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Date: January 13, 2000
Refer to: E/ER:00-007

FEB 18 2000 gc

Mr. John Kieling
NMED-HRMB
P.O. Box 26110
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HSWA LANL 1/1071/0

SUBJECT: SUBMITTAL OF VOLUNTARY CORRECTIVE ACTION (VCA) PLAN FOR POTENTIAL RELEASE SITES (PRSs) 0-003, 0-012, AND 0-030(i)

Dear Mr. Kieling:

Enclosed is the Los Alamos National Laboratory Environmental Restoration (ER) Project's VCA Plan for PRSs 0-003, 0-012, and 0-030(i). PRSs 0-003 and 0-012 have been consolidated into PRS 00-003-99 and are included on Table A of the Hazardous and Solid Waste Amendments Module of the Laboratory's Waste Facility Permit.

If you have any questions or concerns please feel free to call Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely,

Julie A. Canepa

Julie A. Canepa, Program Manager
Los Alamos National Laboratory
Environmental Restoration

Sincerely,

FOR

Theodore J. Taylor, Program Manager
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January 2000

Voluntary Corrective Action Plan for Potential Release Sites 0-003, 0-012, and 0-030(i)

Environmental Restoration Project
A Department of Energy Environmental Cleanup Program
ER19990105

Los Alamos
NATIONAL LABORATORY
Los Alamos, NM 87545

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EXECUTIVE SUMMARY

This Voluntary Corrective Action (VCA) plan addresses potential release sites (PRSs) 0-003, a former container storage area, and 0-012, an underground blowoff tank. These PRSs have been consolidated into PRS 00-003-99 and are part of the inactive Western Steam Plant located at 3750 Finch Street, on the southern boundary of Technical Area (TA)-0. These PRSs are solid waste management units (SWMUs) listed on Table A of the Hazardous and Solid Waste Amendments (HSWA) Module of Los Alamos National Laboratory's (LANL) Hazardous Waste Facility Permit (EPA 1990, 01585).

Also included in this VCA plan is PRS 0-030(i), the remaining inlet and outlet drainlines from a former septic system not related to the Western Steam Plant. This PRS is not listed on LANL's Hazardous Waste Facility Permit. PRS 0-030(i) is included in this activity because of its proximity to PRSs 0-003 and 0-012, which is consistent with the watershed approach, and because it makes complete the group of three PRS in the LAAO land transfer tract (the others are PRSs 0-003 and 0-012).

PRS 0-003. PRS 0-003, the former container storage area, is located at the east end of the inactive Western Steam Plant and was used to store drums containing boiler water treatment chemicals. The duration of operation is unknown and it was decommissioned in 1987.

RCRA Facility Investigation (RFI) field activities conducted in 1997 included the collection of ten subsurface soil samples at four locations beneath the asphalt-covered storage area. The samples were analyzed for target analyte list (TAL) metals, pesticides/polychlorinated biphenyl (PCB)s, semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs).

A review of the analytical results indicated that lead and dibenzofuran were the only COPCs not attributable to the overlying asphalt. The vertical extent of these COPCs has been defined; however, the horizontal extent of the lead has not been determined.

PRS 0-012. The SWMU report (LANL 1990, 07511.1) states that PRS 0-012 is composed solely of the underground blowoff tank and associated piping that served the Western Steam Plant. This tank is 10 ft long and 4 ft in diameter with a capacity of approximately 1,000 gal. The tank discharged through a 4-in. diameter drainline to a nearby sanitary sewer manhole. RFI field activities were conducted in 1997. Several metals, but no organic chemicals, were detected. The tank and piping will be excavated and removed, inspected for leaks, and disposed. Confirmatory samples will be collected and analyzed.

PRS 0-030(i). PRS 0-030(i) was a septic tank located on Department of Energy (DOE) property south of Trinity Drive and east of 35th Street. The tank probably served the West Mess Hall, dormitories, the post office, officer's lounge, post exchange and the Sundt Apartments. The outlet drainline discharged to a drainage channel approximately 100 ft southwest of the septic tank.

In 1996, ER Project personnel collected waste characterization samples from inside the tank, two soil samples from beneath the inlet and outlet drain lines near the tank, and two soil samples at the end of the outfall pipe. One sample was collected beneath a break in the inlet line 100 ft north of the tank. After the tank was removed, two confirmation samples were collected from beneath the tank at the north and south ends.

Five inorganic chemicals were detected above the soil or sediment background values (BVs) in samples collected outside of the septic tank. No radionuclides were detected above background. Twenty-eight organic chemicals were detected in the soil and/or sediments in at least one of the samples collected outside of the tank.

Supplemental samples for defining the extent of contamination will be collected beneath the location of the former septic tank and in the vicinity of the outfall. Deeper samples will be collected beneath the former septic tank. Samples will be collected in the outfall drainage, upgradient and downgradient from the outfall.

Cleanup activities include removal and disposal of the inlet and outlet drainlines. Confirmation samples will be collected at locations beneath each drainline at approximately 28-ft-intervals, selected to coincide with joints in the vitrified clay pipe (VCP).

A summary of this VCA plan's PRSs and their proposed VCA actions is provided in Table ES-1.

Table ES-1
VCA Summary Table

PRS Number	PRS Description	HSWA[a]	Radionuclide Component[b]	Proposed Action	Rationale for Recommendation
0-003	Storage Container Area	Yes	No	Sampling	Define extent
0-012	Blowoff Tank	Yes	No	Remove tank, lines; sampling	Remove legacy structures
0-030(i)	Septic System	No	No	Remove lines and additional sampling	Remove of legacy structures and define extent

[a] This indicates if the site is listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

[b] This indicates if radionuclides are associated with this PRS.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multi-disciplinary research facility owned by the Department of Energy (DOE) and managed by the University of California. The Laboratory is located in north central New Mexico approximately 60 miles northeast of Albuquerque and 20 miles northwest of Santa Fe (Figure 1.0-1). The Laboratory site covers 43 square miles of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing ephemeral and intermittent streams that run from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft. The eastern portion of the plateau stands 300 to 900 ft above the Rio Grande River.

The Laboratory's Environmental Restoration (ER) Project is involved in a national effort by the DOE to clean up facilities that were formerly involved in weapons production. The goal of the ER Project is to ensure that DOE's past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve that goal, the ER Project is currently investigating sites potentially contaminated by past laboratory operations. The sites under investigation are either solid waste management units (SWMUs) or areas of concern (AOCs). In the LANL ER Project, SWMUs and AOCs are collectively referred to as potential release sites (PRSs).

