occupied by PRS 0-031(b) is located to the east of the new bank, and is covered by newly placed asphalt and concrete paving.

A Phase I site investigation took place at PRS 0-031(b) in 1994. The primary purpose of this investigation was to remove the USTs and determine the presence or absence of potential contamination. Sampling procedures and any variations from the planned procedures are described in Section 5.1.4 of this report. Data analysis was conducted according to the general methodologies described in Section 3.0 and as discussed in Sections 5.1.5 through 5.1.7 of this report. Finally, the results of the quality assurance/quality control (QA/QC) activities are discussed in Section 4.0 of this report. Although a few data points were qualified based on QA/QC problems (e.g., low- or high-tracer recovery), none of the data were adjusted before being used in the subsequent data analysis steps.

Based on the results of the human health screening assessment presented in Section 5.1.7.1 of this report, PRS 0-031(b) is recommended for no further action (NFA) on the basis of NFA Criterion 4 (which states that the PRS has been characterized in accordance with current state and federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk). A summary of the proposed action for this PRS is presented in Table ES-1.

TABLE ES-1

SUMMARY OF PROPOSED ACTIONS

		PROPOSED ACTION			
PRS	HSWA	NFA CRITERIA[a]	FURTHER ACTION[b]	RATIONALE	SECTION NUMBER
0-031(b)	No	4	N/A[c]	Screening assessment revealed no threat to human health.	5.1

[a] Reference and appropriate NFA criteria (See Project Consistency Team Policy Number 015 "No Further Action Criteria".
[b] Voluntary corrective action, expedited cleanup, Phase II, or corrective measures study.
[c] N/A = Not applicable.

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1.0 INTRODUCTION

This report presents the results of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at Technical Area (TA) 0, potential release site (PRS) 0-031(b), a former service station, at Los Alamos National Laboratory (the Laboratory or LANL). This PRS is now located on private property. Included in this report are data assessment, analysis approach, and site-specific results, conclusions, and recommendations for this PRS.

1.1 General Site History

PRS 0-031(b) is located within Los Alamos townsite in TA-0 (Fig. 1.1-1 and Fig. 1.1-2). PRS 0-031(b) is part of PRS Group 0-4, which also includes PRS 0-032, the former Zia Motorpool. The former motorpool facility and service station were operated by Zia Company, a contractor to the United States Atomic Energy Commission (AEC), from the mid-1940s through the mid-1960s. The motorpool and service station property ownership was subsequently transferred to the County of Los Alamos in 1967 and later to private ownership between 1978 and 1980. All of the properties located within PRS Group 0-4 are currently owned by private corporations and are being utilized by retail establishments and light industry.

There is some ambiguity in the definitions of PRS 0-031(b) and PRS 0-032 in that Building 3 is included in both PRS reports (LANL 1990, 0145). The 1962 Zia Company engineering drawing Z-1362, Modification of Fleet Maintenance Facilities indicates that the frame, front-end, and wheel shop was originally located within Building 3 (The Zia Company 1962, 05-0144); however, in 1959, Building 3 was converted to a service station. For the purpose of the field investigation activities of this PRS group, Building 3 is included in PRS 0-031(b).

The RFI Work Plan for Operable Unit (OU) 1071 states that three underground storage tanks (USTs) were located east of Building 3 (LANL 1992, 0781). Zia Company engineering drawing Z-1676 of the service station indicates that one 10 000-gal. UST was planned to supply two fuel pumps (The Zia Company 1959, 05-0141). The two other USTs were reported by the property owner to contain gasoline, but were no longer in use. The exact locations, sizes, and orientations of these tanks were not known before field investigations at the site. The work plan also describes a waste oil pit northeast of Building 3, but this pit was never discovered during field activities (LANL 1992, 0781).

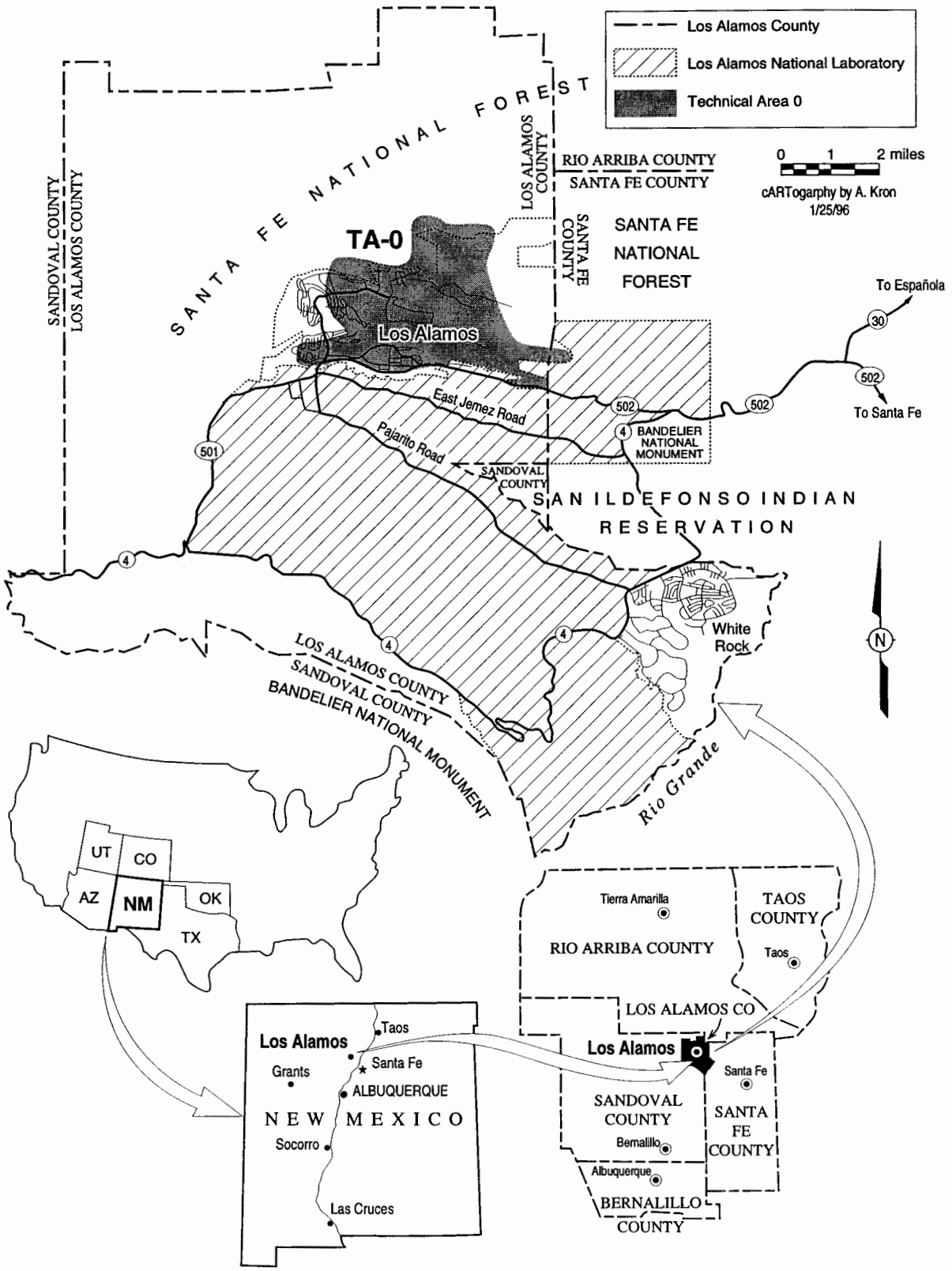


Fig. 1.1-1. Location map of TA-0 within Los Alamos National Laboratory, Los Alamos County, New Mexico.

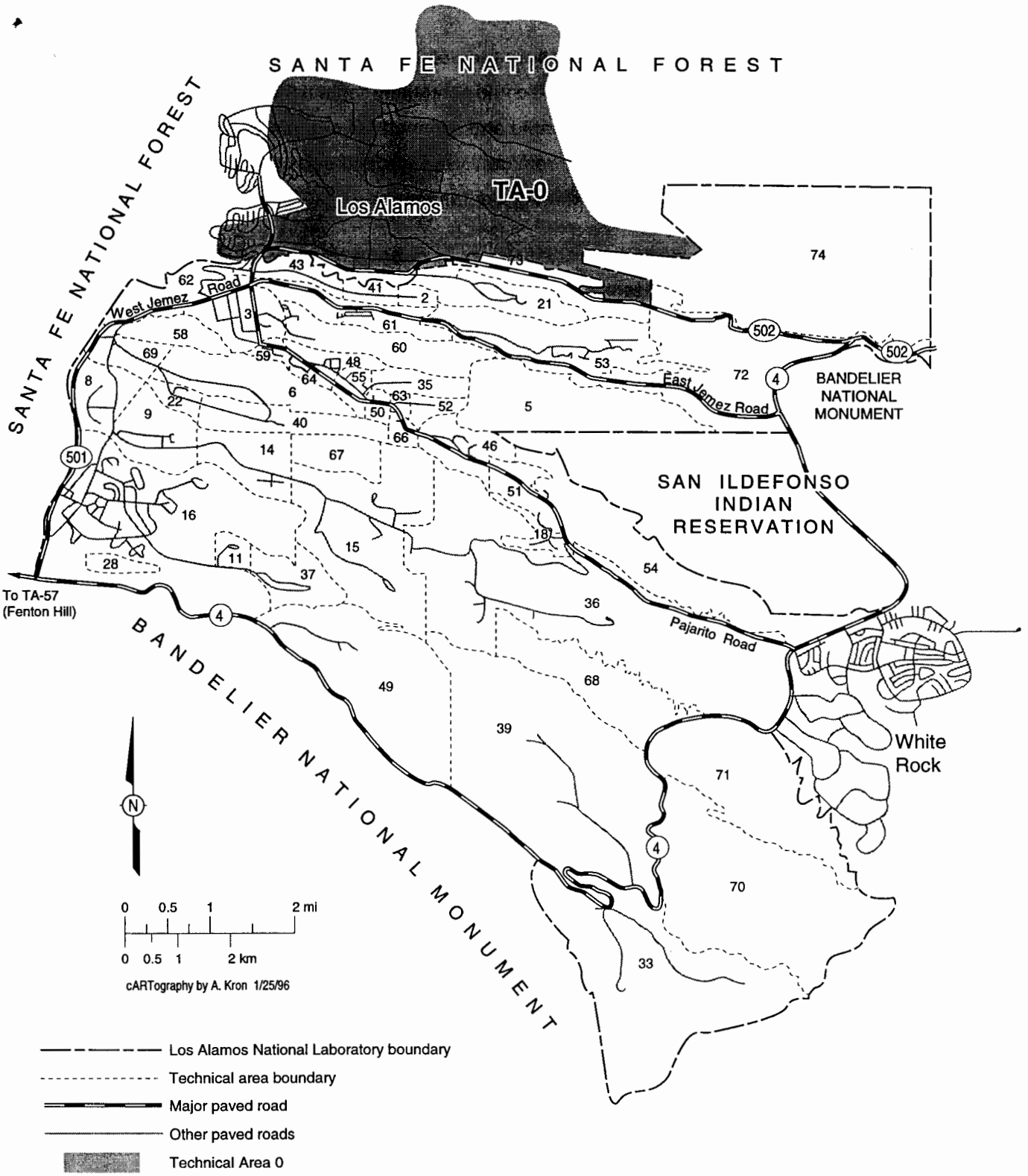


Fig. 1.1-2. Location of TA-0 with respect to Laboratory technical areas and surrounding landholdings.

1.2 RFI Overview

The objective of the Phase I investigation was to determine if any contaminant releases from PRS 0-031(b) had occurred. Soil at this PRS could potentially contain the following contaminants: total petroleum hydrocarbons (TPH), volatile and semivolatile organic compounds (VOCs and SVOCs), and metals (e.g., lead and chromium). Surface and subsurface soil samples were collected to assess the nature and extent of contamination.

Contaminants associated with PRS 0-031(b) may have been released to the environment via leakage from underground fuel tanks and their appurtenances (e.g., fill ports, distribution lines, etc.). As a result, contaminants may be present in soil and/or tuff. Contaminants in soil or tuff may leach or disperse through the vadose zone, migrate upward through vapor phase diffusion, and enter the atmosphere. Possible human exposure to contaminants from this PRS may occur through inhalation of vapors, incidental ingestion of soil particles, and dermal contact with soil.

A conceptual exposure model was developed describing the potential sources of contamination, potential pathways for contaminant migration, and potential pathways to human receptors (LANL 1992, 0781). This conceptual model provided the basis for the field investigations described in this report. Chemicals of potential concern (COPCs) are identified through a screening assessment, and, if necessary, a risk assessment is performed by considering concentration, extent of contamination, and reasonable pathways of exposure to COPCs.

1.3 Field Activities

All applicable LANL Environmental Restoration (ER) standard operating procedures (SOPs) were followed, unless otherwise noted in Section 5.0. The Phase I RFI investigation for PRS 0-031(b) consisted of varied activities as outlined in Subsection 5.12 of the RFI Work Plan for OU 1071 (LANL 1992, 0781).

Investigation of the two USTs located at this PRS was conducted during the 1994 calendar year, as part of the OU 1071 Work Plan activities under the LANL ER Project (LANL 1992, 0781). The objective of this RFI investigation was to determine the location and geometry of the two USTs, and the presence of contaminants within and surrounding the tanks resulting from historical UST use.

1.3.1 Field Surveys

Site investigation activities included historical data searches and reviews, personal interviews, site surveys, and geodetic surveying. Geophysical surveying was conducted in the vicinity of suspected USTs and waste oil pit locations to confirm their presence and to provide a more precise determination of the location and geometry of the UST systems.

1.3.2 Sampling Activities

The Phase I RFI field activities at PRS 0-031(b) can be divided into several categories, including geodetic and geophysical surveys; excavation and removal of two USTs, associated dispensers, and piping; investigation of the release from an auxiliary pipe; investigation of soil within a concrete curb; and investigation of the release from a distribution line. Wherever practical and possible, all samples except verification samples were collected before removing the USTs and associated piping. After completing the geodetic and geophysical surveys, two 10 000-gal. USTs, designated UST-1 and UST-2, were removed according to the New Mexico Environmental Department (NMED) guidance for corrective action for petroleum UST systems. During removal of the vent lines, distribution lines, and gasoline dispensers, visibly stained soil and detectable levels of organic vapors were present beneath a distribution line and auxiliary fill pipe associated with UST-2. Subsequent excavation of soil in the vicinity of the auxiliary fill pipe resulted in the removal of soil containing detectable levels of VOCs and levels of TPH. Excavation in the vicinity of the distribution line suggested that further investigation was required.

The work plan mentions that a waste oil pit was located northeast of Building 3, but a subsurface waste oil pit could not be located and was not investigated (LANL 1992, 0781). Characterization of stained soil within a concrete curb area northeast of Building 3 indicated the soil contained TPH concentrations greater than 100 ppm. Soil was excavated down to the soil/tuff interface where VOCs were below detection limits and TPH concentrations were less than 100 ppm.

Additional investigation of the UST-2 distribution line included drilling 12 boreholes to a maximum depth of 118 ft. Organic vapors were measured continuously, and a minimum of three soil samples were collected from each borehole. These samples corresponded to the core sample where organic vapors were first detected, the core sample where the highest organic vapors were detected, and the final core sample from the borehole. In addition, soil gas samples were collected by one of three methods (downhole packer sampling within select

boreholes, a pilot test for soil vapor extraction [SVE], and surface isolation flux chambers) to assess the efficiency of different collection methods, and the viability of potential corrective actions. Soil samples were analyzed for VOCs, TPH, and total lead; soil gas samples were analyzed for VOCs only.

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, 1164). A detailed discussion of the environmental setting for PRS 0-031(b), including climate, geology, hydrology, and a conceptual hydrogeologic model for the area and its surroundings, is presented in the IWP and is summarized below (LANL 1995, 1275).

2.1 Climate

The Los Alamos area of northcentral New Mexico is classified as a semiarid, temperate mountain climate. Annual precipitation in the area normally reaches about 18 in., 40% of which occurs as brief, intense thunderstorms during July and August. Winter snowfall averages about 51 in. annually. In summer months, maximum daily temperatures in the Los Alamos area are usually below 90°F, dropping into the 50s at night. Winter temperatures typically range from 30°F to 50°F during the day, and from 15°F to 25°F at night, occasionally dropping to 0°F or below. Winds in Los Alamos often vary greatly with the time of day and location, due in large part to the complex terrain. Wind speeds are less than 2.5 m/s (5.5 mph) about 40% of the time and greater than 5 m/s (11 mph) about 20% of the time. The predominant wind direction is from the south-southwest.

2.2 Geology

2.2.1 Geologic Setting

A detailed discussion of the geology of the entire Los Alamos area can be found in Section 2.5.1 of the IWP (LANL 1995, 1164). A summary of that material, emphasizing conditions expected at PRS 0-031(b) is presented below. The generalized stratigraphy at PRS 0-031(b) is shown in Fig. 2.2.1-1.

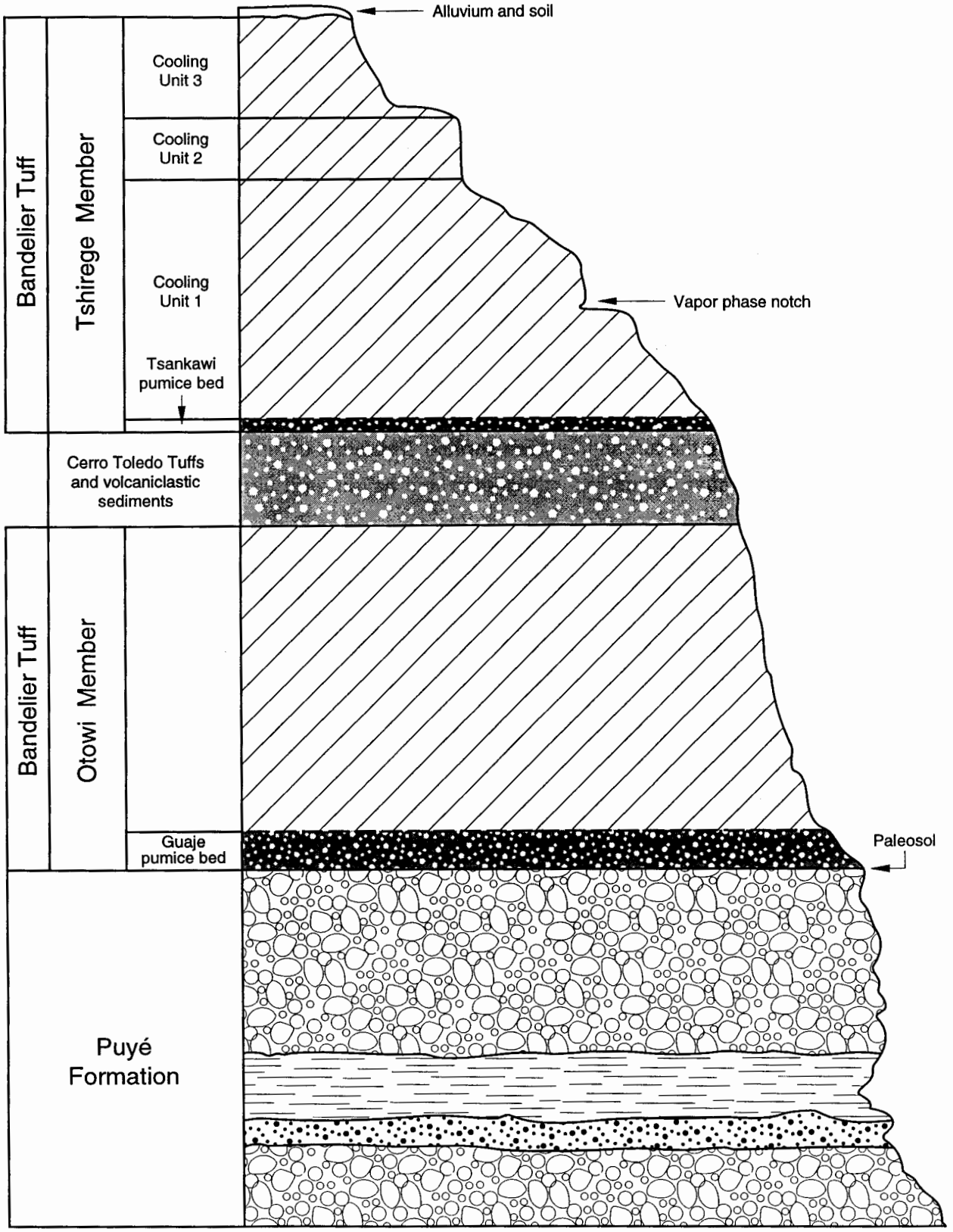


Fig. 2.2.1-1. Stratigraphy of TA-0.

Los Alamos townsite is located on the Pajarito Plateau. PRS 0-031(b) is located on East Mesa at an elevation of 7 308 ft. East Mesa is bounded on the south by Los Alamos Canyon and on the north by Pueblo Canyon. Bedrock at the site is Bandelier Tuff, composed of air-fall and ash-flow deposits of silicic volcanic rock from eruptions 1.5–1.2 million years ago. For mesa sites, about 1 200 ft of unsaturated tuff and volcaniclastic sediments separate the surface from the main aquifer discussed in Section 2.3.2 of this report.

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, 1164). A summary of that material specific to PRS 0-031(b) is presented below.

East Mesa is underlain by Bandelier Tuff and is capped by a thin soil developed in alluvial materials that overlie the tuff on the mesa surface. There are no undisturbed areas left within PRS 0-031(b) because it was recently graded and paved as a parking lot for the new Los Alamos National Bank.

2.3 Hydrology

The hydrology of the Pajarito Plateau is summarized in Section 2.5.2 of the IWP (LANL 1995, 1164). Site-specific conditions are summarized below.

The main aquifer beneath East Mesa is at an elevation of approximately 6 000 ft above mean sea level. At mesa sites such as PRS 0-031(b), 1 000–1 200 ft of unsaturated tuff sediments separate the surface from the main aquifer. A summary of vadose zone studies on mesa tops and the physical and hydrogeochemical properties of the Bandelier tuff are presented in the IWP (LANL 1995, 1164). In general, the findings summarized in the IWP suggest that the tuff does not bear water, except in shallow and localized areas. For example, a shallow alluvial aquifer and a perched aquifer were located at an intermediate depth (325 ft below the floor of Los Alamos Canyon) in drill hole LADP-3 at nearby TA-21 (Broxton et al. in preparation, 1116). It is unknown whether a localized water-bearing zone is present between the surface of PRS 0-031(b) and the main aquifer. Groundwater was not encountered in any of the 13 boreholes associated with this RFI, which were drilled to depths ranging from 70–118 ft below ground surface (bgs).

2.3.1 Surface water

The surface water runoff from this site is minimal because there are no natural drainage channels that cross the site. Therefore, any surface runoff should flow to the storm water drains along Trinity Drive and then with other storm water to the outfall in Los Alamos Canyon for townsite runoff.

2.3.2 Groundwater

This site may have had some surface infiltration of precipitation into the soils on the mesa surface. Some infiltration could have possibly descended a short distance along fractures in the tuff beneath the site, but the extent of the petroleum plume beneath the site indicates that the contaminants were not carried to depth by large quantities of groundwater. There is no evidence of perched water at depth below this site; therefore, neither perched water nor the main aquifer would have been impacted by deep percolation of contaminants in the groundwater.

2.4 Biological Surveys

Comprehensive plant and animal inventories are required by the Federal Endangered Species Act of 1973; the New Mexico Wildlife Conservation 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 required inventories have been performed for the area surrounding this site and the habitat description will be included in the ecological RFI report prepared for the ecological exposure unit in which PRS 0-031(b) is located.

2.5 Cultural Surveys

The National Historic Preservation Act requires a cultural resource survey. However, a survey was not conducted in the area of PRS 0-031(b) because the site is a developed, urban area and a survey would not be relevant.

3.0 APPROACH TO DATA ASSESSMENT AND ANALYSES

The decision approach used for PRS 0-031(b) involves a series of quantitative steps that occur after the field investigation, chemical analysis, and data reporting are complete. These steps begin with routine data validation and continue with more focused data validation, if necessary. Routine validation involves validating each data item against specific targets and adding qualifier flags to the data to signify a potential deficiency. Focused validation consists of analyzing quality assurance/quality control (QA/QC) data for their potential impact on the succeeding data assessment steps (i.e., comparing site data to background concentration data, verifying the identities of detected organic chemicals, comparing site data to screening action levels [SALs] for human health impacts, and performing human health risk assessments when necessary). The following sections provide overviews of the methods used to complete these quantitative steps. Further details can be found in the guidance document, Technical Approach to RFI Reports (LANL in preparation, 1281).

3.1 Sample Analysis

All samples requiring chemical analysis and documentation are submitted to the Sample Management Office (SMO) and/or the mobile chemistry analytical laboratory (MCAL) for analysis.

3.1.1 Analytical Methods

All samples were analyzed using Environmental Protection Agency (EPA) SW-846 methods or equivalent.

3.1.2 Data Validation

Data verification and validation procedures are used to determine whether data packages have been generated according to specifications and contain the information necessary to determine data sufficient for decision-making.

Data verification is a check of data deliverables against a set of stated requirements to ensure that what has been ordered has been delivered. All analytical data generated in support of the ER Project are verified.

Data validation is the process of determining whether individual results (a datum) can be reliably used to support the decision-making process. During the process, validators determine whether data should be qualified or used with caution because of the potential impact of noted flaws or the failure to achieve analytical precision or bias constraints.

Routine validation is the comparison of quality indicators (such as surrogate recovery, measurements of method blanks, holding times, and differences between replicate measurements) with clearly defined limits to determine whether limitations may need to be placed on the use of the data. Routine validation is most suitable for routine analyses and for those nonroutine analyses for which clearly defined limits have been established.

The focused data validation process addresses those characteristics of the data (e.g., precision and bias) that directly affect the decisions to be based on the data. The same data set may undergo different focused validations for different decisions.

3.2 Background Comparisons

Once the data validation process is complete and the site data are finalized, the next step in the process is to compare site data with available background data. The results of a focused data validation should exclude from consideration for background comparison any contaminant that is identified as an artifact of laboratory or field contamination, analytical interference, or improper analyte identification or quantitation. The purpose of this decision step is to determine if chemicals that have natural or anthropogenic background distributions should be retained as COPCs or eliminated from further consideration. Background data are available from two sources: (1) soil samples collected throughout Los Alamos County for which chemical analyses were performed for certain inorganic (metal) chemicals and naturally occurring radioactive chemicals (Longmire et al. 1995, 1142; Longmire et al. 1995, 1266); and, (2) background concentrations of radioactive chemicals associated with global fallout from atmospheric nuclear testing (e.g., plutonium, cesium, strontium, and tritium) reported in LANL Environmental Surveillance reports (Purtymun et al. 1987, 0211; ESG 1988, 0408; ESG 1989, 0308; Environmental Protection Group 1990, 0497; Environmental Protection Group 1992, 0740).

Comparisons between site data and background data are initially performed by comparing each observed concentration datum with a background screening value estimated from background data. Background screening values are upper tolerance limits (UTLs), maximum reported concentrations, or detection limits of nondetected chemicals. These background screening values are derived from LANL-wide soil background data. Details on the calculation of these background screening values are presented in "Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff" (Longmire et al. 1995, 1266). There is one inorganic chemical, silver, for which LANL-wide soil background data do not exist. In this chemical-specific case, PRS sample-specific detection limits for silver are used as nominal background screening values.

Details of statistical methods used to generate UTLs from the background data sets and suggestions for statistical methods for comparing site and background concentration distributions are presented in the guidance document, Statistical Comparisons to Background, Part I (Environmental Restoration Project Assessments Council 1995, 1295). Further statistical comparisons between site and background data might be performed when UTLs are exceeded.

If a chemical has a reported concentration that exceeds its UTL, or fails other statistical background comparison tests (i.e., the site data are statistically greater than background data), then that chemical is carried forward through the screening assessment process. If a chemical does not have a reported concentration that exceeds the UTL, then that chemical is removed from further consideration.

The ER Project has developed UTLs for the most commonly sampled chemicals and the most commonly analyzed media. For chemicals and media not included in the LANL background data or in the Facility for Information Management, Analysis, and Display (FIMAD), UTLs will be developed by the Decision Support Council as needed.

