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Voluntary Corrective Action Completion Report for

Potential Release Sites

0-030(h,i,n,o,p)
Group 0-3
Septic Tanks

Field Unit 1

Environmental
Restoration
Project

September 1996

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-3351

1439

EXECUTIVE SUMMARY

This voluntary corrective action (VCA) report addresses five of the Group 0-3 PRSs that were investigated during the 1996 field season. This report includes both Phase 1 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) activities and subsequent VCA activities at PRSs 0-030(h,i,n,o,p). The potential for chemical or radiological contamination within these septic systems was low; however, all tanks, associated drain lines, and outfall points were investigated in conjunction with VCA activities to determine if contamination was present. Although radionuclides are regulated by the Department of Energy (DOE) and not under RCRA, it is more efficient and cost-effective to investigate all types of potential contamination during a single site characterization. Therefore, it is a LANL/DOE policy to address radiochemical concerns in this report.

PRS 0-030(h) was a septic tank located on private property north of Canyon Road at the new Catholic church. PRS 0-030(i) was a septic tank located on Los Alamos County property south of Trinity Drive and east of 35th Street. PRS 0-030(n) was a septic tank located on Los Alamos county property west of 15th Street between Canyon Road and Pueblo Canyon. All three septic tanks were removed during VCA activities and confirmatory samples show there are no chemicals present at the sites in concentrations that pose a risk. Therefore, PRSs 0-030(h,i,n) are recommended for no further action (NFA).

PRS 0-030(o) is an inactive septic tank located on private property between Canyon Road and Pueblo Canyon. The septic tank was not removed because it is situated partially under the foundation of a house, and the landowner did not want to risk property damage that might occur during excavation and removal of the tank. Data from characterization samples collected at PRS 0-030(o) indicate there are no chemicals present in concentrations that pose a risk to human health. Therefore, PRS 0-030(o) is recommended for NFA.

PRS 0-030(p) was a septic tank located on private property at the eastern end of the Rim Road cul-de-sac. The septic tank could not be located during characterization activities, and is believed to have been previously removed. A 30-ft drain line associated with the tank was located and removed. Data from characterization samples collected at PRS 0-030(p) indicate there are no chemicals present in concentrations that pose a risk to human health. Therefore, PRS 0-030(p) is recommended for NFA.

The proposed actions for PRSs 0-030(h,i,n,o,p) are summarized in Table ES-1.

TABLE ES-1

SUMMARY OF PROPOSED ACTIONS

PRS INFORMATION		PROPOSED ACTION		
PRS	HSWA	NFA CRITERIA	RATIONALE	SECTION NUMBER
0-030(h)	no	4	Contaminants of concern are either not present or are present in concentrations that would pose an acceptable level of risk under projected future land use.	2.0
0-030(i)	no	4	Contaminants of concern are either not present or are present in concentrations that would pose an acceptable level of risk under projected future land use.	3.0
0-030(n)	no	4	Contaminants of concern are either not present or are present in concentrations that would pose an acceptable level of risk under projected future land use.	4.0
0-030(o)	no	4	Contaminants of concern are either not present or are present in concentrations that would pose an acceptable level of risk under projected future land use.	5.0
0-030(p)	no	4	Contaminants of concern are either not present or are present in concentrations that would pose an acceptable level of risk under projected future land use.	6.0

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1.0 INTRODUCTION

Potential Release Site (PRS) Group 0-3 consists of 13 septic systems. The septic systems were installed during the early 1940s and most remained in use until the Central Waste Water Treatment Plant was completed in late 1947. The septic tanks in this PRS Group handled sanitary waste from the original townsite and from early laboratory operations at Technical Area (TA) 1. This voluntary corrective action (VCA) report addresses five of the Group 0-3 PRSs that were investigated during the 1996 field season (Fig. 1-1). This report includes both Phase 1 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) activities and subsequent VCA activities at PRSs 0-030(h,i,n,o,p). The potential for chemical or radiological contamination within these septic systems was low; however, all tanks, associated drain lines, and outfall points were investigated in conjunction with VCA activities to determine if contamination was present. Although radionuclides are regulated by the Department of Energy (DOE) and not under RCRA, it is more efficient and cost-effective to investigate all types of potential contamination during a single site characterization. Therefore, it is a LANL/DOE policy to address radiochemical concerns in this report.

PRS 0-030(h). PRS 0-030(h) was a septic tank located on private property north of Canyon Road at the new Catholic church (Kingsley 1947, 05-0174). The topography suggests that the area serviced by this septic tank was probably bounded on the east by a north and south line that coincides with what is now the east wall of the Catholic Parish Hall. The septic tank probably serviced the areas between Canyon Road and Trinity Drive, and was bounded on the west by what is now Diamond Drive. The buildings contained in this area were Fort Leonard Wood housing units, dormitories, and military barracks. It is believed that this septic tank was connected only to residential-type buildings (Francis and Sullivan 1995, 05-0207).

PRS 0-030(i). PRS 0-030(i) was a septic tank located on Los Alamos County property south of Trinity Drive and east of 35th Street (The Zia Company 1947, 05-0172; The Zia Company 1947, 05-0171; LANL 1990, 0145). Engineering drawings showing the facilities connected to this septic tank are not available; however, the septic tank probably served the West (WAC) Mess Hall and buildings west of the West Mess Hall along Finch Street and south of Trinity Drive. These buildings were dormitories, barracks, a military post office, an officer's lounge, a post exchange, and Sundt Apartments.

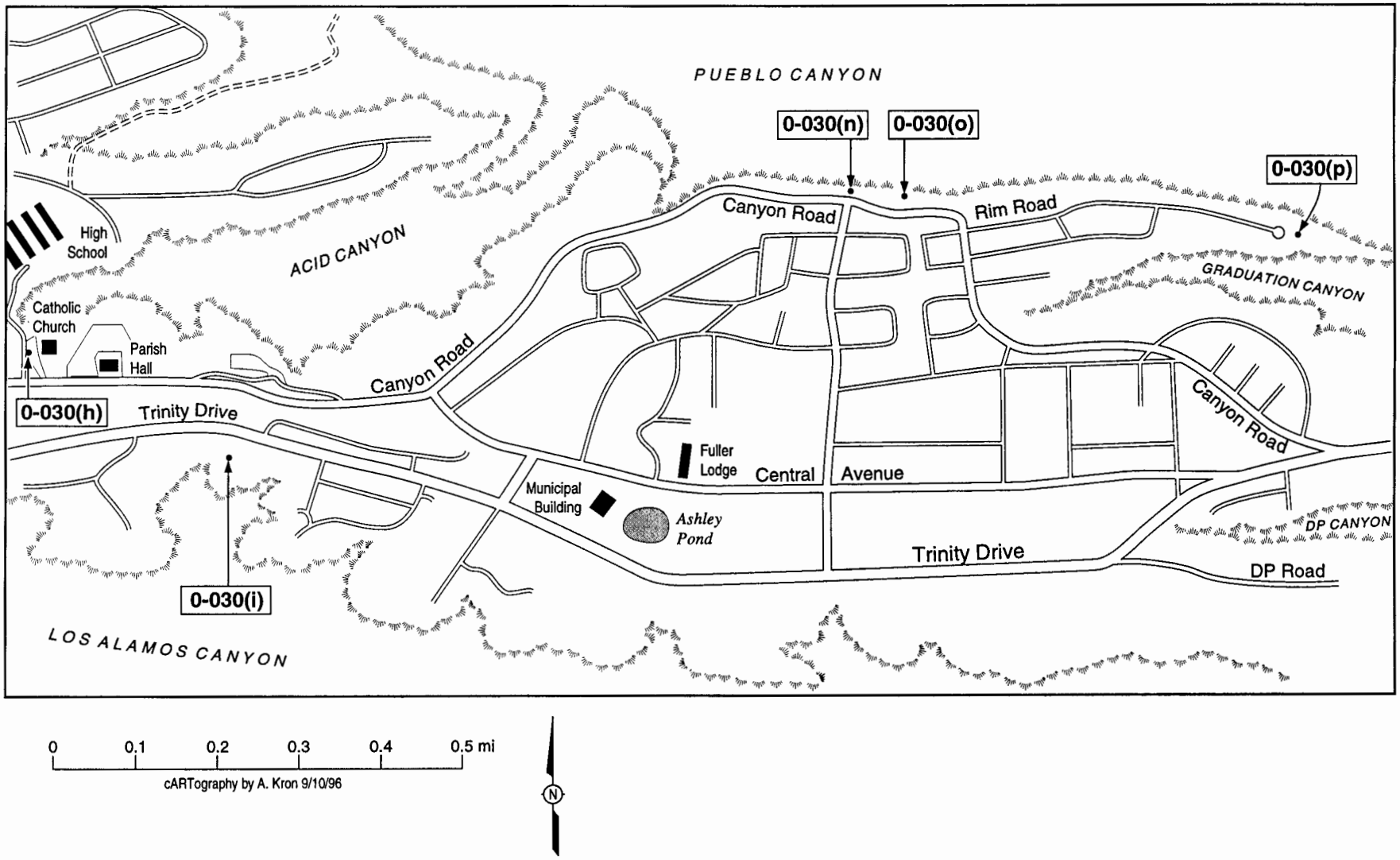

Fig. 1-1. Location of Group 0-3 PRSs 0-030(h,i,n,o,p).

PRS 0-030(n). PRS 0-030(n) was a septic tank located on Los Alamos county property west of 15th Street between Canyon Road and Pueblo Canyon (The Zia Company 1947, 05-0132). The septic system connected to this tank was not found on available drawings; however, because of the small tank size (6.5 ft long x 5.5 ft wide x 4.7 ft deep) and its location, it is believed the septic tank serviced residential housing in the area of 15th Street. It is not likely to have been connected to any technical buildings or to have received radioactive or RCRA materials (Francis and Sullivan 1995, 05-0207). The septic tank is visible at the end of 15th Street in aerial photos taken in the 1940s. South of Canyon Road and the tank are residential buildings.

PRS 0-030(o). PRS 0-030(o) was a septic tank located on private property between Canyon Road and Pueblo Canyon, according to a map prepared in 1947 (The Zia Company 1947, 05-0132). This septic tank serviced the Sundt Apartments, McKee Housing, a dormitory, and a laundry facility located in the area that is now Sage Loop, Oakwood Loop, and the area east of 15th Street.

PRS 0-030(p). PRS 0-030(p) was a septic tank located on private property at the eastern end of the Rim Road cul-de-sac (The Zia Company 1947, 05-0132). This septic tank probably serviced the Rim Road and Quartz Street residential area.

Most of the Group 0-3 septic tanks were left in place after the switch to the Central Waste Water Treatment Plant in 1947. Each tank was either completely or partially backfilled with material when it was initially taken out of service. All of these septic tanks, except for PRS 0-030(p), were located either during the initial field reconnaissance or with geophysical surveying. PRS 0-030(p) is believed to have been previously removed during the installation of a high-pressure gas line that bisects the expected location of the tank based on historical surveys. All septic tanks were accessible with the exception of a small portion of PRS 0-030(o), which is located partially beneath a house foundation.

During precharacterization activities, each tank [except 0-030(n) and 0-030(o)] was partially excavated using a backhoe to uncover the top of the tank and both the inlet and outlet drain lines associated with the tank. Excavation by backhoe was not necessary at PRS 0-030(n) because a hand auger and shovel were sufficient for collecting precharacterization samples. Because the property owner wanted minimal disturbance in the investigation of PRS 0-030(o), a backhoe was not used at the site and the septic tank was not excavated. The intent of the precharacterization activities was to minimize the excavation needed until screening and analytical results determined whether the tank contents were contaminated. Samples were collected from within and adjacent to the tanks, beneath associated drain lines, and downslope from the outfall pipe. Upon receipt of the analytical results for each septic tank, the data and

the remedial options were reviewed and the remedial activity was determined on a site-by-site basis.

2.0 PRS 0-030 (h)

2.1 Site Characterization

Site Survey Results

The septic tank at PRS 0-030 (h) (Figure 2.1-1) is located in the west parking lot of the new Catholic Church located at 3700 Canyon Road. The tank was in use from 1945 to late 1947. Engineering drawings showing the facilities or residential housing connected to the septic tank are not available; however, a 1947 Zia Post Plan Map (The Zia Company 1947, 05-0132) lists PRS 0-030(h) as septic tank #7. The 1947 report, Survey of Los Alamos and Pueblo Canyon for Radioactive Contamination and Radioassay Tests Run on Sewer-Water Samples and Soil Samples Taken from Los Alamos and Pueblo Canyons, describes locations served by various septic tanks and lists septic tank #7 as serving the Special Engineering Detachment (SED) area (Kingsley 1947, 05-0174). Buildings listed as being in the SED area from the 1947 Post Map include: the West Mess Hall, apartments, dormitories, barracks, a supply room, a gymnasium, a post office, and recreation buildings. Based on the buildings the tank serviced, it has been determined that septic tank #7 was a residential tank. The septic tank and the outfall drainage leading into upper Acid Canyon are visible in a field north of Canyon Road in aerial photos taken in 1946.

During the field reconnaissance surveys, it was determined that the location of the septic tank had been covered with backfill material and paved over. Three cement pillars that are believed to have supported the outfall pipe were located leading into upper Acid Canyon. The north-south orientation of the pillars is in alignment with the septic tank identified in the 1946 aerial photographs.

Geodetic Surveys

The location of the septic tank (four corners), the inlet line, the associated sample locations, and the confirmation sample locations were surveyed following the completion of sampling and tank removal activities. Geodetic survey data was transferred to the Facility for Information Management, Analysis, and Display (FIMAD) for incorporation into the Environmental Restoration (ER) database.

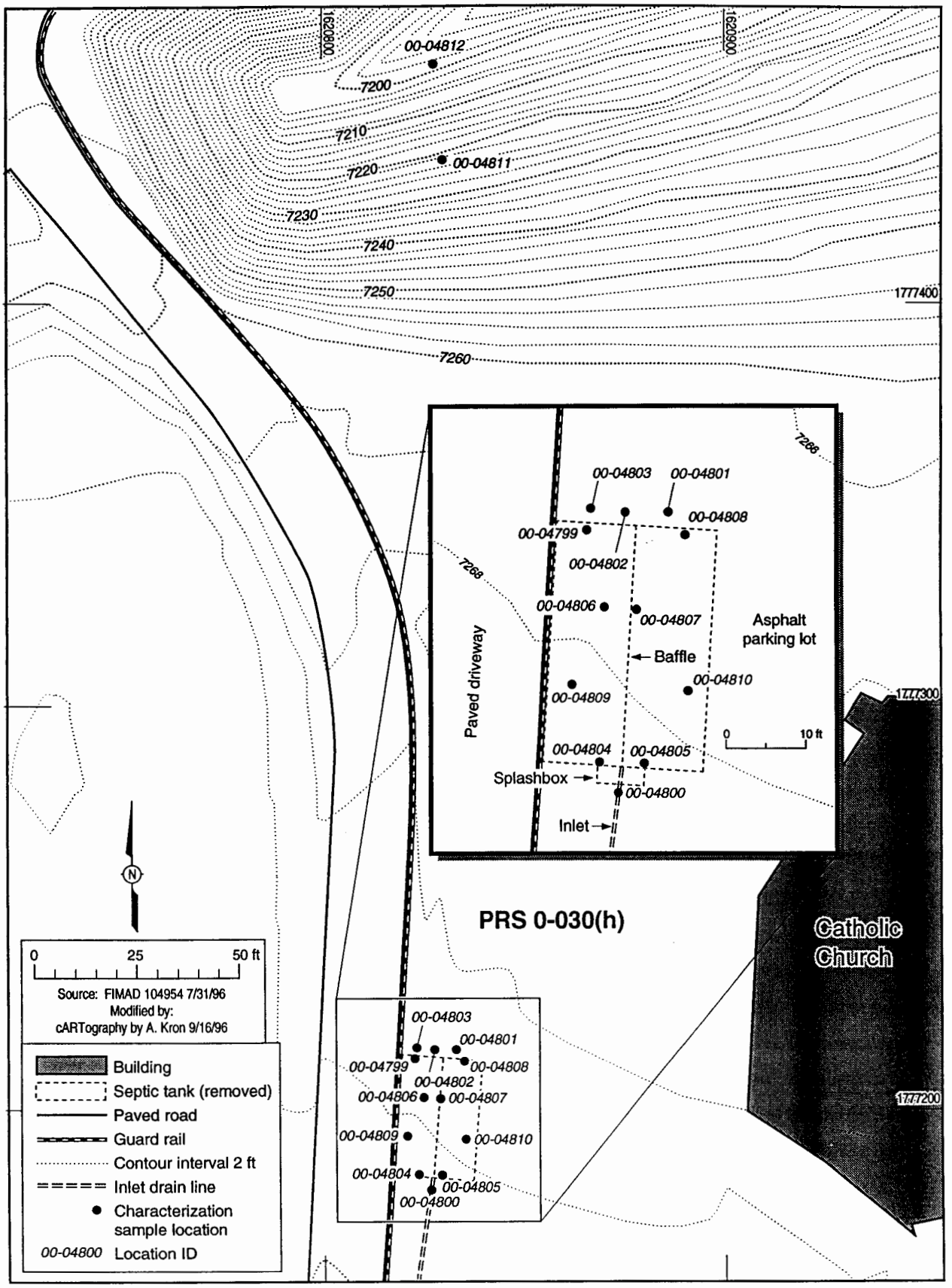

Fig. 2.1-1. Characterization sample locations for PRS 0-030(h).

Geophysical Surveys

A geophysical survey was completed at this site to assist in determining the tank location, orientation, depth, and possible sample sites. The results of the electromagnetic and magnetic surveys indicated a magnetic anomaly along the western edge of the parking lot. The geophysical crew estimated the size of the anomaly to be 30 ft x 30 ft and marked the interpreted boundaries of the septic tank with spray paint. The depth of the anomaly could not be determined with the geophysical instruments used for this survey.

Septic Tank Investigation and Sampling

On April 17, 1996, PRS 0-030(h) precharacterization activities were initiated. A minimal disturbance approach was taken to verify that the septic tank was in place and to assist in identifying sample locations. Using this approach, the estimated tank location, as identified by the geophysical survey and aerial photos, was marked with spray paint on the asphalt parking surface. The asphalt was cut in three places (on the north, south, and east sides, respectively) approximately 5 ft outside the markings for the estimated location of the septic tank. The locations in which the asphalt was cut away were probed with a metal rod and drilled with an electric handheld power auger to determine the depth to tuff. Once the depth to tuff was determined, 16–30 in. below ground surface (bgs), field activities focused on locating the septic tank.

Asphalt cutouts trending east-west were made across the middle of the marked tank location to accommodate probing and power augering equipment. A review of the aerial photos indicated that the top of the tank was approximately one foot above ground surface in 1946. Based on knowledge of backfilling operations and the depth to tuff outside the tank location, it was assumed that the top of the tank (if still in place) would be approximately 2 ft below the current ground surface. Initial probing to depths greater than 30 in. indicated that the top of the tank had been removed. A power auger was used to try to locate the tank bottom and characterize the soils within the tank. The depth to the bottom of the tank could not be determined because of a number of equipment failures (cracked auger flights, broken bits, etc.) associated with drilling through the large tuff boulders, clayish soil, concrete, and other debris in the tank. Because the minimal disturbance approach was not successful for precharacterization activities, a backhoe was needed to complete precharacterization work. Additional work was delayed until the Los Alamos High School spring session was completed. An access agreement was obtained from the Los Alamos School District because precharacterization activities might require closure of the access road behind the high school.

On June 5, 1996, the asphalt within the markout was removed to expedite locating the septic tank, and a backhoe was used to trench and locate the tank walls and floor. The east wall of the tank was located with the backhoe and a trench was dug along the top of the east wall to expose it. Subsequently, the tops of the north, south, and part of the west wall (the west wall was located partially under a guardrail and road) were traced and uncovered with the backhoe. To determine the tank depth, a trench was dug to a depth of 5 ft bgs at the northwest corner of the tank and probed with a metal rod to approximately 12 ft bgs. A north-south concrete baffle was located in the middle of the tank (effectively splitting the tank into an east chamber and a west chamber). A 6 ft x 2 ft splash box was found with the 8-in. vitrified clay pipe (VCP) inlet line on the south side of the tank. The rebar-reinforced, concrete septic tank was 30 ft long x 20 ft wide x 12 ft bgs, with the long axis lying in a north-south direction.

A trench was dug into each chamber of the tank to characterize the soils present. The west chamber contained two distinct soil horizons: the upper 0–11 ft consisted of a moist, mottled backfill material (silty/sandy/clayish soils and tuff boulders), and the remaining 1 ft to the tank bottom was a saturated, black sludge. The east chamber consisted of backfill material (silty/sandy/clayish soils and tuff boulders) from 0–12 ft.

Once the tank dimensions and soil characteristics were known, it was determined that samples would be collected from eight different locations, including four from each half of the tank. A minimum of two samples per location would be collected; one near the midpoint between the top and bottom of the tank, and one near the tank bottom. In addition, one sample would be collected underneath the inlet piping connection, one sample would be collected beneath the outlet piping location (if it could be located), and two outfall area samples (downgradient from the cement, outfall-pipe-support pillars in Acid Canyon) would be collected.

Sample locations in each half of the tank were staggered between the outside wall and the central baffle across the length of the tank (Fig. 2.1-1). Sample locations and requested analyses are summarized in Table 2.1-1. The first location was at the splash box entrance to each chamber of the tank. All sample material was collected with the backhoe bucket and each sample was collected from the bucket using the spade and scoop method. All samples were field screened with hand-held instruments for organic vapor and radiological activity.

TABLE 2.1-1

SUMMARY OF PRECHARACTERIZATION SAMPLES COLLECTED AT PRS 0-030(h)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (ft)	MRAL	VOCs	SVOCs	PEST/ PCBs	INOR-GANICS	RAD
0100-96-0401	00-04799	Inside tank, west side of baffle, in NW corner of west compartment	4–5	2221	2233	2233	2233	2234	2235
0100-96-0402	00-04799	Inside tank, west side of baffle, in NW corner of west compartment	9.5–10	2221	2233	2233	2233	2234	2235
0100-96-0403	00-04800	Outside tank, south end beneath the inlet pipe	3–3.5	2221	2233	2233	2233	2234	2235
0100-96-0404	00-04804	Inside tank, west side of baffle, in SE corner of west compartment	5–6	2221	2233	2233	2233	2234	2235
0100-96-0405	00-04804	Inside tank, west side of baffle, in SE corner of west compartment	8–9	2221	2233	2233	2233	2234	2235
0100-96-0406	00-04804	Inside tank, west side of baffle, in SE corner of east compartment	11.5–12	2221	2233	2233	2233	2234, 2234A[a]	2235
0100-96-0407	00-04805	Inside tank, east of baffle, in SW corner of east compartment	9.5–10	2221	2233	2233	2233	2234	2235
0100-96-0408	00-04805	Inside tank, east of baffle, in SW corner of east compartment	11.5–12	2221	2233	2233	2233	2234	2235
0100-96-0409	00-04806	Inside tank, in middle of west compartment adjacent to the baffle	5–6	2221	2233	2233	2233	2234	2235
0100-96-0410	00-04806	Inside tank, in middle of west compartment adjacent to the baffle	10.5–11	2221	2233	2233	2233	2234, 2234A[a]	2235
0100-96-0411	00-04807	Inside tank, in middle of east compartment adjacent to the baffle	6.5–7	2221	2233	2233	2233	2234	2235
0100-96-0412	00-04807	Inside tank, in middle of east compartment adjacent to the baffle	10.5–11	2221	2233	2233	2233	2234	2235
0100-96-0413	00-04808	Inside tank, east of baffle, in NE corner of east compartment	6–6.5	2221	2233	2233	2233	2234	2235
0100-96-0414	00-04808	Inside tank, east of baffle, in NE corner of east compartment	9.5–10	2221	2233	2233	2233	2234	2235

TABLE 2.1-1 (CONT.)-

SUMMARY OF PRECHARACTERIZATION SAMPLES COLLECTED AT PRS 0-030(h)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (ft)	MRAL	VOCs	SVOCs	PEST/ PCBs	INOR-GANICS	RAD
0100-96-0415	00-04809	Inside tank, west of baffle, in SW area of west compartment	6–6.5	2221	2233	2233	2233	2234	2235
0100-96-0416	00-04809	Inside tank, west of baffle, in SW area of west compartment	10–10.5	2221	2233	2233	2233	2234	2235
0100-96-0417	00-04810	Inside tank, east of baffle, in SE area of east compartment	6–6.5	2221	2233	2233	2233	2234	2235
0100-96-0418	00-04810	Inside tank, east of baffle, in SE area of east compartment	10–10.5	2221	2233	2233	2233	2234	2235
0100-96-0419	00-04811	Collected in outfall area immediatetly downslope from the last concrete pillar for outfall pipe	5–10 in	2224	2238	2238	2238	2239	2240
0100-96-0420	00-04812	Collected in outfall area downslope from sample #0100-96-0419	5–10 in	2224	2238	2238	2238	2239	2240
0100-96-0437	00-04801	Collected outside the tank, adjacent to the the northeast corner of the tank	7–8	2221	2233	2233	2233	2234	2235
0100-96-0438	00-04802	Collected outside the tank adjacent to the middle of the tank	7–8	2221	2233	2233	2233	2234	2235
0100-96-0439	00-04803	Collected outside the tank adjacent to the northwest corner of the tank	7–8	2221	2233	2233	2233	2234	2235

[a] Request Number 2234A was for TCLP Mercury only

In order to determine if a release occurred from the inlet drain line connection with the tank, the 8-in. VCP drain line was uncovered with the backhoe and sample 0100-96-0403 was collected from 3–3.5 ft bgs directly underneath the pipe (FIMAD Location ID 00-04800). The sample was collected with a stainless steel hand-auger.

In an effort to locate and sample the outlet connection, a trench was dug outside the north wall of the septic tank. The outlet piping was not located and is believed to have been removed when the tank top was removed. Three samples (0100-96-0437, 0100-96-0438, and 0100-96-0439) were collected at a 7–8 ft depth along the outside of the north wall to determine if a release may have occurred.

To investigate the probable outfall location, sample 0100-96-0419 (FIMAD Location ID 00-04811) was collected at a depth of 5–10 in. bgs approximately 6 ft downgradient from the last cement pillar. Sample 0100-96-0420 (FIMAD Location ID 00-04812) was collected at a depth of 5–10 in. bgs approximately 18 ft downgradient from the last cement pillar.

Upon completion of sampling activities, the septic tank excavation was backfilled, compacted, and covered with jute matting to assist with erosion control. A temporary fence was erected around the disturbed soils and a straw bale, run-on diversion dam was placed uphill of the former septic tank location.

Deviations from the VCA Plan for Precharacterization Activities

All work was conducted in accordance with the VCA plan (LANL 1996, 05-0239). However, the following deviations occurred:

- Soil samples were not submitted to the Mobile Chemistry Analytical Laboratory (MCAL) for volatile organic compounds (VOCs) or for metals screening by x-ray fluorescence (XRF) because it was determined that the screening data would not have been useful for making field decisions. Instead, seven-day turnaround times for analytical results were requested from a fixed laboratory.

- Waste characterization samples were submitted for target analyte list (TAL) metals analysis instead of toxicity characteristic leaching procedure (TCLP) metals analysis. While TCLP was specificed in the VCA plan in anticipation of finding sludge in the tank, backfilled material in the tank was dry. TAL analyses were requested to save time and money. If TAL analytical results indicated that concentrations were 20 times greater than the Land Disposal Restriction concentrations for any metal, the samples would have been resubmitted for TCLP analyses (40 CFR Part 261.24).

- All samples collected inside the septic tank were submitted for all analyses. Because of the volume of soil in the septic tank, analyses of all samples collected inside the tank were required to adequately characterize the waste.

- Three samples, instead of one, were collected outside the north wall of the septic tank to characterize the outlet line because the outlet line could not be located.

Sampling Methodology

Samples collected from inside the tank and the outfall area were collected using the spade and scoop method. The sample collected beneath the inlet was collected using a stainless steel hand auger. After the sample was collected, it was screened with hand-held equipment to detect gross radiological and chemical contamination (see the following section for additional details). Immediately after screening, the VOC sample was collected. The remaining sample was homogenized and placed into the appropriate sample containers for additional analyses.

All sample containers were appropriately labeled and assigned Los Alamos National Laboratory (LANL) sample identification numbers with bar codes. The samples were documented on sample collection logs, placed in coolers with ice, and transported to the Sample Management Office (SMO) under chain-of-custody. All sampling was conducted in accordance with LANL ER Project procedures.

On June 7, 1996, all samples were submitted to the SMO for delivery to the Mobile Radiological Analytical Laboratory (MRAL) for screening analyses, including gross alpha/beta/gamma, tritium and moisture content. Samples were also submitted for off-site fixed-laboratories for analyses. The fixed-lab analyses included TAL metals by EPA SW-846 Method 6010 and 7470 (mercury), VOCs by EPA SW-846 Method 8260, semivolatile organic compounds (SVOCs) by EPA SW-846 Method 8270, and polychlorinated biphenyls (PCBs)/pesticides by EPA SW-846 Method 8080. In addition, samples were also analyzed for plutonium-238 and plutonium-239/240 by alpha spectrometry, americium-241 by gamma spectrometry, and total uranium by ICP/MS.

Field Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil was screened for organic vapors and gross radiological activity. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc., organic vapor meter (OVM) Model 580B™, PID with a 10.6 or 11.7 eV bulb and for ionizing radiation using Ludlum Model 139™ rate meters with an air proportional (alpha) probe and an Eberline™ (beta/gamma) probe. The excavation and soils were screened for flammable gases using a Mine Safety Appliances combustible gas indicator™. All field screening instruments were calibrated (as necessary) and checked on a daily basis.

Field Screening Results

All samples, the tank contents, and the concrete tank were screened for gross alpha and beta/gamma activity and organic vapors, as described above. Health and safety action levels were not exceeded during field operations. Field screening results were recorded in the site safety officer (SSO) site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples ranged from 0.0–3.0 ppmv for all activities. Alpha and beta/gamma screening results indicated no detectable activity.

2.2 Remedial Activities and Results of Confirmatory Sampling

2.2.1 Risk Calculations and/or Cleanup Level Derivation

The objectives of the Phase 1 RFI investigation and VCA at PRS 0-030(h) were to determine the presence or absence of contamination associated with the septic tank and to remove any remaining structures. No cleanup levels were derived for PRS 0-030(h). Instead, confirmation samples were screened and a qualitative risk assessment was performed to verify that no chemicals remain at concentrations likely to cause adverse human health effects.

2.2.2 Remedial Implementation for PRS 0-030 (h)

Septic Tank Removal

Several remedial alternatives were reviewed following receipt of analytical sample results and the data assessment. Because the Catholic Church requested removal of the tank, the incremental cost of removing the tank and its contents was small, and removing the tank follows the best management practice of removing LANL legacy structures from the townsite, the

remedial option selected was removal of the tank and the contents of the western chamber of the tank. Soil in the western chamber of the tank contained chemicals in concentrations above action levels. Detected concentrations of chemicals in soil from the east chamber of the tank were below action levels. Because the soil in the east chamber was physically separated from the soil in the west chamber by a 6-in.-thick concrete baffle, it was possible to remove only the soil that contained chemicals in concentrations above action levels.

On August 6, 1996, removal of the septic tank and its contents was initiated. The tank was located under a parking lot west of the Catholic Church and east of the access road for Los Alamos High School. A temporary fence was erected to secure the area around the septic tank during excavation and removal activities. Excavation activities were initiated on the west side of the tank because concentrations of plutonium-239 were above screening action levels (SALs) and the soil was scheduled for delivery to TA-54, Area-G. The soil and debris were removed with a backhoe and temporarily stockpiled onsite, screened for organic vapors and gross alpha/beta radiation with hand-held PID and radiation meters, and transferred to a dump truck for transport to TA-54, Area G.

Approximately 225 yds^3 of plutonium-contaminated soil were removed from the western chamber of the septic tank and delivered, under manifest, to TA-54, Area G, for disposal as a low-level radioactive waste. After removal of the contents of the tank's western half was complete, the backhoe began to remove soil/debris from the eastern chamber of the tank. The soil from the eastern half of the tank was temporarily stockpiled on site on plastic sheeting. Sand bags were placed on the upgradient (south) and downgradient (north) sides of the plastic to divert stormwater run-on and prevent runoff from the stockpile. In addition, the edges of plastic were rolled around 4-in. x 4-in. wooden timbers to build a containment area around the temporary stockpile. Removal of soil/debris from inside the septic tank was completed on August 13, 1996.

On August 14, 1996, removal of the concrete tank was initiated. Removal of the tank was difficult because of the large amount of rebar re-enforcement and the thickness of the concrete walls. A hydraulic trackhoe with an attached hydraulic jackhammer was used to perforate the concrete and break up the walls and concrete floor of the septic tank. After the walls of the tank were broken up, the hydraulic jackhammer was removed from the trackhoe and the bucket was attached to remove the concrete from the excavation. Each bucket of concrete was screened for gross alpha and beta/gamma radiation using hand-held instruments. Subsequently, the hydraulic jackhammer was re-attached to the trackhoe so that perforation of the remaining walls and the tank floor could be completed. Again, the bucket was attached to the trackhoe

and the remaining concrete was removed. The west wall footing was located under the access road to the back of the high school and was left in place to minimize damage to the existing road. An adequate number of swipes were collected from the concrete and delivered to TA-21 for analysis by LANL's Health Physics Operations group. The concrete was temporarily stored onsite until approval was obtained for disposal of the concrete as construction debris. Upon approval from LANL's Health Physics Operations group, approximately 75 yds^3 of concrete was loaded into dump trucks and transported to the Los Alamos County Landfill on August 16, 1996.

After all soil and concrete was removed from the excavation, straw bale diversion dams were placed both uphill and downhill from the excavation to divert stormwater around the excavation and to act as a sediment collection dam, respectively.