This Voluntary Corrective Action (VCA) plan addresses PRSs 0-003, a former container storage area, and 0-012, an underground, boiler blowoff tank. These PRSs have recently been consolidated into PRS 00-003-99 but, for the purposes of this plan, will continue to be addressed using their individual PRS identification numbers. Both of these PRSs are located at the inactive Western Steam Plant. Also included in this VCA plan is PRS 0-030(i), the remaining inlet and outlet drainlines from a former septic system unrelated to the Western Steam Plant. However, due to the proximity of PRS 0-030(i) to the Western Steam Plant PRSs, addressing 0-030(i) is consistent with the watershed approach. In addition, PRSs 0-030(i), 0-003, and 0-012 are the only PRSs identified in the LAAO land transfer tract.

This VCA, including sampling and analysis, is conducted under the requirements of the Resource Conservation and Recovery Act (RCRA). The current Installation Work Plan (IWP) (LANL 1998, 62060) describes the methodologies used in the investigation and analysis. For PRSs 0-003, 0-012, and 0-030(i), the investigation is in accordance with the Hazardous and Solid Wastes Amendments of 1984 (HSWA) and follows the requirements in Module VIII of the Laboratory's Hazardous Waste Facility Permit (EPA 1990, 01585). Module VIII was issued to the Laboratory by the US Environmental Protection Agency (EPA) on May 23, 1990 and modified on May 19, 1994. Radionuclides are regulated under DOE order 5400.5, "Radiation Protection of The Public and The Environment" (proposed Rule 10 CFR 843.5 in 58 FR 16268). In this plan, none of the PRSs have a radionuclide component.

The purpose and scope, regulatory history, and rationale for proposed corrective action are presented in Section 1, "Introduction." Section 2, "Previous Site Characterization," discusses the site description and operational history, and previous field investigations and results of previous investigations for PRS 0-003 in Section 2.1; for PRS 0-012 in Section 2.2; and for PRS 0-030(i) in Section 2.3. The basis for cleanup levels is presented in Section 3.0. Section 4.0, "Proposed Corrective Action," includes the conceptual model in Section 4.1, the supplemental sampling in Section 4.2, the cleanup activities in Section 4.3, and the site restoration activities in Section 4.4. The confirmatory sampling is discussed in Section 5.0. Section 6.0, "Waste Management," presents the estimated types and volumes of waste in Section 6.1 and the method of management and disposal in Section 6.2. Section 7.0 discusses the proposed schedule and uncertainties. References are listed in Section 8.0. The appendices include Appendix A, "Acronyms And Abbreviations;" Appendix B, "VCA Checklist;" Appendix C, "SOP 2.01 Surface Water Assessment;" Appendix D, "Ecological Scoping Checklist;" and Appendix E, "Estimated Costs."

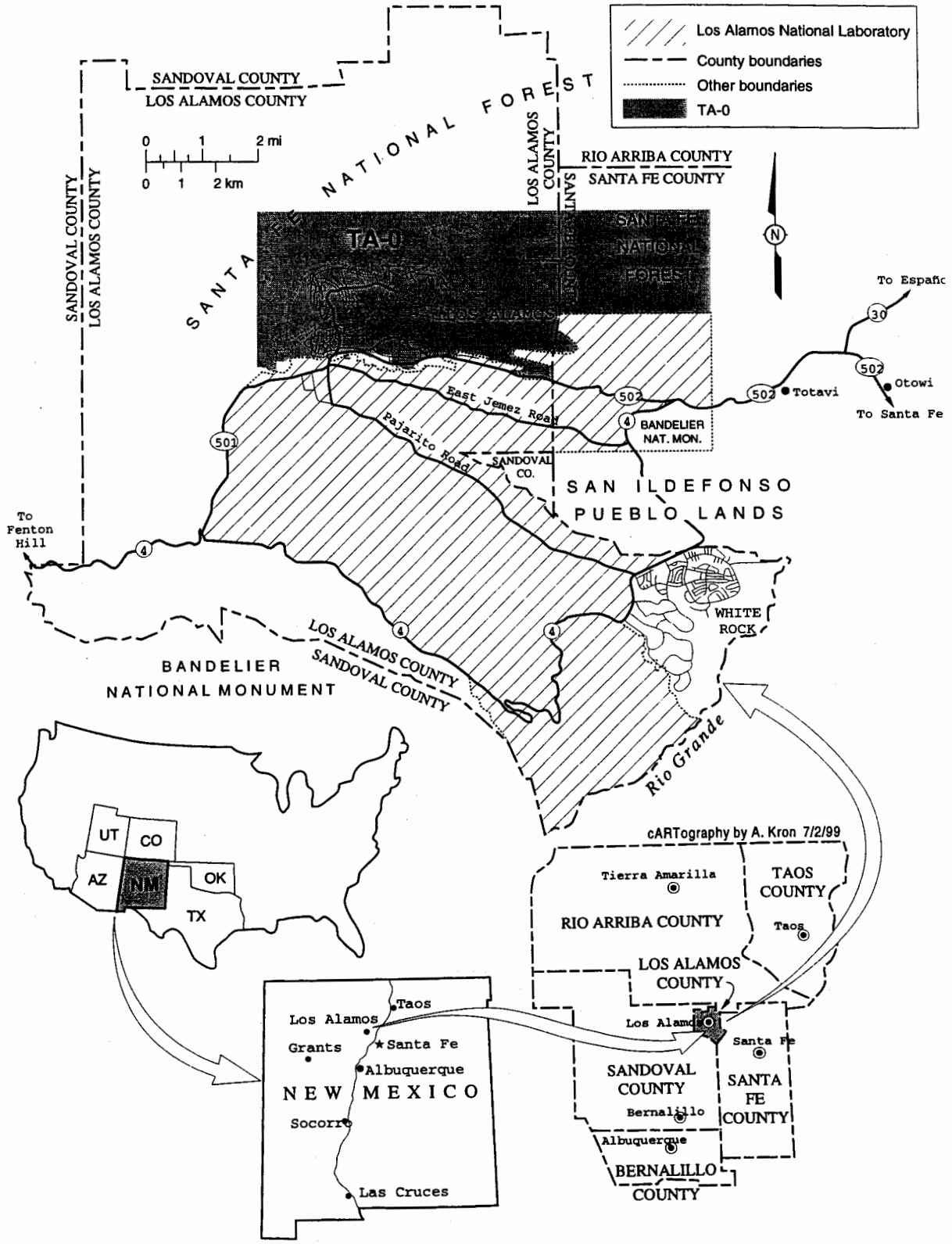

Figure 1.0-1. Location of TA-0 within Los Alamos National Laboratory, Los Alamos County, New Mexico

1.1 Purpose and Scope

The main purpose of this VCA is to achieve a final remedy/final decision for these PRSs. In order to achieve this purpose, the ER Project has proposed actions that include supplemental sample collection, removal of structures, confirmatory sampling and removal of contaminated soil, as necessary (see Figure 1.1.-1 for general decision logic). The scope of activities proposed for each PRS are listed below.

