#52930

RFI Report for

53 Potential Release Sites in TA-3 TA-59 TA-60 TA-61

Field Unit 1

Environmental Restoration Project

February 1996

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-726

Executive Summary

This report presents the results of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at technical areas (TAs) -3, -59, -60, and -61. Most of the 53 potential release sites (PRSs) discussed in this report are described in detail in the RFI Work Plan for Operable Unit (OU) 1114 (LANL 1993, 1090). PRSs 3-042, 3-045(b,c), 3-052(f), and 3-053 are described in the RFI Work Plan for OU 1114, Addendum 1 (LANL 1995 17-1275). The following paragraphs give a brief description of the four TAs addressed in this RFI report. A more detailed description of the PRSs addressed in this report can be found in the Chapter 5 background subsections for each of the 19 PRSs or PRS aggregates.

TA-3 has housed the core operational facilities at Los Alamos National Laboratory (LANL) since 1951. The site includes the main administration buildings, library, cafeteria, shops, warehouses, several large buildings housing diverse groups and programs, and numerous smaller buildings serving specialized functions. A gas-fired electrical generating plant, gas station and garage, and sewage treatment plant (decommissioned in 1993) are also located at TA-3. The site is highly developed, and approximately one-third of the area is enclosed within a security fence for controlled access. PRSs 3-002(c), 3-003(a,b), 3-012(b), 3-013(a,b), 3-014(a,e), 3-014(a-z, a2, b2, c2), 3-015, 3-042, 3-045(b,c), 3-033, 3-052(f), and 3-053 were the TA-3 PRSs sampled during the summer of 1994.

TA-59 began housing Laboratory occupational health, safety, and environmental groups in 1966. Located on the southern edge of South Mesa on the rim of Twomile Canyon, the mesa top component of TA-59 contains a combination laboratory and office building with several smaller support buildings. A large office building and three transportable complexes are situated against the canyon wall approximately 20 ft below the canyon rim. PRS 59-004 was the one TA-59 PRS sampled during the summer of 1994.

TA-60, Sigma Mesa, was created from a portion of TA-3 in 1989, and houses Laboratory support and maintenance operations and contractor service facilities. TA-60 lies on a finger-like mesa between two 200-ft-deep canyons and consists mostly of undeveloped mesa top. The main vehicle maintenance and operational buildings (TA-60-1 and TA-60-2), the Nevada Test Site (NTS) test fabrication facility (TA-60-17), and the NTS test tower (TA-60-19) are located at the western end of the site. Several small, abandoned experimental areas, including a solar pond and a test drill hole, are located on the eastern end of Sigma Mesa. Storage areas on Sigma Mesa contain excess equipment, topsoil, concrete, excavated underground storage tanks (USTs), and recyclable asphalt. PRSs 60-004(b,c,d,e,f), 60-005(a), 60-006(a), and 60-007(a,b) were the TA-60 PRSs sampled during the summer of 1994.

TA-61 was also created from a portion of TA-3 in 1989. The area contains the Los Alamos municipal sanitary landfill, a residential trailer park, a private concrete batch plant, and a Laboratory-operated asphalt batch plant. TA-61 is bounded on the north by 300-ft-deep Los Alamos Canyon and on the south by Sandia Canyon, which is approximately 400 ft wide and 40 to 140 ft deep at TA-61. PRS 61-002 was the one TA-61 PRS sampled during the summer of 1994.

Phase I sampling activities described in the RFI Work Plan for OU 1114 (LANL 1993, 1090) began July 6, 1994 at Sigma Mesa and continued until October 26, 1994. The sampling objectives for the Phase I investigation were to determine whether chemicals of potential concern (COPCs) that may be present based on knowledge of historical site activities were present and to identify any additional, unexpected COPCs. The primary COPCs at TAs -3, -59, -60, and -61 included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and radionuclides.

Most of the analytical data met the laboratory specified requirements for data quality (for example, recovery and precision) without qualification or further assessment. Some selected data did not meet lab performance requirements, but a focused data validation indicated that all data were adequate for the intended uses in this report (background comparisons and screening assessment).

A summary of the results of each investigation, including the recommendations for each site, is presented in Table ES-1. If no further action (NFA) is recommended, the NFA criterion number is listed in the NFA column. PRSs recommended for NFA under criterion number 4 meet the following description;

> The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and available data indicate that contaminants of concern are either not present or are present in concentrations that pose an acceptable level of risk.

If further action is recommended for the individual PRS or PRS aggregate, the recommended action is listed in Table ES-1. Phase II sampling plans are included in the subsection listed in Table ES-1 for all PRSs recommended for Phase II sampling. The voluntary corrective action (VCA) plan for PRS 60-006(a) will be submitted separately.

TABLE ES-1
SUMMARY OF PROPOSED ACTIONS AT TAs -3, -59, -60, and -61

		PROPOSED ACTION			
PRS[a]	HSWA[b]	NFA[c] CRITERIA	FURTHER ACTION	RATIONALE	SUBSECTION NUMBER
3-002(c)	Yes	4		No chemicals above SALs[d].	5.1
3-003(a,b) and collocated 3-042	Yes	4		No chemicals above SALs.	5.2
3-012(b) and collocated 3-045(b); 3-045(c)	Yes		Phase II	Extent of contamination unknown.	5.3
3-013(a,b) and collocated 3-052(f)	Yes, except 3-013(b)	4		Only chemicals retained as COPCs[e] were four PAHs[f], which are attributed to parking lot runoff.	5.4
3-014(a,e), representing 3-014(b-d,f-j, p-z, a2)	Yes, except 3-014 (v-z,a2)	4		No unacceptable risk is present.	5.5
3-014(b2); representing 3-014(b-d,f-j, p-z, a2)	Yes, except 3-014 (v-z, a2,b2)	4		No chemicals above SALs.	5.6
3-014(c2), 3-014(k-o)	Yes, except 3-014(c2)		Phase II	Extent of contamination unknown.	5.7
3-015 and collocated 3-053	Yes, 3-015; No, 3-053	4		Only chemicals retained as COPCs were six PAHs, which are attributed to asphalt in the samples or road runoff.	5.8
3-038	Yes	4		Only chemicals retained as COPCs were five PAHs, which are attributed to road runoff.	5.9
59-004	No	4		No chemicals above SALs.	5.10
60-004(b,d)	No	4		No chemicals above SALs.	5.11
60-004(c)	No	4		No chemicals above SALs.	5.12
60-004(e)	No	4		No chemicals above SALs.	5.13
60-004(f)	No	4		No chemicals above SALs.	5.14

TABLE ES-1 (Continued)

SUMMARY OF PROPOSED ACTIONS AT TAs-3, 59, 60, and 61

		PROPOSED ACTION			
PRS[a]	HSWA[b]	NFA[c] CRITERIA	FURTHER ACTION	RATIONALE	SUBSECTION NUMBER
60-005(a)	Yes	4		Only chemicals retained as COPCs are radionuclides. Radionuclide contamination will be further evaluated under DOE Order 5400.5.	5.15
60-006(a)	Yes		VCA[g]	No hazardous substances present. Tank will be removed and closed under appropriate State UST regulations.	5.16
60-007(a)	Yes	4		No chemicals above SALs.	5.17
60-007(b)	Yes	4		No chemicals above SALs.	5.18
61-002	Yes		Phase II	Extent of contamination unknown.	5.19

[a] PRS = Potential release site.
[b] HSWA = Hazardous and Solid Waste Amendments.
[c] NFA = No further action.
[d] SALs = Screening action levels.
[e] COPCs = Chemicals of potential concern.
[f] PAHs = Polycyclic aromatic hydrocarbons.
[g] VCA = Voluntary corrective action.

Contents

LIST OF TABLES

LIST OF FIGURES

THIS PAGE LEFT INTENTIONALLY BLANK

1.0 INTRODUCTION

1.1 General Site History

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report describes the Phase I investigations performed within Technical Areas (TAs) -3, -59, -60, and -61. A comprehensive description of each TA can be found in the RFI Work Plan for Operable Unit (OU) 1114 (LANL 1993, 1090). Figures 1.1-1 and 1.1-2 show the location of TAs -3, -59, -60, and -61.

Technical Area 3. TA-3 contains the core of operational facilities at Los Alamos National Laboratory (LANL). TA-3 is bounded on the north by 300-ft-deep Los Alamos Canyon and on the south by 80-ft-deep Twomile Canyon. TA-3 is almost completely developed, composed of buildings, roads, and large paved parking lots and landscaped, unpaved areas. Included in TA-3 are the principal administration buildings, library, cafeteria, shops, warehouses, several large laboratory buildings housing diverse groups and programs, and numerous smaller buildings serving specialized functions. A gas-fired electrical generating plant, gas station and garage, and sewage treatment plant (decommissioned in 1993) are also located at TA-3. Approximately one-third of the area is enclosed within a security fence for controlled access.

Technical Area 59, Occupational Health (OH) Site. TA-59 houses several of the occupational health, safety, and environmental groups serving the Laboratory. TA-59 lies at the southern edge of South Mesa on the rim of Twomile Canyon. The site is divided into two levels. The main laboratory and office facility (TA-59-1) and several support buildings are located on the mesa near the canyon rim. A large office building (TA-59-3) and three transportable complexes are located against the canyon wall approximately 20 ft below the canyon rim. Paved roads and parking areas serve both levels. The remainder of TA-59 consists of pine forest on the steep north wall of Twomile Canyon.

Technical Area 60, Sigma Mesa Site. TA-60 contains Laboratory support and maintenance operations and contractor service facilities. TA-60 lies east of TA-3 on a finger-like mesa between Sandia Canyon on the north and Mortandad Canyon on the south. Most of TA-60 consists of undeveloped mesa top. The mesa was an agricultural area during the homestead days before 1943. It is covered with low, invasive shrubs and is unforested, except for pines at the edges of the mesa and a few young pines beginning to invade the fields. The main vehicle maintenance and operational buildings (TA-60-1, TA-60-2), the Nevada Test Site (NTS) test fabrication facility (TA-60-17), and the NTS test tower (TA-60-19) are located at the western end of the site adjacent to TA-3. Several small, abandoned experimental areas, including a solar pond and a test drill hole, are located on the eastern end of Sigma Mesa. Other storage areas on Sigma Mesa contain excess equipment, topsoil, concrete, excavated underground storage tanks (USTs), and recyclable asphalt.

Technical Area 61, East Jemez Site. TA-61 contains the Los Alamos municipal sanitary landfill, a residential trailer park, a private concrete batch plant and a Laboratory-operated asphalt batch plant. TA-61 is bounded on the north by 300-ft-deep Los Alamos Canyon and on the south by Sandia Canyon, which is approximately 400 ft wide and 40 to 140 ft deep within TA-61. The remainder of TA-61 appears to be naturally vegetated with ponderosa pine forest. East Jemez Road traverses the north edge of the site near the rim of Los Alamos Canyon.

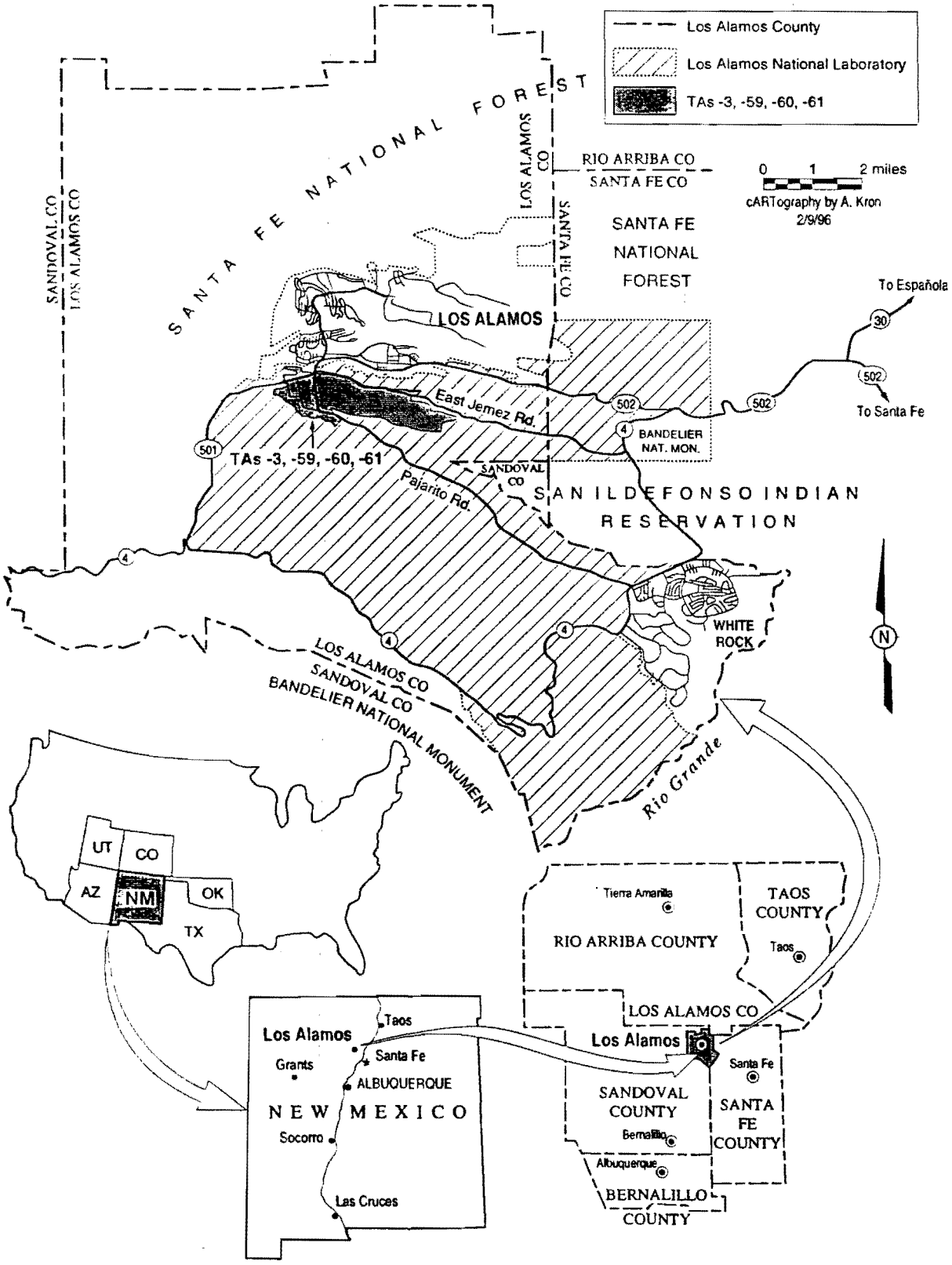

Fig. 1.1-1. Location map of TAs -3, -59, -60, and -61 within Los Alamos National Laboratory Los Alamos County, New Mexico.

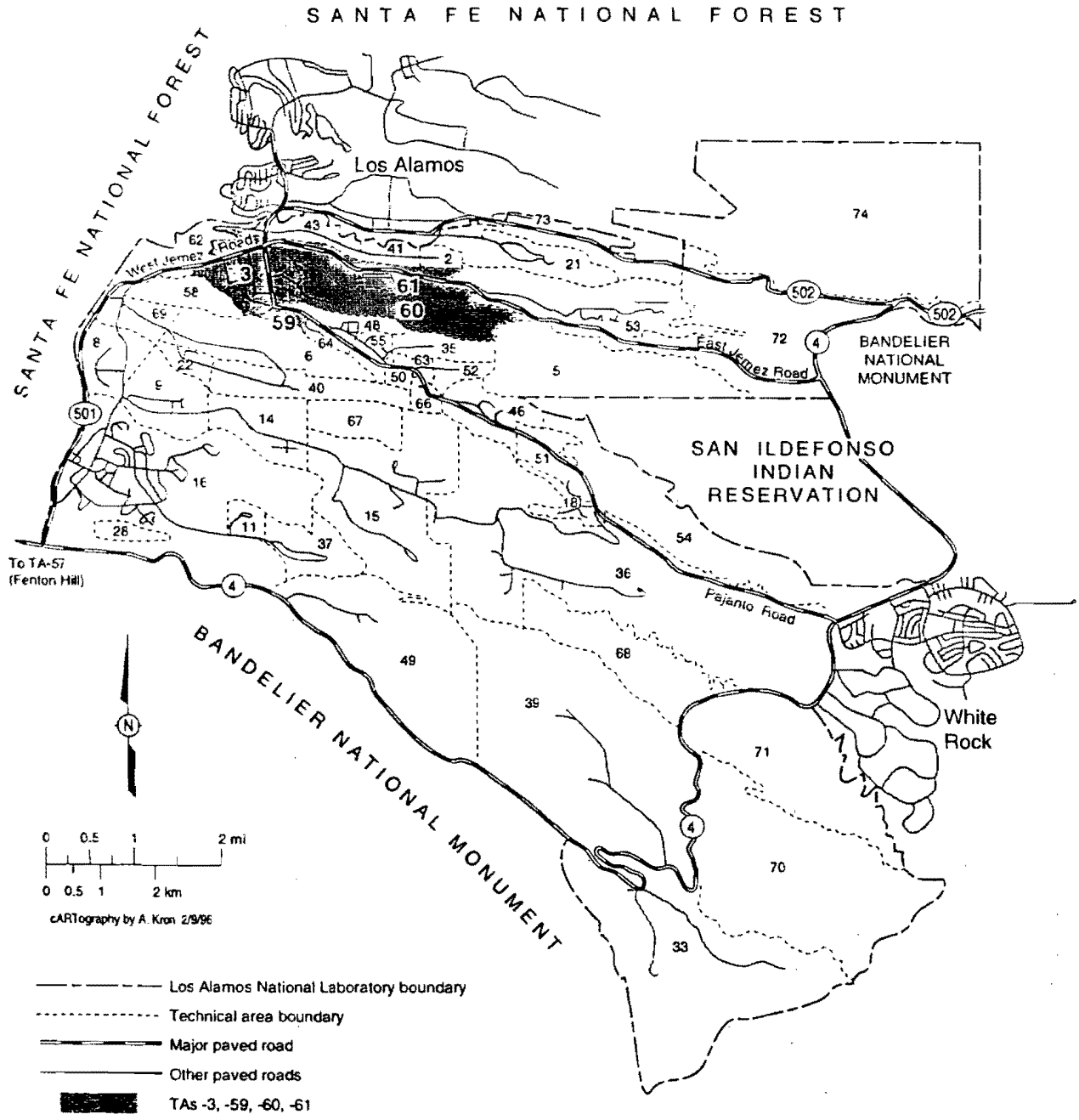

Fig. 1.1-2. Location of TAs -3, -59, -60, and -61 with respect to Laboratory TAs and surrounding landholdings.

1.2 RFI Overview

The sampling objectives for the Phase I investigation of TAs -3, -59, -60, and -61 (formerly OU 1114) were to determine whether chemicals of potential concern (COPCs) that may be present on the basis of historical site activities are present and to determine if unexpected COPCs are present. The primary COPCs at TAs -3, -59, -60, and -61 included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and radionuclides. The conceptual exposure model for former OU 1114 is presented in Subsection 4.3 of the RFI Work Plan for OU 1114 (LANL 1993, 1090) and in Subsection 4.4 of the RFI Work Plan for OU 1114, Addendum I (LANL 1995, 17-1275).

1.3 Field Activities

Field sampling activities outlined in the RFI Work Plan for OU 1114 (LANL 1993, 1090) were initiated July 6, 1994, beginning with sampling at potential release site (PRS) 60-004(e) on Sigma Mesa. Field operations continued four months, through October 26, 1994, when sampling activities concluded at PRS 60-004(f).

The field sampling activities were conducted separately for each PRS, except where PRSs were linked by physical extent and similar investigation approach. All field activities were conducted in accordance with LANL Environmental Restoration Project (ER) standard operating procedures (SOPs) current at the time the sampling was conducted. With exceptions noted, all samples were collected, documented, and preserved using LANL-ER-SOP-06.10, Hand Auger and Thin-Wall Tube Sampler and LANL-ER-SOP-06.09 Spade and Scoop Method for Collection of Soil Samples; LANL-ER-SOP-01.04, Sample Control and Field Documentation; and LANL-ER-SOP-01.02, Sample Containers and Preservation (LANL 1993, 0875). Samples intended for analysis of VOCs were collected using a drive hammer containing two brass sleeves (2 in. diameter by 3 in. long) which were sealed immediately after sample collection with Teflon™ tape and plastic end caps (as described in LANL-ER-SOP-6.10). All applicable LANL ER SOPs were followed unless otherwise noted in Chapter 5 of this report.

Samples submitted for fixed laboratory analyses were analyzed by the following Environmental Protection Agency (EPA) methods: VOCs by SW-846 method 8260, SVOCs by SW-846 method 8270, polychlorinated biphenyls (PCBs) and organochlorine pesticides by SW-846 method 8080, organophosphorus pesticides by SW-846 method 8140, herbicides by SW-846 method 8150, cyanide by SW-846 method 9010, and target analyte list (TAL) metals by SW-846 methods 6010, 7471, and 7000.

Field monitoring for VOCs was initially done with a combination flame ionization detector/ photoionization detector (FID/PID). However, because this detector was not completely reliable, a separate FID or PID was used. For the majority of the investigation, VOCs were monitored using one of the following PIDs: an OVM Model 580B™ or a Photovac Microtip Model 1S-3000™. The FID utilized was a Foxboro OVA Model 128™.

Field monitoring for radioactivity was accomplished using a Ludlum 12 Beta/Gamma Meter with a Ludlum 44-9 Probe™ and a Ludlum Model 139 Alpha Meter™ with a 43-32 Probe.

On-site polychlorinated biphenyl (PCB) analyses were conducted using a D TECH™ PCB Test Kit manufactured by Strategic Diagnostics Inc. The D TECH™ system is based on immunoassay technology that develops a color intensity inversely proportional to the concentration of PCBs in the sample. PCBs are thus measured at parts per million (ppm) in soil. The minimum detection limit for PCBs in soil is 0.5 ppm, with detectable PCB concentrations in ppm being measured in the following ranges: 0.5–1.0, 1.0–4.0, 4.0–15, 15–50, and >50. The purpose of using the PCB test kit was to characterize, in real time, potential PCB contamination in soil and asphalt samples to guide field decisions regarding the need for additional sampling and for determining the location of samples for off-site analyses.

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 discussion of the environmental setting, including climate, geology, hydrology, and a conceptual hydrogeologic model for the area and its surroundings, is presented in the RFI Work Plan for OU 1114 (LANL 1993, 1090), and a summary is presented in the following sections.

2.1 Climate

Los Alamos County has a semiarid, temperate, mountain climate. Summers are generally sunny with moderate, warm days and cool nights. High altitude, light winds, clear skies, and dry atmosphere allow summer temperatures to range from 50°F to 80°F in the area described in this report. During the winter, temperatures typically range from 15°F to 50°F. The average annual rainfall in the area of TAs -3, -59, -60, and -61 is estimated at 18 in., but may range from 6.8 in. to 30.3 in. Of this total, approximately 40% occurs as brief, intense thunderstorms during July and August. Streamflow in canyons can occur as a result of these storms. Spring snowmelt runoff may also induce streamflow in the area canyons.

2.2 Geology

2.2.1 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 in the TA-3 area is presented below.

TA-3 and the contiguous TAs -59, -60, and -61 are situated on mesa tops and upper canyon slopes of the Pajarito Plateau. The surface of the plateau slopes generally eastward, with elevations ranging from approximately 7 520 ft in the western part to 7 280 ft in the eastern parts. The area of the combined TAs is bounded on the north by Los Alamos Canyon and on the south by Twomile Canyon. The upper reaches of Sandia and Mortandad Canyons also cut through the area. The walls of canyons cutting the Pajarito Plateau generally consist of vertical ledges alternating with steep slopes. However, along the upper reaches of canyons and small tributaries cutting the area of TAs -3, -59, -60, and -61, slopes are gentle and mantled with up to several feet of colluvium and soil. Several PRSs, including 3-014(c2) and 3-014(b2), are located on canyon slopes.

2.2.2 Bedrock Soils

The exposed bedrock at TAs -3, -59, -60, and -61 is composed of cooling units 2–4 of the Tshirege (upper) member of the Bandelier Tuff. The tuff ranges from nonwelded to densely welded, depending on the cooling unit. The Tshirege member is separated from the Otowi (underlying lower) Member of the Bandelier by a few feet of undifferentiated airfall and water-reworked silicic tuffs designated the Cerro Toledo Tuffs. The Otowi Member is generally poorly welded to nonwelded. The basal part of the Otowi is composed of approximately 15 ft of air-fall pumice (Guaje pumice bed). A generalized stratigraphy of the site is shown in Fig. 2.2.1-1. The bedrock on mesa tops and upper canyon slopes is overlain by alluvium and soil ranging locally in thickness from zero to a few feet.

Cliff-retreat occurs by detachment of small blocks along fractures in the tuff and by detachment or partial detachment of landslide blocks. Failure of small, fracture-bounded blocks is particularly important for smaller, tributary canyons. Individual landslide blocks can extend 75 ft or more from mesa edges (Reneau 1995, 1117).

2.3 Hydrology

2.3.1 Surface water

Most of the surface drainage of the combined TAs flows to Sandia and Mortandad Canyons, which cut through the site. Surface drainage from TA-3, including flow from the Power Plant outfall [PRS 3-012(b)], and the former Wastewater Treatment Plant outfall [PRS 3-014(c2)], flows into Sandia Canyon and then to the wetlands area downstream. Drainage from the area surrounding the Chemical and Metallurgical Research (CMR) Building flows into Mortandad Canyon. Topography is illustrated on sampling location figures for individual PRSs or PRS aggregates in Chapter 5.

2.3.2 Ground water

The elevation of the main aquifer is about 6 000 ft, more than 1 000 ft below the level of mesa tops at TA-3. No perched or alluvial aquifers are known to be present in, or to underlie, TA-3. A perennial stream is present in Los Alamos Canyon, which bounds TA-3 on the northern side. A shallow aquifer is present in the alluvium of Los Alamos Canyon in the vicinity of TA-21 (Broxton and Eller 1995, 1162). In addition, near TA-21 a perched groundwater zone is present beneath Los Alamos Canyon at a depth of 325 ft in the Guaje pumice bed. The lateral extent of this intermediate-depth perched aquifer, particularly to the south beneath TA-3, is not known; however, it is not present beneath DP Canyon 375 ft to the north (Broxton and Eller 1995, 1162). Following precipitation events, water may emerge from canyon slopes because of moisture storage in alluvium and/or fill along the upper edges of canyons. Drainage from the banks may result in ephemeral seeps where soil is thin and/or bedrock is exposed.

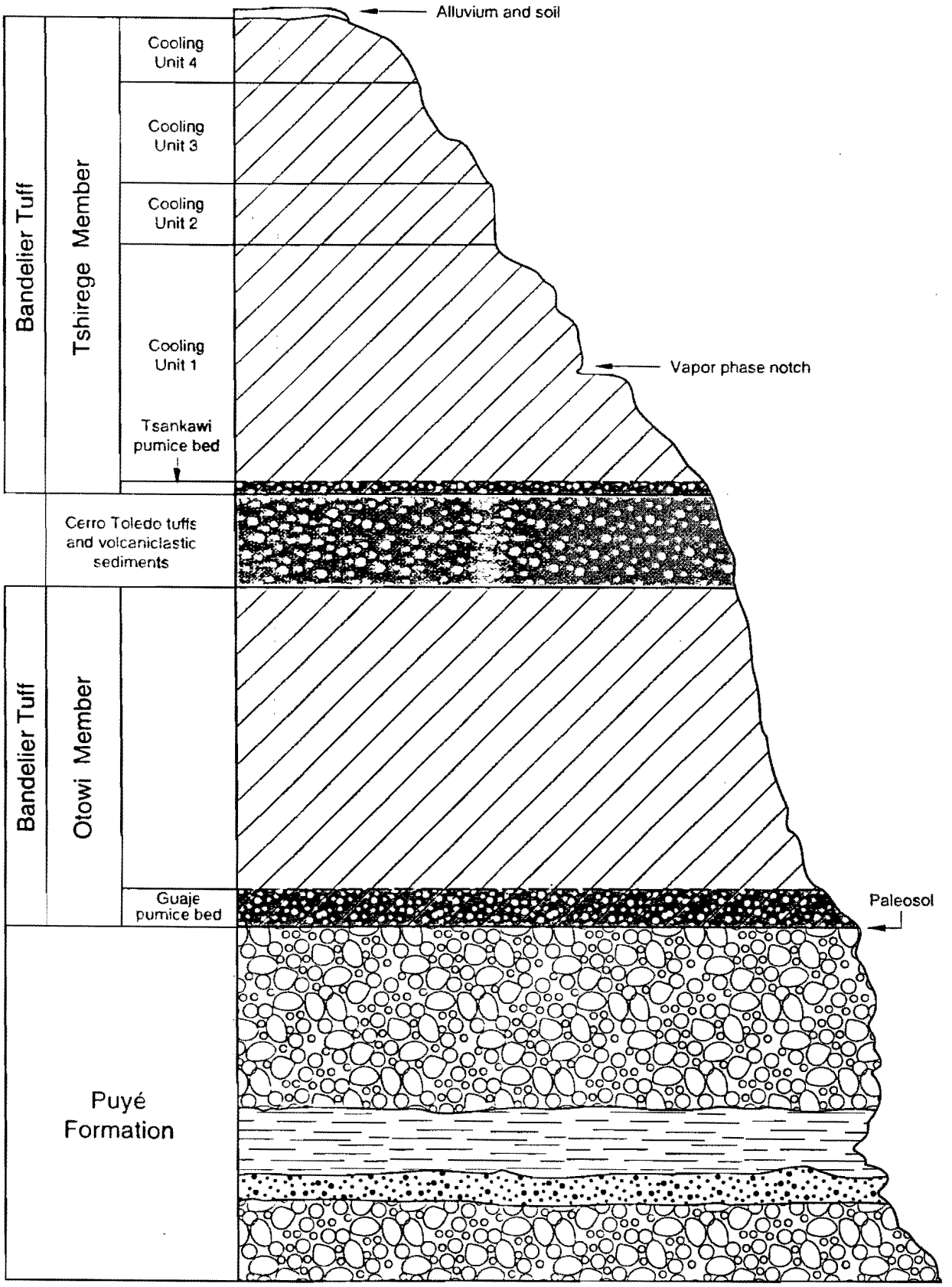

Fig. 2.2.1-1. Generalized Stratigraphy of TAs -3, -59, -60, and -61.

2.4 Biological and Cultural Surveys

2.4.1 Biological Surveys

The locations of TAs -3, -59, -60, and -61 in OU 1114 contain the upper sections of Mortandad and Sandia Canyons and span an elevational gradient between approximately 2 287 m (7 500 ft) at the western boundary and 2 104 m (6 900 ft) at the bottom of the upper canyon on the eastern end of former OU 1114. These technical areas support, or potentially support, a ponderosa pine community [2 104 to 2 303 m (6 900-7 500 ft)] with mixed conifer communities invading the north facing-slopes of the canyons, and piñon-juniper communities invading the south-facing slopes. Also, the extreme eastern edge of OU 1114 contains a tension zone (ecotone) composed of piñon-juniper and ponderosa pine communities. TA-3 (the largest TA at the Laboratory) contains the LANL administrative area, office buildings, roads, parking lots, and warehouses. In addition, TAs -3, -59, -60, and -61 are sites for landfills, experimental areas and other facilities, septic tanks, outfalls, and a solar pond. The fauna of OU 1114 consists of both large and small mammals such as mule deer, coyotes, deer mouse, and rock squirrel and a large number of breeding birds, such as the mountain bluebird, house wren, and the song sparrow. In addition, several species of amphibians and reptiles are known to inhabit the canyons and mesa tops of this operable unit. Examples of amphibians are the woodhouse toad and the canyon treefrog. Examples of reptiles are more numerous, e.g., the coachwhip, gopher snake, and many-lined skink. A more complete listing of flora and fauna common to OU 1114 may be found in a Biological Resource Evaluation Team (BRET) report (Cross 1994, 17-1278). The National Wetlands Inventory has identified two wetland types (riverine and palustrine) within these TAs in Sandia Canyon. The palustrine wetlands located in upper Sandia Canyon are maintained by effluent flows from the TA-3 steam plant, the new TA-46 wastewater treatment plant (previously TA-3 WWTP), and runoff from paved surfaces (Cross, 1994).

Threatened, endangered, and sensitive species (TES) of flora have not been located in TAs-3, -59, -60, and -61; however, the checker lily and wood lily are known to exist in riparian habitats in the vicinity of the Pajarito Plateau in northern New Mexico. The following TES of fauna have been identified as possible inhabitants of former OU 1114: spotted bat, Jemez Mountains salamander, northern goshawk, meadow jumping mouse, peregrine falcon, and the Mexican spotted owl. However, none of these species has been observed at the site (Cross 1994, 17-1278).

2.4.3 Cultural Surveys

In accordance with the National Historic Preservation Act of 1966 (as amended), a cultural resource survey was conducted for the area of TAs-3, -59, -60, and -61 during 1992. Seventeen

archaeological sites within the area are eligible for inclusion on the National Register of Historic Places. The historic value of these sites was undisturbed by ER Project sampling activities. A report documenting the survey area, methods, results, and monitoring recommendations was submitted to the New Mexico State Historic Preservation Officer and the governor of the San Ildefonso Pueblo for concurrence (Schillaci and Parish 1995, 17-790).

3.0 APPROACH TO DATA ASSESSMENT AND ANALYSIS

The decision approach used for the PRSs at TAs -3, -59, -60, and -61 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 signifying 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 with background concentration data, verifying the identities of detected organic chemicals, comparing site data with screening action levels (SALs) for human health impacts, and performing human health risk assessments when necessary. The following subsections provide overviews of the methods used to complete these quantitative steps. Further details can be found in Technical Approach to RFI reports (LANL in preparation, 1281).

3.1 Sample Analysis

All samples requiring chemical and radiological analysis and chain-of-custody documentation are submitted to the sample management office (SMO) for shipment of samples to an off-site laboratory, the Mobile Radiological Analysis Laboratory (MRAL), or to an on-site Mobile Chemical Analytical Laboratory (MCAL) for analysis.

3.1.1 Analytical Methods

All samples were analyzed using EPA SW-846 methods or equivalent methods.

3.1.2 Data Validation

Data verification and validation procedures are used to determine whether data packages have been generated according to specifications, are of known quality, and contain the information necessary to determine data sufficiency 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, thus indicating that the laboratories can be paid. All analytical data generated in support of the ER Project are verified by the SMO.

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 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 data use. Routine validation is most suitable for routine and 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 to available background data. The results of a focused data validation should exclude from consideration in background comparisons 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 chemicals of potential concern (COPCs) or eliminated from further consideration. Background data are available from two sources: 1) soil samples collected from locations 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 to an upper tolerance limit (UTL) estimated from background data. Details of statistical methods used to generate UTLs from the background data sets are summarized in Longmire et al. (1995, 1266). Because there is no documentation on what specific soil horizons were sampled for these PRSs and disturbed fill was the most likely sampled media at most PRSs, the UTLs calculated from the composite A,B and C soil horizons background data were used for the initial background comparisons. Further statistical comparisons between site and background data were performed in some cases when UTLs were exceeded. These additional statistical comparisons were also made between the composite A,B and C soil horizon data and the PRS data. 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, 1218).

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 to 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/or media not included in the Longmire 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. This 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 is reported as detected, then that chemical is generally carried forward through the screening assessment process. If a chemical is not reported as detected in any sample analyses, 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 a release from a PRS. A chemical that is not detected in any sample may be carried through the decision process if, based on historical operations, the chemical is likely to be present at the site.

3.4 Human Health Assessment

3.4.1 Screening Assessment

The screening assessment consists of sequential decisions that are used to determine if chemicals at levels that may be hazardous to human health or the environment have been released to the environment as a result of historical laboratory operations. The decisions include the following:

- Can reported concentrations be attributed solely to positive laboratory or field bias?
- Are site data greater than background data?
- Is the maximum site concentration of a chemical greater than its SAL?

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 (including a risk assessment if appropriate). 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 with available SALs, each observed concentration datum is compared to 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

pending results of the 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 the 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.

Only those chemicals that exceed background concentration thresholds (certain inorganics and radionuclides) or reporting limits (organics) in at least one sample are included in the multiple chemical evaluation. These chemicals 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 calculation of multiple chemical evaluations see Technical Approach to RFI reports (LANL in preparation, 1281).

3.4.2 Risk Assessment

No human health risk assessment is included with this report.

3.5 Ecological Assessment

All information obtained from the Phase I investigations of TAs -3 , -59, -60, and -61 will be considered as part of a larger ecological exposure unit when the ecological exposure unit approach has been formally approved by regulators.

4.0 RESULTS OF QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES BY PRS OR PRS AGGREGATE

4.1 PRS 3-002(c) QA/QC Summary

4.1.1 Inorganic Analysis

Six soil samples and one QA water sample were analyzed for TAL metals under request 18460. One analyte, chromium, had a low recovery (64%) in the QC sample and is qualified an estimated detected quantity (J) or an estimated undetected quantity (UJ) for all of the samples. All other data are valid without qualification.

4.1.2 Organic Analysis

One soil sample and two QA water samples were analyzed for VOCs under request 18269. Method blanks were found to contain methylene chloride (7 µg/kg and 10 µg/kg) detected at levels similar to the levels of blanks in several samples, and the EQLs were raised to the detected levels for the affected samples. All data are valid without qualification.

Six soil samples and 1 QA water sample were analyzed for SVOCs under request 18269. There were major QC problems with this request. For sample AAB6037, all acid-extractable surrogates had recoveries of less than 10%. Therefore, all acid extractable analytes are qualified rejected data (R), for this sample. In sample AAB6039, the acid-extractable surrogates had recoveries between 10–50%. Therefore, all acid extractable analytes are qualified UJ for this sample. The QC sample also had surrogate recovery problems which showed up in the recovery of analytes in the QC sample. Fifteen analytes in the QC sample had recoveries of less than 10%. They were 1,2-dichlorobenzene, hexachloroethane, 2-methylphenol, o-chlorophenol, anthracene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dichlorophenol, 4-methylphenol, pentachlorophenol, pyrene, 1,2,4-trichlorobenzene, phenanthrene, and 2,4,6-trichlorophenol. These analytes are qualified R in all samples. Three analytes, 4-chlorophenyl phenylether, 2,4-dinitrotoluene, and fluorene, had recoveries between 10–50%, and are qualified UJ in all samples.

Six soil samples and one QA water sample were analyzed for chlorinated herbicides under request 18269. All QC data associated with this request were within allowed limits and all sample data are valid.

Six soil samples were analyzed for pesticides under request 18269. All QC data associated with this request were within allowed limits and all sample data are valid.

4.1.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.2 PRSs 3-003(a,b) and 3-042 QA/QC Summary

4.2.1 Inorganic Analysis

Three soil samples and one QA water sample were analyzed for TAL metals under request 19169. There were low recoveries in the QC soil sample for aluminum (73%), chromium (68%), thallium (58%), and mercury (64%). All four analytes are qualified J or UJ in the soil samples. There was a high recovery of sodium (121%) in the QC soil sample, and all soil detects for sodium are qualified J.

4.2.2 Organic Analysis

Two soil samples and three QA water samples were analyzed for VOCs under request 18484. All QC parameters were within allowed limits except for the third and fourth internal standards for AAB7611. These standards were below allowable limits. Therefore, the 26 analytes associated with these standards are qualified UJ for AAB7611. All other data are valid without qualification.

Three soil samples and one QA water sample were analyzed for SVOCs under request 18484. The only problem encountered in this request was that the QA water sample exceeded the extraction holding time by six days. Because of the missed holding time, all analytes for AAB7628 are qualified UJ. All other QC data were within allowed limits and all other data are valid without qualification.

Three soil samples and one QA water sample were analyzed for pesticides under request 18482. One problem encountered in this request was that the QA water sample exceeded the extraction holding time by six days. Because of the missed holding time, all analytes for AAB7628 are qualified UJ (no analytes were detected). Another problem was that there was poor agreement between the two columns used for Aroclor 1260™ in the analysis of sample AAB7613. The values differed by more than 25%. Therefore, the Aroclor 1260™ value for sample AAB7613 is qualified J. All other data are valid without qualification.

4.2.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.3 PRSs 3-012(b) and 3-045(b,c) QA/QC Summary

4.3.1 Inorganic Analysis

Five soil samples were analyzed for TAL metals under request 20225. The only problem in this request was with mercury and cyanide. The samples were not analyzed until over six months after collection. This caused all of the samples to miss the recommended holding times for mercury (28 days) and cyanide (14 days). All of the sample analyses also exceeded the recommended holding time for all TAL metals (6 months). Because all of the samples are soil samples, the following must be taken into consideration when qualifying the mercury and cyanide data:

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28 day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than 1 month) and for the reasons stated above. All other data are valid without qualification.

4.3.2 Organic Analysis

Five soil samples and one QA water sample were analyzed for VOCs under request 18186. The only problem with this request was that methylene chloride and acetone were found in the method blanks. The EQLs for methylene chloride had to be raised for samples AAB5882 and

AAB5885 because it was detected at less than 10 times the concentration level found in the method blank. All data are valid without qualification.

Five soil samples were analyzed for SVOCs under request 18186. All QC data were within allowed limits for this request and all data are valid.

Five soil samples were analyzed for pesticides under request 18186. The only difficulty encountered was that several of the analytes had elevated EQLs because PCBs were present in several samples (AAB5881 and AAB5882). All QC data were within allowed limits for this request and all data are valid without qualification.

Six soil samples were analyzed for PCBs under requests 18850 and 19136. All QC data were within allowed limits for these requests and all data are valid without qualification.

Eleven soil samples were submitted for analysis of herbicides under requests 18186, 18850, and 19136. Three samples under request 18186, AAB5881, AAB5884, AAB5885, were not analyzed because there were insufficient sample volumes for the analysis. All QC data were within allowed limits for the eight samples analyzed under these requests and all data are valid without qualification.

The samples in request 18550 (AAB7667, AAB7668, and AAB7669 for herbicides and PCBs) were left at room temperature for a week in the MRAL. The samples were then cooled, sent to the analytical laboratory and analyzed within holding times. Because the samples were surface samples exposed to the environment for a number of years (therefore removing many of the more volatile compounds) and were sealed in approved containers and cooled before analysis, the week at room temperature should not affect the results. Also, because the MRAL was air-conditioned, temperatures did not exceed those the soils would have experienced in the environment before sampling.

4.3.3 Radiochemistry Analysis

Five samples were analyzed for gross alpha and beta activity, gamma spectroscopy, and tritium under request 19954. One sample (AAB5882) was also analyzed for strontium-90, uranium-234, uranium-235, uranium-238, plutonium-238, and plutonium-239. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes

that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. The QC data were within allowed limits for all analyses associated with this request. All data are valid without qualification.

4.4 PRSs 3-013(a,b) and 3-052(f) QA/QC Summary

4.4.1 Inorganic Analysis

Six soil samples were analyzed for TAL metals under request 18459. All QC data for this request were within allowed limits except for matrix spikes and duplicates. The matrix spikes for lead and manganese were off by a factor of 2. Also, results for the duplicates varied up to 75%, which may be an indication of sample inhomogeneity. Because of these factors, all lead and manganese results are qualified J.

4.4.2 Organic Analysis

Six soil and two QA water samples were analyzed for VOCs under request 18315. There were two QC problems associated with this request. The first was a high surrogate recovery of dibromofluoromethane (120%) in sample AAB6025. However, because no analytes were detected in this sample, no data qualifications are necessary. The second problem was that the last internal standard (for AAB6023 and AAB6025) was below allowed limits. Because of this, the analytes associated with the last internal standard are qualified UJ for samples AAB6023 and AAB6025. These analytes are bromobenzene, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, o-chlorotoluene, p-chlorotoluene, 1,2-dibromo-3-chloropropane, o-dichlorobenzene, m-dichlorobenzene, p-dichlorobenzene, hexachlorobutadiene, 4-isopropyltoluene, naphthalene, propylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.

Six soil samples were analyzed for SVOCs under request 18315. The only QC problem associated with this request was that there were a number of low recoveries in the blind QC sample. There were 5 analytes that had recoveries between 10% and 50% (anthracene, benzo-a-pyrene, 2-methylphenol, naphthalene, and 1,2,4-trichlorobenzene). All of the data for these analytes are qualified UJ. There was one analyte which had a recovery of less than 10%, 1,2-dichlorobenzene. Because of this low recovery, the data for 1,2-dichlorobenzene are qualified R.

Six soil samples were analyzed for PCBs under request 18315. All QC data associated with this request were within allowed limits and all sample data are valid.

4.4.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.5 PRSs 3-014(a,e) and 3-014(b-d, f-j, p-z, a2) QA/QC Summary

4.5.1 Inorganic Analysis

Twelve soil samples and one QA water sample were analyzed for TAL metals under request 18298. Two analytes, chromium (66%) and mercury (49%), had low recoveries in the QC sample and are qualified J or UJ for all of the samples. Cyanide had a high recovery in the QC sample (145%); therefore, all detected cyanide data are qualified J. Copper had a high recovery (128%) in the water laboratory control sample (LCS). However, because copper was not detected in the water sample, it is not qualified. All other data are valid without qualification.

4.5.2 Organic Analysis

Six soil samples and three QA water samples were analyzed for VOCs under request 18246. Method blanks were found to contain acetone (49 µg/kg, 53 µg/kg, 94 µg/kg) and methylene chloride (7 µg/kg, 22 µg/kg). These analytes were detected in several samples at levels similar to the levels found in the blanks, and the EQLs were raised to the detected levels for the affected samples. All data are valid without qualification.

Five soil samples and one QA water sample were analyzed for SVOCs under request 18246. All QC data associated with this request were within allowed limits and all sample data are valid.

Five soil samples and one QA water sample were analyzed for chlorinated herbicides under request 18246. All QC data associated with this request were within allowed limits and all sample data are valid.

Five soil samples and one QA water sample were analyzed for pesticides/PCBs under request 18246. The QA water sample exceeded the extraction holding time of seven days by five days. All analytes for this sample are qualified UJ. The only problem associated with the soil samples in this request was that the analytes delta BHC and beta BHC had recoveries between 10–50% in the QC sample. Because of the low recoveries, these analytes are qualified UJ in all samples. All other data are valid without qualification.

4.5.3 Radiochemistry Analysis

Six soil samples were analyzed for strontium-90, uranium-234, uranium-235, uranium-238, plutonium-238, plutonium-239, and gamma spectroscopy. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. Plutonium-238, plutonium-239 (199%, 212%) and americium-241 (132%) are all qualified J for high recoveries in the QC sample, creating a possible high bias for the data. Plutonium also had duplicates with values outside allowed limits. All other data are valid without qualification.

4.6 PRSs 3-014(b2) and 3-014(b-d, f-j, p-z, a2) QA/QC Summary

4.6.1 Inorganic Analysis

Seven soil samples and one QA water sample were analyzed for TAL metals under request 20225. The only problem in this request was missed extraction holding times. The samples were not analyzed until more than six months after collection. This caused significant problems for the QC water sample. The mercury and cyanide data must be qualified R because the required holding times for mercury (28 days) and cyanide (14 days) were grossly exceeded. Also the six-month holding time for the rest of the metals in the water sample was also exceeded (by six days). Therefore, the rest of the metals must be qualified J or UJ. The soil samples exceeded the recommended holding times for mercury (28 days) and cyanide (14 days). All soil sample analyses also exceeded the recommended holding time for all TAL metals (six months). Because the samples are soil samples, the following must be taken into consideration when qualifying the mercury and cyanide data:

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the

28 day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.6.2 Organic Analysis

Five soil samples and two QA water samples were analyzed for VOCs under request 18186. For samples AAB5937 and AAB5939, one of the internal standards was below allowed limits. Because of this, all of the analytes in these two samples are qualified UJ. The only other problem with this request was that methylene chloride and acetone were found in the method blanks. The EQL for methylene chloride had to be raised for sample AAB5930 and acetone was raised for sample AAB5931 because they were detected at less than ten times the concentration levels found in the method blank. All other data are valid without qualification.

Five soil samples and one QA water sample were analyzed for SVOCs under request 18186. All QC data were within allowed limits for this request and all data are valid.

Five soil samples and one QA water sample were analyzed for pesticides under request 18186. The only difficulty encountered was that several of the analytes had elevated EQLs because of the presence of PCBs in several samples (AAB5930 and AAB5931). All QC data were within allowed limits for this request and all data are valid.

The sample in request 18550 (AAB7670 for herbicides and PCBs) was left at room temperature for a week in the MRAL. The sample was then cooled, sent to the analytical laboratory and analyzed within holding times. Because the sample was a surface sample exposed to the environment for a number of years (therefore removing many of the more volatile compounds) and was sealed in approved containers and cooled before analysis, the week at room temperature should not affect the results. Also, because the MRAL was air-conditioned, temperatures did not exceed those the soil would have experienced in the environment before sampling.

Two soil samples were analyzed for PCBs under requests 18850 and 19136. All QC data were within allowed limits for these requests and all data are valid.

Seven soil samples and one QA water sample were submitted for analysis of herbicides under requests 18186, 18850, and 19136. All QC data were within allowed limits and all data are valid.

4.6.3 Radiochemistry Analyses

Five soil samples were analyzed for gross alpha and beta activity, gamma spectroscopy, and tritium under request 19954. Two samples (AAB5935 and AAB5938) were also analyzed for strontium-90. The QC data were within allowed limits for all analyses associated with this request. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the "detects" were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. All data are valid without qualification.

4.7 PRSs 3-014(c2) and 3-014(k,l,m,n,o) QA/QC Summary

4.7.1 Inorganic Analysis

Twenty soil samples and one QA water sample were analyzed for TAL metals under request 18298. Two analytes, chromium (66%) and mercury (49%), had low recoveries in the QC sample and are qualified J or UJ for all of the samples. Cyanide had a high recovery in the QC sample (145%); therefore, all detected cyanide data are qualified J. Copper had a high recovery (128%) in the water LCS. Therefore, copper is qualified J in the water sample (AAB5926). All other data are valid without qualification.

4.7.2 Organic Analysis

Ten soil samples and three QA water samples were analyzed for VOCs under request 18246. Method blanks were found to contain acetone (49 ug/kg, 53 ug/kg, and 94 ug/kg) and methylene chloride (7ug/kg and 22 ug/kg). These analytes were detected at levels similar to the levels in the blanks for several samples, and the EQLs were raised to the detected levels for the affected samples. One of the internal standards for sample AAB5925 was below allowable limits. All data for this sample are qualified UJ. All other data are valid without qualification.

Ten soil samples and one QA water sample were analyzed for SVOCs under request 18246. All of the QC data associated with this request were within allowed limits and all sample data are valid.

Ten soil samples and one QA water sample were analyzed for chlorinated herbicides under request 18246. All of the QC data associated with this request were within allowed limits and all sample data are valid.

Ten soil samples and one QA water sample were analyzed for pesticides under request 18246. The QA water sample exceeded the extraction holding time of seven days by five days. All analytes for sample AAB5926 are qualified UJ. The only problem associated with the soil samples in this request was that delta BHC and beta BHC had recoveries between 10–50% in the QC sample. Because of the low recoveries, these analytes are qualified UJ in all samples. All other data are valid without qualification.

4.7.3 Radiochemistry Analysis

Ten soil samples were analyzed for strontium-90, uranium-234, uranium-235, uranium-238, plutonium-238, and plutonium-239 by gamma spectroscopy. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. Plutonium-238, plutonium-239 (199%, 212%), and americium-241 (132%) are all qualified J for high recoveries in the QC sample, creating a possible high bias for the data. Plutonium also had poor duplicate values. In addition, there was a low uranium recovery (29%) in the matrix spike for sample AAB5911. All uranium data for this sample are qualified J. All other data are valid without qualification.

4.8 PRSs 3-015 and 3-053 QA/QC Summary

4.8.1 Inorganic Analysis

Six soil samples were analyzed for TAL metals under requests 20215 and 20221. For request 20215, chromium (66%) had a low recovery in the QC sample and is qualified J or UJ for all samples in the request. For requests 20215 and 20221, a problem for mercury and cyanide was that the samples were not analyzed until more than six months after collection. This caused all of the samples to miss the recommended holding times for mercury (28 days) and cyanide (14 days). All of the sample analyses also exceeded the recommended holding time for all TAL metals (6 months). Because all of the samples are soil samples, the following must be taken into consideration when qualifying the mercury and cyanide data:

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28-day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.8.2 Organic Analysis

Six soil samples were analyzed for SVOCs under requests 18212 and 18213. For these requests, all QC data were within allowed limits and all data are valid.

4.8.3 Radiochemistry Analysis

Six samples were analyzed for gross alpha and beta activity, gamma spectroscopy, and tritium under requests 20229 and 20251. Also under request 20251, four samples were further analyzed for isotopic plutonium and uranium, and one sample was analyzed for strontium-90. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotope that was positively identified and that should be considered in the data assessment is cesium-137. All other QC data were within allowed limits for all of the requests, and all data are valid without qualification.

4.9 PRS 3-033 QA/QC Summary

4.9.1 Inorganic Analysis

Fifteen samples (14 soil and 1 QA water) were analyzed for TAL metals and/or cyanide in request 18422. All QC data for the samples were within limits except selenium data. Selenium was detected in the QC sample at a much higher level than it should occur (detected = 0.97 ug/g; QC value = 0.016 ug/g). A number of the analytical labs are having similar problems with selenium in the QC samples. No selenium was detected in any of the RFI samples with detection limits ranging from 0.6 to 0.75 ug/g. Because the matrix spike for selenium was within limits and all selenium values were below detection limits, the selenium data for all 15 samples have been qualified UJ. All other data are valid without qualification.

4.9.2 Organic Analysis

Ten samples (seven soil and three QA water) were analyzed for volatiles under request 18328. All QC data were within limits and no analytes were detected in the samples. All data are valid without qualification.

Eight samples (seven soil, one QA water) were analyzed for SVOCs under request 18328. There were significant problems with much of the QC. For sample AAB7598 (a QC water sample) the extraction holding time of seven days was exceeded by three days; therefore, all analytes for the sample are qualified UJ.

For sample AAB6045, there were problems with the surrogate recoveries as well as with holding times. The recoveries for the acid-extractable surrogates were all less than 10%. Because of this, all acid extractable analytes are qualified R. Because of surrogate recovery problems, the sample had to be extracted twice. The second extraction (nine days past the holding time) gave better results for all surrogates except the acid-extractable surrogates mentioned above. Therefore, all of the other analytes for this sample are qualified UJ because of missed holding times.

For samples AAB6048 and AAB6044, the samples had to be extracted twice in order to meet surrogate recovery limits. The second extraction exceeded holding times for the extracts (9 to 13 days); therefore, all analyte data for these two samples are qualified UJ.

4.9.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.10 PRS 59-004 QA/QC Summary

4.10.1 Inorganic Analysis

Four soil samples and one QA water sample were analyzed for TAL metals under request 20358. The one QC problem with this request was that the samples were not analyzed until more than six months (but less than seven months) after collection. This caused all of the samples to miss the recommended holding time for mercury (28 days) as well as the recommended holding time for all TAL metals (six months). These holding times are required for the water sample. Because the holding time was grossly exceeded for mercury in the water sample, the mercury value is qualified R. The rest of the metals in the water sample are qualified UJ for exceeding the six-month holding time. For the soil samples, the following must be taken into consideration when qualifying the mercury data:

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28-day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.10.2 Organic Analysis

One soil sample and three QA water samples were analyzed for VOCs under request 18162. All QC parameters were within allowed limits and all data are valid without qualification.

Four soil samples and one QA water sample were analyzed for SVOCs under request 18162. All QC parameters were within allowed limits and all data are valid without qualification.

4.10.3 Radiochemistry Analysis

Four soil samples were analyzed for gross alpha and beta activity, gamma spectroscopy, and tritium under request 20235. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. All other QC parameters were within allowed limits for all analyses associated with this request.

4.11 PRS 60-004(b,d) QA/QC Summary

4.11.1 Inorganic Analysis

Three samples were analyzed for TAL metals in request 18958. All QC data for these samples were valid except that the matrix spike recovery was high for lead (150%). The duplicate analysis also showed some variation (up to 80%), which may be an indication of inhomogeneity in the sample. Because of the these problems, all lead detects are qualified J.

4.11.2 Organic Analysis

Three samples were analyzed for VOCs under request 18084. All of the QC data were within allowed limits. Therefore, all data are valid without qualification.