On August 19, 1996, after removal of the septic tank and collection of verification samples, the excavation was backfilled and compacted to LANL-required specifications with soil stockpiled from the eastern chamber of the tank. Compaction was obtained using a hydraulic compacting plate attached to the hydraulic trackhoe for the bottom half of the excavation. The upper half of the excavation was compacted using a hydraulic packer. Approximately 250 yds^3 of clean backfill were brought in to complete backfilling the excavation. After completion of backfilling at the former septic tank location, the area was fenced off to secure the area until site restoration activities are completed. A straw bale diversion dam was placed uphill to divert any storm water run-on around the disturbed soils, the straw bale sediment collection dam was left in place downhill from the disturbed area and a second sediment collection dam was placed at the north end of the parking lot as requested by LANL's Water Quality and Hydrology group.

A monthly stormwater inspection of the area is currently being conducted and documented. Upon completion of site restoration activities by repaving the parking lot, the site will be closed for stormwater inspections.

The remedial activities for this site were conducted in accordance with the VCA plan, except for the following deviations:

- The soil removed from the eastern half of the septic tank was returned to the excavation.
- A portion of the west wall footing was left in place because it is under the access road to Los Alamos High School and removal would have caused excessive and unnecessary damage to the roadway.

2.2.3 Confirmatory Sampling for PRS 0-030(h)

Fill material from the east chamber of the septic tank was returned to the excavation, compacted, and covered with 6–8 ft of clean fill. Samples from the fill material returned to the excavation, samples collected from the outfall area, and four verification samples collected from the bottom of the excavation are considered confirmatory samples for PRS 0-030(h) (Table 2.2.3-1). Background comparisons, a screening assessment, and a qualitative human health risk assessment were performed with this data.

On August 16, 1996, after completion of the septic tank removal, sample material for the four verification samples (Fig. 2.2.3-1) were collected from each quadrant at the bottom of the excavation (under the former tank) using a trackhoe. The samples were collected from the trackhoe bucket using the spade and scoop method. Sample 0100-96-0421 (FIMAD Location ID 00-04813) was collected from beneath the southwest quadrant of the tank footprint at approximately 13.5 ft bgs. Sample 0100-96-0424 (FIMAD Location ID 00-04814) was collected from beneath the southeast quadrant of the tank footprint at approximately 13.5 ft bgs. Sample 0100-96-0425 (FIMAD Location ID 00-04815) was collected from beneath the northwest quadrant of the tank footprint at approximately 13.5 ft bgs. Sample 0100-96-0426 (FIMAD Location ID 00-04816) was collected from beneath the northeast quadrant of the tank footprint at approximately 13.5 ft bgs.

The samples were submitted to the SMO for delivery to the MRAL following the sampling methodology presented in Section 2.1 of this report. The screening analyses included gross alpha/beta/gamma, moisture content, and tritium. The samples were then analyzed in a fixed laboratory for VOCs, SVOCs, pesticides, PCBs, TAL metals, plutonium-238 and plutonium-239/240, americium-241, and total uranium. Deviations from the VCA plan include not submitting the samples to the MCAL for VOC and metals screening by XRF (LANL 1996, 05-0239).

TABLE 2.2.3-1

SUMMARY OF CONFIRMATORY SAMPLES COLLECTED AT PRS 0-030(h)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (ft)	MRAL	VOCs	SVOCs	PEST/ PCBs	INOR-GANICS	RAD
0100-96-0403	00-04800	Outside tank, south end beneath the inlet pipe	3 - 3.5 ft	2221	2233	2233	2233	2234	2235
0100-96-0407	00-04805	Inside tank, east of baffle, in SW corner of east compartment	9.5 - 10 ft	2221	2233	2233	2233	2234	2235
0100-96-0408	00-04805	Inside tank, east of baffle, in SW corner of east compartment	11.5 - 12 ft	2221	2233	2233	2233	2234	2235
0100-96-0411	00-04807	Inside tank, in middle of east compartment adjacent to the baffle	6.5 - 7 ft	2221	2233	2233	2233	2234	2235
0100-96-0412	00-04807	Inside tank, in middle of east compartment adjacent to the baffle	10.5 - 11 ft	2221	2233	2233	2233	2234	2235
0100-96-0413	00-04808	Inside tank, east of baffle, in NE corner of east compartment	6 - 6.5 ft	2221	2233	2233	2233	2234	2235
0100-96-0414	00-04808	Inside tank, east of baffle, in NE corner of east compartment	9.5 - 10 ft	2221	2233	2233	2233	2234	2235
0100-96-0417	00-04810	Inside tank, east of baffle, in SE area of east compartment	6 - 6.5 ft	2221	2233	2233	2233	2234	2235
0100-96-0418	00-04810	Inside tank, east of baffle, in SE area of east compartment	10 - 10.5 ft	2221	2233	2233	2233	2234	2235
0100-96-0419	00-04811	Outfall area immediately downslope from the last concrete pillar for outfall pipe	5 - 10 in	2224	2238	2238	2238	2239	2240
0100-96-0420	00-04812	Outfall area downslope from sample #0100-96-0419	5 - 10 in	2224	2238	2238	2238	2239	2240
0100-96-0421	00-04813	Beneath the SW quadrant of the septic tank	13.5 ft	2508	2510	2510	2510	2512	2513
0100-96-0424	00-04814	Beneath the SE quadrant of the septic tank	13.5 ft	2508	2510	2510	2510	2512	2513
0100-96-0425	00-04815	Beneath the NW quadrant of the septic tank	13.5 ft	2508	2510	2510	2510	2512	2513
0100-96-0426	00-04816	Beneath the NE quadrant of the septic tank	13.5 ft	2508	2510	2510	2510	2512	2513

TABLE 2.2.3-1 (CONT.)

SUMMARY OF CONFIRMATORY SAMPLES COLLECTED AT PRS 0-030(h)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (ft)	MRAL	VOCs	SVOCs	PEST/ PCBs	INOR-GANICS	RAD
0100-96-0437	00-04801	Outside the tank, adjacent to the the northeast corner of the tank	7 - 8 ft	2221	2233	2233	2233	2234	2235
0100-96-0438	00-04802	Outside the tank adjacent to the middle of the tank	7 - 8 ft	2221	2233	2233	2233	2234	2235
0100-96-0439	00-04803	Outside the tank adjacent to the northwest corner of the tank	7 - 8 ft	2221	2233	2233	2233	2234	2235

2.2.3.1 Background Comparisons

Data for inorganics and radionuclides at PRS 0-30(h) were compared to background screening values presented in Statistical Comparisons to Background, Part I (Environmental Restoration Project Decision Support Council 1995, 1218). The results of the background comparison are discussed below.

2.2.3.1.1 Inorganics

Ten soil samples collected from outside the septic tank and eight samples collected from inside the septic tank on the east side of the baffle at PRS 0-030(h) were analyzed for TAL metals and total uranium. Some analyses included one or more laboratory duplicates. The highest detected value was used for samples for which a laboratory duplicate was analyzed. Fifteen inorganics (arsenic, beryllium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, selenium, thallium, and zinc) were detected at concentrations exceeding their respective background screening values.

Further background comparisons were performed for arsenic, beryllium, calcium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, and zinc. Because the background data for mercury, silver, and thallium are inadequate to support other statistical tests, these metals were carried forward to the screening assessment.

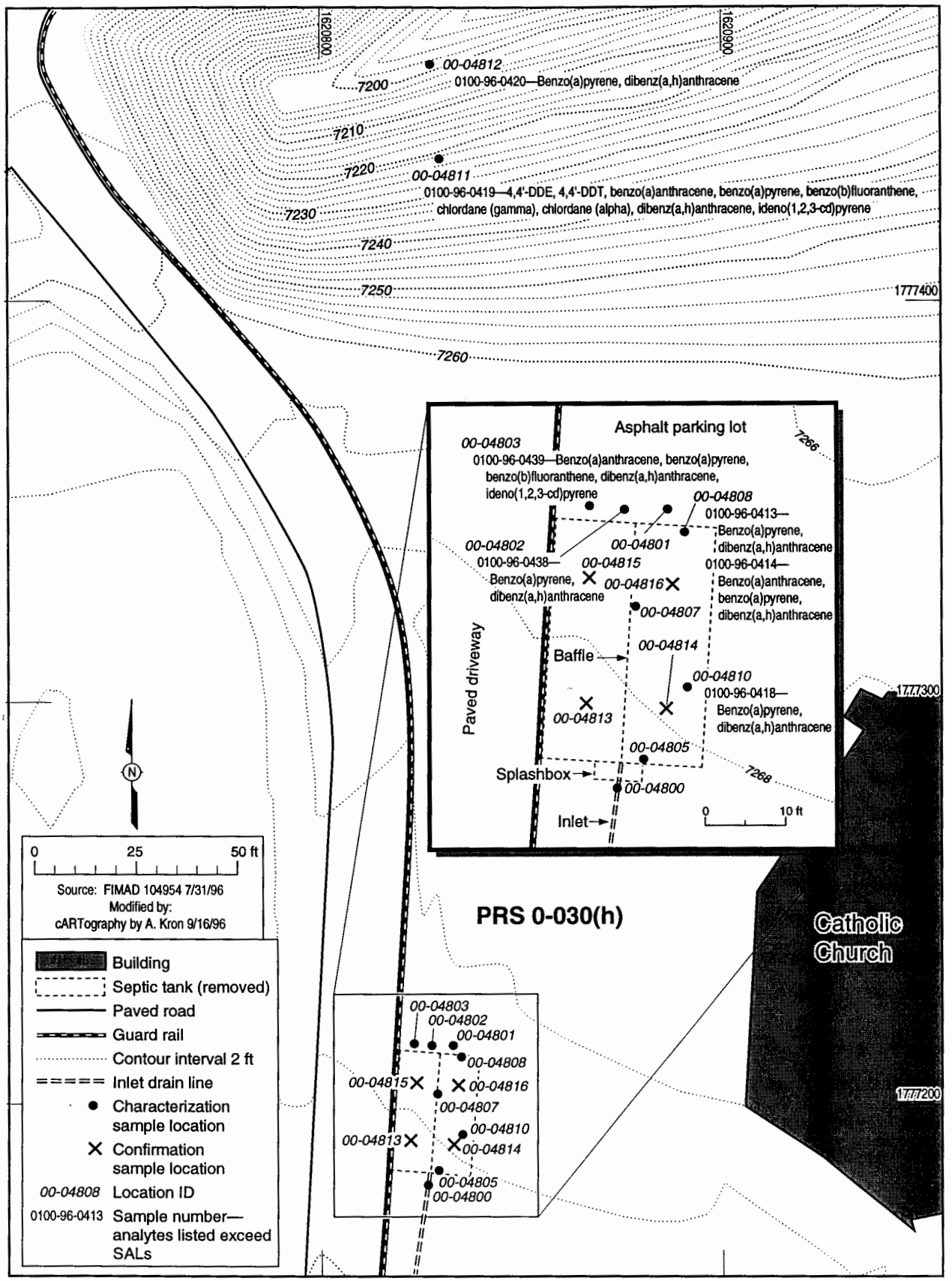

Fig. 2.2.3-1. Confirmation sample locations showing analytes that exceed SALs for PRS 0-030(h).

Because the data for the other twelve metals (arsenic, beryllium, calcium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, and zinc) do not appear to satisfy normality assumptions, non-parametric tests were preferred for further background comparisons. The Gehan modification to the Wilcoxon Rank Sum test and the Quantile test were used for these evaluations. The Gehan test is best suited for assessing complete shifts in distribution, whereas the Quantile test is better suited for assessing partial shifts. These two tests can detect most types of differences between distributions. Observed significance levels (p-values) for these tests are presented in Table 2.2.3-2. If a p-value is less than some small probability, 0.05, then there is some reason to suspect that there is a difference between the background and site distributions; otherwise, no difference is indicated.

TABLE 2.2.3-2

STATISTICAL TESTS FOR BACKGROUND COMPARISON

ANALYTE	GEHAN TEST P-VALUE	QUANTILE TEST P-VALUE
Arsenic	0.77	0.97
Beryllium	0.78	1.0
Calcium	<0.00005	0.0012
Chromium	<0.00005	0.0002
Cobalt	0.12	0.88
Copper	<0.00005	0.0002
Iron	0.0044	0.056
Lead	<0.00005	<0.00005
Manganese	<0.00005	0.0012
Nickel	<0.00005	0.0011
Selenium	<0.00005	0.0004
Zinc	<0.00005	<0.00005

The results for arsenic, beryllium, and cobalt are indicative of site concentrations that are not statistically elevated above background. The results for calcium, chromium, copper, iron, lead, manganese, nickel, selenium, and zinc are indicative of site concentrations that are greater than background.

Based on the background comparisons and further statistical tests performed to compare site and background data, calcium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc are carried forward to the screening assessment. The concentrations for each sample that has at least one value above background screening values for these analytes are presented in Table 2.2.3-3. These twelve inorganics will be carried forward to the screening assessment.

TABLE 2.2.3-3

INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(h)

SAMPLE NUMBER	CALCIUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	IRON (mg/kg)	LEAD (mg/kg)	MANGA-NESE (mg/kg)	MERCURY (mg/kg)	NICKEL (mg/kg)	SELE-NIUM (mg/kg)	SILVER (mg/kg)	THALLIUM (mg/kg)	ZINC (mg/kg)
UTL	6 120	19.3	15.5	21 300	23.3	714	0.1[a]	15.2	1.7	n/a[b]	1[a]	50.8
SAL	n/a	210	2 800	n/a	400	n/a	23	1 500	380	380	5.4	23 000
0100-96-0403	2 400	12.8	7.7	16 000	23.6	928	0.03	10.7	1.4	0.11(U)[c]	0.87	37.5
0100-96-0407	2 550	9.2	8.2	10 700	15.3	473	0.94	8.1	1.2	0.35(J+)[d]	0.5(U)	91.6
0100-96-0408	8 730	14.7	14.6	20 400	33.4	1 540	1.3	10.7	1.9	0.64(J+)	0.55	130
0100-96-0411	4 510	14.8	12	16 000	23.8	472	0.25	10.8	1.2	0.51(J+)	1.2	71.6
0100-96-0412	7 210	13.9	12.3	14 500	22.9	525	0.99	9.4	1.1	0.53(J+)	0.75	79.1
0100-96-0414	3 180	10	6.4	12 900	18.1	487	0.03	8.1	0.88	0.12(U)	1.3	37.5
0100-96-0417	2 510	8.6	6.4	12 200	15.1	467	0.24	7.1	1	0.18(J+)	0.48(U)	39.9
0100-96-0418	4 570	13.5	17.9	16 000	25.1	599	0.71	11.4	1.4	0.78(J+)	0.49(U)	127
0100-96-0419	1 570	51.2(J-)[e]	43.4	140 000	51.2	869	3.5	36.4	2	0.82	0.42(U)(R)[f]	85.1(J-)
0100-96-0420	1 020	10.4(J-)	5.4	10 500	13.2	321	0.25	6.2	0.37	0.42(U)	0.42(U)	50.6(J-)
0100-96-0437	3 680	13.7	8.9	15 600	17.8	835	0.08	11.8	1.7	0.12(U)	0.48(U)	52.4
0100-96-0439	6 500	9.4	5.7	11 800	13.9	310	0.023(U)	7.1	1.2	0.11(U)	0.97	49.8
0100-96-0421	10 700	2.6	4.9	7 860	15.3	386	0.04	3.7	0.42(U)	0.23(U)	0.8 (U)	57.1
0100-96-0424	7 610	2.9	4.4	7 510	29	348	0.08	3.5	0.42(U)	0.24(U)	2.3	48.1
0100-96-0425	4 480	2.1	3.1	6 580	16.9	294	0.11	2.8	0.42(U)	0.23(U)	0.79(U)	35.3
0100-96-0426	4 220	2.7	5.5	7 670	26.6	436	0.07	4.1	0.43(U)	0.24(U)	1.2	49

[a] Value represents the maximum reported background concentration in soil.
[b] n/a = Not available. For silver, the detection limit is used as a background screening value.
[c] (U) = Not detected.
[d] (J+) = Estimated value, probably biased high.
[e] (J-) = Estimated value, probably biased low.
[f] (R) = Rejected data. See Appendix A for details.

2.2.3.1.2 Radionuclides

Ten soil samples collected from outside the septic tank and eight samples collected from inside the septic tank on the east side of the baffle at PRS 0-030(h) were analyzed by gamma spectroscopy. These eighteen samples were also analyzed for isotopic plutonium and total uranium.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These radionuclides include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

- Sixteen short-lived activation/fission products reported at PRS 0-030(h) (barium-140, cadmium-109, cerium-139, cesium-134, cobalt-57, europium-152, lanthanium-140, manganese-54, mercury-203, ruthenium-106, selenium-75, sodium-22, strontium-85, tin-113, yttrium-88, and zinc-65) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to be present at this PRS, these short-lived activation/fission products are eliminated as potential radionuclide contaminants.

- Potassium-40 is a naturally occurring radionuclide that is also routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995, 1142; Longmire et al. 1995, 1266). Potassium-40 will not be considered a potential radionuclide contaminant at this site.

- Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as radionuclides of potential concern. QA/QC activities review daughter radionuclides for consistency with parent activities, and any that cannot be attributed to background concentrations of the parent are retained as radionuclides of potential concern.

EQLs and minimum detectable activities are often not available for radionuclides by gamma spectroscopy. A value of three times the measurement uncertainty (3 sigma or three standard deviations) is used to calculate a sample-specific minimum detectable activity, which is then used in the same manner as a detection limit. This methodology is similar to Currie's method of determining radionuclide maximum detectable activity (Currie1988, 0792). This 3 sigma screening value takes into account variability caused by counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative, and may include radionuclides whose presence is spuriously reported because of spectral interferences or misidentifications. Cobalt-60 is eliminated from further consideration based on this criterion.

Of the remaining seven radionuclides reported for PRS 0-030(h), americium-241, cesium-137, plutonium-238, and total uranium are eliminated from further consideration based on background screening value criteria. One radionuclide, neptunium-237, does not have an established background screening value and is carried forward to the screening assessment. Plutonium-239/240 and uranium-235 have at least one detected concentration above background screening values. The detected values for plutonium-239/240, neptunium-237, and uranium-235 are presented below in Table 2.2.3-4. Plutonium-239/240, neptunium-237, and uranium-235 are carried forward to the screening assessment.

TABLE 2.2.3-4

RADIONUCLIDES WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(h)

SAMPLE ID	NEPTUNIUM-237 (pCi/g)	PLUTONIUM-239/240 (pCi/g)	URANIUM-235 (pCi/g)
UTL	n/a[a]	0.092[b]	0.084
SAL	1.9	24	10
0100-96-0403	1.1(R)[c]	0.181	-0.042(U)[d]
0100-96-0407	0.258(R)	2.51	-0.173(U)
0100-96-0408	0.706(R)	1.52	-0.098(U)
0100-96-0411	-0.337(R)	1.24	-0.058(U)
0100-96-0412	0.3(R)	1.45	-0.151(U)
0100-96-0413	0.472(R)	0.133	-0.189(U)
0100-96-0414	0.778(R)	0.095	-0.081(U)
0100-96-0417	-0.293(R)	0.307	-0.039(U)
0100-96-0418	0.313(R)	0.82	-0.167(U)
0100-96-0419	-0.315(R)	4.44	-0.062(U)
0100-96-0420	-0.229(R)	0.523	-0.054(U)
0100-96-0437	0.403(R)	1.7	-0.179(U)
0100-96-0438	0.594(R)	0.347	-0.064(U)
0100-96-0439	0.354(R)	0.066	-0.068(U)
0100-96-0421	0.954	0.07	0.105
0100-96-0424	0.42	0.1	0.093
0100-96-0425	-0.097(U)	0.02(U)	0.025(U)
0100-96-0426	-0.159(U)	0.26	0.005(U)

[a] n/a = Not available.
[b] Value represents the maximum reported background concentration in soil from the Environmental Surveillance Reports.
[c] (R) = Rejected data. See Appendix A for details.
[d] (U) = Not detected.

2.2.3.2 Evaluation of Organic Chemicals

Ten soil samples collected from outside the septic tank and eight samples collected from inside the septic tank on the east side of the baffle at PRS 0-030(h) were analyzed for VOCs, SVOCs, pesticides, and PCBs. Thirty-one organic chemicals were detected at PRS 0-030(h). The concentrations for each sample that had at least one detected value for these thirty-one chemicals are presented in Table 2.2.3-5. These 31 chemicals are carried forward to the screening assessment.

TABLE 2.2.3-5

ORGANICS WITH DETECTED CONCENTRATIONS AT PRS 0-030(h)

ANALYTE (mg/kg)	SAL (mg/kg)	0100-96-0403	0100-96-0407	0100-96-0408	0100-96-0411	0100-96-0412	0100-96-0413	0100-96-0414	0100-96-0417	0100-96-0418	0100-96-0419	0100-96-0420	0100-96-0437	0100-96-0438	0100-96-0439	0100-96-0421	0100-96-0424	0100-96-0425	0100-96-0426
1,2,4-Trimethylbenzene	8	0.006 (U)[a]	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.001	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
1,4-Dichlorobenzene	7.4	0.006 (U)	0.006 (U)	0.001	0.001	0.002	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.005 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
2-Methylnaphthalene	n/a[b]	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.38 (U)	0.4 (U)	0.4 (U)	0.35 (U)	0.34 (U)	0.4 (U)	0.38 (U)	0.043	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
4,4'-DDD	1.9	0.0076	0.014	0.15	0.012	0.054	0.019	0.013	0.002	0.29	0.25	0.0048	0.0039 (U)	0.019 (U)	0.019 (U)	0.0077 (U)	0.004 (U)	0.004 (U)	0.001 (U)
4,4'-DDE	1.3	1.1	0.015	0.062	0.052	0.17	0.11	0.048	0.005	0.13	2.3	0.003 (U)	0.031	0.077	0.018	0.067	0.022	0.024	0.04
4,4'-DDT	1.3	0.81	0.0087	0.51	0.023	0.022	0.08	0.12	0.003	0.2	18	0.011	0.027	0.048	0.06	0.074	0.042	0.026	0.51
Acenaphthene	360	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.12	0.4 (U)	0.4 (U)	0.12	0.079	0.4 (U)	0.063	0.2	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Acetone	2000	0.005 (U)	0.007 (U)	0.024 (U)	0.024 (U)	0.024 (U)	0.024 (U)	0.022 (U)	0.024 (U)	0.024 (U)	0.016 (U)	0.008 (U)	0.024 (U)	0.024 (U)	0.024 (U)	0.042	0.058	0.04	0.083
Anthracene	19	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.19	0.4 (U)	0.4 (U)	0.21	0.12	0.4 (U)	0.1	0.32	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Benzo(a)anthracene	0.61	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.047	0.14	0.63	0.4 (U)	0.4 (U)	0.81	0.44	0.4 (U)	0.36	0.94	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Benzo(a)pyrene	0.061	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.059	0.16	0.74	0.4 (U)	0.062	0.95	0.56	0.4 (U)	0.46	1.1	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Benzo(b)fluoranthene	0.61	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.055	0.12	0.61	0.4 (U)	0.047	0.82	0.47	0.4 (U)	0.37	0.89	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Benzo(g,h,i)perylene	n/a	0.36 (U)	0.41 (U)	0.4 (U)	0.067	0.061	0.13	0.49	0.4 (U)	0.059	0.71	0.39	0.4 (U)	0.31	0.82	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Benzo(k)fluoranthene	6.1	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.058	0.14	0.61	0.4 (U)	0.05	0.86	0.46	0.4 (U)	0.38	0.95	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Chlordane (gamma)	0.34	0.004 (U)	0.004 (U)	0.004 (U)	0.004 (U)	0.004 (U)	0.008 (U)	0.0094 (U)	0.002 (U)	0.002 (U)	0.48	0.002 (U)	0.002 (U)	0.009 (U)	0.010 (U)	0.004 (U)	0.002 (U)	0.002 (U)	0.00006 (U)
Chlordane - Alpha	0.34	0.004 (U)	0.004 (U)	0.004 (U)	0.004 (U)	0.004 (U)	0.008 (U)	0.009 (U)	0.002 (U)	0.003	0.51	0.002 (U)	0.002 (U)	0.009 (U)	0.010 (U)	0.004 (U)	0.002 (U)	0.002 (U)	0.00006 (U)
Chlorobenzene	160	0.006 (U)	0.006 (U)	0.006 (U)	0.005	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.001	0.006 (U)	0.005 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
Chrysene	24	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.05	0.16	0.78	0.4 (U)	0.046	1.2	0.61	0.4 (U)	0.45	1.1	0.19 (U)	0.19 (U)	0.19 (U)	0.2

TABLE 2.2.3-5 (CONT.)

ORGANICS WITH DETECTED CONCENTRATIONS AT PRS 0-030(h)

ANALYTE (mg/kg)	SAL	010096 0403	010096 0407	010096 0408	010096 0411	010096 0412	010096 0413	010096 0414	010096 0417	010096 0418	010096 0419	010096 0420	010096 0437	010096 0438	010096 0439	010096 0421	010096 0424	010096 0425	010096 0426
cis-1,2-Dichloroethene	59	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.002	0.003	0.006 (U)	0.001	0.006 (U)	0.012 (U)	0.012 (U)	0.011 (U)	0.012 (U)
Dibenz(a,h)anthracene	0.061	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.067	0.15	0.4 (U)	0.4 (U)	0.23	0.14	0.4 (U)	0.1	0.24	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Dibenzofuran	260	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.056	0.4 (U)	0.4 (U)	0.045	0.34 (U)	0.4 (U)	0.38 (U)	0.093	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Fluoranthene	2600	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.078	0.33	1.5	0.4 (U)	0.073	1.7	1.1	0.052	0.88	2.5	0.19 (U)	0.19 (U)	0.23	0.4
Fluorene	300	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.11	0.4 (U)	0.4 (U)	0.1	0.07	0.4 (U)	0.052	0.18	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Indeno(1,2,3-cd)pyrene	0.61	0.36 (U)	0.41 (U)	0.4 (U)	0.059	0.054	0.1	0.43	0.4 (U)	0.044	0.61	0.34	0.4 (U)	0.27	0.68	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Methylene Chloride	11	0.043 (U)	0.017 (U)	0.041 (U)	0.037 (U)	0.04 (U)	0.016 (U)	0.016 (U)	0.024 (U)	0.015 (U)	0.026 (U)	0.032 (U)	0.02 (U)	0.018 (U)	0.018 (U)	0.007	0.006	0.006 (U)	0.006 (U)
Naphthalene	800	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.39 (U)	0.07	0.4 (U)	0.4 (U)	0.045	0.043	0.4 (U)	0.38 (U)	0.11	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Phenanthrene	n/a	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.4 (U)	0.21	1.1	0.4 (U)	0.047	1.2	0.75	0.4 (U)	0.58	1.7	0.19 (U)	0.19 (U)	0.19 (U)	0.19 (U)
Pyrene	2000	0.36 (U)	0.41 (U)	0.4 (U)	0.4 (U)	0.071	0.27	1.4	0.4 (U)	0.067	2.1	1	0.052	0.79	2	0.19 (U)	0.19 (U)	0.21	0.36
Tert-Butylbenzene	130	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.005 (U)	0.006 (U)	0.006 (U)	0.006	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
Toluene	1900	0.006 (U)	0.006 (U)	0.003	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.009	0.003	0.016	0.006	0.006 (U)	0.002	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
Trichloroethene	7.1	0.002	0.002	0.006	0.003	0.006 (U)	0.004	0.007	0.008	0.005	0.01	0.026	0.004	0.009	0.008	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
Trichlorofluoromethane	710	0.006 (U)	0.006 (U)	0.006 (U)	0.002	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.005 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)
Xylene (total)	990	0.006 (U)	0.001	0.004	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.012	0.003	0.005	0.003	0.002	0.003	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)	0.006 (U)

[a] (U) = Not detected.
[b] na = Not available.

2.2.4 Screening and Assessment

The purpose of this section is to assess the potential for adverse human health effects resulting from exposure to any residual contamination associated with PRS 0-030(h). A screening assessment and qualitative risk assessment were conducteded on the data for soil samples that remain at this PRS following methodology presented in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277). Only data from samples sent to a fixed laboratory were included in the screening and assessment.

2.2.4.1 Screening Assessment

Twelve inorganic chemicals, three radionuclides, and thirty-one organic chemicals were carried forward from the background comparison and organic chemical evaluation. The screening assessment includes a comparison to SALs and a multiple chemical evaluation (MCE) as described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277).

Equal to or Greater than SAL. Five polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene], and four pesticides (4,4'-DDE, 4,4'-DDT, alpha-chlordane, and gamma chlordane) were detected at concentrations above SALs. Concentrations of these chemicals are shown in Table 2.2.4-1. These nine chemicals are retained as COPCs and will be evaluated in Section 2.2.4.2 of this report.

TABLE 2.2.4-1

CONCENTRATIONS THAT EXCEED SALs AT PRS 0-030(h)

SAMPLE ID	4,4'-DDE (mg/kg)	4,4'-DDT (mg/kg)	BENZO(a) ANTHRACENE (mg/kg)	BENZO(a) PYRENE (mg/kg)	BENZO(b) FLUORAN-THENE (mg/kg)	CHLORDANE (gamma) (mg/kg)	CHLORDANE (alpha) (mg/kg)	DIBENZ(a,h) ANTHRA-CENE (mg/kg)	INDENO (1,2,3-cd) PYRENE (mg/kg)
SAL	1.3	1.3	0.61	0.061	0.61	0.34[a]	0.34[a]	0.061	0.61
0100-96-0413	0.11	0.08	0.14	0.16	0.12	0.008(U)[b]	0.008(U)	0.067	0.1
0100-96-0414	0.048	0.12	0.63	0.74	0.61	0.009(U)	0.009(U)	0.15	0.43
0100-96-0418	0.13	0.2	0.4(U)	0.062	0.047	0.002(U)	0.003	0.4(U)	0.044
0100-96-0438	0.077	0.048	0.36	0.46	0.37	0.009(U)	0.009(U)	0.1	0.27
0100-96-0439	0.018	0.06	0.94	1.1	0.89	0.01(U)	0.01(U)	0.24	0.68
0100-96-0419	2.3	18	0.81	0.95	0.82	0.48	0.51	0.14	0.34
0100-96-0420	0.003 (U)	0.011	0.44	0.56	0.47	0.002(U)	0.002(U)	0.14	0.34

[a] SAL is for total chlordane.
[b] (U) = Not detected.

No SAL. Six chemicals [calcium, iron, manganese, 2-methylnaphthalene, benzo(g,h,i)perylene, and phenanthrene] have no SALs for comparison. Three organic chemicals, 2-methylnaphthalene, benzo(g,h,i)perylene, and phenanthrene, are retained as COPCs and will be evaluated in Section 2.2.5 of this report.

Calcium is an essential nutrient that can be eliminated as a COPC on the basis of best professional judgment (EPA 1989, 0305). Although calcium has no SAL, as an essential nutrient it may be compared to the recommended daily allowance (RDA) for children and adults. The calcium RDA is 800 mg/day for a child and 1 200 mg/day for an adult. The highest detected concentration of calcium at PRS 0-030(h) was 10 700 mg/kg. At the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 2.1 mg of calcium per day. An adult, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 1.1 mg of calcium per day. Because both amounts are considerably less than the RDAs for child and adult, calcium is eliminated as a COPC.

Iron was detected in a single location (location 00-04811) at a concentration of 140 000 mg/kg, which exceeds its background UTL. This location is at the end of the former iron drainpipe from the septic tank, and it is probable that the elevated concentration is a result of weathering and oxidation of this pipe. Because of the limited area of contamination and because iron is relatively nontoxic, iron is eliminated as a COPC. Although iron has no SAL, as an essential nutrient it may be compared to the recommended daily allowance (RDA) for children and adults. The iron RDA is 10 mg/day for a child and 15 mg/day for an adult female. If all incidental soil ingestion were to occur at this single location with the 140 000 mg/kg detected concentration of iron, at the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 28 mg of iron per day. An adult female, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 14 mg of iron per day. Although the RDA for children is slightly exceeded, deleterious effects for daily intakes between 25 and 75 mg are unlikely in healthy persons (National Research Council 1989, 1251). Iron intake is below the RDA for adult females; therefore, iron is eliminated as a COPC.

Manganese has been shown to be an essential element in every animal species studied. In humans, toxicity has been observed only in workers exposed to high concentrations of manganese dust or fumes in air, but not as a consequence of dietary intake by people consuming 8 to 9 mg of manganese per day in their food. The recommended range of manganese intake is 2 to 5 mg/day for adults (National Research Council 1989, 1251). The highest detected concentration of manganese in PRS 0-030(h) confirmation samples was 1 540 mg/kg. At the EPA default adult soil ingestion rate of 100 mg/day, an adult would ingest about 0.2 mg of manganese per day. Because this amount is considerably less than the recommended intake range for adults, manganese is eliminated as a COPC.

Less than SAL. The remaining 33 chemicals were detected at concentrations below their respective SALs. As described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277), analytes are divided into three classes (carcinogens, noncarcinogens, and radionuclides) to evaluate possible additive effects within each class of chemicals. The MCE for PRS 0-030(h) confirmatory samples in the septic tank excavation is presented in Table 2.2.4-2.

The normalized sums for carcinogens (0.7), noncarcinogens (0.8), and radionuclides (0.7) are all less than unity, indicating that the potential for adverse human health effects from exposure is unlikely. Therefore, all chemicals detected at concentrations less than their respective SALs are eliminated as COPCs.