3.3 Evaluation of Organic Constituents

Background data are not available for organic chemicals. The preliminary evaluation of organic chemicals considers detected chemicals and chemicals that were analyzed for but not detected in any sample. The purpose of this decision step is to determine if organic chemicals should be retained as COPCs or eliminated from further consideration based on detection status. Detection status is determined by the analytical laboratory on a sample-by-sample, analyte-by-analyte basis. Estimated quantitation limits (EQLs) have been established for each analyte as reporting limits when the analyte is not detected. It should be noted that the EQLs reported for individual samples are dependent on a number of factors and may vary from sample to sample and from analysis to analysis. Therefore, the sample-specific EQL for a chemical must be used in this comparison.

If a chemical has a reported concentration that exceeds its reporting limits, then that chemical is generally carried forward through the screening assessment process. If a chemical does not have a reported concentration that exceeds its reporting limits, then that chemical is generally removed from further consideration. Exceptions to these general rules may be made if site-specific process knowledge so indicates. A chemical that is detected may be removed from further consideration if it can be determined that its presence is not due to Laboratory operations, and a chemical that is not detected in any sample may be carried through the decision process if the chemical can be expected to be present at the site based on historical operations.

3.4 Human Health

3.4.1 Risk Due to Background

Background risks can result from inorganics that are naturally occurring at a site. Calculation of background risks using the same methodology as site risk estimates provides a frame of reference for risk levels calculated at a site. This information provides a basis for determining risk-based remediation goals, which in some circumstances may be set at target risks comparable with background rather than default values (i.e., cancer risk of 1E-6 or hazard index of 1). Background risks can also affect decisions at sites that have constituents for which there are thresholds of toxicity. For some inorganics, background intakes may be near a toxicity threshold such that incremental intakes associated with contamination may be unacceptable.

Background risks calculated here use the same exposure assumptions by which SALs are calculated. SALs are based on health-protective assumptions for a residential scenario (EPA 1995, 1307). For soil exposure, the pathways include incidental soil ingestion, inhalation of resuspended dust, and dermal contact with soil. Background soil data represent several soil horizons from geographically diverse locations. Background risks are estimated for both a median concentration and the UTL from the entire background data set to present the range of potential risk associated with different soil constituent concentrations found in and around Los Alamos (Longmire et al. 1995, 1142). The background risks based on the LANL SAL residential exposure model are provided in Table 3.4.1-1.

Risks due to background are presented for both noncarcinogenic and carcinogenic outcomes. The potential for adverse noncarcinogenic health effects is estimated by a hazard quotient. Intakes leading to a hazard quotient up to 1 are not associated with adverse health effects. None of the median background concentrations result in hazard quotients greater than 1. The hazard quotient of the UTL concentration for manganese exceeds 1 (1.9). However, given the unlikely occurrence of this concentration, the conservative assumptions in the exposure assessment, the margin of safety in the reference dose, and the exceedance of less than a factor of 2, this intake estimate is not expected to be associated with adverse health effects.

Two of the background inorganics are also carcinogens. According to the default exposure assumptions used for SALs, the lifetime cancer risks due to background residential soil exposure are estimated at 1 to 2 in 100 000 each for arsenic and beryllium.

These background risk estimates provide a frame of reference for the screening assessment and site decisions. If a site-specific risk assessment is necessary to further evaluate risks, background risks can also be calculated using the site/scenario-specific assumptions to assist in the remedial action decisions for the site.

TABLE 3.4.1-1

RISK DUE TO BACKGROUND CONCENTRATIONS OF SOIL INORGANICS ASSUMING A RESIDENTIAL SCENARIO[a]

SOIL INORGANIC	BACKGROUND SOIL CONCENTRATION[b] (mg/kg)		HAZARD QUOTIENT		LIFETIME CANCER RISK	
	Median	UTL	Median	UTL	Median	UTL
Aluminum	10 000	38 700	0.13	0.5	nc[c]	nc
Antimony	0.6	1.0	0.019	0.032	nc	nc
Arsenic	4.0	7.82	0.18	0.36	1.1E-5	2.1E-5
Barium	130	315	0.025	0.059	nc	nc
Beryllium	0.895	1.95	0.0027	0.0059	6.4E-6	1.4E-5
Cadmium[d]	0.20	2.7	0.0053	0.071	1.4E-10	1.9E-9
Chromium[e]	7.2	16.1	0.00009	0.0002	nc	nc
Cobalt	6.0	19.2	0.0013	0.0042	nc	nc
Copper	5.75	30.7	0.0021	0.011	nc	nc
Lead[f]	12	23.3	0.03	0.058	nc	nc
Manganese	320	714	0.84	1.9	nc	nc
Mercury	0.05	0.1	0.0022	0.0043	nc	nc
Nickel	7.0	15.2	0.0047	0.01	nc	nc
Selenium	0.3	1.7	0.00078	0.0045	nc	nc
Thallium	0.2	1.0	0.033	0.16	nc	nc
Uranium	0.9	1.87	0.0039	0.0081	nc	nc
Vanadium	21	41.9	0.039	0.078	nc	nc
Zinc	30.7	50.8	0.0013	0.0022	nc	nc

[a] Risk estimates are based on reference doses, slope factors, and EPA Region 9 default exposure assumptions effective in April 1996.
[b] Background soil concentrations taken from Longmire et al. 1995, 1142.
[c] nc = Noncarcinogen
[d] Cancer risks for cadmium are based solely on inhalation of resuspended dust.
[e] Naturally occurring chromium is assumed to exist in a trivalent state.
[f] Hazard quotient based on uptake biokinetic model.

3.4.2 Screening Assessment

The purpose of this decision step is to determine if chemicals should be retained as COPCs or eliminated from further consideration based on comparisons with SALs. This is the last step in the screening assessment process for human health concerns. If COPCs remain after this step, then further action may be proposed. If no COPCs remain after this step, then no further action (NFA) may be proposed based on human health concerns. SALs are medium-specific concentrations that are calculated using chemical-specific toxicity information and conservative, default exposure assumptions. For those chemicals for which SALs are available, each observed concentration datum is compared with the chemical's SAL. If a chemical has a reported concentration greater than its SAL, then that chemical is retained as a COPC pending further analysis. If a chemical does not have a reported concentration greater than its SAL, then that chemical is generally removed from further consideration. If more than one chemical is present at the site, this decision is deferred pending the results of a multiple chemical evaluation (described below). The decision to identify a chemical as a 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.

It is possible that COPCs should be retained because of the combined adverse health effects of several chemicals. This possibility is evaluated in a multiple chemical evaluation, in which the reported concentration for each chemical is divided by its respective SAL, and the resulting normalized values are incorporated into a simple additive model. If the sum of the normalized values (i.e., the total normalized value) is less than 1, then the chemicals are removed from further consideration. If the total normalized value is greater than 1, then chemicals having an individual normalized value greater than or equal to 0.1 are retained as COPCs pending further evaluation.

Those chemicals that exceed background concentration thresholds (certain inorganics and radionuclides) or fail other background comparison tests, or exceed reporting limits (organics), and are less than the SAL (all analytes), are divided into three classes: noncarcinogens, chemical carcinogens, and radionuclides. Additive effects are assumed within each class, but each class is evaluated separately. For further information on multiple chemical evaluations, see Technical Approach to RFI Reports (LANL in preparation, 1281).

3.4.3 Risk Assessment

No human health risk assessment was performed for PRS 0-031(b) (see Section 5.0 for details).

3.5 Ecological

Los Alamos National Laboratory is developing a new approach for ecological risk assessment in cooperation with EPA Region 6 and the NMED. Further discussion of ecological risk assessment methodology will be deferred until the Ecological Exposure Unit methodology that is being developed has been approved by the regulators.

4.0 RESULTS OF QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

Data validation was performed on all data from the analytical laboratories. Validation was performed using the guidelines from the ER Project's Generic Quality Assurance Project Plan for RCRA Facility Investigations, Appendix T of the IWP (LANL 1991, 0553). Reviews of the validation and the QA/QC activities for each PRS are included in the following subsections. A summary table of all the QA/QC results for each sample can be found in Appendix B of this document.

As a result of QA/QC activities, qualifiers are added to the data when necessary as part of routine data validation activities. The following is a list of the qualifiers used in this RFI report and their definitions.

J = Estimated quantity. The analyte was detected in the sample, but there were one or more QC parameters associated with this sample that were outside allowed limits.

UJ = Estimated undetected quantity. The analyte was not detected in the sample, but there were one or more QC parameters associated with this sample that were outside allowed limits.

There can be many reasons for qualifying analytical data. For example, there is a set of sample-specific QC parameters that can cause analytes from individual samples to be qualified, such as surrogate recoveries or duplicate results. There are also batch-specific parameters, such as blind QC samples and method blanks that affect all of the samples analyzed in a particular group. Often, the quantity of QA/QC data available for site-specific investigations is inadequate for estimating components of measurement error because statistics cannot be defined for

sample sizes of one, or estimated well with small sample sizes. Consequently, QA/QC data for site-specific investigations will rarely be used to adjust data.

4.1.1 Inorganic Analyses

Soil and water samples were analyzed for lead in requests 16857, 16883, 17085, 17382, 17400, 17408, 17434, 17457, 17482, 17512, 17548, 17588, 17597, 17598, 17623, 17626, 17710, 17745, 17749, and 18113. All QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Soil samples were analyzed for lead in request 17453. There was a low recovery of lead in the QC sample (40%). The lead data are qualified J for the low recovery.

Soil samples were analyzed for lead in request 17670. There was a high recovery of lead in the QC sample (180%). The lead data are qualified J for the high recovery.

Soil samples were analyzed for target analyte list (TAL) metals in request 18030. The only QC problem with this request was that selenium had a low recovery in the internal standard which causes the selenium data to be qualified UJ. Since there were no detects for selenium in this request and all other QC parameters were within allowed limits, the qualification should not affect the usability of the selenium data. All other data are valid and usable without qualification.

4.1.2 Organic Analyses

Soil and water samples were analyzed for volatiles or benzene, toluene, ethylbenzene, and xylenes (known collectively as BTEX) in requests 16858, 16864, 16885, 17405, 17445, 17621, 17625, 17667, 17857, 17975, 17989, 18408, 18499, and 20064. In request 17405, one sample was not analyzed (AAA8388, a trip blank) because the sample jar was broken during shipment and the sample was lost. For all of these requests, QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Soil and water samples were analyzed for volatiles in requests 17383, 17547, 17590, 17600, 17601, 17707, and 17744. In these requests, acetone was found in the QC sample (which was not supposed to contain acetone). The acetone levels were all low, between 0.022 and 0.072 mg/kg in the affected samples and 0.0024 and 0.032 in the QC sample. In all cases, if the level found in the sample was less than ten times the concentration found in the QC sample, the EQL was raised to the level detected in the sample. All other data are valid and usable without qualification.

Soil samples were analyzed for volatiles in request 17077. The only QC deficiency with this request was that there was one high surrogate recovery in samples AAA8513 and AAA8522. However, because there were no detects in either sample, the data are not qualified. All data are valid and usable without qualification.

Soil samples were analyzed for BTEX in request 17399. The only QC deficiency with this request was that there was one low internal standard in sample AAB0171. However, because the four BTEX analytes are not associated with this internal standard, the data are not qualified. All data are valid and usable without qualification.

Soil and water samples were analyzed for volatiles in request 17480. The only QC deficiency with this request was that there was one high surrogate recovery in sample AAB0251. However, because there were no detects in this sample, the data are not qualified. All data are valid and usable without qualification.

Soil and water samples were analyzed for volatiles in requests 17456 and 17505. Acetone was qualified J in samples AAB0248, AAB0259, AAB0260, and AAB0313 because of continuing calibrations being outside allowed limits (percent difference greater than 25%). Sample AAB0313 also had 1,2,4-trimethylbenzene qualified J for continuing calibrations outside allowed limits. All other data are valid and usable without qualification.

Soil and water samples were analyzed for volatiles in request 17747. For the three soil samples in this request, s-butylbenzene and p-isopropyltoluene are qualified J for the percent difference because the continuing calibrations are greater than 25%. For samples AAB5435 and AAB5438 toluene, mixed xylenes and 1,2,4-trimethylbenzene are qualified J for being slightly above the linear calibration range of the instrument. For sample AAB5436, 1,2,4-trimethylbenzene is qualified J for being slightly above the linear calibration range of the instrument. All other data are valid and usable without qualification.

Soil and water samples were analyzed for volatiles in request 18111. The only problem was that toluene and acetone were found in the method blank. If the level found in the sample was less than ten times the concentration found in the method blank, the EQL was raised to the level detected in the sample. All other data are valid and usable without qualification.

Soil samples were analyzed for semivolatiles in request 17975. For this request, QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Soil and water samples were analyzed for TPH in requests 16864, 16885, 16918, 17077, 17383, 17399, 17405, 17445, 17456, 17480, 17505, 17547, 17600, 17601, 17621, 17625, 17667, 17707, 17744, 17748, 17975, 18111, and 18408. For all of these requests, QA/QC

parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Soil samples were analyzed for TPH in request 17590. The only problem with this request is that there was a low recovery for the QC sample (40%). Because of this low recovery, the data are qualified UJ. However, because there were no detects for TPH in these samples and the EQL was low (10 mg/kg), the usability of the data should not be affected by the low recovery.

4.1.3 Radiochemistry Analyses

No fixed laboratory radiochemistry analyses were performed at this site.

5.0 SPECIFIC RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 PRS 0-031(b)

5.1.1 History

The Zia Company motorpool facility (PRS Group 4) consisted of an automotive maintenance hangar and three buildings labeled Buildings 1, 2, and 3 (The Zia Company 1958, 05-0140). Figure 5.1.1-1 shows PRS 0-031(b) at the time of the investigation.

In 1962, the automotive maintenance hangar was removed and its services were moved to other buildings. Building 3 housed the frame, front-end, and wheel shop, and in 1959 was converted to a gas station (The Zia Company 1950, 05-0141). The building contained two vehicle-greasing pits, and a waste oil pit was located at the northeast corner of the building.

In 1959, a service station was constructed next to the police station on Trinity Drive; however, neither an aerial photograph taken in 1960 (Limbaugh Engineering & Aerial Services, Inc. 1960, 05-0168) nor a topographic map dated 1963 (Limbaugh Engineering & Aerial Services, Inc. 1963, 05-0160) shows a service station next to the police station. It is inferred that Building 3 is the service station in question because the date of construction (1959) is close to the dates on the photograph and map and the building is near the former police station. Building 3 had two USTs (known from now on as UST-1 and UST-2) located east of the service station; these USTs have since been removed.

Figure 5.1.1-2 shows the current view of the site, including the new Los Alamos National Bank building. In 1995, Los Alamos National Bank purchased a majority of the property at PRS 0-031(b) and began construction of a new bank. The entire area formally occupied by PRS 0-031(b) was graded and is currently covered by new concrete and asphalt paving.

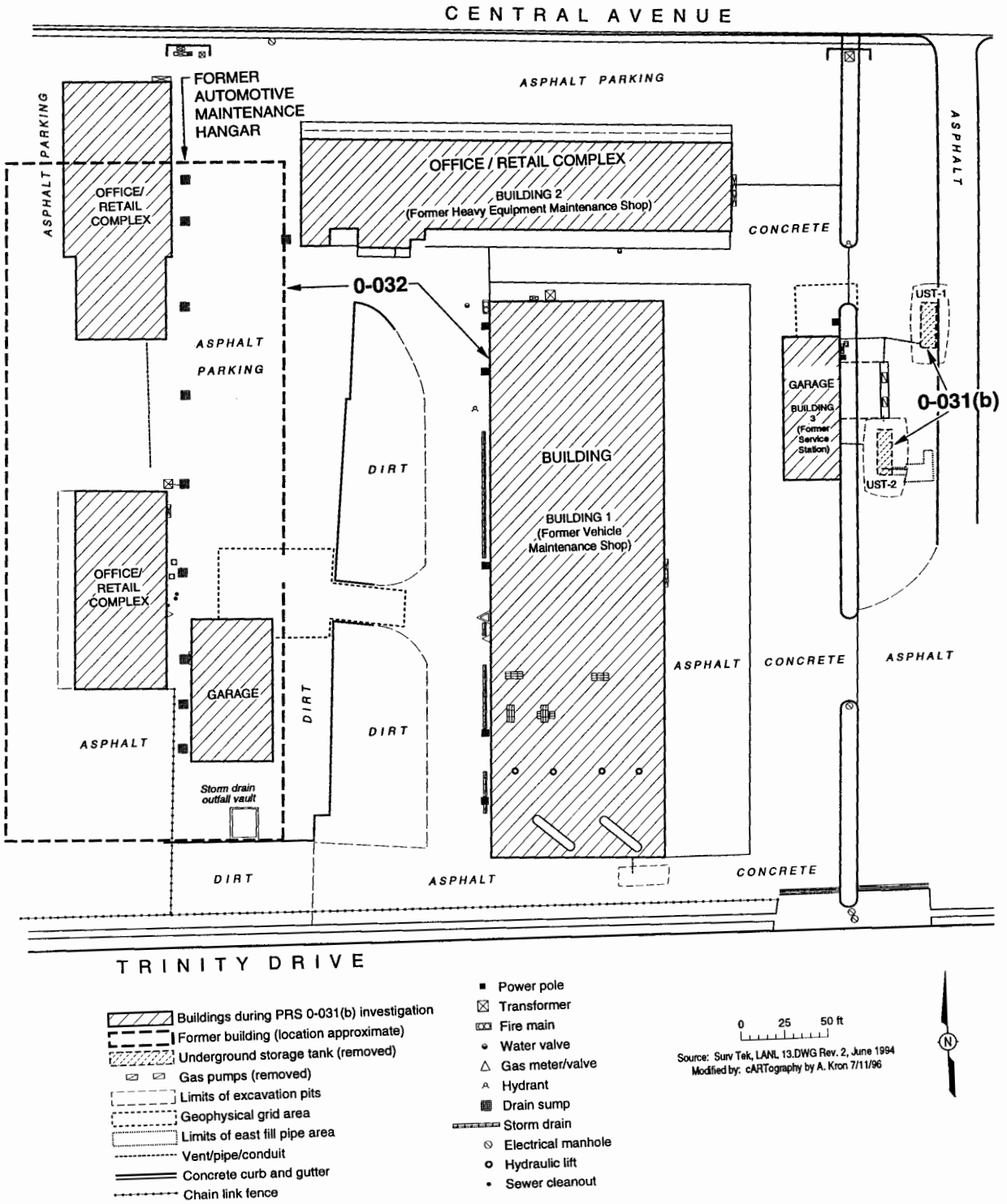


Fig. 5.1.1-1. Former Zia Company motorpool facility (PRS Group 4) as it looked during investigation.

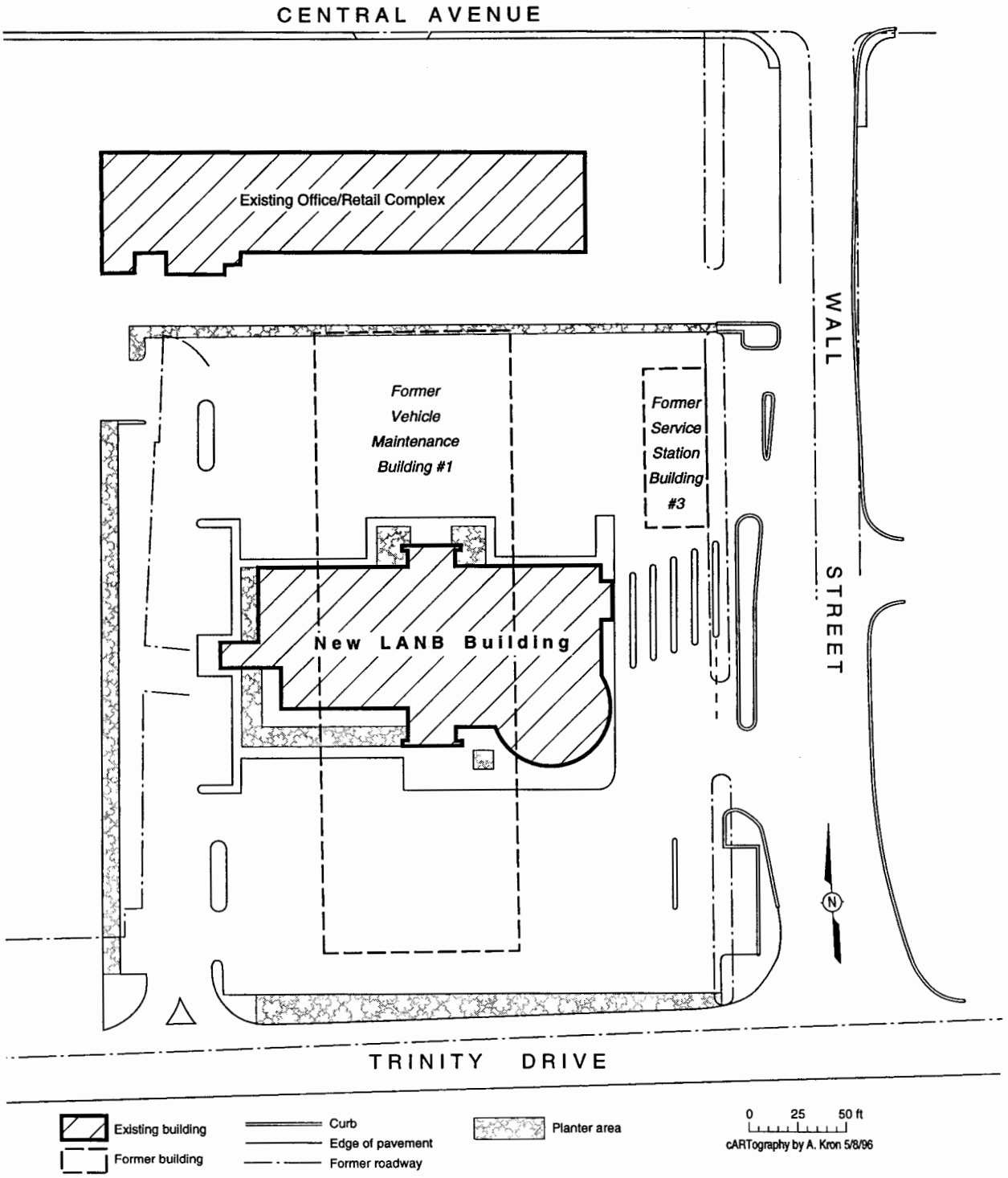


Fig. 5.1.1-2. Current view of PRS 0-031(b) including the new Los Alamos National Bank building.

5.1.2 Description

See Section 2.0 for a description of geological setting, soils, and hydrology pertinent to this report.

5.1.3 Previous Investigations

No previous investigations have been performed at this site.

5.1.4 Field Investigation

The former motorpool facility and service station were operated by Zia Company, a contractor to the AEC, from the 1940s through the mid-1960s. Zia Company engineering drawing Z-1362, sheets 1 and 2, indicates that before 1959, the frame, front-end, and wheel shop were located within Building 3 (The Zia Company 1962, 05-0144). In 1959, Building 3 was converted to a service station (PRS 0-031[b]). Preconstruction drawings indicate that one 10 000-gal. UST was planned to supply two fuel pumps (The Zia Company 1959, 05-0141).

During this investigation, Building 3 was not a service station but a vehicle and machinery maintenance and repair facility. The investigation of PRS 0-031(b) included excavating and removing two 10 000-gal. USTs, and characterizing the UST-2 auxiliary pipe release, the UST-2 distribution line release, and the soil within the concrete curbing east of the building.

5.1.4.1 Excavation and Removal of UST-1 and UST-2

Site investigation activities for PRS 0-031(b) began with historical data searches and reviews, personal interviews, and site surveys. Geophysical surveying confirmed and precisely determined the location and geometry of the USTs. This section presents information about the excavation and removal activities for the USTs.

Deviations from the Work Plan

All field investigation activities were conducted in accordance with the RFI work plan; however, the following deviations occurred:

- The work plan states that three USTs existed at PRS 0-031(b), but only two 10 000-gal. USTs were found east of Building 3.

- The work plan mentions that a waste oil pit was located northeast of Building 3. A subsurface waste oil pit could not be located and therefore was not investigated. However, an area northeast of Building 3 was found to be contaminated with waste oil and will be discussed in the sections titled "Concrete Curb" in this report.

- The work plan states that radiological screening will not be performed because radioactive materials were not used at this site. Gross radiological screening was performed as required by the site-specific health and safety plan and the site-specific waste management plan during removal of UST-1 and UST-2. All radiological screening requirements were eliminated after approximately three months of field investigation activities.

- The work plan states that two vehicle greasing pits inside Building 3 will be investigated. These two pits were not investigated at the request of the property owner, based on additional historical information. These vehicle greasing pits were used for undercarriage access only, and were not used for vehicle greasing as stated in the work plan (LANL 1992, 0781). Furthermore, no visible signs of a release (e.g., stained or cracked concrete) were observed.

- The work plan indicates that total lead analysis is not required for samples collected from this site; however, some samples were analyzed for total lead because leaded-gasoline products were used at this site.

Geodetic Surveys

The locations of the UST systems, the extent of the UST excavations, and sample locations were surveyed. Geodetic survey data was transferred to FIMAD for incorporation into the ER database.

Geophysical Surveys

Geophysical surveys were conducted to locate the position, orientation, and estimated depth of subsurface features including a waste oil pit, USTs, distribution line piping, and utility lines.

Three geophysical techniques were employed to complete the surveys: ground penetrating radar (GPR), electromagnetic (EM) induction, and radiodetection.

On February 7, 1994, a geophysical survey was conducted in the area east of Building 3 and focused on four fill ports and associated subsurface features. The survey results suggested that two small USTs existed northeast of the former service station and pump island and lay end-to-end in a north-south orientation. Survey results also indicated that a third UST existed directly south of the pump island in a north-south orientation. The geophysical survey did not detect a UST beneath the fourth fill port. However, the fourth fill port was connected to a subsurface pipe which originated from the southern UST. This pipe was perpendicular to the UST and extended toward the fourth fill port, which was located approximately 15 ft east of the UST. The purpose of this auxiliary fill port is not known.

Screening Methodology for UST-1 and UST-2

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil was screened by the on-site site safety officer (SSO) and radiological screening personnel (RSP) to detect chemical and gross radiological contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc.™, OVM Model 580B, photoionization detector (PID) with a 10.6 eV bulb. Soil was screened for ionizing radiation using Eberline rate meters with scintillation (alpha) and Geiger-Mueller™ (beta/gamma) probes, respectively. In addition, gamma exposure was measured using a Ludlum™ Model 19 microR meter. Equipment was smeared and counted for alpha activity using a Ludlum™ Model 2000 alpha tray counter before release from the site. All field screening instruments were calibrated and checked on a daily basis by the SSO and RSP.

Additional field screening tools used for waste management purposes were the Quantix® immunoassay analyses for total BTEX. Polyaromatic hydrocarbons (PAH) and total lead screening was performed, if necessary, by field x-ray fluorescence (XRF). To confirm the field screening results, approximately 10% of the samples collected for field screening were submitted for fixed laboratory analyses. Headspace analyses were also performed on all samples collected for immunoassay analyses, following procedures set forth in Part XII, Appendix C, of the NMED UST Regulations.

Field Screening Results for UST-1 and UST-2

Each sample collected during excavation activities was screened for alpha and beta/gamma activity and organic vapors, as described above. Action levels in the breathing zone were exceeded during the purging of gasoline vapors from UST-2. All activities were stopped until additional engineering controls could be implemented to assist in dispersing organic vapors while purging the tank. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples ranged from 0.0 to 35 parts per million by volume (ppmv), and the maximum reading observed in the fill material was from the UST-2 excavation. Alpha screening results ranged from 2.67 to 18.7 counts per minute (cpm). Beta/gamma screening results ranged from 139 to 233 cpm. Gamma exposure results ranged from 14 to 20 μR/hr. These radiological readings were all within background limits.

Waste and verification sample immunoassay results ranged from below detection limit to 8.3 ppm for total BTEX and from below detection limit to 0.94 ppm for PAH. The maximum immunoassay results for BTEX and PAH were from soils excavated from UST-1 and UST-2, respectively. Total lead screening results by XRF ranged from 41 to 47 ppm. All field screening results are presented in Appendix A.

Sampling Methodology for UST-1 and UST-2

Before removing UST-1 and UST-2, excavated soil from around the USTs was screened using hand-held instruments to detect gross radiological (alpha, beta, and gamma activity) and chemical contamination (organic vapors, total BTEX, PAHs, and total lead). Immediately after screening, the samples to be submitted to a fixed laboratory for analysis of BTEX compounds were collected directly from the backhoe bucket, followed by samples for analysis of TPH. Subsequently, samples were collected from the backhoe bucket for the remaining analyses. All field screening samples and samples destined for fixed laboratory analyses were appropriately labeled and assigned unique LANL sample identification numbers (e.g., AAA0000) with bar codes. All samples were documented on sample collection logs, placed in coolers with ice, and transported to LANL's Inorganic Trace Analysis Group. All sampling was conducted in accordance with LANL ER Project procedures. Summary Table 5.1.4-1 lists the sample number, request number, and requested analyses for the UST-1 and UST-2 investigations.