Three samples were analyzed for SVOCs in request 18084. All of the QC data for the three samples are within allowed limits. Therefore, all data are valid without qualification.

Three samples were analyzed for pesticides/PCBs under request 18084. All of the QC data were within allowed limits. Therefore, all data are valid without qualification.

4.11.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.12 PRS 60-004(c) QA/QC Summary

4.12.1 Inorganic Analysis

No inorganic analyses were performed for this site.

4.12.2 Organic Analysis

Five soil sample and three QA water samples were analyzed for VOCs under request 18036. There were low surrogate recoveries of toluene(d8) (66–67%) for samples AAB5823, AAB5824, AAB5825, AAB5827. All data for these samples are qualified UJ for the low recoveries. In the QC sample associated with sample AAB5828, 4-methyl-2-pentanone had a low recovery (45%) and is qualified UJ. All other data are valid without qualification.

Five soil samples and one QA water sample were analyzed for SVOCs under request 18036. There were major problems with the QC sample in this request. Fifteen analytes (anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, bis-2-chloroethylether, 4-chloro-3-methylphenol, 2-chloronaphthalene, dibenzofuran, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 4-methylphenol, naphthalene, pentachlorophenol, pyrene, 1,2,4-trichlorobenzene, and 2,4,6-trichlorophenol) in the QC sample had recoveries between 10–50%. These analytes are qualified UJ in all samples. Three analytes (dichlorobenzene, hexachloroethane and 2-methylphenol) had recoveries of less than 10%. These analytes are qualified R in all samples.

Six soil samples were analyzed for pesticides under request 18036. All QC data associated with this request were within allowed limits and all sample data are valid.

4.12.3 Radiochemistry Analysis

Ten soil samples were analyzed for gamma spectroscopy and gross alpha and beta activity under request 18991. The only QC problem with this request was that there was a high recovery of cesium-137 in the QC sample (121%). This causes the cesium-137 data to be qualified UJ for a possible high bias. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the detects were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. All other QC parameters were within allowed limits for all of the requests.

Four soil samples were analyzed for uranium-234, uranium-235, uranium-238, plutonium-238, and plutonium-239 under request 18991. All QC data associated with this request were within allowed limits and all sample data are valid.

4.13 PRS 60-004(e) QA/QC Summary

4.13.1 Inorganic Analysis

Three soil samples and one QA water sample were analyzed for TAL metals under request 20203. Chromium (48%) had a low recovery in the QC sample and is qualified J or UJ for all samples. A problem for mercury was that the samples were not analyzed until more than six months after collection. This caused all samples to miss the recommended holding times for mercury (28 days). A number of the sample analyses also exceeded the recommended holding time for all TAL metals (six months). The mercury value for the water sample must be qualified R because of the grossly exceeded holding time. For the soil samples, however, the following must be taken into consideration:

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28 day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.13.2 Organic Analysis

Four soil samples and three QA water samples were analyzed for VOCs under two requests, 18013 and 18086. In request 18086 the method blanks contained acetone (10 ug/kg, 12 ug/kg, and 17 ug/kg). EQLs were raised as appropriate for the affected samples. Samples AAB5788 and AAB5789 had low surrogate recoveries. All analyte data for these two samples are qualified J or UJ. For request 18013 the method blank contained mixed xylenes (4.7 ug/kg). EQLs were raised as appropriate for the affected samples. All other data are valid without qualification.

Three soil samples and one QA water sample were analyzed for SVOCs under request 18086. Three analytes, anthracene (28%), 1,2-dichlorobenzene (18%), and 2-methylphenol (26%), had low recoveries in the QC sample. The data for these three analytes are qualified UJ. All other data are valid without qualification.

Two soil samples and one QA water sample were analyzed for PCBs under request 18086. All of the QC data associated with this request were within allowed limits and all sample data are valid.

4.13.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.14 PRS 60-004(f) QA/QC Summary

4.14.1 Inorganic Analysis

Thirteen soil samples and two QA water samples were analyzed for TAL metals under requests 19168, 19866, and 19990. In request 19186 the water sample exceeded the extraction holding time for mercury by 24 days. Therefore, mercury is qualified UJ for this sample. For the soil

samples in request 19186, there were low recoveries of aluminum (73%), chromium (69%), mercury (64%), and thallium (63%) in the QC sample, and antimony (56%) in the matrix spike. All of these analytes are qualified J or UJ in the soil samples. There was also a high recovery of sodium (128%) in the QC soil sample. All soil sodium detects are qualified J. All other data are valid without qualification.

For request 19866, the water sample exceeded the extraction holding time for mercury by 28 days. Therefore, mercury is qualified UJ for the water sample. There was a low recovery for zinc (68%) in the QC sample. All zinc data for this request are qualified J or UJ. There were high recoveries of mercury (136%) and potassium (136%) in the QC sample. All detected data for mercury and potassium are qualified J. All other data are valid without qualification.

For request 19990 there were high recoveries of potassium (142%), mercury (177%), and manganese (212%) in the QC sample. All detected data for mercury and potassium are qualified J. All of the detected data for manganese are qualified R for a recovery of over 200%. All other data are valid without qualification.

4.14.2 Organic Analysis

Eleven soil samples and three QA water samples were analyzed for VOCs under request 19731. All QC were within allowed limits for this request and all data are valid without qualification.

High PID readings and an odor similar to that found with petroleum products were noted in the field where the samples for request 19137 were collected. However, the analytical results for SVOCs did not detect any target analytes. There were a number of tentatively identified compounds (TICs), mostly unknown alkanes with a few substituted benzenes. The data reports were closely reviewed and the data are reported correctly according to the data package from the analytical laboratory.

Eleven soil samples and two QA water samples were analyzed for pesticides (request 19731) or PCBs only (request 19137). All QC were within allowed limits for request 19137. For request 19731 the QC sample had low recoveries (between 10–50%) for 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 2-methyl phenol. These three analytes are qualified UJ for this request. All other data are valid without qualification.

Eleven soil samples and two QA water samples were analyzed for PCBs under requests 19137 and 19731. All QC were within allowed limits for request 19137. For request 19731 there was a problem with the analysis of sample AAC0411. The percent difference for the concentrations

of Aroclor 1254™ found on the two columns used in the analysis was greater than 25%. Because of this problem, Aroclor 1254™ is qualified J in this sample.

4.14.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.15 PRS 60-005(a) QA/QC Summary

4.15.1 Inorganic Analysis

Twenty-three soil samples were analyzed for TAL metals under requests 18955, 20215, and 20219. For request 18955, chromium (66%), thallium (48%), and cyanide (62%) had low recoveries in the QC sample and are qualified J or UJ for all samples. For request 20215, chromium (66%) had a low recovery in the QC sample and is qualified J or UJ for all samples in the request. For requests 20215 and 20219, a problem for mercury and cyanide was that the samples were not analyzed until more than six months after collection. This caused all samples to miss the recommended holding times for mercury (28 days) and cyanide (14 days). All sample analyses also exceeded the recommended holding time for all TAL metals (six months). Because all samples are soil samples, the following must be taken into consideration when qualifying the mercury and cyanide data.

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28 day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.15.2 Organic Analysis

Seven soil samples and two QA water samples were analyzed for VOCs under two requests, 18160 and 18215. For request 18160, all QC were within allowed limits and all data are valid. In request 18215, sample AAB5872 had low surrogate recoveries (3–20%). All analyte data for this sample are qualified J or UJ. All other data are valid without qualification.

Sixteen soil samples were analyzed for SVOCs under requests 18036, 18160, and 18213. For request 18213, all QC were within allowed limits and all data are valid. For request 18036, three analytes, 1,2-dichlorobenzene, hexachloroethane, and 2-methylphenol, had recoveries of less than 10% in the QC sample. The data for these three analytes are qualified R. In the same QC sample, 15 analytes (anthracene, benzo-a-pyrene, benzo(g,h,i)perylene, bis-2-chloroethylether, 4-chloro-3-methylphenol, 2-chloronaphthalene, dibenzofuran, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 4-methylphenol, naphthalene, pentachlorophenol, pyrene, 1,2,4-trichlorobenzene, and 2,4,6-trichlorophenol) had recoveries between 10 and 50%. The data for these 15 analytes are qualified UJ.

For request 18160, 3 analytes, 1,2-dichlorobenzene, hexachloroethane, and 2-methylphenol, had recoveries of less than 10% in the QC sample. The data for these three analytes are qualified R. In the same QC sample, 4 analytes had recoveries between 10 and 50%. They were benzo-a-pyrene, bis-2-chloroethylether, naphthalene, and 1,2,4-trichlorobenzene. The data for these four analytes are qualified UJ. All other data are valid without qualification.

4.15.3 Radiochemistry Analysis

Sixteen samples were analyzed for gross alpha and beta activity and gamma spectroscopy under three requests (18991, 19955, 20229). All nine samples in requests 19955 and 20229 were also analyzed for tritium. The gamma spectroscopy report contained an extensive list of analytes that were identified by the peak search routine used by the analytical laboratory. This is because LANL has asked that the laboratory not censor the data, but provide LANL with all of the results obtained. Many of the "detects" were results with excessive errors (greater than 50%) or peak misidentification. After a careful review of the data, taking into account detection limits and errors, the only isotopes that were positively identified and that should be considered in the data assessment are americium-241 and cesium-137. All other QC parameters were within allowed limits for all of the requests except 18991. Cesium-137 had a high recovery (121%) by gamma spectroscopy. Because of this high recovery, all cesium-137 data in request 18991 are qualified J. All other data are valid without qualification.

4.16 PRS 60-006(a) QA/QC Summary

4.16.1 Inorganic Analysis

Four samples were collected from the septic tank at this site. All four samples were screened by the MRAL.

Two samples, AAB5817 and AAB5818, were analyzed for TAL metals under request 18958. Because all QC data associated with this request were within allowable limits, all of the sample data are valid.

4.16.2 Organic Analysis

Two samples, AAB5814 and AAB5815, were analyzed for VOCs under request 18084. Because all QC data associated with this request were within allowable limits, all of the sample data are valid.

Two samples, AAB5817 and AAB5818, were analyzed for SVOCs under request 18084. All QC data for these samples were under control except the surrogates. For samples AAB5817 and AAB5818, surrogate recoveries for the base-neutral extractable surrogates were below the allowable limits. Therefore, the analytes associated with these surrogates are qualified J or UJ.

4.16.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.17 PRS 60-007(a) QA/QC Summary

4.17.1 Inorganic Analysis

Three soil samples were analyzed for TAL metals under request 20203. Chromium (48%) had a low recovery in the QC sample and is qualified J or UJ for all samples. A problem for mercury was that the samples were not analyzed until more than six months after collection. This caused all of the samples to miss the recommended holding times for mercury (28 days). The samples also exceeded the recommended holding time for all TAL metals (six months). Because all three samples with missed holding times were soil samples, the following must be taken into consideration.

1. The required holding times were developed using unpreserved water samples. The holding times were then applied to soil samples as recommended values without any technical reasoning. All of the samples in this request were solid samples.

2. Soil samples are less likely to undergo the biotransformation from elemental mercury to organomercury compounds (the volatile compounds responsible for the 28 day holding time for mercury) than water samples because these reactions are much more likely to happen in water samples than in soil samples.

3. The samples were kept refrigerated until analyzed, thereby reducing the rates of chemical reactions.

Therefore, it seems reasonable to assume that the missed holding times do not have a substantial effect on the data. Because the mercury and cyanide recommended holding times were greatly exceeded (by more than 3 months), all mercury and cyanide data are qualified J or UJ. None of the other metals are qualified for the missed holding times because the holding times were not grossly exceeded (less than one month) and for the reasons stated above. All other data are valid without qualification.

4.17.2 Organic Analysis

Six soil samples and one QA water sample were analyzed for VOCs under two requests, 18013 and 18086. In request 18086 the method blanks contained acetone (10 ug/kg, 12 ug/kg, and 17 ug/kg). EQLs were raised as appropriate for the affected samples. For request 18013, the method blank contained mixed xylenes (4.7 ug/kg). EQLs were raised as appropriate for the affected samples. All data are valid without qualification.

Three soil samples were analyzed for SVOCs under request 18086. Three analytes, anthracene (28%), 1,2-dichlorobenzene (18%), and 2-methylphenol (26%), had low recoveries in the QC sample. The data for these three analytes are qualified UJ. All other data are valid without qualification.

Four soil samples were analyzed for PCBs under request 18086. All QC data associated with this request were within allowed limits and all sample data are valid.

4.17.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.18 PRS 60-007(b) QA/QC Summary

4.18.1 Inorganic Analysis

Two soil samples and one QA water sample were analyzed for TAL metals under request 19168. All QC data for this request were within allowed limits except for matrix spike and blind

QC sample recoveries. The matrix spike for antimony was low (56%). The blind QC sample had low recoveries for aluminum (73%), chromium (72%), mercury (64%), and thallium (63%). For these analytes all data are qualified J or UJ. Sodium had a high recovery in the QC sample (128%), and all sodium detects are qualified J.

4.18.2 Organic Analysis

Two soil and three QA water samples were analyzed for VOCs under request 19136. There was one very minor QC problem with request 19136. One of the surrogates was 1% below the allowable limit. However, because no analytes were detected in any of the samples, the data are all valid without qualification.

Two soil samples and one QA water sample were analyzed for SVOCs under request 19136. The only QC problem associated with request 19136 was that there were a number of low recoveries in the blind QC samples. For the water sample there were six analytes (2 chlorophenol, 2,4-dichlorophenol, 2-methylphenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol) that had recoveries between 10% and 50%. All of the data for these analytes in water samples are qualified UJ. For the soil QC sample there were nine analytes that had recoveries between 10% and 50% (anthracene, 2 chlorophenol, 1,2-dichlorobenzene, 2,4-dichlorophenol, fluorene, 2-methylphenol, naphthalene, 1,2,4-trichlorobenzene, and 2,4,6-trichlorophenol.) All of the data for these analytes are qualified UJ.

Two soil samples and one QA water sample were analyzed for PCBs under request 19136. All QC were within allowed limits for request 19136.

4.18.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

4.19 PRS 61-002 QA/QC Summary

4.19.1 Inorganic Analysis

Five soil samples and one QA water sample were analyzed for TAL metals under request number 18458. All QC parameters were within allowed limits except for the blind QC sample. In this sample a number of elements [aluminum (72%), arsenic (152%), chromium (59%), lead (169%), and vanadium (67%)] had recoveries outside allowed limits. Arsenic was not detected in any of the samples and, therefore, is not qualified. Because lead had a high recovery, only

the detects are qualified J. All aluminum, chromium, and vanadium values are qualified J or UJ. All other data are valid without qualification.

4.19.2 Organic Analysis

One soil sample and five QC water samples were analyzed for VOCs under requests 18244 and 18550. For request 18550, all QC data were within allowed limits and all data are valid. For request 18244, acetone (20 ug/kg) and methylene chloride (3 ug/kg) were found in the method blanks. Because of this, the EQLs were raised in the samples in which these analytes were detected. Acetone detects were between 20 µg/kg and 43 ug/kg and methylene detects were between 9 µg/kg and 15 ug/kg. All data are valid.

Five soil samples and one QC water sample were analyzed for SVOCs under request 18244. There were a number of QC problems with this request. The water sample (an equipment rinsate) missed the extraction holding time by three days. No analytes were detected in the sample, so all of the data for this equipment rinsate are qualified UJ. For the soil samples, there were major problems with the blind QC sample. There were 11 compounds (anthracene, 4-chloro-3-methylphenol, 2-chloronaphthalene, dibenzofuran, 2,6-dinitrotoluene, 4-methylphenol, naphthalene, pentachlorophenol, pyrene, 2,4,6-trichlorophenol, and 1,2,4-trichlorobenzene) with recoveries between 10–50 %. None of these analytes were detected in the samples, so all of these data are qualified UJ. Six analytes [1,2-dichlorobenzene, hexachloroethane, 2-methylphenol, benzo-a-pyrene, bis(2-chloroethyl)ether, and benzo(g,h,i)perylene] had recoveries of less than 10%. Because of the extremely low recoveries, these data are qualified R.

Sixteen soil samples and one QA water sample were analyzed for PCBs under three requests (18244, 18283, and 18550). For requests 18283 and 18550, all QC data were within allowable limits and all data are valid. For request 18244 there were several problems. For the water sample (an equipment rinsate), the extraction holding time was missed by three days. No analytes were detected in the sample so all of the data are qualified UJ. For the soil samples, there was a problem with the blind QC sample. The recovery of Aroclor 1260™ was 30% (60% is the lower allowed limit). Because of this, all of the Aroclor 1260™ data are qualified J.

The samples in request 18550 (AAB7661 through AAB7666 for PCBs) were left at room temperature for a week in the MRAL. The samples were then cooled, sent to the analytical laboratory, and analyzed within holding times. Because the samples were surface samples exposed to the environment for a number of years (therefore removing many of the more volatile compounds) and were sealed in approved containers and cooled before analysis, the

week at room temperature should not affect the results. Further, because the MRAL was air-conditioned, temperatures did not exceed those the soils would have experienced in the environment before sampling.

4.19.3 Radiochemistry Analysis

No radiochemistry analyses were performed at this site.

5.0 SPECIFIC RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 PRS 3-002(c), Former Pesticide Shed

PRS 3-002(c) is the site of a former pesticide shed 100 ft west of the Johnson Controls World Services, Inc. (JCI) administrative office for roads and grounds, TA-3-70. The shed was formerly designated TA-3-1494. Because no contamination from spills of liquid and powdered pesticides was present in concentrations above SALs, PRS 3-002(c) is recommended for NFA.

5.1.1 History

PRS 3-002(c) is discussed in detail in Subsection 5.1 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). PRS 3-002(c) is the site of a former pesticide shed (TA-3-1494). The wooden pesticide shed was 19 ft by 15 ft. The site includes an unbermed cement pad that was under the center of the shed, in place before the shed was erected. Within the last two years, this original cement pad has been surrounded by a new cement pad that covers the site. Directly east of the shed is a 19 by 12 ft cement pad with 6-in.-high curbing used as secondary containment for the pesticide application vehicles. The pad was asphalted in 1989 to level the surface with the top of the curbing.

From the early 1960s through 1984, the shed was used to store drums of liquid and powdered pesticides and possibly herbicides. It is likely that spills occurred within the shed; the wooden floor of the shed was reported to be permeated with pesticides. The shed was removed in 1989 and the floor was cut up and barreled for disposal as hazardous waste.

5.1.2 Description

PRS 3-002(c) is within the area of TA-3, which is described in Chapter 2 of this report. It is located on a gentle, south-facing slope at the head of Sandia Canyon. The PRS is located on soil and/or alluvium overlying cooling unit 4 of the Bandelier Tuff.

5.1.3 Previous Investigations

No previous investigations were conducted at PRS 3-002(c). No confirmatory samples were collected following removal of the shed in 1989.

5.1.4 Field Investigation

The PRS 3-002(c) sampling approach in the RFI Work Plan for OU 1114 was designed to determine whether the storage and transfer of pesticides at the shed resulted in the release of any contaminants to the site (LANL 1993, 1090).

The sample locations in the area under the former shed were cut into the new concrete. The sample locations were positioned either directly adjacent to the original shed location or directly downgradient to maximize the chance of detecting releases. These sample locations were located radially northeast, northwest, southwest, and southeast of the original concrete pad. The remaining sample location was selected based on the surface runoff from the formerly bermed concrete pad. This sample was positioned downgradient (southwest) of the pad. The sample locations are shown in Fig. 5.1.4-1 and are summarized in Table 5.1.4-1.

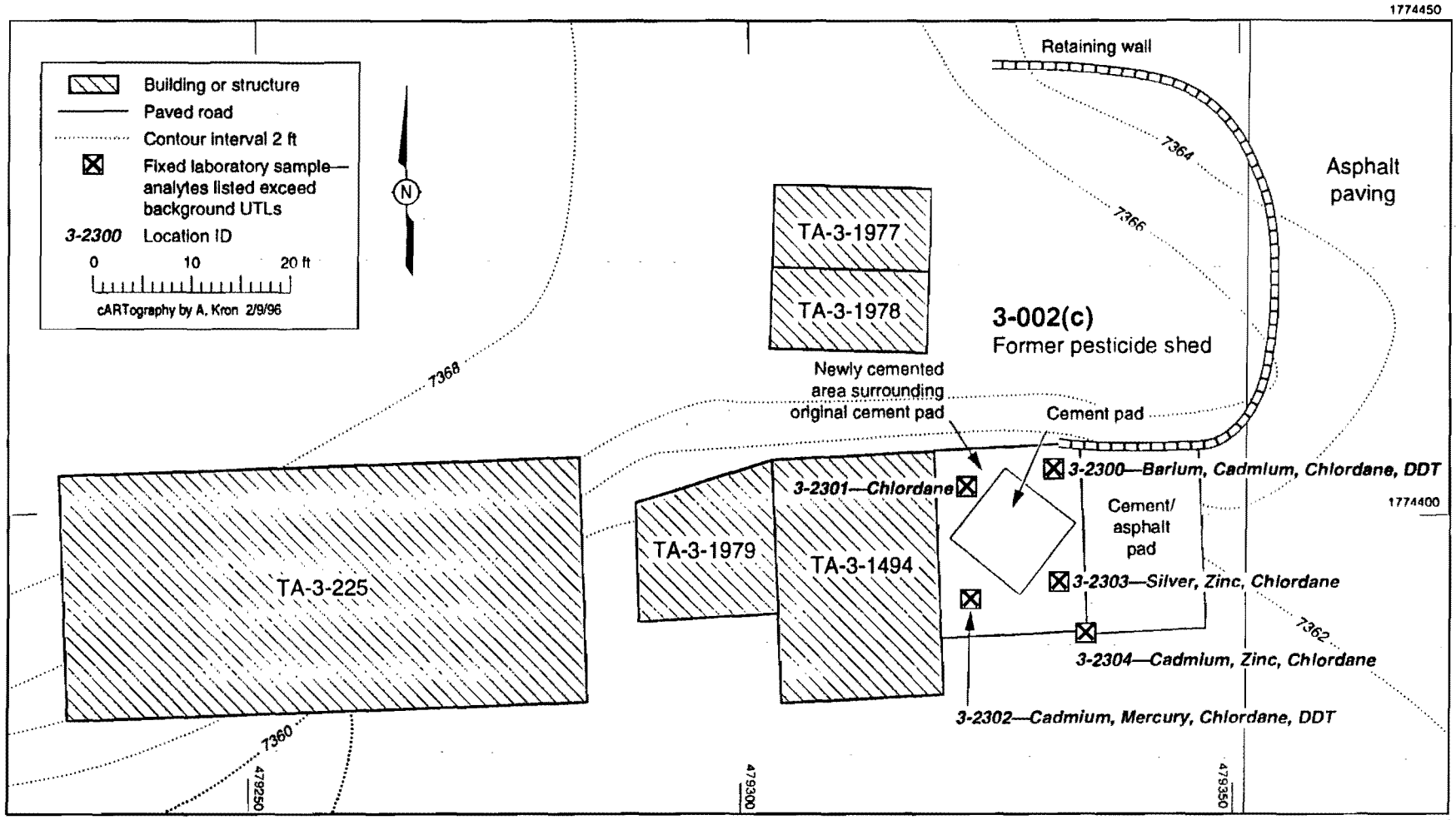

Fig. 5.1.4-1 PRS 3-002(c) 1994 sample collection locations.

TABLE 5.1.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 3-002(c)

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PEST/ PCBs[c]	HERBI-CIDES	INORG-ANICS	MRAL[d]
03-2300	AAB6034	0 - 6	soil	N/A[e]	18269	18269	18269	18460	19231
03-2300	AAB6036[f]	0 - 6	soil	N/A	18269	18269	18269	18460	19231
03-2301	AAB6037	0 - 6	soil	N/A	18269	18269	18269	18460	19231
03-2302	AAB6038	0 - 6	soil	18269	18269	18269	18269	18460	19231
03-2303	AAB6039	0 - 6	soil	N/A	18269	18269	18269	18460	19231
03-2304	AAB6035	0 - 3	soil	N/A	18269	18269	18269	18460	19231
03-N/A	AAB6040	N/A	water	N/A	18269	N/A	18269	18640	N/A
03-N/A	AAB6041	N/A	water	18269	N/A	N/A	N/A	N/A	N/A
03-N/A	AAB6042	N/A	water	18269	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.

Samples were collected using the hand-auger method, except for the sample downgradient from the bermed concrete pad, which was collected using LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. The samples were documented and preserved following standard procedures, with the exception that the spade and scoop sample to be analyzed for VOCs was placed in a 125 ml wide-mouth glass container.

Six soil samples were collected from PRS 3-002(c) at five locations. At the four locations under the concrete pad (03-2300, 03-2301, 03-2302, 03-2303), samples were collected from the 0- to 6-in. interval. At the fifth location (03-2304), downgradient of the bermed pad, the sample was collected from the 0- to 3-in. interval. One sample (AAB6036) was collected as a collocated sample.

All soil samples were submitted for analysis of SVOCs, organochlorine pesticides, organophosphorus pesticides, herbicides, and TAL metals. No VOCs were detected by the FID screening at each sample location; however, one soil sample was collected at location 03-2302 and submitted for analysis of VOCs to confirm the measurements taken with the FID. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples.

5.1.5 Background Comparisons

Three metals, antimony, selenium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of barium, calcium, mercury, silver, and zinc were reported at concentrations less than the background screening values. The results that exceeded background are summarized in Table 5.1.5-1 and the sampling locations are identified on Fig. 5.1.4-1. Calcium is not carried forward for additional evaluation, because: 1) it is considered an essential nutrient and, 2) it has no toxicity information and therefore no SAL. Barium, mercury, silver, and zinc were carried forward in the screening process to the SAL comparison step.

TABLE 5.1.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 3-002(c)

SAMPLE ID	DEPTH (FT)	BARIUM (mg/kg)	CALCIUM (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)	ZINC (mg/kg)
LANL UTL[a]	N/A[b]	315	6 120	0.1	NA[c]	50.8
SAL[d]	N/A	5 300	NA	23	380	23 000
AAB6034	0 - 0.5	341	6 220	<0.08	<0.98	25.5
AAB6036	0 - 6	160	16 300	<0.12	<1.1	28.1
AAB6038	0 - 0.5	96.8	9 360	0.14	<0.91	41.3
AAB6038R[e]	0 - 0.5	96.3	8 877	0.17	<0.91	46.5
AAB6039	0 - 0.5	72.7	5 540	<0.04	12.5	88.8
AAB6035	0 - 3	57.9	8 480	<0.03	<0.8	61.6

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] Replicate sample.

5.1.6 Evaluation of Organics

Three organic chemicals, alpha-chlordane, gamma-chlordane, and DDT, were detected in samples collected from PRS 3-002(c). The results for these detected organics are summarized in Table 5.1.6-1, and the sampling locations are identified on Fig. 5.1.4-1. These detected organic chemicals are carried forward to the SAL comparison step.

TABLE 5.1.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 3-002(c)

SAMPLE ID	DEPTH (ft)	CHLORDANE [ALPHA-] (mg/kg)	CHLORDANE [GAMMA-] (mg/kg)	DDT [p, p'] (mg/kg)
SAL[a]	N/A[b]	0.34[c]	0.34[c]	1.3
EQL[d]	N/A	0.017	0.017	0.03
AAB6035	0 - 0.5	0.0047	0.0077	<0.0036
AAB6039	0 - 0.5	0.0065	0.0085	<0.004
AAB6036	0 - 0.5	0.021	0.021	0.0059
AAB6037	0 - 0.5	0.021	0.023	<0.0041
AAB6034	0 - 0.5	0.022	0.023	0.053
AAB6038	0 - 0.5	0.13	0.15	0.22

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] SAL is for chlordane.
[d] EQL = Estimated quantitation limit.

5.1.7 Human Health

5.1.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.1.5-1, Table 5.1.6-1).

To evaluate multiple chemical effects for PRS 3-002(c), COPCs detected at concentrations below their respective SALs were divided into two classes, noncarcinogens and carcinogens. The maximum value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, results of both the noncarcinogen and carcinogen multiple chemical evaluations were less than unity (Table 5.1.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.1.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 3-002(c) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Barium	AAB6034	341	5 300	0.064
Mercury	AAB6038R	0.17	23	0.0074
Silver	AAB6039	12.5	380	0.033
Zinc	AAB6039	88.8	23 000	0.004
			Total:	0.108
CARCINOGENIC EFFECTS				
Chlordane [alpha-]	AAB6038	0.13	0.34[b]	0.382
Chlordane [gamma-]	AAB6038	0.15	0.34[b]	0.441
DDT [p,p'-]	AAB6034	0.053	1.3	0.041
			Total:	0.864

[a] SAL = Screening action level.
[b] SAL for Chlordane.

5.1.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.1.8 Ecological

5.1.8.1 Ecotoxicological Screening Assessment

PRS 3-002(c) received a landscape condition score of one in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is highly disturbed by human activities. The PRS also received a receptor access score of one because only small habitat parcel areas exist within the industrial area. Given this habitat-based exposure rating, it is unlikely that any threatened and endangered species would be exposed to COPCs at PRS 3-002(c). The site will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.1.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.1.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.1.10 Conclusions, Actions, and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 3-002(c). Therefore, PRS 3-002(c) is recommended for NFA. Based on LANL's No Further Action Criteria Policy Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.2 PRSs 3-003(a,b) and 3-042, PCB Equipment Storage

PRSs 3-003(a,b) were outdoor storage areas associated with buildings TA-3-218 and TA-3-253, respectively. Both areas were used for storage of electrical equipment that may have contained PCBs. PRS 3-042 is a former containment sump west of TA-3-218. COPCs included VOCs and SVOCs, PCBs, waste oil, and metals. Based on analytical results of the Phase I site investigation, PRSs 3-003(a,b) and 3-042 are recommended for NFA.

5.2.1 History

PRSs 3-003(a,b) are discussed in detail in Subsection 5.10 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). PRS 3-042 is discussed in detail in Subsection 5.26 of the RFI Work Plan for OU 1114, Addendum 1 (LANL 1995, 17-1275).

PRS 3-003(a) is a decommissioned, temporary storage area located on the north and west sides of TA-3-218. The asphalted area north of TA-3-218 is visibly stained with oil from automobiles and possibly other sources.

PRS 3-042 is a former containment sump located west of TA-3-218 used for secondary containment of a wooden surge tank that contained dielectric mineral oil used as insulation in experiments. The containment sump consisted of a 43 ft long x 27 ft wide concrete pad surrounded by an 18-in. to 20-in. high cement curb. The wooden surge tank was erected on the containment sump in approximately 1965. A surge tank is an overflow tank used in hydraulic systems for excess oil containment during a pressure surge. During heavy rains, the oil was observed to overflow the secondary containment (PRS 3-042) around the surge tank. For approximately the last 20 years, the area of the former surge tank stored many types of electrical equipment, some of which held PCB-containing oils.

PRS 3-003(b) is a decommissioned, temporary storage area used for the storage of electrical equipment. This storage area was located west of TA-3-253, the electron prototype laboratory. During its active use, the area was observed to hold as many as 100 stacked capacitors, some of which appeared to be leaking. In 1985 and 1986, the capacitors and underlying stained soil were removed and the storage area was decommissioned. A transportainer (TA-3-1950) was placed on the site in 1989. Currently, this area is covered with soil and gravel.

5.2.2 Description

PRSs 3-003(a,b) and 3-042 are located in developed areas between buildings at TA-3, which is described in Chapter 2 of this report. The PRSs are situated on fill and disturbed alluvium overlying cooling unit 4 of the Bandelier Tuff. Bedrock was not encountered during sampling.

5.2.3 Previous Investigations

No previous investigations were conducted at PRSs 3-003(a,b) and 3-042. Following the removal of stained surface soil from PRSs 3-003(a,b) and 3-042, no confirmatory samples were collected.

5.2.4 Field Investigation

The sampling approach for PRSs 3-003(a,b) in the RFI Work Plan for OU 1114 was designed to determine whether PCBs, other SVOCs, and metals remained in the asphalt or in the surface soils (LANL 1993, 1090). The area of PRS 3-042 was covered by sampling at PRSs 3-003(a,b) as described in the RFI Work Plan for OU 1114, Addendum 1 (LANL 1995, 17-1275).

The sample locations indicated in the work plan were located using stained areas and buildings as reference points. In addition, two confirmatory sample locations were selected based on the PCB test kit analyses to provide information on the extent of potential PCB soil contamination. Sample locations are shown in Fig. 5.2.4-1, and samples are summarized in Table 5.2.4-1.

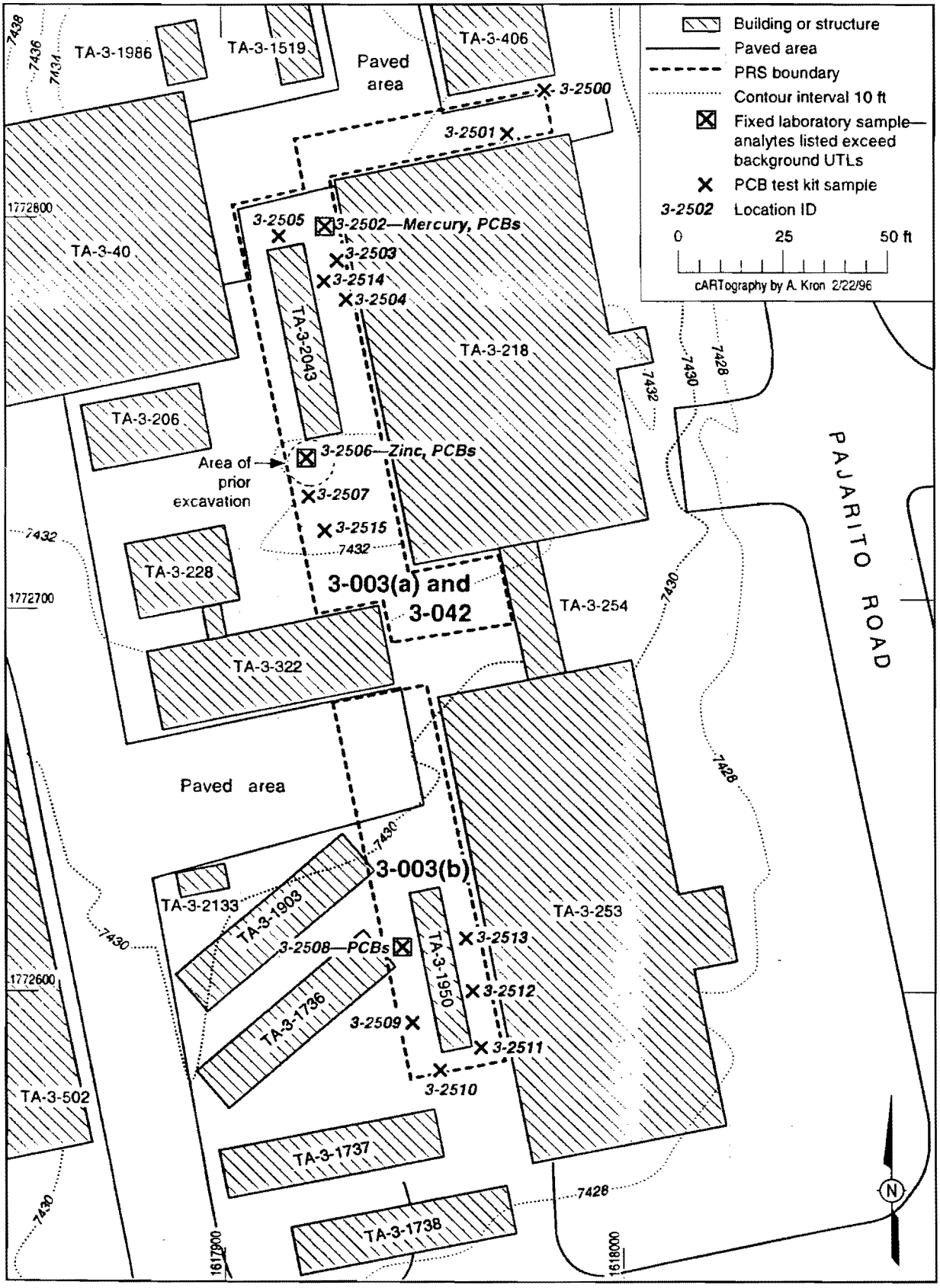

Fig 5.2.4-1 PRSs 3-003(a,b) and 3-042 1994 sample collection locations.

TABLE 5.2.4-1

SUMMARY OF SAMPLES COLLECTED AT PRSs 3-003(a,b) AND 3-042

SAMPLE INFORMATION					ANALYTICAL SUITE AND REQUEST NUMBER					
PRS ID	LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PESTICIDES/ PCBs[c]	PCB FIELD TEST KIT (ppm)	INORGANICS	MRAL[d]
3-003(a) 3-042	03-2500	AAB7618	0 - 1	asphalt	N/A[e]	N/A	N/A	> 50	N/A	N/A
3-003(a) 3-042	03-2501	AAB7619	0 - 1	asphalt	N/A	N/A	N/A	4.0 - 15.0	N/A	N/A
3-003(a) 3-042	03-2502	AAB7605	0 - 2	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(a) 3-042	03-2502	AAB7613	0 - 2	soil	N/A	18482	18482	4.0 - 15.0	19169	21702
3-003(b)	03-2502	AAB7614	0 - 2	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(a) 3-042	03-2503	AAB7606	0 - 3	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(a) 3-042	03-2504	AAB7607	0 - 2	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(a) 3-042	03-2505	AAB7609	0 - 2	soil	N/A	N/A	N/A	1.0 - 4.0	N/A	N/A
3-003(a) 3-042	03-2507	AAB7610	0 - 0.5	soil	N/A	N/A	N/A	15.0 - 50.0	N/A	N/A
3-003(a) 3-042	03-2506	AAB7611	0 - 6	soil	18482	N/A	N/A	0.5 - 1.0	N/A	21702
3-003(a) 3-042	03-2506	AAB7612	0 - 6	soil	N/A	18482	18482	< 0.5	19169	21702
3-003(b)	03-2508	AAB7620	0 - 6	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(b)	03-2508	AAB7626	0 - 6	soil	18482	18482	18482	< 0.5	19169	21702
3-003(b)	03-2509	AAB7621	0 - 6	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(b)	03-2509	AAB7627[f]	0 - 6	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(b)	03-2510	AAB7622	0 - 2	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(b)	03-2511	AAB7623	0 - 2	soil	N/A	N/A	N/A	1.0 - 4.0	N/A	N/A
3-003(b)	03-2512	AAB7624	0 - 3	soil	N/A	N/A	N/A	< 0.5	N/A	N/A
3-003(b)	03-2513	AAB7625	0 - 1.5	soil	N/A	N/A	N/A	1.0 - 4.0	N/A	N/A
3-003(b)	03-2514	N/A[f]	0 - 2	soil	N/A	N/A	N/A	<0.5	N/A	N/A
3-003(b)	03-2515	N/A	0 - 2	soil	N/A	N/A	N/A	<0.5	N/A	N/A
3-003(b)	03-N/A	AAB7628	N/A	water	18482	18482	18482	N/A	19169	N/A
3-003(b)	03-N/A	AAB7629	N/A	water	18482	N/A	N/A	N/A	N/A	N/A
3-003(b)	03-N/A	AAB7630	N/A	water	18482	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.

Twenty-one samples were collected from PRSs 3-003(a,b) and 3-042 at 16 locations [two asphalt (03-2500 and 03-2501) and 14 soil locations (03-2502 through 03-2515)]. All samples collected, including two field split samples, were analyzed in the field using PCB test kits. At three locations, soil samples were collected using a hand-bucket auger from the 0- to 6-in. interval. At 13 locations, soil samples were collected with a scoop from the 0- to 3-in. interval or less because asphalt present beneath the soil prevented use of the auger.

For the asphalt sample areas, the first 0.5 in. of asphalt was sampled using a hammer and chisel following the Chip Sampling of Porous Surfaces method (LANL-ER-SOP-06.28). The soil samples were collected by either the Spade and Scoop Method for Collection of Soil Samples (LANL-ER-SOP-06.09) or the Hand Auger and Thin-Wall Tube Sampler method (LANL-ER-SOP-06.10). All asphalt sample locations were screened for VOCs using the FID as the asphalt was chipped, and all soil sample locations were screened for VOCs within the hole or excavation using the FID. Spade and scoop samples to be analyzed for VOCs were placed in 125 ml wide-mouth glass containers.

One of three confirmatory soil samples was collected and submitted for analysis of VOCs. All three confirmatory samples were submitted for analysis of SVOCs, PCBs, and TAL metals. QC samples included a trip blank and field blank submitted for analysis of VOCs, and a rinsate blank submitted for VOCs and the same analyses as the soil samples.

The results of the PCB test kit analyses indicated that the PCB concentrations ranged from <0.5 ppm to 50 ppm in all soil samples collected (Table 5.2.4-1). For the two asphalt samples, the PCB test kits gave results of 10 ppm and >50 ppm. These concentrations were consistent with false positive results obtained with the test kits for asphalt analyses at other PRSs. Soil samples AAB7610 and AAB7613 showed test kit results of 15 to 50 ppm and 4 to 15 ppm, respectively. The remaining samples, including field splits of samples AAB7610 and AAB7613, showed results of <4 ppm.

5.2.5 Background Comparisons

Ten metals, including antimony, beryllium, cadmium, cobalt, nickel, selenium, silver, sodium, thallium, and vanadium were not detected in the samples analyzed. All detected inorganics, with the exception of mercury and zinc, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.2.5-1, and the sample locations are identified on Fig. 5.2.4-1. Mercury and zinc were carried forward in the screening process to the SAL comparison step.

TABLE 5.2.5-1

INORGANIC CHEMICAL WITH CONCENTRATION GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-003(a,b) AND 3-042

SAMPLE ID	DEPTH (in.)	MERCURY (mg/kg)	ZINC (mg/kg)
LANL UTL[a]	N/A[b]	0.1	50.8
SAL[c]	N/A	23	23 000
AAB7612	0 - 6	<0.03 (UJ)[d]	54.9
AAB7613	0 - 2	0.11 (J)[e]	35.2

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] (UJ) = Estimated undetected quantity.
[e] (J) = Estimated detected quantity.

5.2.6 Evaluation of Organics

One class of organic chemicals, PCBs, was detected in samples collected from PRSs 3-003(a,b) and 3-042. The results for this detected organic are summarized in Table 5.2.6-1, and the sampling locations are identified on Fig. 5.2.4-1. PCBs were carried forward in the screening process to the SAL comparison step.

TABLE 5.2.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRSs 3-003(a,b) AND 3-042

SAMPLE ID	DEPTH (in.)	PCBs[a] (mg/kg)
SAL[b]	N/A[c]	1
EQL[d]	N/A	0.033
AAB7613	0 - 2	0.1934 (J)[e]
AAB7612	0 - 6	0.334
AAB7626	0 - 6	0.0531

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.
[e] (J) = Estimated detected quantity.

5.2.7 Human Health

5.2.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.2.5-1, Table 5.2.6-1).

To evaluate multiple chemical effects for PRSs 3-003(a,b) and 3-042, COPCs detected at concentrations below their respective SALs were divided into two classes: noncarcinogens and carcinogens. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Because the carcinogenic class only contained one chemical, the multiple chemical evaluation was not necessary for this class. The results of the noncarcinogen multiple chemical evaluation were less than unity (Table 5.2.7-4), indicating that health effects caused by the additive effects of multiple chemicals are unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.2.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRSs 3-003(a,b) and 3-042

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NON-CARCINOGENIC EFFECTS				
Mercury	AAB7613	0.11 (J)[b]	23	0.0048
Zinc	AAB7612	54.9	23 000	0.0024
			Total:	0.0072

[a] SAL = Screening action level.
b (J) = Estimated detected quantity.

5.2.7.2 Risk Assessment

No human health risk assessment was necessary for this site.

5.2.8 Ecological

5.2.8.1 Ecotoxicological Screening Assessment

PRSs 3-003(a,b) and 3-042 received a landscape condition score of one in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is highly disturbed by human activities. The PRSs also received a receptor access score of one because only small habitat parcel areas exist within the industrial area. Given this habitat-based exposure rating, it is unlikely that any threatened and endangered species would be exposed to COPCs at PRSs 3-003(a,b) and 3-042. The site will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.2.8.2 Ecological Risk Assessment

No ecological risk assessment was necessary for this PRS.

5.2.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.2.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRSs 3-003(a,b) and 3-042. Therefore, PRSs 3-003(a,b) and 3-042 are recommended for NFA. Based on LANL's No Further Action Criteria Policy Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove these PRSs from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.3 PRSs 3-012(b) and 3-045(b,c), Power Plant Outfalls

PRSs 3-012(b) and 3-045(b,c) are outfalls associated with TA-3-22, the power plant. Historically, the cooling water discharged through the outfalls was treated with chromates. Because several constituents were detected above SALs in the Phase I site investigation, a Phase II investigation will be conducted at PRSs 3-012(b) and 3-045(b,c).

5.3.1 History

PRS 3-012(b) is discussed in detail in Subsection 5.5 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). From 1951 to 1985, the PRS 3-012(b) outfall discharged cooling water that originated from treated effluent generated by the TA-3 Wastewater Treatment Plant (WWTP). In the past, the water from the WWTP was treated with chromates before being used as cooling water at the power plant. The National Pollutant Discharge Elimination System (NPDES) permit number of the outfall is EPA01A001, permitted for release of cooling tower water and treated sanitary effluent.

PRSs 3-045(b,c) are discussed in detail in Subsection 5.27 of the RFI Work Plan for OU 1114 (LANL 1995, 17-1275). PRS 3-045(b) is the outfall from cooling towers TA-3-25 and TA-3-58, which serve the power plant TA-3-22. This discharge point is identified as NPDES permitted outfall EPA 01A001 and is identical to PRS 3-012(b). Cooling tower TA-3-25 was demolished in 1990, and only the concrete basin remains. Cooling tower TA-3-58 remains in operation. The outfall receives effluent from the neutralization tank, the chlorine building, and cooling tower TA-3-58. The neutralization tank receives blowdown from the boilers and wastewater from the water treatment area. The pH of the wastewater in the neutralization tank is maintained at between six and nine by adding either sulfuric acid or sodium hydroxide, as appropriate, before it is released to the outfall.

Storm water that collects in the concrete foundation of TA-3-25 also flows to this outfall from leaking pipe valves that were previously connected to the cooling system. A one-time release was discharged to this outfall May 20, 1990. Low pH values were observed in a 2.5-mile section of the watercourse below the outfall. Soda ash was manually added to the entire 2.5-mile watercourse, and a May 23, 1990 pH survey detected no pH measurements below 6.9.

PRS 3-045(c) is an outfall identified by NPDES permit number EPA03A027 and is located approximately 55 ft east of PRS 3-012(b). This outfall receives effluent from cooling tower

TA-3-285, which serves the generators powering the Laboratory computer system. Both of these outfalls may have received water that had been treated with chromates.

5.3.2 Description

The outfalls discharge to a small tributary of Sandia Canyon south of the power plant. The slopes of the drainage are overlain by a thin mantle of colluvium and soil, generally from less than one to several feet thick. In the bottom of the drainage, bedrock (Bandelier Tuff) and loose blocks of tuff are discontinuously exposed. Up to approximately 3 ft of soil and alluvium are exposed in the banks of the drainage channel. The surface adjacent to the drainage (including directly above the outfalls) and parts of the upper slopes are comprised of fill and/or disturbed soil. At the outfalls, the mantle of soil and colluvium has been removed to expose the bedrock, so that effluent discharges directly onto bedrock.

5.3.3 Previous Investigations

No previous investigations were conducted at PRSs 3-012(b) and 3-045(b,c). However, effluent at the outfall points is periodically monitored in compliance with the NPDES permits. The monitored parameters include total suspended solids, pH, and total chlorine.

5.3.4 Field Investigation

The sampling approach for PRS 3-012(b) in the RFI Work Plan for OU 1114 was designed to determine whether the outfall discharge resulted in the release of any contaminants to the site (LANL 1993, 1090). This sampling was also applicable for collocated PRS 3-045(b), which was included in the RFI Work Plan for OU 1114, Addendum 1 (LANL 1995, 17-1275). The sampling plan described in the work plan was modified to include additional fixed laboratory radiochemical analyses.

The biased sample locations indicated in Fig. 5-9 of the RFI Work Plan for OU 1114 were located using the outfall and the channel as reference points (LANL 1993, 1090). Three downstream sample locations were included in the sampling program in order to characterize the sediments in the outfall channel. To meet the sampling objectives, the sample locations were adjusted in the field from those specified in the RFI Work Plan for OU 1114 (LANL 1993, 1090). A summary of samples collected at PRS 3-012(b) and collocated PRS 3-045(b) are shown in Fig. 5.3.4-1, and summarized in Table 5.3.4-1.

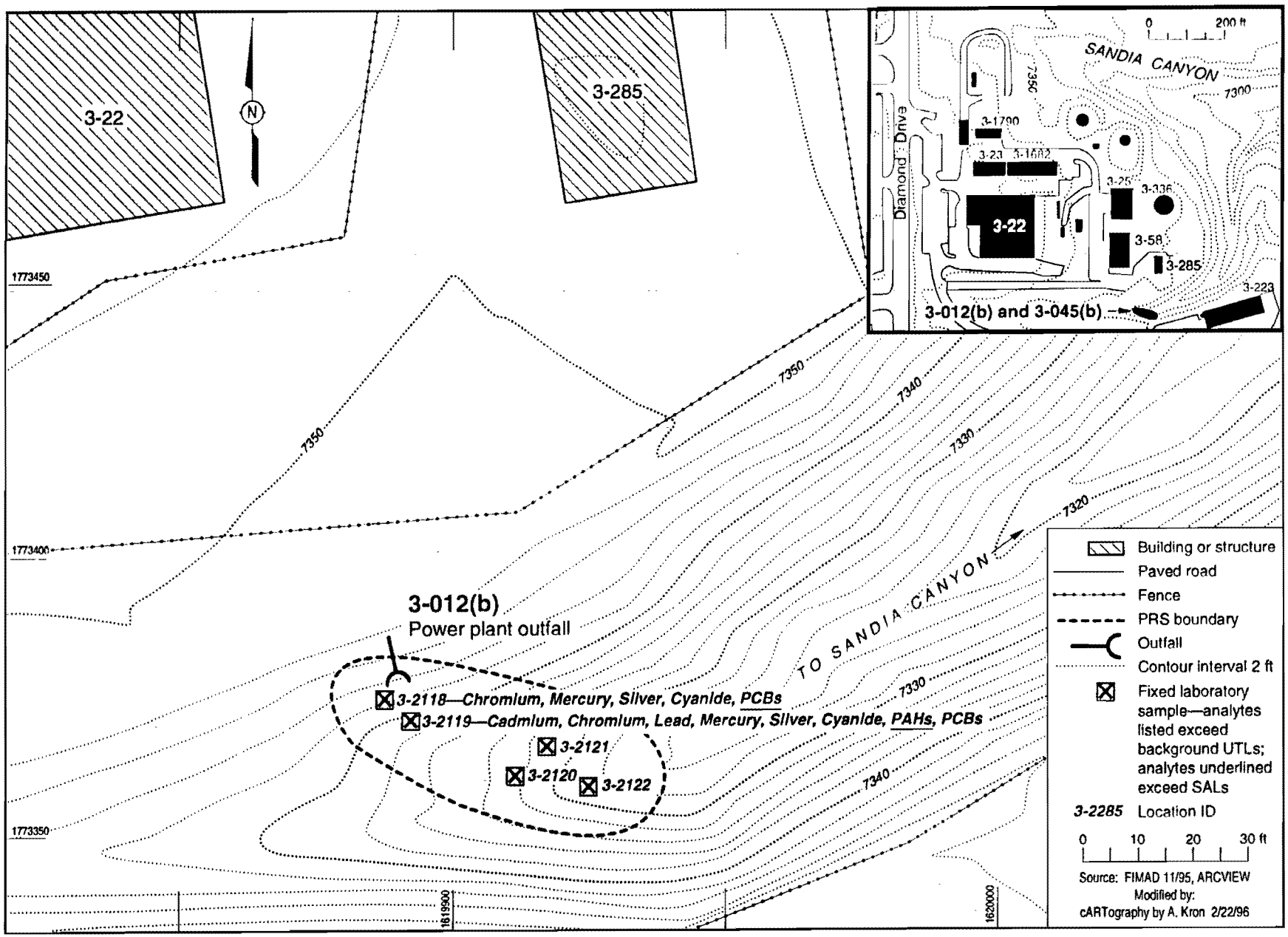

Fig. 5.3.4-1 PRS 3-012(b) and collocated PRS 3-045(b) 1994 sample collection locations.

TABLE 5.3.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER						
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	HERBICIDES	PESTICIDES/ PCBs[c]	INORGANICS	RADIONUCLIDES	MRAL[d]
03-2118	AAB5881	0 - 6	soil	18186	18186	N/A[e]	18186	20225	19954	N/A
03-2118	AAB7668	0 - 6	soil	N/A	N/A	18550	18550	N/A	N/A	20714
03-2118	AAB7703	0 - 6	soil	N/A	N/A	19136	19136[f]	N/A	N/A	20520
03-2119	AAB5882	0 - 6	soil	18186	18186	18186	18186	20225	19954	N/A
03-2120	AAB5883	0 - 6	soil	18186	18186	18186	18186	20225	19954	N/A
03-2121	AAB5884	0 - 6	soil	18186	18186	N/A	18186	20225	19954	N/A
03-2121	AAB7669	0 - 6	soil	N/A	N/A	18550	18550	N/A	N/A	20714
03-2121	AAB7704	0 - 6	soil	N/A	N/A	19136	19136[e]	N/A	N/A	20520
03-2122	AAB5885	0 - 6	soil	18186	18186	N/A	18186	20225	19954	N/A
03-2122	AAB7667	0 - 6	soil	N/A	N/A	18550	18550	N/A	N/A	20714
03-2122	AAB7702	0 - 6	soil	N/A	N/A	19136	19136[e]	N/A	N/A	20520
03-N/A	AAB5898	N/A[f]	water	18186	N/A	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] PCB analyses only were performed.

All samples were collected using LANL-ER-SOP-6.09, Spade and Scoop Method for Collection of Soil Samples. Using the FID, sample locations were screened for VOCs within the hole during sample collection. The samples were documented and preserved following standard procedures, with the exception that samples to be analyzed for VOCs were collected using 125 ml glass wide-mouth containers with Teflon™-seal lids.

Five soil samples were collected at five locations on July 19, 1994 from the 0- to 6-in. interval at PRS 3-012(b) and collocated PRS 3-045(b). The thin veneer of soil adjacent to and within the outfall channel prevented the collection of deeper samples. All samples were submitted for analysis of VOCs, SVOCs, organochlorine pesticides and PCBs, herbicides, TAL metals, and radionuclides. QC samples included a trip blank submitted for analysis of VOCs.

The laboratory reported that three samples (AAB5881, AAB5884, and AAB5885) contained large fractions of coarse-grained material (gravel), which did not provide sufficient sample volume for analysis of all organics. As a result, the laboratory requested that additional sample

volume be provided for PCB and herbicide analysis. Three additional volumes (AAB7668, AAB7667, and AAB7669) were collected on August 9, 1995. These samples were left at room temperature for a week before being cooled, sent offsite for analyses, and analyzed within holding times. However, PCB data from these samples can be used because the surface sample had been exposed to the environment for years, was sealed in an approved container and cooled before analysis, and was in an air-conditioned environment during the week it was left at room temperature. The results of these three sets of analyses are presented but not considered. Three more samples were collected (AAB7702, AAB7703, and AAB7704) on September 15, 1994, and submitted for analysis of PCBs and herbicides.

5.3.5 Background Comparisons

Three metals, including antimony, selenium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of cadmium, chromium, cyanide, lead, mercury, and silver, were reported at concentrations less than background screening values. Because cyanide and silver do not have background screening values, the detection limit is used as a surrogate background comparison value. The results that exceeded background are summarized in Table 5.3.5-1 and the sampling locations are identified on Fig. 5.3.4-1. These analytes are carried forward in the screening process to the SAL comparison step.