- Review existing data and collect supplemental samples as necessary to fully define the extent of any contamination potentially associated with PRS 0-003, and remove contaminated soil, as necessary.
- Remove the blowoff tank and associated piping at PRS 0-012, and collect confirmatory samples beneath the tank and piping to determine if a release has occurred and document the effectiveness of the removal.
- Review existing data and collect supplemental samples to better define the extent of possible contamination at the PRS 0-030(i) outfall and beneath the tank. Remove remaining inlet and outlet line segments associated with the former septic tank. Collect confirmatory samples from beneath the removed lines to determine if a release has occurred, confirm the extent of any contamination, if present, and verify the adequacy of the cleanup.

1.2 Regulatory History

The RCRA Facility Investigation (RFI) Work Plan for Operable Unit (OU) 1071 (LANL 1992, 59731) presented the site description and history, existing knowledge regarding nature and extent of contamination, and the sampling approach for PRSs 0-003, 0-012, and 0-030(i). The RFI conducted at PRSs 0-003 and 0-012 was completed in 1997, and the data were presented in an RFI report (LANL 1997, 62528.1), submitted to the New Mexico Environment Department (NMED) at that time. The RFI data and subsequent corrective action at PRS 0-030(i), completed in 1996, were covered in a VCA completion report for PRSs 0-030 (h,i,n,o,p) (LANL 1996, 62416), submitted to NMED in 1996. No comments have been received from the Administrative Authority (AA) regarding these PRSs.

1.3 Rationale for Proposed Corrective Action

PRS 0-003: Conduct the proposed sampling to define extent. The COPCs have been defined (lead), the remedy is obvious, the time that it will take for removal will be less than six months and the land use assumptions are straightforward. This action will alleviate concerns that may be raised in the future concerning the possibility of contamination.

PRS 0-012: All structures associated with this PRS (tank and piping) will be removed and confirmatory sampling will be conducted to alleviate concerns about the contents and the possibility of contamination that may be raised in the future. Additionally, the remedy is obvious, the time it will take for removal will be less than six months, and the land use assumptions are straightforward.

PRS 0-030(i): Characterization and confirmatory sample data from the prior septic tank removal indicate possible releases. Therefore, the remaining inlet and outlet drainlines associated with this PRS will be removed and confirmatory and supplemental sampling will be conducted to alleviate concerns about the contents and the possibility of contamination that may be raised in the future.Confirmatory and supplemental sampling will be conducted following pipe removal. Additionally, COPCs have been defined, the remedy is obvious, the time that it will take for removal will be less than six months, and land use assumptions are straightforward. In addition to the above, these activities would expedite the transfer of properties from DOE to a new owner.

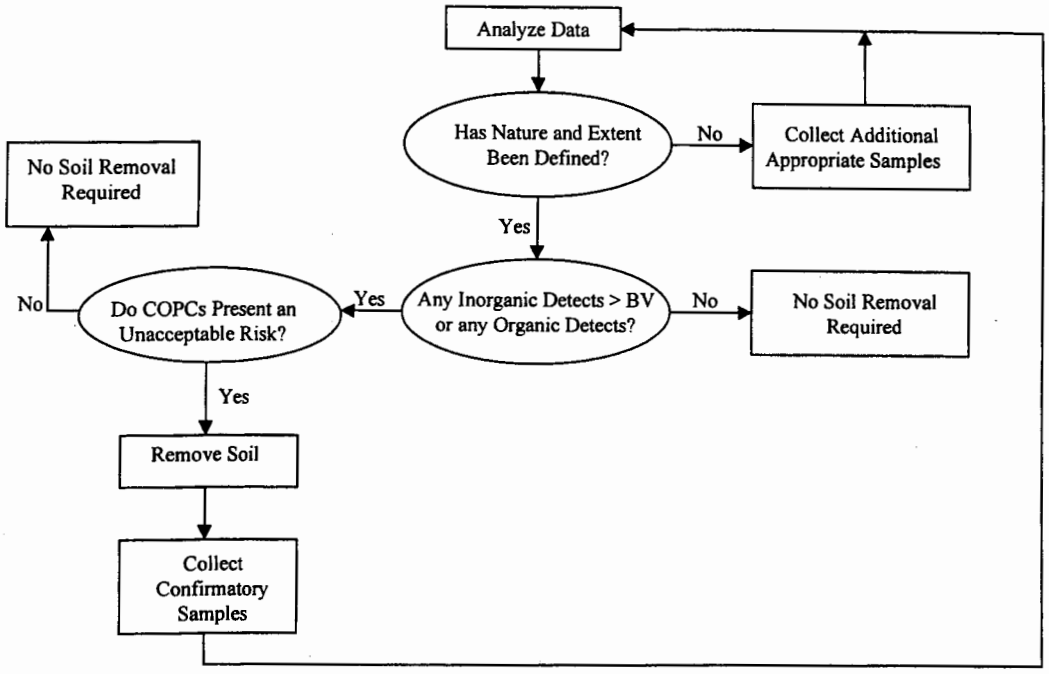

Figure 1.1-1. General decision logic diagram for determining if soil removal is required

2.0 PREVIOUS SITE CHARACTERIZATION

The Western Steam Plant is located at 3750 Finch Street, south of Trinity Drive and immediately northwest of the DOE's Los Alamos Area Office (LAAO), (Figures 2.1-1 and 2.1-2). It is located on the southern boundary of Technical Area (TA)-0 and is surrounded to the west, north, and east by developed areas. To the south is Los Alamos Canyon. The plant began operating in 1949 (DOE 1987, 08660). After the power plant at TA-3 (TA-3-22) was put into service (circa 1952), the Western Steam Plant was placed on standby status until it was removed from service in the spring of 1990. The Zia Company's wastewater laboratory operated at this location between 1976 and 1983.

2.1 PRS 0-003 Container Storage Area

2.1.1 Site Description and Operational History

PRS 0-003 was the container storage area for the Western Steam Plant. It was approximately 100 ft^2 in size and located at the east end of the plant (DOE 1987, 08660) (Figure 2.1-2). Historical information indicated that the area has always been paved with asphalt and was used to store 55-gal. steel drums on wooden pallets. These drums contained both solid and liquid products (descaling chemicals and corrosion inhibitors) used for boiler water treatment (LANL 1990, 07511.1) (see Section 2.2.1). It is unknown how long the storage area was used but it was decommissioned in 1987 (LANL 1989, 11966; LANL 1990, 07511.1). During its use, releases from drums resulted in spillage below the pallets (LANL

1990, 07511.1). However, the frequency, content, and volume of these releases were not recorded, nor were the cleanup responses. There is no evidence of any waste storage at this site.