TABLE 5.1.4-1

SUMMARY OF SAMPLES TAKEN AT PRS 0-031(b)

LOCATION	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	VOCS	SVOCS	PCBS	BTEX	TPH	INORGANICS
UST-1	00-1522	AAA8536	NA[a]	Water (TB)[b]	NR[c]	NR	NR	16864	NR	NR
UST-1	00-1555	AAA8516	13.5	Soil	NR	NR	NR	16864	16864	NR
UST-1	00-1556	AAA8519	13.5	Soil	NR	NR	NR	16864	16864	NR
UST-2	00-1523	AAA8514	NA	Water (EB)[d]	NR	NR	NR	16885	16885	16883
UST-2	00-1523	AAA8515	NA	Water (FR)[e]	NR	NR	NR	16885	16885	16883
UST-2	00-1523	AAA8531	NA	Water (TB)	NR	NR	NR	16885	NR	NR
UST-2	00-1523	AAA8532	NA	Water (TB)	NR	NR	NR	16858	NR	NR
UST-2	00-1569	AAA8521	12	Soil	NR	NR	NR	16885	16885	NR
UST-2	00-1570	AAA8517	12	Soil	NR	NR	NR	16885	16885	NR
UST-2	00-1571	AAA8537	7	Soil	NR	NR	NR	NR	16918	NR
UST-2	00-1572	AAA8543	7	Soil	NR	NR	NR	NR	16918	NR
UST-2	00-1573	AAA8542	7	Soil	NR	NR	NR	NR	16918	NR
UST-2	00-1574	AAA8538	8	Soil	NR	NR	NR	NR	16918	NR
SS-1 (concrete curb)	00-1537	AAA8513	0 - 1.5	Soil	17077	NR	NR	NR	17077	17085
SS-1 (concrete curb)	00-1537	AAA8522	0 - 1.5	Soil	17077	NR	NR	NR	17077	17085
SS-1 (concrete curb)	00-1537	AAB0169	1	Soil	NR	NR	NR	17405	17405	17408
Concrete curb	00-1575	AAB6647	0.5 - 1.2	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1575	AAB6649	NA	Water (TB)	18111	NR	NR	NR	NR	NR
Concrete curb	00-1576	AAB6643	0.5 - 1.2	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1577	AAB6644	0.5-1.3	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1578	AAB6645	0.5-1.3	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1579	AAB3589	3 - 3.5	Soil	20064	NR	NR	NR	NR	NR
Concrete curb	00-1579	AAB6646	0.5 - 1.5	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1602	AAB0171	0.25 - 1.0	Soil	NR	NR	NR	17399	17399	17400
Concrete curb	00-1602	AAB0176	NA	Water (TB)	NR	NR	NR	17399	NR	NR
Concrete curb	00-1602	AAB0386	NA	Water (TB)	18408	NR	NR	NR	NR	NR
Concrete curb	00-1604	AAB0177	0.5	Soil	NR	NR	NR	17405	17405	17408
Concrete curb	00-1613	AAB6639	2.2	Soil	17975	17975	NR	NR	17975	18030
Concrete curb	00-1613	AAB6641	2.2	Soil	17975	17975	NR	NR	17975	18030
Concrete curb	00-1614	AAB6638	1.8	Soil	17975	17975	NR	NR	17975	18030
Concrete curb	00-1615	AAB6648	0.5 - 1.4	Soil	18111	NR	NR	NR	18111	18113
Concrete curb	00-1616	AAB6651	0.33 - 1.3	Soil	18111	NR	NR	NR	18111	18113
SS-2	00-1587	AAB0225	70 - 75	Soil	NR	NR	NR	NR	NR	17434
SS-2	00-1587	AAB0233	31 - 35	Soil	NR	NR	NR	NR	NR	17434
SS-2	00-1587	AAB0234	31 - 35	Soil	NR	NR	NR	NR	NR	17434
SS-2	00-1587	AAB0236	15 - 20	Soil	NR	NR	NR	NR	NR	17434
SS-2	00-1587	AAB0240	NA	Water (TB)	NR	NR	NR	Currently not in FIMAD	NR	NR
SS-3	00-1588	AAA8424	45 - 50	AF[f]	LL[g]	NR	NR	NR	NR	NR
SS-3	00-1588	AAA8425	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-3	00-1588	AAB0241	NA	Water (TB)	17445	NR	NR	NR	NR	NR
SS-3	00-1588	AAB0242	10 - 15	Soil	17445	NR	NR	NR	17445	17453
SS-3	00-1588	AAB0243	40 - 45	Soil	17445	NR	NR	NR	17445	17453
SS-3	00-1588	AAB0244	65 - 70	Soil	17445	NR	NR	NR	17445	17453
SS-4	00-1589	AAA8433	43 - 48	AF	LL	NR	NR	NR	NR	NR
SS-4	00-1589	AAA8434	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-4	00-1589	AAB0245	NA	Water (TB)	17456	NR	NR	NR	NR	NR
SS-4	00-1589	AAB0246	5 - 10	Soil	17456	NR	NR	NR	17456	17457
SS-4	00-1589	AAB0247	10 - 15	Soil	17456	NR	NR	NR	17456	17457
SS-4	00-1589	AAB0248	55 - 60	Soil	17456	NR	NR	NR	17456	17457

TABLE 5.1.4-1 (CONTINUED)

SUMMARY OF SAMPLES TAKEN AT PRS 0-031(b)

LOCATION	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	VOCS	SVOCS	PCBS	BTEX	TPH	INORGANICS
SS-4	00-1589	AAB0249	75 - 80	Soil	17456	NR	NR	NR	17456	17457
SS-5	00-1590	AAA8426	41 - 46	AF	LL	NR	NR	NR	NR	NR
SS-5	00-1590	AAA8427	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-5	00-1590	AAB0250	NA	Water (TB)	17480	NR	NR	NR	NR	NR
SS-5	00-1590	AAB0251	30 - 35	Soil	17480	NR	NR	NR	17480	17482
SS-5	00-1590	AAB0252	35 - 40	Soil	17480	NR	NR	NR	17480	17482
SS-5	00-1590	AAB0254	75 - 80	Soil	17480	NR	NR	NR	17480	17482
SS-5	00-1590	AAB0255	85 - 90	Soil	17480	NR	NR	NR	17480	17482
SS-5	00-1590	AAB0256	NA	Water (FR)	17480	NR	NR	NR	17480	17482
SS-5	00-1590	AAB0257	NA	Water (FB)	17480	NR	NR	NR	17480	17482
SS-6	00-1591	AAA8431	39 - 44	AF	LL	NR	NR	NR	NR	NR
SS-6	00-1591	AAA8432	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-6	00-1591	AAB0258	NA	Water (TB)	17505	NR	NR	NR	NR	NR
SS-6	00-1591	AAB0259	80 - 85	Soil	17505	NR	NR	NR	17505	17512
SS-6	00-1591	AAB0260	20 - 25	Soil	17505	NR	NR	NR	17505	17512
SS-6	00-1591	AAB0313	40 - 45	Soil	17505	NR	NR	NR	17505	17512
SS-7	00-1592	AAA8428	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-7	00-1592	AAA8429	45 - 50	AF	LL	NR	NR	NR	NR	NR
SS-7	00-1592	AAA8430	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-7	00-1592	AAB0314	NA	Water (TB)	17547	NR	NR	NR	NR	NR
SS-7	00-1592	AAB0315	35 - 40	Soil	17547	NR	NR	NR	17547	17548
SS-7	00-1592	AAB0316	45 - 50	Soil	17547	NR	NR	NR	17547	17548
SS-7	00-1592	AAB0317	95 - 100	Soil	17547	NR	NR	NR	17547	17548
SS-8	00-1593	AAB0319	NA	Water (TB)	17590	NR	NR	NR	NR	NR
SS-8	00-1593	AAB0321	55 - 60	Soil	17590	NR	NR	NR	17590	17588
SS-8	00-1593	AAB0322	85 - 90	Soil	17590	NR	NR	NR	17590	17588
SS-8	00-1593	AAB0323	95 - 100	Soil	17590	NR	NR	NR	17590	17588
SS-9	00-1594	AAA8438	52 - 57	AF	LL	NR	NR	NR	NR	NR
SS-9	00-1594	AAA8439	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-9	00-1594	AAB0172	NA	Water (EB)	17600	NR	NR	NR	17600	17597
SS-9	00-1594	AAB0173	NA	Water (FR)	17600	NR	NR	NR	17600	17597
SS-9	00-1594	AAB0324	NA	Water (TB)	17600	NR	NR	NR	NR	NR
SS-9	00-1594	AAB5417	70 - 75	Soil	17600	NR	NR	NR	NR	17597
SS-9	00-1594	AAB5418	85 - 90	Soil	17600	NR	NR	NR	17600	17597
SS-9	00-1594	AAB5419	80 - 85	Soil	17600	NR	NR	NR	17600	17597
SS-10	00-1595	AAB5421	NA	Water (TB)	17601	NR	NR	NR	NR	NR
SS-10	00-1595	AAB5422	67.5 - 69.5	Soil	17601	NR	NR	NR	17601	17598
SS-10	00-1595	AAB5423	72.5 - 77.5	Soil	17601	NR	NR	NR	17601	17598
SS-10	00-1595	AAB5424	87.5 - 90	Soil	17601	NR	NR	NR	17601	17598
Dist. line excavation	00-1596	AAB0178	10	Soil	NR	NR	NR	NR	NR	17434
Dist. line excavation	00-1597	AAB0161	6.4	Soil	17383	NR	NR	NR	17383	17382
Dist. line excavation	00-1597	AAB0166	NA	Water (TB)	17383	NR	NR	NR	NR	NR
Dist. line excavation	00-1603	AAA8388	NA	Water (TB)	NR	NR	NR	17405	NR	NR
Dist. line excavation	00-1603	AAB0175	3.5	Soil	NR	NR	NR	17405	17405	17408
SS-11	00-1608	AAB5425	NA	Water (TB)	17621	NR	NR	NR	NR	NR
SS-11	00-1608	AAB5426	70 - 75	Soil	17621	NR	NR	NR	17621	17623
SS-11	00-1608	AAB5427	70 - 75	Soil	17621	NR	NR	NR	17621	17623
SS-11	00-1608	AAB5428	75 - 80	Soil	17621	NR	NR	NR	17621	17623
SS-11	00-1608	AAB5429	95 - 100	Soil	17621	NR	NR	NR	17621	17623
SS-12	00-1609	AAB5430	NA	Water (TB)	17625	NR	NR	NR	NR	NR
SS-12	00-1609	AAB5431	29.5 - 35	Soil	17625	NR	NR	NR	17625	17626

TABLE 5.1.4-1 (CONTINUED)

SUMMARY OF SAMPLES TAKEN AT PRS 0-031(b)

LOCATION	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	VOCS	SVOCS	PCBS	BTEX	TPH	INORGANICS
SS-12	00-1609	AAB5432	85 - 90	Soil	17625	NR	NR	NR	17625	17626
SS-12	00-1609	AAB5433	80 - 85	Soil	17625	NR	NR	NR	17625	17626
SS-2A	00-1610	AAA8436	0 - 0	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8437	15 - 20	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8440	12 - 52	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8441	12 - 52	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8442	12 - 52	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8443	12 - 52	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAA8444	12 - 52	AF	LL	NR	NR	NR	NR	NR
SS-2A	00-1610	AAB5434	NA	Water (TB)	17747	NR	NR	NR	NR	NR
SS-2A	00-1610	AAB5435	10 - 15	Soil	17747	NR	NR	NR	17748	17749
SS-2A	00-1610	AAB5436	15 - 20	Soil	17747	NR	NR	NR	17748	17749
SS-2A	00-1610	AAB5438	40 - 45	Soil	17747	NR	NR	NR	17748	17749
SS-2A	00-1610	AAB5440	NA	Water (TB)	17744	NR	NR	NR	NR	NR
SS-2A	00-1610	AAB5441	115 - 118	Soil	17744	NR	NR	NR	17744	17745
SS-2A	00-1610	AAB6633	NA	Water (TB)	17857	NR	NR	NR	NR	NR
SS-13	00-1611	AAB5442	85 - 90	Soil	17667	NR	NR	17989	17667	17670
SS-13	00-1611	AAB5443	40 - 45	Soil	17667	NR	NR	NR	17667	17670
SS-13	00-1611	AAB5444	95 - 100	Soil	17667	NR	NR	NR	17667	17670
SS-13	00-1611	AAB5445	NA	Water (TB)	17667	NR	NR	NR	NR	NR
East auxiliary pipe	00-1597	AAB0161	6.4	Soil	17383	NR	NR	NR	17383	17382
East auxiliary pipe	00-1597	AAB0166	NA	Water (TB)	17383	NR	NR	NR	NR	NR
East auxiliary pipe	00-1598	AAB0163	4.5 - 5.0	Soil	17383	NR	NR	NR	17383	17382
East auxiliary pipe	00-1599	AAB0162	4.5 - 5.0	Soil	17383	NR	NR	NR	17383	17382
East auxiliary pipe	00-1600	AAB0165	4.5 - 5.0	Soil	17383	NR	NR	NR	17383	17382
East auxiliary pipe	00-1601	AAB0164	4.5 - 5.0	Soil	17383	NR	NR	NR	17383	17382
East auxiliary pipe	00-1602	AAB0385	NA	Water (TB)	Currently not in FIMAD	NR	NR	NR	NR	NR
East auxiliary pipe	00-1602	AAB0386	NA	Water (TB)	18408	NR	NR	NR	NR	NR
SS-14	00-1612	AAB0221	NA	Water (EB)	17707	NR	NR	NR	17707	17710
SS-14	00-1612	AAB0222	NA	Water (FR)	17707	NR	NR	NR	17707	17710
SS-14	00-1612	AAB5446	NA	Water (TB)	17707	NR	NR	NR	NR	NR
SS-14	00-1612	AAB5447	5 - 10	Soil	17707	NR	NR	NR	17707	17710
SS-14	00-1612	AAB5448	15 - 20	Soil	17707	NR	NR	NR	17707	17710
East auxiliary pipe	00-1617	AAA8411	7-7.25	Soil	18499	NR	NR	NR	NR	NR
East auxiliary pipe	00-1617	AAB0387	7-7.25	Soil	NR	NR	NR	NR	18408	NR
East auxiliary pipe	00-1617	AAB66521	7	Soil	NR	NR	NR	NR	NA	NR
East auxiliary pipe	00-1618	AAB0388	7	Soil	NR	NR	NR	NR	18408	NR
East auxiliary pipe	00-1618	AAB66531	7	Soil	NR	NR	NR	NR	NA	NR

[a] NA = Not available.
[b] TB = Trip blank.
[c] NR = Not requested.
[d] EB = Equipment blank.
[e] FR = Field rinsate.
[f] AF = Soil gas sample.
[g] LL = Method TO14 requested at Lancaster Laboratory and this data is currently not in FIMAD.

Excavation, Removal, and Subsurface Sampling of UST-1

On March 1, 1994, excavation and removal of UST-1 was initiated by removing existing asphalt over the proposed UST-1 excavation area, northeast of the pump island (Fig. 5.1.4-1). The excavation and removal of UST-1 was in accordance with NMED UST regulations and an NMED inspector was on-site during the UST removal.

In accordance with the site-specific waste management plan, field screening was required for total BTEX compounds to segregate potentially gasoline-contaminated soil from clean soil and to guide an expanded excavation in the event a gasoline release was discovered. The field screening tools chosen were the Quantix® immunoassay analyses for total BTEX and PAH, field XRF, and headspace analyses. The headspace analyses were performed to detect BTEX compounds following procedures set forth in Part XII, Appendix C of the NMED UST Regulations.

During excavation, soil samples were collected from the fill material around UST-1 for waste management purposes. The collection of waste samples for field screening and analyses was guided by visual observation of soil staining or a positive field screening response for organic vapors. Neither stained soil nor the presence of organic vapors was noted in soils removed from the UST-1 excavation. Field screening samples were collected in areas where contamination would be expected (e.g., beneath pipe connections and adjacent to the fill port) and in areas randomly selected to obtain representative samples across the excavation. All samples were collected directly from the backhoe bucket in accordance with LANL ER Project procedures.

Twelve soil samples were collected for waste management purposes during the UST-1 excavation and analyzed for total BTEX using the immunoassay system. One sample, AAA8490, was analyzed by the immunoassay system for PAH and was screened for total lead by XRF. The split sample (AAA8512) from sample AAA8490 was collected for fixed laboratory analysis to confirm the total BTEX and PAH field screening analyses. BTEX or PAH compounds were not detected (by immunoassay analyses) in any of the waste samples from the backfill material. The total lead screening (by XRF) of sample AAA8490 did not detect any lead in the sample. The maximum organic vapor concentration detected in headspace samples in UST-1 backfill material was 0.7 ppmv. Gross alpha and beta/gamma screening data for UST-1 soils were within the acceptable range for background activity measured with hand-held instruments. The field screening results are presented later in this section of the report and Appendix A.

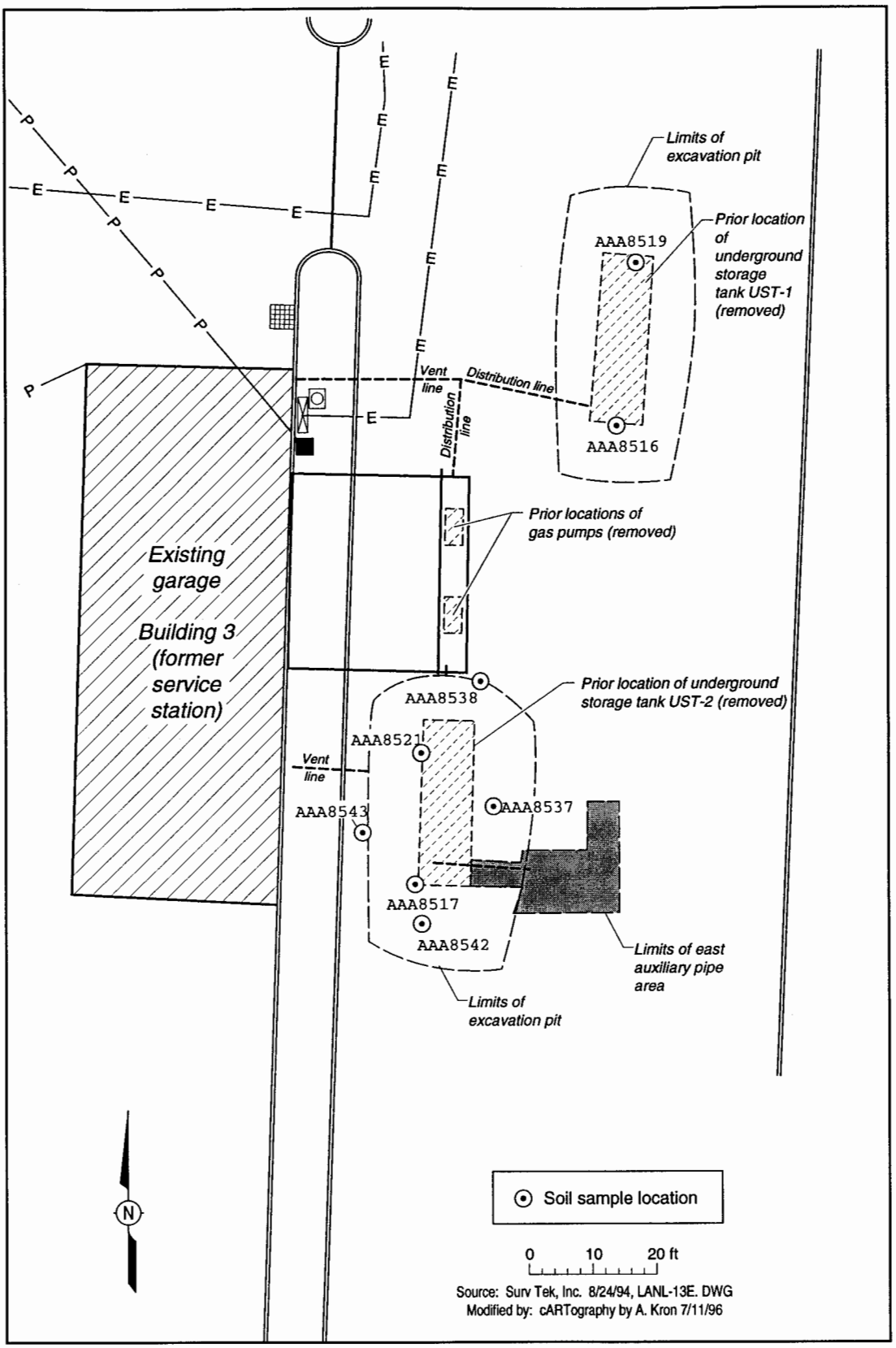


Fig. 5.1.4-1. Sample locations for UST-1 and UST-2 excavation and removal activities at PRS 0-031(b).

UST-1 was exposed and prepared for removal between March 1 and 3, 1994. During this period it was discovered that two fill ports, rather than one, were associated with this tank. Therefore, only one 10 000-gal. tank existed where two small tanks, suggested by the presence of the two fill ports and by the geophysical survey, were previously thought to exist. As a result, only two USTs (UST-1 and UST-2) were found at PRS 0-031(b). The existence of two tanks was further supported by the presence of only two vent lines attached to the service station building.

After removing UST-1, soil beneath the tank was noted to be slightly stained with rust. However, there was no visual evidence of hydrocarbon staining of the soil. Soil samples AAA8519 and AAA8516 were collected beneath the north and south ends of UST-1, as directed by the NMED representative in accordance with Part VIII, Section 802(a) of the NMED UST Regulations. Both samples were submitted to an off-site laboratory for analysis of BTEX compounds and TPH. Splits of the two compliance samples were collected by the NMED inspector.

Immunoassay analysis of the split sample AAA8516 indicated the presence of BTEX compounds at a concentration of 8.3 ppm. Fixed laboratory analytical results indicated that BTEX and TPH were below detection limits. Field screening and fixed laboratory analyses of verification sample AAA8519 collected beneath the north end of the tank did not detect any BTEX or TPH concentrations.

Removal of the UST-1 vent line and distribution line was completed on April 29, 1994. Trenches were excavated to approximately 2 ft bgs in order to remove the pipes. No visual evidence of soil staining was observed in these trenches. The bottom of the trenches were screened for organic vapors using a PID; no organic vapors were detected. Because of the lack of evidence for hydrocarbon contamination, no soil samples were collected from the trenches.

Excavation, Removal, and Subsurface Sampling of UST-2

On March 2, 1994, removal and excavation of UST-2, located south of the pump island, began with breaking and removing the concrete pad and steel bollards located around the tank fill port (Fig. 5.1.4-2). Similar to excavation activities performed at UST-1, the site-specific waste management plan required UST-2 field screening for total BTEX compounds to segregate potentially gasoline-contaminated soil from clean soil, and to guide an expanded excavation in the event a gasoline release was discovered. The field screening tools used were the Quantix® immunoassay analyses, field XRF, and headspace analyses. The excavation and removal of UST-2 was in accordance with NMED UST regulations and an NMED inspector was on-site during the UST removal.

During the excavation of UST-2, soil samples were collected from the fill material for waste management purposes. The collection of waste samples for field screening and analyses was guided by visual observation of soil staining or a positive field screening response for organic vapors. No organic vapors were detected when screening the excavated soil, and no evidence of soil staining was observed. Waste samples were collected at locations where contamination would likely be (e.g., beneath pipe connections and adjacent to the fill port) and also in areas randomly selected to obtain representative samples across the excavation. All samples were collected directly from the backhoe in accordance with LANL ER Project procedures.

A total of 15 samples were collected for waste management purposes and analyzed for total BTEX by the immunoassay method; six of these samples were also analyzed for PAHs by the immunoassay method. Two samples, AAA8471 and AAA8504, were screened for total lead by field XRF. The split sample (AAA8510) for AAA8471 and the split sample (AAA8509) for AAA8504 were submitted to an off-site laboratory for analysis of BTEX, TPH, and total lead to confirm field screening results. In addition, headspace analyses were performed on all 15 waste samples collected for immunoassay analyses, following the procedures set forth in Part XII, Appendix C, of the NMED UST Regulations.

BTEX compounds were not detected in any of the 15 immunoassay analyses. PAH compounds were reported in two of the six samples analyzed for PAH by immunoassay. PAH concentrations in samples AAA8491 and AAA8469 were 0.72 ppm and 0.94 ppm, respectively. Headspace analyses for organic vapors in the waste samples ranged from 0.0 to 35 ppmv. The maximum organic vapor concentration was detected in sample AAA8498 from UST-2. BTEX and PAH compounds were not detected in the immunoassay analysis of sample AAA8498. Total lead concentrations by XRF screening for samples AAA8471 and AAA8504 were 47 and 41 ppm, respectively. Gross alpha and beta/gamma screening data for UST-2 backfill material were within an acceptable range for background activity measured with hand-held instruments. Field screening results are presented later in this section and in Appendix A.

Preliminary TPH analytical results obtained on March 10, 1994, indicated that petroleum hydrocarbons were present in the two waste samples collected from the excavated soil from UST-2. These samples were submitted to a fixed laboratory to confirm field immunoassay analyses. TPH compounds were reported at concentrations of 130 ppm in sample AAA8510 and 230 ppm in sample AAA8509. PAH compounds were not reported in the immunoassay analyses of either sample. In accordance with Part VIII, Section 802(a), of the NMED UST Regulations, a telephone notification of a suspect release was made to the NMED UST Bureau on March 11, 1994.

Immunoassay analysis of the verification samples did not detect BTEX compounds. Field screening by XRF for sample AAA8741 and AAA8504 detected lead at concentrations of 47 ppm (J) and 41 ppm (J), respectively. Split samples of the two verification samples were submitted for fixed laboratory analysis of BTEX and TPH. Analytical results indicated that BTEX was below detection limit for both samples and TPH concentrations were 3 ppm and 5 ppm, respectively.

UST-2 appeared to be in fair condition; some rusted areas were noted on the tank, yet no visible evidence of holes or leaks in the tank were observed. Soil beneath the tank was slightly stained with rust. However, there were no visible signs of hydrocarbon staining in the soil. Soil samples (AAA8521 and AAA8517) were collected from beneath the north and south ends of UST-2 as directed by the NMED representative in accordance with Part VIII, Section 802(a), of the NMED UST Regulations. Splits of the two samples were collected by the NMED inspector.

Under Part XII of the NMED UST Regulations, the vertical and horizontal extent of hydrocarbon migration required assessment to a TPH concentration of 100 ppm or less. It was believed that the extent of contamination did not extend far beyond the walls of the excavation because the excavated soil was predominantly fill material (medium grained sand) and the UST-2 excavation extended to the less permeable tuff walls of the original installation excavation. TPH results from the two samples (AAA8517 and AAA8521) collected at the base of the excavation (after removing the tank) were reported at concentrations of 3 ppm and 5 ppm. Therefore, the vertical extent of contamination was defined. The lateral extent of contamination was assessed by the collection of one sample from the approximate centers of the four excavation side-walls. These samples were collected with the assistance of a backhoe. TPH concentrations reported in these four side-wall samples (north-AAA8538, south-AAA8542, east-AAA8537, and west-AAA8543) were 81 ppm, below detection limit, below detection limit, and 13 ppm, respectively. Based on analytical data, no additional actions were required. Reporting information, as specified in Part XII, Sections 1204 (B), and 1206 (A), (B), was submitted to the NMED regarding the TPH release associated with UST-2 (Cde Baca 1994, 05-0233; Cde Baca 1994, 05-0234; Cde Baca 1995, 05-0235).

5.1.4.2 Field Investigation for East Auxiliary Pipe

On May 2, 1994, excavation and removal of an auxiliary fill pipe for UST-2 was initiated (Fig. 5.1.4-2). The auxiliary pipe was approximately 2 ft bgs, extended approximately 15 ft east of UST-2, and terminated at a fill port set in concrete. During excavation and removal of the auxiliary fill pipe for UST-2, visibly stained soil and organic vapors were detected beneath the 90° piping joint and the fill port. Further investigation of this area included additional excavation to remove the contaminated soil and a borehole to assess vertical extent of contamination.