TABLE 5.3.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

SAMPLE ID	DEPTH (ft)	CADMIUM (mg/kg)	CHROMIUM (mg/kg)	CYANIDE (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)
LANL UTL[a]	N/A[b]	2.7	19.3	NA[c]	23.3	0.1	NA
SAL[d]	N/A	38	210	1 300	400	23	380
AAB5882	0 - 0.5	5.2	2 080	13.3 (J)[e]	224	1.2 (J)	108
AAB5881	0 - 0.5	<0.96	130	10.8 (J)	21.4	0.22 (J)	25.8

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] (J) = Estimated detected value.

All detected radionuclides were reported at concentrations less than their respective background screening values. No radionuclide analytes were carried forward in the screening process to the SAL comparison step. The radionuclides that were detected and do not have background screening values are addressed in Subsection 4.3.3 of this report.

5.3.6 Evaluation of Organics

Thirteen organic chemicals were detected in samples collected from PRS 3-012(b). Results for these detected organics are summarized in Table 5.3.6-1, and the sampling locations are identified on Fig. 5.3.4-1. These detected organic chemicals are carried forward in the screening process to the SAL comparison step.

TABLE 5.3.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION At PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

SAMPLE ID	DEPTH (ft)	Anthracene (mg/kg)	PCBs[a] (mg/kg)	Benzo[a]-anthracene (mg/kg)	Benzo[a]-pyrene (mg/kg)	Benzo[b]-fluoranthene (mg/kg)	Benzo-[g,h,i]-perylene (mg/kg)	Benzo[k]-fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo-[a,h]anthracene (mg/kg)	Fluoranthene (mg/kg)	Indeno-[1,2,3-cd]-pyrene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
SAL[b]	N/A[c]	19	1	0.61	0.061	0.61	N/A	6.1	24	0.061	2 600	0.61	N/A	2 000
EQL[d]	N/A	0.33	0.033	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB5882	0 - 0.5	1.5	0.83	5.9	4.1	4.9	1.2	1.2	3.5	0.5	11	1.6	6.3	7.8
AAB5881	0 - 0.5	<0.41	6.2	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	<0.41	0.41	<0.41	<0.41	<0.41
AAB7668	0 - 0.5	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AAB7703	0 - 0.5	N/A	7.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[a] PCBs = Polychlorinated biphenyls.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.

5.3.7 Human Health

5.3.7.1 Screening Assessment

Six organic chemicals and one inorganic chemical were found to exceed SALs. The noncarcinogen that exceeds SAL is shown in Table 5.3.7-1. The carcinogens that exceed SALs are summarized in Table 5.3.7-2. These chemicals are identified as COPCs based on the SAL comparison. None of the other chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs (Table 5.3.5-1, Table 5.3.6-1) and these chemicals are eliminated as COPCs.

TABLE 5.3.7-1

NONCARCINOGEN THAT EXCEEDS SAL IN SOIL AT PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

SAMPLE ID	LOCATION ID	DEPTH (ft)	CHROMIUM (mg/kg)
SAL[a]	N/A[b]	N/A	210
AAB5882	03-2119	0 - 0.5	2 080

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRS 3-012(b) and collocated PRS 3-045(b), COPCs detected at concentrations below their respective SALs were divided into two classes, noncarcinogens and carcinogens. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. The result of the carcinogen multiple chemical evaluation was less than unity (Table 5.3.7-4), indicating that health effects caused by the additivity of these chemicals are unlikely. The result of the noncarcinogenic multiple chemical evaluation was greater than 1. Cadmium, lead, and silver each contributed at least 0.1 to the total. Therefore, cadmium, lead, and silver are identified as COPCs based on the multiple chemical evaluation.

TABLE 5.3.7-2

CARCINOGENS THAT EXCEED SALs IN SOIL AT PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

SAMPLE ID	LOCATION ID	DEPTH (ft)	PCBs[a] (mg/kg)	BENZO(a) ANTHRACENE	BENZO(a) PYRENE	BENZO(b) FLUORANTHENE	DIBENZO(a,h) ANTHRACENE	INDENO(1,2,3-cd)PYRENE
SAL[b]	N/A[c]	N/A	1	0.61	0.061	0.61	0.061	0.61
AAB5882	03-2119	0 - 0.5	0.83	5.9	4.1	4.9	0.5	1.6
AAB5881	03-2118	0 - 0.5	6.2	<0.41	<0.41	<0.41	<0.41	<0.41
AAB7668	03-2118	0 - 0.5	4.5	N/A	N/A	N/A	N/A	N/A
AAB7703	03-2118	0 - 0.5	7.6	N/A	N/A	N/A	N/A	N/A

[a] PCBs = Polychlorinated biphenyls.
[b] SAL = Screening action level.
[c] N/A = Not applicable.

TABLE 5.3.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 3-012(b) AND COLLOCATED PRS 3-045(b)

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE (mg/kg)
NONCARCINOGENIC EFFECTS				
Anthracene	AAB5882	1.5	23 000	0.000065
Cadmium	AAB5882	5.2	38	0.137
Cyanide	AAB5882	13.3 (J)[b]	1 300	.01
Fluoranthene	AAB5882	11	2 600	0.0042
Lead	AAB5882	224	400	0.56
Mercury	AAB5882	1.2 (J)	23	0.052
Pyrene	AAB5882	7.8	2 000	0.0039
Silver	AAB5882	108	380	0.284
			Total:	1.05
CARCINOGENIC EFFECTS				
Benzo[k]fluoranthene	AAB5882	1.2	6.1	0.197
Chrysene	AAB5882	3.5	88	0.04
			Total:	0.237

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.

5.3.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.3.8 Ecological

5.3.8.1 Ecotoxicological Screening Assessment

PRS 3-012(b) and collocated PRS 3-045(b) received a landscape score of three in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is relatively undisturbed by human activities. The PRSs also received a receptor access score of three because the potential for COPC transport to other habitats is high in an outfall area such as this. PRS 3-012(b) and collocated PRS 3-045(b) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.3.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.3.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. Because chemicals were identified as COPCs in the screening assessment, a Phase II investigation is planned to help determine extent of contamination. The Phase II sampling plan is described in Subsection 5.3.11 of this report.

5.3.10 Conclusions, Actions, and Recommendations

Ten chemicals [PCBs, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, chromium, cadmium, lead, and silver] were retained as COPCs by the screening assessment process for PRS 3-012(b) and collocated PRS 3-045(b). Because chemicals were found to be present in soil at concentrations above SALs and because extent of contamination has not been fully determined, PRS 3-012(b) and its duplicate, PRS 3-045(b), are recommended for a Phase II investigation to identify extent of contamination. The Phase II investigation may be followed by a risk assessment and/or some type of remedial action or site control measures.

5.3.11 Phase II Sampling and Analysis Plan

5.3.11.1 Site Description and Phase I RFI Results

PRS 3-012(b) and collocated PRS 3-045(b) represent an outfall (NPDES Permit Number 01A001), associated with the power plant (TA-3-22), that discharges to a small tributary of Sandia Canyon south of the power plant (Fig. 5.3.4-1). The bottom of the discharge point is concrete lined and the sides are formed by a thin veneer of soil (approximately 4–8 in. thick) stabilized by dense grass. Detailed historical and environmental setting information can be found in Subsection 5.3.1 through Subsection 5.3.3 of this report.

Of the five locations sampled during the Phase I RFI, only the two closest to the outfall contained COPCs [chromium and PCBs at location 3-2118 and polycyclic aromatic hydrocarbons (PAHs) at location 3-2119] at concentrations greater than SALs (see Subsection 5.3.6). These two locations were positioned along the edges of the outfall channel and only the surficial material (0–6 in.) was sampled. Therefore, little information is available about the extent of the affected area. Based on the multiple constituent analysis, cadmium, lead, and silver were also added to the COPC list for the Phase II investigation.

5.3.11.2 Phase II Objectives and Approach

One objective of the Phase II sampling activity is to provide information for a baseline risk assessment for PCBs, PAHs, chromium, cadmium, lead, and silver (the COPCs identified by the screening assessment of the Phase I data). The primary information needed for the baseline risk assessment is the horizontal and vertical extent of elevated COPC concentrations. Because these PRSs are in the core industrial area of LANL, the primary exposure scenario that will be evaluated in the baseline risk assessment is based on the LANL industrial scenario described in Appendix K of the LANL Installation Work Plan (LANL 1993, 1017). Following the EPA risk assessment guidance, the 95% upper confidence level of the mean concentration within each exposure unit will be used to estimate the source term concentration (EPA 1991, 0302). The industrial exposure unit area is 500 m^2.

Because chromium is one of the COPCs identified by Phase I sampling, Phase II sampling locations will include the area adjacent to the three cooling towers (TA-3-25, TA-3-58, and TA-3-225). Although the superstructure of TA-3-25 was demolished approximately six years ago, the foundation is still intact. The cooling towers are the most likely source of chromium because chromates were historically used at the power plant to inhibit algae growth. Because the cooling towers produced an overspray that fell to the ground around the towers, the soil around the cooling towers may contain elevated chromium concentrations. The sampling objective for these locations is to determine if there were historical releases to the environment from the cooling towers and to collect enough data to support a baseline risk assessment if COPC concentrations are detected above SALs.

A third objective will be to determine if the elevated measurements of any COPCs are derived from another, upgradient source area. In particular, the elevated PCB and PAH concentrations may be from another source area.

A fourth objective is to confirm the original elevated chromium, PCB, and PAH concentrations from sampling locations 03-2118 and 03-2119, and determine if these concentrations increase or decrease with depth at these locations.

A fifth objective is to determine if the target COPCs from PRS 3-012(b) and collocated PRS 3-045(b) exist around the outfall of PRS 3-045(c), 55 ft east of the outfall sampled in 1994.

To provide more flexibility in the plan, quick-turnaround methods for analyzing PCBs and the appropriate metals will be used in Phase II activities. This will allow for near real-time evaluation of the lateral and horizontal pattern of contamination at these sites.

The field sample collection methods and guidelines presented in the original RFI Work Plan for OU 1114 will be followed during this Phase II investigation, as appropriate (LANL 1993, 1090).

5.3.11.3 Phase II Sampling Locations and Methods

The Phase II investigation is designed to provide information regarding the possible source of COPCs, if other than the outfall, and information regarding the horizontal and vertical extent of the affected area. The layout of sampling locations is based on the assumption that contaminants would mainly be confined to the primary drainage pathways both leading to and from PRS 3-012(b). The elevated chromium, PCB, and PAH concentrations measured in the Phase I investigation were clustered directly downgradient of the outfall pipe, but may have migrated from an upgradient source. It is anticipated that elevated chromium concentrations will be localized to the splash zone of the outfall. However, because of historic use of chromium in cooling towers at this site, the area around the cooling towers (including drainages) will also be sampled. Samples will also be collected upgradient of the outfall to determine if elevated PCB and PAH concentrations are also limited to the soil and sediment directly downgradient of the outfall. Known PCB soil contamination from outdoor transformers upstream of the outfall were cleaned up in 1990 by ESH-18.

Figure 5.3.11-1 identifies eight outfall sampling locations. Locations 1 and 2 are positioned upgradient to provide information regarding other possible sources for the contaminants. Locations 3 through 8 are positioned to provide information regarding the reproducibility of the original analytical results, as well as the horizontal and vertical extent of the affected area. Locations 3 and 7 are to be positioned as close as possible to the original locations 03-2118 and 03-2119, respectively. Following receipt and review of the analytical results, additional samples will be collected and analyzed, as necessary, to adequately define the affected area. Whenever possible, the MRAL and MCAL will be used to provide real-time data with which to make field decisions.

At each sample location, the 0- to 6-in. interval will be sampled using LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. A second sample will be collected from the 6- to 12-in. interval if the soil profile is of sufficient depth.

The cooling tower sampling locations depicted on Fig. 5.3.11-2 are paired, with one location close to the cooling tower and within the zone of maximum wetting by overspray, and the second location away from the tower and outside the zone of maximum wetting. Because of concrete aprons and other concrete projections adjacent to the cooling tower foundations, the sampling points closest to the towers will, in most cases, be located immediately next to the apron, but no more than 10 ft from the foundation if possible. The paired sampling points will then be located away from the foundation, approximately 20 ft from the initial locations. Three additional sampling locations will be positioned south of the cooling towers within the primary drainage pathway leading from the cooling tower area. Two samples will be collected at each sampling location, from the 0- to 6-in. interval and the 6- to 12-in. interval using LANL-ER-SOP-6.09, Spade and Scoop Method for Collection of Soil Samples. If asphalt paving exists at a sampling location, the asphalt and subgrade will be removed before sampling proceeds.

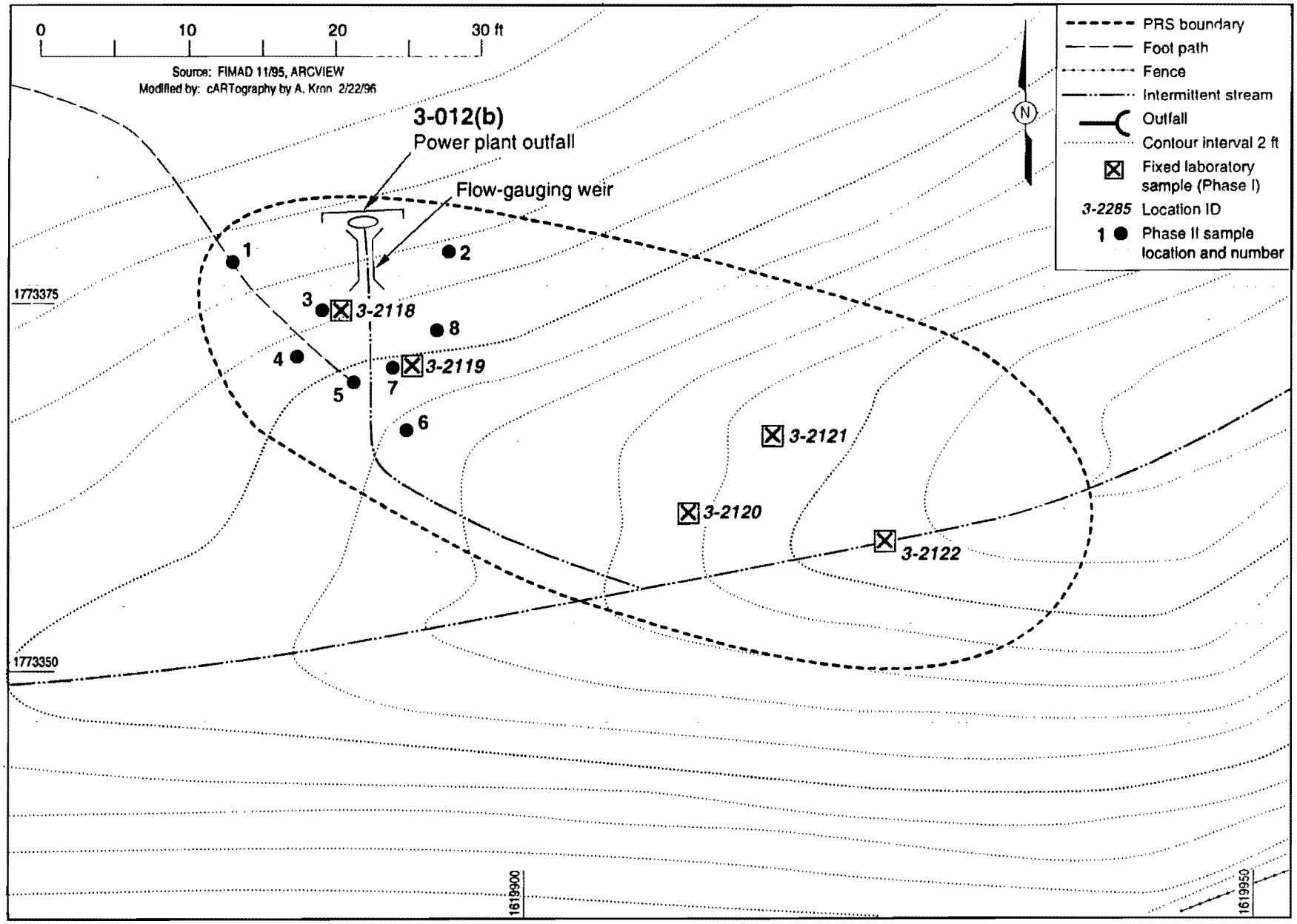

Fig. 5.3.11-1. PRSs 3-012(b) and 3-045(b) Phase II sample locations.

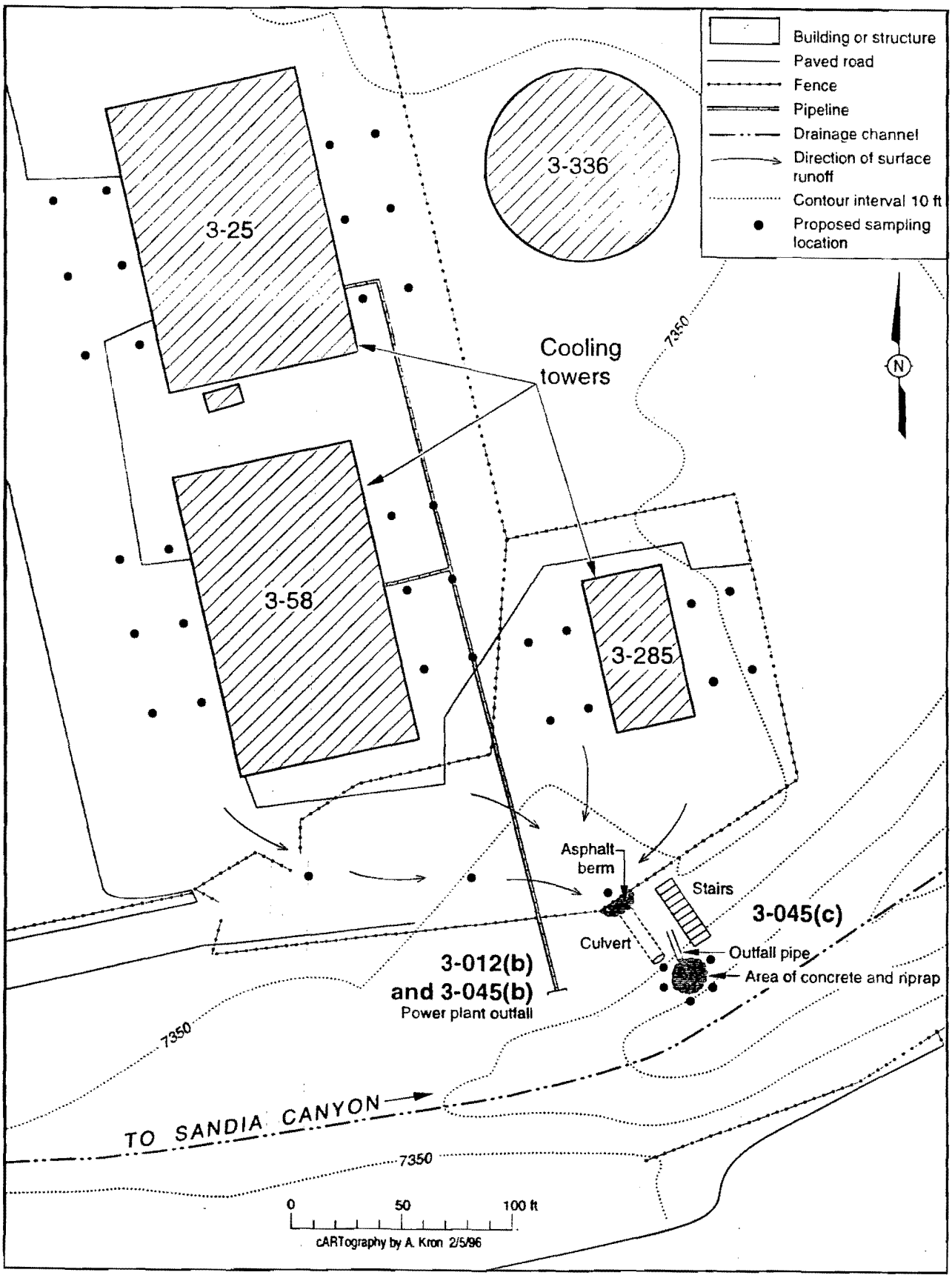

Fig. 5.3.11-2. PRSs 3-012(b) and 3-045(b,c) Phase II cooling tower sample locations.

Five locations will be sampled initially below the PRS 3-045(c) outfall. The samples will be collected from likely locations of potential contamination. Four of the five sampling locations will also be sampled for contaminants that may have resulted from surface runoff directed from the cooling tower area into the ravine via a culvert which discharges in the same area as the outfall. Two samples will be collected at each of these locations, one from the 0- to 6-in. interval and a second from the 6- to 12-in. interval using LANL-ER-SOP-6.09. Because of the steepness of the ravine sides in the vicinity of the outfall, horizontal as opposed to vertical sample holes may be required at the three locations nearest the outfall and culvert. The two sampling locations furthest from the outfall will be positioned near the intermittent stream in the soil and sediment deposits that are currently stabilized by grass roots.

Both outfall and cooling tower samples will be prepared and transported according to LANL-ER-SOPs-01.02, Sample Containers and Preservation, 01.03, Handling, Packaging and Shipping of Samples, and 01.04, Sample Control and Field Documentation. Following sample collection, the bottles will be labeled and the chain-of-custody and other documentation will be completed as required. The bottles will then be placed in a cooler at 4°C for transportation to the analytical laboratory.

5.3.11.4 Phase II Laboratory Analysis

Based on the results of the Phase I investigation in the outfall area as presented in this RFI Report, the analytical suite for the Phase II investigation was modified. The list of COPCs for which the Phase II samples will be analyzed includes PCBs, SVOCs, chromium, cadmium, lead, and silver (Table 5.3.11-1). Because process knowledge indicates that PCBs and PAHs are not anticipated to be released from the cooling towers, the analytical suite for the sets of samples immediately around the cooling towers will include metals and radionuclides only. Analyses will be conducted at MCAL or a fixed laboratory, as appropriate, using EPA SW-846 methods. A portion of each sample will be sent to the MRAL and screened for gross alpha, beta, and gamma radiation to meet transportation and fixed laboratory sample screening requirements.

Where possible, a direct measurement of the concentration of hexavalent chromium will be made because hexavalent chromium (rather than total chromium) is the relevant chemical for the human health risk assessment.

TABLE 5.3.11-1

PHASE II SAMPLES AND ANALYSES FOR PRSs 3-012(b) AND 3-045(b,c)

SAMPLE LOCATION[a]	SAMPLE DEPTHS[b]	ANALYSES
Outfall locations	0-6 and 6-12 in.	chromium[c], cadmium, lead, silver, PCBs[d], SVOCs[e], radionuclides[f]
Cooling tower locations	0-6 and 6-12 in.	XRF metals, TAL[g] metals, radionuclides

[a] Additional sample locations will be added, as necessary, to define the lateral extent of the affected area.
[b] Deeper intervals will be sampled if sufficient soil is present and if necessary to define the vertical extent of the affected area.
[c] Hexavalent chromium, rather than total chromium, will be analyzed where possible.
[d] PCBs = Polychlorinated biphenyls.
[e] SVOCs = Semivolatile organic compounds.
[f] See text for detailed description of radioanalyses.
[g] XRF = X-ray fluorescence.
[h] TAL = Target analyte list.

5.4 PRSs 3-013(a,b) and 3-052(f), TA-3 Storm Drain Outfall

PRSs 3-013(a) and 3-052(f) are a storm drain, one portion of which serves TA-3-38, the Johnson Controls Shop Building. The storm drain runs under much of TA-3 and daylights approximately 100 ft east of the Otowi Building, then flows east into the upper portion of Sandia Canyon. PRS 3-013(b) consists of floor drains in the basement of TA-3-38. Based on analytical results of the Phase I site investigation, both PRSs are recommended for NFA.

5.4.1 History

PRSs 3-013(a,b) are discussed in detail in Subsection 5.9 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). PRS 3-052(f) is discussed in detail in Subsection 5.25 of the RFI Work Plan for OU 1114, Addendum 1 (LANL 1995, 17-1275).

PRS 3-013(a) is a 1 500-ft long storm drain serving the Johnson Controls Shop Building (TA-3-38). There are two grated inlets to this storm drain from TA-3-38; one is located northwest of the building and the other is located at the northeast corner of the building. The majority of the storm drain is an underground corrugated metal pipe that runs south, then east around TA-3-38 and east along the south side of the Otowi Building (TA-3-261). The storm drain merges with several others before it daylights in an open, concrete, rock-lined ditch approximately 100 ft east of the Otowi Building.

PRS 3-013(b) consists of floor drains in the basement of the NTS shop in TA-3-38. These floor drains located in the plasma-burning machine area, metals cutting room, and pipe fabrication shop, may have been previously routed to the storm drain [PRS 3-013(a)]. These floor drains now drain to the sanitary sewer system.

PRS 3-052(f) is an outfall northeast of building TA-3-207. The outfall, which received flow from floor drains, sumps, sinks, and water fountains from several buildings at TA-3, discharges to Sandia Canyon. Dielectric insulating oil, hydraulic oil, and other PCB-containing oil from the Sherwood Building, TA-3-105, may also have been discharged to the storm drain outfall. The drains in TA-3-105 were rerouted to the sanitary sewer system in 1991. PRS 3-013(b) floor drains, sinks, and water fountains in the Johnson Controls World Services, Inc. shop building, TA-3-38, drained to the PRS 3-052(f) outfall until 1987, when the drains were rerouted to the TA-3 sanitary sewer system.

Two reported spills that occurred in building TA-3-287 may also have affected PRS 3-052(f). The first spill consisted of approximately 200 gal. of a water/waste oil mixture that was discharged following the failure of an automatic compressor blow-down mechanism (LANL 1989, 17-952). The second spill consisted of a ruptured air compressor oil line in the basement of TA-3-287 resulting in an approximately one quart spill of compressor oil into the floor drain (LANL 1989, 17-951). This spill resulted in an oily sheen on the surface of the water at the outfall. Another spill originally thought to have discharged to this storm drain actually flowed to a storm drain that runs along Mercury Road and also empties into Sandia Canyon just south of the TA-3 power plant.

5.4.2 Description

The ditch into which the storm drain daylights includes a small, natural drainage which flows across the gently eastward-sloping mesa surface into the upper reaches of Sandia Canyon. The area adjacent to the drainage consists of a thin cover of alluvium and soil over bedrock,

but has been heavily disturbed. In places adjacent to the drainage the ground surface has been cut, and in other places filled, to develop building sites and parking lots. Bedrock is not directly exposed along the drainage. The storm drain then passes under streets and sidewalks and daylights again at the NPDES outfall (EPA 03A023) permitted under the category of noncontact cooling water, nondestructive testing discharge, and water production facilities. The outfall is located just north of TA-3-1837.

5.4.3 Previous Investigations

No previous investigations were conducted at either PRS 3-013(a) or 3-013(b). However, the effluent at the outfall point for PRS 3-013(a) is periodically monitored in compliance with the NPDES permit. The monitored parameters include flow rate, total suspended solids, pH, total chlorine, and total phosphorus.

5.4.4 Field Investigation

The sampling approach described for PRSs 3-013(a,b) in the RFI Work Plan for OU 1114 (LANL 1993, 1090) and also applied to collocated PRS 3-052(f) was designed to determine whether the storm drain discharge at the outfall resulted in the release of contaminants to the drainage ditch (LANL 1993, 1090). In addition, the sampling approach was expected to potentially provide information on other PRSs contributing to the storm drain system.

The biased sample locations indicated in Fig. 5-15 of the RFI Work Plan for OU 1114 (LANL 1993, 1090) were located using the outfall and channel as reference points. Sample locations were biased to areas where sediments could be collected and where it was likely that contaminants would be retained. The sample locations were adjusted in the field to meet the sampling objectives. Sample locations are shown in Fig. 5.4.4-1 and summarized in Table 5.4.4-1.

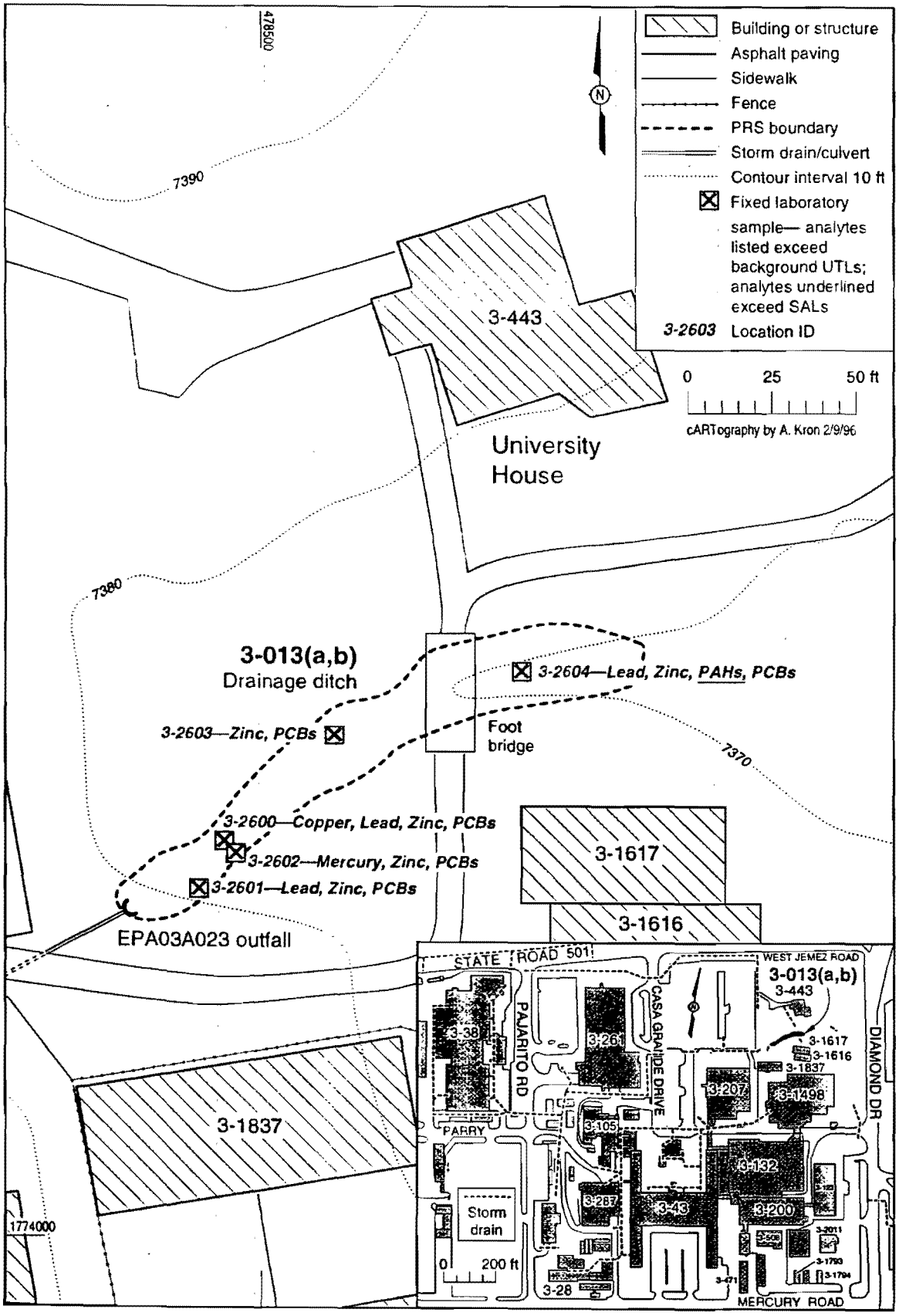

Fig. 5.4.4-1. PRSs 3-013(a,b) and collocated PRS 3-052(f) 1994 sample collection locations.

TABLE 5.4.4-1

SUMMARY OF SAMPLES COLLECTED AT PRSs 3-013(a,b) and 3-052(f)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER				
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PCBs[c]	INORGANICS	MRAL[d]
03-2600	AAB6023	0 - 4	soil	18315	18315	18315	18459	19230
03-2600	AAB6025[e]	0 - 4	soil	18315	N/A[f]	N/A	N/A	19230
03-2601	AAB6026	0 - 3	soil	18315	18315	18315	18459	19230
03-2601	AAB6029[g]	0 - 3	soil	N/A	18315	18315	18459	19230
03-2602	AAB6027	0 - 6	soil	18315	18315	18315	18459	19230
03-2603	AAB6028	0 - 6	soil	18315	18315	18315	18459	19230
03-2604	AAB6030	0 - 8	soil	18315	18315	18315	18459	19230
03-N/A	AAB6032	N/A	water	18315	N/A	N/A	N/A	N/A
03-N/A	AAB6033	N/A	water	18315	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] Field duplicate.
[f] N/A = Not applicable.

Samples were collected using LANL-ER-SOP-6.09, Spade and Scoop Method for Collection of Soil Samples. Using the FID, all sample locations were screened for VOCs during sample collection. The samples were documented and preserved following standard procedures, with the exception that VOC samples were collected using 125 ml glass wide-mouth containers with Teflon™-lined lids.

The sediment samples were collected along the sides of and in the outfall flow channel. The sediment areas mainly contained poorly sorted sand and gravel. Samples were collected from intervals ranging from 0–3 in. to 0–8 in. because of the light sediment load in the drainage channel. No areas of deeper sediment accumulations were observed.

Seven sediment samples were collected at five locations from PRSs 3-013(a,b) and 3-052(f). One of the seven samples was collected as a field duplicate and one was collected as a collocated sample. Five of the seven samples were submitted for analysis of VOCs, SVOCs, PCBs, and TAL metals. One of the seven samples was submitted for analysis of VOCs, and the final sample was submitted for analysis of SVOCs, PCBs, and TAL metals. No VOCs were detected by the FID screening at each sample location. QC samples included field and trip blanks submitted for analysis of VOCs. A rinsate blank was not collected because disposable equipment was used.

5.4.5 Background Comparisons

Twelve metals, including arsenic, barium, beryllium, cadmium, cobalt, magnesium, potassium, selenium, silver, sodium, thallium, and vanadium were not detected in the samples analyzed. All detected inorganics, with the exception of copper, lead, mercury, and zinc were reported at concentrations less than their respective background screening values. The results that exceed background are summarized in Table 5.4.5-1, and the sampling locations are identified on Fig. 5.4.4-1. Copper, lead, mercury, and zinc are carried forward to the SAL comparison step.

TABLE 5.4.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-013(a,b) AND 3-052(f)

SAMPLE ID	DEPTH (in.)	COPPER (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	ZINC (mg/kg)
LANL UTL[a]	N/A[b]	30.7	23.3	0.1	50.8
SAL[c]	N/A	2 800	400	23	23 000
AAB6023	0 -4	114	60.6 (J)[d]	<0.03	105
AAB6023R	0 - 4	8	38.2 (J)	<0.03	94.6
AAB6026	0 - 3	5.9	42.4 (J)	<0.03	107
AAB6027	0 - 6	10.1	14.1 (J)	0.14	111
AAB6028	0 - 6	<5.2	15 (J)	<0.03	72.7
AAB6029	0 - 3	6.7	13.9 (J)	<0.03	80.9
AAB6030	0 - 8	6.7	49.4 (J)	<0.03	83.9

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] (J) = Estimated detected quantity.

5.4.6 Evaluation of Organics

Nine organic chemicals were detected in samples collected from PRSs 3-013(a,b) and 3-052(f). The results for these detected organic chemicals are summarized in Table 5.4.6-1, and the sampling locations are identified on Fig. 5.4.4-1. PCBs, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[b]fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were carried forward in the screening process to the SAL comparison step.

TABLE 5.4.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRSs 3-013(a,b) AND 3-052(f)

SAMPLE ID	DEPTH (in.)	PCBs[a] (mg/kg)	BENZO[a] -ANTHRA-CENE (mg/kg)	BENZO[a] -PYRENE (mg/kg)	BENZO[b] -FLUOR-ANTHENE (mg/kg)	BENZO[k] -FLUOR-ANTHENE (mg/kg)	CHRYSENE (mg/kg)	FLUOR-ANTHENE (mg/kg)	PHEN-ANTHRENE (mg/kg)	PYRENE (mg/kg)
SAL[b]	N/A[c]	1	1	0.1	1	1	96	3 200	N/A	2 400
EQL[d]	N/A	0.033	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB6023	0 - 4	0.137	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5
AAB6027	0 - 6	0.105	<4	<4	<4	<4	<4	<4	<4	<4
AAB6028	0 - 6	0.047	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
AAB6029	0 - 3	0.021	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
AAB6030	0 - 8	0.133	4.6	4.6	4.3	3.6	5.4	12	13	10

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.

5.4.7 Human Health

5.4.7.1 Screening Assessment

Three of the chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.4.7-2). Thus, three organic chemicals are identified as COPCs based on the SAL comparison. None of the other chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs (Tables 5.4.5-1, 5.4.6-1) and these chemicals are eliminated as COPCs.

TABLE 5.4.7-2

CARCINOGENS THAT EXCEED SALs IN SOIL FOR PRSs 3-013(a,b) AND 3-052(f)

SAMPLE ID	LOCATION ID	DEPTH (in.)	BENZO(a) ANTHRACENE (mg/kg)	BENZO(a) PYRENE (mg/kg)	BENZO(b) FLUORANTHENE (mg/kg)
SAL[a]	N/A[b]	N/A	0.61	0.061	0.61
AAB6030	03-2604	0 - 8	4.6	4.6	4.3

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRSs 3-013(a,b) and 3-052(f), COPCs detected at concentrations below their respective SALs were divided into two classes; noncarcinogens and carcinogens. The maximum detected value for each chemical was used, the most conservative method for evaluating multiple chemical effects. Even so, the results of the noncarcinogen and the carcinogen multiple chemical evaluations were less than unity (Table 5.4.7-4), indicating that health effects caused by the additivity of multiple chemicals is unlikely. Thus, no additional COPCs were identified by the multiple chemical evaluation.

TABLE 5.4.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRSs 3-013(a,b) AND 3-052(f) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NON-CARCINOGENIC EFFECTS				
Copper	AAB6023	114	2 800	0.041
Fluoranthene	AAB6030	12	2 600	0.0046
Lead	AAB6023	60.6 (J)[b]	400	0.15
Mercury	AAB6027	0.14	23	0.006
Pyrene	AAB6030	10	2 000	0.005
Zinc	AAB6027	111	23 000	0.0048
			Total:	0.213
CARCINOGENIC EFFECTS				
Benzo[k]fluoranthene	AAB6030	3.6	6.1	0.59
Chrysene	AAB6030	5.4	88	0.061
PCBs[c]	AAB6023	0.137	1	0.137
			Total:	0.789

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.
[c] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.

5.4.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.4.8 Ecological

5.4.8.1 Ecotoxicological Screening Assessment

PRSs 3-013(a,b) and 3-052(f) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRSs received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRSs 3-013(a,b) and 3-052(f) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.4.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.4.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs, with the exception of four PAHs attributed to pavement runoff, and the multiple chemical evaluation is less than one.

5.4.10 Conclusions and Recommendations

Three chemicals were retained as COPCs by the screening assessment process for PRSs 3-013(a,b) and 3-052(f). However, the detection of low level concentrations of PAHs is most likely associated with runoff from the parking lot next to PRSs 3-013(a,b) and 3-052(f). Therefore, PRSs 3-013(a,b) and 3-052(f) are recommended for NFA. Based on LANL's No Further Action Criteria Policy Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove PRSs 3-013(a,b) and 3-052(f) from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.5 PRSs 3-014(a,e), WWTP Imhoff Tanks and Associated PRSs

PRSs 3-014(a,e) are the grassy areas surrounding the Imhoff tanks and other structures at the former WWTP. These sites are recommended for NFA. An additional 20 PRSs at the former WWTP [PRSs 3-014(b-d, f-j, p-z, a2) were considered in conjunction with PRSs 3-014(a,e) and 3-014(b2) described below. These PRSs are also recommended for NFA.

5.5.1 History

PRSs 3-014(a,e) are discussed in detail in Subsection 5.5 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). It is reported that dried sludge and effluent were applied to the grass around the Imhoff tanks as a soil amendor. These areas are also associated with possible spillcver from the Imhoff tanks, clarifiers, or dosing siphons during treatment processes.

The RFI Work Plan for OU 1114 lists 30 PRSs associated with the TA-3 WWTP (LANL 1993, 1090). These PRSs are described on p. 5-46 of the work plan and the descriptions are repeated in Table 5.5.1-1 below. Each component of the WWTP was considered a PRS in the SWMU report (LANL 1990, 0145); however, the piping, lift stations, drains leading to the WWTP, and concrete structures associated with the WWTP were not sampled in the 1994 RFI activities. Instead, four PRSs were sampled because they were believed to be the areas most likely to have received and retained any COPCs associated with the WWTP. PRSs 3-014(a,e) were selected for sampling because treated sludge was directly applied to the soil in the grassy area around the Imhoff tanks. PRSs 3-014(b2,c2) were selected for sampling because PRS 3-014(b2) is a current NPDES permitted outfall for treated effluent and PRS 3-014(c2) was believed to be an abandoned outfall trench (it was later identified as a storm drain trench and overflow outlet pipe outfall).

TABLE 5.5.1-1

COMPONENTS OF THE WASTEWATER TREATMENT PLANT

SWMU	STRUCTURE	YEAR BUILT	DESCRIPTION	FUNCTION
3-014(a)	TA-3-49	1951	Imhoff tank	Settling/digestion
3-014(e)	TA-3-192	1965	Imhoff tank	Settling/digestion
3-014(b)	TA-3-48	1951	Dosing siphon	Holding/dispersing
3-014(f)	TA-3-193	1965	Dosing siphon	Holding/dispersing
3-014(c)	TA-3-47	1951	Trickling filter	Microbial digestion
3-014(g)	TA-3-194	1965	Trickling filter	Microbial digestion
3-014(d)	TA-3-46	1951	Secondary clarifier	Settling/clarifying
3-014(h)	TA-3-195	1965	Secondary clarifier	Settling/clarifying
3-014(i)	TA-3-677	1951	Splitter box, comminutor, bar rack	Divert flow, cutter/shredder, filters large debris
3-014(j)	TA-3-166	1957	Effluent pump pit, chlorinator, contact chamber	Final effluent pump, chlorine injector pump, chlorine contact basin
3-014(k)	TA-3-196	1965	Drying bed	Sludge drying
3-014(l)	TA-3-197	1965	Drying bed	Sludge drying
3-014(m)	TA-3-198	1965	Drying bed	Sludge drying
3-014(n)	TA-3-199	1965	Drying bed	Skimmer bed
3-014(o)	TA-3-1871	1987	Drying beds (3)	Sludge drying
3-014(p)	TA-3-265	1966	Sewage lift station	Pump sewage
3-014(q)	TA-3-336	1967	Effluent tank	Holding tank for cooling tower
3-014(r)	TA-3-693	1970s	Sewage pump station	Pump sewage
3-014(s)	TA-3-1639	1970s	Sewage lift station	Pump sewage
3-014(t)	TA-3-1869	1987	Sewage lift station	Pump sewage
3-014(u)	TA-3-1901	1988	Holding tank	Temporary storage
3-014(v)	TA-3-36	1953	Floor drain	Drain to sewer
3-014(w)	TA-3-29	1953	Floor drain	Inactive drain (1991)
3-014(x)	TA-3-66	1959	Floor drain	Drain to sewer
3-014(y)	TA-3-35	1954	Floor drain	Inactive drain (1981)
3-014(z)	TA-3-40	1950s	Floor drain	Inactive drain (1989)
3-014(a2)	TA-3-316	1969	Floor drain	Drain to sewer
3-014(b2)	TA-3-166	1988	Permitted outfall	Sanitary outfall
3-014(c2)	TA-3-166	1985	Abandoned outfall	Sanitary outfall
3-012(b)	TA-3-22	1989	Permitted outfall	Power plant outfall

[a] WWTP effluents diverted to the power plant's cooling tower and outfall.

5.5.2 Description

PRSs 3-014(a,e) are located on a gentle slope along the edge of the mesa adjacent to a small tributary at the head of Sandia Canyon. Bedrock (Bandelier Tuff) is overlain by several feet of alluvium, colluvium, and soil. The area has been heavily disturbed and probably leveled with fill around and between tanks. Drainage at the site occurs primarily by sheetflow across the surface.

5.5.3 Previous Investigations

No previous investigations were conducted at PRSs 3-014(a,e).

5.5.4 Field Investigation

The sampling approach for PRSs 3-014(a,e) in the RFI Work Plan for OU 1114 (LANL 1090) was designed to determine whether any contaminants were released to the environment as a result of sludge application to soil or from tank spill-overs. Information obtained through this sampling approach is tied to associated WWTP PRSs 3-014(b-d, f-j, p-z, and a2). The program described in the work plan was modified to include additional fixed laboratory radiochemical analyses. The sampling event was not intended to determine if the 1-ft-thick concrete structures had leaked.

The biased sample locations indicated in Fig. 5-10 of the RFI Work Plan for OU 1114 (LANL 1993, 1090) were located using the Imhoff tanks as reference points. The actual sample locations shown in Fig. 5.5.4-1 were adjusted in the field to meet the sampling objectives. The areas that were sampled were typically downgradient from the Imhoff tanks, except sample location 03-2103, which was positioned between the Imhoff tanks in a slightly upgradient location. A summary of samples collected is presented in Table 5.5.4-1

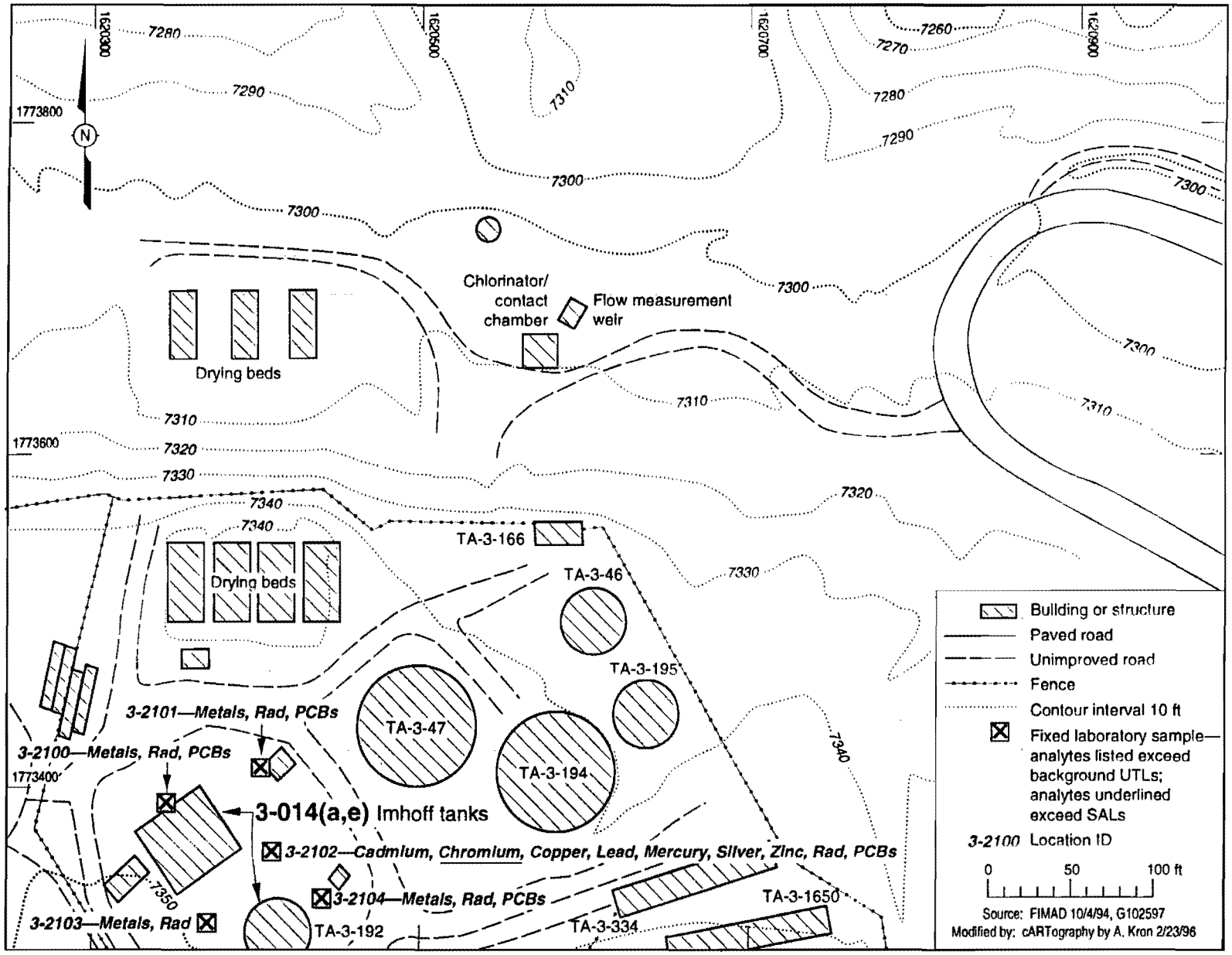

Fig. 5.5.4-1. PRSs 3-014(a,e) 1994 sample collection locations.

TABLE 5.5.4-1

SUMMARY OF SAMPLES COLLECTED AT PRSs 3-014(a,e)

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER						
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	HERBI-CIDES	PESTI-CIDES/ PCBs[c]	INORG-ANICS	RADIO-NUCLIDES	MRAL[d]
03-2100	AAB5944	0 - 12	soil	N/A[e]	18246	18246	18246	18298	19329	18891
03-2100	AAB5952	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2101	AAB5945	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2101	AAB5953	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2102	AAB5947	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2102	AAB5954	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2103	AAB5948	0 - 12	soil	N/A	N/A	N/A	N/A	18298	19329	18891
03-2103	AAB5955	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2104	AAB5949	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2104	AAB5950[f]	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2104	AAB5951[g]	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2104	AAB5956	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-N/A	AAB5957	N/A	water	18246	18246	18246	N/A	18298	N/A	N/A
03-N/A	AAB5958	N/A	water	18246	N/A	N/A	N/A	N/A	N/A	N/A
03-N/A	AAB5959	N/A	water	18246	N/A	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.
[g] Duplicate sample.

Twelve soil samples were collected from PRSs 3-014(a,e) at five locations (03-2100 through 03-2104). One sample (AAB5950) was collected as a collocated sample. Two samples were collected from each shallow hole, one from the 0- to 12-in. interval and one from the 12- to 18-in. interval. Samples were collected according to ER SOPs. Using the FID, all sample locations were screened for VOCs within the hole at the 12-in. depth. Samples from the 0- to 12-in. interval were submitted for analysis of SVOCs, organochlorine pesticides, herbicides, PCBs, TAL metals, gross alpha/beta, gamma spectroscopy, and tritium. Samples AAB5948 and AAB5955, however, were submitted only for TAL metals and radionuclides because of an omission on the chain-of-custody. Samples from the 12- to 18-in. interval were submitted for analysis of cyanide and VOCs, even though no VOCs were detected by the FID screening. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples.

5.5.5 Background Comparisons

Five metals, including antimony, cobalt, selenium, sodium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of cadmium, chromium, copper, cyanide, lead, mercury, silver, and zinc were reported at concentrations less than the background screening values. Note that cyanide and silver do not have background screening values, so the detection limit is used as a surrogate background comparison value. The results that exceed background are summarized in Table 5.5.5-1 and the sampling locations are identified on Fig. 5.5.4-1. These analytes are carried forward in the screening process to the SAL comparison step.

All detected radionuclides, with the exception of plutonium-238, plutonium-239, uranium-234, uranium-235, and uranium-238, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.5.5-2 and the sampling locations are identified on Fig. 5.5.4-1. These analytes are carried forward in the screening process to the SAL comparison step.

Radionuclides that were detected and do not have background screening values are addressed in Subsection 4.5.3 of this report.

TABLE 5.5.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-014(a,e)

SAMPLE ID	DEPTH (in.)	CADMIUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	CYANIDE (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)	ZINC (mg/kg)
LANL UTL[a]	N/A[b]	2.7	19.3	30.7	NA[c]	23.3	0.1	NA	50.8
SAL[d]	N/A	38	210	2 800	1 300	400	23	380	23 000
AAB5944	0 - 12	2.4	30.6 (J)[e]	68.6	N/A	45.8	0.14 (J)	20.2	94.7
AAB5945	0 - 12	2.3	164 (J)	159	N/A	115	0.67 (J)	81.2	111
AAB5945R[f]	0 - 12	2.6	158 (J)	147	N/A	109	0.613 (J)	78	103
AAB5947	0 - 12	4	239 (J)	210	N/A	102	0.14 (J)	110	125
AAB5948	0 - 12	3.4	200 (J)	220	N/A	76.4	2.6 (J)	106	101
AAB5949	0 - 12	3	209 (J)	203	N/A	93	0.21 (J)	106	104
AAB5950	0 - 12	3.2	209 (J)	194	N/A	104	2 (J)	102	115
AAB5951	12 - 18	N/A	N/A	N/A	1.8 (J)	N/A	N/A	N/A	N/A
AAB5952	12 - 18	N/A	N/A	N/A	2.2 (J)	N/A	N/A	N/A	N/A
AAB5953	12 - 18	N/A	N/A	N/A	4.9 (J)	N/A	N/A	N/A	N/A
AAB5955	12 - 18	N/A	N/A	N/A	0.62 (J)	N/A	N/A	N/A	N/A

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] (J) = Estimated detected quantity.
[f] Replicate sample.

TABLE 5.5.5-2

RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-014(a,e)

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.

LOCATION ID	SAMPLE ID	PLUTONIUM-238 (pCi/g)	PLUTONIUM-239 (pCi/g)	URANIUM-234 (pCi/g)	URANIUM-235 (pCi/g)	URANIUM-238 (pCi/g)
UTL[a]	N/A[b]	0.014	0.052	1.94	0.084	1.82
SAL[c]	N/A	27	24	13	10	67
03-2100	AAB5944	0.07 (J)[d]	0.047 (J)	1.482	0.056	1.059
03-2101	AAB5945	0.097 (J)	0.57 (J)	2.734	0.131	1.284
03-2101	AAB5945R[e]	0.09 (J)	0.131 (J)	3.901	0.151	1.583
03-2102	AAB5947	0.178 (J)	0.113 (J)	10.011	0.543	2.581
03-2103	AAB5948	0.135 (J)	0.164 (J)	2.644	0.113	1.633
03-2104	AAB5949	0.144 (J)	0.074 (J)	2.757	0.092	2.16
03-2104	AAB5949R	0.142 (J)	0.223 (J)	3.079	0.146	2.518
03-2104	AAB5950	0.207 (J)	0.169 (J)	3.604	0.117	2.232

[c] SAL = Screening action level.
[d] (J) = Estimated detected quantity.
[e] R = Replicate sample.

5.5.6 Evaluation of Organics

One class of organic chemicals, PCBs, was detected in samples collected from the PRS. Results for this detected organic are summarized in Table 5.5.6-1, and sampling locations are identified on Fig. 5.5.4-1. This detected organic chemical was carried forward in the screening process to the SAL comparison step.

TABLE 5.5.6-1

ORGANIC CHEMICAL WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRSs 3-014(a,e)

SAMPLE ID	DEPTH OF SAMPLE (FT)	PCBS[a] (mg/kg)
SAL[b]	N/A[c]	1
AAB5944	0 - 1	0.18
AAB5950	0 - 1	0.26
AAB5949	0 - 1	0.36
AAB5947	0 - 1	0.42
AAB5945	0 - 1	0.73

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.

5.5.7 Human Health

5.5.7.1 Screening Assessment

Only one chemical identified by the background comparison or the detection limit screening exceeded its SAL (Table 5.5.7-1). None of the other chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs and these chemicals are eliminated as COPCs (Tables 5.5.5-1, 5.5.5-2, and 5.5.6-1.).

TABLE 5.5.7-1

CARCINOGENS THAT EXCEED SALs IN SOIL FOR PRSs 3-014(a,e)

SAMPLE ID	DEPTH OF SAMPLE (FT)	CHROMIUM (mg/kg)
SAL[a]	N/A[b]	210
AAB5947	0 - 1	239 (J)

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRSs 3-014(a,e), COPCs below their respective SALs were divided into two classes, noncarcinogens and radionuclides. Because only one carcinogenic chemical (PCBs) was detected below its SAL, the multiple chemical evaluation for carcinogens is unnecessary. The maximum value for each chemical was used, the most conservative method for evaluating multiple chemical effects. The result of the radionuclide multiple chemical evaluation was less than unity (Table 5.5.7-4). The result of the noncarcinogen multiple chemical evaluation was also less than unity (Table 5.5.7-4).