2.1.2 Previous Field Investigations

The RFI field activities were conducted at PRS 0-003 in June and July 1997. These activities were conducted according to Chapter 5.1 of the RFI Work Plan for OU 1071 (LANL 1992, 59731), and all LANL ER standard operating procedures (SOPs) applicable at the time were followed.

A site survey was initially conducted to verify the location and boundary of the container storage area. The location and size of the area was as described in the work plan. Stormwater runoff from the container storage area flows east along Finch Street, and is contained on the asphalt by a concrete curb. It then flows south through the DOE LAAO parking lot to a storm drain that discharges to Los Alamos Canyon through a culvert that is approximately 50 ft long. This outfall was not sampled because of its distance from the container storage area (about 500 ft of asphalt paving). Any contamination [e.g., polycyclic aromatic hydrocarbons (PAHs)] found at the outfall could originate from other sources in this developed area such as the asphalt or vehicle emissions.

A total of 11 subsurface soil samples (two of which were duplicates) were collected beneath the asphalt at four locations within the container storage area. These locations were selected where there was severely cracked asphalt pavement, the areas of greatest potential for soil contamination. There were no other indictors of potential leaks or spills (such as stained areas) to use in selecting sampling locations.

At each of the four locations, the asphalt was chipped away to expose the underlying base course, which was composed of sand and abundant quartzite gravel and cobbles. The upper 2- to 3-ins. of base course were coated black as the result of a prime coat that was sprayed on the compacted base course before the asphalt was laid. This upper 3 ins. of base course material was also removed. Before samples were collected at PRS 0-003, every attempt was made to remove all visible evidence of the asphalt and coated base course layer to eliminate or minimize cross-contamination from these sources. After all discernible asphalt and coated base course were removed, the first soil samples were collected from the 0.4- to 0.9-ft interval. Hand augering continued to approximately 2.5 ft deep at each location before the next sample was collected. All cuttings were visually screened for evidence of contamination. No visible evidence of contamination was noted and a sample was collected at each location from the approximate 2.5- to 3.0-ft interval. The cuttings and the deeper sample intervals were still base course material composed predominantly of sand and quartzite gravel and cobbles. A total of 11 samples, including two duplicates, were collected, field screened for gross alpha, beta, and gamma radioactivity, and sent to an off-site fixed analytical laboratory for analysis of target analyte list (TAL) metals, pesticides/PCBs, semivolatile organic compounds (SVOCs), and VOCs. Two duplicate samples were collected for quality assurance (QA) purposes.

Information about the sample depths, analyses conducted, and request numbers for each sample is summarized in Table 2.1-1. Sample locations are presented on Figure 2.1-3.

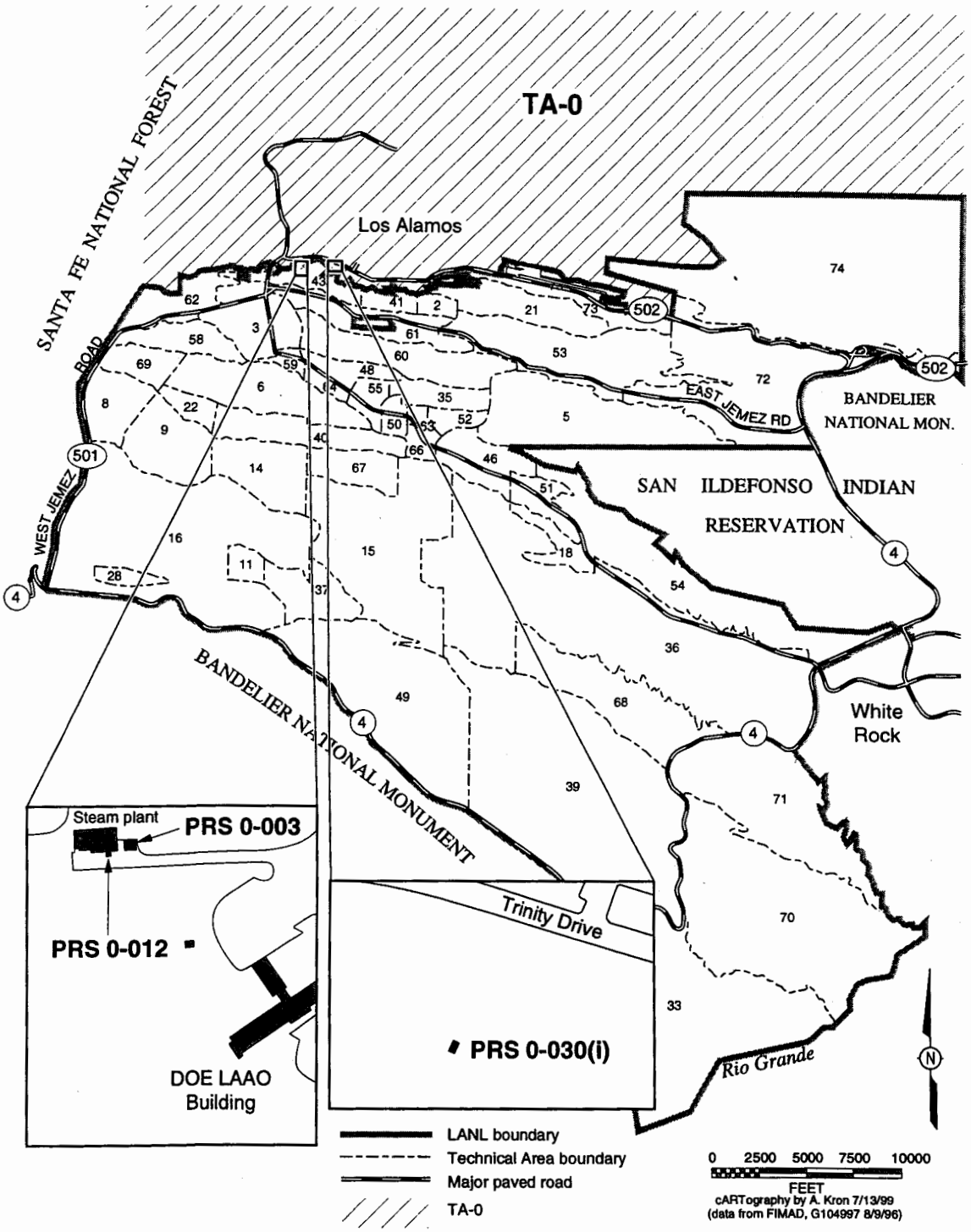

Figure 2.1-1. Location of TA-0 with respect to Laboratory technical areas and surrounding landholdings