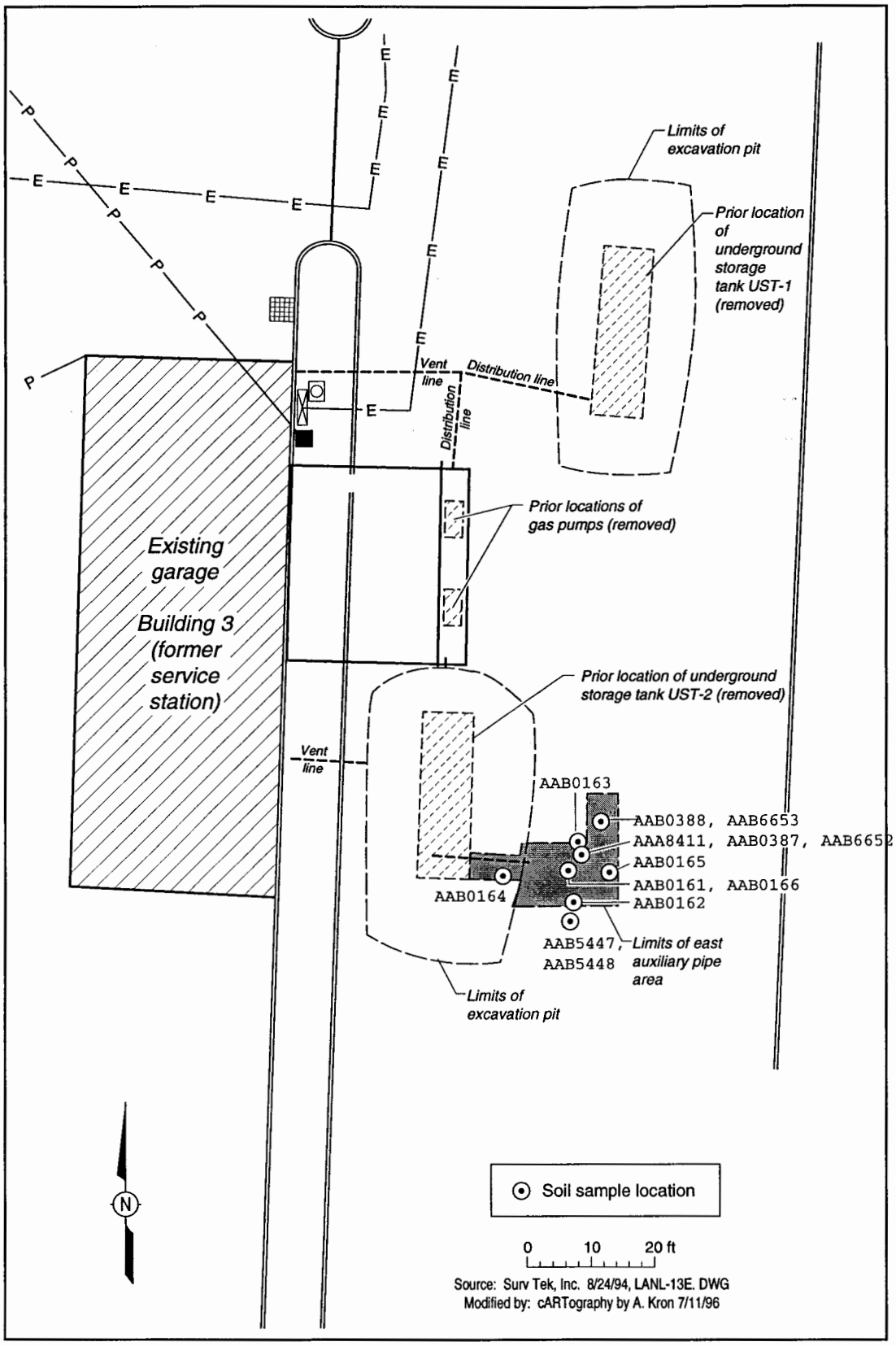


Fig. 5.1.4-2. Borehole and sample locations associated with the investigation of the auxiliary pipe area at PRS 0-031(b).

Geodetic Survey

Sample locations and the extent of the excavation were surveyed following their completion. Geodetic survey data were transferred to FIMAD for incorporation into the ER database.

Geophysical Survey

Geophysical results for this portion of the UST-2 system are discussed in Section 5.1.4.1 of this report.

Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil was screened by the SSO using a hand-held instrument to detect chemical contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc.™, OVM Model 580B, PID with a 10.6 eV bulb. All requirements for radiological screening were eliminated because after three months of fieldwork, radiological contamination had not been detected at this site. All field-screening instruments were calibrated and checked on a daily basis by the SSO.

Field Screening Results

Each sample collected during excavation activities was screened for organic vapors as described above. Action levels in the breathing zone were exceeded during the excavation of soil at approximately 4.0 ft bgs. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples ranged from 0.0 to 690 ppmv, with the maximum reading observed in the excavation at an approximate depth of 4.0 ft bgs. All field screening results are presented in Appendix A.

Sampling Methodology

Before its removal, excavated soil from around the auxiliary fill pipe was screened using a hand-held instrument to detect chemical contamination. Immediately after screening, the samples to be analyzed for BTEX compounds were collected directly from the backhoe bucket to minimize volatilization. Subsequently, samples were collected from the backhoe bucket for the remaining analyses. All samples destined for fixed laboratory analyses were appropriately labeled and assigned unique LANL sample identification numbers (e.g., AAA0000) with bar codes. All samples were documented on sample collection logs, placed in coolers with ice, and

transported to LANL's Inorganic Trace Analysis Group. All sampling was conducted in accordance with LANL ER Project procedures. Summary Table 5.1.4-1 lists the sample number, request number, and requested analyses for the auxiliary pipe investigation.

Over-Excavation and Subsurface Sampling

Elevated organic vapor readings ranged from 35 to 142 ppm in soil directly beneath the 90° piping joint below the fill port. Soil and tuff beneath the pipe were excavated in an attempt to assess the extent of the release. Field screening for organic vapors was conducted to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Maximum organic vapor concentrations of 690 ppmv were recorded in soil and tuff removed from the excavation at a depth of approximately 4.0 ft bgs; dark brown to gray staining of the tuff was observed. Excavation continued to approximately 6.4 ft bgs where tuff staining was no longer observed and organic vapor concentrations decreased to less than 60 ppmv.

Verification samples (AAB0161, AAB0162, AAB0163, AAB0164, and AAB0165) were collected from the base of the excavation and four side-walls (beneath the elbow joint) to assess the vertical and lateral extent of any remaining petroleum contamination. All subsurface samples were collected in accordance with Part XII, Appendix C, of the USTR, and transported to LANL's Inorganic Trace Analysis Group for analysis of VOCs, TPH, and total lead.

Preliminary analytical results indicated the presence of gasoline components, solvents (2-butanone and acetone), and TPH at the base of the excavation. Elevated TPH concentrations were also reported in the south side-wall sample. Preliminary results did not indicate the presence of petroleum constituents on the north, east, or west walls of the excavation. Using a drill rig, an angled boring (SS-14) was advanced on June 10, 1994 from the south side of the excavation to a depth of approximately 15 ft bgs or approximately 8 ft beneath the base of the excavation. This angled borehole would allow collection of additional samples to delineate the southern and vertical extent of the contaminant plume. Core samples (AAB5447 and AAB5448) were collected at depths adjacent to the south side-wall and beneath the base of the excavation, respectively. Both samples were submitted to LANL's Inorganic Trace Analysis Group for VOC, TPH, and total lead analyses.

Validated analytical data from borehole SS-14 samples indicated that TPH and gasoline components were not present in either core sample collected. However, trace amounts of acetone were present in AAB5448 and were probably a laboratory artifact.

Validated results of the five initial excavation samples indicated that elevated levels of TPH were present in the north side-wall sample and TPH was absent in the south side-wall sample,

which contradicted the preliminary analytical results. An investigation regarding the correctness of the final data was performed to confirm the locations of the TPH concentrations. The results of the inquiry confirmed that TPH was present in the north wall of the excavation. The presence of gasoline constituents, acetone, and 2-butanone were also confirmed in the sample collected from the base of the excavation. Therefore, additional activities were required to define the extent of the release in the north side-wall and the base of the excavation.

On July 19, 1994, a backhoe was used to excavate 1 ft into the base of the eastern end of the excavation and a 3 x 7 ft trench into the northeast wall. Tuff and soil removed from the excavation were placed in roll-off bins for waste storage. Samples AAB6652 and AAB6653 were collected from the base of the main excavation and from the base of the north wall extension, respectively. The samples were submitted to LANL's Inorganic Trace Analysis Group for TPH analyses.

On August 3, 1994, notice was provided by the analytical laboratory that holding times for the samples collected on July 19, 1994 had been exceeded. On August 9, 1994, the base of the main excavation and the base of the northeast wall extension were resampled using a stainless steel hand auger. Samples AAB0387 and AAB0388 were the replacement samples for AAB6652 and AAB6653, respectively. Again, both samples were submitted to LANL's Inorganic Trace Analysis Group for TPH analyses. Another sample, AAA8411, was collected from the base of the main excavation and submitted for VOC analysis. Analytical results for samples AAB0387 and AAB0388 indicated VOCs were below detection limit and the TPH concentrations were 23 ppm and 20 ppm, respectively. Based on analytical data, the vertical and horizontal extent of the release from the auxiliary fill pipe had been assessed in all four side-walls and at the base of the excavation.

5.1.4.3 Field Investigation for Concrete Curb

The RFI work plan identified a waste oil pit at the northeast corner of the building (LANL 1992, 0781). A storm drain was identified in this general area during field activities but was not investigated. A concrete curb that forms the boundary of an 8-ft-wide dirt island is located adjacent to the east side of Building 3 and extends from approximately 20 ft north to approximately 80 ft south of the building (Fig. 5.1.4-3). There was no evidence of a waste oil pit inside the concrete curbing; however, it was noted that the surface soil within the concrete curbing was stained black and emitted an odor similar to motor oil. This area was investigated, sampled, and partially excavated to remove contaminated soil.

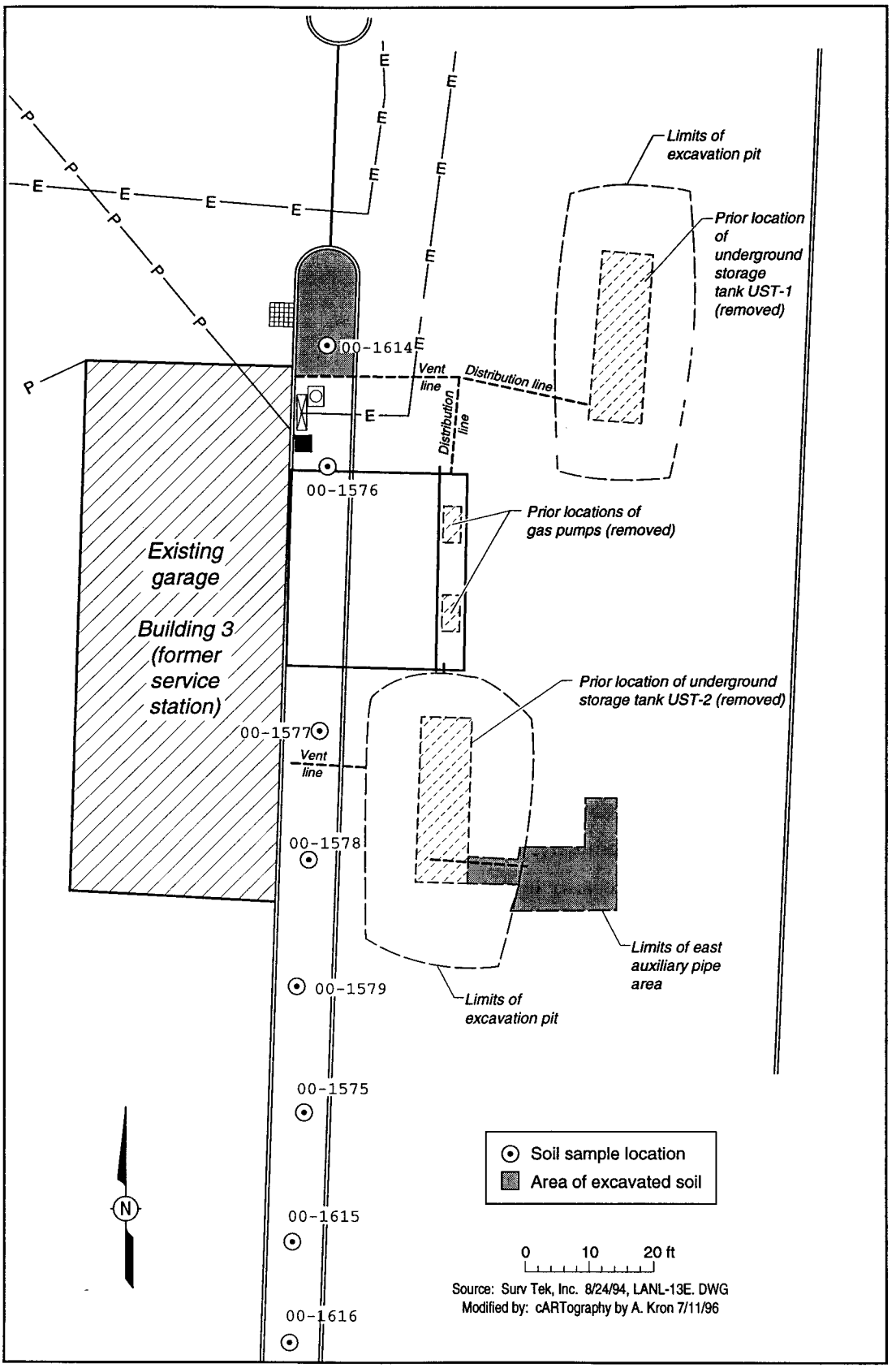


Fig. 5.1.4-3. Soil sample locations within concrete curb area at PRS 0-031(b).

Deviations from the Work Plan

The waste oil pit in the RFI work plan was not found during field activities. Therefore, it was not investigated.

Geodetic Surveys

Sample locations and the location of the concrete curbing were surveyed following their completion. Geodetic survey data were transferred to FIMAD for incorporation into the ER database.

Geophysical Surveys

Geophysical surveys were conducted to locate the position, orientation, and estimated depth of subsurface features. Three geophysical techniques were employed to complete the surveys: GPR, EM induction, and radiodetection.

On February 7, 1994, the geophysical survey was conducted in the area north and northeast of Building 3 in search of the waste oil pit. The geophysical survey could not locate the waste oil pit.

Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil was screened by the SSO using a hand-held instrument to detect chemical contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc.™, OVM Model 580B, PID with a 10.6 eV bulb. All requirements for radiological screening were eliminated because after three months of fieldwork, radiological contamination had not been detected at the site. All field-screening instruments were calibrated and checked on a daily basis by the SSO.

Field Screening Results

Each sample collected during excavation activities was screened for organic vapors as described above. Action levels in the breathing zone were not exceeded during field activities. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples were 0.0 ppm for all sampling and excavation activities. All field screening results are presented in Appendix A.

Sampling Methodology

Excavated surface soil from the north end of the dirt island was screened in the backhoe bucket by the SSO to detect chemical contamination. Immediately after screening, the samples to be analyzed for BTEX compounds were collected directly from within the backhoe bucket. Subsequently, samples were collected from the backhoe bucket for the remaining analyses.

After retrieving the sample auger bucket during hand augering, the outer surface and contents of the bucket were screened by the SSO to detect chemical contamination. Immediately upon retrieval of subsurface materials, the sample to be analyzed for VOCs was collected directly from the auger bucket before significant volatilization could occur. The remaining material was then placed in an aluminum pan and homogenized. This mixture was placed in the appropriate containers for each specific analysis.

All samples destined for fixed laboratory analyses were appropriately labeled and assigned unique LANL sample identification numbers (e.g., AAA0000) with bar codes. All samples were documented on sample collection logs, placed in coolers with ice, and transported to LANL's Inorganic Trace Analysis Group. All sampling was conducted in accordance with LANL ER Project procedures. Summary Table 5.1.4-1 lists the sample number, request number and requested analyses for the investigation of soils within the concrete curb.

Excavation, Sampling and Hand Augering

To assess the extent of any contamination, borehole SS-1 was hand-augered inside the concrete curbing within a pile of black-stained soil that emitted an odor similar to motor oil (Fig. 5.1.4-4). Soil sample AAB8522 was collected from the surface to 1.5 ft bgs and submitted to a fixed laboratory for analyses of TPH, VOCs, and total lead.

Analytical results indicated that the stained soil contained a TPH concentration of 3 600 ppm. Therefore, the impacted soil was excavated and the extent of the release assessed. Soil was excavated to an approximate depth of 0.5 ft adjacent to the northeast corner of the building and to 1 ft at the north end of the island, below the top of the concrete curbing. Excavation activities stopped when visible staining of the soil was no longer evident at the base of the excavation. During excavation, excavated soil was placed in 55-gal. drums and handled as a special waste because of the elevated TPH concentrations. Field screening for organic vapors was conducted to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. No organic vapor concentrations were detected in soil removed from the

excavation. Soil samples (AAB0169, AAB0171, and AAB0177) were collected from the base of the north, middle, and south ends of the excavation. These samples were submitted for analysis of VOCs, TPH, and total lead. TPH concentrations in these samples ranged from 268 to 940 ppm. In sample AAB0177, 1,1,1-trichloroethane was detected at a concentration of 0.019 ppm.

Because of the presence of TPH contamination was greater than 100 ppm at the base of the earlier excavation, an additional 1–2 ft of soil were excavated from the base of the excavation until tuff was encountered. Samples were collected from both the north (AAB6639 and AAB6641) and south (AAB6638) ends of the expanded excavation. These samples were submitted to LANL's Inorganic Trace Analysis Group for analyses of VOCs, SVOCs, TPH, and TAL metals. Analytical results indicated the VOCs and TPH concentrations were below detection limits. SVOCs detected in sample AAB6638 were below SAL with the exception of benzo(a)pyrene which was detected at a concentration of 0.390 ppm. The excavated area was backfilled and compacted during the last two weeks of October 1994.

To complete the assessment of the dirt island, seven additional surface soil samples were collected on 20 ft centers along the remainder of the dirt island to the south of the excavated area (Fig. 5.1.4-4). These samples were collected using a stainless steel hand auger. Field screening for organic vapors was conducted to protect worker health and safety and to guide soil sampling. No organic vapor concentrations were detected in any soil sample. A total of seven surface samples (AAB6643, AAB6644, AAB6645, AAB6646, AAB6647, AAB6648, and AAB6651) were collected from approximately 6 in. and 1 ft bgs and submitted to LANL's Inorganic Trace Analysis Group for analysis of VOCs, TPH, and total lead. VOC concentrations were below detection limits, with the exception of acetone which was detected in AAB6645 and AAB6643 at 24 parts per billion (ppb) and 21 ppb, respectively. Acetone is a presumed laboratory artifact. Total lead concentrations ranged from 15 ppm (AAB6648) to 44 ppm (AAB6651). Analytical results indicated that TPH concentrations ranged from 100 ppm (AAB6647) to 1 800 ppm (AAB6646).

In order to assess the vertical extent of TPH contamination beneath sample AAB6646, a sample was collected at the soil/tuff interface. Soil sample AAB3589 was collected at approximately 3–3.5 ft bgs at the soil/tuff interface. The sample was submitted to the MCAL for VOC and TPH analyses. The TPH concentration was 8 ppm and the VOCs were below detection limits. These analytical results suggest that the TPH contamination in this area is defined vertically at the soil/tuff interface. No soil or tuff was removed from this portion of the dirt island.

5.1.4.4 Field Investigation for Distribution Line

On May 9, 1994, during removal of the UST-2 dispenser pump and distribution line, concentrations of organic vapors were detected in excess of 100 ppmv in soil immediately beneath the distribution line at approximately 3.5 ft bgs. Organic vapor readings in the soil were greater than 700 ppmv at an approximate depth of 5.0 ft bgs and increased to approximately 1 000 ppmv between 6 and 7.5 ft bgs. Consequently, excavation of the UST-2 distribution line area continued to a depth of 12 ft bgs where the organic vapor reading was 3 200 ppmv. At this point it became clear that the organic vapor concentrations were continuing to increase with depth, and an alternate subsurface sampling method should be used to define the extent of the release. The trench was backfilled and work stopped until a drilling and sampling plan was developed to investigate the vertical and horizontal extent of the distribution line release. Drilling was initiated on May 13, 1994.

The investigation of the UST-2 distribution line release was performed in accordance with NMED UST Regulations Part XII, Section 1205 (C). Boreholes were drilled as required by regulations, and the investigation continued when total organic vapors were greater than 100 ppmv.

Geodetic Surveys

Sample locations and boreholes were surveyed following their completion. Geodetic survey data were transferred to FIMAD for incorporation into the ER database.

Screening Methodology

After retrieving the sample barrels while coring, the outer surface and contents of the barrel were screened by the SSO to detect chemical contamination. The core was screened for organic vapors with a Thermo Environmental Instruments, Inc., OVM Model 580B, PID with a 10.6 eV bulb. In an effort to consistently obtain the highest core screening values, the shoe of the core barrel was cracked open slightly to allow the probe of the PID to be inserted into the interior of the core and collect readings before significant volatilization could occur. All field-screening instruments were calibrated and checked daily by the SSO.

Field Screening Results

Each sample collected during excavation activities was screened for organic vapors as described above. Action levels in the breathing zone were exceeded during the drilling of borehole SS-2A. Field activities were stopped until required respirator training could be completed. Borehole SS-2A was completed wearing Level C personal protective equipment (PPE). Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for boreholes SS-2A, and SS-2 through SS-13 ranged from 0.0 to over 10 000 ppmv with the maximum reading observed in borehole SS-2A.

Sampling Methodology

Boreholes drilled with a drill rig were continuously cored from the ground surface to the total depth of each borehole. Upon retrieval, the outer surface and contents of the core barrels were screened using hand-held meters to detect chemical contamination, as discussed in earlier in this section. Immediately after the core barrel was opened and screened, the desired section of the core was then placed in an aluminum pan and homogenized. This mixture was then placed in the appropriate containers for each specific analysis. All field-screening samples and samples destined for fixed laboratory analysis were appropriately labeled and assigned unique LANL sample identification numbers (e.g., AAB0000) with bar codes. All samples were documented on sample collection logs, placed in coolers with ice, and transported to LANL's Inorganic Trace Analysis Group. Summary Table 5.1.4-1 lists the sample number, request number, and requested analyses for the investigation of distribution line release.

Packer soil gas sampling, SVE pilot test sampling, and the flux chamber sampling were collected in evacuated 6-liter SUMMA™ canisters at a constant mass flux rate as described and approved by EPA (Kienbusch 1986, 05-0236). The canisters were attached to the appropriate device for each different soil gas sampling technique described above; the samples were collected by opening the canister valve and allowing the vacuum to pull in soil gas. As soon as the canister was completely filled, the valve was shut off. All soil gas samples destined for fixed laboratory analysis were appropriately labeled and assigned unique LANL sample identification numbers (e.g., AAB0000) with bar codes. All samples were documented on sample collection logs and transported to LANL's Inorganic Trace Analysis Group. All sampling was conducted in accordance with applicable LANL ER Project procedures.

Drilling and Subsurface Sampling

Drilling and sampling of subsurface soil was initiated on May 13, 1994 and continued through June 9, 1994. Initially, five boreholes were advanced in the vicinity of the release location: one borehole was drilled at the approximate source location (SS-2) and four boreholes were drilled approximately 15 to 20 ft north (SS-3), south (SS-7), east (SS-4), and west (SS-6) of the source area (Fig. 5.1.4-4). Drilling continued if PID readings, which were taken along each 2.5 ft core sample, were in excess of 100 ppmv. Organic vapors were detected by a PID at concentrations above 100 ppmv in core samples from each of these boreholes except SS-3. A total of 12 boreholes were drilled to depths between 70 and 118 ft bgs to assess the extent of the release. Near the end of the drilling program, the analytical laboratory reported that the holding times for organic constituents collected from borehole SS-2 had been exceeded. Consequently, a replacement borehole, SS-2A, was drilled adjacent to SS-2.

Core samples of 2.5 ft in length were retrieved through the drilling process. Split-spoon samples were opened and PID readings were collected from fractures in the tuff and from tuff sections that were broken open. The PID readings ranged from 0.0 ppmv to over 10 000 ppmv. The field screening results are presented later in this section and Appendix A.

A minimum of three soil samples were collected from each borehole and submitted to an analytical laboratory for analysis. Three of the samples in each borehole were selected from the core sample where PID screening indicated the following: (1) the first presence of organic vapors in the borehole; (2) the highest detected concentration of organic vapors; and (3) the final core interval of the borehole.

Analytical results for samples collected from boreholes SS-2A and SS-4 exhibit elevated concentrations of benzene, toluene, ethyl benzene, xylenes, trimethylbenzenes, and TPH. Benzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and TPH were detected above SAL; the vertical and lateral extent of these four chemicals are shown in Figs. 5.1.4-5, 5.1.4-6, and 5.1.4-7. Benzene was detected at concentrations above SAL (6 700 ppb) in borehole SS-2A at depths between 10 and 15 ft bgs and at 40 ft bgs. Benzene was detected at concentrations below SAL in borehole SS-4 at an approximate depth of 55 ft bgs. Concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected above SALs in borehole SS-2A between 10 and 15 ft and at 40 ft bgs and in borehole SS-4 at 55 ft bgs. TPH concentrations were detected above 100 ppm in borehole SS-2A between 10 and 15 ft and at 40 ft bgs and in borehole SS-4 at 55 ft bgs. All other organic compounds detected were below SALs. All analytical results are presented in Appendix A.