TABLE 5.5.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRSs 3-014(a,e) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Cadmium	AAB5947	4	38	0.105
Copper	AAB5948	220	2 800	0.078
Cyanide	AAB5953	4.9 (J)[b]	1 300	0.0037
Lead	AAB5945	115	400	0.288
Mercury	AAB5948	2.6 (J)	23	0.113
Silver	AAB5947	110	380	0.289
Zinc	AAB5947	125	23 000	0.0054
			Total:	0.883
RADIONUCLIDE EFFECTS [c]				
Plutonium-238	AAB5950	0.207 (J)	27	0.0077
Plutonium-239	AAB5945	0.57 (J)	24	0.024
Uranium-234	AAB5947	10.011	13	0.77
Uranium-235	AAB5947	0.543	10	0.054
Uranium-238	AAB5947	2.581	67	0.039
			Total:	0.894

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.
[c] Results are in pCi/g.

5.5.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.5.8 Ecological

5.5.8.1 Ecotoxicological Screening Assessment

PRSs 3-014(a,e) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRSs received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRSs 3-014(a,e) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.5.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for these PRSs.

5.5.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations except chromium are less than SALs and the multiple chemical evaluation is less than one.

5.5.10 Conclusions, Actions, and Recommendations

Only one chemical, chromium, slightly exceeded its SAL in one sample collected at PRSs 3-014(a,e) (239 mg/kg in contrast to 210 mg/kg). The presence of chromium at this concentration should not pose an unacceptable risk given that the SALs are derived based on conservative residential exposure assumptions and this PRS is within the primary industrial part of the Laboratory. In addition, it is unlikely that chromium exists in its hexavalent form, which is the carcinogenic variety of chromium.

Therefore, PRSs 3-014(a,e) are recommended for NFA. In addition, associated PRSs 3-014(b-d, f-j, p-z, and a2) are recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the projected industrial future land use), a Class III permit modification

will be requested to remove these PRSs from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.6 PRS 3-014(b2), Wastewater Treatment Plant Current Outfall

PRS 3-014(b2) is an outfall from the WWTP. Based on analytical results from the Phase I investigation, PRS 3-014(b2) is recommended for NFA. In addition, associated PRSs 3-014(b-d, f-j, p-z, and a2) are recommended for NFA.

5.6.1 History

PRS 3-014(b2), the current outfall from the WWTP, is discussed in detail in Subsection 5.5 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). The outfall discharges to a small tributary of Sandia Canyon south of TA-3-22 (the Power Plant). The NPDES permit number of the outfall is EPASSS01S. The outfall discharges at a rocky outcrop on the canyon's edge and flows down a steep, rocky channel to a wetlands area on the canyon floor; however, the plan was to collect samples from the immediate area around the outfall pipe.

In conjunction with sampling at PRSs 3-014(a,e), sampling at PRS 3-014(b2) was intended to identify any COPCs that might be present at PRSs associated with the WWTP. As explained in Subsection 5.5.1 of this report, the RFI Work Plan for OU 1114 (LANL 1993, 1090) lists 30 PRSs associated with the TA-3 WWTP. Four of these PRSs were sampled because they were believed to be the areas most likely to have received and retained any COPCs associated with the WWTP. PRSs 3-014(a,e) were selected for sampling because treated sludge was directly applied to the soil in the grassy area around the Imhoff tanks. PRSs 3-014(b2,c2) were selected for sampling because PRS 3-014(b2) is a current NPDES permitted outfall for treated effluent and PRS 3-014(c2) was believed to be an abandoned outfall trench (it was later identified as a storm drain trench and overflow outlet pipe outfall).

5.6.2 Description

The outfall disgorges onto bedrock (Bandelier Tuff) along the side of Sandia Canyon. The effluent spills across the surface of the bedrock for 15–20 ft and into a mat of vegetation before dropping into the canyon. Bedrock is overlain by from zero to several feet of soil and fill. At this location the natural soil and alluvium is very thin (less than one foot), but immediately adjacent areas have been heavily disturbed. The outlet pipe is covered by fill excavated from material adjacent to the pipe.

5.6.3 Previous Investigations

No previous investigations of the soils surrounding PRS 3-014(b2) have been conducted. However, the effluent at the outfall point is monitored three times a month in compliance with the NPDES permit. The monitored parameters include biochemical oxygen demand, total suspended solids, pH, fecal coliform, total chlorine, and radioactive components.

5.6.4 Field Investigation

The sampling approach for PRS 3-014(b2) in the RFI Work Plan for OU 1114 was designed to determine whether discharge at the outfall resulted in the release of any contaminants to the site (LANL 1993, 1090). Information obtained through this sampling approach is tied to associated WWTP PRSs 3-014(b-d, f-j, p-z, and a2). The program described in the work plan was modified to include additional radiochemical analyses.

The biased sample locations indicated in Fig. 5-10 of the RFI Work Plan for OU 1114 were located using the outfall channel and the outfall as reference points (LANL 1993, 1090). However, the actual sample locations as shown on Fig. 5.6.4-1 were adjusted in the field from those specified in the work plan to meet the sampling objectives. Table 5.6.4-1 summarizes the samples collected at PRS 3-014(b2) The sediment areas sampled were along the channel and in the outfall flow path. Because of the tuff outcrop at the outfall, effluent drained mainly over exposed tuff, with few areas containing sediments. The areas sampled included sediments trapped by vegetation roots. Because most of the steep, rocky outfall is continually washed by the effluent, the most significant area of sediment accumulation downgradient from the outfall was located within a wetlands area on the canyon floor. This area will be sampled by the Canyons Field Unit of the Environmental Restoration Project.

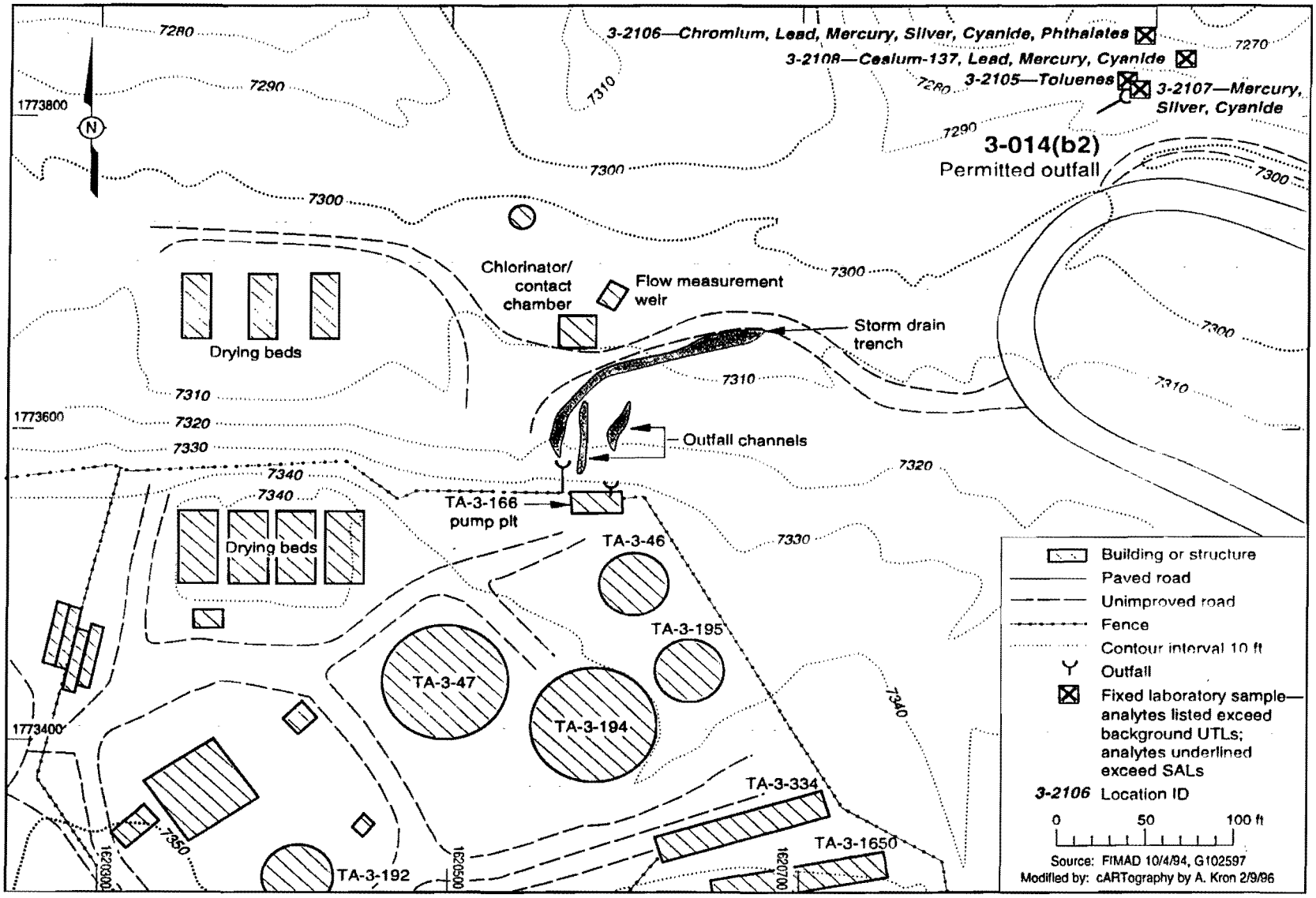

Fig. 5.6.4-1. PRS 3-014(b2) 1994 sample collection locations.

TABLE 5.6.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 3-014(b2)

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER						
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	HERBI-CIDES	PESTI-CIDES/ PCBs[c]	INORG-ANICS	RADIO-NUCLIDES	MRAL[d]
03-2105	AAB5930	0 - 12	soil	18186	18186	18186	18186	20225	19954	21698
03-2105	AAB5932	12 - 18	soil	N/A[e]	N/A	N/A	N/A	20225	N/A	N/A
03-2106	AAB5931	0 - 12	soil	18186	18186	18186	18186	20225	19954	21698
03-2106	AAB5933	12 - 18	soil	N/A	N/A	N/A	N/A	20225	N/A	N/A
03-2107	AAB5934	0 - 12	soil	N/A	18186	18186	18186	20225	19954	21698
03-2107	AAB5936	12 - 18	soil	18186	N/A	N/A	N/A	N/A	N/A	N/A
03-2108	AAB5935	0 - 6	soil	N/A	18186	18186	18186	20225	19954	21698
03-2108	AAB5937	0 - 6	soil	18186	N/A	N/A	N/A	N/A	N/A	N/A
03-2108	AAB5938[f]	0 - 6	soil	N/A	18186	18186	18186	20225	19954	21698
03-2108	AAB5939[g]	0 - 6	soil	18186	N/A	N/A	N/A	N/A	N/A	N/A
03-2108	AAB7670	0 - 6	soil	N/A	N/A	18550	N/A	N/A	N/A	20714
03-2108	AAB7701	0 - 2	soil	N/A	N/A	19136	19136[h]	N/A	N/A	20520
03-N/A	AAB5940	N/A	water	N/A	18186	18186	18186	20225	N/A	N/A
03-N/A	AAB5941	N/A	water	18186	N/A	N/A	N/A	N/A	N/A	N/A
03-N/A	AAB5942	N/A	water	18186	N/A	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Field split sample.
[g] Collocated sample.
[h] PCB only analysis was performed.

Samples were collected using LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. Using the FID, all sample locations were screened for VOCs within the hole during sample collection. Samples were documented and preserved following ER SOPs, with the exception that samples to be analyzed for VOCs were collected using 125 ml glass wide-mouth containers with Teflon™-lined lids.

Eight soil samples were collected at four locations (03-2105 through 03-2108) at PRS 3-014(b2). Two additional samples were collected, one as a field split and one as a collocated sample. Five samples were submitted for analysis of SVOCs, organochlorine pesticides, herbicides, TAL metals, and radionuclides. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples. These QC samples are also associated with the sample collected at PRS 3-012(b), because they were sampled on the same day.

Because the holding times for EPA method SW-846 8080 analyses were exceeded for the original PCB and herbicide samples collected from PRS 3-014(b2), a second sampling event was conducted on August 9, 1994. A single sample (AAB7670) was collected from the 0- to 6-in. interval at location 03-2108 and submitted for analysis of PCBs and herbicides. This sample was left at room temperature for a week before being cooled, sent offsite for analyses, and analyzed within holding times; however, PCB data from this sample can be used because the surface sample had been exposed to the environment for years, was sealed in an approved container and cooled before analysis, and was in an air-conditioned environment during the week it was left at room temperature. However, a third sample (AAB7701) was collected on September 15, 1994, and submitted for analyses of herbicides and PCBs for additional information.

5.6.5 Background Comparisons

Six metals, including antimony, beryllium, cadmium, nickel, selenium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of chromium, cyanide, lead, mercury, and silver were reported at concentrations less than their respective background screening values. Note that cyanide and silver do not have background screening values, so the detection limit is used as a surrogate background comparison. The results that exceeded background are summarized in Table 5.6.5-1, and the sampling locations are identified on Fig. 5.6.4-1. Chromium, cyanide, lead, mercury, and silver are carried forward in the screening process to the SAL comparison step.

TABLE 5.6.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN BACKGROUND AT PRS 3-014(b2)

SAMPLE ID	DEPTH (in.)	CHROMIUM (mg/kg)	CYANIDE (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)
UTL[a]	N/A[b]	19.3	NA[c]	23.3	0.1	NA
SAL[d]	N/A	210	1 300	400	23	380
AAB5931	0 - 12	86	N/A	30.5	0.19 (J)[e]	42.4
AAB5933	12 - 18	N/A	33.9 (J)	N/A	N/A	N/A
AAB5934	0 - 12	10.8	2.2 (J)	17.7	0.2 (J)	5.5
AAB5935	0 - 6	4.1	0.93 (J)	30.2	0.14 (J)	<0.62
AAB5938	0 - 6	3.4	<0.61 (UJ)[f]	23.9	<0.06 (UJ)	<0.28

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] (J) = Estimated detected quantity.
[f] (UJ) = Estimated undetected quantity.

All detected radionuclides, with the exception of cesium-137, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.6.5-2 and the sampling locations are identified on Fig. 5.6.4-1. Cesium-137 is carried forward in the screening process to the SAL comparison step.

Radionuclides that were detected and do not have background screening values are addressed in Subsection 4.6.3 of this report.

TABLE 5.6.5-2

RADIONUCLIDE WITH CONCENTRATION GREATER THAN BACKGROUND AT PRS 3-014(b2)

[a] UTL = Upper tolerance limit.

SAMPLE ID	DEPTH (in.)	CESIUM-137
UTL[a]	N/A[b]	1.4
SAL[c]	N/A	5.1
AAB5935	0 - 6	2.44
AAB5938	0 - 6	2.49

[b] N/A = Not applicable
[c] SAL = Screening action level.

5.6.6 Evaluation of Organics

Three organic chemicals, bis(2-ethylhexyl)phthalate, 4-isopropyltoluene, and toluene were detected in samples collected at PRS 3-014(b2). Results for these detected organics are summarized in Table 5.6.6-1 and sampling locations are identified on Fig. 5.6.4-1. All three organic chemicals are carried forward in the screening process to the SAL comparison step.

TABLE 5.6.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 3-014(b2)

SAMPLE ID	DEPTH (in.)	BIS(2-ETHYLHEXYL)PHTHALATE (mg/kg)	ISOPROPYL-TOLUENE [4-] (mg/kg)	TOLUENE (mg/kg)
SAL[a]	N/A[b]	32	NA[d]	1 900
EQL[c]	N/A	0.33	NA	0.01
AAB5930	0 - 12	<0.43	0.28	0.008
AAB5931	0 - 12	0.6	<0.011	<0.011

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] EQL = Estimated quantitation limit.
[d] NA = Not available.

5.6.7 Human Health

5.6.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs (Tables 5.6.5-1, 5.6.5-2, and 5.6.6-1).

Only one class of chemicals, noncarcinogens, was evaluated for multiple chemical effects for SWMU 3-014(b2) because only one chemical each was detected in the carcinogen and radionuclide classes. The maximum detected value for each chemical was used, the most conservative method for evaluating multiple chemical effects. Even so, results of the noncarcinogen multiple chemical evaluations were less than unity (Table 5.6.7-4), indicating that health effects caused by the additivity of multiple chemicals is unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.6.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 3-014(b2) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Chromium	AAB5931	86	210	0.41
Cyanide	AAB5933	33.9 (J)[b]	1 300	0.026
Lead	AAB5931	30.5	400	0.076
Mercury	AAB5934	0.2 (J)	23	0.009
Silver	AAB5931	42.4	380	0.112
Toluene	AAB5930	0.008	1900	0.000004
			Total:	0.632

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.

5.6.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.6.8 Ecological

5.6.8.1 Ecotoxicological Screening Assessment

PRS 3-014(b2) received a landscape score of three in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is relatively undisturbed by human activities. The PRS also received a receptor access score of three because the potential for COPC transport to other habitats is high in an outfall area such as

this. PRS 3-014(b2) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.6.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.6.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.6.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 3-014(b2). Therefore, PRS 3-014(b2) is recommended for NFA. In addition, associated PRSs 3-014(b-d, f-j, p-z, and a2) are recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.7 PRS 3-014(c2), Wastewater Treatment Plant Pump House Overflow Outfall

PRS 3-014(c2) is an abandoned overflow outfall area associated with the WWTP and located north of TA-3-166, the pump building. Because analytical results of the Phase I site investigation revealed several constituents in soil at concentrations exceeding SALs, PRS 3-014(c2) is recommended for a Phase II investigation. In addition, associated WWTP PRSs 3-014(k,l,m,n, and o) will be included in the Phase II investigation.

5.7.1 History

PRS 3-014(c2), the overflow outfall area associated with the WWTP, is discussed in detail in Subsection 5.5 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). The WWTP was decommissioned in the autumn of 1992 when the Sanitary Waste Consolidation System (SWSC) came on line at TA-46. However, the treated effluent is still routed from the SWSC plant to the TA-3 WWTP's outfall because of NPDES permit issues. The PRS is located on the

north side of TA-3-166, the pump building. The overflow outfall pipe discharged as sheet flow onto a steep slope that contains an erosion channel from storm water runoff. The channel eventually trends northeast toward Sandia Canyon. On occasion, soils in the storm water channel were cleaned out with a backhoe and the removed soil was piled onto the upslope channel bank.

In conjunction with sampling at PRSs 3-014(a,e) and 3-014(b2), sampling at PRS 3-014(c2) was intended to identify any COPCs that might be present at all PRSs associated with the WWTP. As explained in Subsection 5.5.1 of this report, the RFI Work Plan for OU 1114 (LANL 1993, 1090) lists 30 PRSs associated with the TA-3 WWTP. Four of these PRSs were sampled because they were believed to be the areas most likely to have received and retained any COPCs associated with the WWTP. PRSs 3-014(a,e) were selected for sampling because treated sludge was directly applied to the soil in the grassy area around the Imhoff tanks. PRSs 3-014(b2,c2) were selected for sampling because PRS 3-014(b2) is a current NPDES permitted outfall for treated effluent and PRS 3-014(c2) was believed to be an abandoned outfall trench (it was later identified as a storm drain trench and overflow outlet pipe outfall).

5.7.2 Description

PRS 3-014(c2) is located on a steep slope just above a tributary drainage near the head of Sandia Canyon. Bedrock is exposed in several locations on the slope. The hillside adjacent to the channels is covered with 0–3 ft of colluvium, boulders, and soil. The hillside area is heavily disturbed, with much fill pushed over the edge into the area of the outfalls.

5.7.3 Previous Investigations

No previous investigations were conducted at PRS 3-014(c2).

5.7.4 Field Investigation

The sampling approach in the RFI Work Plan for OU 1114 for PRS 3-014(c2) was designed to determine whether discharge from the pump house overflow pipe resulted in the release of any contaminants to the site (LANL 1993, 1090). The program described in the work plan was modified to include additional fixed laboratory radiochemical analyses.

The biased sample locations indicated in Fig. 5-10 of the RFI Work Plan for OU 1114 were located using the pump house overflow outfall channel, the roadway, and TA-3-166 as reference points (LANL 1993, 1090). The sample locations were adjusted in the field to meet the sampling objectives. The actual sample locations are shown in Fig. 5.7.4-1 and summarized in Table 5.7.4-1.

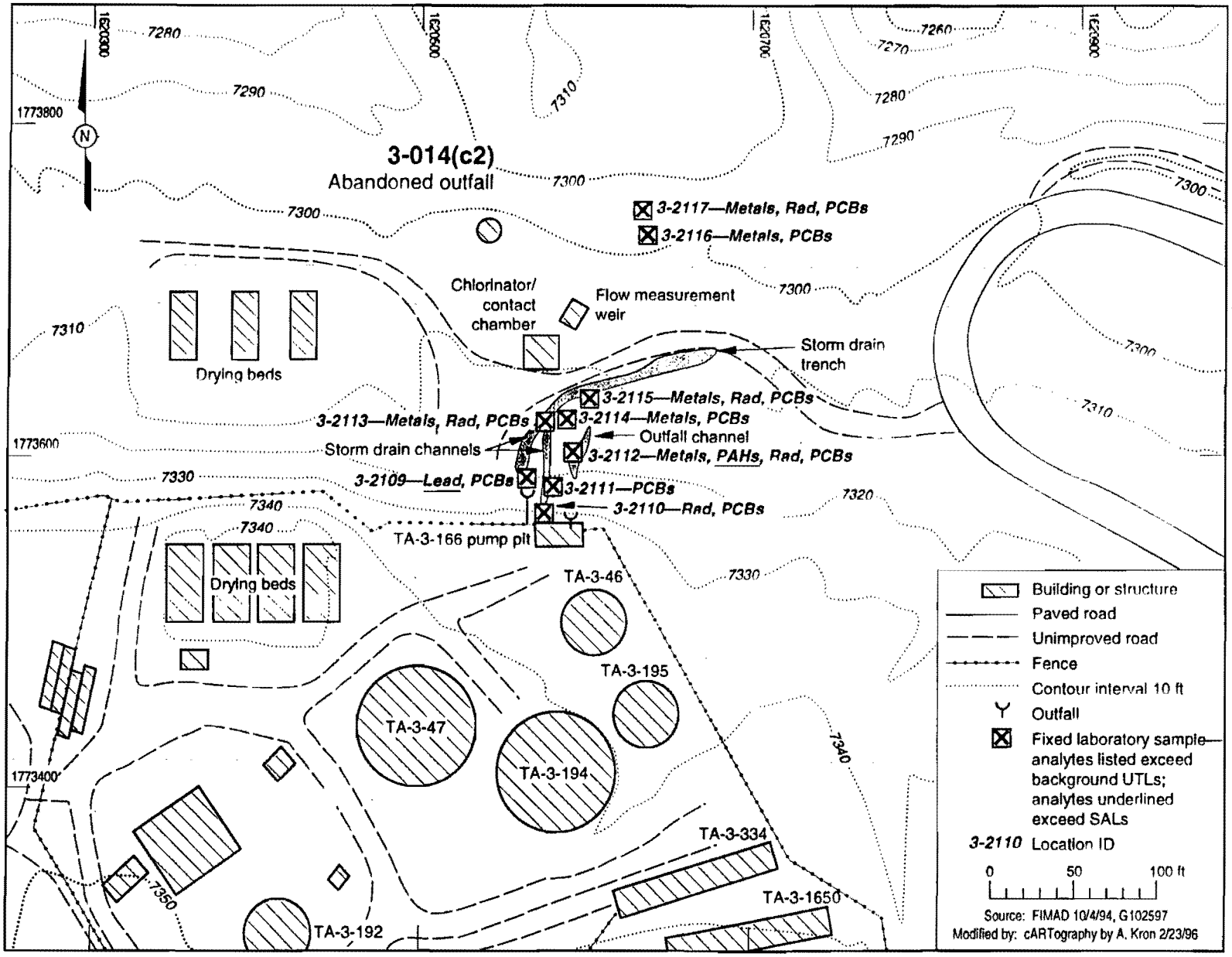

Fig 5.7.4-1. PRS 3-014(c2) 1994 sample collection locations.

TABLE 5.7.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 3-014(c2)

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER						
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	HERBICIDES	PESTICIDES/ PCBs[c]	INORGANICS	RADIONUCLIDES	MRAL[d]
03-2109	AAB5907	0 - 12	soil	N/A[e]	18246	18246	18246	18298	19329	18891
03-2109	AAB5909	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2110	AAB5908	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2110	AAB5910	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2111	AAB5911	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2111	AAB5913	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2112	AAB5912	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2112	AAB5914	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2113	AAB5915	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2113	AAB5916	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2114	AAB5917	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2114	AAB5919	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2115	AAB5918	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2115	AAB5920[f]	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2115	AAB5921[g]	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2115	AAB5929	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2116	AAB5922	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2116	AAB5924	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-2117	AAB5923	0 - 12	soil	N/A	18246	18246	18246	18298	19329	18891
03-2117	AAB5925	12 - 18	soil	18246	N/A	N/A	N/A	18298	N/A	18891
03-N/A	AAB5926	N/A	water	18246	18246	18246	18246	18298	N/A	N/A
03-N/A	AAB5927	N/A	water	18246	N/A	N/A	N/A	N/A	N/A	N/A
03-N/A	AAB5928	N/A	water	18246	N/A	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.
[g] Field duplicate.

Samples were collected using either the hand auger or spade and scoop method, based on the amount of sediment available. Using the FID, all sample locations were screened for VOCs within the hole or excavation during sample collection.

Twenty soil samples were collected from PRS 3-014(c2) at nine locations (03-2109 through 03-2117). Of the twenty samples collected, one was collected as a field duplicate sample and one as a collocated sample. Two samples were collected from each shallow hole, one from the 0- to 12-in. interval and one from the 12- to 18-in. interval, except as described below. Samples from the 0- to 12-in. interval were submitted for analysis of SVOCs, organochlorine pesticides, PCBs, herbicides, TAL metals, and radionuclides. Samples from the 12- to 18-in. interval were submitted for analysis of cyanide and VOCs, even though no VOCs were detected by the FID screening.

For locations 03-2109, 03-2112, 03-2115, 03-2116, and 03-2117, the spade and scoop method was used to collect samples because of insufficient soil depth for use of a hand auger. For these locations, all parameters including VOCs and cyanide were collected from the 0- to 6-in. interval or the 0- to 12-in. interval. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples.

5.7.5 Background Comparisons

Seven metals, including antimony, beryllium, cobalt, selenium, sodium, thallium, and vanadium were not detected in the samples analyzed. All detected inorganics, with the exception of cadmium, calcium, chromium, copper, cyanide, lead, mercury, nickel, silver, and zinc, were reported at concentrations less than their respective background screening values. Because cyanide and silver do not have background screening values, the detection limit is used as a surrogate background comparison value. The results that exceeded background are summarized in Table 5.7.5-1, and the sampling locations are identified on Fig. 5.7.4-1. Calcium is not carried forward for additional evaluation, because 1) it is considered to be an essential nutrient and, 2) it has no toxicity information and therefore no SAL. All other inorganic analytes that were detected at concentrations greater than their background screening values are carried forward in the screening process to the SAL comparison step.

TABLE 5.7.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 3-014(c2)

SAMPLE ID	DEPTH (in.)	CADMIUM (mg/kg)	CALCIUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	CYANIDE (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	NICKEL (mg/kg)	SILVER (mg/kg)	ZINC (mg/kg)
UTL[a]	N/A[b]	2.7	6120	19.3	30.7	NA[c]	23.3	0.1	15.2	NA	50.8
SAL[d]	N/A	38	NA	210	2800	1300	400	23	1500	400	23000
AAB5907	0 - 12	<1.1	1860	4.2 (J)[e]	<5.1	N/A	1 550	<0.03 (UJ)	<1.3	<1.9	28.2
AAB5912	0 - 12	7.3	2600	118 (J)	105	N/A	39.7	1.3 (J)	26.5	60.2	106
AAB5914	12 - 18	N/A	N/A	N/A	N/A	8.5 (J)	N/A	N/A	N/A	N/A	N/A
AAB5915	0 - 12	1.7	1940	61.4 (J)	36.9	N/A	17.8	0.26 (J)	<6.8	29.2	52.2
AAB5916	12 - 18	N/A	N/A	N/A	N/A	32.1 (J)	N/A	N/A	N/A	N/A	N/A
AAB5917	0 - 12	2	1610	11.5 (J)	16.7	N/A	9.7	0.23 (J)	11.3	3	40.2
AAB5918	0 - 12	1.4	6970	67.8 (J)	30.2	N/A	18.4	0.25 (J)	<4.3	32	49.2
AAB5920	0 - 12	<0.74	2110	61.6 (J)	24	N/A	17.2	0.24 (J)	<3	30.4	47.4
AAB5921	12 - 18	N/A	N/A	N/A	N/A	14.4 (J)	N/A	N/A	N/A	N/A	N/A
AAB5929	12 - 18	N/A	N/A	N/A	N/A	13.6 (J)	N/A	N/A	N/A	N/A	N/A
AAB5922	0 - 12	<0.82	2180	30.9 (J)	26.3	N/A	10.5	0.14 (J)	<2.1	15.3	30.7
AAB5924	12 - 18	N/A	N/A	N/A	N/A	7.8 (J)	N/A	N/A	N/A	N/A	N/A
AAB5923	0 - 12	1.3	1280	74.9 (J)	52.9	N/A	15.5	0.5 (J)	12.6	32.6	39.9
AAB5925	12 - 18	N/A	N/A	N/A	N/A	17.4 (J)	N/A	N/A	N/A	N/A	N/A

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] (J) = Estimated detected quantity.

All detected radionuclides, with the exception of plutonium-238, plutonium-239, uranium-234, and uranium-235, were reported at concentrations less than their respective background screening values. The results that exceed background are summarized in Table 5.7.5-2 and the sampling locations are identified on Fig. 5.7.4-1. These analytes are carried forward in the screening process to the SAL comparison step.

Radionuclides that were detected at PRS 3-014(c2) and do not have background screening values are addressed in Subsection 4.7.3 of this report.

TABLE 5.7.5-2

RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 3-014(c2)

SAMPLE ID	DEPTH (in.)	PLUTONIUM-238 (pCi/g)	PLUTONIUM-239 (pCi/g)	URANIUM-234 (pCi/g)	URANIUM-235 (pCi/g)
UTL[a]	N/A[b]	0.014	0.052	1.94	0.084
SAL[c]	N/A	27	24	13	10
AAB5908	0 - 12	0.02 (J)[d]	0.002 (J)	0.689	0.011
AAB5912	0 - 12	0.007 (J)	0.257 (J)	2.41	0.104
AAB5915	0 - 12	0.002 (J)	0.065 (J)	1.248	0.056
AAB5923	0 - 12	0.016 (J)	0.029 (J)	1.815	0.101

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] (J) = Estimated detected quantity.

5.7.6 Evaluation of Organics

Ten organic chemicals were detected in samples collected from PRS 3-014(c2). The results for these detected organics are summarized in Table 5.7.6-1, and the sampling locations are identified on Fig. 5.7.4-1. These detected organic chemicals are carried forward in the screening process to the SAL comparison step.

TABLE 5.7.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 3-014(c2)

SAMPLE ID	DEPTH	PCBs[a] (mg/kg)	BENZO[a]-PYRENE (mg/kg)	BENZO[b]-FLUOR-ANTHENE (mg/kg)	BENZO[g,h,i]-PERYLENE (mg/kg)	BENZO[k]-FLUOR-ANTHENE (mg/kg)	CHRYSENE (mg/kg)	FLUOR-ANTHENE (mg/kg)	INDENO[1,2,3-cd]PYRENE (mg/kg)	PHEN-ANTHRENE (mg/kg)	PYRENE (mg/kg)
SAL[b]	N/A[c]	1	0.061	0.61	N/A	6.1	24	2600	0.61	N/A	2000
EQL[d]	N/A	0.033	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB5907	0 - 12	0.16	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5908	0 - 12	0.3	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5911	0 - 12	0.34	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5912	0 - 12	0.63	1.8	1.7	0.43	2	1.8	3.2	0.66	1.3	3.2
AAB5915	0 - 12	0.25	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5917	0 - 12	0.38	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5918	0 - 12	<1.7	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
AAB5920	0 - 12	0.2	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
AAB5922	0 - 12	0.15	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
AAB5923	0 - 12	0.19	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.

5.7.7 Human Health

5.7.7.1 Screening Assessment

One noncarcinogen and three carcinogens detected in the PRS 3-014(c2) samples exceed their respective SALs (Tables 5.7.7-1, and 5.7.7-2). Thus, these chemicals are identified as COPCs based on the SAL comparison. None of the other chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs and these chemicals are carried to the multiple chemical evaluation step.

TABLE 5.7.7-1

NONCARCINOGEN WITH CONCENTRATION GREATER THAN SAL IN SOIL AT PRS 3-014(c2)

SAMPLE ID	LOCATION ID	DEPTH (FT)	LEAD
SAL[a]	N/A[b]	N/A	400
AAB5907	03-2109	0 - 1	1 550

[a] SAL = Screening action level.
[b] N/A = Not applicable.

TABLE 5.7.7-2

CARCINOGENS WITH CONCENTRATIONS GREATER THAN SALs IN SOIL AT PRS 3-014(c2)

SAMPLE ID	LOCATION ID	DEPTH	BENZO[a]-PYRENE (mg/kg)	BENZO[b]-FLUOR-ANTHENE (mg/kg)	INDENO[1,2,3-CD]PYRENE (mg/kg)
SAL[a]	N/A[b]	N/A	0.061	0.61	0.61
AAB5912	03-2112	0 - 1	1.8	1.7	0.66

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRS 3-014(c2), COPCs detected at concentrations below their respective SALs were divided into three classes: noncarcinogens, carcinogens, and radionuclides. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. The results of both the carcinogen and the radionuclide multiple chemical evaluations were less than unity (Table 5.7.7-4), indicating that health effects caused by the additivity of multiple chemicals within these classes are unlikely. However, the multiple chemical effects for noncarcinogens resulted in a value of 1.038, indicating a potential for health effects caused by the additivity of these chemicals. Thus, the three noncarcinogenic chemicals that contributed at least 0.1 to the total normalized value [cadmium, chromium, and silver] are identified as COPCs by the multiple chemical evaluation.

TABLE 5.7.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 3-014(c2) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Cadmium	AAB5912	7.3	38	0.192
Chromium	AAB5912	118 (J)[b]	210	0.561
Copper	AAB5912	105	2 800	0.038
Cyanide	AAB5916	32.1 (J)	1 300	0.025
Fluoranthene	AAB5912	3.2	2 600	0.001
Mercury	AAB5912	1.3 (J)	23	0.057
Pyrene	AAB5912	3.2	2 000	0.0016
Silver	AAB5912	60.2	380	0.158
Zinc	AAB5912	106	23 000	0.0046
			Total:	**1.038**
CARCINOGENIC EFFECTS				
Benzo[k]fluoranthene	AAB5912	2	6.1	0.328
Chrysene	AAB5912	1.8	88	0.02
PCBs	AAB5912	0.63	1	0.63
			Total:	0.978
RADIONUCLIDE EFFECTS[c]				
Plutonium-238	AAB5908	0.02 (J)	27	0.0007
Plutonium-239	AAB5912	0.257 (J)	24	0.0107
Uranium-234	AAB5912	2.41	13	0.185
Uranium-235	AAB5912	0.104	10	0.0104
			Total:	0.207

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.
[c] Results are in pCi/g.

5.7.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.7.8 Ecological

5.7.8.1 Ecotoxicological Screening Assessment

PRS 3-014(c2) received a landscape score of three in the habitat-based exposure rating (Myers and Ferenbaugh *in preparation*, 1250). This indicates that the site is relatively undisturbed by human activities. The PRS also received a receptor access score of three because the potential for COPC transport to other habitats is high in an outfall area such as this. PRS 3-014(c2) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.7.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.7.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. Because several constituents were detected in soil at concentrations exceeding SALs, this PRS is recommended for a Phase II investigation to identify extent of contamination. In addition, another historical outfall location from this PRS was discovered after the 1994 sampling event. This new sample location and the unlined sludge drying beds will be included in the Phase II sampling plan as a Phase I sampling addendum. The Phase II sampling plan is described in Subsection 5.7.11 of this report.

5.7.10 Conclusions and Recommendations

Seven chemicals [lead, cadmium, chromium, silver, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene] were retained as COPCs by the screening assessment process for PRS 3-014(c2). Because chemicals were present in soil at concentrations exceeding SALs, and because extent of contamination has not been fully determined, this PRS and associated WWTP PRSs 3-014(k,l,m,n, and o) are recommended for a Phase II investigation to identify extent of contamination. The Phase II investigation may be followed by a risk assessment and/or some type of remedial action or site control measures.

5.7.11 Phase II Sampling and Analysis Plan

5.7.11.1 Site Description and Phase I RFI Results

PRS 3-014(c2) is a pump house overflow outfall (former NPDES permit number NM 0024210) located on the north side of the pump building (TA-3-166). Both the overflow outfall and pump building are associated with the WWTP east of the mechanical utilities shop (TA-3-223) and on the southern rim near the head of Sandia Canyon (Fig. 5.7.11-1). The overflow pipe outfall discharged into a storm water erosion channel which flowed into a tributary of Sandia Canyon. The WWTP was decommissioned in the autumn of 1992 when the SWCS came on line. However, effluent is still routed from the SWCS plant to the TA-3 WWTP outfall because of permit issues.

The sampling approach used during the Phase I RFI was designed to determine whether discharge to the overflow outfall area and storm water channel resulted in the release of any contaminants to the site. A total of nine locations were sampled as described in Subsection 5.7.4 of this report. One location in the storm drain channel contained lead above the SAL, one location contained three PAHs above their respective SALs, and all locations were reported to contain low concentrations of PCBs (see Subsection 5.7.7). These data provide only limited information regarding the horizontal extent of the COPCs. No lead above background, nor PAHs above the limit of detection were reported either up or downgradient of the lead and PAH concentrations above SALs. However, insufficient information is available regarding the lateral and vertical extent of the affected areas. Based on the multiple constituent analysis, cadmium, chromium and silver were added to the COPC list for Phase II.

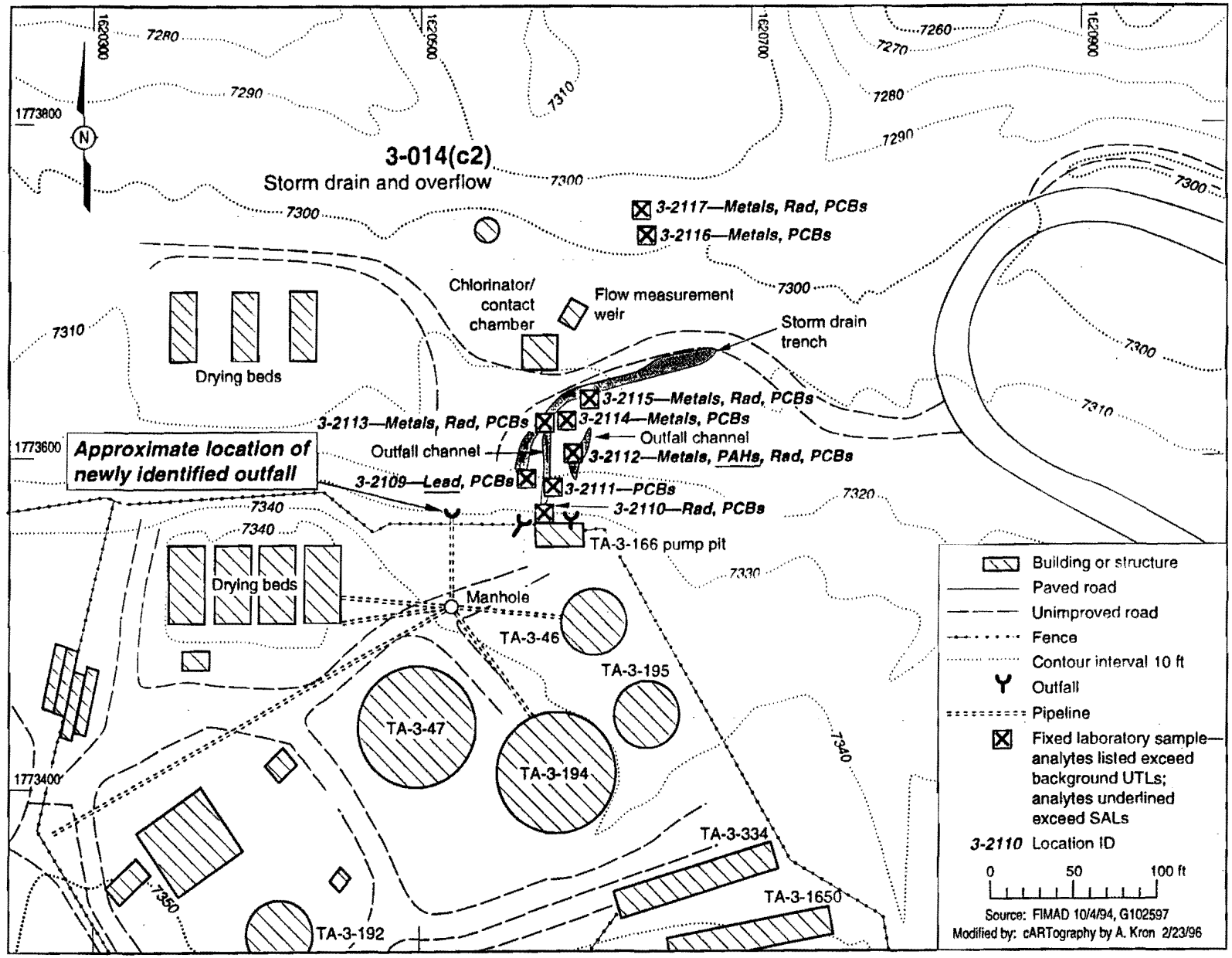

Fig. 5.7.11-1. PRS 3-014(c2) location map.

A re-examination of the WWTP blueprints revealed the location of the original treated effluent outfall 20–30 ft west of the storm water channel and overblow outfall that was abandoned. A combined Phase I/Phase II investigation of this abandoned outfall has been included in this Phase II sampling and analysis plan. It was definitively concluded that the asbestos cement pipe immediately west of the pump building is for surface drainage purposes and is not part of the WWTP. Three of the Phase I samples, including sample AAB5907 with the elevated lead concentration, were located in or beside the storm drain channel leading from this asbestos cement pipe.

The goals of the Phase I RFI were to only characterize the most likely environmental release areas, namely the soils and sediments at the WWTP outfalls and areas within the treatment plant grounds where sludge was applied as a soil amendment. It has since been determined that, unlike most of the components of the treatment system, which are concrete lined, the sludge drying beds [PRSs 3-014(k,l,m,n, and o)] are in direct contact with the underlying soil or tuff. Therefore, they could also be acting as a source of contaminants to the environment. For this reason, an investigation of the sludge drying beds has been included in the combined Phase I/Phase II investigation proposed for the newly identified outfall.

5.7.11.2 Phase II Objectives and Approach

One objective of Phase II sampling will be to determine if there has been a release from the recently identified outfall or from the WWTP sludge drying beds [PRSs 3-014(k,l,m,n, and o)]. Because there is no surface indication of the recently identified outfall, it must be located with geophysical methods. Data from both of these locations will be sufficient for a combined screening assessment/risk assessment. Thus, the analyte lists for the newly discovered outfall and the sludge drying beds will include all potential contaminants. Data will be screened to identify COPCs, and a baseline risk assessment will be performed on the resulting combined COPC list for PRS 3-014(c2).

Another objective of the Phase II sampling activity is to provide information for a baseline risk assessment for lead, cadmium, chromium, silver, PCBs, PAHs (the COPCs identified by the screening assessment of the Phase I data, PAHs and PCBs were included because of the carcinogen MCE was nearly 1.0), and other COPCs identified by the sampling that supports the first objective. The primary information needed for the baseline risk assessment is the horizontal and vertical extent of elevated COPC concentrations. Because this PRS is in the core industrial area of LANL, the primary exposure scenario that will be evaluated in the baseline risk assessment is based on the LANL industrial scenario described in Appendix K of

the LANL Installation Work Plan (LANL 1993, 1017). Per EPA risk assessment guidance, the 95% upper confidence level of the mean concentration within each exposure unit will be used to estimate the source term concentration (EPA 1991, 0302). The industrial exposure unit area is 500 m^2.

A third objective of Phase II sampling activities is to confirm the original elevated lead and PAH results from sampling locations 03-2109 and 03-2112, and determine if lead and PAH concentrations increase or decrease with depth at these locations.

The assumptions used to design the sampling and analysis plan are based on the primary drainage pathways of sediment leading from SWMU 3-014(c2). The elevated lead and PAH concentrations measured in the Phase I investigation were each from a single location. It is anticipated that elevated lead and PAH concentrations will be localized. It is also assumed that the drying beds are expected to contain relatively homogenous contamination, and two sampling locations from each bed are expected to adequately represent the maximum and average COPC concentrations. The sampling locations selected for the recently discovered outfall will be based on the likely surfical water and sediment flow patterns.

To provide more flexibility in the plan, quick-turnaround methods for analyzing PCBs and the appropriate metals will be used in Phase II. This will allow for near real-time evaluation of the lateral and horizontal pattern of contamination at this site.

The field sample collection methods and guidelines presented in the original RFI Work Plan for OU 1114 (LANL 1993, 1090) will be followed during this Phase II investigation.

5.7.11.3 Phase II Location of Outfall

The exact location of the newly identified outfall is uncertain, as no definitive evidence of the outfall is visible on the hillside where it supposedly discharged (Fig. 5.7.11-1). To verify the existence and location of the outfall, it is proposed that the pipeline from the manhole south of the outfall to the outfall itself, be traced using geophysical techniques. After the location of the outfall has been identified, the sampling locations can be selected.

5.7.11.4 Phase II Sampling Locations and Methods

A total of eight sampling locations are planned as shown in Fig. 5.7.11-2. Locations 1 through 4 will be positioned within and immediately adjacent to the probable channel leading from the newly identified outfall, after its location has been determined. The sampling locations will thus be based on the likely surficial water and sediment flow patterns. These samples will provide information regarding the presence and extent of contamination which may have resulted from

the outfall. If COPCs are identified at concentrations exceeding SALs at any of these locations, additional samples will be collected, as necessary, to define the nature and extent of the affected area. Whenever possible, the LANL mobile laboratories will be used to provide real-time data with which to make field decisions.

Locations 5 through 8 are positioned to provide information regarding the reproducibility of the Phase I analytical results, and the lateral and vertical extent of the potentially affected area. These locations were selected based on the assumption that potential contaminants would be concentrated along the primary drainage pathways leading from PRS 3-014(c2). Because of the linear nature of the drainage pathways, it is anticipated that the affected areas will be localized. Locations 6 and 7 are to be positioned as close as possible to the Phase I locations 03-2109 and 03-2112, respectively. Additional samples will be collected, as necessary, to define the nature and extent of the affected area.

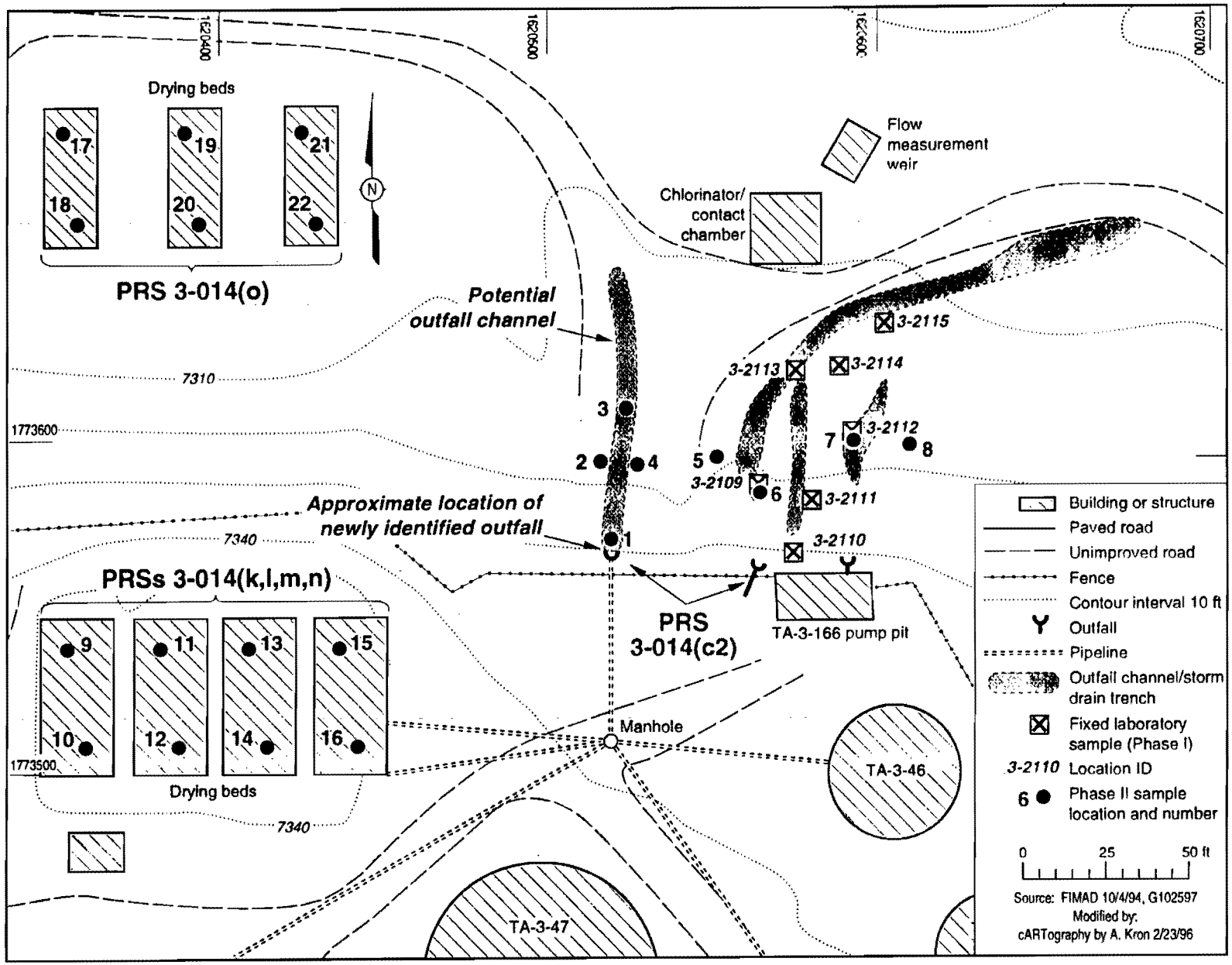

Fig. 5.7.11-2. PRS 3-014(c2,k,l,m,n,o) Phase II sample locations.

The original samples were collected from the 0- to 12-in. and 12- to 18-in. intervals using LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples and LANL-ER-SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. At each of the planned sampling locations 1 through 8, the 0- to 12-in. and 12- to 24-in. intervals will be sampled using the same collection methods. However, both intervals will be analyzed for the same list of COPCs, unlike the Phase I practice of analyzing the 12- to 18-in. samples for cyanide and VOCs only. This practice provided no information about the vertical extent of any detected COPCs.

Locations 9 through 22 will provide information regarding the presence of contamination below the sludge drying beds. Because these beds are expected to contain relatively homogenous materials, two sampling locations, one from each end of each bed, will be collected. Using the hand auger and thin-wall tube sampler method, soil and/or tuff samples will be collected from the 0- to 12-in. and 12- to 24-in. intervals immediately below the sand and gravel layers at the bottom of each sludge drying bed. Because these sand and gravel layers may be loosely packed and tend to cave in during sampling, special techniques, such as temporarily casing the hole with PVC pipe, may be used.

The samples will be prepared and transported according to LANL-ER-SOP-01.02, R0, Sample Container and Preservation; LANL-ER-SOP-01.03, R1, Handling, Packaging and Shipping of Samples; and LANL-ER-SOP-01.04, R2, ICN, Sample Control and Field Documentation. Following sample collection, the bottles will be labeled and the chain-of-custody and other documentation will be completed as required. The bottles will then be placed in a cooler at 4° C for transportation to the analytical laboratory.

5.7.11.5 Phase II Laboratory Analysis

Samples from locations 1 through 4 and 9 through 22 will be analyzed for the entire Phase I list of analytes, including VOCs, SVOCs, pesticides/PCBs, herbicides, radionuclides (isotopic plutonium or uranium, strontium-90, tritium, or other isotopes as indicated by MRAL results), and TAL metals (Table 5.7.11-1). However, because of their volatile nature, VOCs are not expected to be present in the surficial soils. Therefore, they will be analyzed in the 12- to 18-in. interval only. If offset sampling is required to define the extent of affected soil, these additional samples will be analyzed only for COPCs that were detected above SALs.

Based on the results of the Phase I investigation, as presented in this RFI Report, the analytical suite for locations 5 through 8 was modified. The list of COPCs for samples from these locations includes only lead, cadmium, chromium, silver, PCBs, and SVOCs.

Analyses will be conducted at the MCAL or a fixed laboratory, as appropriate, using EPA SW-846 methods. A portion of each sample will be sent to the MRAL and screened for gross alpha, beta and gamma activity to meet transportation and fixed laboratory sample screening requirements.

TABLE 5.7.11-1

PHASE II SAMPLES AND ANALYSES FOR PRSs 3-014(k,l,m,n,o, and c2)

SAMPLE LOCATION[a]	SAMPLE DEPTHS[b] (in.)	ANALYSES
1 through 4	0 - 12	SVOCs[c], pesticides/PCBs[d], herbicides, rad[e], TAL[f] metals
1 through 4	12 - 24	SVOCs, pesticides/PCBs, herbicides, rad, TAL metals
9 through 22	0 - 12	SVOCs, pesticides/PCBs, herbicides, rad, TAL metals
9 through 22	12 - 24	VOCs, SVOCs, pesticides/PCBs, herbicides, rad, TAL metals
5 through 8	0 - 12 and 12 - 24	lead, cadmium, chromium, silver, PCBs, SVOCs, rad

[a] Additional sample locations will be added, as necessary, to define the lateral extent of the affected area.
[b] Deeper intervals will be sampled if sufficient soil is present and if necessary to define the vertical extent of the affected area.
[c] SVOCs = Semivolatile organic compounds.
[d] PCBs = Polychlorinated biphenyls.
[e] See text for detailed description of radioanalyses.
[f] TAL = Target analyte list.

5.8 PRSs 3-015 and 3-053, Rolling Mill Outfall and Floor Drains in the Basement of the Rolling Mill Building

PRSs 3-015 and 3-053 represent an outfall associated with TA-3-141, the Rolling Mill Building. Based on analytical results of the Phase I site investigation, PRSs 3-015 and 3-053 are recommended for NFA.

5.8.1 History

PRS 3-015 is discussed in detail in Subsection 5.3 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). An outfall from the Rolling Mill Building (TA-3-141), PRS 3-015 received effluent from janitor sinks and floor and roof drains until the lines to the outfall were decommissioned in early 1993.

PRS 3-053 is discussed in detail in Subsection 5.24 of the RFI Work Plan for OU 1114 (LANL 1995, 17-1275). The basement area of the Rolling Mill Building (TA-3-141), PRS 3-053 housed electrochemical and depleted uranium processing facilities. Powder characterization, plasma flame spray processing, beryllium processing, and depleted uranium processing are

ongoing operations. It is not known if releases occurred through the basement floor drains formerly connected to the storm water system that leads to the PRS 3-015 outfall.

5.8.2 Description

PRS 3-053 is inside the Rolling Mill Building. PRS 3-015 is located between Eniwetok Road and the security fence northeast of TA-3-141. The outfall area slopes gently to the northeast and eventually flows to a man-made asphalt drainage channel which has been covered with grasses. The outfall is permitted under NPDES with outfall number EPA04A140.

5.8.3 Previous Investigations

No previous investigations of the soils surrounding PRS 3-015 have been conducted. However, the effluent at the outfall point is periodically monitored for flow rate and pH in compliance with the NPDES permit.

5.8.4 Field Investigation

The sampling approach for PRS 3-015 in the RFI Work Plan for OU 1114 was designed to determine whether any contaminants were released through the outfall (LANL 1993, 1090). Because PRS 3-053 was connected to the PRS 3-015 outfall, information from sampling activities at PRS 3-015 also applies to PRS 3-053. The sampling plan described in the work plan was modified to include radiochemical analyses.