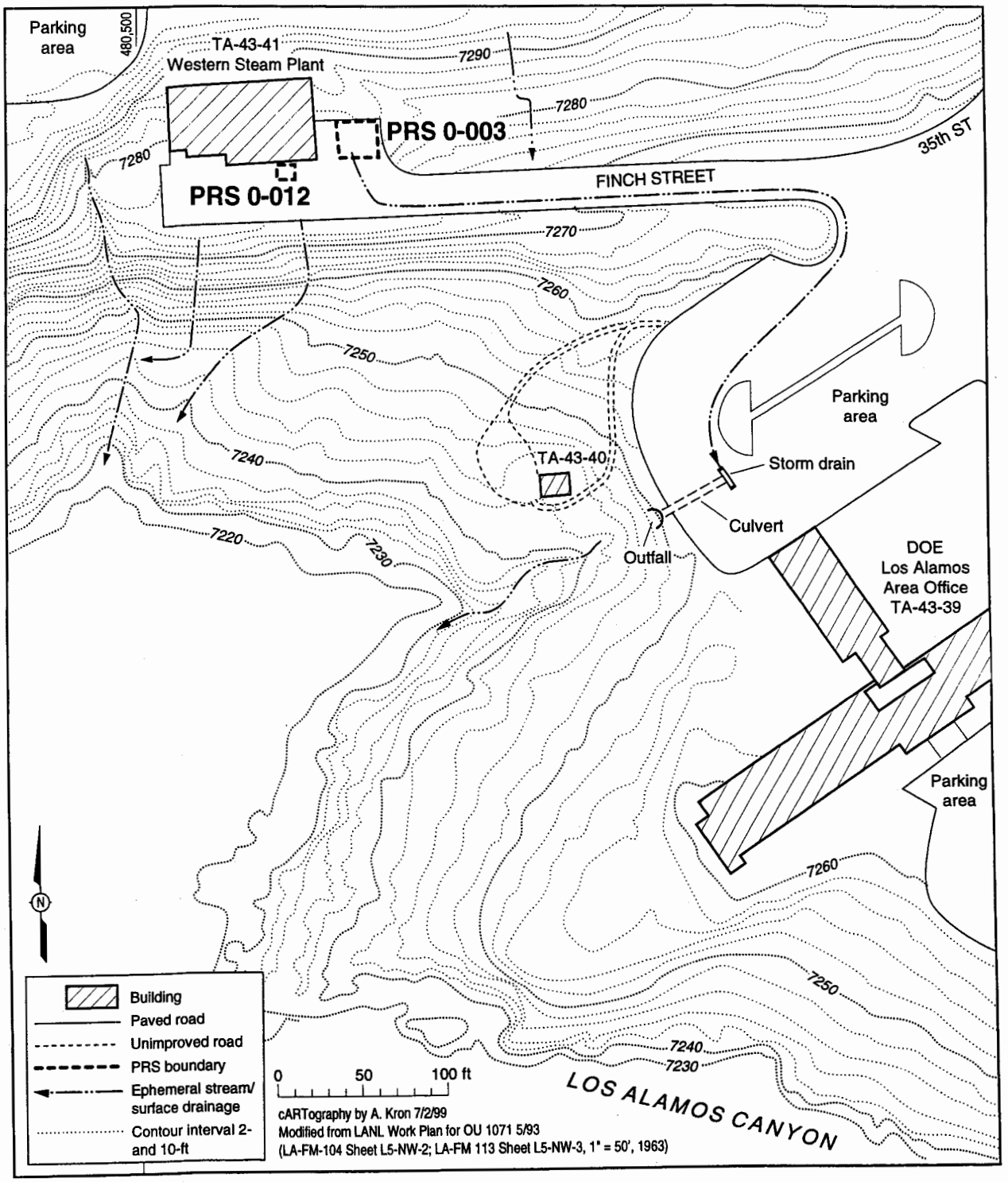

Figure 2.1-2. Locations of PRSs 0-003 and 0-012

Table 2.1-1
Summary of Samples Collected at PRS 0-003

				Request Number			
Location ID	Sample ID	Depth (ft)	Matrix	VOCs	SVOCs	Pesticides/ PCBs	Metals
00-05917	0100-97-0157	0.4-0.9	Soil	3286R	3286R	3286R	3287R
00-05917	0100-97-0158	0.9-1.4	Soil	NR[b]	NR	NR	NR
00-05917	0100-97-0165	2.5-3.0	Soil	3300R	3300R	3300R	3301R
00-05917	0100-97-0166[a]	2.5-3.0	Soil	3300R	3300R	3300R	3301R
00-05918	0100-97-0159	0.4-0.9	Soil	3286R	3286R	3286R	3287R
00-05918	0100-97-0161	2.5-3.0	Soil	3300R	3300R	3300R	3301R
00-05919	0100-97-0160	0.4-0.9	Soil	3286R	3286R	3286R	3287R
00-05919	0100-97-0164	2.5-3.0	Soil	3300R	3300R	3300R	3301R
00-05920	0100-97-0162	0.4-0.9	Soil	3300R	3300R	3300R	3301R
00-05920	0100-97-0163	2.6-3.1	Soil	3300R	3300R	3300R	3301R
00-05920	0100-97-0195[a]	0.4-0.9	Soil	3300R	3300R	3300R	3301R

[a] Duplicate sample
[b] NR = Not Requested

All samples were screened in the field for gross alpha, beta, gamma radioactivity and VOCs to ensure worker health and safety and to help direct sampling by indicating areas of possible contamination. All samples were also screened at the TA-21 Radiological Analytical Laboratory to meet transportation and analytical laboratory acceptance criteria. The results of screening for radiation indicated no detectable activity and no VOCs were detected.

A geodetic survey was conducted to document the sampling locations at PRS 0-003. All sampling locations were recorded in New Mexico state plane coordinates, and location identification numbers were assigned for entry into the Facility for Information Management, Analysis, and Display (FIMAD) database system.