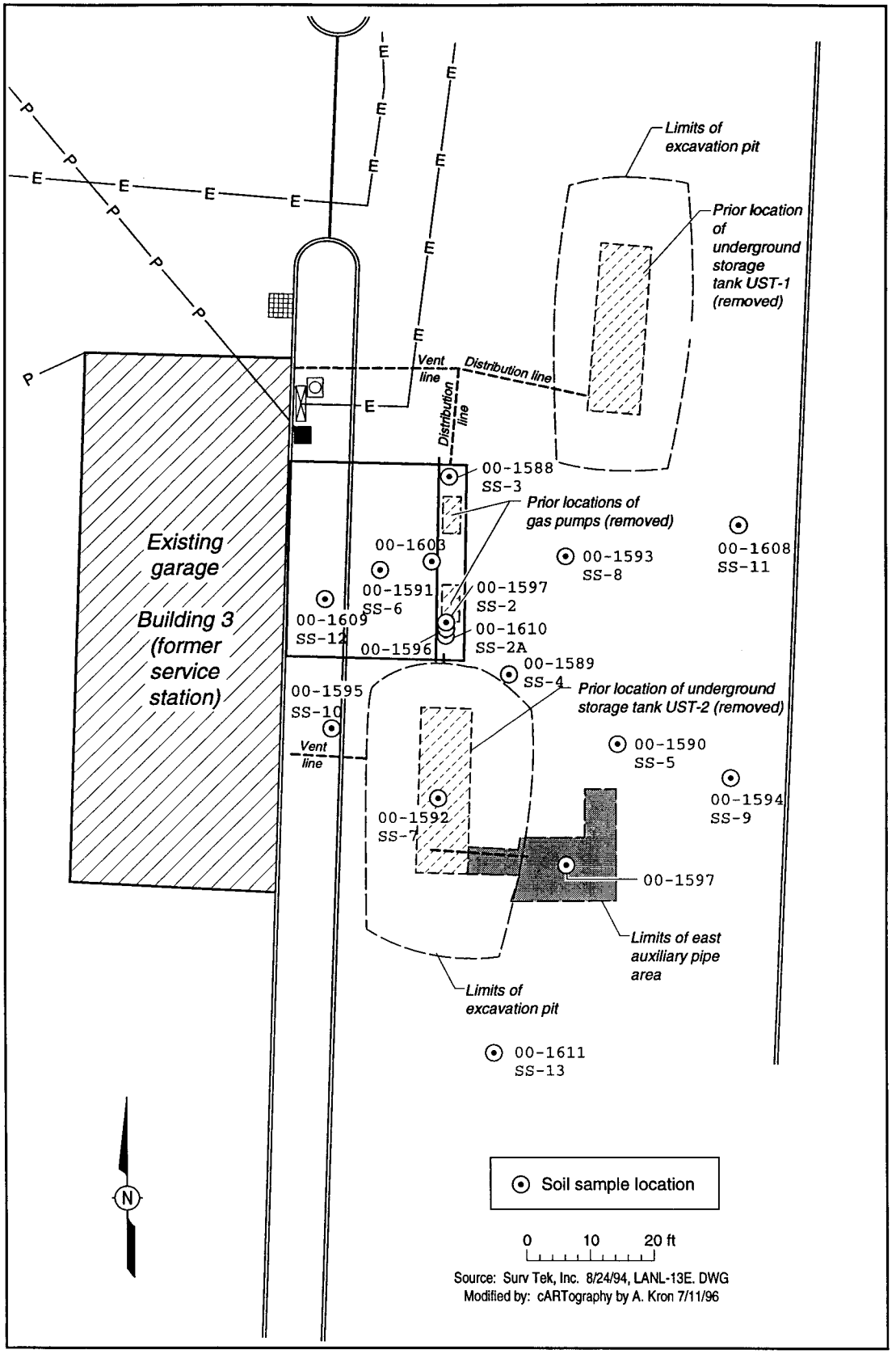
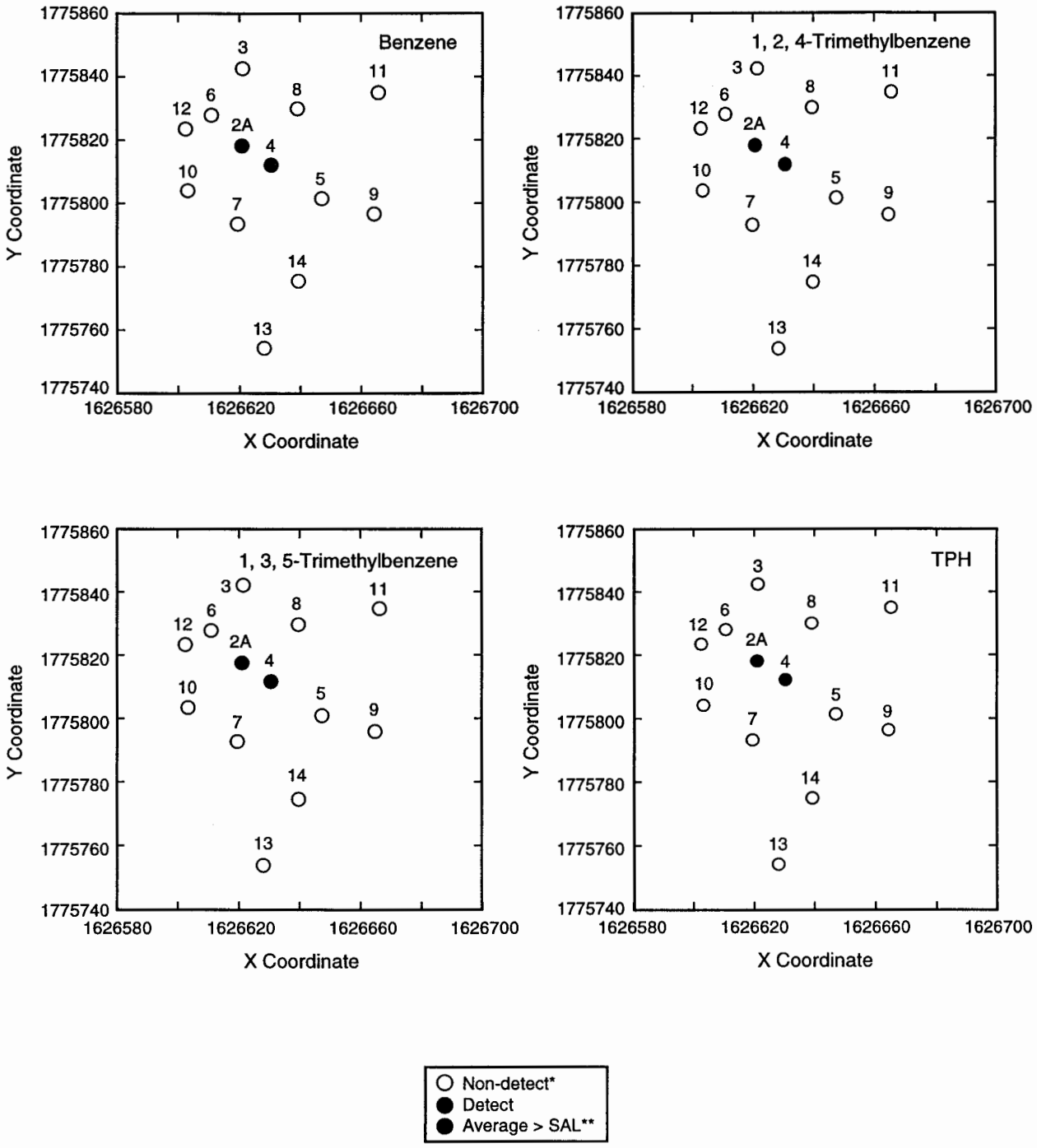


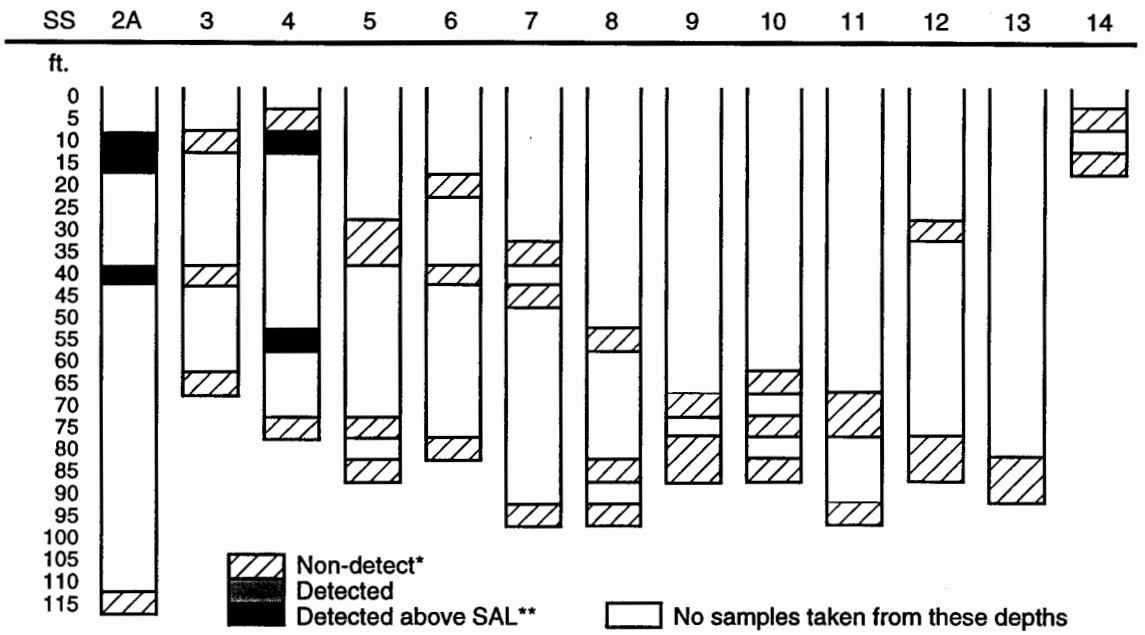
Fig. 5.1.4-4. Borehole and sample locations associated with the investigation of the distribution line at PRS 0-031(b).



*All concentrations were reported as non-detects, or the average concentration is substantially less than 1% of the SAL.
**Regulatory threshold concentration of concern for TPH is 100 mg/kg.

Fig. 5.1.4-5. Soil data.

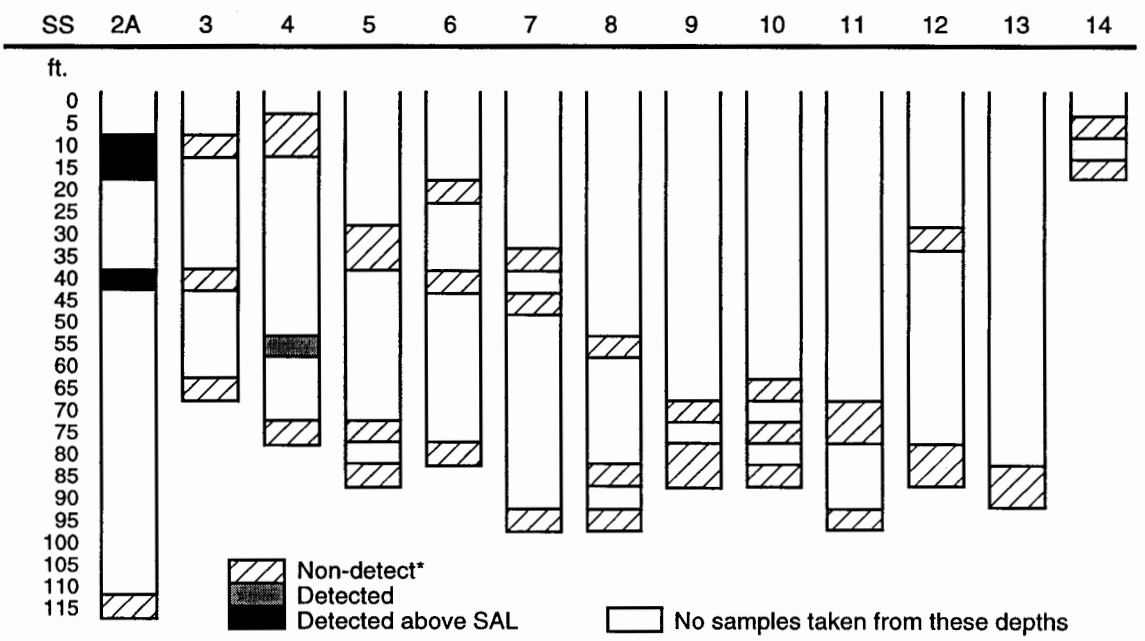
TPH Soil Data



*Detection limits for TPH were between 1 mg/kg and 22.6 mg/kg. Detects in this range are grouped with non-detects for the purpose of this figure.

**Regulatory threshold concentration of concern for TPH is 100 mg/kg.

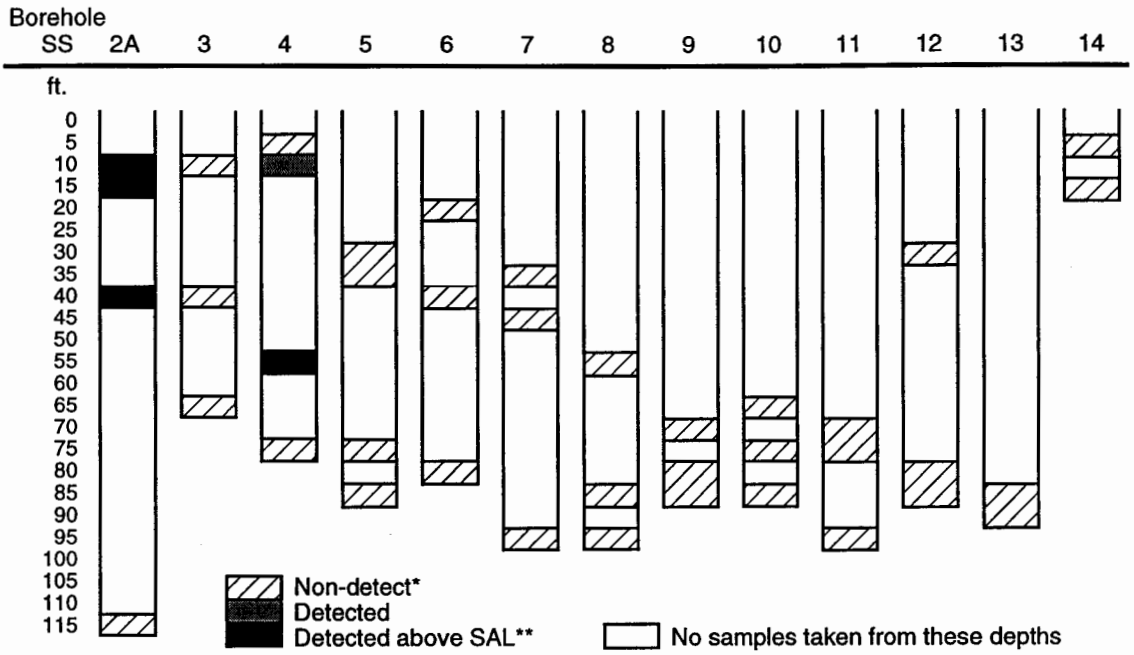
Benzene Soil Data



*All concentrations were reported as non-detects, or the concentration is substantially less than 1% of the SAL.

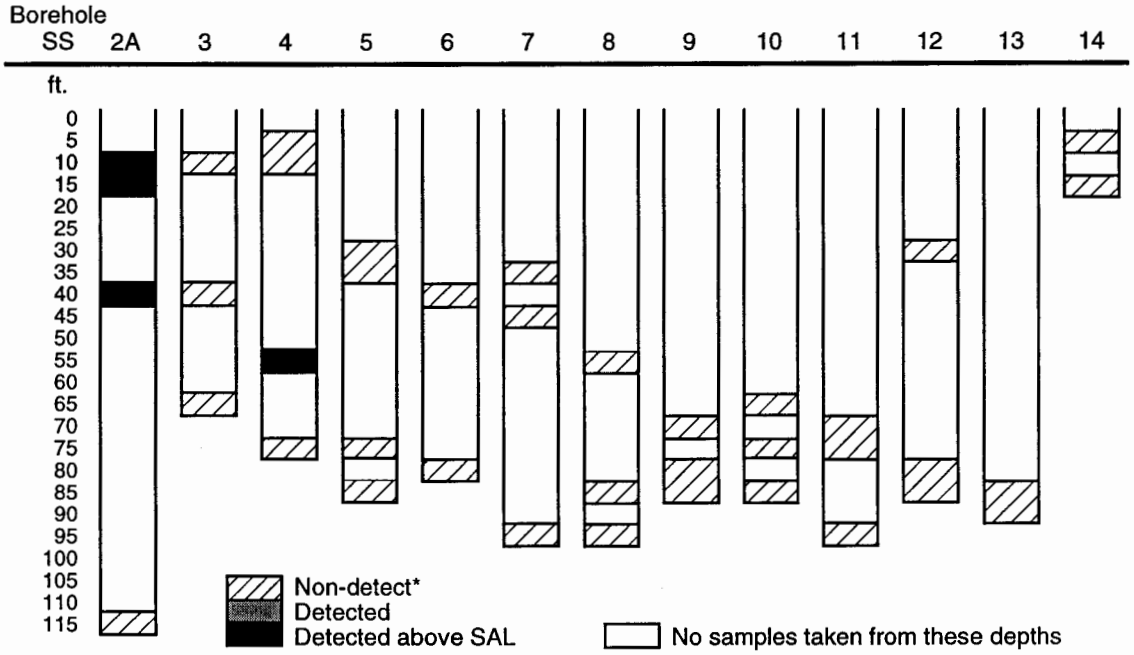
Fig. 5.1.4-6. TPH and benzene soil data.

1, 3, 5-Trimethylbenzene Soil Data



*All concentrations were reported as non-detects, or the concentration is substantially less than 1% of the SAL.

1, 2, 4-Trimethylbenzene Soil Data



*All concentrations were reported as non-detects, or the concentration is substantially less than 1% of the SAL.

Fig. 5.1.4-7. 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene soil data.

Analytical data from the boreholes indicate that the vertical and horizontal extent of the release has been assessed and is bound by the 12 boreholes advanced at the site in accordance with Part XII, Section 1205 (C) of the NMED UST Regulations. The bulk of the petroleum contamination appears to be limited to within an approximate 30-ft radius of the immediate source area. Vertical extent of contamination appears to be limited to less than 115 ft bgs.

The method used to collect soil samples from the cores (which involved crushing the tuff), while consistent with the LANL SOP, may have resulted in reported levels of VOCs that are lower than the actual *in situ* levels. Rather than resampling subsurface soils, results that still may not have been representative, soil vapor samples were collected to further evaluate the extent of VOCs in the vicinity of the distribution line. Three different methods (downhole packer sampling within select boreholes, a pilot test for soil vapor extraction [SVE], and surface isolation flux chambers) were used to maximize the amount of available information to assess the efficiency of different collection methods and the viability of potential corrective action. These investigation activities are described below.

Drilling was completed using a CME-45™ all-terrain, hollow-stem auger drill rig with a continuous core-barrel sampling system. Boreholes were drilled and sampled with 8-in. outside diameter (O.D.), 4.25-in. inside diameter (I.D.), hollow-stem augers. Boreholes were continuously sampled with 2.5-ft long split spoon core barrels (3.5-in. I.D. and a 4-in. O.D.). The core barrel was placed inside the hollow-stem auger, extending slightly beyond the auger bit, to collect relatively undisturbed soil and core samples as the augers were advanced. The core barrels were retrieved at 5-ft intervals from within the hollow-stem augers (via a wire-line, latch-retrieval system) for field screening and analytical sample collection. After sampling to the intended depth in each borehole, the augers were extracted for subsequent backfilling. All drilling and sampling was conducted in accordance with applicable the Laboratory ER Project procedures.

The cuttings for all boreholes were stored in 55-gal. drums and disposed as either nonhazardous chemical or hazardous waste, based on the compounds present in each borehole. Boreholes SS-2, SS-4, SS-5 through SS-8, and SS-10 through SS-14 were backfilled with a cement-bentonite grout on September 28, 1994. On September 27 and 28, 1994, boreholes SS-2A, SS-3, and SS-9 were completed with 2-in. diameter polyvinyl chloride (PVC) pipe as soil vent wells.

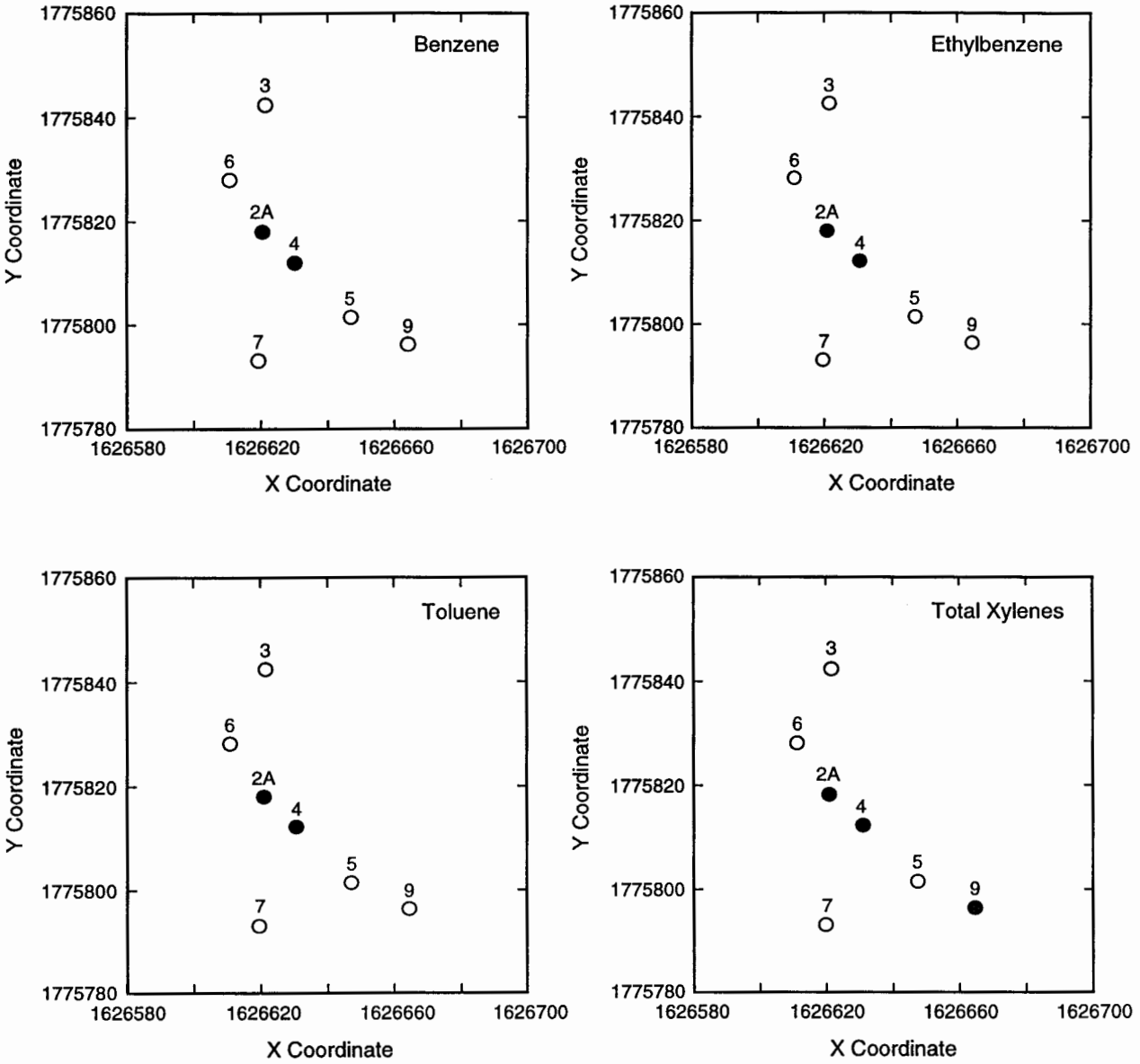
Downhole Packer Sampling

During the week of September 20, 1994, a total of 14 soil vapor samples were collected from seven open boreholes (SS-2A, SS-3, SS-4, SS-5, SS-6, SS-7, and SS-9) using a dual packer assembly. Samples were collected from an upper interval (14 to 21 ft bgs) and a lower interval (somewhere between 38 and 58 ft bgs) within each borehole. The packer assembly consisted of two 5.8-ft-long inflatable packer units separated by a 5-ft-long steel sampling tube. Compressed nitrogen gas was used to inflate the packers at selected depths so that a sample could be collected within the isolated interval. A vacuum pump was used to purge a minimum of one volume of air. Purging continued until vapor concentrations in the line became relatively stable. Vapor samples were collected in SUMMA® canisters from the purge line. The samples were shipped to Lancaster Laboratories in Lancaster, Pennsylvania for VOC analysis by EPA Method TO-14.

The analytical results are not directly comparable to the soil data, because the soil data are reported in units of micrograms per kilogram (µg/kg) or milligrams per kilogram (mg/kg), whereas the packer data are reported in parts per billion by volume (ppbv). However, qualitatively similar results were obtained from the packer samples and the soil samples (the concentrations for several organics were comparatively high in samples taken from boreholes SS-2A and SS-4). BTEX compounds were detected in most of the packer samples at concentrations which were often several orders of magnitude greater than those in samples collected from other boreholes (Fig. 5.1.4-8). Benzene concentrations in borehole SS-2A and SS-4 were 190 000 ppbv and 780 000 ppbv, respectively, at depths between 43 and 48 ft bgs. Concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were greater than 9 500 ppbv in boreholes SS-2A and SS-4 at depths between 43 and 48 ft bgs. All analytical data is presented in Appendix A.

Soil Vapor Extraction Pilot Test

Two-inch diameter soil gas wells were constructed in boreholes SS-2A, SS-3, and SS-9 on September 27 and 28, 1994. The remaining boreholes (SS-2, SS-4 through SS-8, SS-10 through SS-13) were plugged and abandoned with a cement-bentonite grout. On September 28, 1994, soil gas well SS-2A was connected to the mobile SVE system supplied by AcuVac. An 8-hr pilot test was conducted. Soil gas wells SS-2A, SS-3, and SS-9 were monitored and field parameters were collected during the test. Four vapor samples were collected during the test in SUMMA® canisters and submitted to Lancaster Laboratories for analysis. Based on data collected during the SVE pilot test, an estimated effective radius of influence of 25–55 ft could be achieved with extraction well flow of 15–20 ft^3/min. and extraction well vacuum in the 30–40 in. water range.



For Toluene

- ○ Non-detect or avg < 100,000 ppbv
- ● Avg between 100,000 and 1,000,000 ppbv
- ● Avg > 1,000,000 ppbv

For Benzene, Ethylbenzene, and Total Xylenes

- ○ Non-detect or avg < 10,000 ppbv
- ● Avg between 10,000 and 100,000 ppbv
- ● Avg > 100,000 ppbv

Note: Not all boreholes shown

Fig. 5.1.4-8. Soil vapor data.

The SVE pilot test data can be compared directly with the packer data because both are reported in units of ppbv. There is good correlation between the packer results and the SVE pilot test results. In particular, BTEX compounds were detected within an order of magnitude in samples collected by both methods. Benzene concentrations in borehole SS-2A ranged between 58 000 ppbv and 190 000 ppbv in samples collected by the packer method and ranged between 230 000 to 300 000 ppbv in samples collected during the SVE pilot test. All analytical data are presented in Appendix A.

Flux Chamber Sampling

On October 13, 1994, four surface isolation flux chamber samples were collected to monitor ground emissions above the affected soil. Stainless steel flux chambers, a carrier gas of zero air (less than 0.1 ppmv total hydrocarbon content), and SUMMA® canisters were used to collect the surface vapor samples. A flux chamber was placed over the area to be sampled and was sealed to the ground with bentonite. Carrier gas was passed through the chamber to purge it prior to collection of the vapor sample. The samples were shipped to Lancaster Laboratories for VOC analyses by EPA Method TO14.

Analytical data indicated the presence of benzene, toluene, xylenes, and other organic constituents. Benzene concentrations ranged from 0.4 ppbv to 0.6 ppbv. Toluene concentrations ranged from below detection limit to 0.2 ppbv. The maximum concentrations were detected in the sample (AAA8423) collected adjacent to borehole SS-3. All analytical data are presented in Appendix A.

5.1.5 Background Comparisons

5.1.5.1 UST-1 and UST-2

Inorganics

UST-1

Before excavation, one sample collected at UST-1 was analyzed for lead by XRF. This sample was collected from soil that has since been removed as part of the excavation of UST-1. The data from this sample are being considered in this analysis because lead was not analyzed in the confirmation samples for UST-1. This is conservative because, if lead had been released from UST-1, then the concentration of lead would be equal to or higher in soil removed as part of the excavation than it would be in soil remaining after the excavation was complete. Lead was not detected in this sample. Therefore, lead is not carried forward through the screening assessment process.

UST-2

Before excavation, four samples collected at UST-2 were analyzed for lead. Two samples were analyzed by XRF and two samples were analyzed by a fixed analytical laboratory. These samples were collected from soil that has since been removed as part of the excavation of UST-2. The data from these samples are being considered in this analysis because lead was not analyzed in the confirmation samples for UST-2. As described above for UST-1, this is conservative because if lead had been released from UST-2, then the concentration of lead would be equal to or higher in soil removed as part of the excavation than it would be in soil remaining after the excavation was complete. Field XRF analyses detected lead at concentrationsof 41 and 47 mg/kg in samples AAA8504 and AAA8471. Fixed laboratory analyses detected lead at concentrations of 61 and 83 mg/kg in samples AAA8510 (field split of AAA8471) and AAA8509 (field split of AAA8504). All of these values are greater than lead's background screening value of 23.3 mg/kg. Further background comparisons were not performed due to the limited number of samples. Therefore, based on a comparison with the background screening value, lead is carried forward through the screening assessment process. The concentration for each sample that is above the background screening value for lead is presented in Table 5.1.5-1.

TABLE 5.1.5-1

INORGANICS WITH CONCENTRATIONS ABOVE BACKGROUND SCREENING VALUES AT UST-2

LOCATION ID	SAMPLE ID	LEAD (mg/kg)
UTL	N/A	23.3
SAL	N/A	400
00-1566	AAA8504	41
00-1523	AAA8471	47
00-1523	AAA8510	61
00-1566	AAA8509	83

N/A = Not applicable.

Radionuclides

UST-1

Radiological analyses were not requested for samples collected at UST-1.

UST-2

Radiological analyses were not requested for samples collected at UST-2.

5.1.5.2 East Auxiliary Pipe

Inorganics

Five soil samples collected from the east auxiliary pipe area were analyzed for metals. None of the metals were detected above background screening values. Therefore, no inorganics are carried forward through the screening assessment process.

Radionuclides

Radiological analyses were not requested for samples collected at the east auxiliary pipe area.

5.1.5.3 Concrete Curb

Inorganics

Ten soil samples collected from the concrete curb area were analyzed for metals. Three of these samples were analyzed for TAL metals and the remaining seven were analyzed only for lead. Only lead was detected above its background screening value. Further background comparisons were performed for lead. Because the data for lead does not appear to satisfy normality assumptions, nonparametric tests were used for further background comparisons. The Gehan modification to the Wilcoxon Rank Sum test and the Quantile test were used for these evaluations. The Gehan test is best suited for assessing complete shifts in distribution, whereas the Quantile test is better suited for assessing partial shifts. These two tests can detect most types of differences between distributions. Observed significance levels (P-values) for these tests are presented in Table 5.1.5-2. If a P-value is less than some small probability, typically 0.05, then there is some reason to suspect that there is a difference between the background and site distributions; otherwise, no difference is indicated.