The biased sample locations indicated in Fig. 5-6 of the RFI Work Plan for OU 1114 were located using the outfall channel and the fence as reference points (LANL 1993, 1090). The sampling locations are shown in Fig. 5.8.4-1 and summarized in Table 5.8.4-1. The sample locations were adjusted in the field to meet the sampling objectives.

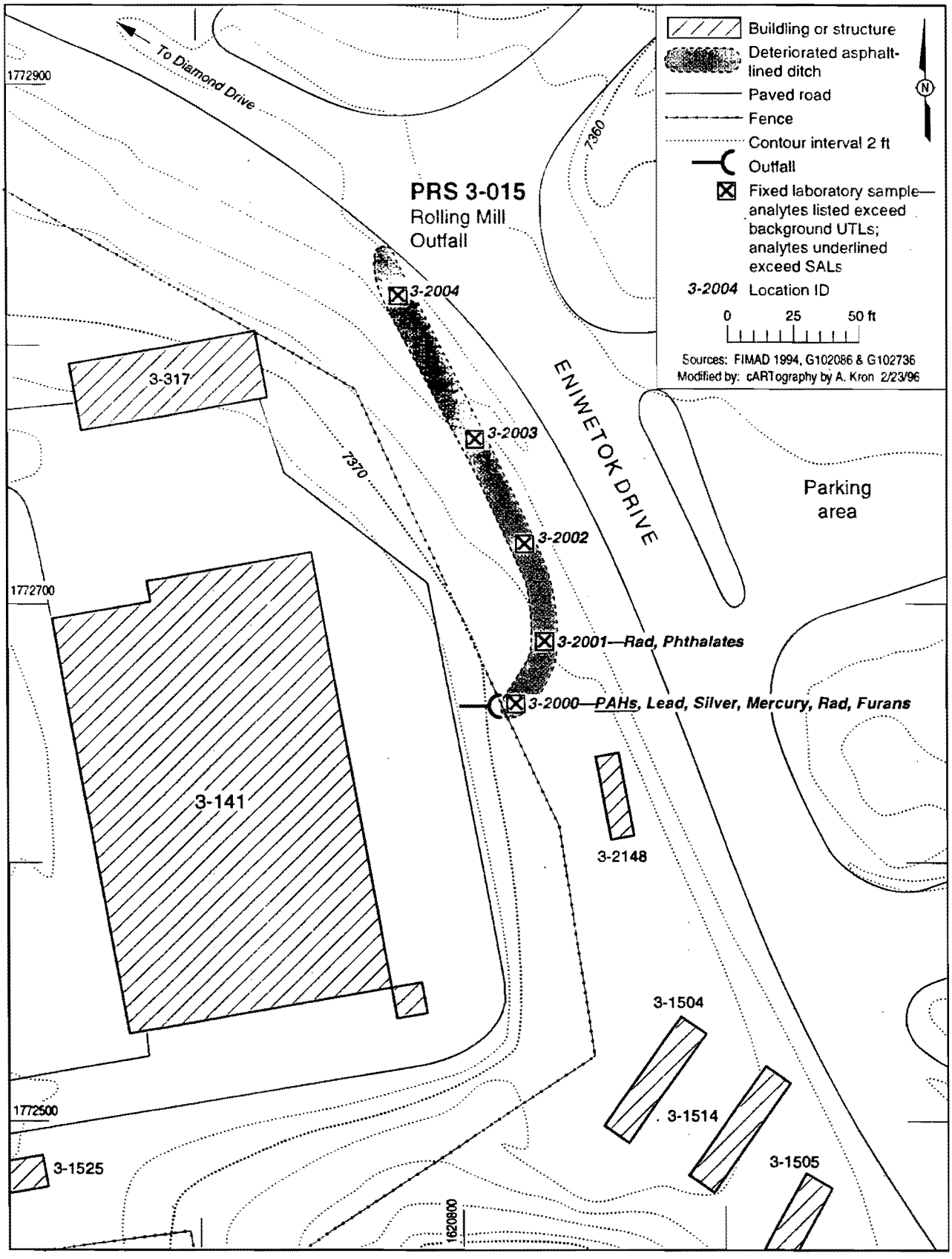

Fig. 5.8.4-1. PRSs 3-015 and collocated PRS 3-053 1994 sample collection locations.

TABLE 5.8.4-1

SUMMARY OF SAMPLES COLLECTED AT PRSs 3-015 and 3-053

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER			
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	SVOCs[a]	INORGANICS	RADIO-NUCLIDES	MRAL[b]
03-2001	AAB5877[c]	0 - 18	soil	18212	20221	20251	20864
03-2000	AAB5809	0 - 18	soil	18212	20221	20251	20864
03-2001	AAB5810	0 - 18	soil	18212	20221	20251	20864
03-2002	AAB5811	0 - 18	soil	18212	20221	20251	20864
03-2003	AAB5812	0 - 18	soil	18212	20221	20251	20864
03-2004	AAB5813	0 - 18	soil	18213	20215	20229	20957

[a] SVOCs = Semivolatile organic compounds.
[b] MRAL = Mobile radiological analytical laboratory.
[c] Field split sample.

Six soil samples were collected from five locations (03-2000 through 03-2004) from the 0- to 18-in. soil interval at PRS 3-015. At least one sample (AAB5809) contained asphalt debris and one (AAB5813) was collected from accumulated sediment above the asphalt. One sample was collected as a field split. All samples were submitted for analysis of SVOCs, TAL metals, and radionuclides. Using the FID, all sample locations were screened for VOCs within each hole at the 12-in. depth.

5.8.5 Background Comparison

The metals antimony and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of lead, mercury, and silver were reported at concentrations less than their respective background screening values. Note that silver does not have a background screening value, so the detection limit is used as a surrogate background comparison value. The results that exceeded background are summarized in Table 5.8.5-1, and the sampling locations are identified on Fig. 5.8.4-1. Lead, mercury, and silver are carried forward in the screening process to the SAL comparison step.

TABLE 5.8.5-1

INORGANIC CHEMICAL WITH CONCENTRATION GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-015 AND 3-053

SAMPLE ID	DEPTH (in.)	LEAD (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)
UTL[a]	N/A[b]	23.3	0.1	NA[c]
SAL[d]	N/A	400	23	380
AAB5809	0 - 18	71.5	2.4 (J)[e]	2.7

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.
[e] (J) = Estimated detected quantity.

All detected radionuclides, with the exception of uranium-234, uranium-235, and uranium-238, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.8.5-2 and the sampling locations are identified on Fig. 5.8.4-1. Uranium-234, uranium-235, and uranium-238 are carried forward in the screening process to the SAL comparison step.

Radionuclides that were detected at PRSs 3-015 and 3-053 and do not have background screening values, are addressed in Subsection 4.8.3 of this report.

TABLE 5.8.5-2

RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 3-015 AND 3-053

SAMPLE ID	DEPTH	URANIUM-234 (pCi/g)	URANIUM-235 (pCi/g)	URANIUM-238 (pCi/g)
UTL[a]	N/A[b]	1.94	0.084	1.82
SAL[c]	N/A	13	10	67
AAB5809	0 - 18	6.31	0.31	6.29
AAB5809R[d]	0 - 18	5.97	0.39	6.33
AAB5810	0 - 18	1.91	0.12	1.89
AAB5877	0 - 18	1.82	0.11	2

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] Field replicate sample.

5.8.6 Evaluation of Organics

Seventeen organic chemicals, all PAHs, were detected in samples collected from PRSs 3-015 and 3-053. The results for these detected organics are summarized in Table 5.8.6-1, and the sampling locations are identified on Fig. 5.8.4-1. All of these organic chemicals are carried forward in the screening process to the SAL comparison step.

5.8.7 Human Health

5.8.7.1 Screening Assessment

Six carcinogenic chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.8.7-2). Thus, six carcinogenic chemicals are identified as COPCs based on SAL comparisons. None of the other chemicals identified by the background comparison or the detection limit screening exceeded SALs (Tables 5.8.5-1, 5.8.5-2, and 5.8.6-1). These chemicals are eliminated as COPCs.

To evaluate multiple chemical effects for PRS 3-015, COPCs detected at concentrations below their respective SALs were divided into two classes: noncarcinogens and radionuclides. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Because the carcinogenic class only contained one chemical, the multiple chemical evaluation was not necessary for this class. The results of the noncarcinogen and the radionuclide multiple chemical evaluations were less than unity (Table 5.8.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no additional COPCs were identified by the multiple chemical evaluation.

TABLE 5.8.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRSs 3-015 AND 3-053

SAMPLE ID	DEPTH (in.)	Acenaphthene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Butyl benzyl phthalate	Chrysene
SAL[a]	N/A[b]	360	19	0.61	0.061	0.61	NA[c]	6.1	13 000	24
EQL[d]	N/A	NA	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB5809	0 - 18	12	22	63	57	54	40	38	<3.8	60
AAB5810	0 - 18	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36
AAB5877	0 - 18	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.37	<0.36

SAMPLE ID	DEPTH (in.)	Dibenzofuran	Dibenzo[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-cd]pyrene	Naphthalene	Phenanthrene	Pyrene
SAL	N/A	260	0.061	2 600	300	0.61	800	NA	2 000
EQL	N/A	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB5809	0 - 18	5.6	14	120	10	45	7.2	88	120
AAB5810	0 - 18	<0.36	<0.36	0.52	<0.36	<0.36	<0.36	<0.36	0.44
AAB5877	0 - 18	<0.36	<0.36	0.54	<0.36	<0.36	<0.36	<0.36	0.46

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] EQL = Estimated quantitation limit.

TABLE 5.8.7-2

CARCINOGENS WITH CONCENTRATIONS GREATER THAN SALs IN SOIL AT PRSs 3-015 AND 3-053

SAMPLE ID	LOCATION ID	DEPTH (FT)	BENZO[a]-ANTHRACENE (mg/kg)	BENZO[a]-PYRENE (mg/kg)	BENZO[b]-FLUOR-ANTHENE (mg/kg)	BENZO[k]-FLUOR-ANTHENE (mg/kg)	DIBENZO[a,h]-ANTHRACENE (mg/kg)	INDENO[1,2,3-cd]PYRENE
SAL[a]	N/A[b]	N/A	0.61	0.061	0.61	6.1	0.061	0.61
AAB5809	03-2000	0 - 1.5	63	57	54	38	14	45

[a] SAL = Screening action level.
[b] N/A = Not applicable.

TABLE 5.8.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRSs 3-015 AND 3-053

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Acenaphthene	AAB5809	12	4700	0.0026
Anthracene	AAB5809	22	23 000	0.00096
Butyl benzyl phthalate	AAB5877	0.37	13 000	0.000028
Fluoranthene	AAB5809	120	2 600	0.046
Fluorene	AAB5809	10	3 100	0.0032
Lead	AAB5809	71.5	400	0.179
Mercury	AAB5809	2.4 (UJ)[b]	23	0.104
Naphthalene	AAB5809	7.2	3 100	0.0023
Pyrene	AAB5809	120	2 000	0.06
Silver	AAB5809	2.7	380	0.007
			Total:	0.405
RADIONUCLIDE EFFECTS[c]				
Uranium-234	AAB5809	6.31	13	0.485
Uranium-235	AAB5809	0.39	10	0.039
Uranium-238	AAB5809	6.33	67	0.094
			Total:	0.619

[a] SAL = Screening action level.
[b] (UJ) = Estimated undetected quantity.
[c] Results are in pCi/g.

5.8.7.2 Risk Assessment

No human health risk assessment was performed for this PRS.

5.8.8 Ecological

5.8.8.1 Ecotoxicological Screening Assessment

PRS 3-015 received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRS 3-053 is located inside a building, and receives a receptor access score of zero. PRSs 3-015 and 3-053 will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.8.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.8.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs, with the exception of six PAHs which are attributed to asphalt runoff and chunks of asphalt in the sample materials, and the multiple chemical evaluation is less than one.

5.8.10 Conclusions and Recommendations

Six chemicals were retained as COPCs by the screening assessment process for PRSs 3-015 and 3-053. All six chemicals were detected above SAL at the same location, next to the fence off Eniwetok Drive. This location was described as "Wet clay at 8". At 12, "red very wet clay [where road runoff occurs]. Asphalt debris, gravel." Given that PAHs are not expected to be present as a result of processes in the Rolling Mill Building, the detection of elevated levels of PAHs in this sample is consistent with impact from road runoff or the presence of asphalt in the sample. Therefore, PRS 3-015 and associated PRS 3-053 are recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been

characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove PRSs 3-015 and 3-053 from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.9 PRS 3-033, Plating Rinse Waste Storage

PRS 3-033 is a liquid waste collection system for the printed-circuit shop in the Physics Building, TA-3-40. Potential contaminants of concern from spills at the plating rinse storage operation included metals and cyanide. Based on analytical results of the Phase I site investigation, PRS 3-033 is recommended for NFA.

5.9.1 History

PRS 3-033 is discussed in detail in Subsection 5.4 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 3-033 is the site of a liquid waste collection system for the printed-circuit shop, which is housed in the northwest corner of the Physics Building (TA-3-40). A transfer tank and two containment areas are located adjacent to the northwest corner of TA-3-40 (Fig. 5.9.1-1). The secondary containment for the transfer tank consists of a below-grade, 6-ft diameter, corrugated-metal culvert section that is lined with an epoxy coating. The culvert section was embedded upright in gravel; the gravel base was upgraded to a concrete base in 1986. This 8-ft deep vault housed a 200-gal. transfer tank and associated pumps and equipment. The liquid from this transfer tank was pumped through underground pipes into an 800-gal. tank, tuff tanks, or drums (located above a bermed concrete pad) for temporary storage pending transport and disposal. In June 1988, during heavy rains, the containment vault reportedly overflowed.

The printed-circuit shop is no longer in operation, and the 200-gal. tank and associated pumps were removed in October 1992. Both containment areas are currently covered with tarps to prevent runoff from entering the containment structures.

5.9.2 Description

PRS 3-033 is located in TA-3, which is described in Chapter 2 of this report. The PRS is located on hillside alluvium and fill adjacent to a roadway. The area has been heavily disturbed by

building and road construction. Depth to bedrock at this site is uncertain, but bedrock is probably located at or near the base of the vault, eight feet below the surface.

5.9.3 Previous Investigations

No previous investigations were conducted at PRS 3-033.

5.9.4 Field Investigation

The sampling approach for PRS 3-033 in the RFI Work Plan for OU 1114 was designed to determine whether the storage and transfer of liquids or the vault overflow resulted in the release of contaminants (LANL 1993, 1090).

The sample locations indicated in the work plan were located using the containment structure, TA-3-40, and the parking lot as reference points. The samples were collected downgradient of the containment vault and on three sides of the sump (the three sides with soil), with an additional sample collected just outside of the southeast corner of the sump. Sample locations are shown in Fig. 5.9.1-1 and summarized in Table 5.9.4-1. One additional planned sample from the material in the sump was not collected. The initial inspection of the sump revealed the presence of live and dead mice, lizards, and nests. Under the Laboratory's health and safety procedures, additional health and safety approvals were necessary in order to sample the material. It was determined that these conditions would not allow any sampling in the sump because the required treatment for Hantavirus (which involves application of a bleach solution) would itself introduce contamination. Therefore, the material in the sump was not sampled.

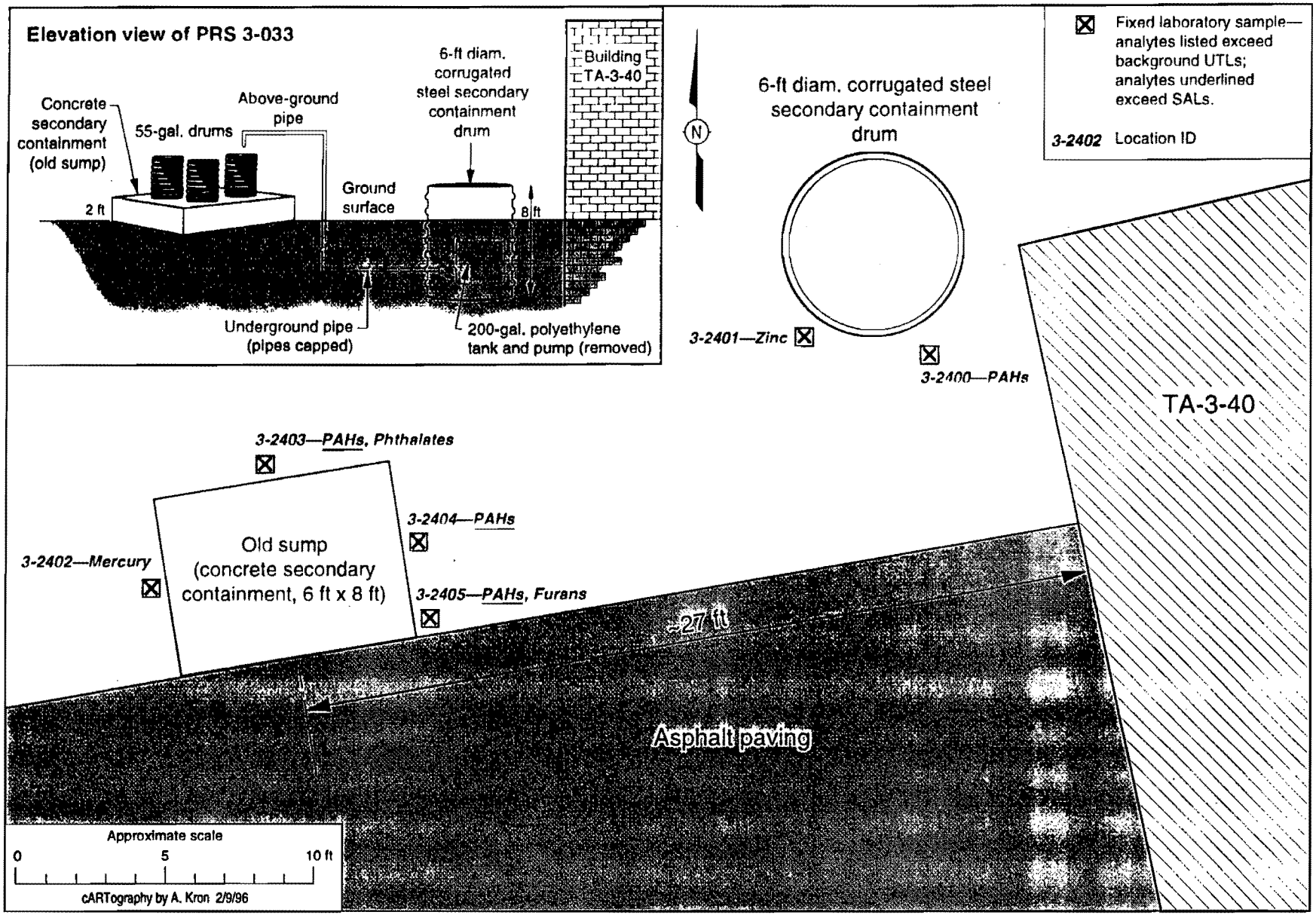

Fig. 5.9.1-1. PRS 3-033 1994 sample collection locations.

TABLE 5.9.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 3-033

SAMPLE INFORMATION				ANALYTICAL SUITE AND ANALYTICAL REQUEST NUMBER			
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	INORGANICS	MRAL[c]
03-2400	AAB6044	0 - 12	soil	N/A[d]	18328	18422	20680
03-2400	AAB6046	12 - 18	soil	18328	N/A	18422	20680
03-2401	AAB6045	0 - 12	soil	N/A	18328	18422	20680
03-2401	AAB6047	12 - 18	soil	18328	N/A	18422	20680
03-2402	AAB6048	0 - 12	soil	N/A	18328	18422	20680
03-2402	AAB7593	12 - 16	soil	18328	N/A	18422	20680
03-2403	AAB6049	0 - 12	soil	N/A	18328	18422	20680
03-2403	AAB7594	12 - 18	soil	18328	N/A	18422	20680
03-2404	AAB6050	0 - 12	soil	N/A	18328	18422	20680
03-2404	AAB7595	12 - 18	soil	18328	N/A	18422	20680
03-2405	AAB6051	0 - 12	soil	N/A	18328	18422	20680
03-2405	AAB6052[e]	0 - 12	soil	18328	N/A	18422	20680
03-2405	AAB7596	12 - 18	soil	18328	N/A	18422	20680
03-2405	AAB7597[e]	12 - 18	soil	N/A	18328	18422	20680
03-N/A	AAB7598	N/A	water	18328	18328	18422	N/A
03-N/A	AAB7599	N/A	water	18328	N/A	N/A	N/A
03-N/A	AAB7600	N/A	water	18328	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] MRAL = Mobile radiological analytical laboratory.
[d] N/A = Not applicable.
[e] Collocated sample.

Fourteen soil samples were collected from PRS 3-033 at six locations (03-2400 through 03-2405). Two samples were collected from each shallow hole, one from the 0- to 12-in. interval and one from the 12- to 18-in. interval. One set of samples was collected as a collocated sample (AAB6052). Using the FID, all sample locations were screened for VOCs during sample collection. There were no measurements above background concentrations. Samples from the 0- to 12-in. interval were all submitted for analysis of SVOCs and TAL metals, except for the collocated sample, which was analyzed for TAL metals and VOCs. Samples from the 12- to 18-in. interval were submitted for analysis of cyanide and VOCs, even though no VOCs were detected by the FID screening. The collocated sample from the 12- to 18-in. interval was submitted for analysis of cyanide and SVOCs. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples.

5.9.5 Background Comparison for Inorganics

Five metals, including antimony, cyanide, selenium, silver, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of mercury and zinc, were reported at concentrations less than their respective background screening values. The mercury and zinc results that exceeded background are summarized in Table 5.9.5-1, and the sampling locations are identified on Fig. 5.9.1-1. Mercury and zinc are carried forward in the screening process to the SAL comparison step.

TABLE 5.9.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 3-033

SAMPLE ID	DEPTH (in.)	MERCURY (mg/kg)	ZINC (mg/kg)
UTL[a]	N/A[b]	0.1	50.8
SAL[c]	N/A	24	23 000
AAB6045	0 - 12	<0.02	56.1
AAB6048	0 - 12	0.15	26.9

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.

5.9.6 Evaluation of Organics

Fifteen PAHs and three other organic chemicals were detected in samples collected from PRS 3-033. The results for these detected organics are summarized in Table 5.9.6-1, and the sampling locations are identified on Fig. 5.9.1-1. The PAH organic detects were most likely associated with runoff from the road approximately 30 ft upgradient of the PRS 3-033 sample locations. The detected organic chemicals were carried forward in the screening process to the SAL comparison step.

TABLE 5.9.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 3-033

SAMPLE ID	DEPTH (in.)	Acenaphthene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Bis(2-ethylhexyl)phthalate
SAL[a]	N/A[b]	36	19	0.61	0.061	0.61	NA[c]	6.1	32
EQL[d]	N/A	NA	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB6044	0 - 12	<0.39 (UJ)[e]	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)
AAB6049	0 - 12	<0.4	<0.4	0.53	0.5	0.52	<0.4	<0.4	0.88
AAB6050	0 - 12	<0.38	0.47	1.7	1.7	1.3	1.2	1.4	<0.38
AAB6051	0 - 12	0.57	0.78	3.1	2.8	1.7	1.8	2.6	<0.38
AAB7597	12 - 18	1	1	2.5	2.3	1.8	1.7	2.1	<0.36

SAMPLE ID	DEPTH (in.)	Chrysene	Di-n-butyl phthalate	Dibenzofuran	Dibenzo[a,h]anthracene	Fluoranthene	Fluorene	Indeno[1,2,3-cd]pyrene	Naphthalene	Phenanthrene	Pyrene
SAL	N/A	24	NA	260	0.061	2 600	300	0.61	800	NA	2 000
EQL	N/A	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
AAB6044	0 - 12	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	0.45	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	<0.39 (UJ)	0.42
AAB6049	0 - 12	0.7	46	<0.4	<0.4	1.1	<0.4	<0.4	<0.4	0.59	0.95
AAB6050	0 - 12	2.4	<0.38	<0.38	<0.38	3.6	<0.38	1.3	<0.38	2.4	3.5
AAB6051	0 - 12	3.9	<0.38	<0.38	0.45	6	0.38	2.1	<0.38	4.1	5.9
AAB7597	12 - 18	3.5	<0.36	0.46	0.95	5.6	0.73	1.8	0.92	4.9	5.5

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] EQL = Estimated quantitation limit.
[e] (UJ) = Estimated undetected quantity.

5.9.7 Human Health

5.9.7.1 Screening Assessment

Five of the PAH organic chemicals detected in the PRS 3-033 samples exceeded their respective SALs (Table 5.9.7-2). Thus, five PAH organic chemicals, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenzo[a,h]anthracene, and indeno[1,2,3-cd]pyrene, are identified as COPCs based on the SAL comparison. None of the other chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs (Tables 5.9.5-1 and 5.9.5-2), and these chemicals were eliminated as COPCs. SALs are not available for benzo(g,h,i)perylene and phenanthrene. Because of the presence of other PAHs, the source of these chemicals is probably the same as the source of the other chemicals. For this reason, these two chemicals will not be carried forward in the screening assessment.

TABLE 5.9.7-2

CARCINOGENS WITH CONCENTRATIONS GREATER THAN SALs IN SOIL AT PRS 3-033

SAMPLE ID	LOCATION ID	DEPTH (in)	BENZO[a]-ANTHRACENE (mg/kg)	BENZO[a]-PYRENE (mg/kg)	BENZO[b]-FLUOR-ANTHENE (mg/kg)	DIBENZO[a,h]-ANTHRACENE (mg/kg)	INDENO[1,2,3-cd]PYRENE
SAL[a]	N/A[b]	N/A	0.61	0.061	0.61	0.061	0.61
AAB6049	03-2403	0 - 12	0.53	0.5	0.52	<0.4	<0.4
AAB6050	03-2404	0 - 12	1.7	1.7	1.3	<0.38	1.3
AAB6051	03-2405	0 - 12	3.1	2.8	1.7	0.45	2.1
AAB7597	03-2405	12 - 18	2.5	2.3	1.8	0.95	1.8

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRS 3-033, COPCs below their respective SALs were divided into two classes, noncarcinogens and carcinogens. The maximum value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, the results of both the noncarcinogen and the carcinogen multiple chemical evaluations were less than unity (Table 5.9.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no additional COPCs were identified by the multiple chemical evaluation.

TABLE 5.9.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 3-033 DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Acenaphthene	AAB7597	1	4 700	0.0002
Anthracene	AAB7597	1	23 000	0.00004
Dibenzofuran	AAB7597	0.46	260	0.0018
Fluoranthene	AAB6051	6	2 600	0.0023
Fluorene	AAB7597	0.73	3 100	0.0002
Naphthalene	AAB7597	0.92	3 100	0.0003
Pyrene	AAB6051	5.9	2 000	0.003
Mercury	AAB6048	0.15	23	0.0065
Zinc	AAB6045	56.1	23 000	0.0024
			Total:	0.017
CARCINOGENIC EFFECTS				
Bis(2-ethylhexyl)phthalate	AAB6049	0.88	32	0.028
Benzo[k[fluoranthene	AAB6051	2.6	6.1	0.426
Chrysene	AAB6051	3.9	88	0.044
			Total:	0.498

[a] SAL = Screening action level.

5.9.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.9.8 Ecological

5.9.8.1 Ecotoxicological Screening Assessment

PRS 3-033 received a landscape condition score of one in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is highly disturbed by human activities. The PRS also received a receptor access score of one because only small habitat parcel areas exist within the industrial area. Given this habitat-based exposure rating, it is unlikely that any threatened and endangered species would be exposed to COPCs at PRSs 3-033. The site will be further evaluated within the scope of an upcoming ecological

investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.9.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.9.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs, except for PAHs, which are attributed to asphalt runoff. The multiple chemical evaluation is less than one.

5.9.10 Conclusions and Recommendations

Five PAH organic chemicals were identified as COPCs by the screening assessment process for PRS 3-033. However, the presence of low level concentrations of PAHs in surface soil is most likely associated with the road upgradient of the sample locations for PRS 3-033. In addition, PAHs were not anticipated to have been associated with the plating rinse storage operations. Rather, potential inorganic contamination was the basis for sampling PRS 3-033, and only low levels of mercury and zinc were detected above LANL background.

Because the only chemicals detected above SALs are likely due to pavement runoff and are present at relatively low concentrations, PRS 3-033 is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.10 PRS 59-004, TA-59-1 Outfall

PRS 59-004 is a former outfall which received water from TA-59-1, the Occupational Health Laboratory. Based on analytical results of the Phase I site investigation, PRS 59-004 is recommended for NFA.

5.10.1 History

PRS 59-004 is discussed in detail in Subsection 5.3 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 59-004, a former outfall, received effluent from floor drains and sinks in TA-59-1 and once-through cooling water. The former outfall is south of TA-59-2 (a portable building) south of TA-59-1. The outfall emptied into a ditch that had recently been lined with rocks and that had a fabric-type liner approximately 4 ft wide by 50 ft long installed in 1994. The outfall was permitted under NPDES for noncontact cooling water, with outfall number EPA03A098, and it drained to Twomile Canyon. The outfall was eliminated in August 1995.

5.10.2 Description

The outfall is located on a slope near the top of the canyon. At the outfall, bedrock (Bandelier Tuff) is overlain by a thin veneer of colluvium and soil from less than 1–3 ft thick. Below the outfall, bedrock is exposed in near vertical ledges along the canyon wall. Discharge is into a small, natural drainage channel.

5.10.3 Previous Investigations

No previous investigations of the soils surrounding PRS 59-004 have been conducted. However, the effluent at the outfall point was periodically monitored for flow rate, total suspended solids, pH, total chlorine, and total phosphorus in compliance with the NPDES permit.

5.10.4 Field Investigation

The sampling approach for PRS 59-004 in the RFI Work Plan for OU 1114 was designed to determine whether discharges to the outfall had resulted in the release of any contaminants to the drainage ditch (LANL 1993, 1090). The program described in the work plan was modified to include additional radiochemical analyses (other than screening) to achieve lower detection limits and provide isotopic-specific analyses when appropriate.

The biased sample locations indicated in Fig. 5-7 of the RFI Work Plan for OU 1114 were located using the outfall channel as a reference point (LANL 1993, 1090). The sample locations are shown in Fig. 5.10.4-1 and summarized in Table 5.10.4-1. The sample locations were adjusted in the field to meet the sampling objectives.

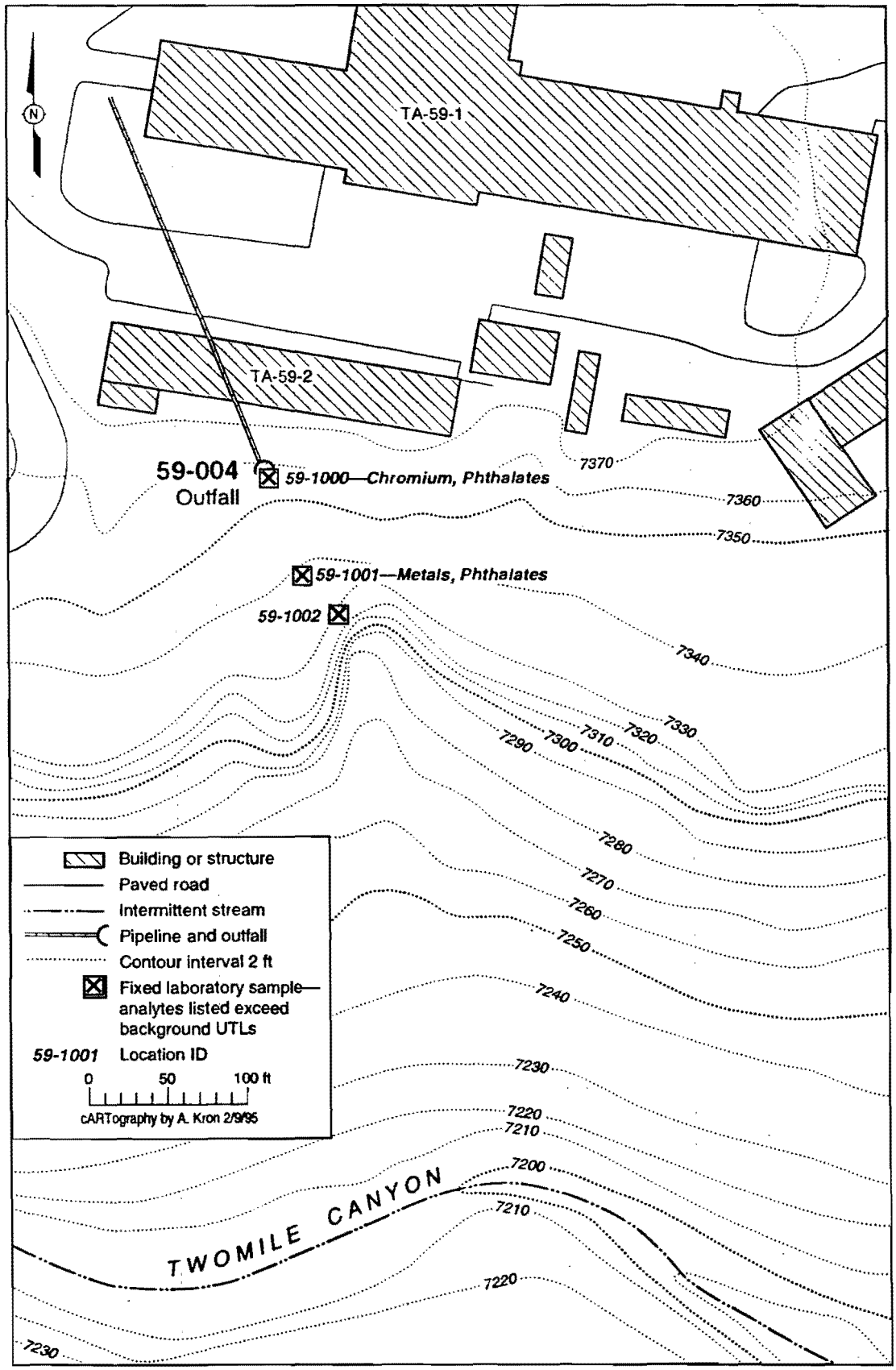

Fig. 5.10.4-1. PRS 59-004 1994 sample collection locations.

TABLE 5.10.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 59-004

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER				
LOCATION ID	SAMPLE ID	DEPTH	MATRIX	VOCs[a]	SVOCs[b]	INORGANICS	RADIO-NUCLIDES	MRAL[c]
59-1000	AAB5900	0 - 18	soil	N/A[d]	18162	20358	20235	20704
59-1000	AAB5903	0 - 18	soil	N/A	18162	20358	20235	20704
59-1001	AAB5901	0 - 18	soil	N/A	18162	20358	20235	20704
59-1002	AAB5902	0 - 18	soil	18162	18162	20358	20235	20704
59-N/A	AAB5904	N/A	water	18162	18162	20358	N/A	N/A
59-N/A	AAB5905	N/A	water	18162	N/A	N/A	N/A	N/A
59-N/A	AAB5906	N/A	water	18162	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] MRAL = Mobile radiological analytical laboratory.
[d] N/A = Not applicable.

Four soil samples were collected at three locations (59-1000 through 59-1002 from the 0- to 18-in. interval at PRS 59-004. One sample was collected as a field split (AAB5903). All samples were submitted for analysis of SVOCs, TAL metals, and radionuclides. Using the FID, all sample locations were screened for VOCs within each hole at the 12-in. depth. One of the four samples was collected at location 59-1002 from the 12- to 18-in. interval and submitted for analysis of VOCs to confirm the nondetects measured by the FID screening. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the investigative samples. These QC samples are also associated with the sample collected at PRSs 3-015 and 3-053 because all samples were collected on the same day.

5.10.5 Background Comparisons

The metals antimony, selenium, silver, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of cadmium, chromium, lead, mercury, and nickel were reported at concentrations less than their respective background screening values. The results that exceed background are summarized in Table 5.10.5-1, and the sampling locations are identified on Fig. 5.10.4-1. Cadmium, chromium, lead, mercury, and nickel are carried forward in the screening process to the SAL comparison step.

TABLE 5.10.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 59-004

SAMPLE ID	DEPTH (in.)	CADMIUM (mg/kg)	CHROMIUM (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	NICKEL (mg/kg)
UTL[a]	N/A[b]	2.7	19.3	23.3	0.1	15.2
SAL[c]	N/A	38	210	400	23	1500
AAB5900	0 - 18	<0.32	44.2	21.3	<0.11 (J)[d]	<5.8
AAB5903	0 - 18	<0.31	52.5	19.1	<0.1 (J)	<5
AAB5901	0 - 18	8.7	131	144	0.18 (J)	32.9

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] (J) = Estimated detected quantity.

All detected radionuclides were reported at concentrations less than background screening values. Radionuclides that were detected at PRS 59-004 and do not have background screening values are addressed in Subsection 4.10.3 of this report.

5.10.6 Evaluation of Organics

One organic chemical, bis(2-ethylhexyl)phthalate, was detected in samples collected at PRS 59-004. The results for this detected organic are summarized in Table 5.10.6-1, and the sampling location is identified on Fig. 5.10.4-1. This organic chemical is carried forward in the screening process to the SAL comparison step.

TABLE 5.10.6-1

ORGANIC CHEMICAL WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 59-004

SAMPLE ID	DEPTH (in.)	Bis(2-ethylhexyl)phthalate
SAL[a]	N/A[b]	32
EQL[c]	N/A	0.33
AAB5900	0 - 18	0.81
AAB5903	0 - 18	1.5
AAB5901	0 - 18	6.3

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] EQL = Estimated quantitation limit.

5.10.7 Human Health

5.10.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceeded SALs (Tables 5.10.5-1 and 5.10.6-1).

To evaluate multiple chemical effects for PRS 59-004, COPCs detected at concentrations below their respective SALs were divided into two classes, noncarcinogens and carcinogens. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, results of the noncarcinogen and carcinogen multiple chemical evaluations were less than unity (Table 5.10.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.10.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 59-004 DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Cadmium	AAB5901	8.7	38	0.229
Lead	AAB5901	144	400	0.36
Mercury	AAB5901	0.18 (UJ)[b]	23	0.0078
Nickel	AAB5901	32.9	1 500	0.022
			Total:	0.619
CARCINOGENIC EFFECTS				
Bis(2-ethylhexyl)phthalate	AAB5901	6.3	32	0.197
Chromium	AAB5901	131	210	0.624
			Total:	0.821

[a] SAL = Screening action level.
[b] (UJ) = Estimated undetected quantity.

5.10.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.10.8 Ecological

5.10.8.1 Ecotoxicological Screening Assessment

PRSs 59-004 received a landscape score of three in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is relatively undisturbed by human activities. The PRS received a receptor access score of zero because the potential for access by receptors is nonexistent. PRS 59-004 will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.10.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.10.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.10.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 59-004. Therefore, PRS 59-004 is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove PRS 59-004 from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.11 PRSs 60-004(b,d), Sigma Mesa Tank Cutting

PRSs 60-004(b,d) are storage and work areas located northeast of the geothermal well mud pit on the east end of Sigma Mesa. Visible oil stains were reported in the area of the PRSs; however, based on analytical results of the Phase I site investigation, PRSs 60-004(b,d) are recommended for NFA.

5.11.1 History

PRSs 60-004(b,d) are discussed in detail in Subsection 5.7 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRSs 60-004(b,d) are within an area near the east end of Sigma Mesa, slightly northeast of the geothermal well mud pit. PRS 60-004(b) is located next to the road and was used in 1988 to store approximately twelve drums containing diesel sludge from the underground storage tanks (USTs) removed from the Western Steam Plant. PRS 60-004(d) is located slightly south of PRS 60-004(b) and was an area used for dismantling decommissioned USTs and for temporarily storing drums containing fluids removed from the USTs.

5.11.2 Description

PRSs 60-004(b,d) are located on Sigma Mesa, which is part of TA-60 described in Chapter 2 of this report. The PRSs are mesa-top sites located on a thin mantle of soil and alluvium overlying cooling unit 3 of the Bandelier Tuff.

5.11.3 Previous Investigations

No previous investigations were conducted at PRSs 60-004(b,d).

5.11.4 Field Investigation

The sampling approach for PRSs 60-004(b,d) in the RFI Work Plan for OU 1114 was designed to determine whether total petroleum hydrocarbons (TPH) or PCBs were present in the surface soils (LANL 1993, 1090). However, the sampling program described in the work plan was modified to exclude sampling for TPH because it was not a RCRA-regulated substance. This modification was made for all PRSs for which TPH was a COPC.

The biased sample locations indicated in the work plan were located in stained areas. Because some debris remained at the site from the tank-dismantling operations, one sample location was also placed where a piece of steel tank was found. Sampling locations are shown in Fig. 5.11.4-1 and summarized in Table 5.11.4-1.

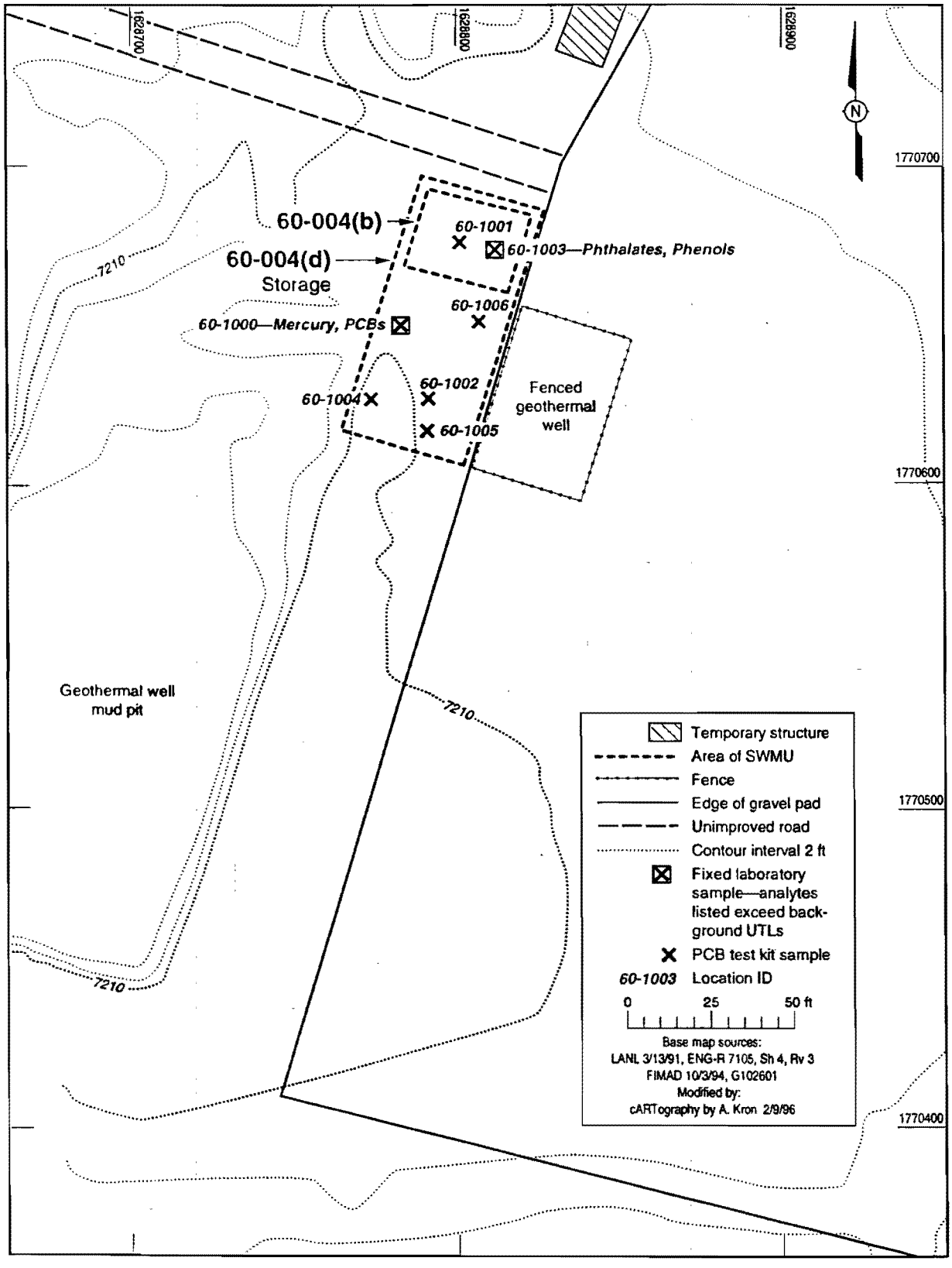

Fig. 5.11.4-1. PRSs 60-004(b,d) 1994 sample collection locations.

TABLE 5.11.4-1

SUMMARY OF SAMPLES COLLECTED AT PRSs 60-004(b,d)

SAMPLE INFORMATION					ANALYTICAL SUITE AND REQUEST NUMBER					
PRS ID	LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PEST-ICIDES/ PCBs[c]	PCB TEST KIT VALUES	INORG-ANICS	MRAL[d]
60-004(d)	60-1000	AAB5769	0 - 12	soil	N/A[e]	18084	18084	1.0 - 4.0	18958	18896
60-004(b)	60-1001	AAB5770	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-004(d)	60-1002	AAB5771	0 - 12	soil	N/A	N/A	N/A	0.5 - 1.0	N/A	N/A
60-004(b)	60-1003	AAB5875	0 - 12	soil	N/A	18084	18084	0.5 - 1.0	18958	18896
60-004(d)	60-1004	AAB5773	0 - 12	soil	N/A	N/A	N/A	0.5 - 1.0	N/A	N/A
60-004(d)	60-1005	AAB5774	0 - 12	soil	18084	N/A	N/A	1.0 - 4.0	N/A	18896
60-004(d)	60-1006	AAB5776	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
Trip Blank	60-N/A	AAB6055	N/A	water	18084	N/A	N/A	N/A	N/A	N/A
Rinsate	60-N/A	AAB6056	N/A	water	18084	18084	18084	N/A	18958	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.

Two soil samples were collected from two locations (60-1001 and 60-1003) at PRS 60-004(b) and five soil samples were collected from five locations (60-1000, 60-1002, 60-1004, 60-1005, 60-1006) at PRS 60-004(d). All samples were analyzed in the field using PCB test kits, and these results are provided in Table 5.11.4-1. Two samples (one from each PRS) were collected as confirmatory samples for analysis of SVOCs, PCBs and pesticides, and TAL metals. Using the PID, all sample locations were screened for VOCs within each hole at the 12-in. depth to help determine which samples to collect for confirmatory analyses. One additional sample from PRS 60-004(d) was collected for analysis of VOCs to confirm the nondetects measured by the PID screening. QC samples included a rinsate blank submitted for the same analyses as the confirmatory samples and a trip blank for analysis of VOCs.

The results from the PCB test kits indicate that the PCB concentrations are below 1.0 ppm for all samples collected except for samples AAB5769 and AAB5774, in which concentrations were between 1.0–4.0 ppm. Because all PCB screening results were below 1.0 ppm, no additional samples were collected.

5.11.5 Background Comparisons

The metals antimony, cadmium, selenium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of mercury, were reported at concentrations less than background screening values. The mercury result that exceeded background is summarized in Table 5.11.5-1, and the sampling location is identified on Fig. 5.11.4-1. Mercury is carried forward in the screening process to the SAL comparison step.

TABLE 5.11.5-1

INORGANIC CHEMICAL WITH CONCENTRATION GREATER THAN LOS ALAMOS BACKGROUND AT PRSs 60-004(b,d)

SAMPLE ID	DEPTH (in.)	MERCURY
UTL[a]	N/A[b]	0.1
SAL[c]	N/A	23
AAB5769	0 - 12	0.17

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.

5.11.6 Evaluation of Organics

Three organic chemicals, PCBs, bis(2-ethylhexyl)phthalate, and phenol, were detected in samples collected from PRSs 60-004(b,d). Results for these detected organics are summarized in Table 5.11.6-1, and the sampling locations are identified on Fig. 5.11.4-1. These detected organic chemicals are carried forward in the screening process to the SAL comparison step.

TABLE 5.11.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRSs 60-004(b,d)

SAMPLE ID	DEPTH (in.)	PCBs[a]	BIS(2-ETHYLHEXYL)PHTHALATE	PHENOL
SAL[b]	N/A[c]	1	32	39 000
AAB5769	0 - 12	0.0563	<0.36	<0.36
AAB5875	0 - 12	<0.0359	0.36	1.9

[a] PCBs represent the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.

5.11.7 Human Health

5.11.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceed SALs (Table 5.11.5-1, Table 5.11.6-1).

To evaluate multiple chemical effects for PRSs 60-004(b,d), COPCs detected at concentrations below their respective SALs were divided into two classes, noncarcinogens and carcinogens. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, results of both the noncarcinogen and carcinogen multiple chemical evaluations were less than unity (Table 5.11.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.11.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRSs 60-004(b,d) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Mercury	AAB5769	0.17	23	0.0073
Phenol	AAB5875	1.9	39 000	0.00005
			Total:	0.0074
CARCINOGENIC EFFECTS				
PCBs[b]	AAB5769	0.0563	1	0.0563
Bis(2-ethylhexyl)phthalate	AAB5875	0.36	32	0.011
			Total:	0.068

[a] SAL = Screening action level.
[b] PCBs represent the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.

5.11.7.2 Risk Assessment

No human health risk assessment was performed for these PRSs.

5.11.8 Ecological Screening Assessment

5.11.8.1 Ecotoxicological Screening Assessment

PRSs 60-004(b,d) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRSs received a receptor access score of two because ecological receptors do have access to any COPCs at the site, although the site has been impacted by human activities. PRSs 60-004(b,d) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.11.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.11.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.11.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process. Therefore, PRSs 60-004(b,d) are recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove PRSs 60-004(b,d) from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.12 PRS 60-004(c), Solar Pond Storage Area

PRS 60-004(c) is a storage area within the fenced area that surrounds the solar pond on Sigma Mesa. Although oil stains were reported at the site, PRS 60-004(c) is recommended for NFA based on analytical results of the Phase I site investigation.

5.12.1 History

PRS 60-004(c) is discussed in detail in Subsection 5.8 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 60-004(c) was a temporary drum storage area east of the solar pond. The area was described as having oil stains on the ground (Martell 1992, 17-599). In December 1985 approximately 125 empty, used 55-gal. drums were stored along the east fence until June or July of 1986. The drums were then returned to TA-54, crushed, and disposed of in Area J, a nonhazardous materials disposal facility (Perkins 1986, 17-222).

5.12.2 Description

PRS 60-004(c) is located on the southern edge of the mesa top. Bedrock (Cooling Unit 3 of the Bandelier Tuff) is overlain by several feet of alluvium and soil, which are thin or absent near the mesa edge. The area of the solar pond has been heavily disturbed by grading and excavation.

5.12.3 Previous Investigations

No previous investigations were conducted at PRS 60-004(c).

5.12.4 Field Investigation

The sampling approach for PRS 60-004(c) in the RFI Work Plan for OU 1114 was designed to determine if any contaminants had been released to the soil (LANL 1993, 1090). The sampling plan described in the work plan was modified to include additional radiochemical analyses to achieve lower detection limits and provide isotopic-specific analyses when appropriate. In part, this was considered necessary because of collocation with PRS 60-005(a) and potential wind dispersement of COPCs.

The biased sample locations indicated in Fig. 5-14 of the RFI Work Plan for OU 1114 were located using the stained areas near the gate and the east fence as reference points (LANL 1993, 1090). These sampling locations, 60-1200 through 60-1203, are shown in Fig. 5.12.4-1 and summarized in Table 5.12.4-1.

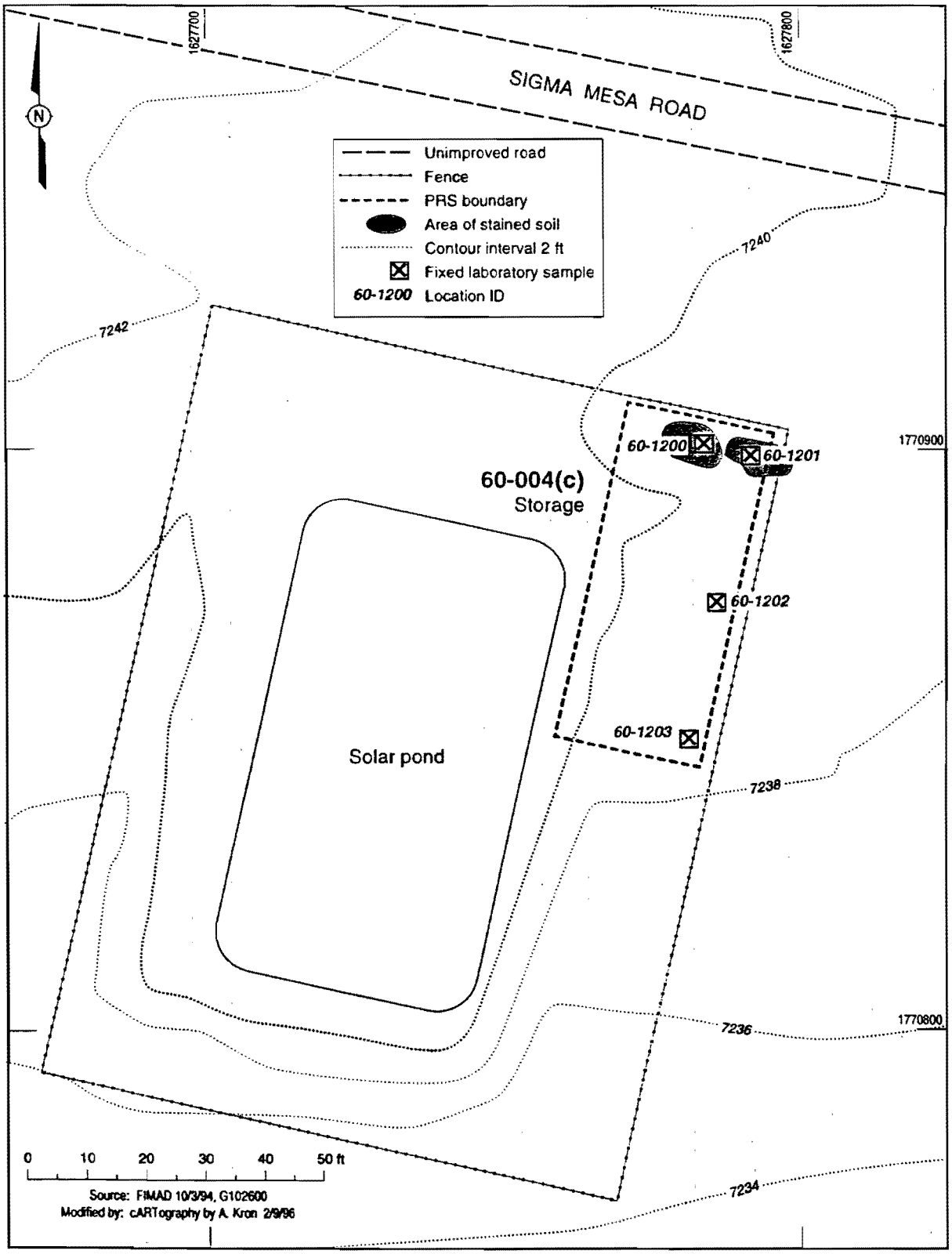

Fig. 5.12.4-1. PRS 60-004(c) 1994 sample collection locations.

TABLE 5.12.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-004(c)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PESTICIDES/ PCBs[c]	TPH[d]	RADIONUCLIDES	MRAL[e]
60-1200	AAB5821	0 - 12	soil	N/A[f]	18036	18036	N/A	18991	21926
60-1200	AAB5823	12 - 18	soil	18036	N/A	N/A	N/A	18991	21926
60-1201	AAB5822	0 - 12	soil	N/A	18036	18036	N/A	18991	21926
60-1201	AAB5824	12 - 18	soil	18036	N/A	N/A	N/A	18991	21926
60-1201	AAB5825[g]	12 - 18	soil	18036	N/A	N/A	N/A	18991	21926
60-1201	AAB5826[h]	0 - 12	soil	N/A	18036	18036	N/A	18991	21926
60-1202	AAB5827	12 - 18	soil	18036	N/A	N/A	N/A	18991	21926
60-1202	AAB5829	0 - 12	soil	N/A	18036	18036	N/A	18991	21926
60-1203	AAB5828	12 - 18	soil	18036	N/A	N/A	N/A	18991	21926
60-1203	AAB5830	0 - 12	soil	N/A	18036	18036	N/A	18991	21926
60-N/A	AAB6057	N/A	water	18036	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB6058	N/A	water	18036	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB6059	N/A	water	18036	18036	18036	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] TPH = Total petroleum hydrocarbons.
[e] MRAL = Mobile radiological analytical laboratory.
[f] N/A = Not applicable.
[g] Duplicate sample.
[h] Collocated sample.