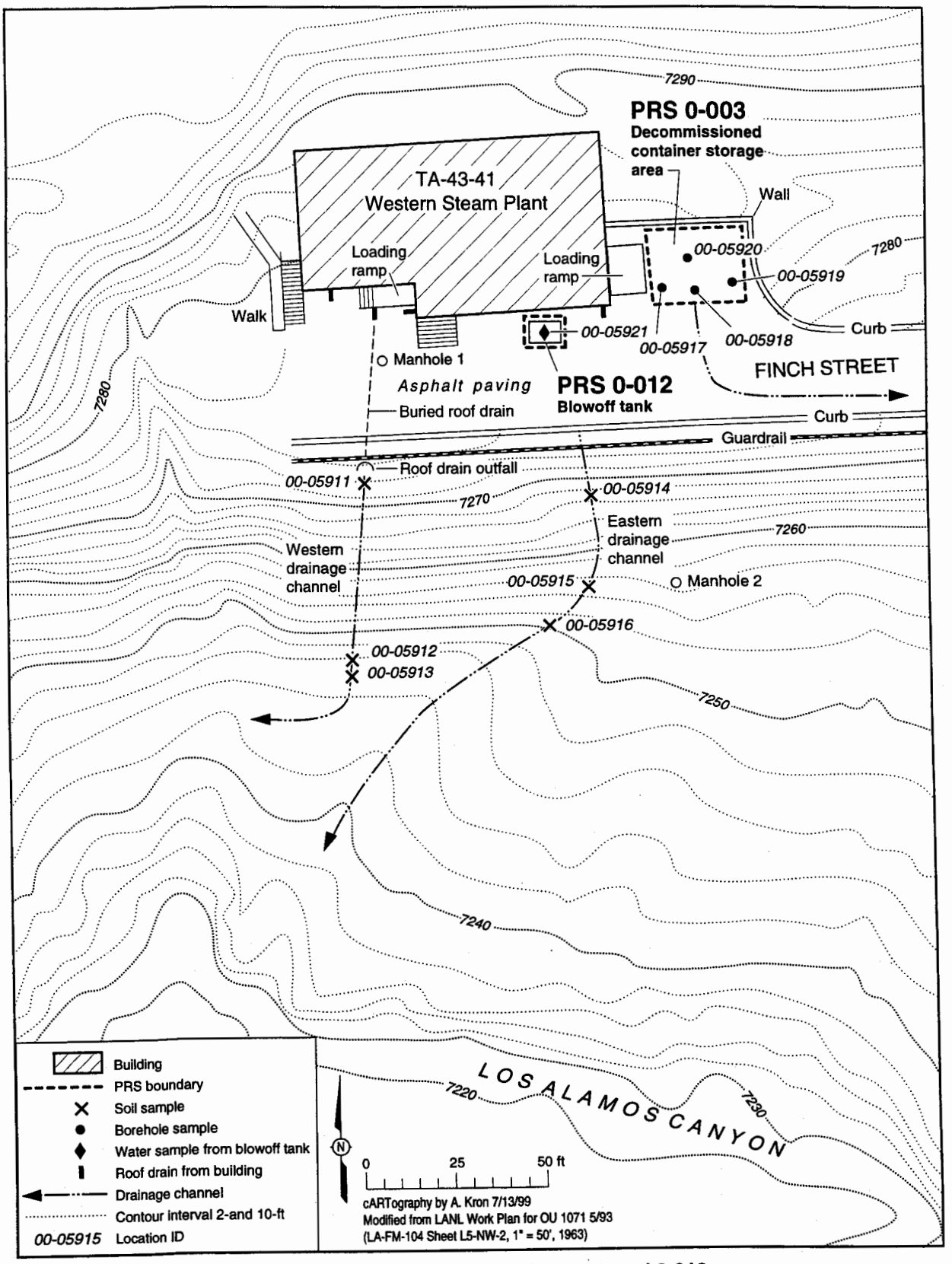

Figure 2.1-3. Locations of samples collected at PRSs 0-003 and 0-012

2.1.3 Results of Previous Investigation

Three inorganic chemicals, calcium, lead, and sodium, were detected above their soil BVs (LANL 1998, 59730) in one sample collected beneath the asphalt pavement at 0.4—0.9 ft deep (Figure 2.1-4). No other inorganic chemicals were detected above their soil BVs in the other samples either immediately beneath the coated base course or deeper.

Calcium is an essential nutrient. Ingesting as much as 2500 mg calcium/day in adults or 600 mg calcium/day in children does not cause adverse effects (National Research Council, 1989, 64000). Therefore, calcium was not considered a COPC. The sodium concentration (1030 mg/kg) was within the range of background concentrations (58 mg/kg to 1800 mg/kg) and was not considered different from background.

Antimony, cadmium, mercury, and silver had reported detection limits above their soil BVs in all or some of the samples collected. However, the detection limits for cadmium (0.43 mg/kg to 0.65 mg/kg) were within the range of background detection limits (0.4 mg/kg to 2.3 mg/kg) and were, therefore, not considered different from background. Antimony, mercury, and silver remain COPCs at this PRS because of detection limit problems.

Sixteen organic compounds (15 PAHs and dibenzofuran) were detected in one or more of the samples collected beneath the asphalt pavement (Figure 2.1-4). No organic compounds were detected in the deeper samples. In addition, no VOCs, pesticides, or PCBs were detected in any of the samples collected.

It is very likely that the presence of the PAHs are not related to the container storage area, PRS 0-003. These detected chemicals are components of asphalt and prime coat, and their presence in the media immediately beneath the asphalt pavement is attributable to these materials. Although an attempt was made to remove the black coated base course before samples were collected, it is likely that the shallow samples contained minute pieces of asphalt or prime coat material. This is supported by the absence of detectable concentrations of these compounds in the deeper samples. Therefore, the PAHs are not considered COPCs at this PRS and further evaluation is not proposed.

The only non-PAH organic detected in the soil was dibenzofuran in one sample beneath the asphalt. There is no known use for dibenzofuran, and its presence at the PRS is unexplained. Laboratories use small amounts of dibenzofuran for research and development. Other than that, this chemical is not deliberately produced by industry. Most dibenzofurans are produced in very small amounts as unwanted impurities of certain products and processes using chlorinated compounds. Extent has been defined for dibenzofuran as it was not detected in the deeper sample or the three downgradient samples.

The existing data have adequately defined the nature of contamination potentially associated with PRS 0-003. Although a human health screening assessment was conducted on these data and presented in the previous RFI report (LANL 1997, 62528.1), the extent of potential contamination, in particular, the extent of lead, has not been determined. Because the extent of the lead detected at this PRS was not defined, the previous screening assessment is not presented here. The sampling proposed in this VCA plan will address this lack of information and all of the data will be reevaluated in human health and ecological screening assessments in the subsequent VCA completion report.