TABLE 2.2.4-2

MULTIPLE CHEMICAL EVALUATION FOR PRS 0-030(h)

ANALYTE	LOCATION ID	SAMPLE NUMBER	MAXIMUM CONCENTRATION	SAL	NORMALIZED VALUE
Carcinogens	n/a[a]	n/a	(mg/kg)	(mg/kg)	n/a
4,4'-DDD	00-04810	0100-96-0418	0.29	1.9	0.2
Benzo(k)fluoranthene	00-04803	0100-96-0439	0.95	6.1	0.2
Chromium	00-04811	0100-96-0419	51.2	210	0.2
Chrysene	00-04811	0100-96-0419	1.2	24	0.05
Methylene chloride	00-04813	0100-96-0421	0.007	11	0.0006
Trichloroethene	00-04812	0100-96-0420	0.026	7.1	0.004
			Normalized Sum		0.7
Noncarcinogens	n/a	n/a	(mg/kg)	(mg/kg)	n/a
1,2,4 -Trimethylbenzene	00-04812	0100-96-0420	0.001	8	0.0001
Acenaphthene	00-04803	0100-96-0439	0.2	360	0.0006
Acetone	00-04816	0100-96-0426	0.083	2000	4.00E-05
Anthracene	00-04803	0100-96-0439	0.32	19	0.02
Chlorobenzene	00-04807	0100-96-0411	0.005	160	3.00E-05
cis-1,2-Dichloroethene	00-04812	0100-96-0420	0.003	59	0.00005
Copper	00-04811	0100-96-0419	43.4	2800	0.02
Dibenzofuran	00-04803	0100-96-0439	0.093	260	0.0004
Fluoranthene	00-04803	0100-96-0439	2.5	2600	0.001
Fluorene	00-04803	0100-96-0439	0.18	300	0.0006
Lead	00-04811	0100-96-0419	51.2	400	0.1
Mercury	00-04811	0100-96-0419	3.5	23	0.2
Naphthalene	00-04803	0100-96-0439	0.11	800	0.0001
Nickel	00-04811	0100-96-0419	36.4	1500	0.02
Pyrene	00-04803	0100-96-0439	2	2000	0.001
Selenium	00-04811	0100-96-0419	2	380	0.005
Silver	00-04811	0100-96-0419	0.82	380	0.002
tert-Butylbenzene	00-04803	0100-96-0439	0.006	130	5.00E-05
Thallium	00-04814	0100-96-0424	2.3	5.4	0.4
Toluene	00-04811	0100-96-0419	0.016	1900	8.00E-06
Xylenes (total)	00-04810	0100-96-0417	0.012	990	1.00E-05
Zinc	00-04805	0100-96-0408	130	23000	0.006
			Normalized Sum		0.8
Radionuclides	n/a	n/a	(pCi/g)	(pCi/g)	n/a
Neptunium-237	00-04800	0100-96-0403	0.954	1.9	0.5
Plutonium-239/240	00-04811	0100-96-0419	4.44	24	0.2
Uranium-235	00-04813	0100-96-0421	0.105	10	0.01
			Normalized Sum		0.7

[a] n/a = Not applicable.

2.2.4.2 Qualitative Human Health Risk Assessment for PRS 0-030(h)

Eight PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and phenanthrene] and four pesticides (alpha-chlordane, gamma chlordane, 4,4'-DDE, and 4,4'-DDT) were identified as COPCs in the screening assessment.

The detected concentrations of the PAHs (all less than 2 mg/kg) are consistent with PAH concentrations (generally less than 2 mg/kg) detected near parking lots and asphalt paved industrial sites within the townsite and LANL (LANL 1995, 09-0520; LANL 1996, 09-0524; LANL 1996, 09-0526). PRS 0-030(h) is located beneath a paved parking lot and adjacent to a paved road. It is likely that the PAHs are a result of runoff and subsequent infiltration from the parking lot and road, and are not present as a result of laboratory processes at PRS 0-030(h). For these reasons, PAHs are eliminated as COPCs at PRS 0-030(h).

Pesticides were present at concentrations exceeding SALs in the outfall area of PRS 0-030(h). This area receives runoff from the adjacent sports practice field at Los Alamos High School. This field is treated with pesticides and herbicides, and is heavily watered. Because the outfall area receives runoff from the field, it is likely that the elevated concentrations of pesticides in this area are a result of this runoff. In addition, the outfall area is situated so that runoff from the townsite traverses the area. Aerial spraying of pesticides (including DDT and chlordane) was conducted in the 1960s and 1970s to control forest pests. It is likely that runoff containing pesticide contaminants from the townsite also contributed to the elevated concentrations in this area. Because the elevated concentrations of pesticides in this area are likely to be from runoff accumulation rather than septic tank usage, pesticides are eliminated as COPCs for PRS 0-030(h).

2.2.5 Conclusions and Recommendations

Because adverse human health effects are not expected from exposure to the concentrations of chemicals that remain at the former location of the septic tank system, and the source of PAHs and pesticides at concentrations above SAL is not likely related to use of the septic tank, no further action is recommended for PRS 0-030(h).

2.3 Waste Management for PRS 0-030(h)

All work was conducted in accordance with the VCA plan and the waste characterization strategy form (LANL 1996, 05-0239). However, the following deviation occurred during the field investigation and VCA activities:

- The personal protective equipment (PPE) and sampling debris generated during precharacterization activities was not shipped under manifest to TA-3, SM-271 upon generation, because it was a sanitary waste. It was stored in the equipment trailer in a 55-gal. drum as a sanitary waste. It will be disposed at the Los Alamos County Landfill.

Asphalt removed during the precharacterization activities was classified as construction debris and disposed of at the Los Alamos County landfill.

During the septic tank removal, more waste was generated than originally estimated. The contents of the western half of the septic tank, the PPE/sampling debris from septic tank removal, and the pipe found inside the tank were classified as low level radioactive waste based on the presence of plutonium-239 above area background from this half of the septic tank. The soil from the eastern chamber of the septic tank, which was physically separated from the western chamber by a 6-in.-thich concrete baffle, was returned to the excavation because detected concentrations of chemicals in this half of the tank were not above action levels (Section 2.2.3). The decontamination water generated during sampling activities was discharged onsite according to the site-specific Spill Prevention Control and Countermeasures Plan (LANL 1996, 05-0240). During field operations, it was determined that a final decontamination rinse with methanol and deionized water was not required. A comparison between the actual amount of waste generated and the amount of waste projected in the VCA plan is presented in Table 2.3-1.

TABLE 2.3-1.

SUMMARY OF PROJECTED WASTE VOLUMES AND GENERATED WASTE VOLUMES

WASTE ITEM	WASTE TYPE	PROJECTED VOLUME	GENERATED VOLUME
sampling waste/PPE	low-level radioactive	1 ft^3	1 ft^3
tank contents, soil	low-level radioactive	4 to 70 yds^3	225 yds^3
decon wash water	liquid nonhazardous	20 gal.	6.5 gal.
decon final rinse with water/methanol	liquid nonhazardous	10 gal.	none
asphalt, concrete	construction debris	20 yds^3	80 yds^3

Seventeen soil samples were collected from the tank contents to characterize the potential waste from inside the septic tank. The samples were collected from two different levels within the tank: the top zone where the soil was moist and the bottom zone where the soil was saturated. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, plutonium-238, plutonium-239/240, americium-241, and total uranium as described in the VCA plan (LANL 1996, 05-0239). In addition, these samples were screened in the MRAL for gross alpha/beta/gamma, moisture content, and tritium.

The western half of the tank contents, the PPE/sampling debris, and the steel pipe filled with sludge were classified as low level radioactive waste because of the presence of plutonium-239 above area background. The waste was transported to TA-54, Area G and disposed in the landfill upon removal of the western half of the tank contents. Although this waste also contained RCRA components, none were above TCLP or SALs (as discussed in Sections 2.1 and 2.2 of this report). Based on historical evidence and area topography, the septic tank was classified as a residential septic tank (Shanley 1996, 05-0241). As such, the household waste exclusion, as amended to include Federal agencies, is applicable [40CFR261.4(b)1]. This exclusion classifies the waste as nonhazardous, RCRA solid waste and allows disposal of the waste as low level radioactive waste.

The asphalt and the concrete tank were classified as construction debris and were disposed at the Los Alamos County Landfill upon approval by LANL's Health Physics Operations group. In order to minimize waste, a dry decontamination step was implemented to remove excess soil from sampling equipment. This additional decontamination step reduced the amount of decontamination water generated during the precharacterization and VCA activities. In addition, returning the soil from the east half of the tank to the excavation reduced the amount of waste taken to TA-54, Area G by approximately 200 yds^3 of soil.

TABLE 2.3.1-1

WASTE CHARACTERIZATION DATA FOR PRS 0-030(h)

ANALYTE	UTL	SAL	0100-96-0401	0100-96-0402	0100-96-0404	0100-96-0405	0100-96-0406	0100-96-0409	0100-96-0410	0100-96-0415	0100-96-0416
Aluminum	38 700	77 000	10 900	6 220	9 420	17 000	8 400	11 400	16 200	12 900	13 500
Antimony	1	31	5.8(R)[a]	7.7(R)	5.9(R)	6.7(R)	6.7(R)	6.4(R)	7.4(R)	6.1(R)	6.3(R)
Arsenic	7.82	n/a[b]	4.1(J-)[c]	2.1(J-)	3.2(J-)	4.8(J-)	3(J-)	3.5(J-)	4.5(J-)	3.4(J-)	3.3(J-)
Barium	315	5 300	108	155	141	167	244	234	226	149	153
Beryllium	1.95	n/a	0.74	0.48	0.8	1.1	0.6	0.87	0.94	0.93	0.86
Cadmium	2.7	38	0.24U[d]	0.79	0.24U	0.27U	1.5	1.3	3.8	0.25U	0.31
Calcium	6 120	n/a	3 180	15 300	3 170	4 690	8 370	4 190	19 900	2 450	3 530
Chromium	19.3	211	10.7	9.1	9.8	15.7	10.9	15.2	19.4	13.6	13.5
Cobalt	19.2	4 600	5.8	3.9	6.5	8.6	4.4	6.9	6.8	8.1	7.4
Copper	15.5	2 800	6.8	14.2	6.9	14.5	22.7	29.5	36.5	7.2	11
Iron	21 300	n/a	13 100	8 280	12 400	17 100	10 400	13 100	20 000	13 300	14 100
Lead	23.3	400	16.6	22.4	16	25.2	47.6	47.2	40.8	15.9	19.9
Magnesium	4 610	n/a	1 570	1 120	1 580	2 350	1 340	1 790	2 230	2 000	1 920
Manganese	714	n/a	452	283	550	459	252	395	413	449	583
Mercury	0.1	23	0.063	3.1	0.04	1.1	3.8	3.4	4.4	0.03U	0.67
Nickel	15.2	1 500	8	19.1	7.9	11.7	7	8.8	13.5	10	9.6
Potassium	3 410	n/a	1 600	1 080	1 620	2 390	1 500	1 650	2 330	2 160	2 020
Selenium	1.7	380	1.6	0.52	0.86	0.96	1	1.3	1.8	1.9	0.89
Silver	NA	380	0.12U	0.96(J+)[e]	0.12U	0.47(J+)	1.5(J+)	3.5(J+)	2.9(J+)	0.13U	0.34(J+)
Sodium	915	n/a	387	478	392	548	617	447	550	304	409
Thallium	1	5.4	0.48U	0.85	0.66	0.76	0.55U	0.66	1.5	0.5U	0.51U
Uranium	5.45	230	3.9	3.5	3.4	3.4	4.2	3.7	4.8	3.4	3.6
Vanadium	41.9	540	18	11.9	19	25.7	17.9	19.3	27.4	25.3	23.9
Zinc	50.8	23 000	44.503	169	36.3	126	230	292	229	32.2	83.4
Americium-241	0.336	22	0.158	0.17	0.007	0.011	2.79	0.061	0.184	0.005	0.031
Cesium-137	1.7	5.1	0.032	0.031	0.011	0.019	-0.012	0.014	-0.003	0.006	-0.005
Cobalt-60	n/a	1.1	-0.009	0.005	-0.027	-0.013	0.023	0.025	0.005	-0.007	-0.003

TABLE 2.3.1-1 (CONT.)

WASTE CHARACTERIZATION DATA FOR PRS 0-030(h)

ANALYTE	UTL	SAL	0100-96-0401	0100-96-0402	0100-96-0404	0100-96-0405	0100-96-0406	0100-96-0409	0100-96-0410	0100-96-0415	0100-96-0416
Neptunium-237	n/a	1.9	0.443	-0.172	0.883	0.461	0.803	0.296	0.504	0.347	0.43
Plutonium-238	0.104	27	0.009	0.050	0	0.194	0.058	0.023	0.4	0.011	0.014
Plutonium 239/240	0.092	24	0.17	7.09	0.031	41	14.437	7.095	112	0.0216	0.539
1,2,4-Trimethylbenzene	n/a	8	0.006U	0.087	0.006U	0.002	0.27	0.006U	0.013	0.001	0.002
1,2-Dichlorobenzene	n/a	2300	0.41U	0.46U	0.4U	0.46U	0.005	0.43U	0.47U	0.4U	0.42U
1,3,5-Trimethylbenzene	n/a	6.4	0.006U	0.06	0.006U	0.006U	0.14	0.006U	0.005	0.006U	0.006U
1,4-Dichlorobenzene	n/a	7.4	0.009	0.43	0.4U	0.02	1.1	0.43U	0.21J[f]	0.4U	0.052
2-Methylnaphthalene	n/a	n/a	0.41U	0.34	0.04U	0.46U	0.19	0.43U	0.47U	0.4U	0.42U
4,4'-DDD	n/a	1.9	0.16	0.18	0.008U	2.1	0.07	0.059	0.11	0.004U	0.074
4,4'-DDE	n/a	1.3	0.027	0.84	0.079	0.15	0.042	0.027	0.31	0.004U	0.029
4,4'-DDT	n/a	1.3	0.012J	0.009	0.069	0.067J	0.007J	0.009U	0.006J	0.004U	0.009U
4-Chlorotoluene	n/a	n/a	0.006U	0.03U	0.006U	0.006U	0.004J	0.006U	0.008U	0.006U	0.006U
Acenaphthene	n/a	360	0.077J	0.098J	0.4U	0.46U	0.065J	0.43U	0.47U	0.4U	0.42U
Anthracene	n/a	19	0.11J	0.16J	0.4U	0.46U	0.18J	0.43U	0.47U	0.4U	0.42U
Benzene	n/a	1.4	0.006U	0.03U	0.006U	0.006U	0.097	0.006U	0.008U	0.006U	0.006U
Benzo(a)anthracene	n/a	0.61	0.35J	0.34J	0.053J	0.46U	0.51	0.43U	0.12J	0.4U	0.42U
Benzo(a)pyrene	n/a	0.061	0.41	0.32J	0.075J	0.46U	0.48	0.052J	0.13J	0.4U	0.42U
Benzo(b)fluoranthene	n/a	0.61	0.29J	0.27J	0.054J	0.46U	0.41J	0.043J	0.13J	0.4U	0.42U
Benzo(g,h,i)perylene	n/a	n/a	0.32J	0.23J	0.082J	0.46U	0.33J	0.074J	0.11J	0.4U	0.42U
Benzo(k)fluoranthene	n/a	6.1	0.33J	0.31J	0.065J	0.46U	0.43J	0.041J	0.12J	0.4U	0.42U
Carbon Disulfide	n/a	16	0.006U	0.03U	0.006U	0.006U	0.003J	0.006U	0.008U	0.006U	0.006U
Chlordane (gamma)	n/a	0.34	0.01U	0.007	0.004U	0.043U	0.005U	0.004U	0.005U	0.002U	0.004U
Chlorobenzene	n/a	160	0.003J	0.13	0.006U	0.075	0.006	0.006U	0.029	0.006U	0.14
Chrysene	n/a	24	0.4J	0.39J	0.072J	0.46U	0.56	0.43U	0.15J	0.4U	0.42U
cis-1,2-Dichloroethene	n/a	59	0.006U	0.03U	0.006U	0.006U	0.008U	0.006U	0.008U	0.001	0.006U
Dibenz(a,h)anthracene	n/a	0.061	0.092J	0.094J	0.4U	0.46U	0.11J	0.043J	0.47U	0.4U	0.42U

TABLE 2.3.1-1 (CONT.)

WASTE CHARACTERIZATION DATA FOR PRS 0-030(h)

ANALYTE	UTL	SAL	0100-96-0401	0100-96-0402	0100-96-0404	0100-96-0405	0100-96-0406	0100-96-0409	0100-96-0410	0100-96-0415	0100-96-0416
Ethylbenzene	n/a	690	0.006U	0.03U	0.006U	0.006U	0.008	0.006U	0.008U	0.006U	0.006U
Fluoranthene	n/a	2 600	0.89	1	0.13J	0.46U	1.3	0.43U	0.26J	0.4U	0.42U
Fluorene	n/a	300	0.059	0.46U	0.4U	0.46U	0.12	0.43U	0.47	0.4U	0.42U
Indeno(1,2,3-cd)pyrene	n/a	0.61	0.28J	0.19J	0.048J	0.46U	0.25J	0.066J	0.1U	0.4U	0.42U
Isopropylbenzene	n/a	49	0.006U	0.03U	0.006U	0.006U	0.016	0.006U	0.008U	0.006U	0.006U
N-Propylbenzene	n/a	n/a	0.006U	0.01	0.006U	0.006U	0.031	0.006U	0.008U	0.006U	0.006U
Naphthalene	n/a	800	0.41U	0.089J	0.4U	0.46U	4.9	0.43U	0.073J	0.4U	0.42U
p-Isopropyltoluene	n/a	n/a	0.006U	0.012J	0.006U	0.006U	0.041	0.006U	0.008U	0.006U	0.006U
Phenanthrene	n/a	n/a	0.59	0.79	0.081J	0.46U	0.79	0.43U	0.14J	0.4U	0.42U
Pyrene	n/a	2 000	0.71	0.84	0.11J	0.46U	0.91	0.43U	0.22J	0.4U	0.42U
Sec-Butylbenzene	n/a	n/a	0.006U	0.027J	0.006U	0.006U	0.03	0.006U	0.003J	0.006U	0.006U
Tert-Butylbenzene	n/a	130	0.006U	0.03U	0.006U	0.006U	0.002	0.006U	0.008U	0.006U	0.006U
Toluene	n/a	1 900	0.006U	0.03U	0.002J	0.006U	0.009	0.003J	0.008U	0.005J	0.006U
Trichloroethene	n/a	7.1	0.005J	0.03U	0.006	0.004J	0.008U	0.003J	0.008U	0.002J	0.004J
Xylene (total)	n/a	990	0.006U	0.03U	0.003J	0.006U	0.027	0.001J	0.008U	0.006J	0.006U

[A] (R) = Rejected data. See Appendix A for details.
[b] n/a = Not available.
[c] (J-) = Estimated value, probably biased low.
[d] U = Not detected.
[e] (J+) = Estimated value, probably biased high.
[f] J = Estimated value.

3.0 PRS 0-030(i)

3.1 Site Characterization

Site Survey Results

The septic tank at PRS 0-030(i) (Fig. 3.1-1) is located on Department of Energy (DOE) property south of Trinity Drive and east of 35th Street (The Zia Company 1947, 05-0172; The Zia Company 1947, 05-0171; LANL 1990, 0145). Engineering drawings illustrating the facilities connected to this septic tank are not available; however, the septic tank is believed to have served the west (WAC) mess hall, dormitories, barracks, military post office, officer's lounge, post exchange, and the Sundt Apartments along Finch Street and south of Trinity Drive (LANL 1992, 0781).

The septic tank is not visible in aerial photos taken in the late 1940s and early 1950s. However, during the initial field reconnaissance survey, the tank was located intact with the top in place. The tank was approximately 15 ft long x 8 ft wide, with three manhole covers. The VCP outfall drain line and the VCP inlet drain line were also located. The outfall drain line entered a drainage channel approximately 100 ft southwest of the septic tank.

Geodetic Surveys

The location of the septic tank (4 corners), inlet and outfall drain lines, associated sample locations, and verification sample locations were surveyed following the completion of sampling and tank removal activities. Geodetic survey data was transferred to FIMAD for incorporation into the ER database.

Geophysical Surveys

Geophysical surveys were not conducted at this site because the tank and its associated piping were located during the initial reconnaissance survey.

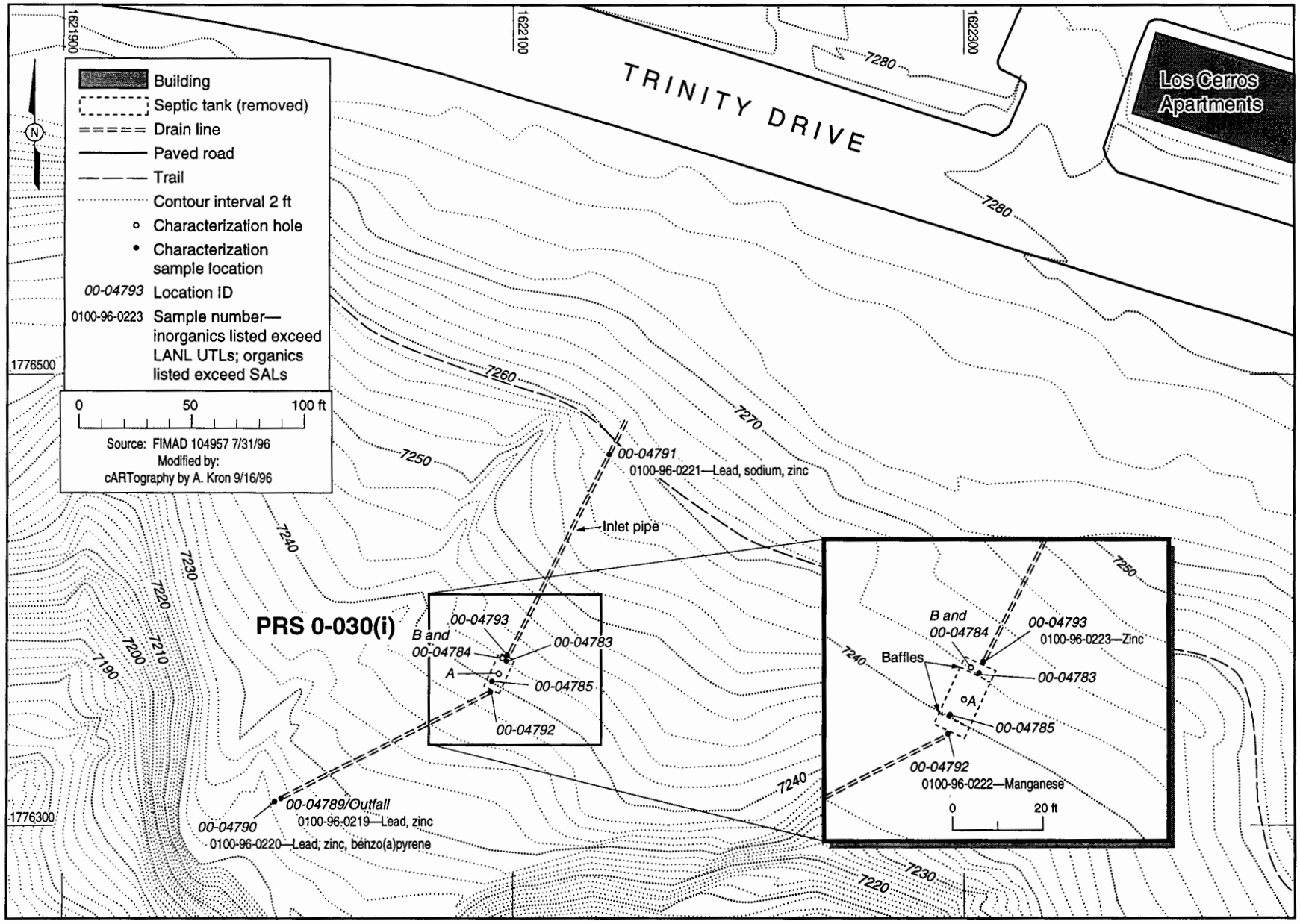

Fig. 3.1-1. Characterization sample locations showing inorganic and radiological analytes above background screening values and organic chemicals above SAL for PRS 0-030(i).

Septic Tank Investigation and Sampling

On April 11, 1996, PRS 0-030(i) precharacterization activities included removing three concrete manhole covers, probing the tank depth at each manhole, and measuring the tank dimensions (16 ft 4 in. x 7 ft 6 in. x 8 ft). The long axis of the tank was oriented in a north-south direction. Tuff boulders, oil filters, stained soil, and backfill material were found inside the tank. The tank was not completely backfilled. It was open from the top surface of the tank to approximately 2 ft below the top of the tank. After removal of the concrete top with a backhoe, two baffles were observed inside the tank. One vertical baffle, assumed to be a splash baffle for septic fluids entering the tank, was located approximately 1.5 ft south of the septic tank's north wall. The second baffle was oriented at a 45° angle near the tank outlet drain line, and is assumed to have prevented sludge from flowing down the outlet drain line. The inlet drain line was 6-in.-diameter VCP and entered the center of the north end of the tank. The outlet drain line was a 6-in.-diameter VCP and exited the center of the south end of the tank.

Two soil characterization holes were hand-augered into the septic tank to determine the best locations to collect samples for characterization. One was augered through the middle manhole (hole A) and the second hole was augered through the north manhole near the inlet pipe (hole B). Information from the soil characterization holes showed that the tank contained two distinct soil horizons: the upper 24–55 in. was a moist, medium- to coarse-grained, sandy silt; and the lower 55–96 in. (tank bottom) was a saturated, medium- to coarse-grained sand with silt and traces of clay. All depth measurements were made from the top of the tank. During characterization of hole B, a strong oil odor was encountered in a 2- to 3-in. layer of yellowish-white, fibrous, clay-like material at a depth from 70–84 in. Field screening for organics indicated a reading of 20 ppmv with a PID. The clay-like material in this characterization hole was sampled (sample 0100-96-0204) because it was not observed in the first characterization hole and it appeared to be an anomalous material.

It was determined that a minimum of two samples would be collected from each auger hole. The first sample would be collected from the upper zone of moist soil and the second sample would be collected from the saturated zone near the tank bottom. Sample locations were chosen inside the septic tank from within the splash baffle zone, near the inlet pipe and the angled exit baffle in the main tank.

A hand-auger hole was completed within the first splash baffle near the inlet drain line (FIMAD Location ID 00-04783), and approximately 2 ft east of characterization hole B in order to collect samples from the upper and lower backfilled areas of the tank. Sample 0100-96-0201 was collected from 39–57 in. (in the saturation transition zone) and sample 0100-96-0202 was collected from 84–96 in. (bottom of tank). The yellowish-white, clay-like material encountered in characterization hole B was not encountered in this hole. Another hand-auger hole was placed just north of the angled exit baffle in the main tank compartment (FIMAD Location ID 00-04785). Sample 0100-96-0207 was collected from 32–37 in. (upper moist soil), sample 0100-96-0208 was collected from 40–48 in. (in the saturation transition zone), and sample 0100-96-0209 was collected from 84–96 in. (bottom of tank). All sampling locations are summarized in Table 3.1-1.

In order to determine if a release occurred from the drain line connections with the tank, samples were collected beneath the VCP inlet and outlet drain lines. A backhoe was used to uncover the inlet and outfall VCP drain lines and samples were collected using the spade and scoop method. Sample 0100-96-0223 was collected outside the septic tank beneath the VCP inlet line at an approximate depth of 20 in. bgs (FIMAD Location ID 00-04793). Sample 0100-96-0222 was collected outside the tank at the VCP outlet connection at 22 in. bgs (FIMAD Location ID 00-04792).

To investigate the outfall area, two samples were collected below the mouth of the pipe. Sample 0100-96-0219 was collected at the mouth of the VCP outfall pipe from 4–7 in. bgs (FIMAD Location ID 00-04789) and sample 0100-96-0220 was collected approximately 6 ft downgradient in the drainage path cut bank at 10–15 in. bgs (FIMAD Location ID 00-4790).

In addition, sample 0100-96-0221 (FIMAD Location ID 00-04791) was collected approximately 100 ft north of the septic tank, beneath a break in the inlet line along a former patrol road. The sample was collected to determine if any contamination was present in the inlet pipe where it was exposed adjacent to the former patrol road and current hiking trail.

After completion of precharacterization sampling activities, the tank was covered and stormwater control measures were implemented. On April 12, 1996, the soil areas disturbed by the backhoe were raked and contoured to the surrounding terrain. All concrete debris from the tank top was temporarily stored on-site and the septic tank was covered with 0.75 in. plywood pending analytical results. As recommended by LANL's water quality and hydrology group, a straw bale diversion dam was placed uphill from the septic tank to divert any potential stormwater run-on around the excavation.

TABLE 3.1-1

SUMMARY OF PRECHARACTERIZATION SAMPLES COLLECTED AT PRS 0-030(i)

SAMPLE INFORMATION				REQUEST NUMBERS						
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (in.)	MRAL	MCAL	VOCs	SVOCs	PEST/ PCBs	INORGANICS	RAD
0100-96-0201	00-04783	Inside tank near inlet pipe	39 - 57	XXXX[A]	1957	1958	1958	1958	1959	1960
0100-96-0202	00-04783	Inside tank near inlet pipe	69 - 84	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0204	00-04784	Inside tank near inlet pipe (clay layer)	70 - 84	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0207	00-04785	Inside tank near outlet	32 - 37	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0208	00-04785	Inside tank near outlet	40 - 48	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0209	00-04785	Inside tank near outlet	84 - 96	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0219	00-04789	Adjacent to outfall pipe	4 - 7	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0220	00-04790	Downslope from the outfall pipe	10 - 15	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0221	00-04791	North of septic tank where inlet pipe exposed	0 - 3	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0222	00-04792	Outside and adjacent to tank under outlet drainline	20 - 22	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0223	00-04793	Outside and adjacent to tank under inlet pipe	22 - 24	XXXX	1957	1958	1958	1958	1959	1960

[a] Request number not available.

Deviations from the VCA Plan for Precharacterization Activities

All work was conducted in accordance with the VCA plan (LANL 1996, 05-0239). However, the following deviations occurred during precharacterization activities.

- Soil samples were not submitted to the MCAL for metals screening by XRF because it was determined that the screening data would not have been useful for making field decisions. Instead, seven-day turnaround times for analytical results were requested from a fixed laboratory.
- One sample was collected approximately 200 ft north of the septic tank location where the inlet VCP was exposed before crossing beneath a former patrol road (currently used as a hiking trail).
- The inlet VCP was cut back and plugged with cement near the hiking trail so that it was no longer accessible or visible.

Sampling Methodology

Samples from inside the tank were collected with a stainless steel hand-auger and samples from beneath the inlet and outlet drain lines and the outfall area were collected using the spade and scoop method. After a sample was collected, it was screened with hand-held instruments to detect gross radiological and chemical contamination (see the following section for additional details). Immediately after screening, the VOC sample was collected. The remaining sample material was homogenized and placed into appropriate sample containers for additional analyses.

All sample containers were appropriately labeled and assigned LANL sample identification numbers with bar codes. The samples were documented on sample collection logs, placed in coolers with ice, and transported to the MCAL, the MRAL, and the SMO under chain-of-custody. All sampling was conducted in accordance with LANL ER Project procedures.

On April 12, 1996, all samples were submitted to the MCAL and MRAL for screening analyses, including VOCs, gross alpha/beta/gamma, tritium, and moisture content.

Samples were also submitted to the SMO for off-site, fixed-laboratory analyses. All samples collected inside the tank for waste characterization were analyzed for SVOCs by EPA SW-846 Method 8270, PCBs/pesticides by EPA SW-846 Method 8080, and TCLP metals. Two of these samples were also analyzed for VOCs by EPA SW-846 8260, total uranium, plutonium-238 and plutonium-239/240 by alpha spectrometry, and americium-241 by gamma spectrometry. All

As a best management practice for stormwater control, the straw bale diversion dam was moved downhill of the septic tank to act as a sediment collection dam during removal activities.

On June 11, 1996, after removal of the septic tank and collection of verification samples, the excavation was backfilled and compacted to LANL-required specifications with soil bermed around the original tank excavation. An additional 15 yds^3 of clean backfill was brought in to complete backfilling the excavation and to aid in recontouring the hillside to the original grade. After completion of backfilling and contouring activities, jute matting was placed over all disturbed soils at the former septic tank location. A mulch consisting of shredded trees and manure (from the Los Alamos County landfill) was spread over the jute mat, the temporary access road, and the staging area. The jute matting and mulch were used to assist in erosion control and revegetation of the natural ground cover. A straw bale diversion dam was placed above the area covered with jute matting and mulch to divert any storm water run-on around the disturbed soils. The straw bale sediment collection dam was left in place beneath the disturbed area.

A monthly stormwater inspection of the area is currently being conducted and documented. Upon completion of the summer rainy season in September and October 1996, a site closure tour will be requested with LANL's Water Quality and Hydrology group. Upon concurrence from this group, the straw bales will be removed or broken open in place (dependent on condition of bales at time of closure).

The remedial activities for this site were conducted in accordance with the VCA plan (LANL 1996, 05-0239).

3.2.3 Confirmatory Sampling for PRS 0-030(i)

Upon completion of the septic tank removal, two verification samples (Fig. 3.2.2-1) were collected from the bottom of the excavation (under the former tank) with the trackhoe bucket. Sample 0100-96-0229 (FIMAD Location ID 00-04817) was collected from beneath the southern half of the tank footprint at approximately 9 ft bgs. Sample 0100-96-0230 (FIMAD Location ID 00-04818) was collected from beneath the northern half of the tank footprint at approximately 9 ft bgs.

Five precharacterization samples collected from locations in which the soil was not removed during the VCA (three in the soil adjacent to the septic tank and two at the outfall), along with the two verification samples described above, are included as confirmatory samples. A summary of confirmatory samples is presented in Table 3.2.3-1, and the locations of the confirmatory samples are shown in Fig. 3.2.2-1.