Ten soil samples were collected from four locations at PRS 60-004(c), including one duplicate sample and one collocated sample. Two samples were collected from each shallow hole, one from the 0- to 12-in. interval and one from the 12- to 18-in. interval. Samples from the 0- to 12-in. interval were submitted for analysis of SVOCs, PCBs, pesticides, and radionuclides. Samples from the 12- to 18-in. interval were submitted for analysis of VOCs and radionuclides. Using the PID, all sample locations were screened for VOCs within each hole at the 12-in. depth. QC samples included a field blank and a trip blank submitted for VOC analysis, and a rinsate blank submitted for analyses of VOCs, SVOCs, PCBs, and pesticides.

The 12- to 18-in. interval was sampled by first driving the VOC sampler through the interval and then using a clean bucket auger to collect soil for the remaining analyses. Samples for VOC analysis were collected from all of the holes at the 12- to 18-in. interval, even though no VOCs were detected in the holes during field screening.

5.12.5 Background Comparison for Radionuclides

All detected radionuclides were reported at concentrations less than their respective background screening values. No analytes were carried forward to the SAL comparison step. Radionuclides that were detected at PRS 60-004(c) and do not have background screening values are addressed in Subsection 4.12.3 of this report.

5.12.6 Evaluation of Organics

There were no detected organic chemicals in samples collected from PRS 60-004(c). Thus, no organic chemicals are carried forward to the SAL comparison step.

5.12.7 Human Health

5.12.7.1 Screening Assessment

No chemicals were identified by the background comparison or the detection limit screening. Therefore, no chemicals were carried forward to the SAL comparison step and a multiple chemical evaluation was not performed. No chemicals are identified as COPCs from the screening assessment.

5.12.7.2 Risk Assessment

No human health risk assessment was performed at this site.

5.12.8 Ecological Screening Assessment

5.12.8.1 Ecotoxicological Screening Assessment

Because there were no COPCs detected above background or the limit of detection at PRS 60-004(c), no habitat-based exposure assessment is necessary for the site. Nonetheless, PRS 60-004(c) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.12.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.12.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All inorganic and radionuclide chemical concentrations were within background and no organic chemicals were detected.

5.12.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 60-004(c). Therefore, PRS 60-004(c) is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove PRS 60-004(c) from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.13 PRS 60-004(e), Sigma Mesa Storage Area

PRS 60-004(e) is a former outdoor storage area near the east end of Sigma Mesa for storage of transformers containing PCB-contaminated oil. The area was remediated in 1992 and is recommended for NFA based on current analytical results.

5.13.1 History

PRS 60-004(e) is discussed in detail in Subsection 5.7 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). Because the area was used for storage of transformers, PCBs were the only potential contaminants expected to be found at the site. Stains on surface soils were visible in early 1992. During July 1992, the stained soil areas were excavated, placed in drums, and removed by the maintenance contractor that stored the transformers at the site (LANL 1992, 17-771). The remediated areas were filled with gravel; however, no sampling was conducted to confirm removal of all contamination.

5.13.2 Description

PRS 60-004(e) is mesa-top site located on the eastern portion of Sigma Mesa, which is part of TA-60 described in Chapter 2 of this report. The PRS is situated on a thin mantle of soil and alluvium overlying cooling unit 3 of the Bandelier Tuff.

5.13.3 Previous Investigations

In 1991 oil-containing equipment stored on Sigma Mesa was tested for PCBs and found to be less than 5 ppm, or non-PCB-containing oil (LANL 1991, 17-0813). PRS 60-004(e) was remediated in 1992, as described in Subsection 5.13.1 of this report.

5.13.4 Field Investigation

The sampling approach for PRS 60-004(e) in the RFI Work Plan for OU 1114 was designed to determine whether TPH or PCBs remained in the surface soils after the 1992 remediation (LANL 1993, 1090). However, the sampling program described in the work plan was modified to exclude sampling for TPH because it was not a RCRA-regulated substance.

The biased sample locations indicated in the RFI Work Plan for OU 1114 (LANL 1993, 1090) were identified using the location of formerly stained areas now filled with new gravel as reference points. For soil samples collected in the area formerly remediated, the gravel was removed and the soil samples were collected from the subsequent 0- to 12-in. depth interval. The sampling locations are shown in Fig. 5.13.4-1 and summarized in Table 5.13.4-1.

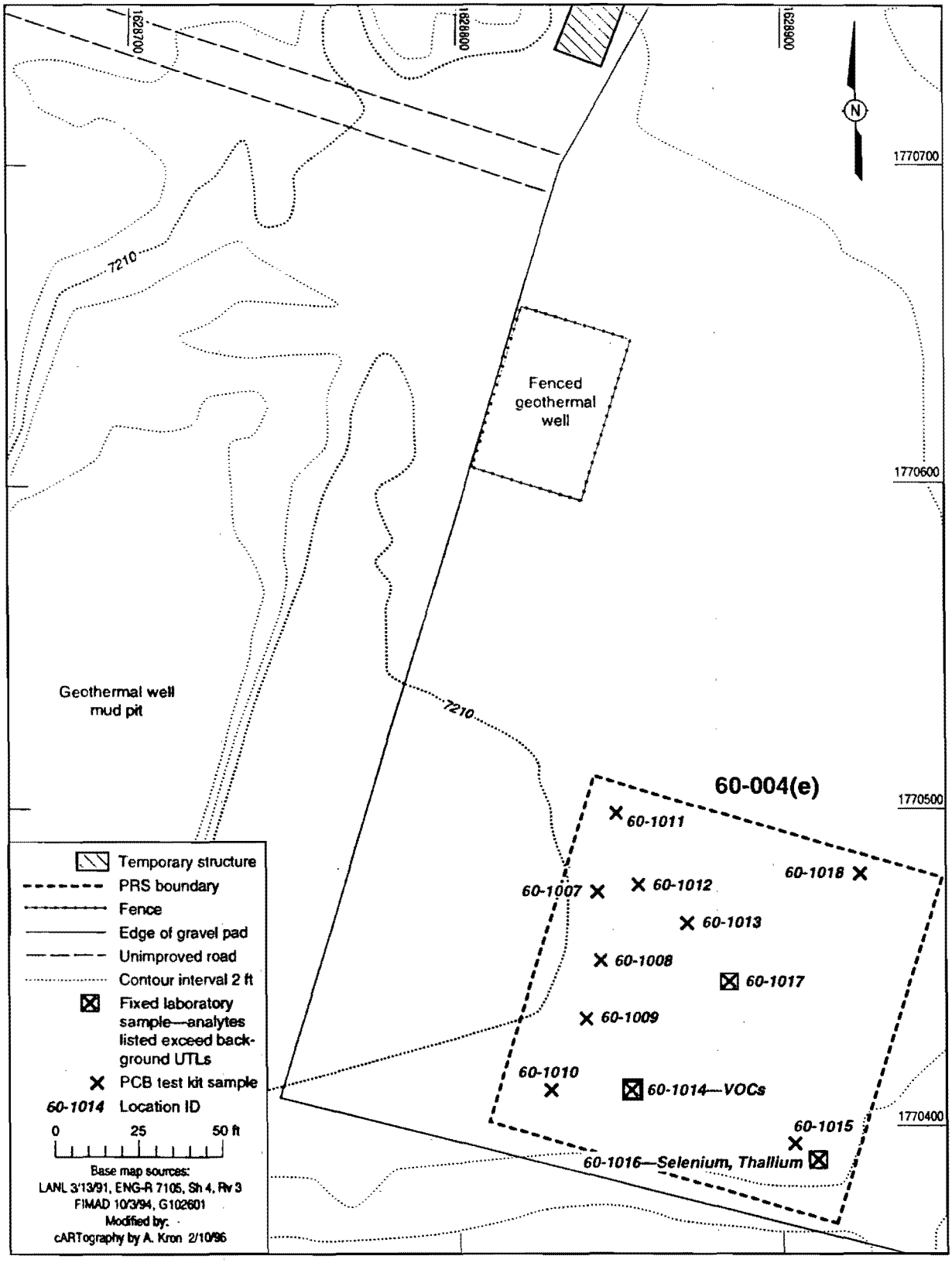

Fig. 5.13.4-1. PRS 60-004(e) 1994 sample collection locations.

TABLE 5.13.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-004(e)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PCBs[c]	PCB FIELD TEST KIT RESULTS	INORG-ANICS	MRAL[d]
60-1007	AAB5778	0 - 12	soil	N/A[e]	N/A	N/A	<0.5	N/A	N/A
60-1008	AAB5779	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1009	AAB5787	12 - 18	soil	18086	N/A	N/A	<0.5	N/A	20952
60-1010	AAB5780[f]	0 - 12	soil	N/A	N/A	N/A	<1	N/A	N/A
60-1011	AAB5781	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1012	AAB5782	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1013	AAB5783	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1014	AAB5775	0 - 12	soil	N/A	18086	18086	N/A	20203	N/A
60-1014	AAB5788[f]	0 - 12	soil	18086	N/A	N/A	<4	N/A	20952
60-1014	AAB5789	0 - 12	soil	18086	N/A	N/A	0.5 - 1.0	N/A	20952
60-1015	AAB5785	0 - 12	soil	N/A	N/A	N/A	<1.0	N/A	N/A
60-1016	AAB5786	0 - 12	soil	N/A	N/A	N/A	<1.0	N/A	N/A
60-1016	AAB5790	0 - 12	soil	N/A	18086	18086	N/A	20203	20952
60-1017	AAB5791	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1017	AAB5793	0 - 12	soil	18086	18086	18086	N/A	20203	20952
60-1018	AAB5792	0 - 12	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-N/A	AAB6063	N/A	water	18013	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB6064	N/A	water	18013	18086	18086	N/A	20203	N/A
60-N/A	AAB6065	N/A	water	18013	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.

Sixteen soil samples were collected from PRS 60-004(e) at 12 locations (Fig. 5.13.4-1, Table 5.13.4-1). Thirteen samples were analyzed in the field using PCB test kits. Three of the 16 samples were collected from the 0- to 12-in. interval as confirmatory samples for analysis of SVOCs, PCBs, and TAL metals, including two samples (one collocated) for VOCs. One of the 16 samples was collected from the 12- to 18-in. interval for analysis of VOCs. Using the PID/FID, all sample locations were screened for VOCs within the hole at the 12-in. depth. QC samples included a field blank and a trip blank submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the confirmatory samples.

Low concentrations of VOCs ranging from 0.1–17.0 ppm were detected at all of the sampling locations during the PID/FID screening. However, moisture was the suspected cause of false positive PID readings. The four samples collected for VOC analysis were considered sufficient to confirm the PID/FID readings. The results from the PCB test kits indicated that PCB concentrations were below 4 ppm for all samples collected.

5.13.5 Background Comparison for Inorganics

The metals antimony, mercury, and silver were not detected in the samples analyzed. All detected inorganics with the exception of selenium and thallium were reported at concentrations less than the background screening values. The selenium and thallium results that exceed background are summarized in Table 5.13.5-1, and the sampling location is identified on Fig. 5.13.4-1. Selenium and thallium are carried forward in the screening process to the SAL comparison step.

TABLE 5.13.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 60-004(e)

SAMPLE ID	DEPTH (in.)	SELENIUM (mg/kg)	THALLIUM (mg/kg)
UTL[a]	N/A[b]	1.7	1
SAL[c]	N/A	380	5.4
AAB5790	0 - 12	2.6	2.2

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.

5.13.6 Evaluation of Organics

Six volatile organic chemicals, acetone, butanone [2-], hexanone [2-], methyl-2-pentanone [4-], toluene, and xylenes (o + m + p) [mixed-], were detected in samples collected from the PRS. The results for these detected organics are summarized in Table 5.13.6-1, and the sampling locations are identified on Fig. 5.13.4-1. These detected organic chemicals are carried forward to the SAL comparison step.

TABLE 5.13.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 60-004(e)

SAMPLE ID	DEPTH	ACETONE	BUTANONE [2-]	HEXANONE [2-]	METHYL-2-PENTANONE [4-]	TOLUENE	XYLENES (o + m + p) [MIXED-]
SAL[a]	N/A[b]	2 000	8700	NA[c]	5200	1900	990
EQL[d]	N/A	0.01	0.01	0.01	0.01	0.01	0.01
AAB5788	0 - 12	0.47	0.24 (J)[e]	0.51 (J)	0.079 (J)	0.015 (J)	0.035 (J)
AAB5789	0 - 12	0.95	0.31 (J)	0.2 (J)	0.041 (J)	<0.012 (UJ)[f]	<0.012 (UJ)

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] EQL = Estimated quantitation limit.
[e] (J) = Estimated detected quantity.
[f] (UJ) = Estimated undetected quantity.

5.13.7 Human Health

5.13.7.1 Screening Action Levels Comparison

None of the chemicals identified by the background comparison or the detection limit screening exceeded SALs (Tables 5.13.5-1 and 5.13.6-1). In the case of 2-hexanone, a SAL has not been calculated because of inadequate toxicity data. However, its presence in two samples at concentrations less than 1 mg/kg is not expected to pose an unacceptable health risk. Therefore, 2-hexanone is not considered a COPC at PRS 60-004(e).

To evaluate multiple chemical effects for PRS 60-004(e), COPCs detected at concentrations below their respective SALs were divided into a single class of noncarcinogens. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, the results of the noncarcinogen multiple chemical evaluation were less than unity (Table 5.13.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.13.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 60-004(e) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Acetone	AAB5789	0.95	2 000	0.00048
Butanone [2-]	AAB5789	0.31 (J)[b]	8 700	0.000036
Selenium	AAB5790	2.6	380	0.0068
Thallium	AAB5790	2.2	5.4	0.407
Toluene	AAB5788	0.015 (J)	1 900	0.000008
Xylenes (o + m + p) [Mixed]	AAB5788	0.035 (J)	160 000	0.00000022
			Total:	0.415

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.

5.13.7.2 Risk Assessment

No human health risk assessment was performed for this PRS because no constituents were found above SALs.

5.13.8 Ecological Screening Assessment

5.13.8.1 Ecotoxicological Screening Assessment

PRS 60-004(e) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of two because ecological receptors do have access to any COPCs at the site, although the site has been impacted by human activities. PRS 60-004(e) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.13.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.13.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.13.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 60-004(e). Therefore, PRS 60-004(e) is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification is requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.14 PRS 60-004(f), Motor Pool Storage Pads

PRS 60-004(f) is a pair of unpaved, bermed storage pads used for new product storage southeast of TA-60-2. Based on analytical results of the Phase I site investigation in which no constituents were detected above SALs, PRS 60-004(f) is recommended for NFA.

5.14.1 History

PRS 60-004(f) is discussed in detail in Subsection 5.2 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 60-004(f) consists of two unpaved, bermed storage pads used for new product storage and located southeast of the maintenance warehouse (TA-60-2). Both pads have stored drums of Stoddard™ solvent, antifreeze, motor oil, grease, transmission fluids, and window-washing fluid. The materials were dispensed directly from the drums stored on the pads. Before 1985 neither pad was completely bermed. The pads are discolored and a petroleum odor is evident. Several COPCs (trichlorotrifluoroethane, methylene chloride, carbon disulfide, naphthylene, 1,3,5-trimethylbenzene) were detected in samples collected in 1990, as stated in the RFI Work Plan for OU 1114 (LANL 1993, 1090). In 1985, 6-in. asphalt berms were constructed at the open ends of both pads to help mitigate rainfall runon/runoff problems. All drummed liquids were removed from the pads in 1990.

5.14.2 Description

PRS 60-004(f) is part of the TA-60 area described in Chapter 2 of this report. The PRS is located on the mesa top adjacent to a gentle slope toward Sandia Canyon. PRS 60-004(f) is situated on soil and alluvium overlying cooling unit 4 of the Bandelier Tuff.

5.14.3 Previous Investigations

Because the two soil pads were discolored and had a distinct petroleum odor, soil samples were collected and analyzed in 1990. Seven samples were collected from Pad #2 at depths of 0–4 in., and five from Pad #3 at depths of 2–10 in. All samples were analyzed for VOCs and SVOCs. Trichlorotrifluoroethane, methylene chloride, and carbon disulfide were found at concentrations of less than 0.1 ppm in samples from Pad #2. Carbon disulfide, in similar concentrations, was found in several samples from Pad #3. In addition, one sample from Pad #3 contained naphthylene at 0.15 ppm and 1,3,5-trimethylbenzene at 12.8 ppm.

5.14.4 Field Investigation

The sampling approach for PRS 60-004(f) in the RFI Work Plan for OU 1114 was designed to determine if the drums stored on the unpaved pads resulted in the release of contaminants in concentrations greater than SALs to the site (LANL 1993, 1090). If releases were confirmed, the sampling approach was also designed to potentially define the vertical extent of contamination. The approach described in the work plan was modified during sampling to include additional VOC sampling as a result of VOC detections by FID field screening.

The biased sample locations indicated in Fig. 5-5 of the RFI Work Plan for OU 1114 (LANL 1993, 1090) were located using the berms around the pads and the stained areas as reference points (LANL 1993, 1090). Sample locations are shown in Fig. 5.14.4-1 and summarized in Table 5.14.4-1.

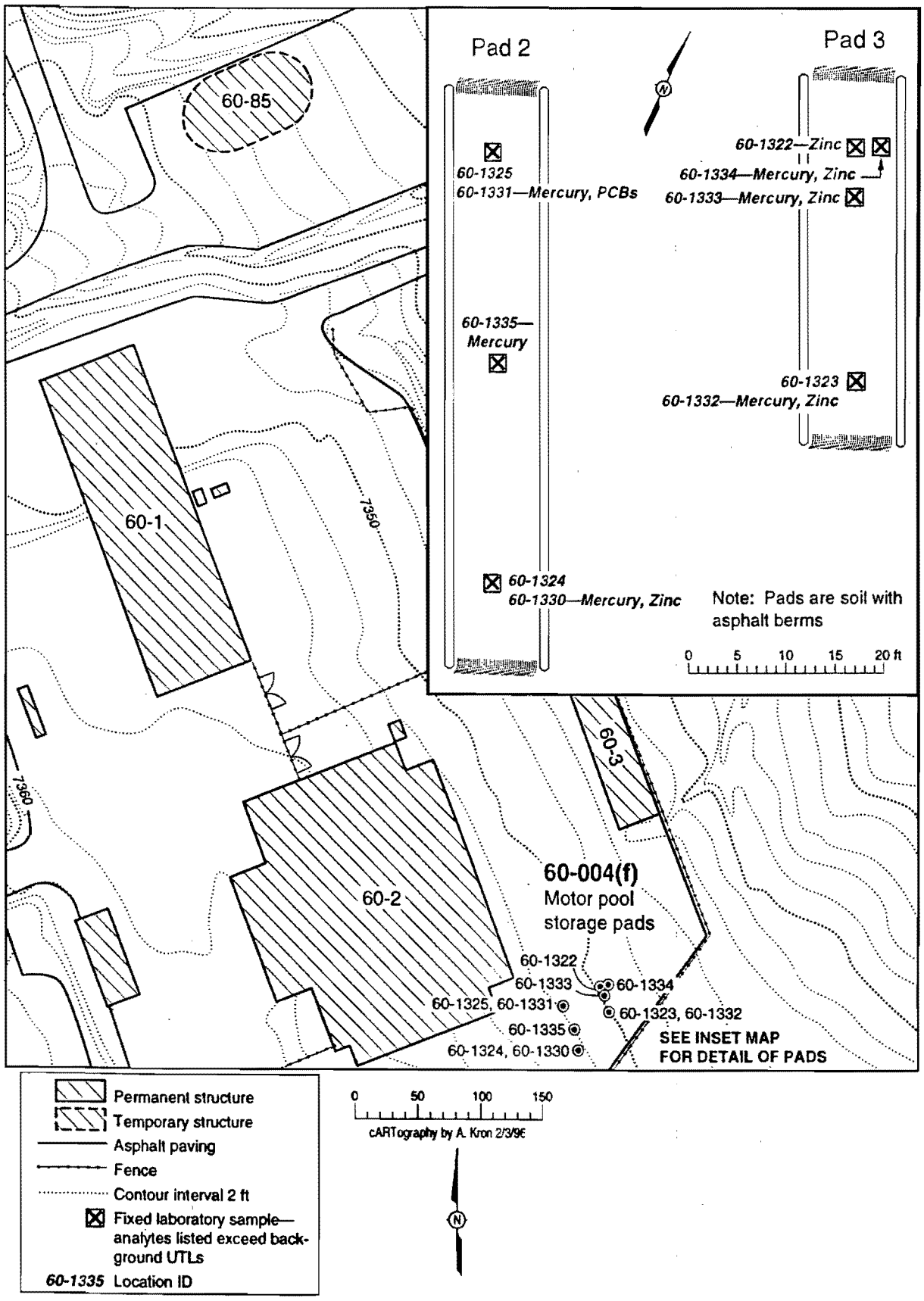

Fig. 5.14.4-1. PRS 60-004(f) 1994 sample collection locations.

TABLE 5.14.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-004(f)

SAMPLE INFORMATION					ANALYTICAL SUITE AND REQUEST NUMBER				
PAD NUMBER	LOCATION ID	SAMPLE ID	DEPTH (ft)	MATRIX	VOCs[a]	SVOCs[b]	PESTI-CIDES/ PCBs[c]	INORG-ANICS	MRAL[d]
Pad 2	60-1324	AAB7635	0 - 1.5	soil	N/A[e]	N/A	N/A	19168	20713
	60-1325	AAB7647	1 - 1.5	soil	N/A	N/A	N/A	N/A	20713
	60-1330	AAB7726	1 - 2	soil	N/A	19137	19137[f]	19866	20527
	60-1330	AAC0405	6 - 6.5	soil	N/A	19731	19731	19990	20639
	60-1330	AAC0406	2 - 2.5	soil	19731	N/A	N/A	N/A	20639
	60-1330	AAC0407	5.5 - 6	soil	19731	N/A	N/A	N/A	20639
	60-1331	AAB7727	1 - 2	soil	N/A	19137	19866[f]	19866	20527
	60-1331	AAC0411	5.5 - 6	soil	N/A	19731	19731	19990	20639
	60-1331	AAC0412	2 - 2.5	soil	19731	N/A	N/A	N/A	20639
	60-1331	AAC0413	5 - 5.5	soil	19731	N/A	N/A	N/A	20639
	60-1335	AAC0408	5.5 - 6	soil	N/A	19731	19731	19990	20639
	60-1335	AAC0409	2 - 2.5	soil	19731	N/A	N/A	N/A	20639
	60-1335	AAC0410	5 - 5.5	soil	19731	N/A	N/A	N/A	20639
	60-1335 (D)[g]	AAC0398	5.5 - 6	soil	N/A	19731	19731	19990	N/A
	60-1335(D)	AAC0397	2 - 2.5	soil	19731	N/A	N/A	N/A	N/A
Pad 3	60-1322	AAB7646	0 - 0.5	soil	N/A	N/A	N/A	19168	20713
	60-1322	AAC0417	6.5 - 7	soil	N/A	19731	19731	19990	20639
	60-1322	AAC0418	2 - 2.5	soil	19731	N/A	N/A	N/A	20639
	60-1322	AAC0419	6 - 6.5	soil	19731	N/A	N/A	N/A	20639
	60-1323	AAB7641	0 - 1.5	soil	N/A	N/A	N/A	N/A	20713
	60-1332	AAC0414	5.5 - 6	soil	N/A	19731	19731	19990	20639
	60-1332	AAC0415	2 - 2.5	soil	19731	N/A	N/A	N/A	20639
	60-1332	AAC0416	5 - 5.5	soil	19731	N/A	N/A	N/A	20639
	60-1332	AAB7728	1 - 2	soil	N/A	19137	19137[f]	19866	20527
	60-1333	AAB7729	1 - 2	soil	N/A	19137	19137[f]	19866	20527
	60-1334	AAB7730	1 - 2	soil	N/A	19137	19137[f]	19866	20527
Water	60-N/A	AAC0400	N/A	water	19731	19731	19731	19990	N/A
	60-N/A	AAB7756	N/A	water	N/A	19137	19137[f]	19866	N/A
	60-N/A	AAC0399	N/A	water	19731	N/A	N/A	N/A	N/A
	60-N/A	AAC0420	N/A	water	19731	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] PCB only samples.
[g] (D) = Duplicate sample.

On August 8, 1994 all sample locations at PRS 60-004(f) were screened for VOCs within the hole at the 6- to 12-in. depth using the FID. FID readings ranged from 4 ppm to over 1 000 ppm. Four soil samples (AAB7635, AAB7641, AAB7646, and AAB7647) were then collected from the 6- to 18-in. depth interval for VOCs. Two samples were collected from the 0- to 12-in. depth at locations 60-1322 and 60-1324 and submitted for analysis of SVOCs and TAL metals. However, the SVOC and VOC samples were not cooled properly before offsite shipment, and were therefore invalidated and not analyzed.

Five more samples (locations 60-1330 through 60-1334) were collected on September 16, 1994. Each of the five samples collected at a depth of 2 ft was submitted for analysis of TAL metals, SVOCs, and PCBs. Two of the sample locations from pad 2 (locations 60-1330 and 60-1331) were collocated to the samples collected on August 8, 1994 (locations 60-1324 and 60-1325, respectively). The remaining three locations from pad 3 were also collocated with samples collected on August 8, 1994, [location 60-1332 for 60-1323, and location 60-1334 for 60-1322 (though spaced at a greater distance)]. Sample location 60-1333 was collected as an additional biased sample at a stained location. Based on these results, an additional focused sampling event was conducted on October 25 and 26, 1994, during which five locations (60-1330, 60-1331, 60-1322, 60-1332, and 60-1335) were sampled to depths of 7 ft. Three samples were collected at each location at approximate depths of 2–2.5 ft and 5–6.5 ft for VOCs, and from 5.5–7 ft for SVOCs, PCBs, pesticides, and TAL metals analyses.

5.14.5 Background Comparisons

The metals antimony, selenium, and thallium were not detected in the samples analyzed. All detected inorganics, with the exception of mercury and zinc, were reported at concentrations less than background screening values. The results that exceed background are summarized in Table 5.14.5-1, and the sampling locations are identified on Fig. 5.14.4-1. Mercury and zinc are carried forward in the screening process to the SAL comparison step.

TABLE 5.14.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 60-004(f)

SAMPLE ID	DEPTH (FT)	MERCURY	ZINC
UTL[a]	N/A[b]	0.1	50.8
SAL[c]	N/A	23	23000
AAB7646	0 - 0.5	<0.06 (UJ)[d]	85.7
AAB7726	1 - 2	0.24 (J)[e]	32.8 (J)
AAC0405	6 - 6.5	0.28 (J)	57.2
AAB7727	2 - 3	2.3(J)	47.1 (J)
AAC0411	5.5 - 6	0.27 (J)	38.6
AAC0414	5.5 - 6	0.28 (J)	53.6
AAB7728	1 - 2	0.14 (J)	98.2 (J)
AAB7729	1 - 2	0.18 (J)	160 (J)
AAB7730	1 - 2	0.33 (J)	77.7 (J)
AAB7730R	1 - 2	0.38 (J)	73.1
AAC0408	5.5 - 6	0.31 (J)	45.5
AAC0398	5.5 - 6	0.31 (J)	33.4
AAC0398R	5.5 - 6	0.34 (J)	31.2

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.
[d] (UJ) = Estimated undetected quantity.
[e] (J) = Estimated detected quantity.

5.14.6 Evaluation of Organics

One class of organic chemicals, PCBs, was detected in a sample collected from PRS 60-004(f). Results for this detected organic are summarized in Table 5.14.6-1, and the sampling location is identified on Fig. 5.14.4-1. This organic chemical is carried forward in the screening process to the SAL comparison step.

TABLE 5.14.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 60-004(f)

SAMPLE ID	DEPTH (FT)	PCBs[a]
SAL[b]	N/A[c]	1
EQL[d]	N/A	0.033
AAC0411	5.5–6	0.0995 (J)[e]

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.
[e] (J) = Estimated detected quantity.

5.14.7 Human Health

5.14.7.1 Screening Assessment

None of the chemicals identified by the background comparison or the detection limit screening exceeded their respective SALs (Tables 5.14.5-1 and 5.14.6-1).

Only one class of chemicals, noncarcinogens, was evaluated for multiple chemical effects for SWMU 60-004(f) because only one chemical was detected in the carcinogen class. The maximum detected value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, the results of the multiple chemical evaluation were less than unity (Table 5.14.7-4), indicating that health effects caused by the additivity of multiple chemicals is unlikely. Thus, no COPCs were identified by the multiple chemical evaluation or the SAL comparison.

TABLE 5.14.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 60-004(f) DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NON-CARCINOGENIC EFFECTS				
Mercury	AAB7727	2.3 (J)[b]	23	0.1
Zinc	AAB7729	160 (J)	23 000	0.007
			Total:	0.107

[a] SAL = Screening action level.
[b] (J) = Estimated detected quantity.

5.14.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.14.8 Ecological

5.14.8.1 Ecotoxicological Screening Assessment

PRS 60-004(f) received a landscape condition score of one in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is highly disturbed by human activities. The PRS received a receptor access score of zero because the potential for access by receptors is nonexistent. PRS 60-004(f) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.14.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.14.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and the multiple chemical evaluation is less than one.

5.14.10 Conclusions, Actions, and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 60-004(f). Therefore, PRS 60-004(f) is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.15 PRS 60-005(a), Solar Pond Sludge

PRS 60-005(a) is an inactive pond on the east end of Sigma Mesa, approximately 1.2 miles east of TA-60-19, the NTS building. The pond was an evaporation experiment that failed. It contained treated, liquid radioactive effluent from the TA-50 Industrial Waste Water Treatment

Plant. Based on analytical results of the Phase I site investigation, radionuclides are the only constituents present above SALs at the site. PRS 60-005(a) is recommended for NFA for the RCRA component; however, radionuclide contamination at the site will be further evaluated under Department of Energy Order 5400.5.

5.15.1 History

PRS 60-005(a) is discussed in detail in Subsection 5.8 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 60-005(a) is an inactive pond, located on the east end of Sigma Mesa, approximately 1.2 miles east of the NTS Building (TA-60-19). A 6-ft security fence surrounds the pond, which is located on the south side of the Sigma Mesa access road. The pond was constructed in 1979 for an evaporation experiment by the Laboratory's waste management group. The pond was constructed by excavating the area, berming the excavation, and lining the excavation with native tuff. The excavation was then lined with a bentonite-amended sand layer, then a gravel layer (containing a leak-detection system), and then another layer of the bentonite-amended sand. To complete the pond construction, a 50-ml, synthetic Hypalon™ liner was installed over the sand and gravel layers.

The experiment was abandoned in 1981 and the pond was pumped out. Between 1981 and 1989, quarterly visual inspections were performed to check on the accumulated rainwater level and the pond liner. A June 30, 1994, inspection of PRS 60-005(a) revealed that there were at least 12 in. of standing water on top of the liner from rain. The integrity of the Hypalon™ liner was compromised in places, allowing water to seep underneath. The standing water was pumped out of the pond and disposed at TA-50.

5.15.2 Description

PRS 60-005(a) is located on the mesa top adjacent to the southern edge. Bedrock (Cooling Unit 3 of the Bandelier Tuff) is overlain by several feet of alluvium and soil, which are thin or absent near the mesa edge. The area of the solar pond has been heavily disturbed by grading and excavation.

5.15.3 Previous Investigations

No previous RCRA investigations were conducted at PRS 60-005(a).

5.15.4 Field Investigation

Samples were collected outside the pond as described in the RFI Work Plan for OU 1114, but inside the fence as modified by the EPA Notice of Deficiency (NOD) responses (LANL 1993, 1090). These samples were collected to determine whether any contamination from the solar pond was deposited outside of the pond.

Because of conditions within the pond, the sampling approach outlined in the work plan was modified. In order to avoid breaching the lower clay liner and creating a potential migration pathway, the sludge layer on top of the Hypalon™ liner and the upper bentonite-amended sand layer below the Hypalon™ liner were sampled. Short sections of polyvinyl chloride (PVC) pipe were used as casing to wall off the liquids surrounding the area to be sampled so that discrete samples of each media could be sampled. Samples were collected using stainless steel ladles. For sludge samples taken above the liner, the materials were ladled directly into sample containers. For the samples below the liner, the liner was cut and the PVC pipe was forced through the liner opening into the bentonite-amended sand layer which was saturated at all five sample locations. The PVC pipe was forced through about 6 in. of saturated material and stopped by what was assumed to be the gravel layer.

Samples were collected from six locations outside of the pond and five locations within the pond as shown in Fig. 5.15.4-1 and summarized in Table 5.15.4-1.

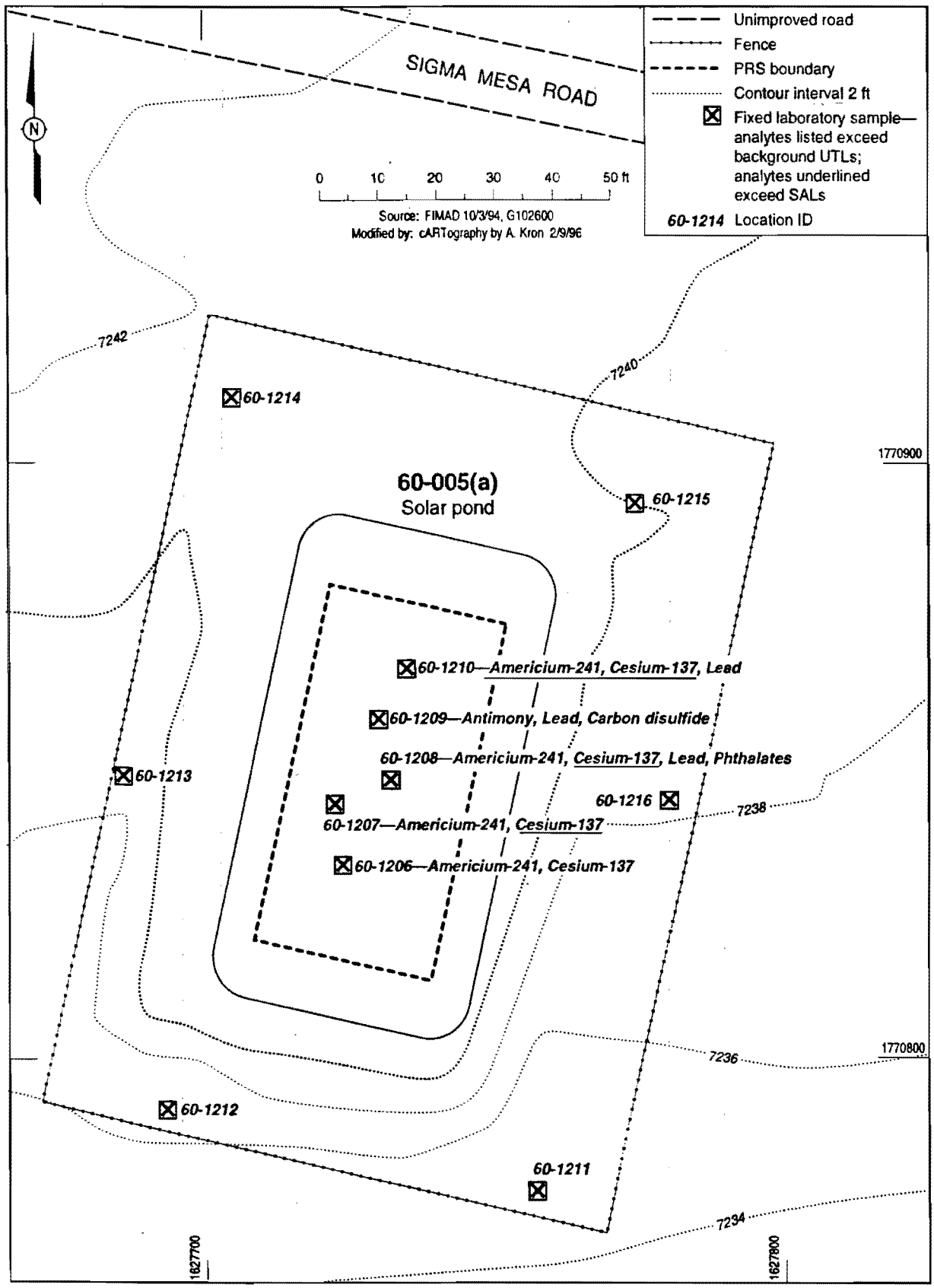

Fig. 5.15.4-1. PRS 60-005(a) 1994 sample collection locations.

TABLE 5.15.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-005(a)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER				
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	INOR-GANICS	RADIO-NUCLIDES	MRAL[c]
60-1206	AAB5807	12 - 18	soil	18160	18160	20219	19955	18943
60-1206	AAB5832[d]	0 - 12	soil	18160	18160	20219	19955	18943
60-1206	AAB5835	0 - 12	soil	18160	18160	20219	19955	18943
60-1207	AAB5834	0 - 12	soil	N/A[e]	18160	20219	19955	18943
60-1207	AAB5836	0 - 12	soil	18160	18160	20219	19955	18943
60-1208	AAB5777	0 - 12	soil	N/A	18160	20219	19955	18943
60-1208	AAB5805	12 - 18	soil	18160	18160	20219	19955	18943
60-1209	AAB5840	0 - 12	soil[f]	18215	18213	20215	20229	20957
60-1210	AAB5872	0 - 12	soil[f]	18215	18213	20215	20229	20957
60-1211	AAB5844	0 - 12	soil	N/A	18036	18955	18991	21926
60-1211	AAB5850	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-1212	AAB5845	0 - 12	soil	N/A	18036	18955	18991	21926
60-1212	AAB5851	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-1212	AAB5856[g]	12 - 18	soil	N/A	N/A	18955	N/A	N/A
60-1212	AAB5857[h]	0 - 12	soil	N/A	18036	18955	18991	21926
60-1213	AAB5846	0 - 12	soil	N/A	18036	18955	18991	21926
60-1213	AAB5852	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-1214	AAB5847	0 - 12	soil	N/A	18036	18955	18991	21926
60-1214	AAB5853	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-1215	AAB5848	0 - 12	soil	N/A	18036	18955	18991	21926
60-1215	AAB5854	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-1216	AAB5849	0 - 12	soil	N/A	18036	18955	18991	21926
60-1216	AAB5855	12 - 18	soil	N/A	N/A	18955	N/A	21926
60-N/A	AAB5870	N/A	water	18160	N/A	N/A	N/A	N/A
60-N/A	AAB5871	N/A	water	18160	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] MRAL = Mobile radiological analytical laboratory.
[d] Field split sample.
[e] N/A = Not applicable.
[f] This sample was analyzed as a sludge sample and all of the organic analyses were reported in ug/L.
[g] Duplicate sample.
[h] Collocated sample.

Fourteen soil samples were collected from six locations outside the pond, including one duplicate sample and one collocated sample. The six sample locations were selected approximately 60] apart around the pond (within the fence). Two samples were collected from each hand-augered hole, one from the 0- to 12-in. interval and one from the 12- to 18-in. interval. The samples from the 0- to 12-in. interval were submitted for analysis of SVOCs, TAL metals, and gross alpha/beta, gamma spectroscopy, and tritium. The samples from the 12- to 18-in. interval were collected using a clean-bucket auger and submitted for cyanide analysis. All samples collected outside the solar pond were screened using the beta/gamma detector and the PID. No elevated radioactivity or VOCs were detected in any of the holes. QC samples included a field blank, rinsate blank, and trip blank.

Sample locations within the pond were selected at random by preparing a grid that included three cells across the width of the pond and six cells along the length of the pond, for a total of 18 grid cells that represented the solar pond bottom. Using a random number table, five of the 18 numbered cells were selected for sample locations. A total of nine samples were collected from the approximate center of the grid cells selected. Samples of the sludge above the liner were collected at all five sampling locations. At two of the five locations, samples of the saturated bentonite-amended sand layer below the liner were collected. Photos and a video recording were used to document the sample collection techniques and site conditions. The black organic sludge above the liner was observed to off-gas whenever the sludge was disturbed; bubbles formed in the wake of field personnel stepping in the sludge. These bubbles appeared to be associated with transient FID readings, up to about 9 ppm with an odor of decaying organic material. If not disturbed, the sludge did not appear to off-gas and the FID indicated background concentrations of organic vapors. Seven of the nine samples were submitted for analysis of VOCs, SVOCs, TAL metals, and gross alpha/beta, gamma spectroscopy, and tritium. Two samples were submitted for analysis of TAL metals, SVOCs, gross alpha and beta, gamma spectroscopy and tritium. Location 60-1210 was also analyzed for strontium-90, isotopic plutonium, and isotopic uranium. QC samples included a field blank and a trip blank submitted for analysis of VOCs, and a rinsate blank submitted for the same analyses as the sludge samples.

5.15.5 Background Comparisons

Cyanide, mercury, selenium, and silver were not detected in the samples analyzed. All detected inorganics, with the exception of antimony and lead, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.15.5-1, and the sampling location is identified on Fig. 5.15.4-1. Antimony and lead are carried forward in the screening process to the SAL comparison step.

TABLE 5.15.5-1

INORGANIC CHEMICALS WITH CONCENTRATION GREATER THAN LOS ALAMOS BACKGROUND AT PRS 60-005(a)

SAMPLE ID	DEPTH (in.)	ANTIMONY (mg/kg)	LEAD (mg/kg)
UTL[a]	N/A[b]	1	23.3
SAL[c]	N/A	31	400
AAB5777	0 - 12	<4.7	34
AAB5840	0 - 12	13.9	25.9
AAB5872	0 - 12	<6.7	25

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.

All detected radionuclides, with the exception of cesium-137, were reported at concentrations less than their respective background screening values. The results that exceeded background are summarized in Table 5.15.5-2 and the sampling locations are identified on Fig. 5.15.4-1. Cesium-137 was carried forward in the screening process to the SAL comparison step. Americium-241 was detected and does not have a background screening value, but it does have a SAL. Therefore, americium-241 will also be carried forward to the SAL comparison step. Radionuclides that were detected at PRS 60-005(a) and do not have background screening values are addressed in Subsection 4.15.3 of this report.

TABLE 5.15.5-2

RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 60-005(a)

SAMPLE ID	DEPTH (in.)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)
UTL[a]	N/A[b]	NA[c]	1.4
SAL[d]	N/A	22	5.1
AAB5777	0–12	0.926	8.89
AAB5805	0–18	0.015	2.09
AAB5832	0–12	0.42	1.64
AAB5834	0–12	2.62	13
AAB5872	0–12	22.5	34.8

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] NA = Not available.
[d] SAL = Screening action level.

5.15.6 Evaluation of Organics

One organic chemical, butyl benzyl phthalate, was detected in a single soil sample collected from the PRS at a concentration of 4.4 mg/kg (see Table 5.15.6-1). The sampling location is identified on Fig. 5.15.4-1. The organic chemical carbon disulfide was detected in a sludge sample at a concentration of 18 ug/L (see Table 5.15.6-2). The sampling location is also identified on Fig. 5.15.4-1; however, because contact with this sludge material is unlikely, this result is not considered further in the screening assessment. Butyl benzyl phthalate was carried forward to the SAL comparison step.

TABLE 5.15.6-1

ORGANIC CHEMICAL WITH CONCENTRATION GREATER THAN THE LIMIT OF DETECTION AT PRS 60-005(a)

SAMPLE ID	DEPTH (in.)	BUTYL BENZYL PHTHALATE (mg/kg)
SAL[a]	N/A[b]	13 000
EQL[c]	N/A	0.33
AAB5805	0 - 18	4.4

[a] SAL = Screening action level.
[b] N/A - Not applicable.
[c] EQL = Estimated quantitation limit.
[a] SAL = Screening action level.

5.15.7.1 Screening Assessment

Two radionuclides, americium-241 and cesium-137, exceeded their respective SALs (Table 5.15.7-3). Thus, americium-241 and cesium-137 are identified as COPCs based on SAL comparisons. None of the other chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.15.5-1, Table 5.15.5-2, Table 5.1.5.6-1) and these chemicals are eliminated as COPCs.

TABLE 5.15.7-3

RADIONUCLIDES WITH CONCENTRATIONS GREATER THAN SALs[a] AT PRS 60-005(a)

SAMPLE ID	LOCATION ID	DEPTH (in.)	AMERICIUM-241 (pCi/g)	CESIUM-137 (pCi/g)
SAL[a]	N/A[b]	N/A	22	5.1
AAB5777	60-1208	0–12	0.926	8.89
AAB5834	60-1207	0–12	2.62	13
AAB5872	60-1210	0 - 12	22.5	34.8

[a] SAL = Screening action level.
[b] N/A = Not applicable.

To evaluate multiple chemical effects for PRS 60-005(a), COPCs below their respective SALs were grouped into one class, noncarcinogens. The maximum value for each chemical was used, which is the most conservative method for evaluating multiple chemical effects. Even so, the results of the noncarcinogen multiple chemical evaluation were significantly less than unity (Table 5.15.7-4). Thus, no additional COPCs were identified by the multiple chemical evaluation.

TABLE 5.15.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 60-005(a)

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NONCARCINOGENIC EFFECTS				
Butyl benzyl phthalate	AAB5805	4.4	13 000	0.0003
Lead	AAB5777	34	400	0.085
Antimony	AAB5840	13.9	31	0.448
			Total:	0.533

[a] SAL = Screening action level.

5.15.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.15.8 Ecological Screening Assessment

5.15.8.1 Ecotoxicological Screening Assessment

PRS 60-005(a) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of two because ecological receptors do have access to any COPCs at the site,

although the site has been impacted by human activities. PRS 60-005(a) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.15.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.15.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. No RCRA constituents were identified by the screening assessment as presented above. All chemical concentrations were less than SALs and the multiple chemical evaluation was less than one. The extent of elevated radiological concentrations was limited to the Solar Pond sediments.

5.15.10 Conclusions and Recommendations

Two chemicals were retained as COPCs by the screening assessment process for PRS 60-005(a). The highest detected values for both americium-241 and cesium-137 were in the same sample.

Because the only chemicals retained as COPCs are radionuclides, PRS 60-005(a) is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that nonradionuclide COPCs are not present in concentrations that would pose an unacceptable risk under the projected future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173). Radionuclide contamination at this site will be further evaluated under Department of Energy Order 5400.5.

5.16 PRS 60-006(a), Test Rack Septic Tank

PRS 60-006(a) is an abandoned septic system that served TA-60-17, the NTS Test Rack Facility, and TA-60-19, a test tower. The septic system received wastewater from facility bathrooms and seven floor drains, including one in a paint booth.

Sampling was conducted in the test rack septic tank to address three questions.

- Had the tank been drained before it was abandoned?

- Did the tank contain RCRA constituents in concentrations that might be hazardous to the environment?
- Was the tank structurally sound?

Because the tank was installed in 1986 and was only used for three years before it was abandoned in 1989, it was expected to be structurally sound. When the manhole cover to the tank was opened, it was discovered that the tank had never been drained prior to abandonment and that it was still full of effluent. The tank was still full of liquid, which proves that it was structurally sound and had no leaks. Further, any sludge accumulated over the three-year operational life of the tank would still be in the tank, and samples collected from the effluent would therefore be representative of all COPC concentrations. The septic tank drained to a vertical seepage pit that filtered the decanted effluent through 40 ft of small-to-medium sized rocks. The Phase I investigation was intended to determine if any sludge remaining in the tank was contaminated. If so, a Phase II sampling plan would include sampling the seepage pit and under the septic tank during removal.

Because the tank was full of effluent, the samples collected were liquid sludge samples rather than environmental concentrations (soil samples). A standard screening assessment is not appropriate for these data. There are no appropriate background data for liquid sludge samples, and SALs do not apply to this liquid matrix. The material in the tank represented what could potentially be released to the environment either through the seepage pit or from the tank if there had been a leak. If there were no hazardous constituents in the liquid sludge, there could have been no release of hazardous material to the environment. Thus, the data assessment for this site will be limited to a presentation of the detected inorganic and organic chemicals. This information will be used to determine if hazardous waste was present in the septic tank. If no hazardous waste was present in the source unit, NFA would be planned for the septic tank and outfall (seepage pit). If the effluent in the tank was identified as hazardous, the tank, its contents, and the seepage pit would be removed and the site closed under appropriate New Mexico State regulations.

Based on this approach, the seepage pit for PRS 60-006(a) is recommended for NFA. A voluntary corrective action (VCA) plan is being developed to remove the contents of the septic tank and close the tank under appropriate State regulations.

5.16.1 History

PRS 60-006(a) is discussed in detail in Subsection 5.6 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 60-006(a) is an abandoned septic system that served the NTS Test Rack Facility (TA-60-17) and test tower (TA-60-19) on Sigma Mesa. The septic system consists of a 1 000-gal. septic tank and an associated seepage pit that measures approximately 4 ft wide by 50 ft long. The tank is located 20 ft south of the NTS Facility north fence and 30 ft east of the support trailers north of TA-60-19. From 1986 through 1989, wastewater generated from the facility bathrooms and seven floor drains, including one drain in a paint booth, discharged to the septic system.

The septic system was abandoned in place in 1989 when the facility was connected to the sanitary sewer system and TA-3 WWTP. The contents of the tank were never pumped out before the tank was abandoned.

5.16.2 Description

PRS 60-006(a) is located at TA-60, on Sigma Mesa, which is described in Chapter 2 of this report. The PRS is a mesa-top site on cooling unit 3 of the Bandelier Tuff.

5.16.3 Previous Investigations

No previous investigations were conducted at PRS 60-006(a).

5.16.4 Field Investigation

The sampling approach outlined in the RFI Work Plan for OU 1114 required collection of three samples from the two manhole locations indicated in Fig. 5-11 of the work plan (LANL 1993, 1090). This approach was modified based on the site conditions. Because the tank was found to be accessible only from the northernmost manhole, only one location was available for sampling.

Two samples each of the liquid and sludge were collected from one location shown in Fig. 5.16.4-1. The samples are summarized in Table 5.16.4-1. The two liquid samples were submitted for analysis of VOCs. The two liquid sludge samples were submitted for analysis for SVOCs, PCBs, and TAL metals. In addition to the samples collected, the work plan called for measurements of the tank and sludge depths and measurement of the VOCs in the tank atmosphere. The tank atmosphere was sampled using a PID with a Tygon™ tubing extension in order to obtain atmosphere samples from specific heights above the liquid in the tank; measurements were taken 8 ft, 4 ft, and 2 in. above the liquid in the tank. In addition, the tank atmosphere was sampled continuously while the other samples were collected. No VOCs were detected with the PID during this sampling event.

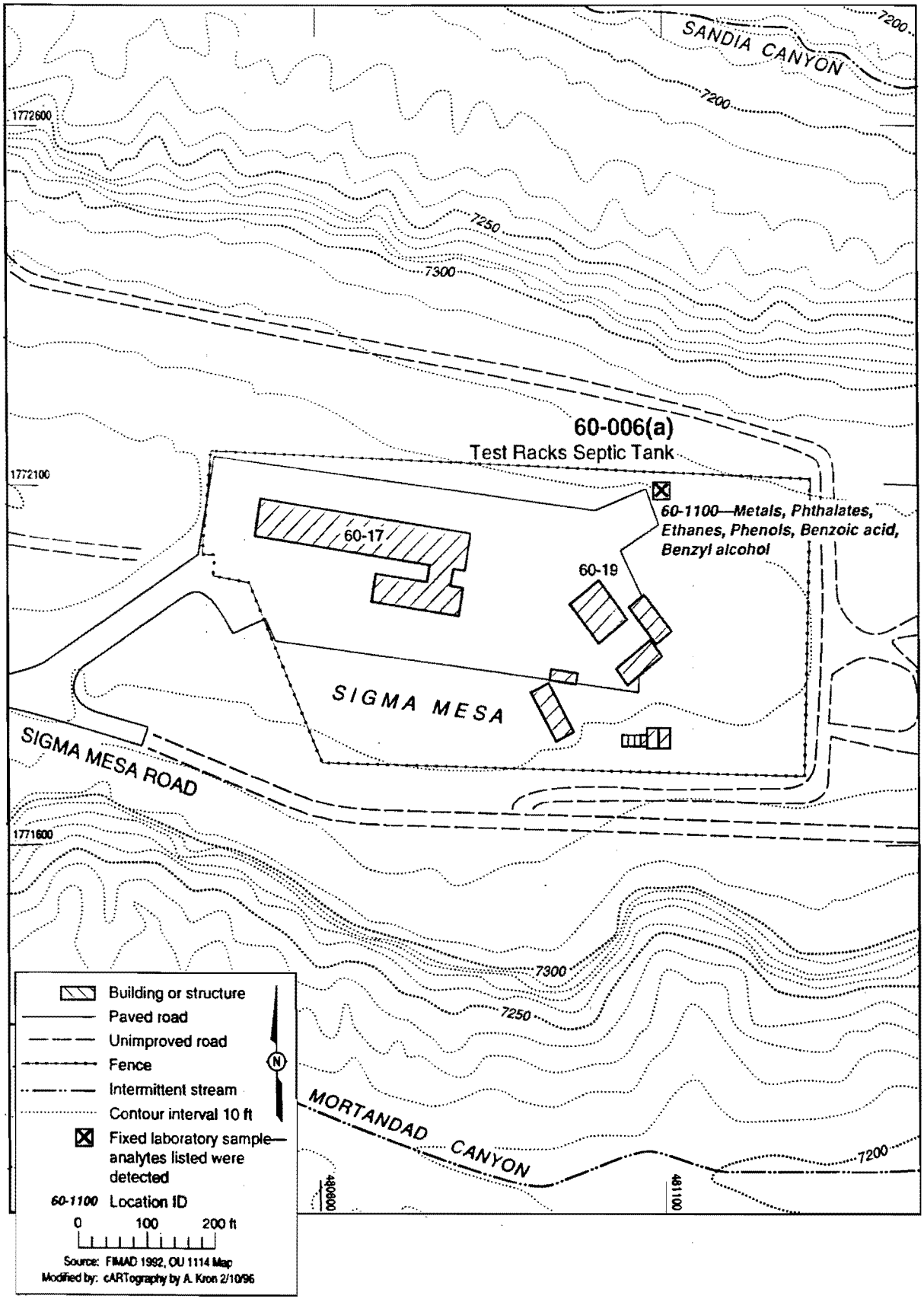

Fig. 5.16.4-1. PRS 60-006(a) 1994 sample collection locations.

TABLE 5.16.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-006(a)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER		
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOC[a]	SVOCs[b]	INORGANICS
60-1100	AAB5814	N/A[c]	liquid	18084	N/A	N/A
60-1100	AAB5815	N/A	liquid	18084	N/A	N/A
60-1100	AAB5817	N/A	sludge	N/A	18084	18958
60-1100	AAB5818	N/A	sludge	N/A	18084	18958

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] N/A = Not applicable.

Sample collection was accomplished by using a disposable, polyvinyl chloride (PVC) bailer for the liquid samples and a Kemerer™ sampler for the sludge samples. The samples were collected following LANL-ER-SOP-06.19, Weighted Bottle Sampler for Liquids and Slurries in Tanks, with appropriate changes to accommodate the differences in the sampling equipment. The PVC bailer was a 2-in. diameter, bottom-filling bailer that was lowered into the liquid, which was approximately 9 ft below the top of the tank. The Kemerer™ sampler was lowered to the bottom of the tank and a weight was released down the hand line which closed the sampler. The sludge samples were fine-grained, black, and resembled silt; the sampled materials had a sanitary sewer odor when removed from the tank. The sampler was then retrieved and opened at the top. Samples were transferred from the top of the sampler into appropriate containers. Care was taken to pour off any free liquid before collecting the sludge samples. These sample collection techniques were used in place of the coliwasa and spade and scoop methods given in the RFI Work Plan for OU 1114, because of the nature of the materials in the tank (LANL 1993, 1090).

5.16.5 Background Comparisons

Because there are no background data appropriate for the liquid sludge material sampled in Phase I, no background comparison is appropriate. The sampling objective was to determine if any hazardous chemicals are present in the source unit (the septic tank). Thus, all detected inorganics in the sludge or water samples collected from the septic tank are presented in Table 5.16.5-1.