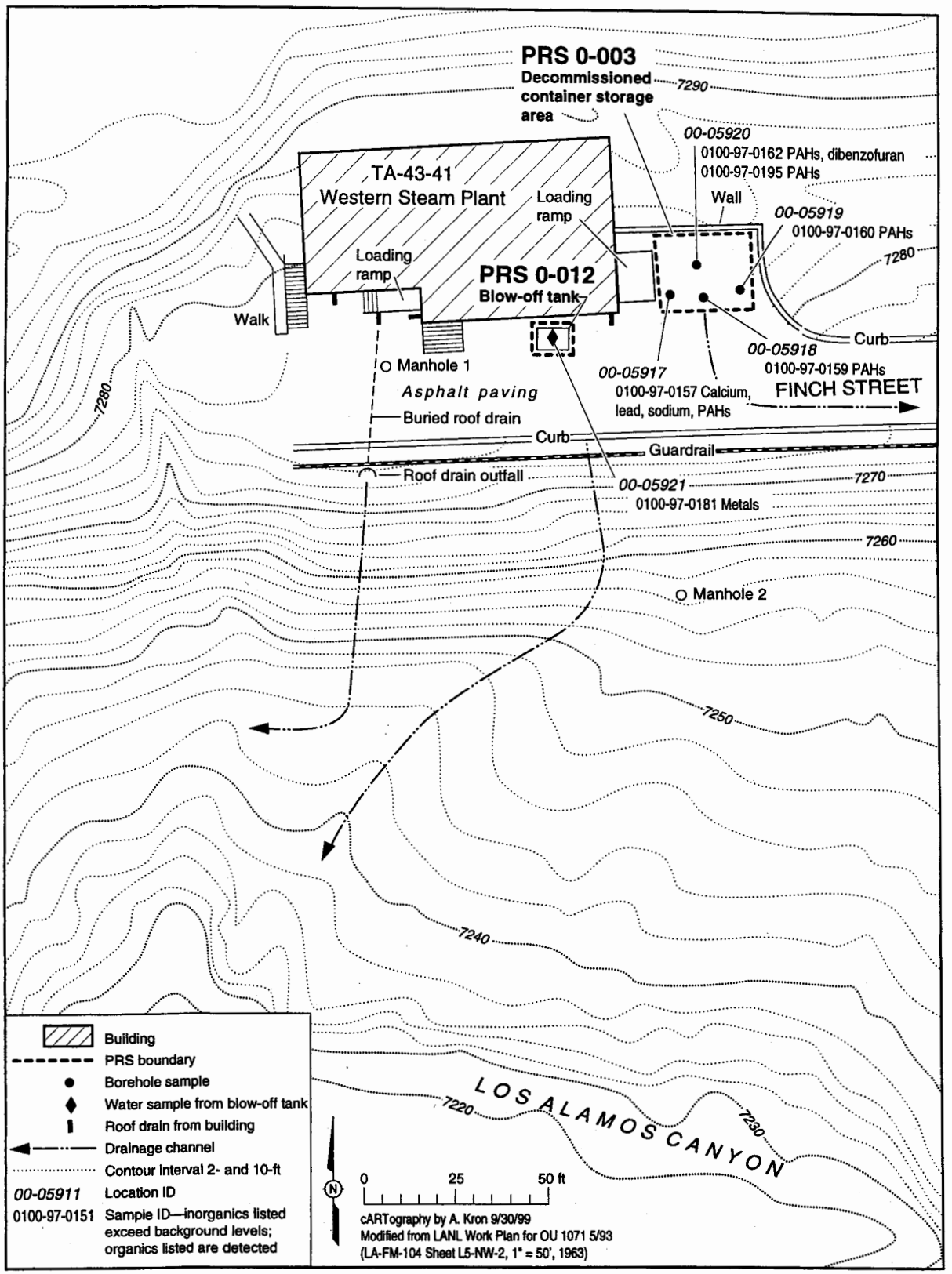

Figure 2.1-4. Locations at PRSs 0-003 and 0-012 where inorganics were detected at levels exceeding background screening values and organics

2.2 PRS 0-012 Underground Blowoff Tank

2.2.1 Site Description and Operational History

The SWMU report states that PRS 0-012 is composed solely of the underground blowoff tank and associated piping that served the Western Steam Plant (LANL 1990, 07511.1).

To prevent the buildup of calcium carbonate and magnesium carbonate on the internal heated boiler components, sodium hydroxide and hexameta phosphate were added to the boiler feed water to maintain a pH of 10 to 10.5. This altered the calcium and magnesium carbonate into a non-adhering solid that was removed from the two boilers by opening the blowoff valves. The frequency of the blowoff operation and the amount of water treatment chemicals used in the boiler feed water were determined by daily testing of the boiler water. Blowoffs were performed as often as every 8 hours but never less than every 24 hours (Francis 1997, 63541).

The blowoff water was piped through a 3-in.-diameter drainline to the underground blowoff tank located on the south side of the building (Figure 2.2-1). This tank is constructed of 5/16-in. steel plate and is 10 ft long by 4 ft in diameter with a capacity of approximately 1,000 gal. The tank discharged through a 4-in.-diameter drainline to a nearby sanitary sewer manhole, not to a NPDES-permitted outfall as noted in the SWMU report (LANL 1990, 07511.1). The combined length of the inlet and outlet drainlines is approximately 62 ft.

The RFI Work Plan for OU 1071 (LANL 1992, 59731) mistakenly identified four drainpipes that extend from the south wall of the steam plant as floor drains and included them as part of the PRS. The work plan required soil sampling in runoff drainages into Los Alamos Canyon that might have received discharge water from these pipes. During the initial phase of the RFI, it was determined that these drainpipes served roof drains and that they were in no way related to PRS 0-012. However, by the time this determination had been made, the drainage soil samples had already been collected and submitted for analysis. The results of the drainage soil samples are discussed in Section 2.2.3.

2.2.2 Previous Field Investigations

RFI field activities were conducted in June and July 1997. A site survey was conducted to confirm the location of the blowoff tank and any outfall points along the rim of Los Alamos Canyon that may have received runoff from the area. The outfall that supposedly received discharge from the blowoff tank was found and its channel (the western drainage) was examined for sediment catchments as part of the geomorphologic mapping done to select sampling locations. A second drainage channel (the eastern drainage) was located east of the first drainage and south of the building. This drainage receives runoff from the asphalt street and parking area to the south of the building as well as runoff from the roof drains, initially thought to be floor drains (LANL 1992, 59731).

A total of six surface soil samples were collected, three from within each of the two drainage channels. The samples were field screened for gross alpha, beta, and gamma radioactivity and sent to an off-site fixed laboratory for analysis of TAL metals, SVOCs, and pesticides/PCBs. It was later determined, after examining engineering drawings and verifying the accuracy of these drawings in the field, that the blowoff tank discharge flowed into the nearby sanitary sewer and not to the outfall. The outfall was, however, connected to one of the roof drains and receives runoff from the roof of the building during storms. It was also determined that the east drainage channel receives rainwater runoff from the asphalt area and the roof drains, but not from floor drains as had been stated in the work plan (LANL 1992, 59731).