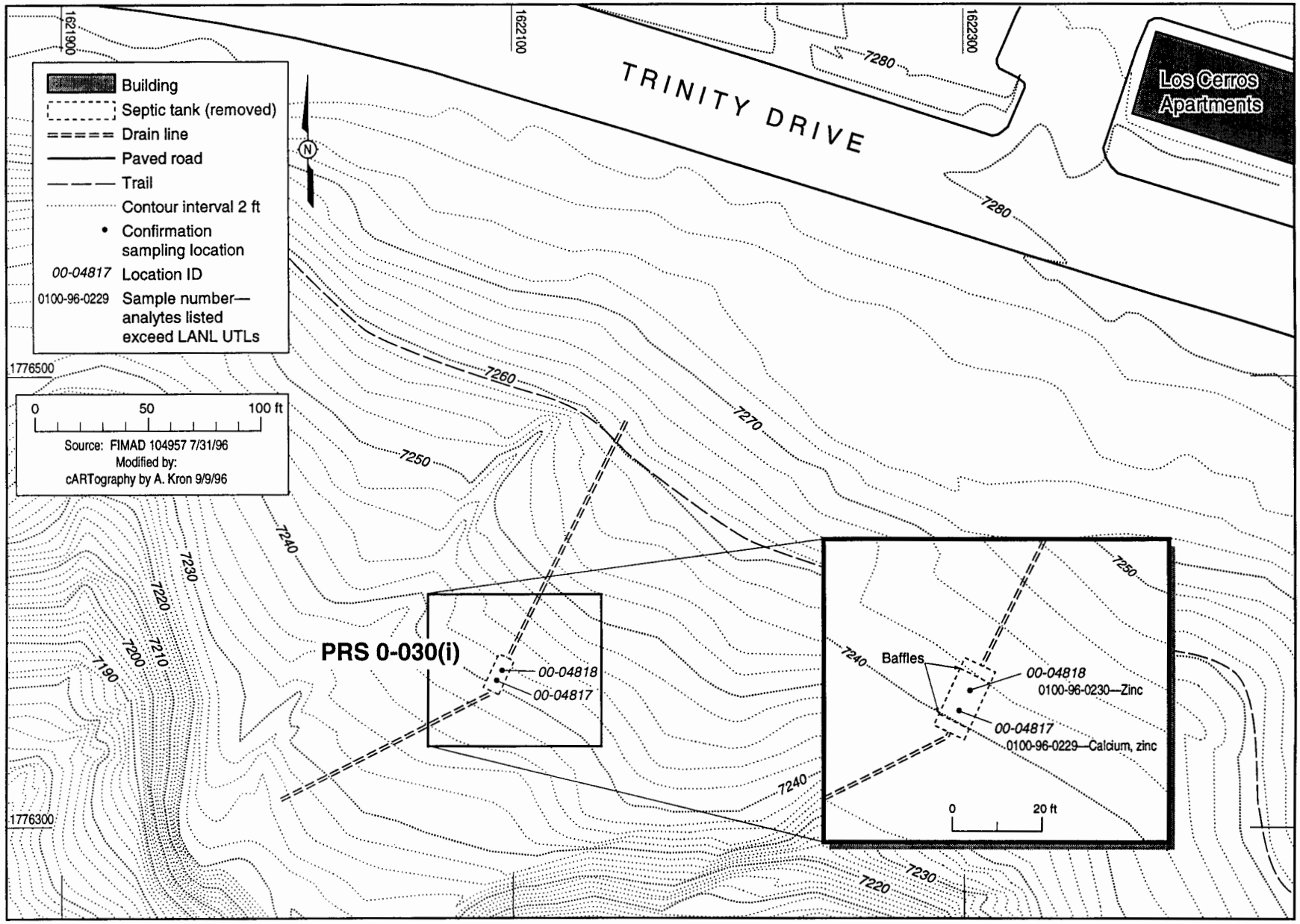

Fig. 3.2.2-1. Confirmation sampling locations for PRS 0-030(i).

samples collected outside the tank were analyzed for SVOCs, pesticides/PCBs and TAL metals. One of these samples was also analyzed for VOCs, total uranium, plutonium-238, plutonium-239/240, and americium-241.

Field Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil (including the concrete) was screened to detect organic vapor and gross radiological activity. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc., OVM Model 580B, PID with a 10.6 eV bulb, and for ionizing radiation using Ludlum Model 139 rate meters with an air proportional (alpha) probe and an Eberline (beta/gamma) probe. In addition, gamma exposure was measured using a Ludlum model 19 microR meter. The excavation and soils were screened for flammable gases using a Mine Safety Appliances Combustible Gas Indicator. All field screening instruments were calibrated and checked on a daily basis by the SSO.

Field Screening Results

All hand-auger cuttings, samples, tank contents, and the concrete tank were screened for gross alpha and beta/gamma radiological activity and organic vapors, as described above. Health and safety action levels were not exceeded during field operations. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples ranged from 0.0–20 ppmv, with the maximum reading detected in the clay-like, fibrous material in sample 0100-96-0204. Alpha and beta/gamma screening results indicated no detectable activitity. Gamma exposure results ranged from 20–22 μR/hr which is within area background levels for field screening instruments.

3.2 Remedial Activities and Results of Confirmatory Sampling

3.2.1 Risk Calculations and/or Cleanup Level Derivation

The objectives of the Phase 1 RFI investigation and VCA at PRS 0-030(i) were to determine the presence or absence of contamination associated with the septic tank and to remove any remaining structures. No cleanup levels were derived for PRS 0-030(i). Instead, confirmation samples were screened and a qualitative risk assessment was performed to verify that no chemicals remain at concentrations likely to cause adverse human health effects.

3.2.2 Remedial Implementation for PRS 0-030 (i)

Septic Tank Removal

The septic tank at PRS 0-030 (i) (Fig. 3.2.2-1) is located on Department of Energy (DOE) property south of Trinity Drive and east of 35th Street (The Zia Company 1947, 05-0172 and 05-0171; LANL 1990, 0145). Several remedial alternatives were reviewed following receipt of analytical sample results and the data assessment. The remedial option selected was removal of the tank and its contents because the tank is located on DOE property, which is expected to be part of a land transfer with Los Alamos County in the future.

On June 10, 1996, the removal of the septic tank and its contents commenced. The tank was located on the sloping northern edge of a side canyon to Los Alamos Canyon and was surrounded by Ponderosa pines and natural grasses. To mitigate damage to the natural environment, a staging area was established south of Trinity Drive with a temporary access road leading to the septic tank. A trackhoe was positioned uphill of the tank to remove the tank contents and the concrete tank. As the soil and debris were being removed, they were placed in the bucket of a front end loader, screened for organic vapors and gross alpha and beta/ gamma radiation with hand-held PID and radiation meters, and then moved to the staging area and dumped directly into a dump truck.

Approximately 20 yds^3 of soil were removed from the septic tank. Once the removal of the tank contents was complete, the trackhoe began to remove the tank walls. Removal of the tank was difficult because of the amount of rebar reinforcement and because the tank was poured in place, using the tuff as the outside wall and forms for the inside wall. This construction method caused the concrete and tuff to glue together. To facilitate removal of the tank, trenches were dug along the outside of the east and west walls into the tuff and the walls were pushed into the tank. Once the walls had been broken, screened for organic vapors and gross radiation, and removed to the staging area with the front-end loader, the trackhoe broke up the tank bottom into smaller pieces. The bottom pieces, along with any disturbed soils, were removed, screened for organic vapors and gross radiation, and placed in a dump truck at the staging area. Approximately 20 yds^3 of concrete (with a minor amount of soil) were removed from the excavation. A total of 40 yds^3 of soil and concrete debris were delivered, under manifest, to TA-54, Area J for disposal as a nonhazardous chemical waste.

TABLE 3.2.3-1

SUMMARY OF CONFIRMATORY SAMPLES COLLECTED AT PRS 0-030(i)

SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH	MRAL	MCAL	VOCs	SVOCs	PEST/ PCBs	INORGANICS	RAD
0100-96-0219	00-04789	Adjacent to outfall pipe	4 - 7 in.	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0220	00-04790	Downslope from the outfall pipe	10 - 15 in.	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0221	00-04791	North of septic tank where inlet pipe exposed	0 - 3 in.	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0222	00-04792	Outside and adjacent to tank under outlet drainline	20 - 22 in.	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0223	00-04793	Outside and adjacent to tank under inlet pipe	22 - 24 in.	XXXX	1957	1958	1958	1958	1959	1960
0100-96-0229	00-04817	Confirmation sample beneath the south half of tank after removal	8 - 8.5 ft.	2250	NR[a]	2261	2261	2261	2262	2263
0100-96-0230	00-04818	Confirmation sample beneath the north half of tank after removal	8 - 8.5 ft.	2250	NR	2261	2261	2261	2262	2263

[a] NR = Not requested

The samples were submitted to the SMO following the sampling methodology presented in Section 3.1 of this report. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, plutonium-238, plutonium-239/240, americium-241, and total uranium. Deviations from the VCA plan include not using the MCAL for screening the samples for metals by XRF and VOCs (LANL 1996, 05-0239).

3.2.3.1 Background Comparisons

Data for inorganics and radionuclides at PRS 0-30(i) were compared to background screening values presented in Statistical Comparisons to Background, Part I (Environmental Restoration Project Decision Support Council 1995, 1218). The results of the background comparison are discussed below.

3.2.3.1.1 Inorganics

Seven soil samples collected from outside the septic tank at PRS 0-030(i) were analyzed for TAL metals. Five inorganics (calcium, lead, manganese, sodium, and zinc) were detected at concentrations exceeding their respective background screening values. The concentrations for each sample that has at least one value above background screening values for these analytes are presented in Table 3.2.3-2. Calcium, lead, manganese, sodium, and zinc are carried forward to the screening assessment.

TABLE 3.2.3-2

INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(i)

SAMPLE ID	CALCIUM (mg/kg)	LEAD (mg/kg)	MANGANESE (mg/kg)	SODIUM (mg/kg)	ZINC (mg/kg)
UTL	6 120	23.3	714	915	50.8
SAL	n/a[a]	400	n/a	n/a	23 000
0100-96-0219	1 280	71.2	239 (J+)[b]	619	63.7
0100-96-0220	1 740	62.5	166 (J+)	806	68
0100-96-0221	2 170	57.5	366 (J+)	1 180	64.5
0100-96-0222	2 930	15.3	778 (J+)	310	46.7
0100-96-0223	3 090	22	107 (J+)	276	56.8
0100-96-0229	7 340[c]	9.1[c]	368[c]	372[c]	73.3[c]
0100-96-0230	5 190	13.5	199	388	102

[a] n/a = Not available.
[b] (J+) = Estimated quantity, possibly biased high.
[c] Value represents the maximum of a sample concentration and its laboratory duplicate.

3.2.3.1.2 Radionuclides

Seven soil samples collected outside of the tank at PRS 0-030(i) were analyzed by gamma spectroscopy. These seven samples were also analyzed for isotopic plutonium and total uranium.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

- Sixteen short-lived activation/fission products reported at PRS 0-030(i) (barium-140, cadmium-109, cerium-139, cesium-134, cobalt-57, europium-152, lanthanium-140, manganese-54, mercury-203, ruthenium-106, selenium-75, sodium-22, strontium-85, tin-113, yttrium-88, and zinc-65) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to be present at this PRS, these short-lived activation/fission products are eliminated as potential radionuclide contaminants.

- Potassium-40 is a naturally occurring radionuclide that is also routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995, 1142; Longmire et al. 1995, 1266). Potassium-40 will not be considered a potential radionuclide contaminant at this site.

- Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants. QA/QC activities review daughter radionuclides for consistency with parent activities, and any that cannot be attributed to background concentrations of the parent are retained as potential contaminants.

EQLs and minimum detectable activities are often not available for radionuclides analyzed by gamma spectroscopy. A value of three times the measurement uncertainty (3 sigma or 3 standard deviations) is used to calculate a sample-specific minimum detectable activity, which is then used in the same manner as a detection limit. This methodology is similar to Currie's method of determining radionuclide maximum detectable activity (Currie 1988, 0792). This 3 sigma screening value takes into account variability caused by counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative, and may include radionuclides whose presence is spuriously reported because of spectral interferences or misidentifications. Americium-241, cobalt-60, neptunium-237, and uranium-235 were eliminated from further consideration based on this criterion.

Of the remaining four radionuclides reported for PRS 0-030(i), cesium-137, plutonium-238, plutonium-239/240, and total uranium were eliminated from further consideration based on background screening value criteria. Therefore, no radionuclides are carried forward to the screening assessment.

3.2.3.2 Evaluation of Organic Chemicals

Seven soil samples collected from outside the tank at PRS 0-030(i) were analyzed for SVOCs, PCBs, and pesticides. Three of these samples were also analyzed for VOCs. Twenty-eight organic chemicals were detected at PRS 0-030(i). The concentrations for each sample that had at least one detected value for these twenty-eight chemicals are presented in Table 3.2.3-3. These twenty-eight chemicals are carried forward to the screening assessment.

TABLE 3.2.3-3

ORGANICS WITH DETECTED CONCENTRATIONS AT PRS 0-030(i)

ANALYTE (mg/kg)	SAL	0100-96-0219	0100-96-0220	0100-96-0221	0100-96-0222	0100-96-0223	0100-96-0229	0100-96-0230
2-Butanone	8 700	0.022(UJ)[a]	NA[b]	NA	NA	NA	0.004	0.021 (U)[c]
2-Methylnaphthalene	n/a[d]	0.36 (U)	0.36 (U)	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.085
4,4'-DDD	1.9	0.004 (U)	0.004 (U)	0.004 (U)	0.014	0.003 (U)	0.011	0.018(J-)[e]
4,4'-DDE	1.3	0.004 (U)	0.004(U)	0.004 (U)	0.012	0.003 (U)	0.004(U)	0.005(J-)
4,4'-DDT	1.3	0.004 (U)	0.004 (U)	0.004 (U)	0.004 (U)	0.003 (U)	0.004 (U)	0.035(J-)
1,4-Dichlorobenzene	7.4	0.006 (U)	0.36 (U)	0.41 (U)	0.35 (U)	0.34 (U)	0.052	0.028
1,1,1-Trichloroethane	3 000	0.008(J+)[f]	NA	NA	NA	NA	0.005 (U)	0.005 (U)
1,2,4-Trimethylbenzene	8	0.006 (U)	NA	NA	NA	NA	0.005 (U)	0.034
1,3,5-Trimethylbenzene	6.4	0.006(UJ)	NA	NA	NA	NA	0.005 (U)	0.01
Benzo(a)anthracene	0.61	0.36 (U)	0.088	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.48
Benzo(a)pyrene	0.061	0.048	0.096	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Benzo(b)fluoranthene	0.61	0.045	0.092	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.13
Benzo(g,h,i)perylene	n/a	0.049	0.11	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Benzo(k)fluoranthene	6.1	0.039	0.092	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Bis(2-ethylhexyl)phthalate	32	0.36 (U)	0.28	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.46
Butylbenzylphthalate	13 000	0.36 (U)	0.36 (U)	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.53
Chrysene	24	0.05	0.12	0.048	0.35 (U)	0.34 (U)	0.35 (U)	0.41
Di-n-octyl phthalate	1 300	0.36 (U)	0.36 (U)	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.091
Dibenz(a,h) anthracene	0.061	0.36 (U)	0.042	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Endrin aldehyde	n/a	0.004(U)	0.006	0.004	0.004 (U)	0.003 (U)	0.004 (U)	0.004 (U)
Fluoranthene	2 600	0.072	0.18	0.086	0.35 (U)	0.34 (U)	0.35 (U)	0.12
Indeno(1,2,3-cd)pyrene	0.61	0.36 (U)	0.086	0.41 (U)	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Methoxychlor	330	0.018 (U)	0.019 (U)	0.03	0.017 (U)	0.017 (U)	0.018 (U)	0.018 (U)
Methylene Chloride	11	0.013(UJ)	NA	NA	NA	NA	0.003	0.003
p-Isopropyltoluene	n/a	0.006(UJ)	NA	NA	NA	NA	0.005 (U)	0.019
Phenanthrene	n/a	0.052	0.14	0.069	0.35 (U)	0.34 (U)	0.35 (U)	0.35 (U)
Pyrene	2 000	0.09	0.21	0.083	0.35 (U)	0.34 (U)	0.35 (U)	0.5
Toluene	1 900	0.006(UJ)	NA	NA	NA	NA	0.005 (U)	0.002

[a] (UJ) = Estimated undetected value.
[b] NA = Not analyzed.
[c] (U) = Not detected.
[d] n/a = Not available.
[e] (J-) = Estimated value, probably biased low.
[f] (J+) = Estimated value, probably biased high.

3.2.4 Screening and Assessment

The purpose of this section is to assess the potential for adverse human health effects resulting from exposure to any residual contamination associated with the septic tank PRS 0-030(i). A screening assessment and qualitative risk assessment were conducted on the data for samples that remain at PRS 0-030(i) following methodology presented in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277). Only data from samples sent to a fixed laboratory were included in the screening and assessment.

3.2.4.1 Human Health Screening Assessment

COPCs detected at concentrations greater than background screening values, lacking background data for comparison, or detected at concentrations exceeding EQLs were carried forward to the screening assessment. Five inorganic chemicals and twenty-eight organic chemicals were carried forward from the background comparison and the organic chemical evaluation of confirmatory samples. The screening assessment includes a comparison to SALs and an MCE as described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277).

Equal to or Greater than SAL. One chemical, benzo(a)pyrene was detected at a concentration (0.96 mg/kg) exceeding its SAL of 0.061 mg/kg. This chemical will be further evaluated in the qualitative risk assessment.

No SAL. Seven chemicals with no SAL for comparison were detected in confirmatory samples from soil at PRS 0-030(i). Detected concentrations for calcium, sodium, benzo(g,h,i)perylene, 2-methylnaphthalene, phenanthrene, manganese, and p-isopropyltoluene are shown in Tables 3.2.3-2 and 3.2.3-3.

Calcium and sodium are essential nutrients that can be eliminated as COPCs on the basis of best professional judgment (EPA 1989, 0305). Although calcium has no SAL, as an essential nutrient it may be compared to the recommended daily allowance (RDA) for children and adults. The RDA for calcium is 800 mg/day for a child and 1 200 mg/day for an adult. The highest detected concentration of calcium at PRS 0-030(i) was 7 340 mg/kg. At the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 1.5 mg of calcium. An adult, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 0.7 mg of calcium. Because both amounts are considerably less than the RDAs for adult and child, calcium is eliminated as a COPC. Estimated minimum daily requirements for sodium are based on estimates of what is needed for growth and for replacement of obligatory losses. Estimated minimum requirements are 300 mg/day for children aged 2 to 5 years, and 500 mg/day for adults. The highest detected concentration of sodium at PRS 0-030(i) was 1 180 mg/kg. At the

EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 1 mg of sodium. An adult, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 0.5 mg of sodium. Because both amounts are considerably less than the estimated minimum requirements for adult and child, sodium is eliminated as a COPC.

TABLE 3.2.4-1

MULTIPLE CHEMICAL EVALUATION FOR PRS 0-030(i)

ANALYTE	LOCATION ID	SAMPLE NUMBER	MAXIMUM CONCENTRATION	SAL	NORMALIZED VALUE
Carcinogens	n/a[a]	n/a	(mg/kg)	(mg/kg)	n/a
1,4-Dichlorobenzene	00-04817	0100-96-0229	0.052	7.4	0.007
4,4'-DDD	00-04818	0100-96-0230	0.018	1.9	0.009
4,4'-DDE	00-04792	0100-96-0222	0.012	1.3	0.009
4,4'-DDT	00-04818	0100-96-0230	0.035	1.3	0.03
Benzo(a)anthracene	00-04818	0100-96-0230	0.48	0.61	0.8
Benzo(b)fluoranthene	00-04818	0100-96-0230	0.13	0.61	0.2
Benzo(k)fluoranthene	00-04790	0100-96-0220	0.092	6.1	0.02
Bis(2-ethylhexyl)phthalate	00-04818	0100-96-0230	0.46	32	0.01
Chrysene	00-04818	0100-96-0230	0.41	24	0.02
Dibenzo(a,h)anthracene	00-04790	0100-96-0220	0.042	0.061	0.7
Indeno(1,2,3-cd)pyrene	00-04790	0100-96-0220	0.086	0.61	0.1
Methylene chloride	00-04818	0100-96-0230	0.003	11	0.003
			Normalized Sum		1.9
Noncarcinogens	n/a	n/a	(mg/kg)	(mg/kg)	n/a
1,1,1-Trichloroethane	00-04789	0100-96-0219	0.008	3000	3.00E-06
1,2,4-Trimethylbenzene	00-04818	0100-96-0230	0.034	8	0.004
1,3,5-Trimethylbenzene	00-04818	0100-96-0230	0.01	6.4	0.002
2-Butanone	00-04817	0100-96-0229	0.004	8700	5.00E-07
Butylbenzylphthalate	00-04818	0100-96-0230	0.53	13000	0.00004
Di-n-octyl phthalate	00-04818	0100-96-0230	0.091	1300	0.00007
Endrin aldehyde	00-04790	0100-96-0220	0.006	20	0.0003
Fluoranthene	00-04790	0100-96-0220	0.18	2600	6.92E-05
Lead	00-04789	0100-96-0219	71.2	400	0.2
Methoxychlor	00-04791	0100-96-0221	0.03	330	0.00009
Pyrene	00-04818	0100-96-0230	0.5	2000	0.00004
Toluene	00-04818	0100-96-0230	0.002	1900	1.00E-06
Zinc	00-04818	0100-96-0230	102	23000	0.004
			Normalized Sum		0.2

[a] n/a = Not applicable.

Manganese has been shown to be an essential element in every animal species studied. In humans, toxicity has been observed only in workers exposed to high concentrations of manganese dust or fumes in air, but not as a consequence of dietary intake by people consuming 8 to 9 mg of manganese per day in their food. The recommended range of manganese intake is 2 to 5 mg/day for adults (National Research Council 1989, 1251). The highest detected concentration of manganese in PRS 0-030(i) confirmation samples was 778 mg/kg. At the EPA default adult soil ingestion rate of 100 mg/day, an adult would ingest about 0.1 mg of manganese per day. Because this amount is considerably less than the recommended intake range for adults, manganese is eliminated as a COPC.

The aromatic hydrocarbon p-isopropyltoluene is similar in structure to cumene, toluene, and xylene. Although it does not have a SAL for comparison, if the most stringent SAL of similarly structured chemicals is used as a surrogate SAL (SAL for cumene is 49 mg/kg), the normalized value for the single detected concentration of p-isopropyltoluene (0.019 mg/kg) would be 0.0004. This value would not change the MCE results; therefore, p-isopropyltoluene is eliminated as a COPC.

Less than SAL. Twenty-five chemicals were detected at concentrations below their respective SALs. As described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277), analytes are divided into three classes (carcinogens, noncarcinogens, and radionuclides) to evaluate possible additive effects within each class of chemicals. In this case, no radionuclides were detected. The MCE for confirmatory samples in soil at PRS 0-030(i) is presented in Table 3.3.4-1.

The normalized sum for carcinogens is 1.9. The COPCs contributing 0.1 or more to the normalized sum are four PAHs [benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene]. These four PAHs will be retained as COPCs for further evaluation in the qualitative risk assessment.

The normalized sum for noncarcinogens is less than unity at 0.2, indicating that potential adverse human health effects are unlikely. All noncarcinogens with detected concentrations less than their respective SALs are therefore eliminated as COPCs.

3.2.4.2 Qualitative Human Health Risk Assessment

Eight PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, phenanthrene, and benzo(g,h,i)perylene] were identified as COPCs in the screening assessment of confirmatory sample results. The detected concentrations of the PAHs (all less than 1 mg/kg) are consistent with PAH concentrations (generally less than 2 mg/kg) detected near parking lots and asphalt

paved industrial sites within the townsite and LANL (LANL 1995, 09-0520; LANL 1996, 09-0524; LANL 1996, 09-0526). Based on process knowledge, it is not likely the PAHs are present as a result of laboratory processes at PRS 0-030(i). The tank is located in an area that receives runoff and subsequent infiltration from a nearby asphalt-paved road. It is likely that the PAHs are a result of runoff from this road, and possible that the PAH concentrations are from a discrete source such as a piece of asphalt rubble, oil filter, or charred wood. For these reasons, PAHs are eliminated as COPCs at PRS 0-030(i).

3.2.5 Conclusions and Recommendations

Because adverse human health effects are not expected from exposure to the concentrations of chemicals that remain at the former location of the septic tank system, and the source of PAHs at concentrations above SAL is not likely related to use of the septic tank, no further action is recommended for PRS 0-030(i).

3.3 Waste Management for PRS 0-030(i)

All work was conducted in accordance with the VCA plan and the waste characterization strategy form (LANL 1996, 05-0239). However, the following deviation occurred during precharacterization and VCA activities:

- The PPE and sampling debris generated during precharacterization activities was not shipped under manifest to TA-3, SM-271 upon generation, because it was determined to be sanitary waste. It was stored in the equipment trailer in a 55-gal. drum as sanitary waste and will be disposed at the Los Alamos County Landfill.

During the precharacterization sampling and removal of the septic tank, less waste was generated than originally estimated. The tank and its contents were classified as nonhazardous chemical waste because the presence of 1,4-dichlorobenzene (140 ppm) in one sample from inside the septic tank does not exceed the 20 times TCLP rule (40 CFR Part 261.24). The sampling waste and PPE were classified as sanitary waste and will be disposed at the Los Alamos County Landfill. The decontamination water generated during sampling activities was discharged onsite according to the site-specific Spill Prevention, Control and Countermeasures Plan (LANL 1996, 05-0240). During field operations, it was determined that a final decontamination rinse with methanol and deionized water was not required. A comparison between the actual amount of waste generated and the amount of waste projected in the VCA plan is presented in Table 3.3-1.

TABLE 3.3-1

SUMMARY OF PROJECTED WASTE VOLUMES AND GENERATED WASTE VOLUMES

WASTE ITEM	WASTE TYPE	PROJECTED VOLUME	GENERATED VOLUME
sampling waste/PPE	sanitary waste	1 ft^3	0.50 ft^3
tank contents, soil and concrete	nonhazardous chemical	4 to 90 yds^3	40 yds^3
decon wash water	liquid nonhazardous	20 gal.	4.75 gal.
decon final rinse with water/methanol	liquid nonhazardous	10 gal.	none

Six soil samples were collected from the tank contents to characterize the potential waste from inside the septic tank. The samples were collected from three different levels within the tank: the top zone where the soil was moist, the bottom zone where the soil was saturated, and the isolated clay-like material which was only observed in characterization hole B, north of the splash baffle near the inlet line. These samples were analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, plutonium-238, plutonium-239/240, americium-241, and total uranium as described in the VCA plan (LANL 1996, 05-0239). In addition, these samples were screened in the MCAL and the MRAL.

The tank contents and concrete were classified as nonhazardous chemical waste as described above. The waste was tranported to TA-54, Area J and disposed in the landfill as soon as the tank contents and the tank were removed from the excavation. Currently, the PPE/sampling debris is being stored as a sanitary waste and will be disposed at the Los Alamos County Landfill as soon as a waste profile form has been approved.

In order to minimize waste, a dry decontamination step was implemented to remove excess soil from sampling equipment. This additional decontamination step reduced the amount of decontamination water generated during the precharacterization and VCA activities.

TABLE 3.3.1-1

WASTE CHARACTERIZATION DATA FOR PRS 0-030(i)

	UTL	SAL	0100-96-0201	0100-96-0202	0100-96-0204	0100-96-0207	0100-96-0208	0100-96-0209
Inorganics								
Aluminium	38 700	77 000	1 960	2 150	1 060	3 160	3 030	2 620
Antimony	1	31	6.5 (U)[a]	6.7 (U)	9.1 (U)	5.9 (U)	6 (U)	6.7 (U)
Arsenic	7.82	n/a[b]	0.7438	1.1	1	1.1	0.93	0.92
Barium	315	5 300	23.4	17.2	28.9	29	34.9	18.8
Beryllium	1.95	n/a	0.52 (U)	0.53 (U)	0.73 (U)	0.58	0.49	0.54 (U)
Cadmium	2.7	38	0.65 (U)	0.67 (U)	0.91 (U)	0.59 (U)	0.6 (U)	0.67 (U)
Calcium	6 120	n/a	828	603	7780	813	1010	958
Chromium	19.3	211	1.4	1.9	2.4	3.1	4.6	2
Cobalt	19.2	4 600	1.3 (U)	1.3 (U)	1.8 (U)	1.2 (U)	1.2	1.3 (U)
Copper	15.5	2 800	4.4	2.9	19.2	3.1	3.4	2.8
Iron	21 300	n/a	3190	4150	1690	6820	7620	4800
Lead	23.3	400	12.9632	13.7	35.9	32.7	13.7	10.2
Magnesium	4 610	n/a	275	282	187	397	398	352
Manganese	714	n/a	51.3 (J+)[c]	56.1 (J+)	72.1 (J+)	121 (J+)	213 (J+)	89.3 (J+)
Mercury	0.1	23	0.0614 (U)	0.06 (U)	0.22	0.05	0.06 (U)	0.06 (U)
Nickel	15.2	1 500	2.4	2.5	2.8	3.2	4.5	2.8
Potassium	3 410	n/a	303 (U)	297	180	430	393	369
Selenium	1.7	380	0.33 (U)	0.33 (U)	0.44 (U)	0.3 (U)	0.3 (U)	0.32 (U)
Silver	n/a	380	0.65 (U)	0.67 (U)	0.91	0.59 (U)	0	0.67 (U)
Sodium	915	n/a	322.8259	355	427	294	323	370
Thallium	1	5.4	0.26 (U)	0.26 (U)	0.35 (U)	0.24 (U)	0.24 (U)	0.26 (U)
Vanadium	41.9	540	4.8	3.8	3.4	5.1	8.3	3.6
Zinc	50.8	23 000	81.7	58.5	266	46.9	68.9	61.3

TABLE 3.3.1-1

WASTE CHARACTERIZATION DATA FOR PRS 0-030(i)

	UTL	SAL	0100-96-0201	0100-96-0202	0100-96-0204	0100-96-0207	0100-96-0208	0100-96-0209
Radionuclides								
Americium-241	0.336	22	0.133	0.014	NA [d]	NA	NA	NA
Cesium-137	1.4	5.1	0.069	0.025	NA	NA	NA	NA
Cobalt-60	n/a	1.1	-0.005	0.002	NA	NA	NA	NA
Neptunium-237	n/a	1.9	0.032	0.001	NA	NA	NA	NA
Plutonium-238	0.104	27	0	0.007	NA	NA	NA	NA
Plutonium-239/240	0.092	24	0.028	0	NA	NA	NA	NA
Uranium	5.45	230	2.16	1.81	NA	NA	NA	NA
Organics								
1,1,1-Trichloroethane	n/a	3000	0.006 (U)	0.008 (U)	NA	NA	NA	NA
1,2,4-Trimethylbenzene	n/a	8	0.006 (U)	0.088	NA	NA	NA	NA
1,3,5-Trimethylbenzene	n/a	6.4	0.006 (U)	0.033	NA	NA	NA	NA
1,4-Dichlorobenzene	n/a	7.4	0.006 (U)	0.16	140	0.068	0.42 (U)	0.43 (U)
2-Butanone	n/a	8700	0.024 (U)	0.03 (U)	NA	NA	NA	NA
2-Methylnaphthalene	n/a	n/a	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.047
4,4'-DDD	n/a	1.9	0.0088	0.034	0.13	0.004 (U)	0.0041 (U)	0.12
4,4'-DDE	n/a	1.3	0.0042 (U)	0.0047	0.027 (U)	0.004 (U)	0.0041 (U)	0.027
4,4'-DDT	n/a	1.3	0.0042 (U)	0.0042 (U)	0.027 (U)	0.004 (U)	0.0041 (U)	0.023 (U)
Acetone	n/a	2000	0.024 (U)	0.076 (U)	NA	NA	NA	NA
Benzo(a)anthracene	n/a	0.61	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Benzo(a)pyrene	n/a	0.061	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Benzo(b)fluoranthene	n/a	0.61	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)

TABLE 3.3.1-1

WASTE CHARACTERIZATION DATA FOR PRS 0-030(i)

	UTL	SAL	0100-96-0201	0100-96-0202	0100-96-0204	0100-96-0207	0100-96-0208	0100-96-0209
Organics								
Benzo(g,h,i)perylene	n/a	n/a	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Benzo(k)fluoranthene	n/a	6.1	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Bis(2-ethylhexyl)phthalate	n/a	32	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.056
Butylbenzylphthalate	n/a	13 000	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Chrysene	n/a	24	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Di-n-octyl phthalate	n/a	1 300	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Dibenz(a,h)anthracene	n/a	0.061	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Endrin aldehyde	n/a	n/a	0.0042 (U)	0.0042 (U)	0.027 (U)	0.004 (U)	0.0041 (U)	0.023 (U)
Fluoranthene	n/a	2 600	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Indeno(1,2,3-cd)pyrene	n/a	0.61	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Methoxychlor	n/a	330	0.021 (U)	0.021 (U)	0.14 (U)	0.02 (U)	0.021 (U)	0.11 (U)
Methylene Chloride	n/a	11	0.006 (U)	0.011 (U)	NA	NA	NA	NA
N-Propylbenzene	n/a	n/a	0.006 (U)	0.008	NA	NA	NA	NA
p-Isopropyltoluene	n/a	n/a	0.006 (U)	0.034	NA	NA	NA	NA
Phenanthrene	n/a	n/a	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Pyrene	n/a	2000	0.42 (U)	0.46 (U)	15 (U)	0.41 (U)	0.42 (U)	0.43 (U)
Toluene	n/a	1900	0.006 (U)	0.008 (U)	NA	NA	NA	NA
Xylene (total)	n/a	990	0.006 (U)	0.006	NA	NA	NA	NA

[a] (U) = Not detected.
[b] n/a = Not available.
[c] (J+) = Estimated value, probably biased high.
[d] NA = Not analyzed.