TABLE 5.16.5-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 60-006(a)

Sample ID	Depth	Aluminium (ug/L)	Antimony (ug/L)	Arsenic (ug/L)	Barium (ug/L)	Beryllium (ug/L)	Cadmium (ug/L)	Calcium (ug/L)	Chromium (ug/L)	Cobalt (ug/L)	Copper (ug/L)	Iron (ug/L)
AAB5817	N/A[a]	116 000	<42.1	115	5 060	9.7	174	327 000	1 230	106	4 240	237 000
AAB5817R[b]	N/A	112 000	172	91	5 216	9.4	141	337 000	1 177	104	4 067	228 000
AAB5818	N/A	9 820	<42	<7.5	334	<1.7	10.6	170 000	96.7	<13.6	285	21 900

Sample ID	Depth	Lead (ug/L)	Magnesium (ug/L)	Manganese (ug/L)	Mercury (ug/L)	Nickel (ug/L)	Potassium (ug/L)	Selenium (ug/L)	Silver (ug/L)	Sodium (ug/L)	Thallium (ug/L)	Vanadium (ug/L)	Zinc (ug/L)
AAB5817	N/A	3 600	33 100	2 450	65.6	737	67 100	71.28	215	72 400	<29	819	42 600
AAB5817R	N/A	1 968	34 300	2 399	-	728	72 000	52.1	207	80 000	<29	796	42 000
AAB5818	N/A	369	16 900	287	3.76	82.4	52 300	<6.2	<7.6	66 200	<2.9	56.5	2 950

[a] N/A = Not applicable.
[b] Replicate sample.

5.16.6 Evaluation of Organics

Eight organic chemicals were detected in samples collected at PRS 60-006(a). The results for these detected organics are summarized in Table 5.16.6-1, and the sampling location is identified on Fig. 5.16.4-1.

5.16.7 Human Health

5.16.7.1 Screening Assessment

No screening assessment was performed because the sampling objective was to determine if any hazardous wastes were present in the source unit (the septic tank). The inorganic and organic chemicals and associated concentrations detected in the tank do not constitute a hazardous waste. Pursuant to 40 CFR 261, Subpart D, Lists of Hazardous Wastes, none of the detected organic constituents are listed, either directly or indirectly by the "derived from" rule. Three of the organics [butyl benzyl phthalate, [2,4]dimethylphenol, and phenol] are listed as hazardous constituents in Appendix VIII to Part 261, but all three chemicals are U-listed constituents and the U-listing is not applicable to this PRS.

5.16.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.16.8 Ecological

5.16.8.1 Ecotoxicological Screening Assessment

PRS 60-006(a) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRS 60-006(a) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.16.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

TABLE 5.16.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 60-006(a)

SAMPLE ID	DEPTH (FT)	BENZOIC ACID (ug/L)	BENZYL ALCOHOL (ug/L)	BIS(2-ETHYLHEXYL) PHTHALATE (ug/L)	BUTYL BENZYL PHTHALATE (ug/L)	DICHLOROETHANE [1,1-] (ug/L)	DIMETHYLPHENOL [2,4-] (ug/L)	METHYLPHENOL [2-] (ug/L)
AAB5814	N/A	N/A	N/A	N/A	N/A	6	N/A	N/A
AAB5815	N/A	N/A	N/A	N/A	N/A	<5	N/A	N/A
AAB5817	N/A	150	50	63	270	N/A	40	22
AAB5818	N/A	<100	<20	30	53	N/A	20	<20

[a] N/A = Not applicable.

5.16.9 Extent of Contamination

By design, solids and sludge were to settle out in the septic tank before the liquids were passed along to the seepage pit, and there is no evidence that the septic system did not operate according to its design. Therefore, it is assumed that solids and sludge accumulated only in the septic tank. Also, because of the short period of operation of the septic system, there was never a need to pump the solids and sludge out of the septic tank, thus eliminating the possibility of accidental spills.

Because the sludge is confined to the tank and because all of the detected constituents, except the trace concentration of 1,1- dichloroethane in one water sample, were found only in the sludge samples, any contamination at the site would be limited to the septic tank contents.

5.16.10 Conclusions and Recommendations

A review of the detected inorganic and organic chemicals in the septic tank samples indicates that this sludge and water can be disposed into the LANL industrial waste system. The majority of the detected constituents were found only in the sludge samples, and the sludge is confined to the septic tank. Because the PRS 60-006(a) seepage pit received no sludge and is unaffected by the constituents detected in the sludge inside the tank, it is proposed for NFA.

None of the constituents in the tank constitute a hazardous waste; therefore, the contents of the septic tank will be removed and the tank closed under appropriate State of New Mexico regulations. A VCA plan to implement this closure is under development. After the VCA is implemented, a Class III permit modification will be requested to remove PRS 60-006(a) from the HSWA Module of LANL's RCRA operating permit.

5.17 PRS 60-007(a), Sigma Mesa Stained Soil

PRS 60-007(a) is a storage area near the east end of Sigma Mesa that was reportedly contaminated with oil, hydraulic fluid, and other materials. Based on analytical results of the Phase I site investigation, PRS 60-007(a) is recommended for NFA.

5.17.1 History

PRS 60-007(a) is a 50 ft by 100 ft area southeast of the geothermal well concrete pad on the east end of Sigma Mesa. This area was used to store equipment used to drill the geothermal well. Oil, hydraulic fluid, and other materials were reported to have been released in this area, and the ground surface does have some small stains (Martell 1992, 17-600). During July 1992, the stained areas were excavated, placed in drums, and disposed of by the Laboratory's

maintenance contractor (LANL 1992, 17-771). The remediated areas were covered with gravel; however, no sampling was conducted to confirm removal of contamination.

5.17.2 Description

PRS 60-007(a) is located on Sigma Mesa, which is included in the description of TA-60 in Chapter 2 of this report. One side of the PRS is adjacent to the mesa edge, and the site is located on a thin mantle of soil and alluvium overlying cooling unit 3 of the Bandelier Tuff.

5.17.3 Previous Investigations

No previous investigations were conducted at PRS 60-007(a).

5.17.4 Field Investigation

The sampling approach for PRS 60-007(a) in the RFI Work Plan for OU 1114 was designed to determine whether TPH or PCB contamination remained in the surface soils after the 1992 remediation (LANL 1993, 1090). Again, the sampling program described in the work plan was modified to exclude sampling for TPH because it was not a RCRA-regulated substance. Although not specified on the sample table in Subsection 5.7.3 of the RFI Work Plan for OU 1114, field PCB analyses were added for the samples collected from this PRS because the work plan text specified that PCBs were to be analyzed (LANL 1993, 1090).

The biased sample locations indicated in the RFI Work Plan for OU 1114 were located using the previously stained areas now covered with new gravel and the geothermal well as reference points (LANL 1993, 1090). For the biased sample locations, the gravel was removed and the samples were collected from the soil 0–12 in. below the surface. The sampling locations are shown in Fig. 5.17.4-1 and summarized in Table 5.17.4-1.

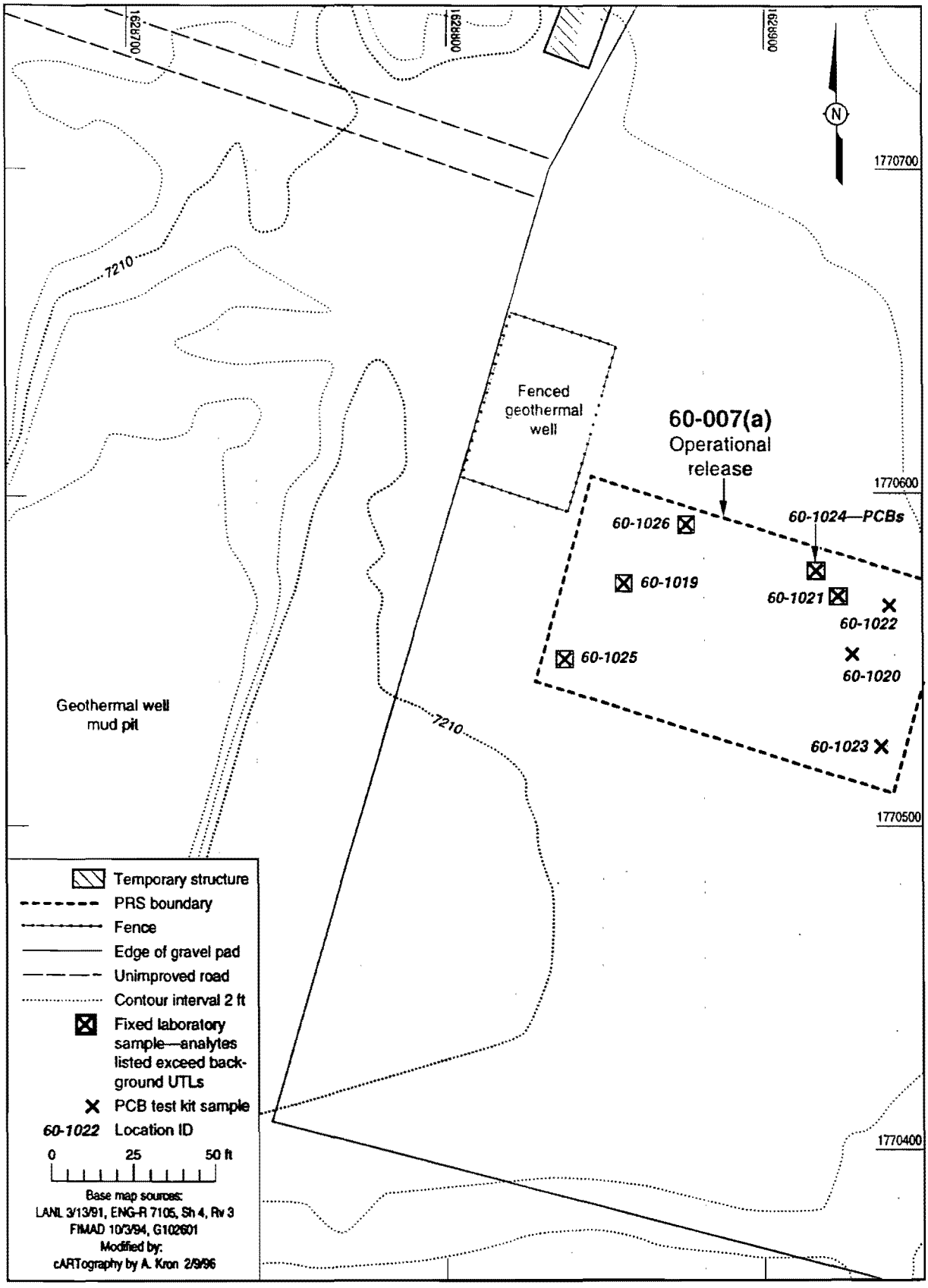

Fig. 5.17.4-1. PRS 60-007(a) 1994 sample collection locations.

TABLE 5.17.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-007(a)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	INORG-ANICS	VOCs[a]	SVOCs[b]	PCBs[c]	PCB FIELD TEST KIT RESULTS	MRAL[d]
60-1019	AAB5794	0 - 12	soil	N/A[e]	18086	N/A	N/A	<0.5	20952
60-1019	AAB5800[f]	0 - 12	soil	N/A	18086	N/A	N/A	<0.5	20952
60-1019	AAB5804	0 - 12	soil	20203	N/A	18086	18086	<0.5	20952
60-1020	AAB5795	0 - 12	soil	N/A	N/A	N/A	N/A	<0.5	N/A
60-1021	AAB5796	0 - 12	soil	N/A	18086	N/A	N/A	<0.5	20952
60-1022	AAB5797	0 - 12	soil	N/A	N/A	N/A	N/A	<0.5	N/A
60-1023	AAB5798	0 - 12	soil	N/A	N/A	N/A	N/A	<0.5	N/A
60-1024	AAB5799	0 - 12	soil	N/A	18086	N/A	N/A	N/A	N/A
60-1024	AAB5803	0 - 12	soil	20203	N/A	18086	18086	<0.5	20952
60-1025	AAB5801	0 - 12	soil	20203	18086	18086	18086	<0.5	20952
60-1026	AAB5806	0 - 12	soil	N/A	18086	N/A	18086	4 - 15	20952
N/A	AAB6066	N/A	water	N/A	18013	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.

Eleven soil samples were collected from eight locations at PRS 60-007(a). Ten samples were analyzed in the field using PCB test kits. Three of the 11 samples were collected as confirmatory samples for analysis of SVOCs, PCBs, and TAL metals. One of the three confirmatory samples and five additional samples were submitted for analysis of VOCs. All sample locations were screened for VOCs within the hole at the 12-in. depth using the PID/FID. QC samples included a trip blank and a field blank submitted for analysis of VOCs, and a rinsate blank submitted for the same analysis as the confirmatory samples. The field and rinsate blanks collected at PRS 60-004(e) also served as QC samples at PRS 60-007(a) because all sampling equipment was used at both PRSs on the same day. The field blank was submitted for analyses of VOCs, and the rinsate blank for the same analyses as the confirmatory samples.

Low concentrations of VOCs ranging from 0.2–16.5 ppm were detected at all of the sampling locations except the following three: 60-1019, 60-1025, and 60-1026, where the PID/FID equipment malfunctioned. Moisture interference is suspected as the reason for most of the

elevated PID readings. At locations 60-1019, 60-1021, and 60-1024 through 60-1026, confirmatory VOC samples were collected.

The results from the PCB test kits indicated that PCB concentrations were below 0.5 ppm for all samples collected (Table 5.17.4-1) except for sample AAB5806, which indicated a result of 4.0–15.0 ppm with an interpolated result of 11 ppm. The sample was from under the gravel in the remediated area of PRS 60-007(a).

5.17.5 Background Comparison for Inorganics

Antimony, arsenic, beryllium, cadmium, mercury, nickel, selenium, silver, and thallium were not detected in the samples analyzed. All detected inorganics were reported at concentrations less than the background screening values. Thus no inorganics were carried forward in the screening process to the SAL comparison step.

5.17.6 Evaluation of Organics

One group of organic chemicals, PCBs, was detected in one sample collected from PRS 60-007(a). The result for this detected organic is summarized in Table 5.17.6-1, and the sampling location is identified on Fig. 5.17.4-1. PCBs are carried forward in the screening process to the SAL comparison step.

TABLE 5.17.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 60-007(a)

SAMPLE ID	DEPTH (in.)	PCBs[a] (mg/kg)
SAL[b]	N/A[c]	1
EQL[d]	N/A	0.033
AAB5803	0 - 12	0.45

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.

5.17.7 Human Health

5.17.7.1 Screening Assessment

The only chemical identified by the detection limit screening did not exceed its SAL (Table 5.17.6-1). Because only one chemical (PCBs) was detected below its SAL, the multiple chemical evaluation is unnecessary.

5.17.7.2 Risk Assessment

No risk assessment was performed for this PRS.

5.17.8 Ecological

5.17.8.1 Ecotoxicological Screening Assessment

PRS 60-007(a) received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRS 60-007(a) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.17.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.17.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and no multiple chemical evaluation was performed.

5.17.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 60-007(a). Therefore, PRS 60-007(a) is recommended for NFA. Based on LANL's No Further Action Criteria Policy, Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future

land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.18 PRS 60-007(b), Motor Pool Drainage Areas

PRS 60-007(b) is a storm drainage ditch north of the Motor Pool Building, TA-60-1. Potential sources of contamination included a steam-cleaning pad, spills from a used-oil storage tank, an oil/water separator, and PCB-containing equipment stored at TA-60-1. Based on analytical results of the Phase I site investigation, PRS 60-007(b) is recommended for NFA.

5.18.1 History

PRS 60-007(b) is discussed in detail in Subsection 5.2 of the RFI Work Plan for OU 1114 (LANL 1993, 1090).

PRS 60-007(b), a storm drainage ditch, extends approximately 600 ft from a paved area directly north of TA-60-1 to the bottom of Sandia Canyon. Two parking lots located east of TA-60-1 drain to a ditch on the east that joins PRS 60-007(b). Several potential sources of contamination to PRS 60-007(b) included a steam-cleaning pad that drained to the ditch, a used-oil storage tank associated with several spills, and an oil/water separator that periodically drained to the ditch. Another source of possible contamination was equipment that used PCB-containing oil and was stored on the asphalt area east of TA-60-1. The area of the ditch visibly affected by these sources was remediated in 1986 by removing the stained soil down to the bedrock channel of the ditch.

5.18.2 Description

PRS 60-007(b) is part of TA-60, which is described in Chapter 2 of this report. The PRS is located on the south slope of Sandia Canyon. The storm drainage ditch was excavated through soil and alluvium to bedrock on cooling unit 3 of the Bandelier Tuff.

5.18.3 Previous Investigations

No previous investigations were conducted at PRS 60-007(b).

5.18.4 Field Investigation

The sampling approach for PRS 60-007(b) in the RFI Work Plan for OU 1114 was designed to determine if contamination remained in the sediments of PRS 60-007(b) after the soil removal conducted in 1986 (LANL 1993, 1090). However, the sampling program described in the work

plan was modified to exclude sampling for TPH because it was not a RCRA-regulated substance.

The biased sample locations indicated in Figs. 5-3 and 5-4 of the RFI Work Plan for OU 1114 (LANL 1993, 1090) were located using the drainage channels and buildings as reference points. Sample locations were adjusted in the field to meet the sampling objectives. Sample locations are shown in Fig. 5.18.4-1 and summarized in Table 5.18.4-1.

TABLE 5.18.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 60-007(b)

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PCBs[c]	PCB FIELD TEST KIT	INORGANICS	MRAL[d]
60-1309	AAB7639	0 - 12	soil	N/A[e]	N/A	N/A	N/A	19168	20713
60-1309	AAB7708	0 - 12	soil	N/A	19136	19136	N/A	N/A	20520
60-1313	AAB7636	0 - 18	soil	N/A	N/A	N/A	N/A	N/A	20713
60-1313	AAB7705	0 - 18	soil	19136	N/A	N/A	N/A	N/A	20520
60-1315	AAB7643	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	21950
60-1315	AAB7706	0 - 6	soil	19136	N/A	N/A	N/A	N/A	20520
60-1316	AAB7640	0 - 18	soil	N/A	N/A	N/A	N/A	N/A	N/A
60-1316	AAB7642[f]	0 - 18	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1316	AAB7648	0 - 6	soil	N/A	N/A	N/A	<0.5	19168	20713
60-1316	AAB7707	0 - 12	soil	N/A	19136	19136	N/A	N/A	20520
60-1317	AAB7644	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1318	AAB7641	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1319	AAB7645	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1320	AAB7646	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-1321	AAB7647	0 - 6	soil	N/A	N/A	N/A	<0.5	N/A	N/A
60-N/A	AAB7649	N/A	water	N/A	N/A	N/A	N/A	19168	N/A
60-N/A	AAB7650	N/A	water	N/A	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB7651	N/A	water	N/A	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB7723	N/A	water	19136	19136	19136	N/A	N/A	N/A
60-N/A	AAB7724	N/A	water	19136	N/A	N/A	N/A	N/A	N/A
60-N/A	AAB7725	N/A	water	19136	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] Collocated sample.

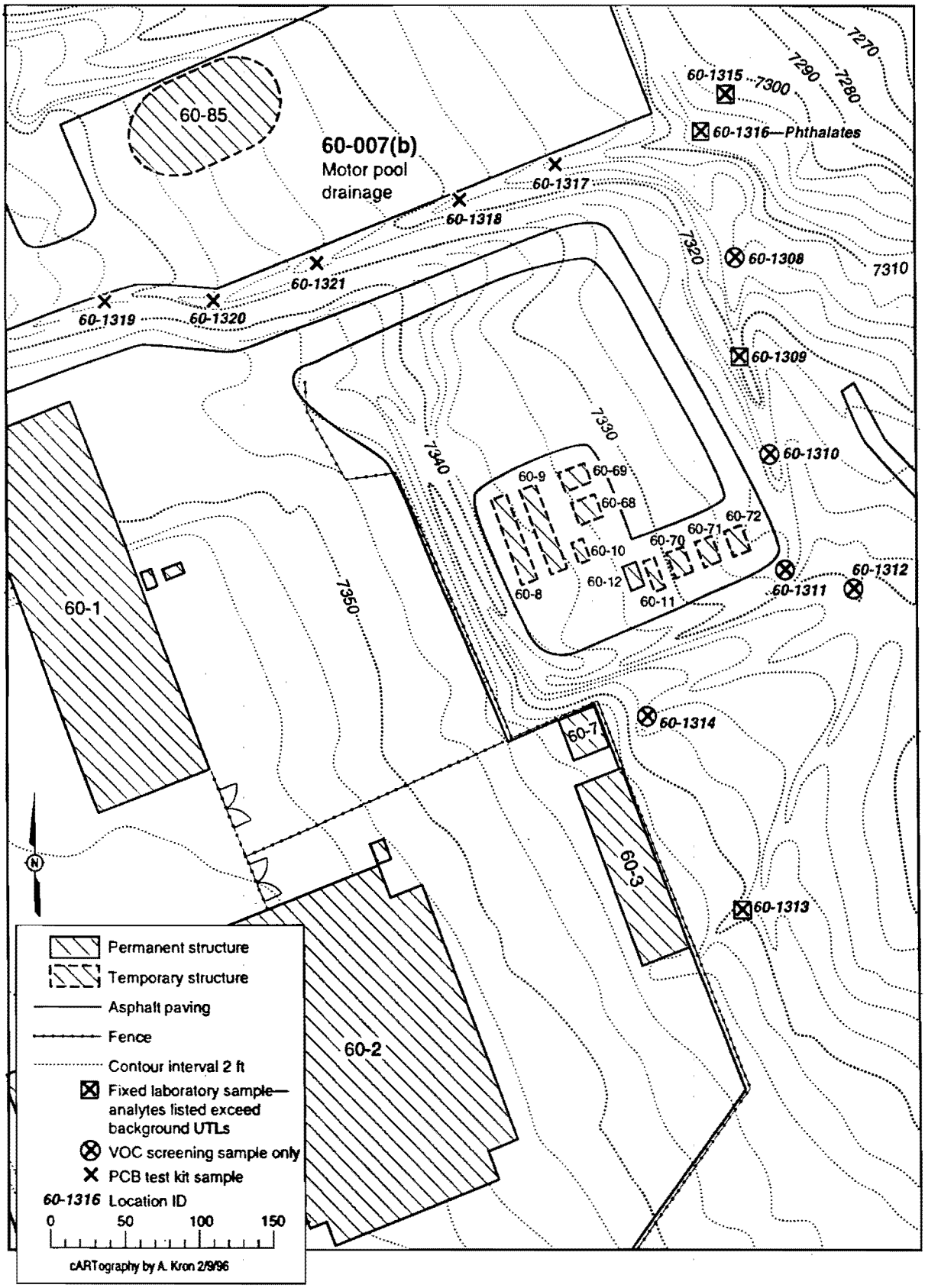

Fig. 5.18.4-1. PRS 60-007(b) 1994 sample collection locations.

Samples were collected using LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. Samples to be analyzed for VOCs were placed in 125 ml glass, wide-mouth containers with Teflon™-lined lids.

In the east/west drainage ditch to the north of TA-60-1, eight soil samples were collected from seven locations (60-1315 through 60-1321) for field PCB test kit analysis. No PCBs were detected above the 0.5 ppm detection limit. One confirmatory sample was collected from location 60-1316 for analysis of SVOCs, PCBs, and TAL metals. Location 60-1315 was analyzed for VOCs because of a detect by the PID.

In the north/south drainage ditch to the east of TA-60-1, seven locations (60-1308 through 60-1314) were sampled and field screened using an FID for VOCs. No VOCs were detected. Samples from location 60-1313 were analyzed for VOCs to confirm the nondetects measured by the FID. One confirmatory sample was collected from location 60-1309 and analyzed for SVOCs, PCBs, and TAL metals.

QC samples included a trip and field blank submitted for analysis of VOCs and two rinsate blanks submitted for the same analyses as the investigative samples.

Samples for fixed laboratory analysis from this PRS were not cooled properly before off-site shipment and therefore were not analyzed. Samples were recollected on September 15, 1994. Locations 60-1309 and 60-1316 were resampled for SVOC and PCB analysis, and locations 60-1315 and 60-1313 were resampled for VOCs.

5.18.5 Background Comparison for Inorganics

Antimony, arsenic, beryllium, cadmium, cobalt, copper, magnesium, mercury, nickel, potassium, selenium, sodium, silver, thallium, and vanadium were not detected. All detected inorganics were reported at concentrations less than background screening values. Thus, no inorganics were carried forward in the screening process to the SAL comparison step.

5.18.6 Evaluation of Organics

One organic chemical, bis(2-ethylhexyl)phthalate, was detected in one sample collected from PRS 60-007(b). The result for this detected organic is shown in Table 5.18.6-1, and the sampling location is identified on Fig. 5.18.4-1. This detected organic chemical is carried forward in the screening process to the SAL comparison step.

TABLE 5.18.6-1

ORGANIC CHEMICAL WITH CONCENTRATION GREATER THAN THE LIMIT OF DETECTION AT PRS 60-007(b)

SAMPLE ID	DEPTH (in.)	BIS (2-ETHYLHEXYL) PHTHALATE (mg/kg)
SAL[a]	N/A[b]	32
EQL[c]	N/A	0.33
AAB7707	0 - 12	5.3

[a] SAL = Screening action level.
[b] N/A = Not applicable.
[c] EQL = Estimated quantitation limit.

5.18.7 Human Health

5.18.7.1 Screening Assessment

The only chemical identified by the detection limit screening exceeded did not exceed its SAL (Table 5.18.6-1). Because only one chemical (bis2-ethylhexylphthalate) was detected below its SAL, a multiple chemical evaluation is unnecessary.

5.18.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.18.8 Ecological

5.18.8.1 Ecotoxicological Screening Assessment

PRS 60-007(b) received a landscape score of three in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is relatively undisturbed by human activities. The PRS also received a receptor access score of three because the potential for COPC transport to other habitats is high in an outfall area such as this. PRS 60-007(b) will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.18.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.18.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. The results of the screening assessment are presented above. All chemical concentrations are less than SALs and no multiple chemical evaluation was performed.

5.18.10 Conclusions and Recommendations

No chemicals were retained as COPCs by the screening assessment process for PRS 60-007(b). Therefore, PRS 60-007(b) is recommended for NFA. Based on LANL's No Further Action Criteria Policy Criterion 4 (which states that the PRS has been characterized in accordance with current state or federal regulations, and that COPCs are not present in concentrations that would pose an unacceptable risk under the most conservative assumption of residential future land use), a Class III permit modification will be requested to remove this PRS from the HSWA Module of LANL's RCRA operating permit (Environmental Restoration Project 1995, 1173).

5.19 PRS 61-002, Radio Repair Shop PCB Storage

PRS 61-002 is a storage area near the Radio Repair Shop, TA-61-23, on East Jemez Road. It was used to store PCB-containing drums and equipment and at one time had documented PCB contamination. Based on analytical results of the Phase I site investigation, a Phase II investigation is planned for PRS 61-002. The Phase II sampling plan is presented in Subsection 5.19.11 of this report.

5.19.1 History

PRS 61-002 is discussed in detail in Subsection 5.10 of the RFI Work Plan for OU 1114 (LANL 1993, 1090). The original discussion in the work plan references PRS 61-001; however, the PRS number was changed to 61-002 in response to an EPA Notice of Deficiency.

PRS 61-002 was originally unpaved and was used as a storage yard for PCB-containing drums and equipment; storage was discontinued in 1985. PRS 61-002 includes an approximately 600 sq ft area downgradient (south side) of the current asphalted area. This area may have been affected by sediments carried off-site prior to asphalt application and is

currently part of the Los Alamos County Landfill used for employee parking and equipment storage. The downgradient area is mostly covered by asphalt except for some areas near the fence where the asphalt is discontinuous, broken, and gravelly.

5.19.2 Description

PRS 61-002 is located in TA-61, which is described in Chapter 2 of this report. The PRS is located on the mesa top and the gentle southward slope toward the drainage at the head of Sandia Canyon. PRS 61-002 is situated on soil and alluvium overlying cooling unit 4 of the Bandelier Tuff.

5.19.3 Previous Investigations

In 1986, surface soil samples were collected and analyzed for PCBs. The results indicated PCB concentrations up to 691 ppm. The area was then excavated to a depth of at least 10 in. and resampled. The results of the second sampling effort indicated that the PCB concentrations had decreased to a maximum of 51.3 ppm (Morales 1992, 17-743). The area was then covered with clean fill and asphalted. After the area was asphalted, it was again used to store PCB-containing drums and equipment, but this practice discontinued by 1992.

5.19.4 Field Investigation

The sampling approach for PRS 61-002 in the RFI Work Plan for OU 1114 was designed to determine whether PCBs were present above action levels in stains on the asphalt or in the surface soils downgradient of PRS 61-002 (LANL 1993, 1090). The sampling was not designed to evaluate the concentrations of PCBs left in the soil under the asphalt and fill.

The sample locations indicated in Fig. 5-18 of the work plan were located using stained areas and a minor drainage area as reference points. Additional sample locations were selected based on professional judgment to provide more information on the extent of any possible PCB contamination on the asphalt. Sample locations are shown in Fig. 5.19.4-1 and summarized in Table 5.19.4-1.

TABLE 5.19.4-1

SUMMARY OF SAMPLES COLLECTED AT PRS 61-002

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER					
LOCATION ID	SAMPLE ID	DEPTH (in.)	MATRIX	VOCs[a]	SVOCs[b]	PCBs[c]	PCB TEST KITS	INORGANICS	MRAL[d]
61-1000	AAB7602	0 - 2	soil	N/A[e]	N/A	18283	<0.5	N/A	20778
61-1001	AAB7652	0 - 2	soil	N/A	N/A	18283	4.0 - 15.0	N/A	20778
61-1002	AAB7653	0 - 2	soil	N/A	N/A	18283	<0.5	N/A	20778
61-1003	AAB7603	0 - 2	soil	N/A	N/A	18283	>50	N/A	20778
61-1004	AAB6015	0 - 6	soil	N/A	18244	18244	1.0 - 4.0	18458	19229
61-1004	AAB6019	0 - 6	soil	18244	18244	18244	0.5 - 1.0	18458	19229
61-1005	AAB6016	0 - 6	soil	N/A	18244	18244	1.0 - 4.0	18458	19229
61-1005	AAB6018	NA[f]	soil	N/A	18244	18244	1.0 - 4.0	18458	19229
61-1006	AAB6017	0 - 6	soil	N/A	18244	18244	<0.5	18458	19229
61-1007	N/A	N/A	soil	N/A	N/A	N/A	<0.5	N/A	N/A
61-1008	N/A	N/A	soil	N/A	N/A	N/A	<0.5	N/A	N/A
61-1009	AAB7604	0 - 2	soil	N/A	N/A	18283	N/A	N/A	20778
61-1010	AAB7661	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-1011	AAB7662	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-1012	AAB7663	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-1013	AAB7664	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-1014	AAB7665	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-1015	AAB7666	0 - 2	soil	N/A	N/A	18550	N/A	N/A	20714
61-N/A	AAB6020	N/A	water	18244	18244	18244	N/A	18458	N/A
61-N/A	AAB6021	N/A	water	18244	N/A	N/A	N/A	N/A	N/A
61-N/A	AAB6022	N/A	water	18244	N/A	N/A	N/A	N/A	N/A
61-N/A	AAB7671	N/A	water	18244	N/A	N/A	N/A	N/A	N/A
61-N/A	AAB7672	N/A	water	18244	N/A	N/A	N/A	N/A	N/A

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatile organic compounds.
[c] PCBs = Polychlorinated biphenyls.
[d] MRAL = Mobile radiological analytical laboratory.
[e] N/A = Not applicable.
[f] NA = Not available.

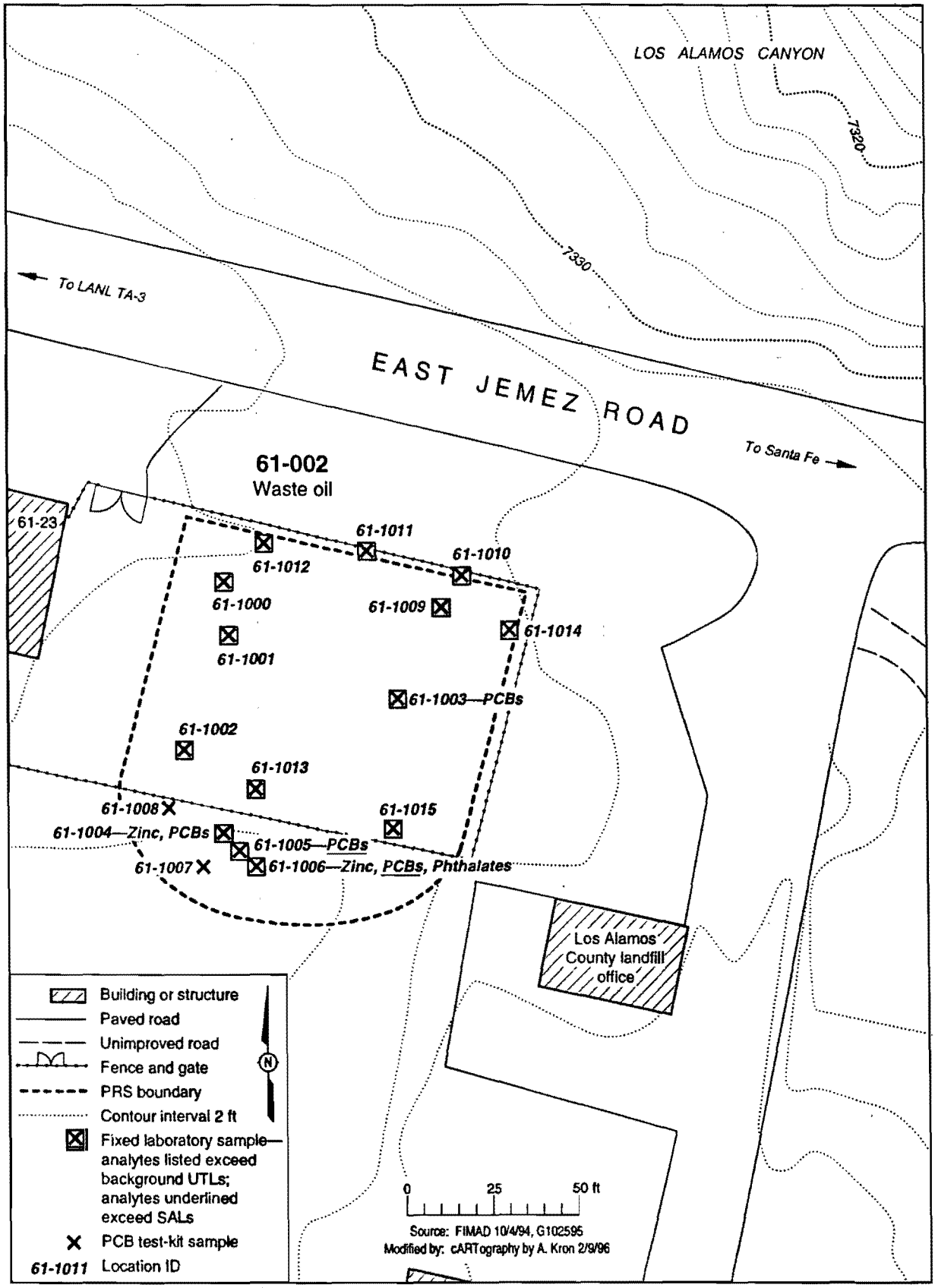

Fig. 5.19.4-1. PRS 61-002 1994 sample collection locations.

For the asphalt sample areas, the first 2 in. of asphalt was removed using a hammer and chisel following LANL-ER-SOP-06.28, Chip Sampling of Porous Surfaces. All asphalt sample locations were screened for VOCs using the FID as the asphalt was chipped. Soil sampling locations downgradient from the asphalt were screened for VOCs within the hole at the 6-in. depth using the FID.

Eighteen samples were collected at 16 locations from PRS 61-002. Twelve samples were collected on July 22, 1994, and analyzed in the field using PCB test kits. Five of the 18 samples were collected from the 0- to 6-in. interval and submitted for analysis of SVOCs, PCBs, and TAL metals. One of these was also analyzed for VOCs. QC samples included field and trip blanks submitted for analysis of VOCs and a rinsate blank submitted for the same analyses as the soil samples.

The soil results from the PCB test kits indicated that the PCB concentrations ranged from 0.5 ppm to greater than 50 ppm (Table 5.19.4-1). The fixed laboratory results were all below 1 ppm and possibly indicate a false positive problem with the field test kit analyses when sampling asphalt. According to field personnel who used the test kits at this site, the asphalt samples produced dark brown extracts that appeared to interfere with the color development step of the analysis.

Additional asphalt samples were collected for fixed-laboratory analyses to determine the presence or absence of PCBs at this PRS. Although these additional samples were stored at room temperature for a period of about one week, given that the samples were asphalt chip samples collected at the surface and that PCBs are very stable in the environment, it is highly unlikely that one week of storage at room temperature would impact the analytical results, particularly when the primary objective was merely a determination of presence or absence of PCBs.

5.19.5 Background Comparisons

Antimony, beryllium, cobalt, magnesium, mercury, nickel, potassium, selenium, silver, sodium, thallium, and vanadium were not detected in the samples that were analyzed. All detected inorganics, except zinc, were reported at concentrations less than the background screening values. Zinc was carried forward to the SAL comparison step.

TABLE 5.19.5-1

INORGANIC CHEMICAL WITH CONCENTRATIONS GREATER THAN LOS ALAMOS BACKGROUND AT PRS 61-002

SAMPLE ID	DEPTH (FT)	ZINC (mg/kg)
UTL[a]	N/A[b]	50.8
SAL[c]	N/A	23 000
AAB6015	0 - 0.5	57.3
AAB6017	0 - 0.5	59.9

[a] UTL = Upper tolerance limit.
[b] N/A = Not applicable.
[c] SAL = Screening action level.

5.19.6 Evaluation of Organics

Two organic chemicals, butyl benzyl phthalate and PCBs, were detected in samples collected from PRS 61-002. The results for these detected organics are summarized in Table 5.19.6-1, and the sampling locations are identified on Fig. 5.19.4-1. These detected organic chemicals are carried forward in the screening process to the SAL comparison step.

TABLE 5.19.6-1

ORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN THE LIMIT OF DETECTION AT PRS 61-002

SAMPLE ID	DEPTH (FT)	BUTYL BENZYL PHTHALATE (mg/kg)	PCBs[a] (mg/kg)
SAL[b]	N/A[c]	13 000	1
EQL[d]	N/A	0.33	0.033
AAB6015	0 - 0.5	<0.41	0.94
AAB6016	0 - 0.5	<0.37	0.99
AAB6017	0 - 0.5	0.92	1.6
AAB6018	0 - 0.5	<0.38	1.4
AAB6019	0 - 0.5	<0.41	0.55
AAB7603	0 - 0.17	N/A	0.53

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260™.
[b] SAL = Screening action level.
[c] N/A = Not applicable.
[d] EQL = Estimated quantitation limit.

5.19.7 Human Health

5.19.7.1 Screening Assessment

One of the carcinogenic chemicals (PCBs) detected in the PRS 61-002 samples exceeded its SAL in two samples (Table 5.19.7-2). Thus, PCBs are identified as a COPC based on the SAL comparison. None of the other chemicals identified by the background comparison or the detection limit screening exceeded SALs (Table 5.19.5-1, Table 5.19.6-1) and these chemicals are eliminated as COPCs.

TABLE 5.19.7-2

CARCINOGENIC CHEMICALS WITH CONCENTRATIONS GREATER THAN SALS IN SOIL AT PRS 61-002

SAMPLE ID	LOCATION ID	DEPTH (ft)	PCBs[a] (mg/kg)
SAL[b]	N/A[c]	N/A	1
AAB6017	61-006	0 - 0.5	1.6
AAB6018	61-005	0 - 0.5	1.4

[a] PCBs represents the sum of the detected values of Aroclor 1016, 1221, 1232, 1242, 1248, 1254, and 1260.
[b] SAL = Screening action level.
[c] N/A = Not applicable.

To evaluate multiple chemical effects for PRS 61-002, COPCs detected at concentrations below their respective SALs were divided into a single class of noncarcinogens. The maximum detected value for remaining detected (noncarcinogen) chemicals was used, which is the most conservative method for evaluating multiple chemical effects. Even so, the result of the noncarcinogen multiple chemical evaluation was less than unity (Table 5.19.7-4), indicating that health effects caused by the additivity of multiple chemicals are unlikely. Thus, no additional COPCs were identified by the multiple chemical evaluation.

TABLE 5.19.7-4

MULTIPLE CHEMICAL EVALUATION FOR PRS 61-002 DATA

ANALYTE	SAMPLE ID	SAMPLE VALUE (mg/kg)	SAL[a] (mg/kg)	NORMALIZED VALUE
NON-CARCINOGENIC EFFECTS				
Butyl benzyl phthalate	AAB6017	0.92	13 000	0.000071
Zinc	AAB6017	59.9	23 000	0.0026
			Total:	0.00268

[a] SAL = Screening action level.

5.19.7.2 Risk Assessment

No human health risk assessment was performed for this site.

5.19.8 Ecological

5.19.8.1 Ecotoxicological Screening Assessment

PRS 61-002 received a landscape condition score of two in the habitat-based exposure rating (Myers and Ferenbaugh in preparation, 1250). This indicates that the site is disturbed by human activities but still may be used by ecological receptors. The PRS received a receptor access score of one because only small habitat parcel areas exist within the industrial area. PRS 61-002 will be further evaluated within the scope of an upcoming ecological investigation that evaluates landscape and receptor factors in the context of ecological exposure units rather than on a PRS-by-PRS basis.

5.19.8.2 Ecological Risk Assessment

No ecological risk assessment was performed for this PRS.

5.19.9 Extent of Contamination

Sampling was designed to support the screening assessment with samples collected from the most likely locations of potential contamination. Since chemicals were identified as COPCs in the screening assessment for PRS 61-002, a Phase II investigation is planned to help determine extent of contamination. The Phase II sampling plan is described in Subsection 5.19.11 of this report.

5.19.10 Conclusions and Recommendations

Because PCBs were detected in two soil samples at concentrations above SALs, and because extent of contamination has not been fully determined, PRS 61-002 is recommended for a Phase II investigation to identify extent of contamination. The Phase II investigation may be followed by a risk assessment and/or some type of remedial action or site control measures.

5.19.11 Phase II Sampling and Analysis Plan

5.19.11.1Site Description and Phase I RFI Results

PRS 61-002 is described in Subsections 5.19, 5.19.1, 5.19.2, and 5.19.3 of this report.

The sampling approach for PRS 61-002 in the RFI Work Plan for OU 1114 was designed to determine whether PCBs were present in the asphalt or in the surface soils downgradient of PRS 61-002 (LANL 1993, 1090). The sampling was not designed to evaluate the concentrations of PCBs left in the soil under the asphalt and fill. Details of the Phase I investigation are discussed in Subsection 5.19.4 of this report. Although other analytes were analyzed, only PCBs, at locations 61-1005 and 61-1006, were detected above SALs. These sampling locations were in the shallow drainage pathway leading to the Los Alamos County Landfill employee parking area and were the most southerly (downgradient) locations sampled. Therefore, the Phase II sampling plan is designed to define the horizontal and vertical extent of elevated PCB concentrations in the soils/sediment south of the asphalted fenced area only. Phase I sampling does indicate that there is no new surface PCB contamination within the fenced yard.

5.19.11.2Phase II Objectives and Approach

One objective of Phase II sampling is to provide information for a baseline risk assessment for PCBs. Because this PRS is in the core industrial area of LANL, the primary exposure scenario that will be evaluated in the baseline risk assessment is based on the LANL industrial scenario described in Appendix K of the LANL Installation Work Plan (LANL 1993, 1017). EPA risk assessment guidance indicates that the 95% upper confidence level of the mean concentration within each exposure unit will be used to estimate the source term concentration (EPA 1991, 0302). The industrial exposure unit area is 500 m^2.

Another objective of Phase II sampling activities at PRS 61-002 is to confirm the original elevated PCB results from sampling locations 61-1004, 61-1005, and 61-1006, and determine if these PCB concentrations are localized or decrease with depth and distance.

The assumptions used to design the sampling and analysis plan are based on the primary drainage pathways of sediment from SWMU 61-002. The elevated PCB concentrations measured in the Phase I investigation were clustered in the drainage south of the currently asphalted storage area. It is anticipated that the concentrations of PCBs will decrease further south in this drainage area. Phase II sampling locations will be selected to determine if the elevated PCB concentrations measured in Phase I are localized.

The field investigation approach, methods, and guidelines presented in the original RFI Work Plan for OU 1114 (LANL 1993, 1090) will be followed during this Phase II investigation.

5.19.11.3Phase II Sampling Locations and Methods

A total of seven sampling locations are planned, six of which are shown in Fig. 5.19.11-1. These sampling locations were selected based on the assumption that the PCBs are concentrated in the primary drainage pathway from PRS 61-002. This is supported by the fact that the elevated PCB concentrations measured in the Phase I investigation were clustered in the shallow, indistinct drainage pathway south of the asphalted storage area. However, the drainage pathway flattens and loses its identity to the south of location 61-006. It is anticipated that the concentrations of PCBs will decrease in this broadened, ill-defined drainage area.

Location 2 will be centrally located within the vaguely discernible drainage pathway remaining south of location 61-1006. The other five sampling locations will be positioned on a 20-ft grid pattern to the south, east, and west of location 2. A seventh sampling location will be positioned as close as possible to location 61-1005.

These sampling locations should provide the necessary information regarding vertical and horizontal extent of PCBs. If PCBs are identified at concentrations exceeding SALs, additional samples will be collected, as necessary, to define the extent of the affected area. The MCAL will be used to provide real-time PCB data with which to make field decisions.

The original samples were collected from asphalt (0- to 2-in. interval) and soil (0- to 6-in. interval) using LANL-ER-SOP-06.28, Chip Sampling of Porous Surfaces and LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. At each of the planned locations, the 0- to 2-in. interval (if asphalt is present), or 0- to 6-in. interval (if soil is present) will be sampled using the appropriate collection methods. The 6- to 12-in. soil interval will also be sampled to provide information regarding vertical extent.

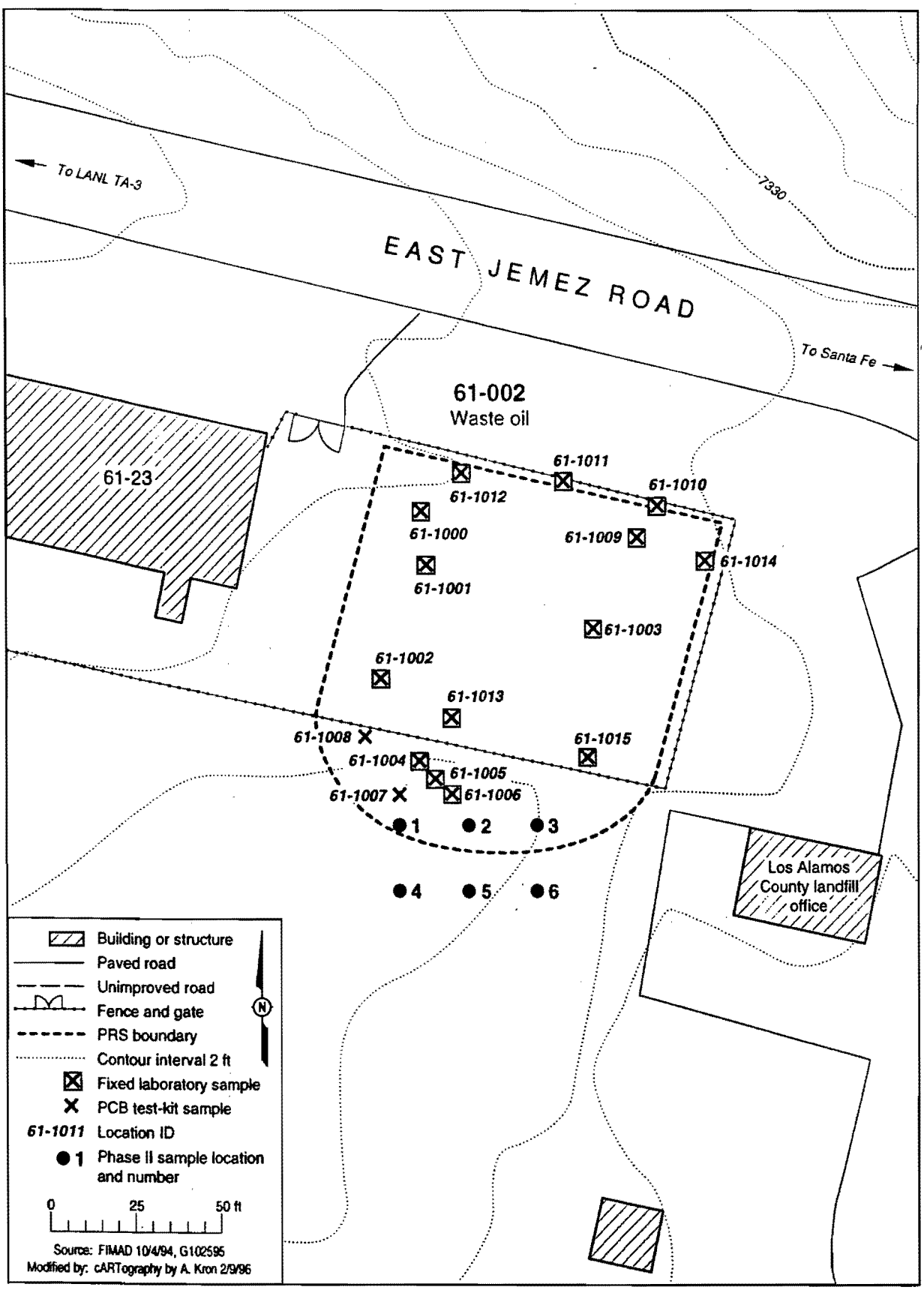

Fig. 5.19.11-1 PRS 61-002 Phase II sample locations.

The samples will be prepared and transported according to LANL ER SOPs. Following sample collection, the bottles will be labeled and the chain-of-custody and other documentation will be completed as required. The bottles will then be placed in a cooler at 4°C for transportation to the analytical laboratory.

5.19.11.4 Phase II Laboratory Analysis

The samples will be analyzed for PCBs only at the MCAL using EPA SW-846 methods. Because no samples will be sent to off-site laboratories, no radionuclide analyses will be requested.

6.0 REFERENCES

Broxton, D. E., and P. G. Eller (Eds), June 1995. "Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory Technical Area 21," Los Alamos National Laboratory Report LA-12934-MS, Los Alamos, New Mexico. **(Broxton and Eller 1995, 1162)**

Cross, Saul, 1994. "Biological Evaluation for Environmental Restoration Program Operable Unit 1114; Technical Areas, 3, 30, 59, 60, 61, 64," Los Alamos National Laboratory Report LA-UR-94-21, Los Alamos, New Mexico. **(Cross 1994, 17-1278)**

Environmental Protection Group, December 1990. "Environmental Surveillance at Los Alamos during 1989," Los Alamos National Laboratory Report LA-12764-ENV, Los Alamos, New Mexico. **(Environmental Protection Group 1990, 0497)**

Environmental Protection Group, March 1992. "Environmental Surveillance at Los Alamos during 1990," Los Alamos National Laboratory Report LA-12271-MS, Los Alamos, New Mexico. **(Environmental Protection Group 1992, 0740)**

Environmental Restoration Project, 1995. "Policy Memo Notebook," Los Alamos National Laboratory, Los Alamos, New Mexico. **(Environmental Restoration Project, 1173)**

Environmental Restoration Project Assessments Council, March 28, 1995. "Statistical Comparisons to Background, Part I," Los Alamos National Laboratory Report LA-UR-95-1217, Los Alamos, New Mexico. **(Environmental Restoration Project Assessments Council 1995, 1218)**

EPA (US Environmental Protection Agency), December 1991. "Risk Assessment Guidance for Superfund, Volume I—Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)," Interim, EPA/540/R-92/003, Publication 9285.7-01B, Office of Research and Development, Washington, DC. **(EPA 1991, 0302)**

EPA (US Environmental Protection Agency), February 1992. "Framework for Ecological Risk Assessment. EPA/630/R-92/001" Risk Assessment Forum, US Environmental Protection Agency, Washington, DC. **(EPA 1992, 0989)**

ESG, May 1988. *Environmental Surveillance at Los Alamos during 1987*, Los Alamos National Laboratory Report LA-11306-ENV, Los Alamos, New Mexico. **(ESG 1988, 0408)**

ESG, June 1989. *Environmental Surveillance at Los Alamos during 1988*, Los Alamos National Laboratory Report LA-11628-ENV, Los Alamos, New Mexico. **(ESG 1988, 0308)**

LANL (Los Alamos National Laboratory). "Los Alamos National Laboratory Environmental Restoration Program Standard Operating Procedures," Los Alamos National Laboratory report, Los Alamos, New Mexico. **(LANL 1993, 0875)**

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Volumes I through IV, Los Alamos National Laboratory Report No. LA-UR-90-3400, prepared by International Technology Corporation under Contract 9-XS8-0062R-1, Los Alamos, New Mexico. **(LANL 1990, 0145)**

LANL (Los Alamos National Laboratory), July 6, 1992. "Corrective Action at Sigma Mesa," Los Alamos National Laboratory memorandum ADEE: 92-296 to Distribution from C. Michels (ADEE), Los Alamos, New Mexico. **(LANL 1992, 17-771)**

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1114," Los Alamos National Laboratory Report LA-UR-93-1000, Los Alamos, New Mexico. **(LANL 1993, 1090)**

LANL (Los Alamos National Laboratory), November 1993. "Installation Work Plan for Environmental Restoration," Revision 3, Los Alamos National Laboratory Report LA-UR-93-3987, Los Alamos, New Mexico. **(LANL 1993, 1017)**

LANL (Los Alamos National Laboratory), February 1995. "Installation Work Plan for Environmental Restoration," Revision 4, Los Alamos National Laboratory Report LA-UR-95-740, Los Alamos, New Mexico. **(LANL 1995, 1164)**

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1114, Addendum 1," Los Alamos National Laboratory Report LA-UR-95-731, Los Alamos, New Mexico. **(LANL 1995, 17-1275)**

LANL (Los Alamos National Laboratory), in preparation. "Technical Approach to RFI Reports," A. M. Dorries (Ed.), Los Alamos National Laboratory Report LA-UR-___, Los Alamos, New Mexico. **(LANL in preparation, 1281)**

Longmire, P., S. Reneau, P. Watt, J. Gardner, and C. Duffy, 1995. "Pedogenesis and Geochemistry of Background Bandelier Tuff and Selected Soil Profiles, Los Alamos, New Mexico," Los Alamos National Laboratory Report LA-12913-MS, Los Alamos, New Mexico. **(Longmire et al. 1995, 1142)**

Longmire, P. A., D. E. Broxton, and S. L Reneau (Eds.), October 1995. " Natural Background Geochemistry and Statistical Analysis of Selected Soil Profiles, Sediments, and Bandelier Tuff, Los Alamos, New Mexico, Los Alamos National Laboratory Report LA-UR-95-3486, Los Alamos, New Mexico. **(Longmire et al. 1995, 1266)**

Martell, C.J., May 12, 1992. "Phone Interview with T. Montoya about PRS 60-004(c)," Los Alamos National Laboratory memorandum CLS-ER-CM-003 to CLS-ER file, Los Alamos, New Mexico. **(Martell 1992, 17-599)**

Martell, C.J., May 14, 1992. "Site Visit to Sigma Mesa with T. Mirabal," Los Alamos National Laboratory memorandum CLS-ER-CM-004 to CLS-ER file, Los Alamos, New Mexico. **(Martell, 1992, 17-600)**

Morales, R., April 22, 1991. "PCB Analysis of Oil in Pulse Rad #316," Los Alamos National Laboratory Memorandum HSE-8:91-654 to J. D. Umphres (CLS-7) from R. Morales (HSE-8), Los Alamos, New Mexico. **(LANL 1991, 17-0813)**

Morales, R., September 4, 1992. "Solid Waste Management Unit (SWMU) Information," Los Alamos National Laboratory letter EM-8:92-2557 to L. Sobojinski (CLS-DO) from R. Morales (EM-8) Los Alamos, New Mexico. **(Morales 1992, 17-743)**

Myers, O.B., and R.W. Ferenbaugh, in preparation. "Screening Methodology for Ecological Risk Assessment," Los Alamos National Laboratory Report, Los Alamos, New Mexico. **(Myers and Ferenbaugh in preparation, 1250)**

Perkins, B., February 18, 1986. "Initial Field Observation Report re: Old Solar Pond on Sigma Mesa," Los Alamos National Laboratory, Los Alamos, New Mexico. **(Perkins 1986, 17-222)**

Purtymun, W.D., R.J. Peters, T.E. Buhl, M.N. Maes, and F.H. Brown, November 1987. "Background Concentrations of Radionuclides in Soils and River Sediments in Northern New Mexico, 1974-1986," draft Los Alamos National Laboratory Report LA-11134-MS, Los Alamos, New Mexico. **(Purtymun et al. 1987, 0211)**

Reneau, S. L., 1995 "Potential Mesa-Edge Instability at Pajarito Mesa, Los Alamos National Laboratory, New Mexico," Los Alamos National Laboratory Report **LA-** , Los Alamos, New Mexico. **(Reneau 1995, 1117)**

Schillaci, Michael A., and A. Nelson Parish, May 31, 1995. "Environmental Restoration Program Operable Unit (OU) 1114 Cultural Resource Survey Report," Los Alamos National Laboratory Controlled Publication LA-CP-95-390, Los Alamos, New Mexico. **(Schillaci and Parish 1995, 17-790)**

APPENDIX A ANALYTICAL DATA

All analytical data are available on Facility for Information Management, Analysis, and Display (FIMAD). If FIMAD is not accessible, data will be provided upon request. A hard copy of the data is available from the Records Processing Facility under the title, "Analytical Data for the 1996 RFI Report for TAs -3, -59, -60, and -61."