TABLE 5.1.5-2

STATISTICAL TESTS FOR BACKGROUND COMPARISONS

ANALYTE	GEHAN TEST P-VALUE	QUANTILE TEST P-VALUE
Lead	0.0012	0.0045

The results for lead are indicative of site concentrations that are greater than background.

Based on the background comparisons and the further statistical tests performed to compare site and background data, lead is carried forward through the screening assessment process. The concentration for each sample that is above the background screening value for lead is presented in Table 5.1.5-3.

TABLE 5.1.5-3

INORGANICS WITH CONCENTRATIONS ABOVE BACKGROUND SCREENING VALUES AT THE CONCRETE CURB

LOCATION ID	SAMPLE ID	LEAD (mg/kg)
UTL	N/A[a]	23.3
SAL	N/A	400
00-1576	AAB6643	26
00-1578	AAB6645	24
00-1579	AAB6646	36
00-1616	AAB6651	44

[a] N/A = Not applicable.

Radionuclides

Radiological analyses were not requested for samples collected at the concrete curb.

5.1.5.4 Distribution Line

Inorganics

Forty-four soil samples collected from the distribution line were analyzed for lead. Lead was detected above its background screening value in two samples. As discussed in Section 4.1.1, soil samples for lead in request number 17453 were qualified J for low tracer recovery and soil samples for lead in request number 17670 were qualified J for high tracer recovery. The reported concentratrions in these six samples range from 5 to 10 mg/kg, which are consistent with the reported concentrations for the other 38 samples. Therefore, the qualification of these data is not believed to affect the results of this background comparison.

Further background comparisons were performed for lead. Because the data for lead does not appear to satisfy normality assumptions, nonparametric tests were used for further background comparisons. The Gehan modification to the Wilcoxon Rank Sum test and the Quantile test were used for these evaluations. The Gehan test is best suited for assessing complete shifts in distribution, whereas the Quantile test is better suited for assessing partial shifts. These two tests can detect most types of differences between distributions. Observed significance levels (P-values) for these tests are presented in Table 5.1.5-4. If a P-value is less than some small probability, typically 0.05, then there is some reason to suspect that there is a difference between the background and site distributions; otherwise, no difference is indicated.

TABLE 5.1.5-4

STATISTICAL TESTS FOR BACKGROUND COMPARISONS

ANALYTE	GEHAN TEST P-VALUE	QUANTILE TEST P-VALUE
Lead	1	1

The results for lead are indicative of site concentrations that are not statistically elevated above background.

Based on the background comparisons and the further statistical tests performed to compare site and background data, lead is not carried forward through the screening assessment process.

Radionuclides

Radiological analyses were not requested for samples collected at the distribution line.

5.1.6 Evaluation of Organics

5.1.6.1 UST-1 and UST-2

UST-1

Before excavation, two soil samples collected at UST-1 were analyzed for organics. Both samples were analyzed for BTEX and TPH. No BTEX or TPH was detected in these samples. Therefore, no organics are carried forward through the screening assessment process.

UST-2

Before excavation, six soil samples collected at UST-2 were analyzed for organics. Two samples were analyzed for BTEX and all six samples were analyzed for TPH. Only TPH was detected in these samples. Therefore, TPH is carried forward through the screening assessment process. The detected values for TPH are presented in Table 5.1.6.-1

TABLE 5.1.6-1

ORGANICS WITH DETECTED CONCENTRATIONS AT UST-2

LOCATION ID	SAMPLE ID	PETROLEUM HYDROCARBONS, TOTAL RECOVERABLE (mg/kg)
N/A	N/A	100
00-1570	AAA8517	3
00-1569	AAA8521	5
00-1574	AAA8538	81
00-1572	AAA8543	13

N/A = Not applicable.

5.1.6.2 East Auxiliary Pipe

During excavation, eight soil samples collected at the east auxiliary pipe area were analyzed for organics. Seven samples were analyzed for TPH and six samples were analyzed for volatiles. TPH and acetone were detected in these samples. As discussed in Section 4.1.2, the presence of acetone is considered to be the result of laboratory contamination because acetone was detected in the laboratory blank. As a result, the EQLs for these samples were raised and, for purposes of this assessment, acetone is not considered to have been detected in samples from the east auxiliary pipe (see Appendix B). Therefore, TPH is carried forward through the screening assessment process. The detected values for TPH are presented in Table 5.1.6-2

TABLE 5.1.6-2

ORGANICS WITH DETECTED CONCENTRATIONS AT THE EAST AUXILIARY PIPE AREA

LOCATION ID	SAMPLE ID	PETROLEUM HYDROCARBONS, TOTAL RECOVERABLE (mg/kg)
SAL	N/A	100
00-1617	AAB0387	23
00-1618	AAB0388	20
00-1612	AAB5448	<21.2

5.1.6.3 Concrete Curb

Seven soil samples collected within the concrete curb area were analyzed for organics. Eleven samples were analyzed for VOCs, three for SVOCs, and eleven for TPH. Eight organics (acetone, benzo[a]pyrene, benzo[g,h,i]perylene, benzo[k]fluoranthene, fluoranthene, TPH, phenanthrene, and pyrene) were detected in these samples. As discussed in Section 4.1.2, the presence of acetone is considered to be the result of laboratory contamination because acetone was detected in the laboratory blank. As a result, the EQLs for these samples were raised and, for purposes of this assessment, acetone is not considered to have been detected in samples from the concrete curb (see Appendix B). The concentrations for each sample that had at least one detected value for the remaining seven chemicals are presented in Table 5.1.6-3.

TABLE 5.1.6-3

ORGANICS WITH DETECTED CONCENTRATIONS AT THE CONCRETE CURB

LOCATION ID	SAMPLE ID	Benzo[a]pyrene (mg/kg)	Benzo[g,h,i]perylene (mg/kg)	Benzo[k]fluoranthene (mg/kg)	Fluoranthene (mg/kg)	Petroleum Hydrocarbons, Total Recoverable (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
SAL	N/A[a]	0.061	n/a[b]	6.1	2 600	100	n/a	2 000
00-1579	AAB3589	NA[c]	NA	NA	NA	8	NA	NA
00-1614	AAB6638	0.39	0.37	0.53	0.68	62	0.42	0.54
00-1576	AAB6643	NA	NA	NA	NA	210	NA	NA
00-1577	AAB6644	NA	NA	NA	NA	320	NA	NA
00-1578	AAB6645	NA	NA	NA	NA	190	NA	NA
00-1579	AAB6646	NA	NA	NA	NA	1 800	NA	NA
00-1575	AAB6647	NA	NA	NA	NA	100	NA	NA
00-1615	AAB6648	NA	NA	NA	NA	390	NA	NA
00-1616	AAB6651	NA	NA	NA	NA	140	NA	NA

[a] N/A = Not applicable.
[b] n/a = Not available.
[c] NA = Not analyzed.

These seven organics are carried forward through the screening assessment process.

Of the organics that were not detected in any sample collected from the concrete curb area, six had reporting limits greater than SALs (bis[2-chloroethyl]ether, dibenzo[a,h]anthracene, hexachlorobenzene, N-nitrosodi-n-propylamine, N-nitrosodimethylamine, and vinyl chloride). In addition, 11 others do not have SALs to which the reporting limits can be compared (acenaphthylene, bis[2-chloroethoxy]methane, 4-bromophenylphenyl ether, 4-chloro-3-methylphenol, 4-chlorophenylphenyl ether, 2-methyl-4,6-dinitrophenol, 2-methylnaphthalene, 3-nitroaniline, 4-nitroaniline, 2-nitrophenol, and 4-nitrophenol). Of these 17 organic chemicals, dibenzo(a,h)anthracene, acenaphthylene, and 2-methylnaphthalene are carried forward through the screening assessment process because several other PAHs have been detected in samples collected from the concrete curb area. The remaining 14 organic compounds are not associated with petroleum products or automotive maintenance and would not be expected to be present at this site. Therefore, these 14 organic chemicals are not carried forward through the screening assessment process.

5.1.6.4 Distribution Line

Forty-four soil samples collected at the distribution line were analyzed for organics. Forty samples were analyzed for volatiles, 39 samples for TPH, and one sample for BTEX. Twenty organics (acetone, benzene, 2-butanone, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, chlorobenzene, 1,1-dichloroethene, ethylbenzene, 2-hexanone, isopropylbenzene, 4-isopropyltoluene, propylbenzene, styrene, toluene, trichloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, xylenes, and TPH) were detected in these samples. As discussed in Section 4.1.2, soil samples for TPH in request number 17590 were qualified UJ due to low tracer recovery. However, because TPH was detected at higher concentrations in other samples collected at the distribution line, the qualification of these data do not affect this evaluation of organics.The concentrations for each sample that had a least one detected value for these chemicals are presented in Table 5.1.6-4.

TABLE 5.1.6-4

ORGANICS WITH DETECTED CONCENTRATIONS AT THE DISTRIBUTION LINE

LOCATION ID	LOCATION/DEPTH	SAMPLE ID	Acetone (mg/kg)	Benzene (mg/kg)	2-Butanone (MEK) (mg/kg)	n-Butylbenzene (mg/kg)	sec-Butylbenzene (mg/kg)	tert-Butylbenzene (mg/kg)	Chlorobenzene (mg/kg)	1,1-Dichloroethene (mg/kg)	Ethylbenzene (mg/kg)	2-Hexanone (mg/kg)
SAL	N/A[a]	N/A	2 000	1.4	8 700	n/a[b]	n/a	130	160	0.038	690	n/a
00-1610	SS-2A, 10-15 ft	AAB5435	<10	6.7	<10	<2.5	8.4	<2.5	<2.5	<2.5	84.6	<10
00-1610	SS-2A, 15-20 ft	AAB5436	<1	1.6	<1	<0.25	<0.25	<0.25	<0.25	<0.25	79.3	<1
00-1610	SS-2A, 40-45 ft	AAB5438	<20	17.4	<20	<5	14(J)[c]	<5	<5	<5	147	<20
00-1610	SS-2A, 115-118 ft	AAB5441	0.036	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1588	SS-3, 10-15 ft	AAB0242	0.026	<0.006	<23	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<23
00-1589	SS-4, 5-10 ft	AAB0246	<0.020	0.009	<0.020	<0.005	<0.005	<0.005	0.012	0.007	<0.005	<0.020
00-1589	SS-4, 10-15 ft	AAB0247	<2.8	<0.7	<2.8	5.6	0.85	50	<0.7	<0.7	0.96	<2.8
00-1589	SS-4, 55-60 ft	AAB0248	0.970(J)	0.14	0.7	39	8	<0.027	<0.027	<0.027	63	<0.054
00-1589	SS-4, 75-80 ft	AAB0249	0.088	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1590	SS-5, 30-35 ft	AAB0251	<0.020	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1590	SS-5, 35-40 ft	AAB0252	0.056	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1590	SS-5, 75-80 ft	AAB0254	0.19	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1590	SS-5, 85-90 ft	AAB0255	0.91	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1591	SS-6, 20-25 ft	AAB0260	0.025(J)	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1591	SS-6, 40-45 ft	AAB0313	0.027(J)	<0.005	<0.020	<0.005	0.018	<0.005	<0.005	<0.005	<0.005	<0.020
00-1591	SS-6, 80-85 ft	AAB0259	0.021(J)	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.020
00-1592	SS-7, 35-40 ft	AAB0315	0.072	<0.006	<0.022	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.022
00-1592	SS-7, 45-50 ft	AAB0316	0.046	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1592	SS-7, 95-100 ft	AAB0317	0.055	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1594	SS-9, 80-85 ft	AAB5419	0.031	<0.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.023
00-1595	SS-10, 72.5-77.5 ft	AAB5423	0.036	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1595	SS-10, 87.5-90 ft	AAB5424	0.041	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1608	SS-11, 70-75 ft (Duplicate)	AAB5427	0.024	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1609	SS-12, 80-85 ft	AAB5433	0.023	<0.005	<0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021

TABLE 5.1.6-4 (CONTINUED)

ORGANICS WITH DETECTED CONCENTRATIONS AT THE DISTRIBUTION LINE

LOCATION ID	LOCATION/DEPTH	SAMPLE ID	Isopropylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)	Propylbenzene (mg/kg)	Styrene (mg/kg)	Toluene (mg/kg)	Trichloroethene (mg/kg)	1,2,4-Trimethylbenzene (mg/kg)	1,3,5-Trimethylbenzene (mg/kg)	Mixed Xylenes (o+m+p) (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)
SAL	N/A	N/A	49	n/a	n/a	2 200	1 900	7.1	8	6.4	990	100
00-1610	SS-2A, 10-15 ft	AAB5435	13.7	19.9(J)	45.5	4.1	139 (J)	<2.5	187(J)	79.4	354(J)	2 290
00-1610	SS-2A, 15-20 ft	AAB5436	9.9	1.2(J)	48.5	2.4	114(J)	<0.25	279(J)	106	428	2 040
00-1610	SS-2A, 40-45 ft	AAB5438	20.7	29.8(J)	72.7	6.7	243(J)	<5	302(J)	132	566(J)	2 170
00-1610	SS-2A, 115-118 ft	AAB5441	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<21.4
00-1588	SS-3, 10-15 ft	AAB0242	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<22.6
00-1589	SS-4, 5-10 ft	AAB0246	<0.005	<0.005	<0.005	<0.005	0.013	0.01	<0.005	<0.005	<0.005	<20.5
00-1589	SS-4, 10-15 ft	AAB0247	<0.7	<0.7	1.8	<0.7	<0.7	2.2	<0.7	9.7	13	282
00-1589	SS-4, 55-60 ft	AAB0248	11	0.99	24	<0.027	60	<0.027	360	89	440	1 700
00-1589	SS-4, 75-80 ft	AAB0249	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<20.8
00-1590	SS-5, 30-35 ft	AAB0251	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	3
00-1590	SS-5, 35-40 ft	AAB0252	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	9
00-1590	SS-5, 75-80 ft	AAB0254	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<1
00-1590	SS-5, 85-90 ft	AAB0255	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<1
00-1591	SS-6, 20-25 ft	AAB0260	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<1
00-1591	SS-6, 40-45 ft	AAB0313	<0.005	0.057	0.022	<0.005	<0.005	<0.005	0.420(J)	0.11	0.0076	3
00-1591	SS-6, 80-85 ft	AAB0259	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<1
00-1592	SS-7, 35-40 ft	AAB0315	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.022
00-1592	SS-7, 45-50 ft	AAB0316	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<21.5
00-1592	SS-7, 95-100 ft	AAB0317	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<20.7
00-1594	SS-9, 80-85 ft	AAB5419	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<20.4
00-1595	SS-10, 72.5-77.5 ft	AAB5423	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.021
00-1595	SS-10, 87.5-90 ft	AAB5424	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<21.2
00-1608	SS-11, 70-75 ft (Duplicate)	AAB5427	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<20.7
00-1609	SS-12, 80-85 ft	AAB5433	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<21.3

[a] N/A = Not applicable.
[b] n/a = Not available.
[c] NA = Not analyzed.

These twenty organics are carried forward through the screening assessment process.

Of the organics that were not detected in any sample collected from the distribution line area, one had reporting limits greater than SALs (vinyl chloride). In addition, 11 others do not have SALs to which the reporting limits can be compared (bromochloromethane, bromobenzene, p-chlorotoluene, 1,2-dibromoethane, 1,3-dichloropropane, delta-BHC, 1,1-dichloropropane, 2,2-dichloropropane, cis-1,3-dichloropropene, trans-1,3-dichloropropene, and methyl iodide). These 12 organic compounds are not associated with petroleum products or automotive maintenance, and would not be expected to be present at this site. Therefore, these 12 organic chemicals are not carried forward through the screening assessment process.

5.1.7 Human Health

5.1.7.1 Screening Assessment

5.1.7.1.1 UST-1 and UST-2

UST-1

A screening assessment was not conducted for UST-1 because no chemicals were detected above background (inorganics) or reporting limits (organics).

UST-2

Two chemicals (lead and TPH) were carried forward from the background and reporting limit comparisons. Lead was detected at a maximum concentration of 83 mg/kg, which is well below its SAL of 400 mg/kg. TPH was detected at a maximum concentration of 81 mg/kg, which is below its SAL of 100 mg/kg. Because neither chemical was detected at a concentration above its SAL, they would normally be included in a multiple chemical evaluation to determine if cumulative exposure to both chemicals could pose a potential health risk. However, the SAL for TPH is based primarily on a threshold concentration established by the NMED's UST regulations, which assumes that petroleum hydrocarbons (as gasoline or diesel) are within 50 ft of usable groundwater. Therefore, the TPH SAL is based on protection of groundwater and is not comparable to the other soil SALs, such as the value for lead, which are based on potential health effects associated with exposure to soil. In addition, TPH measurements represent variable mixtures of chemicals that do not have descriptive health criteria. Toxicity for these materials is generally described by specific individual chemicals within the mixture (e.g., BTEX for gasoline and PAHs for diesel and lubricating oils). BTEX measurements were taken from several soil samples from UST-2, either by immunoassay or by fixed laboratory analysis. BTEX was not detected in any sample; therefore, the presence of low levels of TPH

in soil is not expected to pose a potential health risk. Given that lead is the only remaining chemical included in this screening assessment, a multiple chemical evaluation was not necessary.

5.1.7.1.2 East Auxiliary Pipe

A single chemical, TPH, was carried forward from the background and reporting limit comparisons. TPH was detected at a maximum concentration of 23 mg/kg, which is well below its SAL of 100 mg/kg. Therefore, TPH is not identified as a COPC.

5.1.7.1.3 Concrete Curb

Eleven chemicals were carried forward from the background and reporting limit comparisons. Two of the chemicals (benzo[a]pyrene and TPH) were detected at concentrations greater than SAL at one or more locations, as shown on Fig. 5.1.7-1. Another chemical (dibenzo[a,h]anthracene) was not detected in any sample; however, the reporting limit was greater than its SAL. Therefore, benzo(a)pyrene, dibenzo(a,h)anthracene, and TPH are identified as COPCs.

Four of the chemicals do not have SALs to which the detected concentrations (benzo[g,h,i]perylene and phenanthrene) or reporting limits (acenaphthylene and 2-methylnaphthalene) can be compared. Benzo(g,h,i)perylene and phenanthrene were detected in a single sample at estimated concentrations of 0.37 and 0.42 mg/kg, respectively. These values are significantly lower than the SALs for structurally similar compounds (e.g., 2000 mg/kg for pyrene). The reporting limits for acenaphthylene and 2-methylnaphthalene (0.33 mg/kg) are significantly lower than SALs for structurally similar compounds (e.g., 360 mg/kg for acenaphthene and 800 mg/kg for naphthalene). Therefore, these four chemicals are not considered further in this screening assessment.

None of the remaining four chemicals were detected at concentrations greater than SAL; therefore, these chemicals (benzo[k]fluoranthene, fluoranthene, lead, and pyrene) are included in the following multiple chemical evaluation.

A multiple chemical evaluation is performed separately for three classes of analytes: noncarcinogens, carcinogens (nonradioactive), and radionuclides. In this case, two classes of analytes (noncarcinogens and carcinogens [nonradioactive]) were identified for the multiple chemical evaluation. Lead is evaluated as a noncarcinogen because, even though it has been identified as a probable human carcinogen, a toxicity value has not been identified for this health endpoint. Benzo(k)fluoranthene is the only chemical with a toxicity criterion for carcinogenic health effects; therefore, a multiple chemical evaluation was not conducted for this class of analytes.

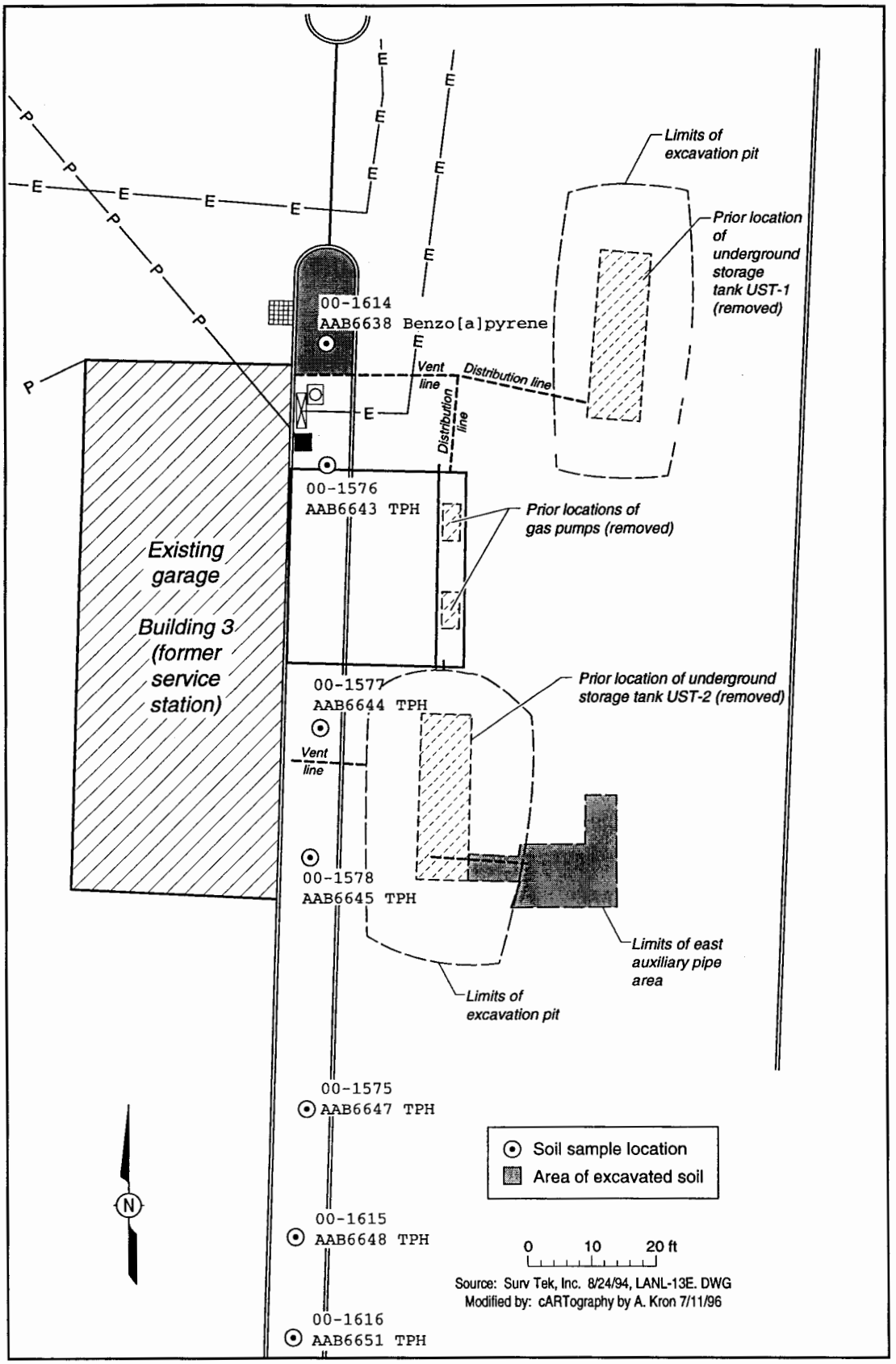


Fig. 5.1.7-1. Sample locations of benzo(a)pyrene and TPH above SAL at concrete curb area.

Table 5.1.7-1 presents the results of the multiple chemical evaluation for the concrete curb area. The total normalized value is 0.11 for noncarcinogenic effects. These results indicate that the chemicals included in the multiple chemical evaluation should not pose an unacceptable noncarcinogenic health risk. Therefore, none are identified as COPCs.

TABLE 5.1.7-1

MULTIPLE CHEMICAL EVALUATION FOR SOIL SAMPLES FROM THE CONCRETE CURB AREA AT PRS 0-031(b)

ANALYTE	LOCATION ID	SAMPLE ID	SAMPLE VALUE (mg/kg)	SOIL SAL (mg/kg)	NORMALIZED VALUE
Noncarcinogenic Effects					
Fluoranthene	00-1614	AAB6638	0.68	2 600	0.00026
Lead	00-1616	AAB6651	44	400	0.11
Pyrene	00-1614	AAB6638	0.54	20 00	0.00027
				Total:	**0.11**

Based on the results of this screening assessment, three chemicals (benzo[a]pyrene, dibenzo[a,h]anthracene, and TPH) were identified as COPCs. The need for further evaluation (e.g. risk assessment or site characterization) of each chemical is discussed below.

- Benzo(a)pyrene was detected in a single sample at a concentration of 0.39 mg/kg, which is greater than its SAL of 0.061 mg/kg; it was not detected in a duplicate of that sample at a reporting limit of 0.37 mg/kg. Dibenzo(a,h)anthracene was not detected in any sample at a reporting limit of 0.33 mg/kg, which is greater than its SAL of 0.061 mg/kg. As described above, several other PAHs were detected in a single sample at concentrations well below SALs, and other PAHs were not detected in any sample at reporting limits also well below SALs. Some of the samples from the concrete curb area were not analyzed for PAHs. Based on the TPH results for these samples, PAHs may be present in soil from the concrete curb area at higher concentrations than what has been measured. However, the presence (or possible presence) of PAHs in soil at the concrete curb area at concentrations greater than SALs should not be of concern because SALs are based on conservative assumptions regarding exposure by a long-term resident, and the concrete curb area is currently beneath the parking lot of the newly constructed Los Alamos National Bank. Under

these conditions, there is very little potential for exposure to these chemicals, certainly not the extent assumed under a residential scenario. Therefore, further evaluation of benzo(a)pyrene, dibenzo(a,h)anthracene, or other PAHs in the concrete curb area is not warranted.

- TPH was detected in six samples at concentrations ranging from 140 to 1 800 mg/kg, which are greater than its SAL of 100 mg/kg. All of these samples were collected from near-surface soil to the south of the excavation completed at the northern end of the concrete curb area. A single subsurface sample was also collected beneath the sample containing TPH at 1 800 mg/kg; the concentration of TPH in this sample was well below SAL (see Section 5.1.4.3). As stated previously, the SAL for TPH is based primarily on a threshold concentration established in NMED's UST regulations, which assumes that gasoline or diesel are within 50 ft of usable groundwater. Therefore, this value is based on protection of groundwater, not on protection of human health as a result of contact with impacted soil. As also discussed previously, TPH represents variable mixtures of chemicals that do not have descriptive health criteria. Toxicity for these materials is generally described by specific individual chemicals within the mixture (e.g., BTEX for gasoline and PAHs for diesel and lubricating oils). One or more samples from the concrete curb area were analyzed for BTEX and PAHs. BTEX was not detected and, as described above, several PAHs were detected in a single sample at low concentrations. Given that the results of this screening assessment for the individual PAHs suggest that they are not present at concentrations of concern, the presence of TPH in this limited area (both vertically and horizontally) is also not considered to be of concern. Therefore, further evaluation of TPH in the concrete curb area is not warranted.

5.1.7.1.4 Distribution Line

Twenty chemicals were carried forward from the background and reporting limit comparisons. Four of these chemicals (benzene, TPH, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) were detected at concentrations greater than SAL at one or more locations, as shown on Fig. 5.1.7-2. Five chemicals (n-butylbenzene, sec-butylbenzene, 2-hexanone, 4-isopropyltoluene, and propylbenzene) do not have SALs to which the detected concentrations can be compared. Therefore, these nine chemicals are identified as COPCs. None of the remaining 11 chemicals were detected at concentrations greater than SAL; therefore, these chemicals (acetone, 2-butanone, tert-butylbenzene, chlorobenzene, 1,1-dichloroethene, ethylbenzene, isopropylbenzene, styrene, toluene, trichloroethene, and xylenes) are included in the following multiple chemical evaluation.

A multiple chemical evaluation is performed separately for three classes of analytes: noncarcinogens, carcinogens (nonradioactive), and radionuclides. In this case, two classes of analytes (noncarcinogens and carcinogens [nonradioactive]) were identified for the multiple chemical evaluation.

Table 5.1.7-2 presents the results of the multiple chemical evaluation for the distribution line. The total normalized value for noncarcinogenic effects is 1.7, indicating that cumulative exposure to the nine chemicals included in the multiple chemical evaluation for noncarcinogenic effects may pose a noncarcinogenic health risk. Based on this result, those chemicals with an individual normalized value greater than 0.1 (tert-butylbenzene, ethylbenzene, isopropylbenzene, toluene, and xylenes) are identified as COPCs. The total normalized value for carcinogenic effects is 0.47, indicating that the two chemicals included in the multiple chemical evaluation for carcinogenic effects should not pose an unacceptable carcinogenic health risk. Therefore, neither is identified as a COPC.