4.0 PRS 0-030(n)

4.1 Site Characterization

Site Survey Results

The septic tank at PRS 0-030 (n) (Fig. 4.1-1) is located on Los Alamos County property at the end of 15th Street between Canyon Road and Pueblo Canyon (The Zia Company 1947, 05-0132). Engineering drawings showing the facilities or residential housing connected to this septic tank are not available. However, because of the small tank size (6.5 ft long x 5.5 ft wide x 4.7 ft deep) and its location, it is believed the septic tank serviced residential housing in the area of 15th Street. It is not likely to have been connected to any technical buildings or to have received radioactive or RCRA materials (Francis and Sullivan 1995, 05-0207). The septic tank is visible at the end of 15th Street in aerial photos taken in the 1940s. South of Canyon Road and the tank are residential buildings.

The septic tank and outfall pipe were located during the initial field reconnaissance survey. The tank was intact (except for a missing top) and was located along and partially in an active stormwater drainage channel. The 6-in.-diameter steel outfall drain line entered Pueblo Canyon approximately 25 ft north of the septic tank.

Geodetic Surveys

The location of the septic tank (4 corners), the inlet line, the outfall drain line, the associated sample locations, and the verification sample locations were surveyed following the completion of sampling and tank removal activities. Geodetic survey data was transferred to FIMAD for incorporation into the ER database.

Geophysical Surveys

Geophysical surveys were not conducted at this site because the tank and its associated piping were located during the initial reconnaissance survey.

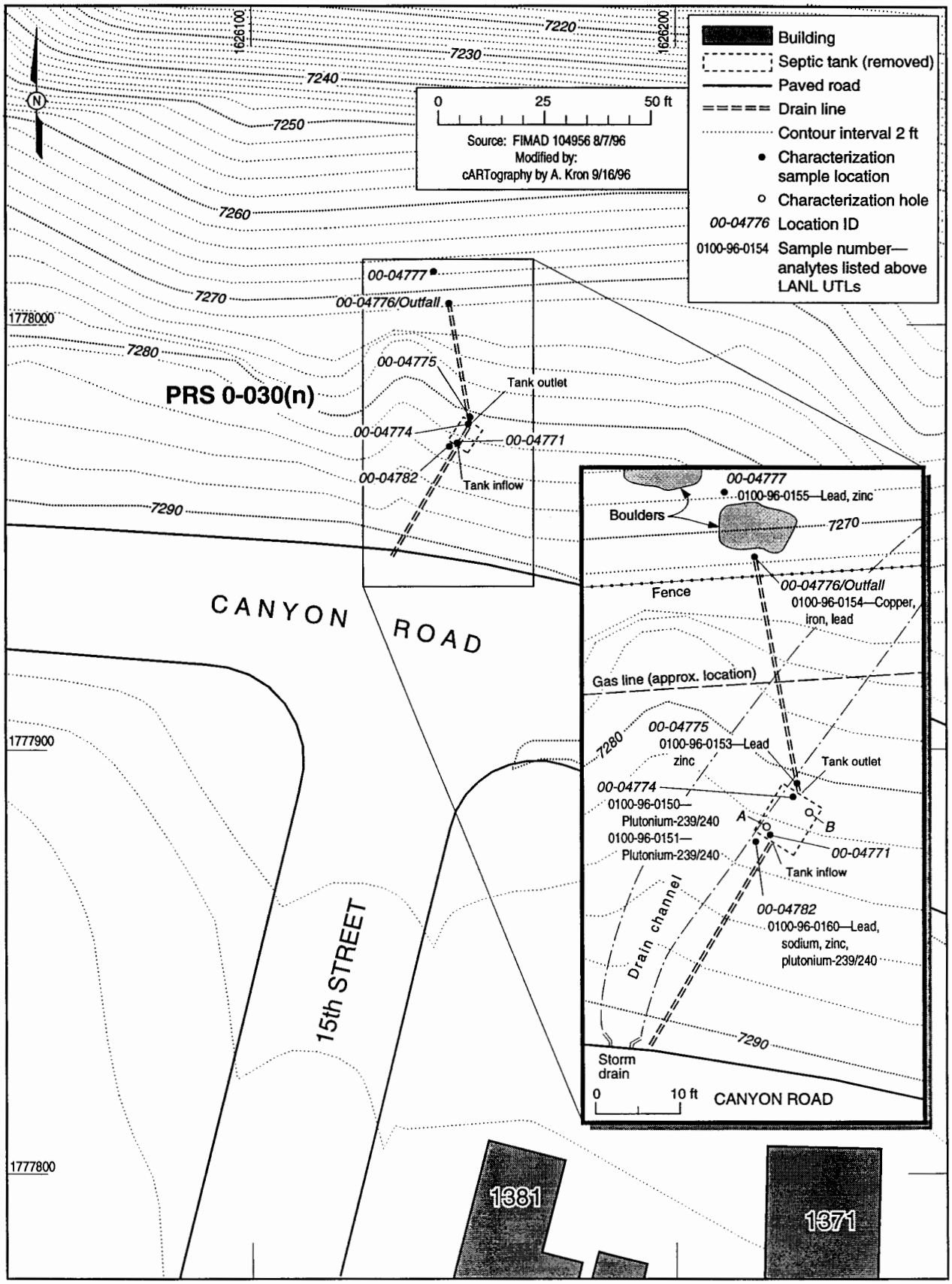

Fig. 4.1-1. Characterization sample locations showing inorganic and radiological analytes above background screening values for PRS 0-030(n).

Septic Tank Investigation and Sampling

On April 8, 1996, septic tank PRS 0-030(n) precharacterization activities included removing 6 in. of soil to expose the top of the east wall (the north, south, and west walls were partially exposed in the drainage channel), probing the tank depth at each corner, and measuring the tank dimensions (6.5 ft long x 5.5 ft wide x 4.7 ft deep). The long axis of the tank was oriented roughly north-south. The western half of the tank was in an active stormwater drainage channel. Material inside the tank consisted of backfill material and possible sediments from stormwater runoff. The tank did not contain a baffling system. The inlet drain line was composed of a 6-in.-diameter VCP that entered the center of the south end of the tank. The outlet drain line was composed of 6-in.-diameter steel pipe that exited the center of the north end of the tank.

Two soil characterization holes were hand-augered into the septic tank to determine the best locations to collect samples for characterization. One was augered at the southwest corner (hole A) and the second hole was augered at the northeast corner (hole B) (see Fig. 4.1-1). The soil characterization holes showed that the tank contained two distinct soil horizons: the upper 0–34 in. was a moist, medium- to coarse-grained, sandy silt, and the lower 34–56 in. (to the tank bottom) was a moist to saturated, silty clay with traces of sand. All depth measurements were made from the top of the tank. It was determined that a minimum of two samples would be collected from each auger hole. The first sample would be collected from the upper zone where the soil was moist and sandy, and the second sample would be collected from the saturated, silty clay at the tank bottom. Table 4.1-1 summarizes the precharacterization samples that were collected at PRS 0-030(n).

Sample locations were chosen inside the septic tank near the inlet and the outlet pipes. A hole was hand-augered near the inlet drain line (FIMAD Location ID 00-04771), approximately 2 ft east of characterization hole A, to collect samples from the upper and lower backfilled areas of the tank. Sample 0100-96-0141 was collected from 20–26 in. and sample 0100-96-0142 was collected from 42–52 in. (bottom of tank). The second hole was hand-augered just west of the outlet drain line inside the tank, and approximately 3 ft west of characterization hole B (FIMAD Location ID 00-04774). Sample 0100-96-0150 was collected from 20–30 in. and sample 0100-96-0151 was collected from 45–56 in. (bottom of tank).

TABLE 4.1-1

SUMMARY OF PRECHARACTERIZATION SAMPLES COLLECTED AT PRS 0-030(n)

SAMPLE INFORMATION				REQUEST NUMBER						
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH (in.)	MCAL	MRAL	VOCs	SVOCs	PEST/ PCBs	INORGANICS	RAD
0100-96-0141	00-04771	Inside tank adjacent to the inlet pipe	20–26	XXXX[a]	XXXX	NR[b]	1950	1950	1951	NR
0100-96-0142	00-04771	Inside tank adjacent to the inlet pipe	42–52	XXXX	XXXX	NR	1950	1950	1951	NR
0100-96-0150	00-04774	Inside tank adjacent to the outlet drainline	20–30	XXXX	XXXX	1950	1950	1950	1951	1952, 1952A[c], 1952B
0100-96-0151	00-04774	Inside tank adjacent to the outlet drainline	43–56	XXXX	XXXX	1950	1950	1950	1951	1952, 1952A, 1952B
0100-96-0153	00-04775	Outside tank beneath the outlet drainline	34–37	XXXX	XXXX	NR	1950	1950	1951	NR
0100-96-0154	00-04776	Adjacent to the outlet drainline in outfall area	0–5	XXXX	XXXX	NR	1950	1950	1951	NR
0100-96-0155	00-04777	Downslope from the outlet drainline in outfall area	0–5	XXXX	XXXX	NR	1950	1950	1951	NR
0100-96-0160	00-04782	Outside tank beneath the inlet pipe	15–20	XXXX	XXXX	1950	1950	1950	1951	1952, 1952A, 1952B

[a] XXXX = Request number not available.
[b] NR = Not requested.
[c] Request Numbers 1952A and 1952B were re-analyses of isotopic plutonium only.

In order to determine if a release occurred from the drain line connections with the tank, samples were collected beneath the VCP inlet and steel outlet drain lines. A shovel was used to uncover the inlet VCP drain line and a sample was collected using the spade and scoop method. Sample 0100-96-0160 was collected beneath the VCP inlet line (outside the septic tank) at an approximate depth of 20 in. bgs (FIMAD Location ID 00-04782). A hand auger was used to collect a sample beneath the outfall drain line. Sample 0100-96-0153 was collected at the steel outlet connection (outside the tank) at an approximate depth of 40 in. bgs (FIMAD Location ID 00-04775).

Two samples were collected in the outfall area below the mouth of the outfall pipe. Sample 0100-96-0154 was collected at the mouth of the steel outfall pipe from 0–5 in. bgs (FIMAD Location ID 00-04776) and sample 0100-96-0155 was collected approximately 10 ft downstream in the drainage path at 0–5 in. bgs (FIMAD Location ID 00-4777).

As recommended by LANL's Water Quality and Hydrology group, stormwater controls were not implemented at this site because the septic tank was located in an active stormwater channel. Also, precharacterization activities disturbed very little surface area outside of the stormwater channel.

Deviations from the VCA Plan

All work was conducted in accordance with the VCA plan (LANL 1996, 05-0239). However, the following deviations occurred:

- The septic tank partially occupied a stormwater channel that was scheduled for renovation by Los Alamos County. In an agreement with Los Alamos County, it was determined that the septic tank would be removed by LANL and, upon completion of the field investigation, the County would renovate the stormwater channel.

- To comply with the biological assessment of this area, the removal of the septic tank was delayed until August 15, 1996 (Foxx, in preparation, 0612). The United States Fish and Wildlife Service has issued strict guidelines for protection of the peregrine falcon, an endangered bird species that nests in Pueblo Canyon below PRS 0-030(n).

- Soil samples were not submitted to the MCAL for metals screening by XRF because it was determined that the screening data would not have been

useful for making field decisions. Instead, seven-day turnaround times for analytical results were requested from a fixed laboratory.

- Waste characterization samples were submitted for TAL metals analysis instead of TCLP metals analysis. If TAL analytical results indicated that concentrations were 20 times greater than the Land Disposal Restriction concentrations for any metal, the samples would have been resubmitted for TCLP analyses (40 CFR Part 261.24).

- A backhoe was not used to uncover the inlet and outlet piping during pre-characterization activities because the inlet pipe was uncovered with a shovel and the outlet sample was collected with a hand auger.

Sampling Methodology

A stainless steel hand auger was used to collect samples from inside the tank and at the outlet drain line. The spade and scoop method was used to collect samples from beneath the inlet drain line and the outfall area. Once the samples were collected, they were screened with hand-held equipment to detect gross radiological and chemical contamination (see the following section for additional details). Immediately after screening, the VOC sample was collected and the remaining sample was homogenized and placed into the appropriate sample containers for additional analyses.

All sample containers were appropriately labeled and assigned LANL sample identification numbers with bar codes. The samples were documented on sample collection logs, placed in coolers with ice, and transported to the MCAL, MRAL, and the SMO under chain-of-custody. All sampling was conducted in accordance with LANL ER Project procedures.

On April 9, 1996, all samples were submitted to the MCAL and the MRAL for screening analyses to determine if any contamination was present. The screening analyses included VOCs, gross gamma, gross alpha/beta, tritium, and moisture content.

Samples were also submitted to the SMO for off-site, fixed-laboratory analyses. All waste characterization samples collected inside the tank were analyzed for SVOCs by EPA SW-846 Method 8270, PCBs/pesticides by EPA SW-846 Method 8080, and TCLP metals. In addition, two of the tank samples were also analyzed for VOCs by EPA SW-846 Method 8260, plutonium-238 and plutonium-239/240 by alpha spectrometry, americium-241 by gamma spectrometry, and total uranium by ICP/MS. All samples collected outside the tank were analyzed for SVOCs, PCBs/pesticides, and TAL metals by EPA SW-846 Method 6010 and 7470

(mercury). In addition, one sample collected outside of the tank was also analyzed for VOCs, plutonium-238, plutonium-239/240, americium-241, and total uranium.

Field Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil (including the concrete) was screened to detect chemical and gross radiological contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc., Organic Vapor Meter (OVM) Model 580B™, PID with either a 10.6 or 11.7 eV bulb, and for ionizing radiation using Ludlum Model 139™ rate meters with air proportional (alpha) probe and Eberline™ (beta/gamma) probe. In addition, gamma exposure was measured using a Ludlum model 19™ microR meter. The excavation and soils were screened for flammable gases using a Mine Safety Appliances Combustible Gas Indicator™. All field screening instruments were calibrated (as necessary) and checked on a daily basis.

Field Screening Results

All hand-auger cuttings, samples, the tank contents, and the concrete tank were screened for gross alpha and beta/gamma activity and organic vapors, as described above. Heath and safety action levels were not exceeded during field operations. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples were 0.0 ppmv for all activities. Alpha and beta/gamma screening results indicated no detectable activity. Gamma exposure results ranged from 20–22 μR/hr which is within background levels for field screening instruments.

4.1.1 Background Comparisons

Data for inorganics and radionuclides at PRS 0-030(n) were compared to background screening values presented in Statistical Comparisons to Background, Part I (Environmental Restoration Project Decision Support Council 1995, 1218). The results of the background comparison are discussed below.

4.1.1.1 Inorganics

Four soil samples collected from PRS 0-030(n) were analyzed for TAL metals and three were analyzed for total uranium. Some analyses included one or more laboratory duplicates. For purposes of the screening assessment, the highest detected value was used for samples for which a laboratory duplicate was analyzed. Five inorganics (copper, iron, lead, sodium, and

zinc) were detected at concentrations exceeding their respective background screening values. The concentrations for each sample that has at least one value above background screening values for these analytes are presented in Table 4.1.1-1.Copper, iron, lead, sodium, and zinc will be carried forward to the screening assessment.

TABLE 4.1.1-1

INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(n)

SAMPLE ID	COPPER (mg/kg)	IRON (mg/kg)	LEAD (mg/kg)	SODIUM (mg/kg)	ZINC (mg/kg)
UTL	15.5	21 300	23.3	915	50.8
SAL	2 800	n/a[a]	400	n/a	23 000
0100-96-0153	6.26[b]	6 280[b]	111[b](J-)[c]	806[b]	55.3[b]
0100-96-0154	16.3	55 600	72.2(J-)	332	48.1
0100-96-0155	6.72	8 090	97.1(J-)	406	59.7
0100-96-0160	8.4	8 580	109(J-)	1 080	86.7

[a] n/a = Not available.
[b] Value represents the maximum of a sample concentration and its laboratory duplicate.
[c] Estimated detected value, probably biased low.

4.1.1.2 Radionuclides

Three soil samples collected from PRS 0-030(n) were analyzed by gamma spectroscopy. These three samples were also analyzed for isotopic plutonium and total uranium.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These radionuclides include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

- Four short-lived activation/fission products reported at PRS 0-030(n) (cobalt-57, europium-152, ruthenium-106, and sodium-22) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to be present at this PRS, these short-

lived activation/fission products are eliminated as potential radionuclide contaminants.

- Potassium-40 is a naturally occurring radionuclide that is also routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995,1142; Longmire et al. 1995,1266). Potassium-40 will not be considered a potential radionuclide contaminant at this site.

- Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants. QA/QC activities review daughter radionuclides for consistency with parent activities, and any that cannot be attributed to background concentrations of the parent are retained as potential contaminants.

EQLs and minimum detectable activities are often not available for radionuclides by gamma spectroscopy. A value of three times the measurement uncertainty (3 sigma or three standard deviations) is used to calculate a sample-specific minimum detectable activity, which is then used in the same manner as a detection limit. This methodology is similar to Currie's method of determining radionuclide maximum detectable activity (Currie1988, 0792). This 3 sigma screening value takes into account variability caused by counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative, and may include radionuclides whose presence is spuriously reported because of spectral interferences or misidentifications. Cobalt-60 and neptunium-237 were eliminated from further consideration based on this criterion.

Of the remaining five radionuclides reported for PRS 0-030(n), americium-241, cesium-137, plutonium-238, and total uranium were eliminated from further consideration based on background screening value criteria. Plutonium-239/240 has at least one detected concentration above its background screening value. The detected values for plutonium-239/240 are presented below in Table 4.1.1-2. Plutonium-239/240 will be carried forward to the screening assessment.

TABLE 4.1.1-2

RADIONUCLIDES WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(n)

SAMPLE ID	PLUTONIUM 239/240 (pCi/g)
UTL	0.092[a]
SAL	24
0100-96-0150	1.29
0100-96-0151	1.45
0100-96-0160	2.38

a = Value represents the maximum reported background concentration in soil from the Environmental Surveillance Reports.

4.1.2 Evaluation of Organic Chemicals

Eight soil samples collected from PRS 0-030(n) were analyzed for SVOCs, pesticides, and PCBs. Three of these samples were also analyzed for VOCs. Twenty-one organic chemicals (aldrin, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzoic acid, butylbenzylphthalate, chlordane, chrysene, delta-BHC, 1,4-dichlorobenzene, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endosulfan sulfate, fluoranthene, heptachlor epoxide, methylene chloride, pentachlorophenol, phenanthrene, and pyrene) were detected at PRS 0-030(n). The concentrations for each sample that had at least one detected value for these twenty-one chemicals are presented in Table 4.1.2-1. These twenty-one chemicals will be carried forward to the screening assessment.

Individual analyses for alpha-chlordane and gamma-chlordane were not reported by the analytical laboratory for data from PRS 0-030(n). Instead, results were reported as chlordane (alpha and gamma).

TABLE 4.1.2-1

ORGANICS WITH DETECTED CONCENTRATIONS AT PRS 0-030(n)

ANALYTE (mg/kg)	SAL	0100-96-0141	0100-96-0142	0100-96-0150	0100-96-0151	0100-96-0153	0100-96-0154	0100-96-0155	0100-96-0160
1,4-Dichlorobenzene	7.4	0.71 (U)[a]	0.79	0.72 (U)	0.85 (U)	0.37 (U)	0.35 (U)	0.69 (U)	0.4 (U)
4,4'-DDD	1.9	0.054	0.161	0.158	0.104	0.355	0.211	0.329	3.67
4,4'-DDE	1.3	0.027	0.015	0.099	0.006	0.399	0.176	0.211	0.81
4,4'-DDT	1.3	0.112	0.011	0.542	0.011	1.66	0.533	0.818	9.12
Aldrin	0.026	0.001 (U)	0.002	0.001 (U)	0.002	0.004	0.003	0.003	0.003
Benzo(a)anthracene	0.61	0.22	0.072	0.72 (U)	0.46 (U)	0.37 (U)	0.35 (U)	0.69 (U)	0.4 (U)
Benzo(a)pyrene	0.061	0.71 (UJ)[b]	0.086	0.72 (UJ)	0.46 (UJ)	0.37 (UJ)	0.35 (UJ)	0.69 (UJ)	0.4 (UJ)
Benzo(b)fluoranthene	0.61	0.71 (UJ)	0.13	0.72 (UJ)	0.089	0.056 (J)	0.08 (J)	0.69 (UJ)	0.4 (U)
Benzoic acid	100 000	0.28 (J)	0.17	7.2	4.6	0.3 (J)	0.18	6.9	4
Butylbenzylphthalate	13 000	0.71 (U)	0.44 (U)	0.72 (U)	0.46 (U)	0.077	0.35 (U)	0.69 (U)	0.4 (U)
Chlordane (alpha & gamma)	0.34	0.095	0.004(U)	0.2	0.004(U)	0.112	0.057	0.096	0.108
Chrysene	24	0.3	0.093	0.72 (U)	0.069	0.059	0.061	0.69 (U)	0.4 (U)
delta-BHC	n/a[c]	0.005	0.001 (U)	0.009	0.001 (U)	0.001 (U)	0.001 (U)	0.001 (U)	0.001 (U)
Dieldrin	0.028	0.002	0.001 (U)	0.005	0.001 (U)	0.001 (U)	0.002	0.002	0.001 (U)
Endosulfan sulfate	3.3	0.001 (U)	0.001 (U)	0.003	0.001 (U)	0.001 (U)	0.001 (U)	0.002	0.001 (U)
Fluoranthene	2600	0.39 (J)	0.094	0.075	0.078	0.043 (J)	0.086 (J)	0.69 (U)	0.4 (U)
Heptachlor epoxide	0.049	0.001 (U)	0.001 (U)	0.003	0.001 (U)	0.002	0.002	0.002	0.001 (U)
Methylene chloride	11	NA[d]	NA	0.002	0.007	NA	NA	NA	0.006
Pentachlorophenol	2.5	3.4	2.1	3.5	0.91	1.8	1.7	3.3	1.9
Phenanthrene	n/a	0.3 (J)	0.44	0.72	0.05	0.044 (J)	0.087 (J)	0.69	0.4
Pyrene	2000	0.79	0.09	0.15	0.1	0.1	0.14	0.11	0.4 (U)

a (U) = Not detected.
b (UJ) = Estimated nondetected value.
c n/a = Not available.
d NA = Not analyzed.

4.1.3 Screening and Assessment

The purpose of this section is to assess the potential for adverse human health effects resulting from exposure to any residual contamination associated with the septic tank 0-030(n). A screening assessment and qualitative risk assessment were performed on the precharacterization data for this PRS following methodology presented in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277). Only data from samples sent to a fixed laboratory were included in the screening and assessment.

4.1.3.1 Screening Assessment

COPCs detected at concentrations greater than background screening values, lacking background data for comparison, or detected at concentrations exceeding EQLs, were carried forward to the screening assessment. These include five inorganic chemicals, twenty-one organic chemicals, and one radionuclide that were carried forward from the background comparison and organic chemical evaluation. The screening assessment includes a comparison to SALs and an MCE as described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277).

Greater than SAL. Four organic chemicals, 4,4'-DDD, 4,4'-DDT, benzo(a)pyrene, and pentachlorophenol, were detected at concentrations exceeding their respective SALs. These concentrations are presented in Table 4.1.2-1, and the sample locations at which they were detected are shown in Fig. 4.1.3-1. No inorganics or radionuclides were detected at concentrations greater than SALs.

TABLE 4.1.3-1

CONCENTRATIONS OF ORGANIC CHEMICALS IN SOIL THAT EXCEED SALs AT PRS 0-030(n)

LOCATION ID	SAMPLE NUMBER	4,4'-DDD (mg/kg)	4,4'-DDT (mg/kg)	BENZO(a)PYRENE (mg/kg)	PENTACHLORO-PHENOL (mg/kg)
SAL	n/a[a]	1.9	1.3	0.061	2.5
00-04771	0100-96-0141	0.054	0.112	0.71(UJ)[b]	3.4
00-04771	0100-96-0142	0.161	0.0114	0.086	2.1
00-04774	0100-96-0150	0.158	0.542	0.72(UJ)	3.5
00-04775	0100-96-0153	0.355	1.66	0.37(UJ)	1.8
00-04777	0100-96-0155	0.329	0.818	0.69(UJ)	3.3
00-04782	0100-96-0160	3.67	9.12	0.4(UJ)	1.9

[a] n/a = Not applicable.
[b] (UJ) = Estimated undetected value.

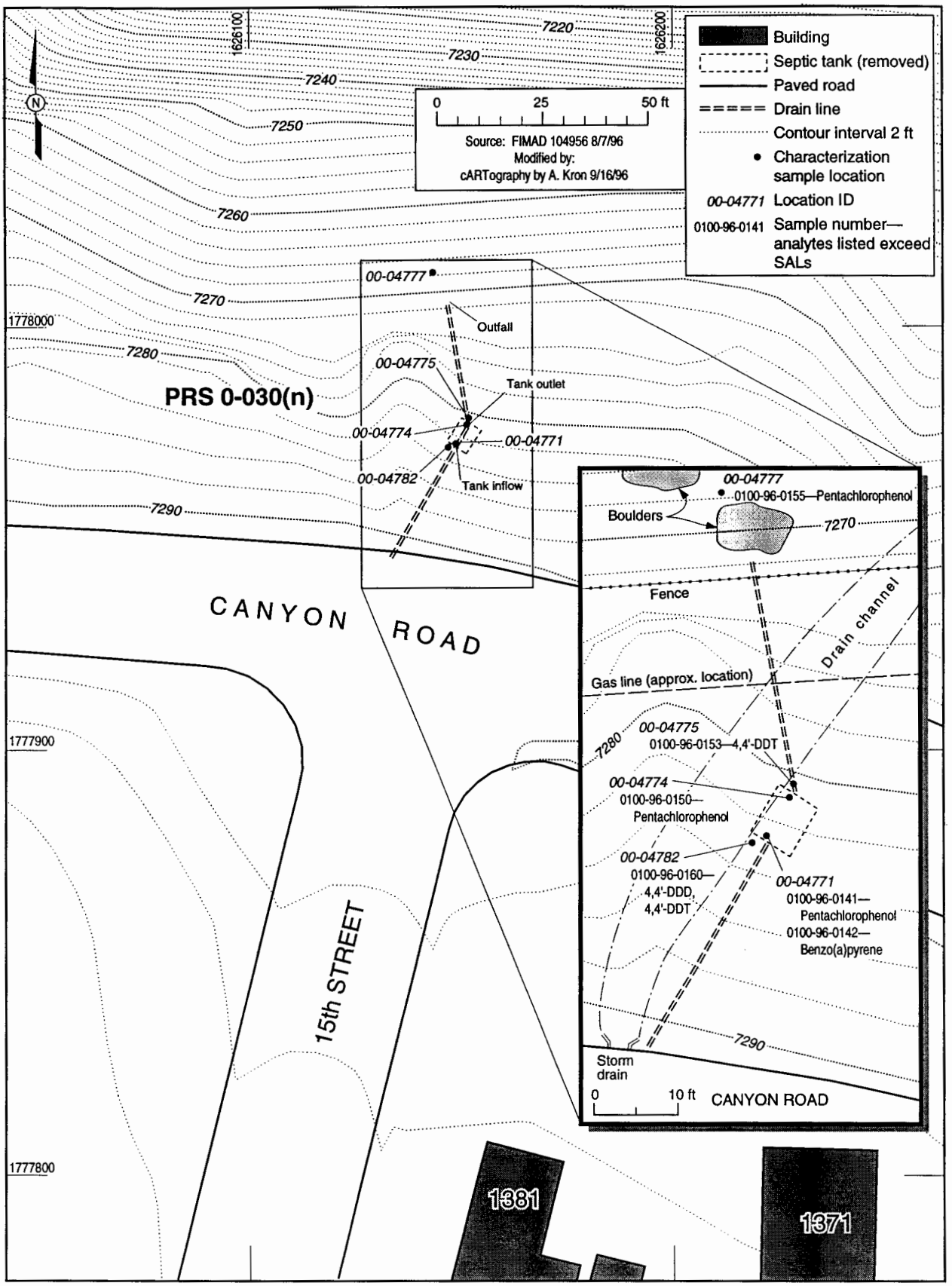

Fig. 4.1.3-1. Characterization sample locations showing organic chemicals that exceed SALs for PRS 0-030(n).

No SAL. Of the 27 COPCs carried forward from the background and EQL comparisons, 4 chemicals, delta-BHC, iron, phenanthrene, and sodium, have no SAL for comparison. Phenanthrene is discussed in Section 4.1.3.2. Iron and sodium are essential nutrients that can be eliminated as COPCs on the basis of best professional judgment (EPA 1989, 0305).

Iron was detected above background screening values at one location at the end of the former iron drainpipe from the septic tank, and it is probable that the elevated concentration is a result of weathering and oxidation of this pipe. Although iron has no SAL, as an essential nutrient it may be compared to the recommended daily allowance (RDA) for children and adults. (The iron RDA is 10 mg/day for a child and 15 mg/day for an adult female). The highest detected concentration of iron at PRS 0-030(n) was 55 600 mg/kg at location 00-04776; iron at all other locations was within the background range. If all incidental soil ingestion were to occur at this single location at the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 11 mg of iron per day. An adult female, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 5.5 mg of iron per day. Although the RDA for children is slightly exceeded, deleterious effects for daily intakes between 25 and 75 mg are unlikely in healthy persons (National Research Council 1989, 1251). Iron intake is below the RDA for adult females; therefore, iron is eliminated as a COPC.

The estimated minimum requirements of sodium for healthy persons are 200 mg/day for 6–11 year old children, and 500 mg/day for adults. The highest detected concentration of sodium at PRS 0-030(n) was 1 080 mg/kg. At the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 0.2 mg of sodium. An adult female, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 0.1 mg of sodium. Because both amounts are considerably less than the estimated minimum requirements, sodium is eliminated as a COPC.

Delta-BHC is a less potent carcinogen than the other isomers of the commercial pesticide Lindane. If the SAL for Lindane is used as a toxicity surrogate for delta-BHC, the highest detected concentration of delta-BHC (0.0089 mg/kg) is well below the SAL for Lindane (0.25 mg/kg). Therefore, delta-BHC is not expected to be of human health concern at this site, and is eliminated as a COPC.

Less than SAL. The nineteen remaining chemicals were detected at concentrations below their respective SALs. As described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277), analytes are divided into three classes (carcinogens, noncarcinogens, and radionuclides) to evaluate possible additive effects within each class of chemicals in an MCE. Plutonium-239/240 was the only radionuclide detected, therefore, an MCE for radionuclides was not performed. Because plutonium-239/240 was detected at a maximum concentration (2.38 pCi/g) that is below its SAL (24 pCi/g), adverse human health effects are not expected and plutonium-239/240 is eliminated as a COPC. The MCE for PRS 0-030(n) is presented in Table 4.1.3-2.

TABLE 4.1.3-2

MULTIPLE CHEMICAL EVALUATION FOR PRS 0-030(n)

ANALYTE	LOCATION ID	SAMPLE NUMBER	MAXIMUM CONCENTRATION	SAL	NORMALIZED VALUE
Carcinogens					
Units	n/a	n/a	(mg/kg)	(mg/kg)	n/a
1,4-Dichlorobenzene	00-04771	0100-96-0142	0.79	7.4	0.1
4,4'-DDE	00-04782	0100-96-0160	0.81	1.3	0.6
Aldrin	00-04775	0100-96-0153	0.004	0.026	0.1
Benzo(a)anthracene	00-04771	0100-96-0141	0.22	0.61	0.4
Benzo(b)fluoranthene	00-04771	0100-96-0142	0.13	0.61	0.2
Chlordane	00-04774	0100-96-0150	0.2	0.34	0.6
Chrysene	00-04771	0100-96-0141	0.3	24	0.01
Dieldrin	00-04774	0100-96-0150	0.005	0.028	0.2
Heptachlor epoxide	00-04774	0100-96-0150	0.003	0.049	0.06
Methylene Chloride	00-04774	0100-96-0151	0.007	11	0.0006
			Normalized Sum		2.3
Noncarcinogens					
Units	n/a	n/a	(mg/kg)	(mg/kg)	n/a
Benzoic acid	00-04774	0100-96-0150	7.2	100000	0.00007
Butylbenzylphthalate	00-04775	0100-96-0153	0.077	13000	6.00E-06
Copper	00-04776	0100-96-0154	16.3	2800	0.006
Endosulfan sulfate	00-04774	0100-96-0150	0.003	3.3	0.001
Fluoranthene	00-04771	0100-96-0141	0.39	2600	0.0002
Lead	00-04775	0100-96-0153	111	400	0.3
Pyrene	00-04771	0100-96-0141	0.79	2000	0.0004
Zinc	00-04782	0100-96-0160	86.7	23000	0.004
			Normalized Sum		0.3

The normalized sum for noncarcinogens (0.3) was less than unity, indicating that the potential for adverse human health effects from exposure is unlikely. Therefore, all noncarcinogens are eliminated as COPCs. The normalized sum for chemical carcinogens, however, is greater than one at 2.3. The seven chemicals that contribute more than 0.1 to the normalized sum include five pesticides (1,4-dichlorobenzene, 4,4'-DDE, aldrin, chlordane, and dieldrin) and two PAHs (benzo(a)anthracene and benzo(b)fluoranthene). These seven chemicals, the four chemicals detected at concentrations exceeding SALs, and one chemical with no SAL are retained as COPCs and are discussed in the qualitative risk assessment below.

4.1.3.2 Qualitative Human Health Risk Assessment

Four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and phenanthrene) and eight pesticides (1,4-dichlorobenzene, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, chlordane, dieldrin, and pentachlorophenol) were identified as COPCs in the screening assessment.

The detected concentrations of the PAHs (all less than 1 mg/kg) are consistent with PAH concentrations (generally less than 2 mg/kg) detected near parking lots and asphalt-paved industrial sites within the townsite and LANL (LANL 1995, 09-0520; LANL 1996, 09-0524; LANL 1996, 09-0526). The tank location is in a storm drain which drains nearby city streets. Because the PAHs are most likely a result of runoff from these paved streets rather than the result of Laboratory operations, no further investigation of PAHs at this site is proposed.