THIS PAGE LEFT INTENTIONALLY BLANK

APPENDIX B DATA QUALITY EVALUATION TABLES

TABLE B-1

DATA QUALITY EVALUATION FOR PRS 3-002(c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB6034	Herbicides	18269	All data valid and usable without qualification
AAB6034	TAL metals[a]	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J[b] or UJ[c].
AAB6034	Pesticides	18269	All data valid and usable without qualification
AAB6034	SVOCs[d]	18269	15 analytes had recoveries of <10%. All are qualified R[e]. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6036	Herbicides	18269	All data valid and usable without qualification
AAB6036	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6036	Pesticides	18269	All data valid and usable without qualification
AAB6036	SVOCs	18269	15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6037	Herbicides	18269	All data valid and usable without qualification
AAB6037	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6037	Pesticides	18269	All data valid and usable without qualification
AAB6037	SVOCs	18269	Acid extractable surrogates had recoveries <10%. All acid extractable analytes qualified R (rejected data). 15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6038	Herbicides	18269	All data valid and usable without qualification
AAB6038	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6038	Pesticides	18269	All data valid and usable without qualification
AAB6038	SVOCs	18269	15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6038	VOCs[f]	18269	Methylene chloride (7, 10 ug/kg) found in method blanks. EQLs[g] raised when appropriate.
AAB6039	Herbicides	18269	All data valid and usable without qualification
AAB6039	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6039	Pesticides	18269	All data valid and usable without qualification

TABLE B-1 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 3-002(c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB6039	SVOCs	18269	Acid extractable surrogates had recoveries between 10 and 50%. All acid extractable analytes qualified UJ. 15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. All are qualified UJ
AAB6035	Herbicides	18269	All data valid and usable without qualification
AAB6035	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6035	Pesticides	18269	All data valid and usable without qualification
AAB6035	SVOCs	18269	15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6040	Herbicides	18269	All data valid and usable without qualification
AAB6040	TAL metals	18460	Low recovery of chromium(64%) in QC sample. All chromium values qualified J or UJ
AAB6040	SVOCs	18269	15 analytes had recoveries of <10%. All are qualified R. 3 analytes had recoveries between 10-50%. These analytes are qualified UJ
AAB6041	VOCs	18269	Methylene chloride (7, 10 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB6042	VOCs	18269	Methylene chloride (7, 10 ug/kg) found in method blanks. EQLs raised when appropriate.

[a] TAL metals = Target analyte list metals including cyanide.
[b] J = Estimated detected quantity.
[c] UJ = Estimated undetected quantity.
[d] SVOCs = Semivolatile organic compounds.
[e] R = Rejected data.
[f] VOCs = Volatile organic compounds.
[g] EQLs = Estimated quantitation limits.

TABLE B-2

DATA QUALITY EVALUATION FOR PRSs 3-003(a,b) AND 3-042 SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7613	SVOCs[a]	18482	All QC are within allowed limits. All data are valid.
AAB7613	Pesticides	18482	The % difference for the values of aroclor 1260 between the 2 columns is >25%. Aroclor is qualified J[b].
AAB7613	TAL metals[c]	19169	Low recoveries in QC soil sample : aluminum (73%), chromium (68%), thallium (58%), and mercury (64%). All 4 analytes are qualified J or UJ[d]. High recovery of sodium (121%). All detects are qualified J.
	VOCs[e]	18482	The 3rd and 4th internal standards were below allowable limits. All associated analytes (26) are qualified UJ.
AAB7612	SVOCs	18482	All QC are within allowed limits. All data are valid.
AAB7612	Pesticides	18482	All QC are within allowed limits. All data are valid.
AAB7612	TAL metals	19169	Low recoveries in QC soil sample : aluminum (73%), chromium (68%), thallium (58%), and mercury (64%). All 4 analytes are qualified J or UJ. High recovery of sodium (121%). All detects are qualified J.
AAB7626	VOCs	18482	All QC are within allowed limits. All data are valid.
AAB7626	SVOCs	18482	All QC are within allowed limits. All data are valid.
AAB7626	Pesticides	18482	All QC are within allowed limits. All data are valid.
AAB7626	TAL metals	19169	Low recoveries in QC soil sample : aluminum (73%), chromium (68%), thallium (58%), and mercury (64%). All 4 analytes are qualified J or UJ. High recovery of sodium (121%). All detects are qualified J.
AAB7628	VOCs	18482	All QC are within allowed limits. All data are valid.
AAB7628	SVOCs	18482	Exceeded extraction holding time by 6 days. All analytes are qualified UJ.
AAB7628	Pesticides	18482	Exceeded extraction holding time by 6 days. All analytes are qualified UJ.
AAB7628	TAL metals	19169	Low recoveries in QC soil sample : aluminum (73%), chromium (68%), thallium (58%), and mercury (64%). All 4 analytes are qualified J or UJ. High recovery of sodium (121%). All detects are qualified J.
AAB7629	VOCs	18482	All QC are within allowed limits. All data are valid.
AAB7630	VOCs	18482	All QC are within allowed limits. All data are valid.

[a] SVOCs = Semivolatile organic compounds.
[b] J = Estimated detected quantity.
[c] TAL metals = Targe analyte list metals including cyanide.
[d] UJ = Estimated undetected quantity.
[e] VOCs = Volatile organic compounds.

TABLE B-3

DATA QUALITY EVALUATION FOR PRSs 3-012(b) AND 3-045(b,c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5881	SVOCs[a]	18186	All QC within allowed limits. All data are valid.
AAB5881	Pesticides	18186	EQL[b] raised for several analytes because of Aroclor in sample.
AAB5881	Herbicides	18186	Not analyzed due to insufficient sample volume
AAB5881	VOCs[c]	18186	All QC within allowed limits. All data are valid.
AAB5881	Radionuclides[d]	19954	All QC within allowed limits. All data are valid.
AAB5881	TAL metals[e]	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J[f] or UJ[g].
AAB7668	Herbicides	18550	All QC within allowed limits. All data are valid.
AAB7668	PCBs[h]	18550	All QC within allowed limits. All data are valid.
AAB7703	Herbicides	19136	All QC within allowed limits. All data are valid.
AAB7703	PCBs	19136	All QC within allowed limits. All data are valid.
AAB5882	SVOC	18186	All QC within allowed limits. All data are valid.
AAB5882	Pesticides	18186	EQL raised for several analytes because of Aroclor in sample.
AAB5882	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5882	VOC	18186	Methylene chloride found in blank. EQL raised for detect in sample.
AAB5882	Radionuclides[i]	19954	All QC within allowed limits. All data are valid.
AAB5882	TAL metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5883	SVOC	18186	All QC within allowed limits. All data are valid.
AAB5883	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5883	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5883	VOC	18186	All QC within allowed limits. All data are valid.
AAB5883	Radionuclides	19954	All QC within allowed limits. All data are valid.
AAB5883	TAL metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5884	SVOC	18186	All QC within allowed limits. All data are valid.
AAB5884	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5884	Herbicides	18186	Not analyzed due to insufficient sample volume
AAB5884	VOC	18186	All QC within allowed limits. All data are valid.
AAB5884	Radionuclides	19954	All QC within allowed limits. All data are valid.
AAB5884	TAL metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB7669	Herbicides	18550	All QC within allowed limits. All data are valid.
AAB7669	PCBs	18550	All QC within allowed limits. All data are valid.
AAB7704	Herbicides	19136	All QC within allowed limits. All data are valid.

TABLE B-3 (Continued)

DATA QUALITY EVALUATION FOR PRSs 3-012(b) AND 3-045(b,c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7704	PCBs	19136	All QC within allowed limits. All data are valid.
AAB5885	SVOC	18186	All QC within allowed limits. All data are valid.
AAB5885	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5885	Herbicides	18186	Not analyzed due to insufficient sample volume.
AAB5885	VOC	18186	Methylene chloride found in blank. EQL raised for detect in sample.
AAB5885	Radionuclides	19954	All QC within allowed limits. All data are valid.
AAB5885	TAL metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB7667	Herbicides	18550	All QC within allowed limits. All data are valid.
AAB7667	PCBs	18550	All QC within allowed limits. All data are valid.
AAB7702	Herbicides	19136	All QC within allowed limits. All data are valid.
AAB7702	PCBs	19136	All QC within allowed limits. All data are valid.
AAB5898	VOCs	18186	All QC within allowed limits. All data are valid.

[a] SVOCs = Semivolatile organic compounds.
[b] EQL = Estimated quantitation limit.
[c] VOCs = Volatile organic compounds.
[d] Radionuclides = Gross alpha and beta radiation, gamma spectroscopy, and tritium.
[e] TAL metals = Target analyte list metals.
[f] J = Estimated detected quantities.
[g] UJ = Estimated undetected quantities.
[h] PCBs = Polycyclic aromatic hydrocarbons.
[i] Radionuclides = Gross alpha and beta radiation, gamma spectroscopy, and tritium, as well as isotopic plutonium and uranium.

TABLE B-4

DATA QUALITY EVALUATION FOR PRSs 3-013(a,b) AND 3-045(b,c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB6023	SVOCs[a]	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ[b]. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R[c]. All other data valid.
AAB6023	PCBs[d]	18315	QC results within allowable limits; all data valid.
AAB6023	VOCs[e]	18315	Last internal standard below allowed limits. Associated analytes qualified UJ (there were no detects). All data valid.
AAB6023	TAL metals[f]	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J[g]. All data valid.
AAB6025	VOCs	18315	Last internal standard below allowed limits. Associated analytes qualified UJ (there were no detects). All data valid
AAB6026	SVOCs	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R. All other data valid.
AAB6026	PCBs	18315	QC results within allowable limits; all data valid.
AAB6026	VOCs	18315	QC results within allowable limits; all data valid.
AAB6026	TAL metals	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J. All data valid.
AAB6029	SVOCs	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R. All other data valid.
AAB6029	PCBs	18315	QC results within allowable limits; all data valid.
AAB6029	TAL metals	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J. All data valid.
AAB6027	SVOCs	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R. All other data valid.
AAB6027	PCBs	18315	QC results within allowable limits; all data valid.
AAB6027	VOCs	18315	QC results within allowable limits; all data valid.
AAB6027	TAL metals	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J. All data valid.
AAB6028	SVOCs	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R. All other data valid.
AAB6028	PCBs	18315	QC results within allowable limits; all data valid.
AAB6028	VOCs	18315	QC results within allowable limits; all data valid.
AAB6028	TAL metals	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J. All data valid.
AAB6030	SVOCs	18315	QC sample recoveries low for 5 analytes (10 to 50%), all associated data qualified UJ. Recovery for 1,2 dichlorobenzene less than 10%; all data for this analyte qualified R. All other data valid.
AAB6030	PCBs	18315	QC results within allowable limits; all data valid.
AAB6030	VOCs	18315	QC results within allowable limits; all data valid.

TABLE B-4 (CONTINUED)

DATA QUALITY EVALUATION FOR PRSs 3-013(a,b) AND 3-045(b,c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB6030	TAL metals	18459	Lead and manganese had high matrix spike recoveries and up to 70% variance in duplicates. All lead and manganese results qualified J. All data valid.
AAB6032	VOCs	18315	QC results within allowable limits; all data valid.
AAB6033	VOCs	18315	QC results within allowable limits; all data valid.

[a] SVOCs = Semivolatiles organic compounds.
[b] UJ = Estimated undetected quantities.
[c] R = Rejected.
[d] PCBs = Polychlorinated biphenyls.
[e] VOCs = Volatile organic compounds.
[f] TAL metals = Target analyte list metals.
[g] J = Estimated detected quantities.

TABLE B-5

DATA QUALITY EVALUATION FOR PRSs 3-014(a,e) and 3-014(b-d, f-j, p-z, a2) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5944	Herbicides[a]	18246	All QC within allowed parameters. All data are valid.
AAB5944	TAL metals[b]	18298	Chromium (66%) and mercury (49%) qualified J[c] or UJ[d] for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5944	Pesticides	18246	Delta and beta BHC[e] had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5944	Radionuclides[f]	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5944	SVOCs[g]	18246	All QC within allowed parameters. All data are valid.
AAB5952	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5952	VOCs[h]	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs[i] raised when appropriate.
AAB5945	Herbicides	18246	All QC within allowed parameters. All data are valid.
AAB5945	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5945	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5945	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5945	SVOCs	18246	All QC within allowed parameters. All data are valid.
AAB5953	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5953	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5947	Herbicides	18246	All QC within allowed parameters. All data are valid.
AAB5947	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5947	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5947	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5947	SVOCs	18246	All QC within allowed parameters. All data are valid.
AAB5954	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5954	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5948	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5948	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5955	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5955	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5949	Herbicides	18246	All QC within allowed parameters. All data are valid.
AAB5949	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5949	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5949	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5949	SVOCs	18246	All QC within allowed parameters. All data are valid.
AAB5950	Herbicides	18246	All QC within allowed parameters. All data are valid.

TABLE B-5 (CONTINUED)

DATA QUALITY EVALUATION FOR PRSs 3-014(a,e) and 3-014(b-d, f-j, p-z, a2) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAE5950	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAE5950	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAE5950	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAE5950	SVOCs	18246	All QC within allowed parameters. All data are valid.
AAE5951	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAE5951	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAE5956	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAE5956	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAE5957	Herbicides	18246	All QC within allowed parameters. All data are valid.
AAE5957	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAE5957	Pesticides	18246	Extraction holding time exceeded by 5 days. Delta and beta BHC had recoveries between 10-50% in the QC sample. All analytes are qualified UJ for missed holding time.
AAE5957	SVOCs	18246	All QC within allowed parameters. All data are valid.
AAE5957	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAE5958	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAE5959	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.

[a] Herbicides = Chlorinated herbicides.
[b] TAL metals = Target analyte list metals, including cyanide.
[c] J = Estimated detected quantities.
[d] UJ = Estimated undetected quantities.
[e] BHC = Benzene hexachloride.
[f] Radionuclides = Isotopic uranium and plutonium, strontium-90, and gamma spectroscopy.
[g] SVOCs = Semivolatile organic compounds.
[h] VOCs = Volatile organic compounds.
[i] EQLs = Estimated quantitation limits.

TABLE B-6

DATA QUALITY EVALUATION FOR PRS 3-014(b2) AND 3-014(b-d, f-j, p-z, a2) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5930	Herbicides[a]	18186	All QC within allowed limits. All data are valid.
AAB5930	TAL Metals[b]	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J[c] or UJ[d].
AAB5930	Pesticides	18186	EQL[e] raised for several analytes because of Aroclor in sample.
AAB5930	Radionuclides[g]	19954	All QC within allowed limits. All data are valid.
AAB5930	SVOCs[f]	18186	All QC within allowed limits. All data are valid.
AAB5930	VOCs[g]	18186	Methylene chloride found in blank. EQL[h] raised for detect in sample.
AAB5932	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5931	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5931	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5931	Pesticides	18186	EQL raised for several analytes because of Aroclor in sample.
AAB5931	Radionuclides	19954	All QC within allowed limits. All data are valid.
AAB5931	SVOCs	18186	All QC within allowed limits. All data are valid.
AAB5931	VOCs	18186	Acetone found in method blank. EQL raised for detect in sample.
AAB5933	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5934	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5934	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5934	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5934	Radionuclides	19954	All QC within allowed limits. All data are valid.
AAB5934	SVOCs	18186	All QC within allowed limits. All data are valid.
AAB5936	VOCs	18186	All QC within allowed limits. All data are valid.
AAB5935	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5935	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5935	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5935	Radionuclides[f]	19954	All QC within allowed limits. All data are valid.
AAB5935	SVOCs	18186	All QC within allowed limits. All data are valid.
AAB5937	VOCs	18186	One low internal standard. All associated analytes are qualified UJ (no detects).
AAB5938	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5938	TAL Metals	20225	Suggested hold times for mercury and cyanide greatly exceeded and both are qualified J or UJ.
AAB5938	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5938	Radionuclides[f]	19954	All QC within allowed limits. All data are valid.
AAB5938	SVOCs	18186	All QC within allowed limits. All data are valid.

TABLE B-6 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 3-014(b2) AND 3-014(b-d, f-j, p-z, a2) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5939	VOCs	18186	One low internal standard. All associated analytes are qualified UJ (no detects).
AAB7670	Herbicides	18550	All QC within allowed limits. All data are valid.
AAB7670	PCB[j]	18550	All QC within allowed limits. All data are valid.
AAB7701	Herbicides	19136	All QC within allowed limits. All data are valid.
AAB7701	PCB	19136	All QC within allowed limits. All data are valid.
AAB5940	Herbicides	18186	All QC within allowed limits. All data are valid.
AAB5940	TAL Metals	20225	Hold time greatly exceeded for mercury and cyanide. Both qualified R[h]. All other TAL Metals exceeded hold times and are qualified J or UJ.
AAB5940	Pesticides	18186	All QC within allowed limits. All data are valid.
AAB5940	SVOCs	18186	All QC within allowed limits. All data are valid.
AAB5941	VOCs	18186	All QC within allowed limits. All data are valid.
AAB5942	VOCs	18186	All QC within allowed limits. All data are valid.

[a] Herbicides = Chlorinated herbicides.
[b] TAL metals = Target analyte list metals.
[c] J = Estimated detected quantities.
[d] UJ = Estimated undetected quantities.
[e] Radionuclides = Gross alpha and beta radiation, gamma spectroscopy and tritium.
[f] SVOCs = Semivolatile organic compounds.
[g] VOCs = Volatile organic compounds.
[h] EQL = Estimated quantitation limit.
[i] Radionuclides = Gross alpha and beta radiation, gamma spectroscopy and tritium, as well as strontium-90.
[j] PCBs = Polychlorinated biphenyls.

TABLE B-7

DATA QUALITY EVALUATION RESULTS FOR PRSs 3-014(c2) AND 3-014(k,l,m,n,o) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5907	Herbicides[a]	18246	All QC within allowed parameters. All data are valid
AAB5907	TAL metals[b]	16298	Chromium (66%) and mercury (49%) qualified J[c] or UJ[d] for low recovenes in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5907	Pesticides	18246	Delta and beta BHC[e] had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5907	Radionuclides[f]	19329	Plutonium-238,239 (199%, 212%) and americium-241(132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5907	SVOCs[g]	18246	All QC within allowed parameters. All data are valid
AAB5909	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5909	VOCs[h]	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5908	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5908	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5908	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5908	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5908	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5910	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5910	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs[i] raised when appropriate.
AAB5911	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5911	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5911	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5911	Radionuclides	19329	Plutonium-238,239(199,212%) and americium-241(132%) qualified J for high recoveries in QC sample (possible high bias). Plutonium had poor duplicates values. Low matrix spike recovery for Uranium(29%). All uranium data qualified J. All other data valid.
AAB5911	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5913	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5913	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5912	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5912	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5912	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5912	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5912	SVOCs	18246	All QC within allowed parameters. All data are valid

TABLE B-7 (CONTINUED)

DATA QUALITY EVALUATION RESULTS FOR PRSs 3-014(c2) AND 3-014(k,l,m,n,o) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5914	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5914	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5915	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5915	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5915	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5915	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5915	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5916	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5916	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5917	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5917	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5917	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5917	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5917	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5919	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5919	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5918	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5918	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5918	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5918	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5918	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5920	Herbicides	18246	All QC within allowed parameters. All data are valid
AAB5920	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5920	Pesticides	18246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5920	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5920	SVOCs	18246	All QC within allowed parameters. All data are valid
AAB5921	TAL metals	18298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5921	VOCs	18246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.

TABLE B-7 (CONTINUED)

DATA QUALITY EVALUATION RESULTS FOR PRSs 3-014(c2) AND 3-014(k,l,m,n,o) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5929	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5929	VOCs	16246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5922	Herbicides	16246	All QC within allowed parameters. All data are valid
AAB5922	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5922	Pesticides	16246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5922	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5922	SVOCs	16246	All QC within allowed parameters. All data are valid
AAB5924	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5924	VOCs	16246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5923	Herbicides	16246	All QC within allowed parameters. All data are valid
AAB5923	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5923	Pesticides	16246	Delta and beta BHC had recoveries between 10-50% in the QC sample. These analytes are qualified UJ.
AAB5923	Radionuclides	19329	Plutonium-238,239 (199%, 212%) and americium-241 (132%) qualified J for high recoveries in the QC sample (possible high bias). Plutonium also had poor duplicates values. All other data valid.
AAB5923	SVOCs	16246	All QC within allowed parameters. All data are valid
AAB5925	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%).
AAB5925	VOCs	16246	Low internal standard area. All data qualified UJ. Acetone (49, 53, 94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5926	Herbicides	16246	All QC within allowed parameters. All data are valid
AAB5926	TAL metals	16298	Chromium (66%) and mercury (49%) qualified J or UJ for low recoveries in QC sample. Cyanide qualified J when detected for high recovery in QC sample (145%). Copper qualified J because of high recovery in laboratory control sample (128%).
AAB5926	Pesticides	16246	Delta and beta BHC had recoveries between 10-50% in the QC sample. Also the extraction holding time of 7 days was exceeded by 5 days. All analytes are qualified UJ.
AAB5926	SVOCs	16246	All QC within allowed parameters. All data are valid
AAB5926	VOCs	16246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5927	VOCs	16246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.
AAB5928	VOCs	16246	Acetone (49, 53,94 ug/kg) and methylene chloride (7, 22 ug/kg) found in method blanks. EQLs raised when appropriate.

[a] Herbicides = Chlorinated herbicidesicides.
[b] TAL metals = Target analyte metals, including cyanide.
[c] J = Estimated detected quantities.
[d] UJ = Estimated undetected quantities.
[e] BHC = Benzene hexachloride.
[f] Radionuclides = Isotopic uranium and plutonium, strontium-90, and gamma spectroscopy.
[g] SVOCs = Semivolatile organic compounds.
[f] VOCs = Volatile organic compounds.
[i] EQLs = Estimated quantitation limits.

TABLE B-8

DATA QUALITY EVALUATION FOR PRSs 3-015 and 3-053 SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAE5809	SVOCs[a]	18212	All data valid and usable without qualification
AAE5809	TAL metals[b]	20221	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ. Chromium (65%) had a low recovery in the QC sample and is qualified J or UJ.
AAE5809	Radionuclides[c]	20251	All data valid and usable without qualification
AAE5809	Radionuclides[d]	20251	All data valid and usable without qualification
AAE5810	SVOCs	18212	All data valid and usable without qualification
AAE5810	TAL metals	20221	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ. Chromium (65%) had a low recovery in the QC sample and is qualified J or UJ.
AAE5810	Radionuclides[c]	20251	All data valid and usable without qualification
AAE5810	Radionuclides[e]	20251	All data valid and usable without qualification
AAE5877	SVOCs	18212	All data valid and usable without qualification
AAE5877	TAL metals	20221	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ. Chromium (65%) had a low recovery in the QC sample and is qualified J or UJ.
AAE5877	Radionuclides[c]	20251	All data valid and usable without qualification
AAE5877	Radionuclides[e]	20251	All data valid and usable without qualification
AAB5811	SVOCs	18212	All data valid and usable without qualification
AAB5811	TAL metals	20221	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ. Chromium (65%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5811	Radionuclides[c]	20251	All data valid and usable without qualification
AAB5811	Radionuclides[e]	20251	All data valid and usable without qualification
AAB5812	SVOCs	18212	All data valid and usable without qualification
AAB5812	TAL metals	20221	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ. Chromium (65%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5812	Radionuclides[c]	20251	All data valid and usable without qualification
AAB5813	SVOCs	18213	All data valid and usable without qualification
AAB5813	TAL metals	20215	Extraction holding times grossly exceeded for mercury and cyanide. All mercury and cyanide values are qualified UJ.
AAB5813	Radionuclides[c]	20229	All data valid and usable without qualification

[a] SVOCs = Semivolatile organic compounds.
[b] TAL metals = Target analyte list metals, including cyanide.
[c] Gross alpha and beta radiation, gamma spectroscopy, and tritium.
[d] Strontium-90, isotopic plutonium, and isotopic uranium.
[e] Isotopic plutonium and isotopic uranium.

TABLE B-9

DATA QUALITY EVALUATION FOR PRS 3-033 SAMPLES

SAMPLE ID	SUITE	REQUEST NUMBER	COMMENTS
AAB6044	TAL metals[a]	18422	QC results within allowable limits except selenium which are qualified as UJ[b]. All data are valid.
AAB6044	SVOCs[c]	18328	Holding time exceeded, associated non-detected results qualified as UJ. All data are valid.
AAB6046	Cyanide	18422	QC results within allowable limits. All data are valid.
AAB6046	VOCs[d]	18328	QC results within allowable limits. All data are valid.
AAB6045	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ. All data are valid.
AAB6045	SVOCs	18328	Poor surrogate recovery and exceeded holding time. All acid-extractable analytes qualified R[e] and all other results are qualified as UJ
AAB6047	Cyanide	18422	QC results within allowable limits; All data are valid.
AAB6047	SVOCs	18328	QC results within allowable limits; All data are valid.
AAB6047	VOCs	18328	QC results within allowable limits; All data are valid.
AAB6048	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB6048	SVOCs	18328	Holding time exceeded, associated nondetected results qualified as UJ. All data are valid.
AAB7593	Cyanide	18422	QC results within allowable limits; All data are valid.
AAB7593	VOCs	18328	QC results within allowable limits; All data are valid.
AAB6049	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB6049	SVOCs	18328	QC results within allowable limits; All data are valid.
AAB7594	Cyanide	18422	QC results within allowable limits; All data are valid.
AAB7594	VOCs	18328	QC results within allowable limits; All data are valid.
AAB6050	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB6050	SVOCs	18328	QC results within allowable limits; All data are valid.
AAB7595	Cyanide	18422	QC results within allowable limits; All data are valid.
AAB7595	VOCs	18328	QC results within allowable limits; All data are valid.
AAB6051	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB6051	SVOCs	18328	QC results within allowable limits; All data are valid.
AAB6052	TAL metals	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB6052	VOCs	18328	QC results within allowable limits; All data are valid.
AAB7596	Cyanide	18422	QC results within allowable limits; All data are valid.
AAB7596	VOCs	18328	QC results within allowable limits; All data are valid.
AAB7597	cyanide	18422	QC results within allowable limits; All data are valid.
AAB7598	TAL metals and cyanide	18422	QC results within allowable limits except selenium which are qualified as UJ; All data are valid.
AAB7598	SVOCs	18328	Holding time exceeded, associated nondetected results qualified as UJ. All data are valid.
AAB7598	VOCs	18328	QC results within allowable limits; All data are valid.
AAB7599	VOCs	18328	QC results within allowable limits; All data are valid.
AAB7600	VOCs	18328	QC results within allowable limits; All data are valid.

[a] TAL metals = Target analyte metals.
[b] UJ = Estimated undetected quantity.
[c] SVOCs = Semivolatile organic compounds.
[d] VOCs = Volatile organic compounds.
[e] R = Rejected data.

TABLE B-10

DATA QUALITY EVALUATION FOR PRS 59-004 SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5900	SVOCs[a]	18162	All QC are within allowed limits. All data are valid.
AAB5900	Radionuclides[b]	20235	All QC are within allowed limits. All data are valid.
AAB5900	TAL metals[c]	20358	Extraction holding times were exceeded for all metals and grossly exceeded for mercury. Mercury is qualified R[d] in water sample and UJ[e] in soil samples. All other metals in water samples are qualified UJ. Other metals in soil samples are not qualified.
AAB5903	SVOCs	18162	All QC are within allowed limits. All data are valid.
AAB5903	Radionuclides	20235	All QC are within allowed limits. All data are valid.
AAB5903	TAL metals	20358	Extraction holding times were exceeded for all metals and grossly exceeded for mercury. Mercury is qualified R in water sample and UJ in soil samples. All other metals in water samples are qualified UJ. Other metals in soil samples are not qualified.
AAB5901	SVOCs	18162	All QC are within allowed limits. All data are valid.
AAB5901	Radionuclides	20235	All QC are within allowed limits. All data are valid.
AAB5901	TAL metals	20358	Extraction holding times were exceeded for all metals and grossly exceeded for mercury. Mercury is qualified R in water sample and UJ in soil samples. All other metals in water samples are qualified UJ. Other metals in soil samples are not qualified.
AAB5902	VOCs[f]	18162	All QC are within allowed limits. All data are valid.
AAB5902	SVOCs	18162	All QC are within allowed limits. All data are valid.
AAB5902	Radionuclides	20235	All QC are within allowed limits. All data are valid.
AAB5902	TAL metals	20358	Extraction holding times were exceeded for all metals and grossly exceeded for mercury. Mercury is qualified R in water sample and UJ in soil samples. All other metals in water samples are qualified UJ. Other metals in soil samples are not qualified.
AAB5904	VOCs	18162	All QC are within allowed limits. All data are valid.
AAB5904	SVOCs	18162	All QC are within allowed limits. All data are valid.
AAB5904	TAL metals	20358	Extraction holding times were exceeded for all metals and grossly exceeded for mercury. Mercury is qualified R in water sample and UJ in soil samples. All other metals in water samples are qualified UJ. Other metals in soil samples are not qualified.
AAB5905	VOCs	18162	All QC are within allowed limits. All data are valid.
AAB5906	VOCs	18162	All QC are within allowed limits. All data are valid.

[a] SVOCs = Semi volatile organic compounds.
[b] Radionuclides= Gross alpha and beta radiation, gamma spectroscopy and tritium.
[c] TAL metals = Target analyte list metals.
[d] R = Rejected.
[e] UJ = Estimated undetected quantities.
[f] VOCs = Volatile organic compounds.

TABLE B-11

DATA QUALITY EVALUATION FOR PRS 60-004(b,d) SAMPLES

SAMPLE ID	SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5769	TAL metals[a]	18958	Matrix spike recovery too high for lead (150%). All lead values are qualified as estimated, J[b]. All data are valid.
AAB5769	SVOCs[c]	18084	QC results within allowable limits. All data are valid.
AAB5769	Pesticides/ PCBs[d]	18084	QC results within allowable limits. All data are valid.
AAB5675	TAL metals	18958	Matrix spike recovery too high for lead (150%). All lead values are qualified as estimated, J. All data are valid.
AAB5675	SVOCs	18084	QC results within allowable limits. All data are valid.
AAB5675	Pesticides/ PCBs	18084	QC results within allowable limits. All data are valid.
AAB5774	VOCs[e]	18084	QC results within allowable limits. All data are valid.
AAB6055	VOCs	18084	QC results within allowable limits. All data are valid.
AAB6056	TAL metals	18958	QC results within allowable limits. All data are valid.
AAB6056	SVOCs	18084	QC results within allowable limits. All data are valid.
AAB6056	Pesticides/ PCBs	18084	QC results within allowable limits. All data are valid.
AAB6056	VOCs	18084	QC results within allowable limits. All data are valid.

[a] TAL metals = Target analyte list metals.
[b] J = Estimated detected quantities.
[c] SVOCs = Semivolatiles organic compounds.
[d] PCBs = Polychlorinated biphenyls.
[e] VOCs = Volatile organic compounds.

TABLE B-12

DATA QUALITY EVALUATION FOR PRS 60-004(c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5821	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J[a] for possible high bias.
AAB5821	Pesticides	18036	All QC within allowed limits; all data valid.
AAB5821	SVOCs[b]	18036	3 analytes in the QC sample had recoveries <10% and are qualified R[c]. 15 analytes had recoveries between 10-50%. All are qualified UJ[d].
AAB5823	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5823	Isotopic uranium and plutonium	18991	All QC within allowed limits; all data valid.
AAB5823	VOCs[e]	18036	Low surrogate recovery (toluene-d8 = 66-67%). All data qualified UJ.
AAB5822	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5822	Pesticides	18036	All QC within allowed limits; all data valid.
AAB5822	SVOCs	18036	3 analytes in the QC sample had recoveries <10% and are qualified R. 15 analytes had recoveries between 10-50%. All are qualified UJ.
AAB5824	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5824	Isotopic uranium and plutonium	18991	All QC within allowed limits; all data valid.
AAB5824	VOCs	18036	Low surrogate recovery (toluene-d8 = 66-67%). All data qualified UJ.
AAB5825	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5825	Isotopic uranium and plutonium	18991	All QC within allowed limits; all data valid.
AAB5825	VOCs	18036	Low surrogate recovery (toluene-d8 = 66-67%). All data qualified UJ.
AAB5826	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5826	Pesticides	18036	All QC within allowed limits; all data valid.
AAB5826	SVOCs	18036	3 analytes in the QC sample had recoveries <10% and are qualified R. 15 analytes had recoveries between 10-50%. All are qualified UJ.
AAB5827	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5827	Isotopic uranium and plutonium	18991	All QC within allowed limits; all data valid.
AAB5827	VOCs	18036	Low surrogate recovery (toluene-d8 = 66-67%). All data qualified UJ.
AAB5829	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5829	Pesticides	18036	All QC within allowed limits; all data valid.
AAB5829	SVOCs	18036	3 analytes in the QC sample had recoveries <10% and are qualified R. 15 analytes had recoveries between 10-50%. All are qualified UJ.
AAB5828	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5828	VOCs	18036	Low recovery of 4-methyl-2-pentanone in QC sample. This anlyte qualified UJ.
AAB5830	Gamma scan and gross alpha and beta	18991	High recovery of cesium -137 in QC sample (121%). All cesium-137 qualified J for possible high bias.
AAB5830	Pesticides	18036	All QC within allowed limits; all data valid.

TABLE B-12 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 60-004(c) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5830	SVOCs	18036	3 analytes in the QC sample had recoveries <10% and are qualified R. 15 analytes had recoveries between 10-50%. All are qualified UJ.
AAB6057	VOCs	18036	All QC within allowed limits; all data valid.
AAB6058	VOCs	18036	All QC within allowed limits; all data valid.
AAB6059	Festicides	18036	All QC within allowed limits; all data valid.
AAB6059	SVOCs	18036	3 analytes in the QC sample had recoveries <10% and are qualified R. 15 analytes had recoveries between 10-50%. All are qualified UJ.
AAB6059	VOCs	18036	All QC within allowed limits; all data valid.

[a] J = Estimated detected quanitity.
[b] SVOCs = Semivolatile organic compounds.
[c] R = Rejected data.
[d] UJ = Estimated undetected quantity.
[e] VOCs = Volatile organic compounds.

TABLE B-13

DATA QUALITY EVALUATION FOR PRS 60-004(e) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB6063	VOCs[a]	18013	Xylene (4.7 ug/kg) found in method blank. EQLs[b] raised as appropriate.
AAB6064	TAL metals[c]	20203	Mercury holding time grossly exceeded. Mercury is qualified R[d]. Chromium (48%) had a low recovery in the QC sample. Qualified J[e] or UJ[f].
AAB6064	PCBs[g]	18086	All data are valid without qualification.
AAB6064	SVOCs[h]	18086	Missed holding time by 8 days. All analytes qualified UJ.
AAB6064	VOCs	18013	Xylene (4.7 ug/kg) found in method blank. EQLs raised as appropriate.
AAB6065	VOCs	18013	Xylene (4.7 ug/kg) found in method blank. EQLs raised as appropriate.
AAB5787	VOCs	18086	Acetone (12,12,17 ug/kg) found in methods blanks. EQLs raised as appropriate.
AAB5775	TAL metals	20203	Mercury holding time grossly exceeded. Mercury is qualified J or UJ. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ
AAB5775	PCBs	18086	All data are valid without qualification
AAB5775	SVOCs	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5788	VOCs	18086	Low internal standards. All data qualified J or UJ. Acetone (12,12,17 ug/kg) found in methods blanks. EQLs raised as appropriate.
AAB5789	VOCs	18086	Low internal standards. All data qualified J or UJ. Acetone (12,12,17 ug/kg) found in methods blanks. EQLs raised as appropriate.
AAB5790	TAL metals	20203	Mercury holding time grossly exceeded. Mercury is qualified J or UJ. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ
AAB5790	SVOCs	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5793	TAL metals	20203	Mercury holding time grossly exceeded. Mercury is qualified J or UJ. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ
AAB5793	PCBs	18086	All data are valid without qualification
AAB5793	SVOCs	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5793	VOCs	18086	Acetone (12,12,17 ug/kg) found in methods blanks. EQLs raised as appropriate.

[a] VOCs = Volatile organic compounds.
[b] EQLs = Estimated quantitation limits.
[c] TAL metals = Target analyte list metals.
[d] R = Rejected.
[e] J = Estimated detected quantities.
[f] UJ = Estimated undetected quantities.
[g] PCBs = Polychlorinated biphenyls.
[h] SVOCs = Semivolatile organic compounds.

TABLE B-14

DATA QUALITY EVALUATION FOR PRS 60-004(f) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7646	TAL metals[a]	19168	Low recovery of aluminum, chromium, mercury and thallium in QC sample and antimony in matrix spike. All qualified J[t] or UJ[t]. High recovery of sodium in QC sample, all detects qualified J.
AAC0417	SVOCs[d]	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0417	PCBs[e]	19731	All QC within allowed limits. All data are valid
AAC0417	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R[f].
AAC0418	VOCs[g]	19731	All QC within allowed limits. All data are valid
AAC0419	VOCs	19731	All QC within allowed limits. All data are valid
AAB7635	TAL metals	19168	Low recovery of aluminum, chromium, mercury and thallium in QC sample and antimony in matrix spike. All qualified J or UJ. High recovery of sodium in QC sample, all detects qualified J.
AAB7726	PCBs	19137	All QC within allowed limits. All data are valid
AAB7726	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7726	TAL metals	19866	High recovery of mercury (136%) and potassium (136%) in QC sample. Detects are qualified J. Low recovery of zinc (68%). Qualified J or UJ.
AAC0405	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0405	PCBs	19731	All QC within allowed limits. All data are valid
AAC0405	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAC0406	VOCs	19731	All QC within allowed limits. All data are valid
AAC0407	VOCs	19731	All QC within allowed limits. All data are valid
AAB7727	PCBs	19137	All QC within allowed limits. All data are valid
AAB7727	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7727	TAL metals	19866	High recovery of mercury (136%) and potassium (136%) in QC sample. Detects are qualified J. Low recovery of zinc (68%). Qualified J or UJ.
AAC0411	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0411	PCBs	19731	The percent difference for the values of Aroclor1254™ between the 2 columns is less than 25%. Aroclor1254™ is qualified J.
AAC0411	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAC0412	VOCs	19731	All QC within allowed limits. All data are valid
AAC0413	VOCs	19731	All QC within allowed limits. All data are valid
AAB7728	TAL metals	19866	High recovery of mercury (136%) and potassium (136%) in QC sample. Detects are qualified J. Low recovery of zinc (68%). Qualified J or UJ.
AAC0414	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0414	PCBs	19731	All QC within allowed limits. All data are valid
AAC0414	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAC0415	VOCs	19731	All QC within allowed limits. All data are valid
AAC0416	VOCs	19731	All QC within allowed limits. All data are valid
AAB7728	PCBs	19137	All QC within allowed limits. All data are valid
AAB7728	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7729	PCBs	19137	All QC within allowed limits. All data are valid

TABLE B-14 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 60-004(f) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7729	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7729	TAL metals	19866	High recovery of mercury (136%) and potassium (136%) in QC sample. Detects are qualified J. Low recovery of zinc (68%). Qualified J or UJ.
AAB7730	PCBs	19137	All QC within allowed limits. All data are valid
AAB7730	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7730	TAL metals	19866	High recovery of mercury (136%) and potassium (136%) in QC sample. Detects are qualified J. Low recovery of zinc (68%). Qualified J or UJ.
AAC0408	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0408	PCBs	19731	All QC within allowed limits. All data are valid
AAC0408	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAC0409	VOCs	19731	All QC within allowed limits. All data are valid
AAC0410	VOCs	19731	All QC within allowed limits. All data are valid
AAC0398	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0398	PCBs	19731	All QC within allowed limits. All data are valid
AAC0398	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAC0397	VOCs	19731	All QC within allowed limits. All data are valid
AAC0400	SVOCs	19731	QC sample had low recoveries for 1,2- and 1,3- dichlorobenzene and 2-methyl phenol. All qualified UJ.
AAC0400	PCBs	19731	All QC within allowed limits. All data are valid
AAC0400	VOCs	19731	All QC within allowed limits. All data are valid
AAC0400	TAL metals	19990	High recovery of mercury (177%) and potassium (142%) in QC sample. Detects are qualified J. Very high recovery of manganese (212%). Manganese data are rejected R.
AAB7756	PCBs	19137	All QC within allowed limits. All data are valid
AAB7756	SVOCs	19137	All QC within allowed limits. All data are valid
AAB7756	TAL metals	19866	Missed holding time for mercury by 24 days. Mercury qualified UJ.
AAC0399	VOCs	19731	All QC within allowed limits. All data are valid
AAC0420	VOCs	19731	All QC within allowed limits. All data are valid

[a] TAL metals = Target analyte list metals.
[b] J = Estimated detected quantities.
[c] UJ = Estimated undetected quantities.
[d] SVOC = Semivolatile organic compounds.
[e] PCBs = Polychlorinated biphenyls.
[f] R = Rejected.
[g] VOCs = Volatile organic compounds.

TABLE B-15

DATA QUALITY EVALUATION FOR PRS 60-005(a) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5832	SVOCs[a]	18160	3 analytes qualified R[b] for recoveries less than10% in QC sample. 4 analytes qualified UJ[c] for recoveries between 10 to 50% in the QC sample.
AAB5807	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5807	VOCs[d]	18160	All QC are within allowed limits and all data are valid.
AAB5807	Radionuclides[e]	19955	All QC are within allowed limits and all data are valid.
AAB5807	TAL metals[f]	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5832	VOCs	18160	All QC are within allowed limits and all data are valid.
AAB5832	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5832	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5835	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5835	VOCs	18160	All QC are within allowed limits and all data are valid.
AAB5835	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5835	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5834	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5834	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5834	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5836	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5836	VOCs	18160	All QC are within allowed limits and all data are valid.
AAB5836	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5836	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5777	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5777	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5777	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5805	SVOCs	18160	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5805	VOCs	18160	All QC are within allowed limits and all data are valid.
AAB5805	Radionuclides	19955	All QC are within allowed limits and all data are valid.
AAB5805	TAL metals	20219	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ. Chromium (64%) had a low recovery in the QC sample and is qualified J or UJ.
AAB5840	SVOCs	18213	All QC are within allowed limits and all data are valid.
AAB5840	VOCs	18215	All QC are within allowed limits and all data are valid.
AAB5840	TAL metals	20215	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ.
AAB5840	Radionuclides	20229	All QC are within allowed limits and all data are valid.

TABLE B-15 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 60-005(a) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5872	SVOCs	18213	All QC are within allowed limits and all data are valid.
AAB5872	VOCs	18215	All surrogate recoveries for AAB5872 were low (8-20%). All data are qualified UJ.
AAB5872	TAL metals	20215	Extraction holding times grossly exceeded for mercury and cyanide. All values are qualified UJ.
AAB5872	Radionuclides	20229	All QC are within allowed limits and all data are valid.
AAB5844	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5844	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5844	Radionuclides[e]	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5850	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5845	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5845	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5845	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5851	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5856	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5857	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5857	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5857	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5846	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5846	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5846	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5852	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5847	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5847	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5847	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5853	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5848	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5848	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5848	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualfied J.
AAB5854	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5849	SVOCs	18036	3 analytes qualified R for recoveries less than10% in QC sample. 4 analytes qualified UJ for recoveries between 10 to 50% in the QC sample.
AAB5849	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5849	Radionuclides	18991	High recovery of cesium-137 (121%) in QC sample. All cesium-137 detects are qualified J.
AAB5855	TAL metals	18955	Chromium (66%), Thallium (48%), and cyanide (62%) had low recoveries in the QC sample. All are qualified J or UJ.
AAB5870	VOCs	18160	All QC are within allowed limits and all data are valid.
AAB5871	VOCs	18160	All QC are within allowed limits and all data are valid.

[a] SVOCs = Semivolatile organic compounds.
[b] R = Rejected.
[c] UJ = Estimated undetected quantities.
[d] VOCs = Volatile organic compounds.
[e] Radionuclides = Gross alpha and beta radiation, gamma spectroscopy, and tritium.
[f] TAL metals = Target analyte metals, including cyanide.

TABLE B-16

DATA QUALITY EVALUATION FOR PRS 60-006(a) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5814	VOC[a]	18084	QC results within allowable limits; all data valid.
AAB5815	VOC	18084	QC results within allowable limits; all data valid.
AAB5817	SVOC[b]	18084	The base-neutral surrogates were below allowable recoveries (14-21%). All associated analytes are qualified J when detected, UJ when undetected.
	TAL Metals[c]	18958	QC results within allowable limits; all data valid.
AB5818	SVOC	18084	The base-neutral surrogates were below allowable recoveries (14-21%). All associated analytes are qualified J when detected, UJ when undetected.
	Metals	18958	QC results within allowable limits; all data valid.

[a] VOCs = Volatile organic compounds.
[b] SVOCs = Semivolatiles organic compounds.
[c] TAL metals = Target analyte list metals.

TABLE B-17

DATA QUALITY EVALUATION FOR PRS 60-007(a) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB5794	VOCs[a]	18086	All data are valid without qualification
AAB5800	VOCs	18086	All data are valid without qualification
AAB5804	TAL metals[b]	20203	Mercury holding time grossly exceeded. Mercury is qualified J[c] or UJ[d]. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ.
AAB5804	PCBs[e]	18086	All data are valid without qualification
AAB5804	SVOCs[f]	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5796	VOCs	18086	All data are valid without qualification
AAB5799	VOCs	18086	All data are valid without qualification
AAB5803	TAL metals	20203	Mercury holding time grossly exceeded. Mercury is qualified J or UJ. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ.
AAB5803	PCBs	18086	All data are valid without qualification
AAB5803	SVOCs	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5801	TAL metals	20203	Mercury holding time grossly exceeded. Mercury is qualified J or UJ. Chromium (48%) had a low recovery in the QC sample. Qualified J or UJ.
AAB5801	PCBs	18086	All data are valid without qualification
AAB5801	SVOCs	18086	Anthracene (28%), 1,2-dichlorobenzene (18%) and 2-methylphenol (26) had low recoveries in the QC sample. All are qualified UJ.
AAB5801	VOCs	18086	All data are valid without qualification
AAB6066	VOCs	18013	All data are valid without qualification
AAB5806	PCBs	18086	All data are valid without qualification
AAB5806	VOCs	18086	All data are valid without qualification

[a] VOC = Volatile organic compounds.
[b] TAL metals = Target analyte list metals.
[c] J = Estimated detected quantities.
[d] UJ = Estimated undetected quantities.
[e] PCB = Polychlorinated biphenyls.
[f] SVOC = Semi volatile organic compounds.

TABLE B-18

DATA QUALITY EVALUATION FOR PRS 60-007(b) SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7639	TAL metals[a]	19168	Low recoveries in QC sample for aluminum(73%), chromium(72%), mercury(64%) and thallium(63%). Low spike recovery for antimony(56%). For these analytes all data qualified J[b] or UJ[c]. Sodium recovery high in QC sample (128%). All sodium detects qualified J.
AAB7708	SVOCs[d]	19136	Low recoveries (10-50%) in the blind QC sample for 9 analytes. All data for these analytes qualified UJ.
AAB7708	PCBs[e]	19136	QC results within allowable limits; all data valid.
AAB7705	VOCs[f]	19136	One surrogate was low by 1%. No analytes detected, no data qualified. All data valid
AAB7706	VOCs	19136	One surrogate was low by 1%. No analytes detected, no data qualified. All data valid
AAB7648	TAL metals	19168	Low recoveries in QC sample for aluminum(73%), chromium(72%), mercury(64%) and thallium(63%). Low spike recovery for antimony(56%). For these analytes all data qualified J or UJ. Sodium recovery high in QC sample (128%). All sodium detects qualified J.
AAB7707	SVOCs	19136	Low recoveries (10-50%) in the blind QC sample for 9 analytes. All data for these analytes qualified UJ.
AAB7707	PCBs	19136	QC results within allowable limits; all data valid.
AAB7649	TAL metals	19168	Low recoveries in QC sample for aluminum(73%), chromium(72%), mercury(64%) and thallium(63%). Low spike recovery for antimony(56%). For these analytes all data qualified J or UJ. Sodium recovery high in QC sample (128%). All sodium detects qualified J.
AAB7723	SVOCs	19136	Low recoveries (10-50%) in the blind QC sample for 9 analytes. All data for these analytes qualified UJ.
AAB7723	PCBs	19136	QC results within allowable limits; all data valid.
AAB7723	VOCs	19136	One surrogate was low by 1%. No analytes detected, no data qualified. All data valid
AAB7724	VOCs	19136	One surrogate was low by 1%. No analytes detected, no data qualified. All data valid
AAB7725	VOCs	19136	One surrogate was low by 1%. No analytes detected, no data qualified. All data valid

[a] TAL Metals = Target analyte list metals.
[b] J = Estimated detected quantities.
[c] UJ = Estimated undetected quantities.
[d] SVOCs = Semivolatiles organic compounds.
[e] PCBs = Polychlorinated biphenyls.
[f] VOCs = Volatile organic compounds.

TABLE B-19

DATA QUALITY EVALUATION FOR PRS 61-002 SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7602	PCBs[a]	18283	QC results within allowable limits; all data valid.
AAB7652	PCBs	18283	QC results within allowable limits; all data valid.
AAB7653	PCBs	18283	QC results within allowable limits; all data valid.
AAB7603	PCBs	18283	QC results within allowable limits; all data valid.
AAB6015	TAL metals[b]	18458	QC sample recoveries outside limits for arsenic (152%), chromium (59%), lead (169%). Arsenic not detected in samples; therefore, no qualification. All lead detects qualified J[c], and all chromium values qualified J or UJ[c].
AAB6015	PCBs	18244	30% recovery of Aroclor 1260™ in QC sample. All Aroclor 1260™ values are qualified J.
AAB6015	SVOCs[e]	18244	In QC sample, 11 analytes with recoveries between 10 to 50%. All qualified UJ. 6 analytes with recoveries less than 10%. All qualified R[f].
AAB6019	TAL metals	18458	QC sample recoveries outside limits for arsenic (152%), chromium (59%), lead (169%). Arsenic not detected in samples; therefore, no qualification. All lead detects qualified J, and all chromium values qualified J or UJ.
AAB6019	PCBs	18244	30% recovery of Aroclor 1260™ in QC sample. All Aroclor 1260™ values are qualified J.
AAB6019	SVOCs	18244	In QC sample, 11 analytes with recoveries between 10 to 50%. All qualified UJ. 6 analytes with recoveries less than 10%. All qualified R.
AAB6019	VOCs[g]	18244	Acetone (20ug/kg) and methylene chloride (3 ug/kg) found in method blank. EQLs[h] raised to level detected. All data valid.
AAB6016	TAL metals	18458	QC sample recoveries outside limits for arsenic (152%), chromium (59%), lead (169%). Arsenic not detected in samples; therefore, no qualification. All lead detects qualified J, and all chromium values qualified J or UJ.
AAB6016	PCBs	18244	30% recovery of Aroclor 1260™ in QC sample. All Aroclor 1260™ values are qualified J.
AAB6016	SVOCs	18244	In QC sample, 11 analytes with recoveries between 10 to 50%. All qualified UJ. 6 analytes with recoveries less than 10%. All qualified R.
AAB6018	TAL metals	18458	QC sample recoveries outside limits for arsenic (152%), chromium (59%), lead (169%). Arsenic not detected in samples; therefore, no qualification. All lead detects qualified J, and all chromium values qualified J or UJ.
AAB6018	PCBs	18244	30% recovery of Aroclor 1260™ in QC sample. All Aroclor 1260™ values are qualified J.
AAB6018	SVOCs	18244	In QC sample, 11 analytes with recoveries between 10 to 50%. All qualified UJ. 6 analytes with recoveries less than 10%. All qualified R.
AAB6017	TAL metals	18458	QC sample recoveries outside limits for arsenic (152%), chromium (59%), lead (169%). Arsenic not detected in samples; therefore, no qualification. All lead detects qualified J, and all chromium values qualified J or UJ.
AAB6017	PCBs	18244	30% recovery of Aroclor 1260™ in QC sample. All Aroclor 1260™ values are qualified J.
AAB6017	SVOCs	18244	In QC sample, 11 analytes with recoveries between 10 to 50%. All qualified UJ. 6 analytes with recoveries less than 10%. All qualified R.
AAB7604	PCBs	18283	QC results within allowable limits; all data valid.

TABLE B-19 (CONTINUED)

DATA QUALITY EVALUATION FOR PRS 61-002 SAMPLES

SAMPLE ID	ANALYTE SUITE	REQUEST NUMBER	QUALITY CONTROL (QC) COMMENTS
AAB7661	PCBs	18550	QC results within allowable limits; all data valid.
AAB7662	PCBs	18550	QC results within allowable limits; all data valid.
AAB7663	PCBs	18550	QC results within allowable limits; all data valid.
AAB7664	PCBs	18550	QC results within allowable limits; all data valid.
AAB7665	PCBs	18550	QC results within allowable limits; all data valid.
AAB7666	PCBs	18550	QC results within allowable limits; all data valid.
AAB6020	TAL metals	18458	QC sample recoveries outside limits for As (152%), Cr (59%), Pb (169%). As not detected in samples therefore no qualification. All Pb detects qualified J, and all Cr values qualified J or UJ.
AAB6020	PCBs	18244	Missed holding time by 3 days. No detects. All data qualified UJ
AAB6020	SVOCs	18244	Missed holding time by 3 days. No detects. All data qualified UJ
AAB6020	VOCs	18244	Acetone (20ug/kg) and methylene chloride (3 ug/kg) found in method blank. Only metylene chloride in sample. EQL raised to level detected. All data valid.
AAB6021	VOCs	18244	Acetone (20ug/kg) and methylene chloride (3 ug/kg) found in method blank. Only metylene chloride in sample. EQL raised to level detected. All data valid.
AAB6022	VOCs	18244	Acetone (20ug/kg) and methylene chloride (3 ug/kg) found in method blank. Neither detected in sample. All data valid.
AAB7671	VOCs	18550	QC results within allowable limits; all data valid.
AAB7672	VOCs	18550	QC results within allowable limits; all data valid.

[a] PCBs = Polychlorinated biphenyls.
[b] TAL Metals = Target analyte list metals.
[c] J = Estimated detected quantities.
[d] UJ = Estimated undetected quantities.
[e] SVOCs = Semivolatiles organic compounds.
[f] R = Rejected.
[g] VOCs = Volatile organic compounds.
[h] EQLs = Estimated quantitation limits.

APPENDIX C RISK ASSESSMENT CALCULATIONS

No risk assessment was performed for the potential release sites PRSs included in the RFI Report for TAs -3, -59, -60, and -61.

THIS PAGE LEFT INTENTIONALLY BLANK