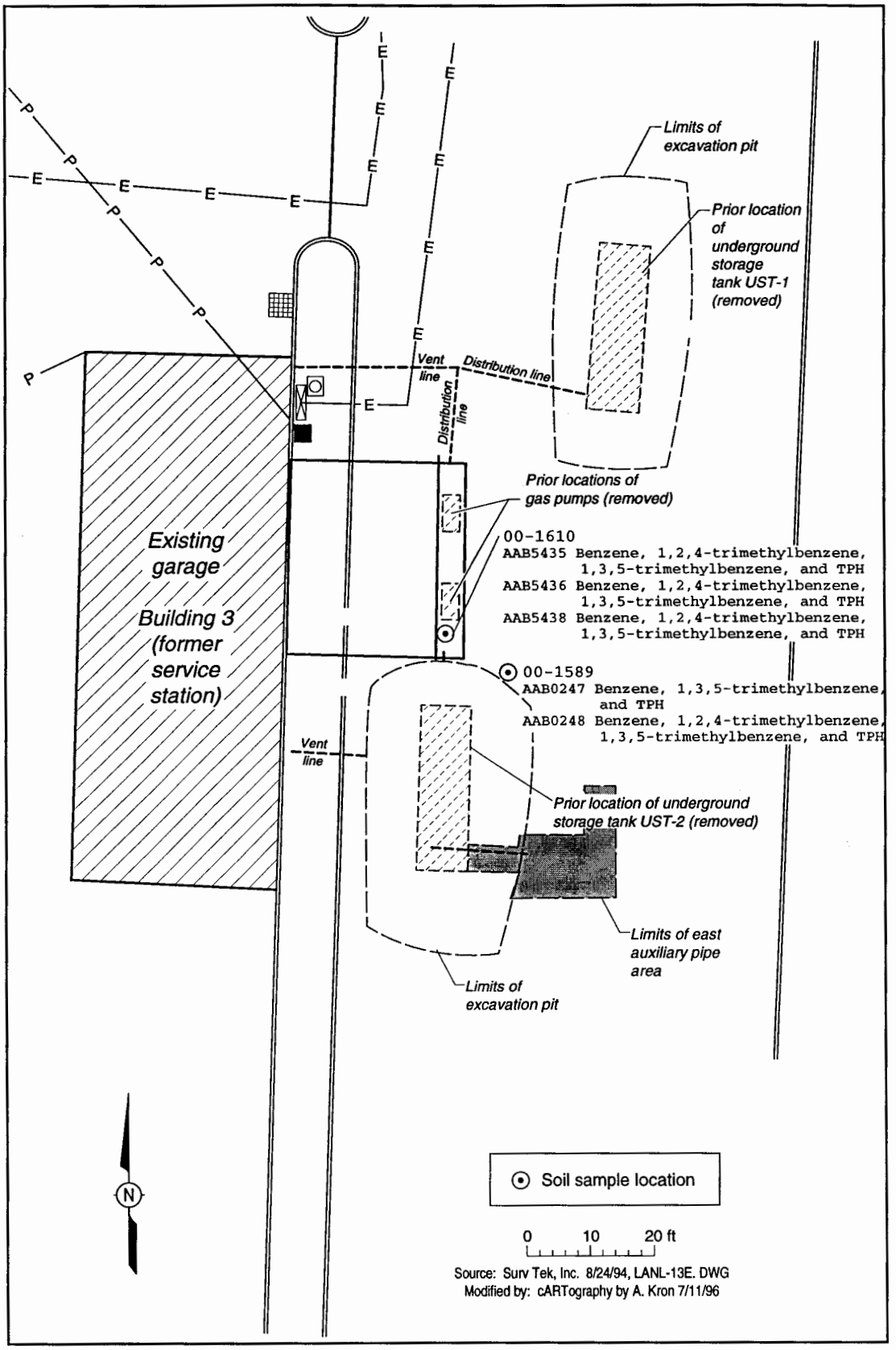


Fig. 5.1.7-2. Four chemicals detected at concentrations greater than SAL.

TABLE 5.1.7-2

MULTIPLE CHEMICAL EVALUATION FOR SOIL SAMPLES FROM THE DISTRIBUTION LINE AT PRS 0-031(b)

ANALYTE	LOCATION ID	SAMPLE ID	SAMPLE VALUE (mg/kg)	SOIL SAL (mg/kg)	NORMALIZED VALUE
Noncarcinogenic Effects					
Acetone	00-1589	AAB0248	0.97 J[a, b]	2 000	0.00049
2-Butanone	00-1589	AAB0248	0.7[b]	8 700	0.000080
tert-Butylbenzene	00-1589	AAB0247	50	130	0.38
Chlorobenzene	00-1589	AAB0246	0.012[b]	160	0.000075
Ethylbenzene	00-1610	AAB5438	147	690	0.21
Isopropylbenzene	00-1610	AAB5438	20.7	49	0.42
Styrene	00-1610	AAB5438	6.7	2 200	0.0030
Toluene	00-1610	AAB5438	243 J	1 900	0.13
Xylenes	00-1610	AAB5438	566 J	990	0.57
				Total:	**1.7**
Carcinogenic Effects					
1,1-Dichloroethene	00-1589	AAB0246	0.007[c]	0.038	0.18
Trichloroethene	00-1589	AAB0247	2.2[d]	7.1	0.29
				Total:	**0.47**

[a] J = Estimated value.

[b] The reporting limits for four samples were elevated because of analytical interferences caused by the presence of high concentrations of gasoline constituents in the samples. However, it is not expected that these compounds are present in these samples at high concentrations, if at all, because they are not commonly associated with petroleum products or automotive maintenance.

[c] The reporting limits for three or four samples were elevated because of analytical interferences caused by the presence of high concentrations of gasoline constituents in the samples. Although these compounds could be associated with automotive maintenance, it is not expected that they are present in these samples at high concentrations because relatively low detection limits were achieved in other samples containing significant concentrations of gasoline constituents.

Based on the results of this human health screening evaluation for the distribution line, 14 chemicals (benzene, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, ethylbenzene, 2-hexanone, isopropylbenzene, 4-isopropyltoluene, propylbenzene, toluene, TPH, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and xylenes) were identified as COPCs. With the exception of 2-hexanone and TPH, all of these chemicals are components of gasoline. The need for further evaluation (e.g., risk assessment or site characterization) of 2-hexanone, the gasoline constituents, and TPH is discussed next.

- A total of 39 samples were analyzed for 2-hexanone. This chemical was detected in a single sample at a concentration of 0.023 mg/kg, which is just slightly above the reporting limits for the majority of the other samples (0.020 to 0.022 mg/kg). The reporting limits for five samples were elevated (0.054 to 20 mg/kg) because of analytical interferences caused by the presence of high concentrations of gasoline constituents in the samples. However, 2-hexanone is not expected to be present in these samples at elevated concentrations, if at all, because 2-hexanone is not commonly associated with petroleum products or automotive maintenance. A SAL has not been developed for 2-hexanone; however, the SAL for a structurally similar compound, 2-butanone, is 8 700 mg/kg. The single detected concentration and the reporting limit concentrations, including those that were elevated, are well below this SAL. Therefore, further evaulation of 2-hexanone is not warranted.

- The majority of the chemicals identified as COPCs are common components of gasoline. Three of these chemicals, benzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene, were detected in up to five samples at concentrations exceeding SALs. All of these samples, which range in depth from 10–60 ft bgs, were from two locations: boreholes SS-2A and SS-4. Elevated concentrations of the other gasoline constituents were also restricted to these two locations. All of these chemicals were either detected at low concentrations or not at all in the remaining samples from the distribution line area. These results support the conclusion that elevated levels of gasoline constituents are restricted to a small area at least 10 ft bgs in the immediate vicinity of the distribution line. This area is located to the east of the new Los Alamos National Bank building and is currently covered by new concrete or asphalt paving. The NMED UST Bureau has completed their review of the investigation of the distribution line, including the 45-day on-site investigation reports (NMED 1994, 05-0237). Based on this review, the NMED concluded that (1) the vertical and horizontal extent of petroleum hydrocarbons had been adequately defined, (2) the vertical extent of petroleum hydrocarbons is greater than 875 ft above the high-static groundwater level at the site, and (3) soil containing petroleum hydrocarbons from the UST and distribution line excavation and dispenser island had been removed and properly disposed. Based on these conclusions, the NMED issued a letter stating that it does not require any

additional work to be performed at this site (NMED 1994, 05-0237). Therefore, no further evaluation of the gasoline constituents in the vicinity of the distribution line is warranted.

- TPH was detected in five samples at concentrations exceeding its SAL of 100 mg/kg. As with the individual gasoline constituents described above, these five samples were from two locations, boreholes SS-2A and SS-4. As discussed previously, the SAL for TPH is based primarily on an NMED regulatory threshold, which assumes that gasoline or diesel are within 50 ft of usable groundwater. The potential adverse health effects associated with petroleum mixtures is best evaluated based on the toxicity of its individual components, as described above. Therefore, TPH is not identified as a COPC requiring further evaluation.

5.1.7.2 Risk Assessment

No human health risk assessment was performed for this PRS because the screening assessment did not identify any COPCs requiring further evaluation.

5.1.8 Ecological Assessment

Los Alamos National Laboratory is developing a new approach for ecological risk assessment in cooperation with EPA Region 6 and the New Mexico Environment Department. Further ecological risk assessment at this site will be deferred until the site can be assessed as part of the new ecological exposure unit methodology that is being developed.

5.1.9 Extent of Contamination

Chemicals were detected at concentrations greater than SALs in one or more samples collected in the vicinity of the concrete curb and distribution line. For the concrete curb, TPH was detected in six near-surface samples at concentrations ranging from 140–1800 mg/kg, which is greater than its SAL of 100 mg/kg. Benzo(a)pyrene was detected in a single sample at a concentration of 0.39 mg/kg, which is greater than its SAL of 0.061 mg/kg. As discussed in Section 5.1.7.1.3, the presence of TPH at concentrations exceeding its SAL is limited to the near-surface soil in the immediate area of the concrete curb. This assumption is based on samples collected along the perimeter of the excavation in the northern portion of the curb area and samples collected at multiple locations at approximately 3 ft bgs, which contained very low levels of TPH. Although benzo(a)pyrene was not analyzed in all of the samples collected from the concrete curb, the extent of this chemical in soil is also considered limited because (1) benzo(a)pyrene is expected to be co-located with the TPH, and (2) as described above, the extent of TPH is limited.

Four chemicals (benzene, TPH, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) were detected at concentrations exceeding SALs in one or more samples collected in the vicinity of the distribution line. As discussed in Section 5.1.7.1.4, all of these samples were from two locations (SS-2A and SS-4) that were within 10–15 ft of the distribution line (Fig. 5.1.4-5). These chemicals were either detected at low concentrations or not at all in the remaining samples from the distribution line area; some were also collected within 10–15 ft of the distribution line. Therefore, the presence of chemicals at concentrations greater than SALs in the distribution line area appears to be limited to an area approximately 10–15 ft in diameter in the immediate vicinity of the distribution line.

5.1.10 Conclusions and Recommendations

The investigation of PRS 0-031(b), a former service station, comprised several components, including two USTs (UST-1 and UST-2), an auxiliary pipe associated with UST-2 (referred to as the east auxiliary pipe), an area of soil bounded by a concrete curb, and a distribution line associated with UST-2. As described in Section 5.1.4, several chemicals, generally petroleum hydrocarbons, were detected in soil in the vicinity of UST-2, the east auxiliary pipe, the concrete curb, and the distribution line. Subsequent remediation activities in the vicinity of UST-2 and the east auxiliary pipe resulted in the removal of petroleum hydrocarbons to nondetectable or very low levels. In addition, subsequent investigation activities defined the extent of petroleum hydrocarbons in the vicinity of the concrete curb and distribution line. Screening assessments were conducted for each component of PRS 0-031(b). The results of these screening assessments identified COPCs for the concrete curb and distribution line. With the exception of one chemical (2-hexanone), all of the COPCs are common components of heavy petroleum mixtures (in the concrete curb area) or gasoline (in the distribution line area). As discussed in Sections 5.1.7.1.3 and 5.1.7.1.4, these COPCs do not warrant further evaluation (e.g., risk assessment or site characterization) because (1) the presence of chemicals at concentrations greater than SALs is very limited, (2) SALs are based on conservative assumptions regarding exposure by a long-term resident, whereas the site is currently occupied by the newly constructed Los Alamos National Bank, and (3) NMED UST Bureau has completed its review of this investigation and does not require any additional work to be performed at this site (NMED 1994, 05-0237). Therefore, PRS 0-031(b) is recommended for NFA based on NFA criterion 4. A Class III permit modification will be requested to remove this site from the Hazardous and Solid Waste Amendments Module of the Laboratory's RCRA operating permit.

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APPENDIX A ANALYTICAL DATA

TABLE A-1

SUMMARY OF FIELD SCREENING RESULTS FOR PID SAMPLES COLLECTED AT PRS 0-031(b)

LOCATION	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	TYPE OF SAMPLE	PID READING (ppmv)	TOTAL LEAD BY XRF (ppm)	BTEX BY IMMUNOASSAY (ppm)	ALPHA (cpm)	BETA/ GAMMA (cpm)	GAMMA (ur/hr)
UST-1	00-1522	AAA8499	2	Soil	waste	0.7	NR[a]	BDL[b]	18.7	207	20
UST-1	00-1546	AAA8507	3	Soil	waste	0	NR	BDL	16	233	20
UST-1	00-1547	AAA8506	8	Soil	waste	0	NR	BDL	10.7	224	19.5
UST-1	00-1548	AAA8496	8	Soil	waste	0	NR	BDL	16	224	19
UST-1	00-1549	AAA8505	7	Soil	waste	0	NR	BDL	13.3	187	19
UST-1	00-1550	AAA8500	3	Soil	waste	0	NR	BDL	16	196	17.5
UST-1	00-1551	AAA8497	3	Soil	waste	0	NR	BDL	10.7	196	18.5
UST-1	00-1552	AAA8495	8	Soil	waste	0	NR	BDL	8	169	16.5
UST-1	00-1553	AAA8492	8	Soil	waste	0	NR	BDL	10.7	139	16
UST-1	00-1554	AAA8490	8	Soil	waste	0	BDL	BDL	10.7	187	16
UST-1	00-1554	AAA8512	8	Soil	waste	0	NR	NR	NA	NA	NA
UST-1	00-1555	AAA8516	13.5	Soil	RFI	NA	NR	8.3	NA	NA	NA
UST-1	00-1556	AAA8519	13.5	Soil	RFI	NA	NR	BDL	NA	NA	NA
UST-2	00-1523	AAA8471	1.5	Soil	waste	0	47(J)	BDL	10.7	205	18.3
UST-2	00-1523	AAA8510	1.5	Soil	waste	0	NR	NR	NA	NA	NA
UST-2	00-1557	AAA8503	3	Soil	waste	0	NR	BDL	13.3	176	16
UST-2	00-1558	AAA8488	3	Soil	waste	7.8	NR	BDL	18.7	183	17
UST-2	00-1559	AAA8469	1.5	Soil	waste	0.8	NR	BDL	24	196	17.5
UST-2	00-1560	AAA8486	2	Soil	waste	0.8	NR	BDL	10.7	174	16.5
UST-2	00-1561	AAA8489	6	Soil	waste	0	NR	BDL	2.67	161	15.5
UST-2	00-1562	AAA8508	8	Soil	waste	0.8	NR	BDL	10.7	205	15
UST-2	00-1563	AAA8491	5	Soil	waste	0	NR	BDL	8	167	15
UST-2	00-1564	AAA8501	5	Soil	waste	1.4	NR	BDL	16	178	16
UST-2	00-1565	AAA8502	5	Soil	waste	0	NR	BDL	16	198	16
UST-2	00-1566	AAA8504	7	Soil	waste	0	41(J)	BDL	8	143	16
UST-2	00-1566	AAA8509	7	Soil	waste	0	NR	NR	NA	NA	NA
UST-2	00-1567	AAA8498	9	Soil	waste	35	NR	BDL	5.33	178	14
UST-2	00-1568	AAA8470	8	Soil	waste	1.4	NR	BDL	10.7	185	15
UST-2	00-1569	AAA8521	12	Soil	RFI	NA[c]	NR	BDL	13.3	169	18.5
UST-2	00-1570	AAA8517	12	Soil	RFI	NA	NR	BDL	10.7	222	18.5
UST-2	00-1571	AAA8537	7	Soil	RFI	NA	NR	NR	NR	NR	NR
UST-2	00-1572	AAA8543	7	Soil	RFI	NA	NR	NR	NR	NR	NR
UST-2	00-1573	AAA8542	7	Soil	RFI	NA	NR	NR	NR	NR	NR
UST-2	00-1574	AAA8538	8	Soil	RFI	NA	NR	NR	NR	NR	NR
SS-1 (concrete curb)	00-1537	AAA8513	0–1.5	Soil	RFI	0	NR	NR	NR	NR	NR
SS-1 (concrete curb)	00-1537	AAA8522	0–1.5	Soil	RFI	0	NR	NR	NR	NR	NR
SS-1 (concrete curb)	00-1537	AAB0169	1	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1575	AAB6647	0.5–1.2	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1576	AAB6643	0.5–1.2	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1577	AAB6644	0.5–1.3	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1578	AAB6645	0.5–1.3	Soil	RFI	0	NR	NR	NR	NR	NR

TABLE A-1 (CONTINUED)

SUMMARY OF FIELD SCREENING RESULTS FOR PID SAMPLES COLLECTED AT PRS 0-031(b)

LOCATION	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	TYPE OF SAMPLE	PID READING (ppmv)	TOTAL LEAD BY XRF (ppm)	BTEX BY IMMUNOASSAY (ppm)	ALPHA (cpm)	BETA/ GAMMA (cpm)	GAMMA (ur/hr)
Concrete curb	00-1579	AAB3589	3–3.5	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1579	AAB6646	0.5–1.5	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1602	AAB0171	0.25–1.0	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1604	AAB0177	0.5	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1613	AAB6639	2.2	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1613	AAB6641	2.2	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1614	AAB6638	1.8	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1615	AAB6648	0.5 –1.4	Soil	RFI	0	NR	NR	NR	NR	NR
Concrete curb	00-1616	AAB6651	0.33–1.3	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00--1597	AAB0161	6.4	Soil	RFI	0 to 60	NR	NR	NR	NR	NR
East auxiliary pipe	00-1598	AAB0163	4.5–5.0	Soil	RFI	0 to 40	NR	NR	NR	NR	NR
East auxiliary pipe	00-1599	AAB0162	4.5–5.0	Soil	RFI	0 to 40	NR	NR	NR	NR	NR
East auxiliary pipe	00-1600	AAB0165	4.5–5.0	Soil	RFI	0 to 40	NR	NR	NR	NR	NR
East auxiliary pipe	00-1601	AAB0164	4.5–5.0	Soil	RFI	0 to 40	NR	NR	NR	NR	NR
SS-14	00-1612	AAB5447	5–10	Soil	RFI	0	NR	NR	NR	NR	NR
SS-14	00-1612	AAB5448	15–20	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00-1617	AAA8411	7–7.25	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00-1617	AAB0387	7–7.25	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00-1617	AAB66521	7	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00-1618	AAB0388	7	Soil	RFI	0	NR	NR	NR	NR	NR
East auxiliary pipe	00-1618	AAB66531	7	Soil	RFI	0	NR	NR	NR	NR	NR