Pesticides were present in the septic tank fill material at concentrations exceeding SALs and contributing to an MCE greater than unity. The fill material was removed from the tank, placed in the bottom of the excavation, and the site was released to Los Alamos County for storm water control implemention. If the fill material containing the pesticide COPCs were on the surface of the ground where exposure could occur, the small (6 ft x 4 ft) area comprises only 0.004 of a residential exposure unit (500 m^2). If the detected pesticide concentrations are area weighted over the residential exposure unit, excess cancer risk would be $5x10^{-8}$ (based on the residential health protective screening exposure assumptions). The excess cancer risk of $5x10^{-8}$ is well below the acceptable cancer risk guidelines of one in ten thousand to one in a million specified by the National Contingency Plan (NCP) and proposed in RCRA Subpart S (EPA 1989, 0559). Exposure to contaminants contained within such a small area in relation to a residential exposure unit is unlikely to cause adverse human health effects.

Concentrations of the pesticides decrease in the outfall area with only pentachlorophenol detected at a concentration exceeding SAL. The SAL of 2.5 mg/kg represents the concentration at which an excess cancer risk for a residential scenario would be one in a million. The detected concentration of 3.3 mg/kg in the outfall represents an excess cancer risk of 1.3 in a million. The risk of 1.3 in a million is well within the acceptable risk guidelines of one in ten thousand to one in a million, as specified by NCP and proposed in RCRA Subpart S (EPA 1989, 0559; Federal Register). Additionally, the outfall is located on a steep slope above a vertical cliff in an area where residential use is not possible. Exposure in the outfall area is limited to occasional recreational use; and the small size of the outfall area in relation to the area of a recreational exposure unit would again make it highly unlikely that any adverse human health effects would occur. For these reasons, the pesticides 1,4-dichlorobenzene, 4,4'-DDD, 4,4'-DDE, 4,4-DDT, aldrin, chlordane, dieldrin, and pentachlorophenol are eliminated as COPCs.

4.2 Remedial Activities and Results of Confirmatory Sampling

4.2.1 Risk Calculations and/or Cleanup Level Derivation

The objectives of the Phase 1 RFI investigation and VCA at PRS 0-030(n) were to determine the presence or absence of contamination associated with the septic tank and to remove any remaining structures. No cleanup levels were derived for PRS 0-030(n). Instead, precharacterization samples were screened and a qualitative risk assessment was performed to verify that no chemicals were present at concentrations likely to cause adverse human health effects.

4.2.2 Remedial Implementation for PRS 0-030(n)

Septic Tank Removal and Verification Sampling

Several remedial alternatives were reviewed following receipt of analytical sample results and the data assessment. The remedial option selected was removing the tank and returning the contents to the excavation. This tank is located on Los Alamos County land in a current stormwater drainage channel. Los Alamos County requested removal of the septic tank so they could improve stormwater controls in the drainage ditch. In addition, removing the tank follows the best management practice of removing LANL legacy structures from the townsite.

PRS 0-030 (n) is located at the end of 15th Street and between Canyon Road and Pueblo Canyon (Fig. 4.1-1). On August 21, 1996, the removal of the septic tank and its contents commenced. The tank was located on the sloping southern edge of Pueblo Canyon partially in a stormwater drainage channel, and was surrounded by Ponderosa pines and natural grasses.

A backhoe was positioned west of the tank to remove the tank contents and the concrete tank. As the soil was removed it was stockpiled to the side and screened with hand-held PID and radiation instruments for gross chemical and radiological contamination. Once the removal of the tank contents was complete (less than 6 yd^3 of soil), the backhoe began removing the tank walls. The tank removal was not difficult because the tank was not reinforced with rebar. The tank walls came loose first and then the tank floor was removed. Less than 10 yd^3 of concrete was removed. Upon removal, the concrete was swiped and screened for gross radiological contamination with hand-held radiation instruments. The swipes were analyzed by LANL's Health Physics Operations group at TA-21. Subsequently, the concrete was hauled out of the PRS area to a temporary staging area west of the site. In addition, the 20-ft-long steel outfall pipe was removed and transported to the temporary staging area for storage with the concrete. The steel pipe was also swiped and screened with hand-held radiation instruments for gross radiological contamination.

After removal of the septic tank and collection of verification samples, the excavation was backfilled with soil removed from the septic tank and soil cleaned out of the drainage channel. The excavation was compacted to LANL-required specifications. Subsequently, the banks of the drainage channel were recontoured to enhance flow through the channel. Stormwater controls were not implemented at this site. Los Alamos County Public Works Department was scheduled to improve the stormwater controls in the drainage channel upon removal of the septic tank.

The remedial activities were conducted in accordance with the VCA plan, with one exception (LANL 1996, 05-0239). Soil removed from the septic tank was returned to the excavation.

4.2.3 Confirmatory Sampling for PRS 0-030(n)

Upon completion of the septic tank removal, two verification samples were collected from the bottom of the excavation (under the former tank) with the backhoe bucket (Fig. 4.2.3-1; Table 4.2.3-1). Sample 0100-96-0161 (FIMAD Location ID 00-04783) was collected from beneath the southern half of the tank footprint at approximately 5–6 ft bgs. Sample 0100-96-0162 (FIMAD Location ID 00-04784) was collected from beneath the northern half of the tank footprint at approximately 5–6 ft bgs.

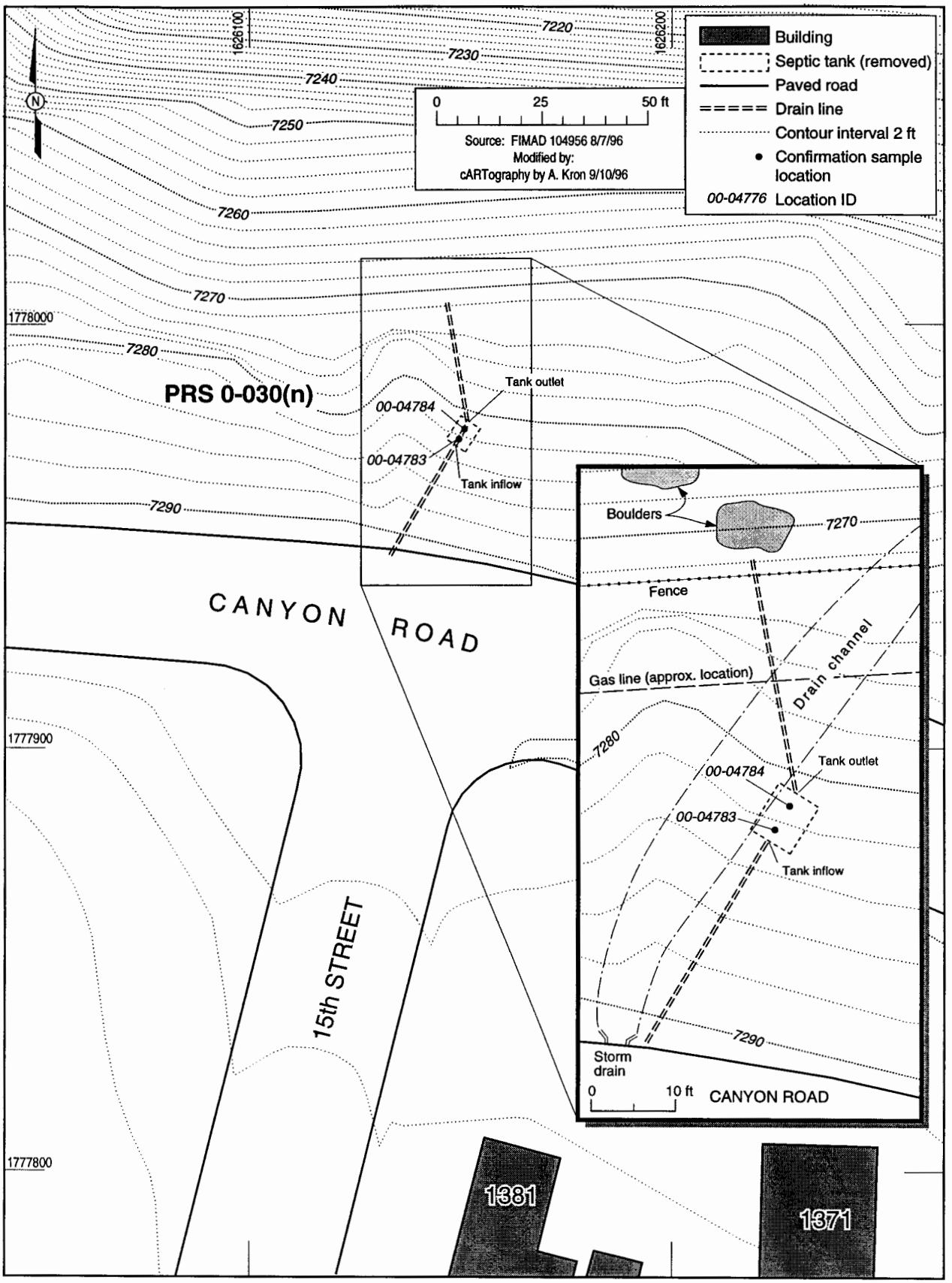

Fig. 4.2.3-1. Confirmation sample locations for PRS 0-030(n).

TABLE 4.2.3-1

SUMMARY OF CONFIRMATION SAMPLES COLLECTED AT PRS 0-030(n)

SAMPLE INFORMATION				REQUEST NUMBER						
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH	MCAL	MRAL	VOCs	SVOCs	PEST/ PCBs	INORGANICS	RAD
0100-96-0161	00-04783	Confirmation sample beneath south half of tank after removal	0–3 in.	NR[a]	2533	2538	2538	2538	2547	2539
0100-96-0162	00-04784	Confirmation sample beneath north half of tank after removal	0–3 in.	NR	2533	2538	2538	2538	2547	2539

[a] NR = Not requested

These samples were sent to an analytical laboratory to confirm that no chemicals were present in unacceptable levels under the former location of the tank. The samples were analyzed for TAL metals, total uranium, isotopic plutonium, gamma spectroscopy, VOCs, SVOCs, pesticides, and PCBs. Deviations from the VCA plan include not using the MCAL for screening the samples for metals by XRF and screening for VOCs (LANL 1996, 05-0239).

The results of the confirmation samples show that the three PAHs and the eight pesticides that were identified as COPCs in the screening assessment, and subsequently eliminated in the human health risk assessment, were either not detected or were detected at very low levels under the former location of the tank. The confirmation data for these samples is presented in Table 4.2.3-2. This sample data confirms that this site is not likely to pose a significant human health risk now or in the foreseeable future.

TABLE 4.2.3-2

RESULTS OF CONFIRMATION SAMPLING AT PRS 0-030(n)

SAMPLE ID	SAL	0100-96-0161	0100-96-0162
1,4-Dichlorobenzene (mg/kg)	7.4	0.006(U)[a]	0.006(U)
4,4'-DDD (mg/kg)	1.9	0.004(U)	0.004(U)
4,4'-DDE (mg/kg)	1.3	0.0084	0.01
4,4'-DDT (mg/kg)	1.3	0.02	0.038
Aldrin (mg/kg)	0.026	0.002(U)	0.002(U)
Benzo(a)anthracene (mg/kg)	0.61	0.2(U)	0.2(U)
Benzo(a)pyrene (mg/kg)	0.061	0.2(U)	0.2(U)
Benzo(b)fluoranthene (mg/kg)	0.61	0.2(U)	0.2(U)
Chlordane (alpha & gamma) (mg/kg)	0.34	0.002(U)	0.002(U)
Dieldrin (mg/kg)	0.028	0.004(U)	0.004(U)
Pentachlorophenol (mg/kg)	2.5	0.99(U)	0.99(U)

[a] (U) = Not detected.

4.2.4 Conclusions and Recommendations

Sample data indicate that chemicals remaining at this site is not likely to pose a human health risk now or in the future. No further action is proposed for PRS 0-030(n).

4.3 Waste Management for PRS 0-030(n)

All work was conducted in accordance with the VCA plan and the waste characterization strategy form (LANL 1996, 05-0239). However, the following deviation occurred during field investigation and VCA activities.

- The PPE and sampling debris generated during precharacterization activities was not shipped under manifest to TA-3, SM-271 upon generation because it was determined to be a sanitary waste. It was stored in the equipment trailer in a 55-gal. drum as a sanitary waste and will be disposed at the Los Alamos County Landfill.

Less waste was generated than originally estimated during precharacterization sampling and removal of the septic tank. The concrete tank was classified as a nonhazardous waste. The sampling waste/PPE was classified as sanitary waste and will be disposed at the Los Alamos County Landfill. The decontamination water generated during sampling activities was discharged onsite according to the site-specific Spill Prevention, Control and Countermeasures Plan (LANL 1996, 05-0240). During field operations, it was determined that a final decontamination rinse with methanol and deionized water was not required. A comparison between the actual amount of waste generated and the amount of waste projected in the VCA plan is presented in Table 4.3-1.

TABLE 4.3-1

SUMMARY OF PROJECTED WASTE VOLUMES AND GENERATED WASTE VOLUMES

WASTE ITEM	WASTE TYPE	PROJECTED VOLUME	GENERATED VOLUME
sampling waste/PPE	sanitary waste	1 ft^3	0.25 ft^3
tank contents, soil and concrete	nonhazardous	4 to 90 yd^3	<10 yd^3 (concrete only)
decon wash water	liquid nonhazardous	20 gal.	3 gal.
decon final rinse with water/methanol	liquid nonhazardous	10 gal.	none

After removal, the concrete was swiped and screened with hand-held radiation instruments for gross radiological contamination. LANL's Health Physics Operations group analyzed the swipes and released the concrete as construction debris. The concrete tank was transported to the Los Alamos County Landfill the day after removal. Currently, the PPE/sampling debris is being stored as a sanitary waste and will be disposed of at the Los Alamos County Landfill as soon as a waste profile form has been approved.

In order to minimize waste, a dry decontamination step was implemented to remove excess soil from sampling equipment. This additional decontamination step reduced the amount of decontamination water generated during the precharacterization and VCA activities.

4.3.1 Waste Characterization Data

Analysis of precharacterization sampling results indicated that the soil could be returned to the excavation. No waste was generated except the construction debris generated during removal of the concrete tank.

5.0 PRS 0-030(o)

5.1 Site Characterization

Site Survey Results

The septic tank at PRS 0-030(o) (Fig. 5.1-1) is located behind the private residence at 1300 Canyon Drive. This septic tank serviced the Sundt Apartments, McKee Housing, a dormitory, a laundry located in the area that is now Sage Loop, Oakwood Loop, and the area east of 15th Street. It is unlikely that this septic tank would contain radioactive or RCRA contaminants (Francis and Sullivan 1995, 05-0207). The septic tank is visible north of Canyon Road in aerial photographs taken in the 1940s. Residential buildings are visible south of Canyon Road and the tank. Neither the tank nor the outfall pipe were located during the initial field reconnaissance survey.

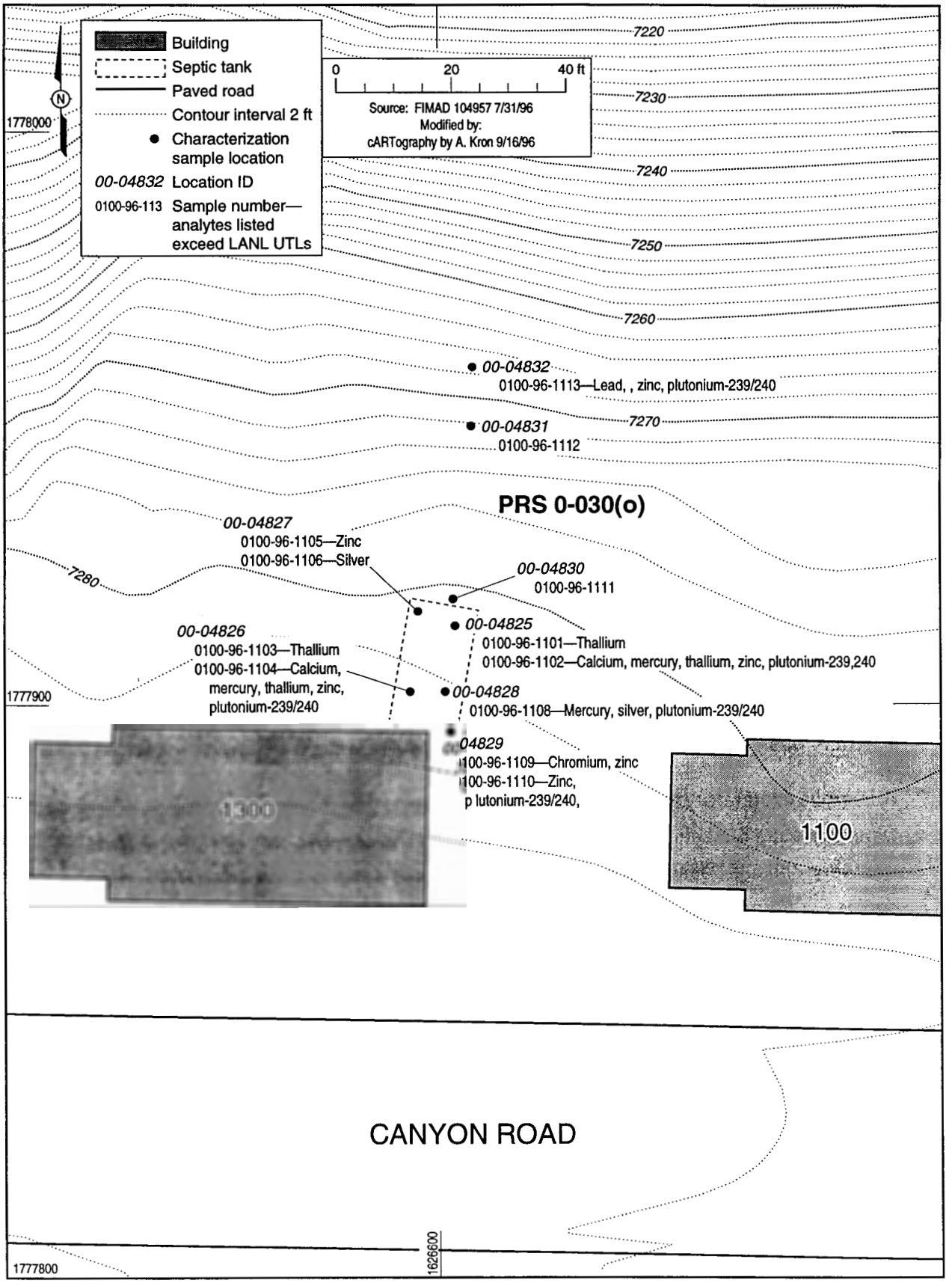

Fig. 5.1-1. Characterization sampling locations and inorganic and radiological analytes above background screening values for PRS 0-030(o).

Geodetic Surveys

The approximate septic tank location coordinates were obtained from Zia Company drawings circa 1947. During the initial geodetic survey, it was detemined that the coordinates were accurate because they placed the tank close to the location observed on old Zia Post Plan maps (The Zia Company 1947, 05-0132).

The location of the septic tank and precharacterization sample locations were surveyed following the completion of precharacterization sampling. Geodetic survey data was transferred to FIMAD for incorporation into the ER database.

Geophysical Surveys

A geophysical survey was conducted in an effort to locate the position and orientation of the septic tank and the associated piping. The geophysical survey consisted of magnetic and electromagnetic (EM) surveys. The septic tank produced a large EM and magnetic anomaly which was easily identifiable north-northeast of the house. There were no other anomalies in the area of the septic tank.

Septic Tank Investigation and Sampling

During the week of May 20, 1996, septic tank precharacterization activities included probing and augering within the marked boundaries of the anomaly provided by the geophysical survey. The tank was oriented with the long axis roughly in a northeast-southwest direction.

Numerous exploratory holes were probed and augered (hand-auger and electric power auger) within the estimated septic tank location marked by the geophysical crew. Drilling and probing was very difficult because the soil was very dry and several hardpack zones and layers of cobbles were encountered. The hardpack zones consisted of tuff and gravel fragments and were encountered most often between 12–18 in. bgs. Another difficult zone to auger through consisted of large cobbles, at 7 ft bgs, near the bottom of the tank. Equipment failures (cracked auger flights, broken bits, etc.) were common and often delayed progress of precharacterization activities. It was not possible to upgrade to larger equipment because the homeowner would not allow the use of a backhoe to expedite the precharacterization activities.

Initially, exploratory holes were probed across the southern end of the tank in an east-west direction to locate the tank walls and floor. In an area along what was assumed to be the eastern edge of the tank, a small trench was dug with a shovel to determine if the hard material encountered at approximately 16–18 in. bgs was a concrete wall. The east wall of the septic tank was found and subsequently traced to the north and south. The northeast corner of the tank was located by tracing the east wall to the north. The north wall was traced by probing and digging small trenches to the west. The northwest corner of the tank was located 12 ft from the northeast corner. The east and west walls near the house could not be located. It is possible that the south end of the septic tank was partially removed when the house foundation was constructed. The estimated dimensions scaled off the Zia Post Plan maps were 30 ft x 15 ft, and the aerial photos show a fairly large septic tank with the top of the tank exposed above ground surface. The tops of the walls were broken and uneven, with exposed rebar, indicating the top of the tank had been previously removed. At this point it was determined that precharacterization sampling could proceed with the existing knowledge of the septic tank dimensions (28–30 ft x 12 ft). It was not determined whether any baffles were present within the septic tank because a backhoe was not used to uncover the tank before precharacterization activities.

The exploratory holes used in locating the septic tank indicated that the tank contents were fairly uniform from top to bottom, with the exception of the hardpack and cobble zones. The tank contents consisted of fine-grained, dry, silty soil from top to bottom with a hardpack zone from 12–18 in. bgs and a cobble zone at approximately 7 ft bgs. The bottom of the tank was 8 ft bgs.

After the tank dimensions and soil characteristics were known, it was determined that samples would be collected from five different locations inside the tank. A minimum of two samples would be collected from each auger hole. The first sample would be collected from the zone 3.5–5 ft bgs and the second sample would be collected near the tank bottom, between 6.5–8 ft bgs. In addition, one sample would be collected beneath the inlet piping location if it could be located, one sample would be collected beneath the outlet piping location if it could be located, and two outfall samples would be collected from a drainage channel downhill from the center of the tank's north wall. Samples collected are summarized in Table 5.1-1.

TABLE 5.1-1

SUMMARY OF SAMPLES COLLECTED AT PRS 0-030(o)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH	MRAL	VOCs	SVOCs	PEST/ PCBs	INOR-GANICS	RAD
0100-96-1101	00-04825	Inside tank in northeast corner	4.5 - 5.5 ft	2187	2191	2191	2191	2192	2193
0100-96-1102	00-04825	Inside tank in northeast corner	7 - 7.5 ft	2187	2191	2191	2191	2192	2193
0100-96-1103	00-04826	Inside tank near the southwest area of the tank	4.5 - 5.5 ft	2187	2191	2191	2191	2192	2193
0100-96-1104	00-04826	Inside tank near the southwest area of the tank	7 - 8 ft	2187	2191	2191	2191	2192	2193
0100-96-1105	00-04827	Inside tank near the northwest corner	3.5 - 5 ft	2318	2329	2329	2329	2330	2331
0100-96-1106	00-04827	Inside tank near the northwest corner	6.5 - 7.5 ft	2318	2329	2329	2329	2330	2331
0100-96-1107	00-04828	Inside the tank, near center of eastern side of tank	4 - 5 ft	2318	2329	2329	2329	2330	2331
0100-96-1108	00-04828	Inside the tank, near center of eastern side of tank	7 - 8.3 ft	2318	2329	2329	2329	2330	2331
0100-96-1109	00-04829	Inside tank, adjacent to the NE corner of the house	4 - 4.5 ft	2318	2329	2329	2329	2330	2331
0100-96-1110	00-04829	Inside tank, adjacent to the NE corner of the house	7 - 7.5 ft	2318	2329	2329	2329	2330	2331
0100-96-1111	00-04830	Outside tank, adjacent to the outlet drainline	4 - 4.5 ft	2318	2329	2329	2329	2330	2331
0100-96-1112	00-04831	Outside tank, estimated location for outfall pipe, 27 ft north of fence	1.5 - 2.0 ft	2318	2329	2329	2329	2330	2331
0100-96-1113	00-04832	Outside tank, estimated location for outfall pipe, 15 to 18 ft north of fence	3 - 5 in	2318	2329	2329	2329	2330	2331

After the tank was located and numerous attempts were made to collect samples with a hand auger, it was determined that additional equipment would be required to collect the samples. A portable Mobile Drill Minuteman™ rig mounted on a handcart was used to drill down to the desired sampling depth, then the sample material was collected with a stainless steel hand auger. Sample locations were staggered across the entire length of the tank. The first samples were collected in the northeast corner of the tank (FIMAD Location ID 00-04825). Sample 0100-96-1101 was collected from 4.5–5 ft bgs and sample 0100-96-1102 was collected from 7–7.5 ft bgs. Two samples were collected near the southwest corner of the tank (FIMAD Location ID 00-04826). Sample 0100-96-1103 was collected from 4.5–5.5 ft bgs and sample 0100-96-1104 was collected from 7–8 ft bgs. Two samples were collected near the northwest corner of the tank (FIMAD Location ID 00-04827). Sample 0100-96-1105 was collected from 3.5–5 ft bgs and sample 0100-96-1106 was collected from 6.5–7.5 ft bgs. Two samples were collected near the middle of the tank adjacent to the east sidewall (FIMAD Location ID 00-04828). Sample 0100-96-1107 was collected from 4–5 ft bgs and sample 0100-96-1108 was collected from 7–8 ft bgs. Two samples were collected near the southeast corner of the tank (FIMAD Location ID 00-04829). Sample 0100-96-1109 was collected from 4.5–5 ft bgs and sample 0100-96-1110 was collected from 7–7.5 ft bgs.

In order to determine if a release occurred from the drain line connections with the tank, a sample was collected beneath the estimated location of the outlet drain line. The Mobile Drill Minuteman™ was used to drill down to the desired sampling depth, then a hand auger was used to collect the sample. Sample 0100-96-1111 was collected outside the tank near the estimated location of the outlet connection from 4–4.5 ft bgs (FIMAD Location ID 00-04830). A sample could not be collected from beneath the location of the inlet pipe connection with the tank because this location was apparently under the foundation of the house.

Two samples were collected from different locations in the estimated outfall area. Sample 0100-96-1112 was collected from 1.5– ft bgs (FIMAD Location ID 00-04831) and sample 0100-96-1113 was collected from 3–5 in. bgs (FIMAD Location ID 00-04832).

After completion of precharacterization sampling activities, the exploratory auger holes and trenches were backfilled and the area of disturbed soil around the holes was raked to spread out the soil. Grass seed was broadcast over the area of disturbed soil and watered. The reseeded area was checked periodically throughout the summer to monitor recovery of the grass, which was completely restored by the end of the summer.

Deviations from the VCA Plan for Precharacterization Activities

All work was conducted in accordance with the VCA plan (LANL 1996, 05-0239). However, the following deviations occurred during precharacterization activities:

- Soil samples were not submitted to the MCAL for metals screening by XRF because it was determined that the screening data would not have been useful for making field decisions. Instead, seven-day turnaround times for analytical results were requested from a fixed laboratory.
- A backhoe was not used to assist in locating and uncovering the septic tank for precharacterization activities, because the landowner requested the precharacterization activities be limited to hand-operated equipment such as shovels, hand augers, an electric power auger, and the Mobile Drill Minuteman™ rig.
- The location of the septic tank in relationship to the house's foundation did not allow for complete precharacterization of the septic tank. An estimated one-third of the southern end of the septic tank could not be sampled because of the house and other subsurface obstructions.
- In order to adequately characterize the tank contents, all samples were submitted for a full suite of analyses rather than the 10% of samples originally planned.
- Samples were not collected from beneath the inlet pipe because the southern end of the tank was below the house foundation and could not be accessed.
- Waste characterization samples were submitted for TAL metals analysis instead of TCLP metals analysis. If TAL analytical results indicated that concentrations were 20 times greater than the Land Disposal Restriction concentrations for any metal, the samples would have been resubmitted for TCLP analyses (40 CFR Part 261.24).
- Remedial activities were not performed at this location because the southern third of the septic tank was inaccessible.

Sampling Methodology

Samples collected from inside the tank and beneath the outlet drain line were collected with a stainless steel hand-auger and samples collected from the outfall area were collected using the spade and scoop method. After a sample was collected, it was screened with hand-held instruments to detect gross radiological and chemical contamination (see the following section for additional details). Immediately after screening, the VOC sample was collected. The remaining sample material was homogenized and placed into appropriate sample containers for additional analyses.

All sample containers were appropriately labeled and assigned LANL sample identification numbers with bar codes. The samples were documented on sample collection logs, placed in coolers with ice, and transported to the SMO under chain-of-custody. All sampling was conducted in accordance with LANL ER Project procedures.

All samples were submitted to the MRAL (by the SMO) for screening analyses to determine if any contamination was present. The screening analyses included VOCs, gross alpha/beta/ gamma, tritium, and moisture content.

Samples were submitted to the SMO for off-site, fixed-laboratory analyses. All samples collected were analyzed for TAL metals by EPA SW-846 Method 6010 and 7470 (mercury), SVOCs by EPA SW-846 Method 8270, PCBs/pesticides by EPA SW-846 Method 8080, and VOCs by EPA SW-846 Method 8260. In addition, samples were also analyzed for total uranium by ICP/MS, plutonium-238 and plutonium-239/240 by alpha spectrometry, and americium-241 by gamma spectrometry.

Field Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil (trenching and augering) was screened to detect chemical and gross radiological contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc., OVM Model 580B™, PID with a 10.6 eV bulb, and for ionizing radiation using Ludlum Model 139™ rate meters with an air proportional (alpha) probe and an Eberline™ (beta/gamma) probe. The excavation and soils were screened for flammable gases using a Mine Safety Appliances Combustible Gas Indicator™. All field screening instruments were calibrated (as necessary) and checked on a daily basis.

Field Screening Results

All excavated soils, auger cuttings and samples were screened for gross alpha and beta/ gamma radiological activity and organic vapors, as described above. Health and safety action levels were not exceeded during field operations. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples ranged from 0.0–23 ppmv, with the maximum reading detected at the top of the borehole near the middle of the tank and the east wall of the septic tank (FIMAD Location ID 00-04828). Alpha and beta/gamma screening results indicated no detectable activitity.

5.1.1 Background Comparisons

Data for inorganics and radionuclides at PRS 0-030(o) were compared to background screening values presented in *Statistical Comparisons to Background, Part I* (Environmental Restoration Project Decision Support Council 1995, 1218). The results of the background comparison are discussed below.

5.1.1.1 Inorganics

Thirteen soil samples collected from 0-030(o) were analyzed for TAL metals. Seven inorganics (calcium, chromium, lead, mercury, silver, thallium, and zinc) were detected at concentrations exceeding their background screening values. The concentrations for each sample that has at least one value above background screening values for these analytes are presented in Table 5.1.1-1.

TABLE 5.1.1-1

INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(o)

SAMPLE ID	CALCIUM (mg/kg)	CHROMIUM (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	SILVER (mg/kg)	THALLIUM (mg/kg)	ZINC (mg/kg)
UTL	6 120	19.3	23.3	0.1	n/a[a]	1	50.8
SAL	n/a	211	400	23[b]	380	5.4[b]	23 000
0100-96-1101	2 410	4.43	9.01	0.03	0.213(U)[c]	1.2	37.7
0100-96-1102	9 480	9.5	9.3	0.12	0.21(U)	1.6	61.5
0100-96-1103	3 550	8.1	14.2	0.07	0.23(U)	1.8	38.5
0100-96-1104	6 880	10.2	17.2	0.13	0.22(U)	1.6	58.7
0100-96-1105	1 550	5.4	7	0.031	0.104(U)	NA[d]	52.8
0100-96-1106	1 760	6.2	7.1	0.04	0.13	NA	42
0100-96-1107	2 820	11.6	15	0.03	0.11(U)	NA	35.6
0100-96-1108	4 260	11.3	16.7	0.33	0.35	NA	46.3
0100-96-1109	3 090	19.4	15	0.02(U)	0.11(U)	NA	71.7
0100-96-1110	3 950	14	15.5	0.04	0.11(U)	NA	98
0100-96-1111	1 910	4.4	4.8	0.02(U)	0.1(U)	NA	32
0100-96-1112	1 790	5.1	7.3	0.02	0.11(U)	NA	35.5
0100-96-1113	2 170	8.2	35.2	0.07	0.11(U)	NA	66.6

[a] n/a =Not available. For silver, the detection limit is used as a background screening value.
[b] Value represents the maximum reported background concentration in soil.
[c] (U) = Not detected.
[d] NA =Not analyzed.

5.1.1.2 Radionuclides

Thirteen soil samples collected from PRS 0-030(o) were analyzed by gamma spectroscopy. These samples were also analyzed for isotopic plutonium.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

- Fifteen short-lived activation/fission products reported at PRS 0-030(o) (cadmium-109, cerium-139, cesium-134, cobalt-57, europium-152, lanthanium-140, manganese-54, mercury-203, ruthenium-106, selenium-75, sodium-22, strontium-85, tin-113, yttrium-88, and zinc-65) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to occur at this PRS, these short-lived activation/fission products are eliminated as potential radionuclide contaminants.

- Potassium-40 is a naturally occurring radionuclide that is also routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995,1142; Longmire et al. 1995,1266). Potassium-40 will not be considered a potential radionuclide contaminant at this site.

- Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants. QA/QC activities review daughter radionuclides for consistency with parent activities, and any that cannot be attributed to background concentrations of the parent are retained as potential contaminants.

EQLs and minimum detectable activities are often not available for radionuclides by gamma spectroscopy. A value of three times the measurement uncertainty (3 sigma or three standard deviations) is used to calculate a sample-specific minimum detectable activity, which is then used in the same manner as a detection limit. This methodology is similar to Currie's method of determining radionuclide maximum detectable activity (Currie1988, 0792). This 3 sigma screening value takes into account variability caused by counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative,

and may include radionuclides whose presence is spuriously reported because of spectral interferences or misidentifications. Americium-241, cobalt-60, and uranium-235 were eliminated from further consideration based on this criterion.

Of the remaining three radionuclides reported for PRS 0-030(o), cesium-137 and plutonium-238 were eliminated from further consideration based on background screening value criteria. Plutonium-239/240 was detected above its background screening value. The concentrations of plutonium-239/240 that exceed its background screening value are presented in Table 5.1.1-2.

TABLE 5.1.1-2

RADIONUCLIDE WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(o)

LOCATION ID	SAMPLE NUMBER	PLUTONIUM-239/240 (pCi/g)
UTL	n/a[a]	0.092[b]
SAL	n/a	24
00-04825	0100-96-1102	0.180
00-04826	0100-96-1104	1.950
00-04828	0100-96-1108	0.516
00-04829	0100-96-1110	0.100
00-04832	0100-96-1113	0.14

[a] n/a = not applicable
[b] Value represents the maximum reported concentration in the Environmental Surveillance Reports.

5.1.2.1 Evaluation of Organic Chemicals

Thirteen soil samples collected from PRS 0-030(o) were analyzed for VOCs, SVOCs, pesticides, and PCBs. Eight organic chemicals were detected at PRS 0-030(o). Concentrations of these organic chemicals are shown in Table 5.1.2-1. These eight organic chemicals will be carried forward to the screening assessment.

TABLE 5.1.2-1

CONCENTRATIONS OF ORGANIC CHEMICALS DETECTED AT PRS 0-030(o)

LOCATION ID	SAMPLE NUMBER	DEPTH	ACETONE	BIS(2-ETHYLHEXYL) PHTHALATE	4,4-DDD	4,4'-DDE	4,4'-DDT	p-ISO PROPYL TOLUENE	TOLUENE	XYLENES (TOTAL)
SAL	N/A[a]	N/A	2 000	32	1.9	1.3	1.3	n/a[b]	190	990
00-04825	0100-96-1101	4.5 - 5.5 ft	0.021 (U)[c]	0.35 (U)	0.23 (U)	0.029	0.005	0.005 (U)	0.005 (U)	NA[d]
00-04825	0100-96-1102	7 - 7.5 ft	0.029	0.35 (U)	1.4 (U)	0.17	0.17 (U)	0.005 (U)	0.005 (U)	NA
00-04826	0100-96-1103	4.5 - 5.5 ft	0.026	0.38 (U)	0.059	0.095	0.052	0.006 (U)	0.006 (U)	NA
00-04826	0100-96-1104	7 - 7.5 ft	0.035	0.37 (U)	0.3	0.19	0.28	0.006 (U)	0.006 (U)	NA
00-04827	0100-96-1105	3.5 - 5.0 ft	0.021 (U)	0.17 (U)	0.011	0.024	0.042	0.005 (U)	0.005 (U)	0.005 (U)
00-04827	0100-96-1106	6.5 - 7.5 ft	0.049 (U)	0.17 (U)	0.015	0.042	0.065	0.005 (U)	0.005 (U)	0.005 (U)
00-04828	0100-96-1107	4 - 5 ft	0.022 (U)	0.18 (U)	0.005	0.017	0.009	0.005 (U)	0.005 (U)	0.005 (U)
00-04828	0100-96-1108	7 - 8.3 ft	0.026 (U)	0.22 (U)	0.61	0.067	0.22	0.41	0.028	0.0092
00-04829	0100-96-1109	4 - 4.5 ft	0.039 (U)	0.18 (U)	0.004 (U)	0.014	0.038	0.005 (U)	0.005 (U)	0.005 (U)
00-04829	0100-96-1110	7.0 - 7.5 ft	0.021 (U)	0.18 (U)	0.091	0.018	0.01	0.005 (U)	0.005 (U)	0.005 (U)
00-04830	0100-96-1111	4.0 - 4.5 ft	0.045 (U)	0.17 (U)	0.004 (U)	0.027	0.011	0.005 (U)	0.005 (U)	0.005 (U)
00-04831	0100-96-1112	1.5 - 2.0 ft	0.022 (U)	0.18 (U)	0.004 (U)	0.004 (U)	0.0043	0.005 (U)	0.005 (U)	0.005 (U)
00-04832	0100-96-1113	3 - 5 in	0.021 (U)	0.18	0.019	0.196	0.35	0.005 (U)	0.005 (U)	0.005 (U)

[a] N/A = Not applicable.
[b] n/a = Not available.
[c] (U) = Not detected.
[d] NA = Not analyzed.

5.1.3 Screening and Assessment

The purpose of this section is to assess the potential for adverse human health effects resulting from exposure to residual contamination associated with the septic tank PRS 0-030(o). A screening assessment and qualitative risk assessment were performed on the RFI data for this PRS following methodology presented in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277). Only data from samples sent to a fixed laboratory were included in this screening and assessment.

5.1.3.1 Screening Assessment

COPCs detected at concentrations greater than background screening values, lacking background data for comparison, or detected at concentrations exceeding EQLs were carried forward to the screening assessment. These include seven inorganic chemicals, eight organic chemicals, and one radionuclide that were carried forward from the background comparison and organic chemical evaluation. The screening assessment includes a comparison to SALs and an MCE as described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277).

Equal to or Greater than SAL. No chemicals were detected at concentrations exceeding their respective SALs.

No SAL. Of the 17 COPCs carried forward from the background and EQL comparisons, two chemicals, calcium and p-isopropyltoluene, have no SAL for comparison. Calcium is an essential nutrient that can be eliminated as a COPC on the basis of best professional judgment (EPA 1989, 0305). Although calcium has no SAL, as an essential nutrient it may be compared to the recommended daily allowance (RDA) for children and adults. The calcium RDA is 800 mg/day for a child and 1 200 mg/day for an adult. The highest detected concentration of calcium at PRS 0-030(o) was 9 480 mg/kg. At the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 1.9 mg of calcium. An adult, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 1 mg of calcium. Because both amounts are considerably less than the RDAs for adult and child, calcium is eliminated as a COPC.

An aromatic hydrocarbon, p-Isopropyltoluene is similar in structure to cumene, toluene, and xylene. Although it does not have a SAL for comparison, if the lowest SAL of similarly structured chemicals is used as a surrogate SAL (SAL for cumene is 49 mg/kg), the normalized value for the single detected concentration of p-isopropyltoluene (0.41 mg/kg) would be 0.008. This

value would not change the MCE results; therefore, p-isopropyltoluene is eliminated as a COPC.

Less than SAL. The 15 remaining chemicals were detected at concentrations below their respective SALs. As described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277), analytes are divided into three classes (carcinogens, noncarcinogens, and radionuclides) to evaluate possible additive effects within each class of chemicals. In this case, only one radionuclide, plutonium-239/240, was detected at a concentration (1.95 pCi/g) below its SAL (24 pCi/g). An MCE was not performed for radionuclides, and plutonium-239/240 is eliminated as a COPC. The MCE for PRS 0-030(o) is presented in Table 5.1.3-1.

TABLE 5.1.3-1

MULTIPLE CHEMICAL EVALUATION FOR PRS 0-030(o)

	LOCATION ID	SAMPLE NUMBER	MAXIMUM CONCENTRATION (mg/kg)	SAL (mg/kg)	NORMALIZED VALUE
Carcinogens	n/a[a]	n/a	(mg/kg)	(mg/kg)	n/a
4,4'-DDD	00-04828	0100-96-1108	0.61	1.9	0.3
4,4'-DDE	00-04832	0100-96-1113	0.196	1.3	0.2
4,4'-DDT	00-04832	0100-96-1113	0.35	1.3	0.3
Chromium	00-04829	0100-96-1109	19.4	211	0.09
bis(2-Ethylhexyl)phthalate	00-04832	0100-96-1113	0.18	32	0.006
			Normalized Sum		0.9
Noncarcinogens	n/a	n/a	(mg/kg)	(mg/kg)	n/a
Acetone	00-04827	0100-96-1106	0.049	2000	0.00002
Lead	00-04832	0100-96-1113	35.2	400	0.09
Mercury	00-04828	0100-96-1108	0.33	23	0.01
Silver	00-04828	0100-96-1108	0.35	380	0.0009
Thallium	00-04826	0100-96-1103	1.8	5.4	0.3
Toluene	00-04828	0100-96-1108	0.028	190	0.0001
Xylenes (total)	00-04828	0100-96-1108	0.0092	990	9.00E-06
Zinc	00-04829	0100-96-1110	98	23000	0.004
			Normalized Sum		0.4

a n/a = Not applicable.

The normalized sum for carcinogens (0.9) and noncarcinogens (0.4) are both less than unity, indicating that the potential for adverse human health effects from exposure is unlikely. Therefore, all chemicals with concentrations less than SAL are eliminated as COPCs.

5.1.4 Preliminary Ecological Assessment

In cooperation with the New Mexico Environment Department and EPA Region 6, the Laboratory ER Project is developing an approach for ecological risk assessment. Further ecological risk assessment at PRS 0-030(o) will be deferred until this site can be assessed as part of the ecological exposure unit methodology currently being developed.

5.1.5 Conclusions and Recommendations

Because adverse human health effects are not expected at PRS 0-030(o), no further action is recommended.

5.2 Remedial Activities and Results of Confirmatory Sampling

5.2.1 Risk Calculations and/or Cleanup Level Derivation

The objectives of the Phase 1 RFI investigation and VCA at PRS 0-030(o) were to determine the presence or absence of contamination associated with the septic tank. No cleanup levels were derived for PRS 0-030(o), because no remedial activities were conducted. Instead, RFI samples were screened to verify that no chemicals remain at concentrations likely to cause adverse human health effects.

5.2.2 Remedial Implementation for PRS 0-030(o)

Septic Tank Removal

The septic tank behind the private residence at 1300 Canyon Road was not removed. The southern portion of the tank is under the house foundation and is inaccessible, and the homeowner did not want to risk property damage during tank removal.

5.2.3 Confirmatory Sampling for PRS 0-030(o)

Confirmation samples were not collected because the septic tank is still in place.

5.3 Waste Management for PRS 0-030(o)

Waste issues are not addressed for PRS 0-030(o) because no waste was generated.

5.3.1 Waste Characteriztion Data for PRS 0-030(o)

Waste issues are not addressed for PRS 0-030(o) because no waste was generated.

6.0 PRS 0-030(p)

6.1 Site Characterization

Site Survey Results

The septic tank at PRS 0-030(p) (Fig. 6.1-1) was located on private property behind the residence at 99 Rim Road (at the eastern end of the Rim Road cul-de-sac) (The Zia Company 1947, 05-0132). Engineering drawings showing the facilities or residential housing connected to this septic tank are not available. However, it is believed the septic tank serviced the Rim Road and Quartz Street residential areas. It is not likely to have been connected to any technical buildings or have received radioactive or RCRA materials (Francis and Sullivan 1995, 05-0207).

A review of aerial photos taken in the mid 1940s shows the residential housing foundations under construction. The septic tank is not visible. During the initial field reconnaissance survey, the tank and associated piping were not located; however, it was noted that approximately 1 ft of backfill soil had been brought in to level the lot.

Geodetic Surveys

The approximate septic tank location coordinates were obtained from Zia Company drawings circa 1947. During the initial geodetic survey, it was determined that the coordinates were inaccurate because they placed the tank too close to the footprint of the former residence. However, during the survey, a 6-in.-diameter steel outfall pipe was located along the northern edge of the mesa (see the Geophysical Survey section for additional information).

The location of the outfall pipe, sample locations, and the estimated location of the septic tank walls were surveyed following the removal of the pipe and backfilling of the excavation. Geodetic survey data was transferred to FIMAD for incorporation into the ER database.

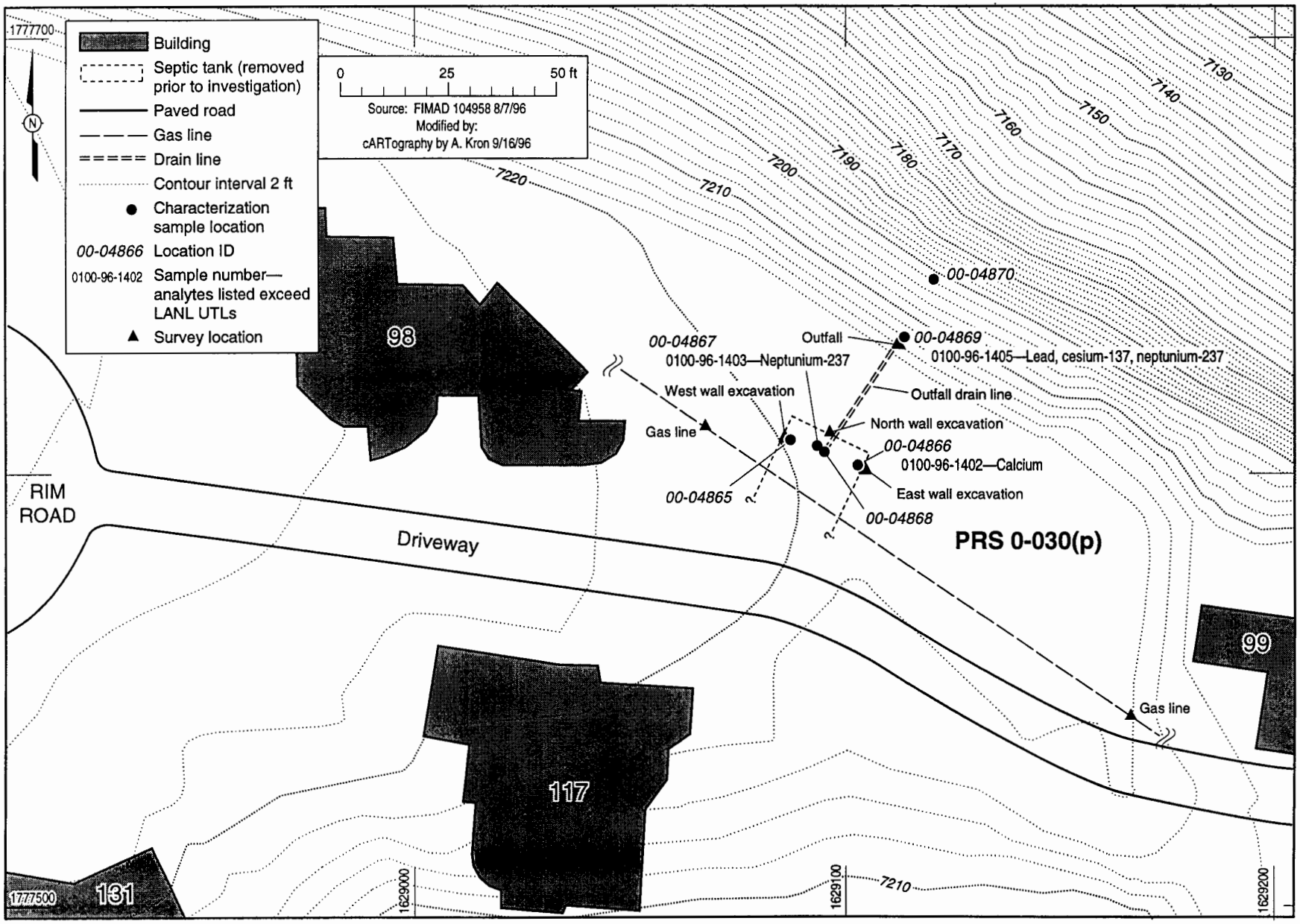

Fig. 6.1-1. Characterization sampling locations showing analytes above background screening values for PRS 0-030(p).

Geophysical Surveys

A geophysical survey was conducted in an effort to locate the position and orientation of the septic tank and the associated piping. To assist in locating the septic tank, a metal snake was used to trace the outfall pipe from the canyon edge for approximately 30 ft south before an obstruction was encountered. A weak electromagnetic induction anomaly corresponded to the southern extent of the outfall pipe. The results of the magnetic survey were inconclusive because of background noise from the utility lines crossing the survey area.

Septic Tank Investigation and Sampling

On July 10, 1996, PRS 0-030(p) precharacterization activities included marking out the edge of the safe excavation zone, taking into account the location of electric and water lines and a 10-in. gas main crossing over the possible southern edge of the tank. The outfall pipe was traced, and a backhoe trenched in east-west and north-south directions to try to locate the walls and floor of the septic tank.

A 6-in. steel outfall pipe, draining into Pueblo Canyon, was exposed on the north edge of the mesa. A backhoe was used to uncover the outfall pipe and trace its length from the canyon edge to its endpoint toward the south. The pipe was found to have a vertical T 30 ft from the mouth of the outfall. The upper section of the T had a cover plate (possibly a cleanout port) while the lower section extended approximately 4 ft down and appeared to have been cut off with a cutting torch. The T-section of the outfall pipe was located in a previously excavated and backfilled pit. An east-west trench was dug south of the T to look for the septic tank walls and floor. Vertical walls of tuff were encountered 10 ft west and 10 ft east of the T. Tuff was also encountered at 10 ft below ground surface as measured from the current surface (an estimated 1 ft of soil had been brought in to level the lot). A second trench was dug in a north-south direction parallel to the outfall pipe in an effort to locate the septic tank walls and floor. The length of the second trench was limited to 7 ft in the southern direction by a 10-in. gas main line angling across the southern edge of the suspected septic tank location. Because of conflicting reports from Los Alamos County utility personnel, Public Services of New Mexico gas personnel, and Johnson Control Inc. utility personnel, it was not known whether the gas main

was active. For health and safety reasons, a 7-ft safety zone was established on both sides of the gas main, and trenching was prohibited in the safety zone. In the second trench, the tuff wall was located 3 ft north of the T in the outfall pipe. From the north tuff wall, the trench was extended 7 ft to the south and was stopped at the edge of the safety zone. The north-south trench did not encounter the south septic tank wall or floor. The previously excavated pit contained a tree trunk, large tuff boulders, and soil. Additional utilities (electric and water lines) to the south of the gas main prohibited any excavation activities on the southern side of the gas main to look for the inlet pipe.

The septic tank was put into service in 1946 and removed from service sometime in the 1947-1948 time-frame (records of usage could not be located). Conversations with former Los Alamos County utility personnel indicated that the gas main was put into service around 1950. It was assumed that the septic tank was removed and the outfall pipe was left in place during installation of the gas main. Based on this assumption, three samples were collected from the bottom of the east-west trench. Because the trench walls caved in and the bottom of the north-south trench was inaccessible, one sample was collected beneath the T in the outfall pipe, and two samples were collected from the outfall location. Samples collected inside the previous excavation and at the mouth of the outfall pipe will be used as confirmation samples. All samples collected at PRS 0-030(p) are summarized in Table 6.1-1.

TABLE 6.1-1

SUMMARY OF SAMPLES COLLECTED AT PRS 0-030(p)

SAMPLE INFORMATION				REQUEST NUMBER					
SAMPLE ID	LOCATION ID	LOCATION DESCRIPTION	DEPTH	RAD VAN	VOCs	SVOCs	PEST/ PCBs	INORGANICS	RAD
0100-96-1401	00-04865	Inside backfilled pit, in NW corner	10 - 10.5 ft.	2397	2398	2398	2398	2400	2399
0100-96-1402	00-04866	Inside backfilled pit, in NE corner	10 - 10.5 ft.	2397	2398	2398	2398	2400	2399
0100-96-1403	00-04867	Inside backfilled pit, beneath the outlet pipe	3 - 3.5 ft.	2397	2398	2398	2398	2400	2399
0100-96-1404	00-04868	Inside backfilled pit, at bottom of excavation under outlet pipe	10 - 10.5 ft.	2397	2398	2398	2398	2400	2399
0100-96-1405	00-04869	At the mouth of the outlet pipe	0 - 5 in.	2397	2398	2398	2398	2400	2399
0100-96-1406	00-04870	Ten feet downslope from the mouth of the outlet pipe	3 - 9 in.	2397	2398	2398	2398	2400	2399

Sample 0100-96-1401 (FIMAD Location ID 00-04865) was collected in the tuff at the west end of the east-west trench at the bottom (10–10.5 ft) of the previous excavation. Sample 0100-96-1402 (FIMAD Location ID 00-04866) was collected in the tuff at the east end of the east-west trench at the bottom (10–10.5 ft) of the previous excavation. Sample 0100-96-1404 (FIMAD Location ID 00-04868) was collected in the tuff from the middle of the east-west trench at the bottom (10–10.5 ft) of the previous excavation (below the T). A backhoe bucket was used to collect samples from the bottom of the excavation. The samples were then collected from the backhoe bucket using the spade and scoop method. Sample 0100-96-01403 (FIMAD Location ID 00-04867) was collected underneath the vertical T outfall pipe near the center of the previously excavated pit. The sample was collected from soil/tuff underneath the outfall pipe (depth of 3–3.5 ft) using the spade and scoop method. All samples were screened, using hand-held instruments (PID and radiation meters), to detect gross chemical and radiological contamination (see Field Screening Methodology and Field Screening Results in this section of the report for additional information).

Two samples were collected in the outfall area below the mouth of the pipe. Sample 0100-96-1405 was collected at the mouth of the steel outfall pipe from 0–5 in. bgs (FIMAD Location ID 00-04869) and sample 0100-96-1406 was collected approximately 12 ft downstream, in the drainage path, at 3–9 in. bgs (FIMAD Location ID 00-4870).

After completion of sampling, pipe removal, backfilling, and compacting activities, the disturbed soils were covered with jute matting to assist in erosion control and revegetation of the natural ground cover. A straw bale sediment catchment dam was placed along the mesa edge to control stormwater runoff.

Deviations from the VCA Plan

All work was conducted in accordance with the VCA plan (LANL 1996, 05-0239). However, the following deviations occurred during field investigation activities.

- Because of the proximity of utility lines, the former septic tank location could not be fully excavated to the south.
- The inlet pipe, where it enters the septic tank, was not investigated or located because of the proximity of the utility lines and for health and safety concerns.
- Soil samples were not submitted to the MCAL for metals screening by XRF because it was determined that the screening data would not have been

useful for making field decisions. Instead, seven-day turnaround times for analytical results were requested from a fixed laboratory.

- Waste characterization samples were not collected from inside the septic tank because the tank was not found (it is assumed the tank had been previously removed). Confirmatory samples were collected from within the previously excavated septic tank pit.

- Waste characterization samples were submitted for TAL metals analysis instead of TCLP metals analysis. If TAL analytical results indicated that concentrations were 20 times greater than the Land Disposal Restriction concentrations for any metal, the samples would have been resubmitted for TCLP analyses (40 CFR Part 261.24).

Sampling Methodology

Samples collected from the former septic tank location, from beneath the T, and at the outfall area, were collected using the spade and scoop method. Once the sample was collected, it was screened with hand-held equipment to detect gross radiological and chemical contamination (see the following section for additional details). Immediately after screening, the VOC sample was collected. The remaining sample material was homogenized and placed into the appropriate sample containers for additional analyses.

All sample containers were appropriately labeled and assigned LANL sample identification numbers with bar codes. The samples were documented on sample collection logs, placed in coolers with ice, and transported to the SMO under chain-of-custody. All sampling was conducted in accordance with LANL ER Project procedures.

On July 11, 1996, all samples were submitted to the SMO for delivery to the MRAL for screening analyses to determine if any contamination was present. The screening analyses included gross alpha/beta/gamma, tritium, and moisture content. Samples were also submitted for off-site, fixed-laboratories for analyses. The fixed-laboratory analyses included TAL metals by EPA SW-846 Method 6010 and 7470 (mercury), VOCs by EPA SW-846 8260, SVOCs by EPA SW-846 Method 8270, and PCBs/pesticides by EPA SW-846 Method 8080. In addition, samples were also analyzed for plutonium-238 and plutonium-239/240 by alpha spectrometry, americium-241 by gamma spectrometry, and total uranium by ICP/MS.

Field Screening Methodology

Field screening was performed to protect worker health and safety, to comply with LANL waste minimization policies, and to guide soil sampling. Excavated soil was screened to detect chemical and gross radiological contamination. The soil was screened for organic vapors using a Thermo Environmental Instruments, Inc., organic vapor meter (OVM) Model 580B™, PID with an 11.7 eV bulb and for ionizing radiation using Ludlum Model 139™ rate meters with an air proportional (alpha) probe and an Eberline™ (beta/gamma) probe. The excavation and soils were screened for flammable gases using a Mine Safety Appliances Combustible Gas Indicator™. All field screening instruments were calibrated (as necessary) and checked on a daily basis.

Field Screening Results

All excavated soils, samples, and trenches were screened for alpha and beta/gamma activity and organic vapors, as described above. Health and safety action levels were not exceeded during field operations. Field screening results were recorded in the SSO site logbook, field screening forms, and sample collection logs.

Organic vapor readings for soil samples were 0.0 ppmv for all activities. Alpha and beta/gamma screening results indicated no detectable activity.

6.1.1 Background Comparisons

Data for inorganics and radionuclides at PRS 0-030(p) were compared to background screening values presented in Statistical Comparisons to Background, Part I (Environmental Restoration Project Decision Support Council 1995, 1218). The results of the background comparison are discussed below.

6.1.1.1 Inorganics

Six soil samples collected from PRS 0-030(p) were analyzed for TAL metals and total uranium. Some analyses included one or more laboratory duplicates. For purposes of the screening assessment, the highest detected value was used for samples for which a laboratory duplicate was analyzed. Two inorganics (calcium and lead) were detected at concentrations exceeding their respective background screening values. The concentrations for each sample that has at least one value above background screening values for these analytes are presented in Table 6.1.1-1. Calcium and lead will be carried forward to the screening assessment.

TABLE 6.1.1-1

INORGANICS WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(p)

SAMPLE ID	CALCIUM (mg/kg)	LEAD (mg/kg)
UTL	6 120	23.3
SAL	n/a[a]	400
0100-96-1402	6 130	13.2
0100-96-1405	4 240	34.2

[a] n/a = Not available.

6.1.1.2 Radionuclides

Six soil samples collected from PRS 0-030(p) were analyzed by gamma spectroscopy. These six samples were also analyzed for isotopic plutonium and total uranium.

Analyses of radionuclides by gamma spectroscopy often leads to the reporting of concentrations for certain radionuclides that are inappropriate to evaluate as potential site contaminants. These radionuclides include: short-lived activation/fission products, naturally occurring background radionuclides, and daughter radionuclides of naturally occurring radionuclides. These three classes of radionuclides are generally not considered site contaminants for the reasons discussed below.

- Sixteen short-lived activation/fission products reported at PRS 0-030(p) (barium-140, cadmium-109, cerium-139, cesium-134, cobalt-57, europium-152, lanthanium-140, manganese-54, mercury-203, ruthenium-106, selenium-75, sodium-22, strontium-85, tin-113, yttrium-88, and zinc-65) have half-lives ranging from a few days to 2.6 years. Several of these radionuclides are used as internal standards to measure equipment performance, laboratory background (or contamination), etc. Because activation/fission products with short half-lives are routinely reported for reasons not related to RFI investigations, and are not expected to be present at this PRS, these short-lived activation/fission products are eliminated as potential radionuclide contaminants.

- Potassium-40 is a naturally occurring radionuclide that is also routinely reported because it is used as an internal standard. There is no process knowledge of the use of potassium-40 at this PRS, and reported concentrations are generally within known background ranges for potassium-40 (Longmire et al. 1995, 1142; Longmire et al. 1995, 1266). Potassium-40 will not be considered a potential radionuclide contaminant at this site.

- Daughters of naturally occurring radionuclides (uranium and thorium) are also reported by gamma-spectroscopy analyses. These daughters (e.g., isotopes of actinium, bismuth, lead, protactinium, radium, radon, thallium, and thorium) are normally present in secular equilibrium concentrations and are not directly evaluated as potential radionuclide contaminants. QA/QC activities review daughter radionuclides for consistency with parent activities, and any that cannot be attributed to background concentrations of the parent are retained as potential contaminants.

EQLs and minimum detectable activities are often not available for radionuclides by gamma spectroscopy. A value of three times the measurement uncertainty (3 sigma or three standard deviation) is used to calculate a sample-specific minimum detectable activity, which is then used in the same manner as a detection limit. This methodology is similar to Currie's method of determining radionuclide maximum detectable activity (Currie1988, 0792). This 3 sigma screening value takes into account variability caused by counting statistics, but does not account for spectral peak identification problems. Thus, this 3 sigma screening is conservative, and may include radionuclides whose presence is spuriously reported because of spectral interferences or misidentifications. Americium-241, cobalt-60, and uranium-235 were eliminated from further consideration based on this criterion.

Of the remaining three radionuclides reported for PRS 0-030(p), plutonium-238 and plutonium-239/240 were eliminated from further consideration based on background screening value criteria. Cesium-137 has at least one detected concentration above its background screening value. The detected values for cesium-137 are presented below in Table 6.1.1-2. Cesium-137 is carried forward to the screening assessment.

TABLE 6.1.1-2

RADIONUCLIDES WITH CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-030(p)

SAMPLE ID	CESIUM-137 (pCi/g)
UTL	1.7[a]
SAL	5.1
0100-96-1403	0.056(U)[b]
0100-96-1405	1.79
0100-96-1406	0.706

[a] Maximum reported value in the Environmental Surveillance Reports.
[b] (U) = Not detected.

6.1.2 Evaluation of Organic Chemicals

Six soil samples collected from PRS 0-030(p) were analyzed for VOCs, SVOCs, pesticides, and PCBs. Eight organic chemicals [acetone, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, and p-isopropyltoluene] were detected at PRS 0-030(p). The concentrations for each sample that had at least one detected value for these eight chemicals are presented in Table 6.1.2-1. These eight chemicals will be carried forward to the screening assessment.

TABLE 6.1.2-1

ORGANICS WITH DETECTED CONCENTRATIONS AT PRS 0-030(p)

SAMPLE ID	ACETONE (mg/kg)	BENZO(a) ANTHRACENE (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)	p-ISO PROPYL TOLUENE (mg/kg)
SAL	2 000	0.61	0.061	0.61	0.61	24	2 600	n/a[a]
0100-96-1401	0.022 (U)[b]	0.28	0.27	0.39	0.29	0.56	0.19	0.0054 (U)
0100-96-1405	0.031 (J)[c]	0.22 (UJ)[d]	0.22 (UJ)	0.22 (UJ)	0.22 (UJ)	0.22 (UJ)	0.22 (UJ)	0.024 (J)

[a] n/a = Not available.
[b] (U) = Not detected.
[c] (J) = Estimated value.
[d] (UJ) = Estimated undetected value.

6.1.3 Screening and Assessment

The purpose of this section is to assess the potential for adverse human health effects resulting from exposure to residual contamination associated with the septic tank PRS 0-030(p). A screening assessment and qualitative risk assessment were performed on the data for samples that remain at this PRS following methodology presented in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277). Only data from samples sent to a fixed laboratory were included in the screening and assessment.

6.1.3.1 Screening Assessment

COPCs detected at concentrations greater than background screening values, lacking background data for comparison, or detected at concentrations exceeding EQLs were carried forward to the screening assessment. These include two inorganic chemicals, eight organic chemicals, and one radionuclide that were carried forward from the background comparison and organic chemical evaluation. The screening assessment includes a comparison to SALs and an MCE as described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277).

Equal to or Greater than SAL. One organic chemical, benzo(a)pyrene, was detected at a concentration exceeding its SAL. This concentration is presented in Table 6.1.3-1 and shown on Fig. 6.1.3-1. No inorganics or radionuclides were detected at concentrations greater than SALs.

TABLE 6.1.3-1

CONCENTRATIONS IN SOIL THAT EXCEED SALS AT PRS 0-030(p)

LOCATION ID	SAMPLE NUMBER	BENZO(a)PYRENE (mg/kg)
SAL[a]	n/a[b]	0.061
00-04865	0100-96-1401	0.27

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

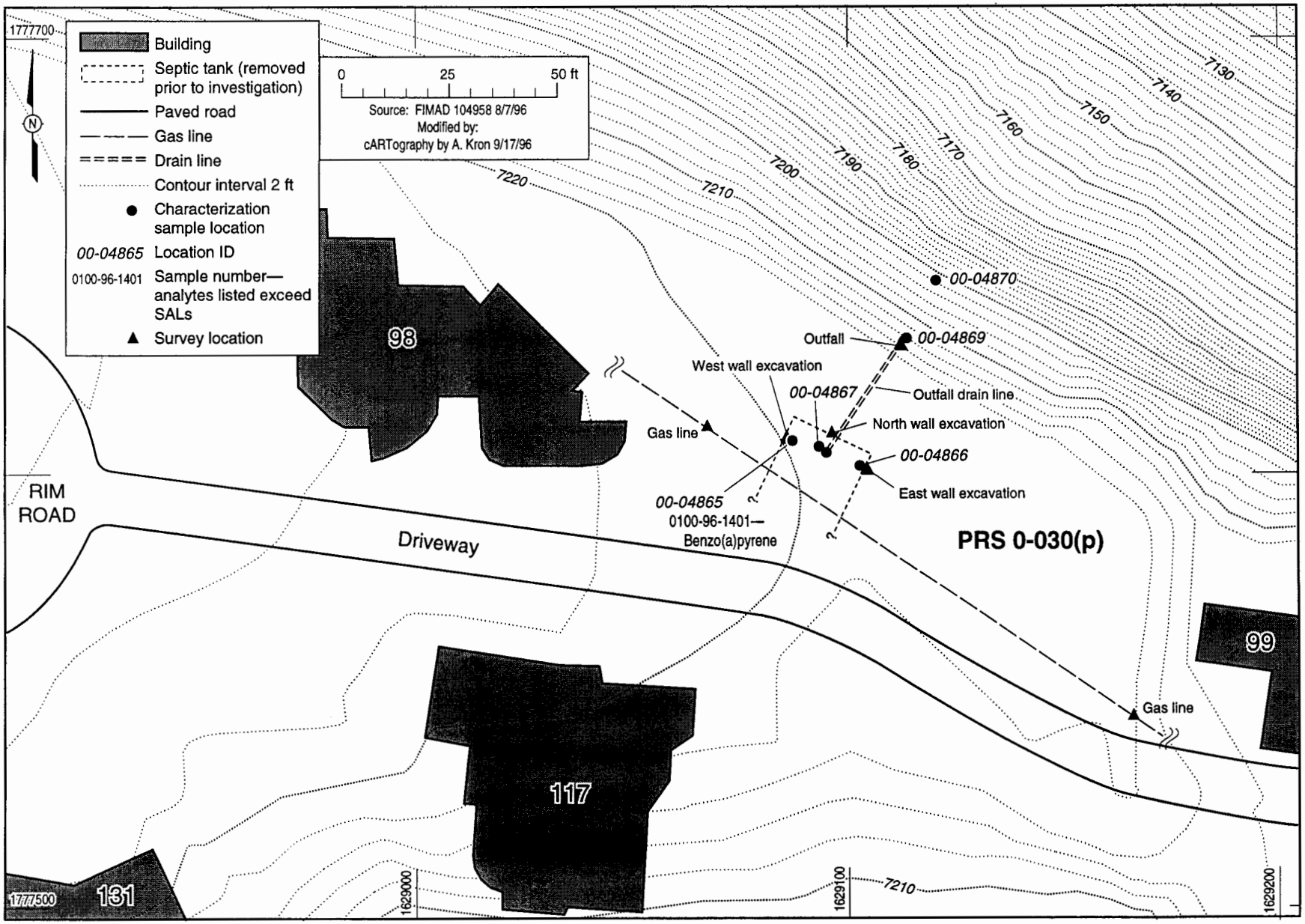

Fig. 6.1.3-1. Characterization sampling locations showing analyte above SAL at PRS 0-030(p).