[a] NR = Not requested.
[b] BDL = Below detection limit.
[c] NA = Not available.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8420 Concentration in PPBv	Q	AAA8421 Concentration in PPBv	Q	AAA8422 Concentration in PPBv	Q	AAA8423 Concentration in PPBv	Q	AAA8424 Concentration in PPBv	Q
Sample Location	Northwest of SS-5		South of SS-4		West of SS-4		East of SS-3		Borehole #SS-3	
Depth of Sample	0' (at surface)		0' (at surface)		0' (at surface)		0' (at surface)		45-50' bgs	
Collection Date	10/13/94		10/13/94		10/13/94		10/13/94		9/20/94	
Location ID	00-1619		00-1620		00-1621		00-1622		00-1588	
Compound Name										
Dichlorodifluoromethane	ND		ND		ND		ND		ND	
Freon 114	ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND		ND	
Acrolein	ND		ND		ND		ND		57	DJ
1,1-Dichloroethene	ND		ND		ND		ND		ND	
Freon 113	ND		ND		ND		ND		78	DJ
Acetone	1	DJ	1	DJ	2	DJ	1	DJ	370	DJ
3-Chloro-1-Propene	ND		ND		ND		ND		ND	
Methylene Chloride	ND		ND		ND		ND		260	DJ
Acrylonitrile	ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		ND	
Chloroform	ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		ND		ND		ND	
Benzene	0.4	DJ	0.9	DJ	0.6	DJ	0.6	DJ	53	DJ
Trichloroethene	ND		ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND	
Toluene	ND		ND		ND		0.2	DJ	260	BDJ
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND		ND	
Tetrachloroethene	ND		ND		ND		ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND	
Ethyl Benzene	ND		ND		ND		ND		ND	
m/p-Xylene	ND		0.4	DJ	ND		0.3	DJ	60	DJ
o-Xylene	ND		ND		ND		ND		ND	
Styrene	ND		ND		ND		ND		48	DJ
Bromoform	ND		ND		ND		ND		ND	
Cumene	ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND	
Propyl Benzene	0.4	DJ	1	D	ND		0.5	DJ	ND	
4-Ethyltoluene	ND		ND		ND		ND		ND	
1,3,5-Trimethylbenzene	ND		ND		ND		ND		ND	
tert-Butyl Benzene	ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	ND		ND		ND		ND		ND	
Isobutyl Benzene	ND		ND		ND		ND		ND	
sec-Butyl Benzene	ND		ND		ND		ND		ND	
4-Isopropyl Toluene	ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND	
Benzyl Chloride	ND		ND		ND		ND		ND	
Butyl Benzene	ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8420 Concentration in PPBv	Q	AAA8421 Concentration in PPBv	Q	AAA8422 Concentration in PPBv	Q	AAA8423 Concentration in PPBv	Q	AAA8424 Concentration in PPBv	Q
Sample Location	Northwest of SS-5		South of SS-4		West of SS-4		East of SS-3		Borehole #SS-3	
Depth of Sample	0' (at surface)		0' (at surface)		0' (at surface)		0' (at surface)		45-50' bgs	
Collection Date	10/13/94		10/13/94		10/13/94		10/13/94		9/20/94	
Location ID	00-1619		00-1620		00-1621		00-1622		00-1588	
TIC Name										
Butanal	2	DJ	3	DJ	4	DJ	2	DJ	ND	
1-Butanol	2	DJ	9	DJ	4	DJ	4	DJ	ND	
Unknown Siloxane	3	DJ	7	DJ	ND		ND		ND	
Isocyanomethane	ND		ND		ND		ND		1,000	DJ
2-methylpentane	ND		ND		ND		ND		ND	
3-methylpentane	ND		ND		ND		ND		ND	
2,4-dimethylpentane	ND		ND		ND		ND		ND	
2,3-dimethylpentane	ND		ND		ND		ND		ND	
2,2,4,4-tetramethylpentane	ND		ND		ND		ND		ND	
Ethyl Cyclobutane	ND		ND		ND		ND		ND	
Methyl Cyclopentane	ND		ND		ND		ND		ND	
2-methylhexane	ND		ND		ND		ND		ND	
3-methylhexane	ND		ND		ND		ND		ND	
Pentane	ND		ND		ND		ND		ND	
Hexane	ND		ND		ND		ND		ND	
Heptane	ND		ND		ND		ND		ND	
Octane	ND		ND		ND		ND		ND	
2,2,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,4-trimethylpentane	ND		ND		ND		ND		ND	
2,2,3-trimethylhexane	ND		ND		ND		ND		ND	
2,2,4-trimethylhexane	ND		ND		ND		ND		ND	
2,2-dimethylhexane	ND		ND		ND		ND		ND	
3-methylheptane	ND		ND		ND		ND		ND	
4-methylheptane	ND		ND		ND		ND		ND	
2,2-dimethylheptane	ND		ND		ND		ND		ND	
3-methyloctane	ND		ND		ND		ND		ND	
unknown	ND		ND		ND		ND		ND	
unknown	ND		ND		ND		ND		ND	
unknown alkene, ~C4	4	DJ	8	DJ	21	DJ	16	DJ	ND	
unknown hydrocarbon	ND		ND		ND		ND		11,000	DJ
unknown hydrocarbon	ND		ND		ND		ND		710	DJ
unknown hydrocarbon	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C4	ND		3	DJ	4	DJ	5	DJ	ND	
aliphatic hydrocarbon, ~C5	ND		ND		1	DJ	ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		2	J	ND		1,100	DJ
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		750	DJ
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		1	J	ND		2,900	DJ
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		2,800	DJ
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		3,200	DJ
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		4,400	DJ
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		1,600	DJ
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8425 Concentration in PPBv	Q	AAA8426 Concentration in PPBv	Q	AAA8427 Concentration in PPBv	Q	AAA8428 Concentration in PPBv	Q	AAA8429 Concentration in PPBv	Q
Sample Location	Borehole #SS-3		Borehole #SS-5		Borehole #SS-5		Borehole #SS-7		Borehole #SS-7	
Depth of Sample	15-20' bgs		41-46' bgs		15-20' bgs		15-20' bgs		45-50' bgs	
Collection Date	9/20/94		9/20/94		9/20/94		9/21/94		9/21/94	
Location ID	00-1588		00-1590		00-1590		00-1592		00-1592	
Compound Name										
Dichlorodifluoromethane	ND		ND		ND		ND		ND	
Freon 114	ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND		ND	
Acrolein	ND		ND		ND		ND		ND	
1,1-Dichloroethene	ND		ND		ND		ND		ND	
Freon 113	ND		1,400	DJ	ND		290	DJ	470	DJ
Acetone	ND		7,000	DJ	ND		1,500	DJ	ND	
3-Chloro-1-Propene	ND		ND		ND		ND		ND	
Methylene Chloride	ND		5,600	DJ	ND		ND		ND	
Acrylonitrile	ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		ND	
Chloroform	ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		92	DJ	ND		420	DJ
Benzene	15	DJ	6,000	DJ	2,400	D	4,300	D	14,000	D
Trichloroethene	ND		ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND	
Toluene	39	DJ	15,000	BD	4,200	D	8,600	BD	32,000	D
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		150	D	ND		ND	
Tetrachloroethene	7	DJ	ND		13	DJ	ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND	
Ethyl Benzene	ND		ND		360	D	900	DJ	2,100	D
m/p-Xylene	ND		2,500	DJ	690	D	3,800	D	9,300	D
o-Xylene	6	DJ	2,600	DJ	930	DJ	1,900	DJ	4,000	D
Styrene	ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND	
Cumene	ND		ND		44	DJ	ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		12	DJ	ND		ND	
Propyl Benzene	ND		ND		48	DJ	ND		ND	
4-Ethyltoluene	ND		ND		200	D	630	DJ	1,100	DJ
1,3,5-Trimethylbenzene	ND		ND		350	D	370	DJ	540	DJ
tert-Butyl Benzene	ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	ND		ND		50	DJ	430	DJ	640	DJ
Isobutyl Benzene	ND		ND		11	DJ	ND		ND	
sec-Butyl Benzene	ND		ND		14	DJ	250	DJ	ND	
4-Isopropyl Toluene	ND		ND		22	DJ	ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND	
Benzyl Chloride	ND		ND		ND		ND		ND	
Butyl Benzene	ND		ND		14	DJ	ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	6	BDJ	ND		16	DJB	ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8425 Concentration in PPBv	Q	AAA8426 Concentration in PPBv	Q	AAA8427 Concentration in PPBv	Q	AAA8428 Concentration in PPBv	Q	AAA8429 Concentration in PPBv	Q
Sample Location	Borehole #SS-3		Borehole #SS-5		Borehole #SS-5		Borehole #SS-7		Borehole #SS-7	
Depth of Sample	15-20' bgs		41-46' bgs		15-20' bgs		15-20' bgs		45-50' bgs	
Collection Date	9/20/94		9/20/94		9/20/94		9/21/94		9/21/94	
Location ID	00-1588		00-1590		00-1590		00-1592		00-1592	
TIC Name										
Butanal	ND		ND		ND		ND		ND	
1-Butanol	ND		ND		ND		ND		ND	
Unknown Siloxane	ND		ND		ND		ND		ND	
Isocyanomethane	ND		ND		ND		ND		ND	
2-methylpentane	ND		ND		ND		ND		ND	
3-methylpentane	ND		ND		ND		ND		ND	
2,4-dimethylpentane	ND		ND		ND		ND		17,000	DJ
2,3-dimethylpentane	ND		ND		ND		ND		22,000	DJ
2,2,4,4-tetramethylpentane	ND		ND		ND		ND		ND	
Ethyl Cyclobutane	ND		ND		ND		ND		ND	
Methyl Cyclopentane	ND		ND		ND		ND		14,000	DJ
2-methylhexane	ND		ND		ND		ND		11,000	DJ
3-methylhexane	ND		ND		ND		ND		14,000	DJ
Pentane	ND		ND		ND		ND		ND	
Hexane	ND		ND		ND		ND		ND	
Heptane	ND		ND		ND		ND		ND	
Octane	ND		ND		ND		ND		ND	
2,2,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,4-trimethylpentane	ND		ND		ND		ND		16,000	DJ
2,2,3-trimethylhexane	ND		ND		ND		ND		16,000	DJ
2,2,4-trimethylhexane	ND		ND		ND		ND		ND	
2,2-dimethylhexane	ND		ND		ND		ND		ND	
3-methylheptane	ND		ND		ND		ND		ND	
4-methylheptane	ND		ND		ND		ND		ND	
2,2-dimethylheptane	ND		ND		ND		ND		9,700	DJ
3-methyloctane	ND		ND		ND		ND		ND	
unknown	ND		170,000	DJ	950	DJ	ND		ND	
unknown	ND		ND		ND		ND		ND	
unknown alkene, ~C4	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		64,000	DJ	ND		29,000	DJ	ND	
unknown hydrocarbon	ND		75,000	DJ	ND		27,000	DJ	ND	
unknown hydrocarbon	ND		170,000	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C4	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C5	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	150	DJ	ND		920	DJ	25,000	DJ	ND	
aliphatic hydrocarbon, ~C6	190	DJ	ND		710	DJ	43,000	DJ	ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		33,000	DJ	ND	
aliphatic hydrocarbon, ~C7	400	DJ	120,000	DJ	1,200	DJ	45,000	DJ	ND	
aliphatic hydrocarbon, ~C7	190	DJ	64,000	DJ	710	DJ	30,000	DJ	ND	
aliphatic hydrocarbon, ~C7	450	DJ	ND		ND		66,000	DJ	ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		36,000	DJ	ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	2,200	DJ	79,000	DJ	990	DJ	23,000	DJ	10,000	DJ
aliphatic hydrocarbon, ~C8	200	DJ	79,000	DJ	1,600	DJ	ND		19,000	DJ
aliphatic hydrocarbon, ~C8	1,100	DJ	ND		820	DJ	ND		ND	
aliphatic hydrocarbon, ~C8	1,500	DJ	ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C9	430	DJ	120,000	DJ	830	DJ	ND		ND	
aliphatic hydrocarbon, ~C9	ND		89,000	DJ	710	DJ	ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8430 Concentration in PPBv	Q	AAA8431 Concentration in PPBv	Q	AAA8432 Concentration in PPBv	Q	AAA8433 Concentration in PPBv	Q	AAA8434 Concentration in PPBv	Q
Sample Location	Borehole #SS-7		Borehole #SS-6		Borehole #SS-6		Borehole #SS-4		Borehole #SS-4	
Depth of Sample	15-20' bgs		39-44' bgs		15-20' bgs		43-48' bgs		15-20' bgs	
Collection Date	9/21/94		9/21/94		9/21/94		9/21/94		9/21/94	
Location ID	00-1592		00-1591		00-1591		00-1589		00-1589	
Compound Name										
Dichlorodifluoromethane	ND		ND		ND		ND		ND	
Freon 114	ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND		ND	
Acrolein	ND		ND		ND		ND		ND	
1,1-Dichloroethene	ND		ND		ND		ND		ND	
Freon 113	2,000	DJ	250	DJ	1,200	DJ	2,700	DJ	5,500	DJ
Acetone	10,000	D	ND		ND		ND		ND	
3-Chloro-1-Propene	ND		ND		ND		ND		ND	
Methylene Chloride	6,700	DJ	ND		ND		ND		ND	
Acrylonitrile	ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		ND	
Chloroform	ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		ND		12,000	DJ	7,000	DJ
Benzene	3,500	DJ	8,400	D	4,600	DJ	780,000	D	450,000	D
Trichloroethene	ND		ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND	
Toluene	10,000	D	17,000	D	11,000	D	1,600,000	D	1,100,000	D
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND		ND	
Tetrachloroethene	ND		ND		ND		ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND	
Ethyl Benzene	ND		1,200	DJ	ND		130,000	D	100,000	D
m/p-Xylene	3,200	DJ	5,300	D	3,800	DJ	360,000	D	320,000	D
o-Xylene	1,400	DJ	2,900	D	2,000	DJ	120,000	D	110,000	D
Styrene	1,000	DJ	ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND	
Cumene	ND		ND		ND		4,300	DJ	4,600	DJ
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND	
Propyl Benzene	ND		ND		ND		7,400	DJ	10,000	DJ
4-Ethyltoluene	ND		1,400	DJ	1,100	DJ	38,000	D	56,000	D
1,3,5-Trimethylbenzene	ND		770	DJ	ND		9,500	DJ	17,000	DJ
tert-Butyl Benzene	ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	ND		550	DJ	ND		18,000	DJ	36,000	D
Isobutyl Benzene	ND		ND		ND		ND		ND	
sec-Butyl Benzene	ND		ND		ND		ND		ND	
4-Isopropyl Toluene	ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND	
Benzyl Chloride	ND		ND		ND		ND		ND	
Butyl Benzene	ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8430 Concentration in PPBv	Q	AAA8431 Concentration in PPBv	Q	AAA8432 Concentration in PPBv	Q	AAA8433 Concentration in PPBv	Q	AAA8434 Concentration in PPBv	Q
Sample Location	Borehole #SS-7		Borehole #SS-6		Borehole #SS-6		Borehole #SS-4		Borehole #SS-4	
Depth of Sample	15-20' bgs		39-44' bgs		15-20' bgs		43-48' bgs		15-20' bgs	
Collection Date	9/21/94		9/21/94		9/21/94		9/21/94		9/21/94	
Location ID	00-1592		00-1591		00-1591		00-1589		00-1589	
TIC Name										
Butanal	ND		ND		ND		ND		ND	
1-Butanol	ND		ND		ND		ND		ND	
Unknown Siloxane	ND		ND		ND		ND		ND	
Isocyanomethane	35,000	DJ	ND		ND		ND		ND	
2-methylpentane	78,000	DJ	15,000	DJ	130,000	DJ	140,000	DJ	160,000	DJ
3-methylpentane	87,000	DJ	ND		150,000	DJ	93,000	DJ	ND	
2,4-dimethylpentane	120,000	DJ	10,000	DJ	180,000	DJ	ND		ND	
2,3-dimethylpentane	180,000	DJ	12,000	DJ	290,000	DJ	110,000	DJ	130,000	DJ
2,2,4,4-tetramethylpentane	ND		ND		ND		ND		ND	
Ethyl Cyclobutane	67,000	DJ	ND		ND		ND		ND	
Methyl Cyclopentane	ND		ND		ND		ND		ND	
2-methylhexane	62,000	DJ	ND		ND		ND		ND	
3-methylhexane	85,000	DJ	ND		150,000	DJ	ND		ND	
Pentane	ND		ND		ND		ND		ND	
Hexane	ND		ND		ND		ND		ND	
Heptane	ND		ND		ND		170,000	DJ	190,000	DJ
Octane	ND		ND		ND		ND		ND	
2,2,3-trimethylpentane	ND		37,000	DJ	ND		ND		ND	
2,3,3-trimethylpentane	ND		36,000	DJ	ND		ND		ND	
2,3,4-trimethylpentane	ND		32,000	DJ	220,000	DJ	160,000	DJ	190,000	DJ
2,2,3-trimethylhexane	ND		ND		ND		ND		ND	
2,2,4-trimethylhexane	ND		ND		ND		ND		430,000	DJ
2,2-dimethylhexane	140,000	DJ	ND		750,000	DJ	ND		ND	
3-methylheptane	ND		ND		ND		ND		110,000	DJ
4-methylheptane	ND		ND		ND		ND		ND	
2,2-dimethylheptane	ND		ND		ND		100,000	DJ	120,000	DJ
3-methyloctane	ND		ND		ND		ND		ND	
unknown	ND		12,000	DJ	140,000	DJ	91,000	DJ	98,000	DJ
unknown	ND		17,000	DJ	ND		120,000	DJ	140,000	DJ
unknown alkene, ~C4	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C4	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C5	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	38,000	DJ	12,000	DJ	270,000	DJ	95,000	DJ	120,000	DJ
aliphatic hydrocarbon, ~C8	ND		ND		140,000	DJ	96,000	DJ	ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		22,000	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8435 Concentration in PPBv	Q	AAA8436 Concentration in PPBv	Q	AAA8437 Concentration in PPBv	Q	AAA8438 Concentration in PPBv	Q	AAA8439 Concentration in PPBv	Q
Sample Location	Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-9		Borehole #SS-9	
Depth of Sample	45-50' bgs		Field Blank		15-20' bgs		52-57' bgs		15-20' bgs	
Collection Date	9/22/94		9/22/94		9/22/94		9/22/94		9/22/94	
Location ID	00-1610		00-1610		00-`1610		00-1594		00-1594	
Compound Name										
Dichlorodifluoromethane	ND		ND		ND		ND		ND	
Freon 114	ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND		ND	
Acrolein	ND		ND		ND		ND		ND	
1,1-Dichloroethene	ND		ND		ND		ND		ND	
Freon 113	2,100	DJ	ND		1,000	DJ	600	DJ	240	DJ
Acetone	ND		2	DJ	ND		2,200	DJ	510	DJ
3-Chloro-1-Propene	ND		ND		ND		ND		ND	
Methylene Chloride	7,200	DJ	ND		ND		1,600	DJ	190	DJ
Acrylonitrile	ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		200	DJ
Chloroform	ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND		ND	
1,2-Dichloroethane	3,700	DJ	ND		ND		ND		ND	
Benzene	190,000	D	1	DJ	58,000	D	5,100	D	3,200	D
Trichloroethene	ND		ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND	
Toluene	650,000	D	12	D	210,000	D	33,000	D	32,000	D
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND		ND	
Tetrachloroethene	ND		ND		ND		ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND	
Ethyl Benzene	57,000	D	2	DJ	17,000	D	4,400	D	5,700	D
m/p-Xylene	240,000	D	13	D	84,000	D	21,000	D	37,000	D
o-Xylene	85,000	D	5	DJ	30,000	D	7,600	D	14,000	D
Styrene	ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND	
Cumene	2,600	DJ	ND		ND		250	DJ	430	DJ
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND	
Propyl Benzene	4,900	DJ	ND		1,600	DJ	520	DJ	990	DJ
4-Ethyltoluene	40,000	D	6	DJ	16,000	D	4,600	D	9,300	D
1,3,5-Trimethylbenzene	13,000	DJ	2	DJ	5,200	DJ	1,500	DJ	3,200	D
tert-Butyl Benzene	ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	23,000	D	8	DJ	10,000	D	2,800	D	6,400	D
Isobutyl Benzene	ND		ND		ND		ND		110	DJ
sec-Butyl Benzene	ND		ND		ND		ND		110	DJ
4-Isopropyl Toluene	ND		ND		ND		ND		200	DJ
1,3-Dichlorobenzene	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND	
Benzyl Chloride	ND		ND		ND		ND		ND	
Butyl Benzene	ND		ND		ND		ND		130	DJ
1,2-Dichlorobenzene	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		2	BDJ	ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8435 Concentration in PPBv	Q	AAA8436 Concentration in PPBv	Q	AAA8437 Concentration in PPBv	Q	AAA8438 Concentration in PPBv	Q	AAA8439 Concentration in PPBv	Q
Sample Location	Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-9		Borehole #SS-9	
Depth of Sample	45-50' bgs		Field Blank		15-20' bgs		52-57' bgs		15-20' bgs	
Collection Date	9/22/94		9/22/94		9/22/94		9/22/94		9/22/94	
Location ID	00-1610		00-1610		00-1610		00-1594		00-1594	
TIC Name										
Butanal	ND		ND		ND		ND		ND	
1-Butanol	ND		ND		ND		ND		ND	
Unknown Siloxane	ND		ND		ND		ND		ND	
Isocyanomethane	ND		ND		ND		ND		ND	
2-methylpentane	130,000	DJ	ND		71,000	DJ	13,000	DJ	ND	
3-methylpentane	ND		ND		ND		ND		ND	
2,4-dimethylpentane	ND		ND		ND		19,000	DJ	3,100	DJ
2,3-dimethylpentane	140,000	DJ	ND		75,000	DJ	48,000	DJ	8,400	DJ
2,2,4,4-tetramethylpentane	ND		ND		230,000	DJ	ND		ND	
Ethyl Cyclobutane	ND		ND		ND		ND		ND	
Methyl Cyclopentane	ND		ND		ND		ND		ND	
2-methylhexane	ND		ND		ND		29,000	DJ	5,200	DJ
3-methylhexane	100,000	DJ	ND		54,000	DJ	36,000	DJ	6,600	DJ
Pentane	ND		ND		ND		ND		ND	
Hexane	ND		ND		ND		17,000	DJ	3,000	DJ
Heptane	200,000	DJ	ND		94,000	DJ	ND		ND	
Octane	ND		ND		ND		13,000	DJ	4,400	DJ
2,2,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,4-trimethylpentane	210,000	DJ	ND		81,000	DJ	ND		ND	
2,2,3-trimethylhexane	ND		ND		ND		ND		ND	
2,2,4-trimethylhexane	ND		ND		ND		ND		ND	
2,2-dimethylhexane	520,000	DJ	ND		ND		ND		ND	
3-methylheptane	130,000	DJ	ND		ND		ND		ND	
4-methylheptane	140,000	DJ	ND		ND		ND		ND	
2,2-dimethylheptane	140,000	DJ	ND		52,000	DJ	ND		ND	
3-methyloctane	ND		ND		ND		ND		3,800	DJ
unknown	ND		ND		75,000	DJ	22,000	DJ	ND	
unknown	ND		ND		ND		ND		ND	
unknown alkene, ~C4	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		4	DJ	ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C4	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C5	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		13,000	DJ	3,800	DJ
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		6	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		7	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		5	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C7	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	170,000	DJ	4	DJ	57,000	DJ	ND		ND	
aliphatic hydrocarbon, ~C8	ND		10	DJ	53,000	DJ	ND		ND	
aliphatic hydrocarbon, ~C8	ND		6	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		7	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		5	DJ	ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		13	DJ	ND		15,000	DJ	2,900	DJ
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		6,700	DJ

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8440 Concentration in PPBv	Q	AAA8441 Concentration in PPBv	Q	AAA8442 Concentration in PPBv	Q	AAA8443 Concentration in PPBv	Q	AAA8444 Concentration in PPBv	Q
Sample Location	Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A	
Depth of Sample	12-52' bgs		12-52' bgs		12-52' bgs		12-52' bgs		12-52' bgs	
Collection Date	9/27/94		9/27/94		9/27/94		9/27/94		9/27/94	
Location ID	00-1610		00-1610		00-1610		00-1610		00-1610	
Compound Name										
Dichlorodifluoromethane	ND		ND		ND		ND		ND	
Freon 114	ND		ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND		ND	
Acrolein	ND		ND		ND		ND		ND	
1,1-Dichloroethene	ND		ND		ND		ND		ND	
Freon 113	ND		ND		ND		ND		ND	
Acetone	ND		ND		ND		ND		ND	
3-Chloro-1-Propene	ND		ND		ND		ND		ND	
Methylene Chloride	ND		61,000	DJ	90,000	DJ	ND		ND	
Acrylonitrile	ND		ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	ND		ND		ND		ND		ND	
2-Butanone	ND		ND		ND		ND		ND	
Chloroform	ND		ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		ND		ND		ND	
Benzene	300,000	D	290,000	D	230,000	D	230,000	D	260,000	D
Trichloroethene	ND		ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND		ND	
Toluene	580,000	D	650,000	D	550,000	D	540,000	D	560,000	D
trans-1,3-Dichloropropene	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND		ND	
Tetrachloroethene	ND		ND		ND		ND		ND	
1,2-Dibromoethane	ND		ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND		ND	
Ethyl Benzene	45,000	DJ	53,000	DJ	47,000	DJ	51,000	DJ	49,000	DJ
m/p-Xylene	260,000	D	300,000	D	240,000	D	240,000	D	220,000	D
o-Xylene	92,000	DJ	110,000	D	89,000	DJ	87,000	DJ	75,000	DJ
Styrene	ND		ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND		ND	
Cumene	ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND		ND	
Propyl Benzene	ND		ND		ND		ND		ND	
4-Ethyltoluene	39,000	DJ	52,000	DJ	46,000	DJ	43,000	DJ	35,000	DJ
1,3,5-Trimethylbenzene	12,000	DJ	19,000	DJ	17,000	DJ	16,000	DJ	14,000	DJ
tert-Butyl Benzene	ND		ND		ND		ND		ND	
1,2,4-Trimethylbenzene	31,000	DJ	38,000	DJ	33,000	DJ	29,000	DJ	24,000	DJ
Isobutyl Benzene	ND		ND		ND		ND		ND	
sec-Butyl Benzene	ND		ND		ND		ND		ND	
4-Isopropyl Toluene	ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND		ND	
Benzyl Chloride	ND		ND		ND		ND		ND	
Butyl Benzene	ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

Table A-2
A Summary of PRS 0-031(b) Former Zia Motorpool Facility
Soil Vapor Sample Volatile Organic Analysis Results

Sample Description	AAA8440 Concentration in PPBv	Q	AAA8441 Concentration in PPBv	Q	AAA8442 Concentration in PPBv	Q	AAA8443 Concentration in PPBv	Q	AAA8444 Concentration in PPBv	Q
Sample Location	Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A		Borehole #SS-2A	
Depth of Sample	12-52' bgs		12-52' bgs		12-52' bgs		12-52' bgs		12-52' bgs	
Collection Date	9/27/94		9/27/94		9/27/94		9/27/94		9/27/94	
Location ID	00-1610		00-1610		00-1610		00-1610		00-1610	
TIC Name										
Butanal	ND		ND		ND		ND		ND	
1-Butanol	ND		ND		ND		ND		ND	
Unknown Siloxane	ND		ND		ND		ND		ND	
Isocyanomethane	ND		ND		ND		ND		ND	
2-methylpentane	ND		ND		ND		ND		ND	
3-methylpentane	ND		ND		ND		ND		ND	
2,4-dimethylpentane	ND		ND		ND		ND		ND	
2,3-dimethylpentane	ND		ND		ND		ND		ND	
2,2,4,4-tetramethylpentane	ND		ND		ND		ND		ND	
Ethyl Cyclobutane	ND		ND		ND		ND		ND	
Methyl Cyclopentane	ND		ND		ND		ND		ND	
2-methylhexane	ND		ND		ND		ND		ND	
3-methylhexane	ND		ND		ND		ND		ND	
Pentane	250,000	DJ	230,000	DJ	180,000	DJ	180,000	DJ	200,000	DJ
Hexane	870,000	DJ	790,000	DJ	620,000	DJ	640,000	DJ	700,000	DJ
Heptane	ND		ND		ND		ND		ND	
Octane	ND		ND		ND		ND		ND	
2,2,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,3-trimethylpentane	ND		ND		ND		ND		ND	
2,3,4-trimethylpentane	ND		ND		ND		ND		ND	
2,2,3-trimethylhexane	ND		ND		ND		ND		ND	
2,2,4-trimethylhexane	ND		ND		ND		ND		ND	
2,2-dimethylhexane	ND		ND		ND		ND		ND	
3-methylheptane	ND		ND		ND		ND		ND	
4-methylheptane	ND		ND		ND		ND		ND	
2,2-dimethylheptane	ND		ND		ND		ND		ND	
3-methyloctane	ND		ND		ND		ND		ND	
unknown	ND		ND		ND		ND		ND	
unknown	ND		ND		ND		ND		ND	
unknown alkene, ~C4	ND		ND		ND		ND		ND	
unknown hydrocarbon	900,000	DJ	810,000	DJ	640,000	DJ	660,000	DJ	760,000	DJ
unknown hydrocarbon	ND		530,000	DJ	ND		ND		ND	
unknown hydrocarbon	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C4	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C5	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C6	930,000	DJ	830,000	DJ	650,000	DJ	700,000	DJ	770,000	DJ
aliphatic hydrocarbon, ~C6	880,000	DJ	800,000	DJ	640,000	DJ	650,000	DJ	720,000	DJ
aliphatic hydrocarbon, ~C6	ND		ND		610,000	DJ	ND		ND	
aliphatic hydrocarbon, ~C7	820,000	DJ	760,000	DJ	640,000	DJ	620,000	DJ	690,000	DJ
aliphatic hydrocarbon, ~C7	870,000	DJ	810,000	DJ	1,100,000	DJ	640,000	DJ	700,000	DJ
aliphatic hydrocarbon, ~C7	1,500,000	DJ	1,400,000	DJ	740,000	DJ	1,100,000	DJ	1,200,000	DJ
aliphatic hydrocarbon, ~C7	1,000,000	DJ	950,000	DJ	500,000	DJ	750,000	DJ	810,000	DJ
aliphatic hydrocarbon, ~C7	ND		ND		ND		490,000	DJ	ND	
aliphatic hydrocarbon, ~C8	510,000	DJ	ND		ND		ND		520,000	DJ
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C8	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		ND	
aliphatic hydrocarbon, ~C9	ND		ND		ND		ND		ND	

bgs=below ground surface; ND=Not Detected; B=Analyte was also detected in the blank; D=Compound quantitated on a diluted sample; and J=Estimated value.

APPENDIX B SUMMARY OF QUALITY CONTROL RESULTS

TABLE B-1

SUMMARY OF SAMPLES COLLECTED AT PRS 0-031(b)

LOCATION	REQUEST #	SAMPLE ID	MATRIX	ANALYTE SUITE	QC COMMENT
SS-1 (concrete curb)	17077	AAA8513	Soil	VOC	One high surrogate recovery, but no detects. All data are valid and usable without qualification.
SS-1 (concrete curb)	17077	AAA8522	Soil	VOC	One high surrogate recovery, but no detects. All data are valid and usable without qualification.
Distribution line excavation/east auxilarypipe	17383	AAB0161	Soil	VOC	Acetone EQL raised and qualified U because of blank contamination (26 µg/kg).
Concrete curb	17399	AAB0171	Soil	BTEX	One low internal standard. None of the 4 analytes associated with this internal standard. All data are valid and usable without qualification.
Distribution line excavation	17405	AAA8388	Water (TB)[a]	BTEX/ VOC	Sample not analyzed because sample jar was broken and sample was lost.
SS-3	17453	AAB0242	Soil	Lead	Lead data are qualified J for low recovery in the QC sample (less than 75%).
SS-3	17453	AAB0243	Soil	Lead	Lead data are qualified J for low recovery in the QC sample (less than 75%).
SS-3	17453	AAB0244	Soil	Lead	Lead data are qualified J for low recovery in the QC sample (less than 75%).
SS-4	17456	AAB0248	Soil	VOC	Acetone qualified J for internal calibration outside allowed limits.
SS-5	17480	AAB0251	Soil	VOC	One high surrogate recovery, but no analytes detected . All data are valid and usable without qualification.
SS-6	17505	AAB0259	Soil	VOC	Acetone qualified J for internal calibration outside allowed limits.
SS-6	17505	AAB0260	Soil	VOC	Acetone qualified J for internal calibration outside allowed limits.
SS-6	17505	AAB0313	Soil	VOC	Acetone qualified J for internal calibration outside allowed limits. 1,2,4-trimethylbenzene is qualified J for detection outside instrument linear calibration range.
SS-7	17547	AAB0315	Soil	VOC	Acetone found in QC sample (shouldn't be there), so EQL raised to level of detect (72 ug/kg)
SS-7	17547	AAB0316	Soil	VOC	Acetone found in QC sample (shouldn't be there), so EQL raised to level of detect (46 µg/kg).
SS-7	17547	AAB0317	Soil	VOC	Acetone found in QC sample (shouldn't be there), so EQL raised to level of detect (55 µg/kg).
SS-8	17590	AAB0321	Soil	TPH	Low recovery in QC sample (40%). All data qualified UJ for possible low bias.
SS-8	17590	AAB0322	Soil	TPH	Low recovery in QC sample (40%). All data qualified UJ for possible low bias.

TABLE B-1 (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT PRS 0-031(b)

LOCATION	REQUEST #	SAMPLE ID	MATRIX	ANALYTE SUITE	QC COMMENT
SS-8	17590	AAB0323	Soil	TPH	Low recovery in QC sample (40%). All data qualified UJ for possible low bias.
SS-8	17590	AAB0322	Soil	VOC	Acetone EQL raised (32 µg/kg) and qualified 'U' because of blank contamination (26 µg/kg).
SS-9	17600	AAB5418	Soil	VOC	Acetone EQL raised (31 µg/kg) and qualified 'U' because of QC sample contamination (22 µg/kg).
SS-10	17601	AAB5423	Soil	VOC	Acetone EQL raised (36 µg/kg) and qualified 'U' because of QC sample contamination (22 µg/kg).
SS-10	17601	AAB5424	Soil	VOC	Acetone EQL raised (41 µg/kg) and qualified 'U' because of QC sample contamination (22 µg/kg).
SS-13	17670	AAB5442	Soil	Lead	Lead qualified J for high recovery in the QC sample.
SS-13	17670	AAB5443	Soil	Lead	Lead qualified J for high recovery in the QC sample.
SS-13	17670	AAB5444	Soil	Lead	Lead qualified J for high recovery in the QC sample.
SS-14	17707	AAB0221	Water (EB)[b]	VOC	Acetone was found in the method blank. EQLs were raised appropriately.
SS-14	17707	AAB0222	Water (FR)[c]	VOC	Acetone was found in the method blank. EQLs were raised appropriately.
SS-14	17707	AAB5446	Water (TB)	VOC	Acetone was found in the method blank. EQLs were raised appropriately.
SS-14	17707	AAB5447	Soil	VOC	Acetone was found in the method blank. EQLs were raised appropriately.
SS-14	17707	AAB5448	Soil	VOC	Acetone was found in the method blank. EQLs were raised appropriately.
SS-2A	17744	AAB5441	Soil	VOC	Acetone EQL raised (36 ug/kg) and qualified 'U' because of QC sample contamination (26 µg/kg).
SS-2A	17747	AAB5435	Soil	VOC	S-butylbenzene and p-isopropyltoluene qualified J for percent difference greater than 25% for continuing calibration. Toluene, mixed xylenes and 1,2,4-trimethylbenzene qualified J for being above the linear calibration range of the instrument.
SS-2A	17747	AAB5436	Soil	VOC	S-butylbenzene and p-isopropyltoluene qualified J for percent difference greater than 25% for continuing calibration. 1,2,4-trimethylbenzene qualified J for being above the linear calibration range of the instrument.
SS-2A	17747	AAB5438	Soil	VOC	S-butylbenzene and p-isopropyltoluene qualified J for percent difference greater than 25% for continuing calibration. Toluene, mixed xylenes and 1,2,4-trimethylbenzene qualified 'J' for being above the linear calibration range of the instrument.

TABLE B-1 (CONTINUED)

SUMMARY OF SAMPLES COLLECTED AT PRS 0-031(b)

LOCATION	REQUEST #	SAMPLE ID	MATRIX	ANALYTE SUITE	QC COMMENT
Concrete curb	18030	AAB6638	Soil	METALS	Selenium qualified UJ for low internal standard result.
Concrete curb	18030	AAB6639	Soil	METALS	Selenium qualified UJ for low internal standard result.
Concrete curb	18030	AAB6641	Soil	METALS	Selenium qualified UJ for low internal standard result.
Concrete curb	18111	AAB6643	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6644	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6645	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6646	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6647	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6648	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6649	Water (TB)	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
Concrete curb	18111	AAB6651	Soil	VOC	Toluene and acetone found in method blank. EQL were raised appropriately.
SS-2	currently not in FIMAD	AAB0240	Water (TB)	BTEX	N/A[d]
East auxiliary pipe	currently not in FIMAD	AAB6652	Soil	TPH	N/A
East auxiliary pipe	currently not in FIMAD	AAB6653	Soil	TPH	N/A
East auxiliary pipe	currently not in FIMAD	AAB0385	Water (TB)	VOC	N/A

[a] TB = Trip blank.
[b] EB = Equipment blank.
[c] FR = Field rinsate.
[d] N/A = Not applicable.

APPENDIX C RISK ASSESSMENT CALCULATIONS

No risk assessment was performed for potential release site 0-031(b).

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