No SAL. Of the 12 COPCs carried forward from the background and EQL comparisons, two chemicals, calcium and p-isopropyltoluene, have no SAL for comparison. Calcium is an essential nutrient that can be eliminated as a COPC on the basis of best professional judgment (EPA 1989, 0305). Although calcium has no SAL, as an essential nutrient it may be compared to the RDA for children and adults. The RDA for calcium is 800 mg/day for a child and 1 200 mg/day for an adult. The highest detected concentration of calcium at PRS 0-030(p) was 6 130 mg/kg. At the EPA default child soil ingestion rate of 200 mg/day, a child would ingest about 1.2 mg of calcium. An adult, at the EPA default adult soil ingestion rate of 100 mg/day, would ingest about 0.6 mg of calcium. Because both amounts are considerably less than the RDAs for adult and child, calcium is eliminated as a COPC.

The chemical p-isopropyltoluene is an aromatic hydrocarbon similar in structure to cumene, toluene, and xylene. Although it does not have a SAL for comparison, if the lowest SAL of similarly structured chemicals is used as a surrogate SAL (SAL for cumene is 49 mg/kg), the normalized value for the single detected concentration of p-isopropyltoluene (0.024 mg/kg) would be 0.0005. This value would not change the MCE results; therefore, no further evaluation of p-isopropyltoluene is necessary.

Less than SAL. The eight remaining chemicals were detected at concentrations below their respective SALs. As described in Risk-Based Corrective Action Process (LANL/SNL 1996, 1277), analytes are divided into three classes (carcinogens, noncarcinogens, and radionuclides) to evaluate possible additive effects within each class of chemicals. Because cesium-137 was the only radionuclide carried forward to the screening assessment, it is not necessary to evaluate additive radionuclide effects in the MCE. The maximum detection of cesium-137 was 1.79 pCi/g, well below its SAL of 5.1 pCi/g. Cesium-137 is eliminated as a COPC. The MCE for PRS 0-030(p) is presented in Table 6.1.3-2.

TABLE 6.1.3-2

MULTIPLE CHEMICAL EVALUATION FOR PRS 0-030(p)

ANALYTE	LOCATION ID	SAMPLE NUMBER	MAXIMUM CONCENTRATION	SAL	NORMALIZED VALUE
Carcinogens	n/a[a]	n/a	(mg/kg)	(mg/kg)	n/a
Benzo(a)anthracene	00-04865	0100-96-1401	0.28	0.61	0.5
Benzo(b)fluoranthene	00-04865	0100-96-1401	0.39	0.61	0.6
Benzo(k)fluoranthene	00-04865	0100-96-1401	0.29	6.1	0.05
Chrysene	00-04865	0100-96-1401	0.56	24	0.02
			Normalized Sum		1.2
Noncarcinogens	n/a	n/a	(mg/kg)	(mg/kg)	n/a
Lead	00-04869	0100-96-1405	34.2	400	0.09
Acetone	00-04869	0100-96-1405	0.031	2000	0.00002
Fluoranthene	00-04869	0100-96-1405	0.19	2600	0.00007
			Normalized Sum		0.09

a n/a = Not applicable.

The normalized sums for noncarcinogens (0.09) is less than unity, indicating that the potential for adverse human health effects from exposure is unlikely. Therefore, all noncarcinogens are eliminated as COPCs. The normalized sum for chemical carcinogens, however, is greater than one, at 1.2. The two chemicals that contribute more than 0.1 to the normalized sum (benzo(a)anthracene and benzo(b)fluoranthene) are retained as COPCs and are discussed in the qualitative risk assessment below.

6.1.3.2 Qualitative Human Health Risk Assessment

Three PAHs, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, were identified as COPCs in the screening assessment. PAHs were detected in only one of six samples at PRS 0-030(p) at a depth of 10–10.5 ft (sample location 00-04865) in fill material within the previously excavated pit where it is assumed the septic tank was located. If a widespread release had occurred, PAHs would have been detected in samples collected at the outfall, where no evidence of significant chemical contamination was shown. Therefore, it is most likely that the PAHs detected at sample location 00-04865 are attributable to a discrete source (such as a piece of asphalt rubble in the fill material) rather than a widespread release. Based on the single sample location where PAHs were detected, and evidence that the PAH source is likely to be discrete rather than widespread, no further evaluation of these three PAHs is necessary.

6.1.4 Conclusions and Recommendations

Adverse human health effects are not expected at PRS 0-030(p), now or in the foreseeable future. No further action is recommended for this PRS.

6.2 Remedial Activities and Results of Confirmatory Sampling

6.2.1 Risk Calculations and/or Cleanup Level Derivation

The objectives of the Phase 1 RFI investigation and VCA at PRS 0-030(p) were to determine the presence or absence of contamination associated with the septic tank and to remove any remaining structures. No cleanup levels were derived for PRS 0-030(p). Instead,precharacterization samples were screened and a qualitative risk assessment was performed to verify that no chemicals were present at concentrations likely to cause adverse human health effects.

6.2.2 Remedial Implementation for PRS 0-030 (p)

Drain Line Removal

PRS 0-030 (p) was located east of the Rim Road cul-de-sac (Fig. 6.2.2-1). During precharacterization sampling activities on July 10, 1996, it was determined that the tank had been previously removed. However, a 30-ft-long, 6-in.-diameter steel outlet drain line was located. The pipe was removed with a backhoe during sampling activities on July 10, 1996. After removal of the steel outfall pipe, it was swiped and screened with hand-held radiation instruments for gross radiological contamination. The swipes were analyzed by LANL's Health Physics Operations group at TA-21. The pipe was temporarily stored on site until arrangements could be made to transport the pipe to TA-3, SM-271 for temporary storage before disposal.

On August 8, 1996, the pipe was delivered to TA-3, SM-271 for temporary storage as construction debris. After removal of the pipe and collection of confirmation samples, the excavation was backfilled with soil removed from the former septic tank pit and compacted to LANL-required specifications. See Section 6.1 of this report for additional details.

There were no deviations from the VCA plan for remedial activities at this PRS (LANL 1996, 05-0239).

6.2.3 Confirmatory Sampling for PRS 0-030 (p)

Confirmatory samples were not collected inside the outfall pipe trench. After the 6-in.-diameter steel pipe was removed, it was inspected and found to be in excellent condition, without any visible breaks or holes.

6.3 Waste Management for PRS 0-030(p)

All work was conducted in accordance with the VCA plan and the waste characterization strategy form (LANL 1996, 05-0239). However, the following deviations occurred during precharacterization and VCA activities:

- The PPE and sampling debris generated during precharacterization activities were not shipped under manifest to TA-3, SM-271 upon generation, because it was determined to be a sanitary waste. It was stored in the equipment trailer in a 55-gal. drum as a sanitary waste and it will be disposed at the Los Alamos County Landfill.

Less waste was generated than originally estimated for the precharacterization sampling and removal of the septic tank. The sampling waste and PPE were classified as sanitary waste and will be disposed at the Los Alamos County Landfill. The decontamination water generated during sampling activities was discharged onsite according to the site-specific Spill Prevention, Control and Countermeasure Plan. During field operations, it was determined that a final decontamination rinse with methanol and deionized water was not required. A comparison between the actual amount of waste generated and the amount of waste projected in the VCA plan is presented in Table 6.3-1.

TABLE 6.3-1

SUMMARY OF PROJECTED WASTE VOLUMES AND GENERATED WASTE VOLUMES

WASTE ITEM	WASTE TYPE	PROJECTED VOLUME	GENERATED VOLUME
sampling waste/PPE	sanitary waste	1 ft^3	0.25 ft^3
tank contents, soil and concrete	nonhazardous	4 to 90 yds^3	30 linear ft (steel pipe)
decon wash water	liquid nonhazardous	20 gal.	none
decon final rinse with water/methanol	liquid nonhazardous	10 gal.	none

The steel pipe was transported to TA-3, SM-271 for temporary storage until a waste profile is approved to dispose of it as construction debris or recycling.

6.3.1 Waste Characterization Data for PRS 0-030(p)

No soil samples were collected for waste characterization, because no soil was removed from the site.

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APPENDIX A QUALITY ASSURANCE/QUALITY CONTROL DATA

1.0 Quality Assurance/Quality Control Results for PRS 0-030(h)

1.1 Inorganic Analyses

Soil samples were analyzed for TAL metals and total uranium in request 2234. One of the QC problems with this request was that arsenic and antimony had low recoveries in the matrix spike sample. Silver had a high recovery in the matrix spike sample. Because of the low recovery, arsenic values are qualified J-, estimated detected quantity (probably biased low), or UJ, estimated undetected quantity. Antimony had a recovery of less than 30%. A post-digestion spike for antimony was then performed with a recovery greater than 75%. Because of the original low recovery, antimony data are qualified UJ. Silver detects are qualified J+, estimated detected quantity (probably biased high), for the high recovery. Also, manganese, aluminum, chromium, and silver had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the laboratory control samples (LCS) were all within allowed limits. All other data are valid and usable without qualification.

Soil samples were analyzed for TAL metals and total uranium in request 2239. One of the QC problems with this request was that chromium, zinc, thallium, and antimony had low recoveries in the matrix spike sample. Barium had a high recovery in the matrix spike sample. Because of the low recovery chromium and zinc, values are qualified J- or UJ. Antimony and thallium had recoveries of less than 30%. A post-digestion spike for antimony and thallium was performed with a recovery greater than 75% for antimony and less than 30% for thallium. Because of the original low recovery, antimony data are qualified UJ. Because thallium was below allowed limits in both spikes, the thallium data are qualified R, rejected. Silver detects are qualified J+ for the high recovery. Also, arsenic, nickel, chromium, copper, and iron had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations. and the LCS samples were all within allowed limits. All other data are valid and usable without qualification.

1.2 Organic Analyses

Twenty-one soil samples were analyzed for VOCs in request 2233. There were major matrix interferences with many of the samples. For samples 0100-96-0401, -0402, -0405, -0408, -0409, -0410, -0412, -0413, -0414, -0415, -0416, -0417, -0418, -0437, -0438 and -0439, high

surrogate recoveries caused all detects to be qualified J+. Also, methylene chloride, acetone, trichlorofluoromethane, and 1,4-dichlorobenzene were found in method blank. All sample values less than five times the blank values (ten times for acetone and methylene chloride) were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Two soil samples were analyzed for VOCs in request 2238. There were major matrix interferences with one of the samples. For sample 0100-96-0420 all data are qualified J or UJ for all of the internal standards being outside allowed limits. Also, methylene chloride and acetone were found in method blank. All sample values less than 10 times the blank values were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Twenty-one and two soil samples were analyzed for semivolatiles in requests 2233 and 2238 respectively. For request 2233, QA/QC parameters were within allowed limits, therefore, all data are valid and usable without qualification. For request 2238, the only problem was that di-n-butylphthalate was found in the method blank. All sample values less than 5 times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Twenty-one and two soil samples were analyzed for pesticides/PCBs in requests 2233 and 2238 respectively. All QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

1.3 Radiochemistry Analyses

Twenty-one and two soil samples were analyzed for gamma scan, plutonium-238 and plutonium-239 in requests 2235 and 2240. The only problem with these requests was that cadmium-109 and neptunium-237 were misidentified and should not have appeared in the report. The data for these isotopes is qualified R, rejected. All other data are valid and usable without qualification.

TABLE A-1

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2233	0100-96-0401	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0402	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0403	Soil	VOCs	Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0404	Soil	VOCs	Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0405	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0406	Soil	VOCs	Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0407	Soil	VOCs	Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0408	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0409	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0410	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0411	Soil	VOCs	Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0412	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0413	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0414	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1-,4 dichlorobenzene found in method blank. EQLs were raised accordingly.

TABLE A-1 (CONT.)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2233	0100-96-0415	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0416	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0417	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0418	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0437	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0438	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0439	Soil	VOCs	All detects qualified J+ for high surrogate recoveries of BFB. Methylene chloride, acetone, trichlorofluoromethane and 1,4 dichlorobenzene found in method blank. EQLs were raised accordingly.
2233	0100-96-0401	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0402	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0403	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0404	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0405	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0406	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0407	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0408	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0409	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0410	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0411	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.

TABLE A-1 (CONT.)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2233	0100-96-0412	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0413	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0414	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0415	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0416	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0417	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0418	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0437	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0438	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2233	0100-96-0439	Soil	SVOCs	Di-n-butylphthalate found in method blank. EQLs were raised appropriately.
2234	0100-96-0401	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0402	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0403	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0404	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0405	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0406	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0407	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.

TABLE A-1 (CONT.)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2234	0100-96-0408	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0409	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0410	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0411	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0412	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0413	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0414	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0415	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0416	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0417	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0418	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0437	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.

TABLE A-1 (CONT.)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2234	0100-96-0438	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2234	0100-96-0439	Soil	TAL metals and total uranium	Silver detects qualified J+ for high matrix spike recovery. Arsen qualified J- or UJ for low matrix spike recovery. Antimony qualified R (PM) for matrix spike recovery of less than 30%.
2235	0100-96-0401	Soil	Radio-nuclides[a]	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0402	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0403	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0404	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0405	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0406	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0407	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0408	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0409	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0410	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0411	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0412	Soil	Radionu clides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0413	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0414	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0415	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0416	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0417	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0418	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0437	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0438	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2235	0100-96-0439	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.

TABLE A-1 (CONT.)

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(h)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2238	0100-96-0419	Soil	VOCs	Methylene chloride and acetone found in method blank. EQLs were raised accordingly.
2238	0100-96-0420	Soil	VOCs	All data are qualified J or UJ because internal standards were outside allowed limits. Methylene chloride and acetone found i method blank. EQLs were raised accordingly.
2239	0100-96-0419	Soil	TAL metals and total uranium	Barium detects qualified J+ for high matrix spike recovery. zinc and chromium qualified J- or UJ for low matrix spike recoveries Antimony and thallium qualified R (PM) for matrix spike recove less than 30%.
2239	0100-96-0420	Soil	TAL metals and total uranium	Barium detects qualified J+ for high matrix spike recovery. zinc and chromium qualified J- or UJ for low matrix spike recoveries Antimony and thallium qualified R (PM) for matrix spike recove less than 30%.
2240	0100-96-0419	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.
2240	0100-96-0420	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 in the gamma spec are rejected because the peaks were misidentified.

[a] Radionuclides = Suite includes gamma scan, plutonium-238, plutonium-239.

2.0 Quality Assurance/Quality Control Results for PRS 0-030(i)

2.1 Inorganic Analyses

Eleven soil samples were analyzed for TAL metals in request 1959. One of the QC problems with this request was that manganese had a high recovery in the matrix spike sample. Because of the high recovery, detected manganese data are qualified J+. Also, lead and zinc had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the LCS samples were all within allowed limits. All other data are valid and usable without qualification.

Two soil samples were analyzed for TAL metals plus uranium in request 2262. One of the QC problems with this request was that antimony had a low recovery in the matrix spike sample. Because of the low recovery, antimony data are qualified UJ. Also, chromium, manganese, lead, and zinc had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the LCS samples were all within allowed limits. All other data are valid and usable without qualification.

2.2 Organic Analyses

Three soil samples were analyzed for VOCs in request 1958. There were problems for sample 0100-96-0219. The third internal standard was outside allowed limits and one surrogate had a high recovery because of matrix effects. Therefore, all associated analytes are qualified UJ or J+. Also, methylene chloride and acetone were found in the method blank. All sample values less than 10 times the blank values were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Two soil samples were analyzed for VOCs in request 2261. The only problem was that methylene chloride was found in method blank. All sample values less than 10 times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Eleven and two soil samples were analyzed for SVOCs in requests 1958 and 22261 respectively. For these requests, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Eleven soil samples were analyzed for pesticides/PCBs in request 1958. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Two soil samples were analyzed for pesticides/PCBs in request 2261. For sample 0100-96-0330, all three surrogates were below allowed limits (each by 5% or less); therefore all data for this sample are qualified J- or UJ. All other data are valid and usable without qualification.

2.3 Radiochemistry Analyses

Eleven soil samples were analyzed for gamma spec, plutonium-238, plutonium-239, and total uranium in request 1960. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Two soil samples were analyzed for gamma spec, plutonium-238, and plutonium-239 in request 2263. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

TABLE A-2

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(i)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
1958	0100-96-0201	Soil	VOCs	Methylene chloride and acetone found in method blank EQLs were raised appropriately.
1958	0100-96-0202	Soil	VOCs	Methylene chloride and acetone found in method blank EQLs were raised appropriately.
1958	0100-96-0219	Soil	VOCs	The 3rd internal standard was outside allowed limits and surrogate was high because of matrix effects. All associated analytes are qualified J+ or UJ. Methylene chloride and acetone found in method blank. EQLs were raised appropriately.
1959	0100-96-0201	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0202	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0204	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0207	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0208	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0209	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0219	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0220	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0221	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0222	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
1959	0100-96-0223	Soil	TAL metals	Manganese detects qualified J+ for high recovery in the matrix spike sample.
2261	0100-96-0229	Soil	VOCs	Methylene chloride in method blank. EQLs were raised appropriately.
2261	0100-96-0230	Soil	VOCs	Methylene chloride in method blank. EQLs were raised appropriately.
2261	0100-96-2030	Soil	PCBs	All 3 surrogate were below allowed limits. All analytes qualified J- or UJ.
2262	0100-96-0229	Soil	TAL metals and total uranium	Antimony qualified UJ for a low recovery in the matrix sp sample.
2262	0100-96-0230	Soil	TAL metals and total and uranium	Antimony qualified UJ for a low recovery in the matrix sp sample.

3.0 Quality Assurance/Quality Control Results for PRS 0-030(n)

3.1 Inorganic Analyses

Four soil samples were analyzed for TAL metals, four samples were analyzed for TCLP metals and one sample was analyzed for total uranium in request 1951. One of the QC problems with this request for TAL metals was that lead had a low recovery in the matrix spike sample. Because of the low recovery, lead data are qualified J- or UJ. Also, chromium had a duplicate value greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the LCS samples were all within allowed limits. The only problem in the TCLP anlysis was that barium was present in the method blank. All sample values less than five times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

3.2 Organic Analyses

Three soil samples were analyzed for VOCs in request 1950. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Eight soil samples were analyzed for SVOCs in request 1950. There were two problems with this request. The first was that the 6th internal standard was below allowed limits in all samples. Therefore, all analytes associated with the internal standard are qualified J- or UJ. The second was that bis-2-ethylhexylphthalate was found in the method blank. All sample values less than five times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Eight soil samples were analyzed for pesticides/PCBs in request 1950. All QA/QC parameters were within allowed limits, therefore, all data are valid and usable without qualification.

3.3 Radiochemistry Analyses

Three and two soil samples were analyzed for gamma spec, plutonium-238 and plutonium-239 in requests 1952 and 2539 respectively. For these requests, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

TABLE A-3

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(n)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
1950	0100-96-0150	Soil	VOCs	Acetone found in method blank. EQLs were raised appropriately.
1950	0100-96-0151	Soil	VOCs	Acetone found in method blank. EQLs were raised appropriately.
1950	0100-96-0160	Soil	VOCs	Acetone found in method blank. EQLs were raised appropriately.
1950	0100-96-0141	Soil	SVOCs	The 6th internal standard was outside allowable limits. All associated analytes are qualified UJ or J. Bis-2 ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0142	Soil	SVOCs	Bis-2-ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0150	Soil	SVOCs	The 6th internal standard was outside allowable limits. All associated analytes are qualified UJ or J. Bis-2 ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0151	Soil	SVOCs	Bis-2-ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0153	Soil	SVOCs	The 6th internal standard was outside allowable limits. All associated analytes are qualified UJ or J. Bis-2 ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0154	Soil	SVOCs	The 6th internal standard was outside allowable limits. All associated analytes are qualified UJ or J. Bis-2 ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0155	Soil	SVOCs	The 6th internal standard was outside allowable limits. All associated analytes are qualified UJ or J. Bis-2 ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1950	0100-96-0160	Soil	SVOCs	Bis-2-ethylhexylphthalate was detected in the method blank. EQLs were raised appropriately.
1951	0100-96-0141	Soil	TCLP	Barium was detected in the method blank. EQLs were raised appropriately.
1951	0100-96-0142	Soil	TCLP	Barium was detected in the method blank. EQLs were raised appropriately.
1951	0100-96-0150	Soil	TCLP	Barium was detected in the method blank. EQLs were raised appropriately.
1951	0100-96-0151	Soil	TCLP	Barium was detected in the method blank. EQLs were raised appropriately.
1951	0100-96-0153	Soil	TAL metals	Lead qualified J- for low recovery in the matrix spike sample.
1951	0100-96-0154	Soil	TAL metals	Lead qualified J- for low recovery in the matrix spike sample.
1951	0100-96-0155	Soil	TAL metals	Lead qualified J- for low recovery in the matrix spike sample.
1951	0100-96-0160	Soil	TAL metals and total uranium	Lead qualified J- for low recovery in the matrix spike sample.

4.0 Quality Assurance/Quality Control Results for PRS 0-030(o)

4.1 Inorganic Analyses

Four soil samples were analyzed for TAL metals and total uranium in request 2192. One of the QC problems with this request was that antimony had a low recovery in the matrix spike sample. Manganese had a high recovery in the matrix spike sample. Because of the low recovery, antimony data are qualified J- or UJ. Barium detects are qualified J+ for the high recovery. All other data are valid and usable without qualification.

Nine soil samples were analyzed for TAL metals and total uranium in request 2330. One of the QC problems with this request was that antimony had a very low recovery in the matrix spike sample (less than 30%) which would normally require a qualification of R. However, a post-digestion spike for antimony was performed with a recovery greater than 75%. Because of the original low recovery, antimony data are qualified UJ. Also, aluminum, iron, and zinc had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the LCS samples were all within allowed limits. All other data are valid and usable without qualification.

4.2 Organic Analyses

Four soil samples were analyzed for VOCs in request 2191. There were problems for all of the samples in this request. For samples 0100-96-1101, 1102 and 1103, the 4th internal standard was outside allowed limits because of matrix effects. All associated analytes are qualified UJ or J. For sample 0100-96-1104, the last 2 internal standards were outside allowed limits because of matrix effects. Therefore, all analytes associated with these 2 internal standards are qualified UJ. Methylene chloride was found in the method blank. All sample values less than 10 times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Nine soil samples were analyzed for VOCs in request 2329. There were problems for two of the samples in this request. For sample 0100-96-1113 the 4th internal standard was outside allowed limits because of matrix effects. All associated analytes are qualified UJ or J. For sample 0100-96-1108, the last 2 internal standards were outside allowed limits because of matrix effects. Therefore, all analytes associated with these 2 internal standards are qualified UJ. Acetone was found in the method blank. All sample values less than 10 times the blank value were changed to nondetects (at the level detected if above the EQL). All other data are valid and usable without qualification.

Four soil samples were analyzed for SVOCs in request 2191. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Nine soil samples were analyzed for SVOCs in request 2329. The only problem in this request was with sample 0100-96-1108, which had the first internal standard outside allowed limits because of matrix effects. Therefore, all associated analytes are qualified UJ. All other data are valid and usable without qualification.

Four and nine soil samples were analyzed for pesticides/PCBs in requests 2191 and 2329 respectively. For these requests, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

4.3 Radiochemistry Analyses

Four and nine soil samples were analyzed for gamma spec, plutonium-238, and plutonium-239 in requests 2193 and 2331 respectively. The only problem with these requests was that cadmium-109 and neptunium-237 for request 2193, and lead-210, cadmium-109, and neptunium-237 for request 2331 were misidentified and should not have appeared in the report. The data for these isotopes is qualified R. All other data are valid and usable without qualification.

TABLE A-4

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(o)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2191	0100-96-1101	Soil	VOCs	Last internal standard was outside allowed limits becau of matrix effects. All analytes associated with this intern standard are qualified UJ. Methylene chloride was foun in the method blank. EQLs were raised appropriately.
2191	0100-96-1102	Soil	VOCs	Last internal standard was outside allowed limits becau of matrix effects. All analytes associated with this intern standard are qualified UJ. Methylene chloride was foun in the method blank. EQLs were raised appropriately.
2191	0100-96-1103	Soil	VOCs	Last internal standard was outside allowed limits becau of matrix effects. All analytes associated with this intern standard are qualified UJ. Methylene chloride was foun in the method blank. EQLs were raised appropriately.
2191	0100-96-1104	Soil	VOCs	Last 2 internal standards were outside allowed limits because of matrix effects. All analytes associated with these 2 internal standards are qualified UJ. Methylene chloride was found in the method blank. EQLs were raised appropriately.
2192	0100-96-1101	Soil	TAL metals and total uranium	Antimony qualified J- or UJ for low recovery in the matri spike sample. Manganese detects qualified J+ for high recovery in the matrix spike sample.
2192	0100-96-1102	Soil	TAL metals and total uranium	Antimony qualified J- or UJ for low recovery in the matri spike sample. Manganese detects qualified J+ for high recovery in the matrix spike sample.
2192	0100-96-1103	Soil	TAL metals and total uranium	Antimony qualified J- or UJ for low recovery in the matri spike sample. Manganese detects qualified J+ for high recovery in the matrix spike sample.
2192	0100-96-1104	Soil	TAL metals and total uranium	Antimony qualified J- or UJ for low recovery in the matri spike sample. Manganese detects qualified J+ for high recovery in the matrix spike sample.
2193	0100-96-1101	Soil	Radio-nuclides[a]	Cadmium-109 and neptunium-237 were misidentified (were not really present) and are qualified R.
2193	0100-96-1102	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentified (were not really present) and are qualified R.
2193	0100-96-1103	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentified (were not really present) and are qualified R.
2193	0100-96-1104	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentified (were not really present) and are qualified R.
2329	0100-96-1105	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1106	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1107	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1108	Soil	VOCs	3rd and 4th internal standards outside allowable limits one high surrogate recovery because of matrix effects. All detects are qualified J+. All other associated analyte are qualified UJ.
2329	0100-96-1109	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1110	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1111	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1112	Soil	VOCs	Acetone found in method blank. EQL raised if detected less than 10 times blank value.

TABLE A-4

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(o)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2329	0100-96-1113	Soil	VOCs	4th internal standard outside allowable limits because o matrix effects. All associated analytes are qualified UJ. Acetone found in method blank. EQL raised if detected less than 10 times blank value.
2329	0100-96-1108	Soil	SVOCs	First internal standard outside allowable limits because matrix effects. All associated analytes are qualified UJ.
2330	0100-96-1105	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1106	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1107	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1108	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1109	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1110	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1111	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1112	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2330	0100-96-1113	Soil	TAL metals and total uranium	Antimony qualified UJ for low matrix spike recovery.
2331	0100-96-1105	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1106	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1107	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1108	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1109	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1110	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1111	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1112	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified
2331	0100-96-1113	Soil	Radio-nuclides	Cadmium-109, lead-210, and neptunium-237 were misidentified (were not really present) and are qualified

[a] Radionuclides suite includes gamma spec, plutonium-238, and plutonium-239.

5.0 Quality Assurance/Quality Control Results for PRS 0-030(p)

5.1 Inorganic Analyses

Six soil samples were analyzed for TAL metals and total uranium in request 2400. One of the QC problems with this request was that barium had a low recovery in the matrix spike sample. Because of the low recovery, barium data are qualified J- or UJ. Also, barium, calcium, iron, manganese, and zinc had duplicate values greater than 20% different from the original concentration. The duplicate problems are probably caused by heterogeneity in the samples, because the method blank, calibrations, and the LCS samples were all within allowed limits. All other data are valid and usable without qualification.

5.2 Organic Analyses

Six soil samples were analyzed for VOCs in request 2398. There were problems for two samples in this request. For sample 0100-96-1405, all of the internal standards were outside allowed limits because of matrix effects. Therefore, all analytes are qualified UJ or J. For sample 0100-96-1406, the last two internal standards were outside allowed limits because of matrix effects. Therefore, all analytes associated with these two internal standards are qualified UJ. All other data are valid and usable without qualification.

Six soil samples were analyzed for SVOCs in request 2398. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

Six soil samples were analyzed for pesticides/PCBs in request 2398. For this request, all QA/QC parameters were within allowed limits; therefore, all data are valid and usable without qualification.

5.3 Radiochemistry Analyses

Six soil samples were analyzed for gamma spec, plutonium-238, and plutonium-239 in request 2399. The only problem with this request was that cadmium-109 and neptunium-237 were misidentified and should not have appeared in the report. The data for these isotopes is qualified R. All other data are valid and usable without qualification.

TABLE A-5

SUMMARY TABLE OF QUALITY CONTROL RESULTS FOR PRS 0-030(p)

REQUEST NUMBER	SAMPLE ID	SAMPLE MATRIX	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
2398	0100-96-1405	Soil	VOCs	All of the internal standards were outside allowed limi because of matrix effects. All analytes are qualified U or J.
2398	0100-96-1406	Soil	VOCs	Last 2 internal standards were outside allowed limits because of matrix effects. All analytes associated wit these 2 internal standards are qualified UJ.
2400	0100-96-1401	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2400	0100-96-1402	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2400	0100-96-1403	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2400	0100-96-1404	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2400	0100-96-1405	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2400	0100-96-1406	Soil	TAL metals and total uranium	Barium qualified J- or UJ for low recovery in the matri spike sample.
2399	0100-96-1401	Soil	Radio-nuclides[a]	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.
2399	0100-96-1402	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.
2399	0100-96-1403	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.
2399	0100-96-1404	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.
2399	0100-96-1405	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.
2399	0100-96-1406	Soil	Radio-nuclides	Cadmium-109 and neptunium-237 were misidentifie (were not really present) and are qualified R.

[a] Radionuclides suite includes gamma spec, plutonium-238, and plutonium-239.

APPENDIX B DATA

Analytical results of sampling at PRSs 0-030(h,i,n,o,p) are available in the Facility for Information Management, Analysis, and Display (FIMAD) database, or upon request.

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APPENDIX C COST COMPARISON

The cost comparison below is based on preliminary reports of the actual costs.

TABLE C-1

COST COMPARISON FOR PRS 0-030(h)

	BASELINE COSTS	ACTUAL COSTS
Pre-Field Activities	13 000	15 000
Field Activities	104 000	60 000
Waste Disposal	12 000	15 000
Sampling/Analytical	68 000	25 000
Post-Field Activities	34 000	20 000
TOTAL	231 000	135 000

TABLE C-2

COST COMPARISON FOR PRS 0-030(i)

	BASELINE COSTS	ACTUAL COSTS
Pre-Field Activities	13 000	10 000
Field Activities	113 000	40 000
Waste Disposal	16 000	10 000
Sampling/Analytical	55 000	25 000
Post-Field Activities	56 000	10 000
TOTAL	253 000	95 000

TABLE C-3

COST COMPARISON FOR PRS 0-030(n)

	BASELINE COSTS	ACTUAL COSTS
Pre-Field Activities	13 000	10 000
Field Activities	101 000	20 000
Waste Disposal	12 000	5 000
Sampling/Analytical	67 000	15 000
Post-Field Activities	57 000	15 000
TOTAL	250 000	65 000

TABLE C-4

COST COMPARISON FOR PRS 0-030(p)

	BASELINE COSTS	ACTUAL COSTS
Pre-Field Activities	13 000	10 000
Field Activities	99 000	15 000
Waste Disposal	9 000	5 000
Sampling/Analytical	71 000	5 000
Post-Field Activities	38 000	10 000
TOTAL	230 000	45 000

APPENDIX D CONFIRMATORY SAMPLING RESULTS

Confirmatory sampling results for PRSs 0-030(h,i,n,o,p) are presented in Sections 2.2.3, 3.2.3, 4.2.3, 5.2.3, and 6.2.3, respectively, of this report.

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APPENDIX E CERTIFICATIONS OF COMPLETION

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CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the Voluntary Corrective Action Report has been completed in accordance with the Department of Energy approved VCA plan entitled VCA Plan for Potential Release Site 0-030(h,i,n,p), (Septic Tanks). Based on my personal involvement or inquiry of the person or persons who managed this cleanup, a review of all data gathered and a visit to the site, to the best of my knowledge and belief, all criteria of the plan have been met or exceeded. I believe that the completion of this VCA is both protective to human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

GR Allen

Field Unit 1 Field Project Leader
Environmental Restoration Project
Los Alamos National Laboratory

26 Sept 96

Date Signed