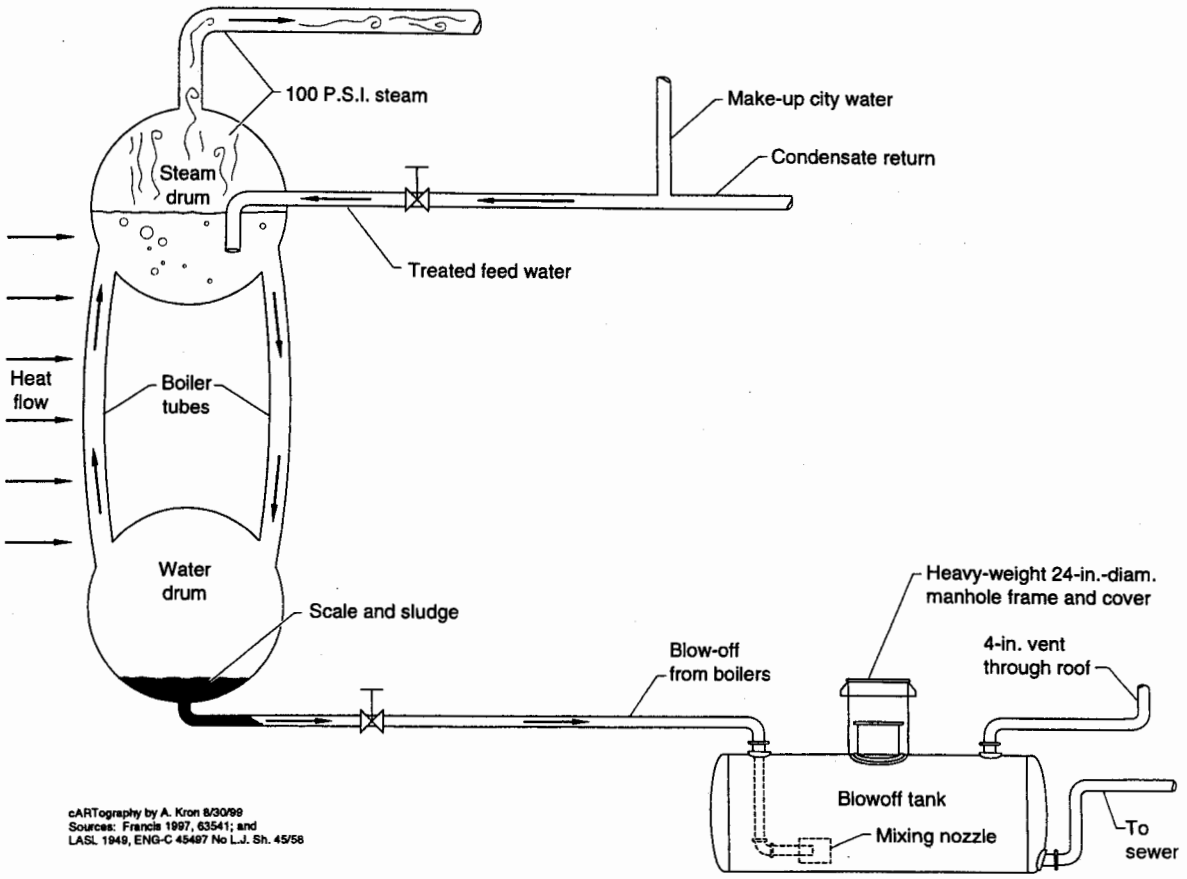

Figure 2.2-1. Schematic of steam generation boilers and blowoff tank

The blowoff tank was accessed through an 18-in.-diameter manhole in the top of the tank to collect water samples. ER Project personnel used a bailer to transfer water from the tank to the sample containers. These samples were sent to an off-site fixed laboratory for analysis of TAL metals, pesticides/PCBs, SVOCs, and VOCs. Total dissolved solids (TDS), total suspended solids (TSS), and pH were also analyzed for possible waste characterization.

Sample locations are presented on Figure 2.1-3. Information about the sample depths, analyses conducted, and request numbers for each sample collected is summarized in Table 2.2-1.

All samples were screened in the field for gross alpha, beta, and gamma radioactivity and VOCs to ensure worker health and safety and to help direct the sampling effort. All samples were also screened at the TA-21 Radiological Analytical Laboratory to meet transportation and analytical laboratory acceptance criteria. The results of screening for radiation indicated no detectable activity and no VOCs.

A geodetic survey was conducted to document the sampling locations. All locations were recorded in New Mexico state plane coordinates, and location identification numbers were assigned for entry into the FIMAD database system.

Table 2.2-1
Summary of Samples Collected at PRS 0-012

				Request Number						
Location ID	Sample ID	Depth (ft)	Matrix	VOCs	SVOCs	Pesticies/ PCBs	Metals	Ph	TDS	TSS
00-05911	0100-97-0151	0.05-0.5	Soil	NR[a]	3286R	3286R	3287R	NR	NR	NR
00-05912	0100-97-0152	0.05-0.5	Soil	NR	3286R	3286R	3287R	NR	NR	NR
00-05913	0100-97-0153	0.05-0.5	Soil	NR	3286R	3286R	3287R	NR	NR	NR
00-05914	0100-97-0154	0.05-0.5	Soil	NR	3286R	3286R	3287R	NR	NR	NR
00-05915	0100-97-0155	0.05-0.5	Soil	NR	3286R	3286R	3287R	NR	NR	NR
00-05916	0100-97-0156	0.05-0.5	Soil	NR	3286R	3286R	3287R	NR	NR	NR
00-05921	0100-97-0181	NA[b]	Water	3321R	3321R	3321R	3322R	3323R	3323R	3323R
00-05921	0100-97-0182[c]	NA	Water	NR	3391R	NR	NR	NR	NR	NR

[a]NR = Not Requested

[b]NA = Not Applicable

[c]Duplicate Sample

2.2.3 Results of Previous Investigation

The water sample from the blowoff tank contained several inorganic chemicals above their detection limits including aluminum, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, silver, sodium, vanadium, and zinc. No organic chemicals were detected in this water sample.

Samples were collected from two drainages that were originally thought to have received blowoff tank discharge (Figure 2.1-4). Subsequently, it was confirmed (via engineering drawing Eng-C45497, sheet 45, provided in Appendix G) that the blowoff tank did not discharge to a drainage but to the sanitary sewer. The set of contaminants detected in the drainage samples is consistent with contaminants associated with other asphalt roof drains and parking lot runoff, and is inconsistent with what might be expected to have been associated with steam generation processes. This, coupled with the engineering drawings, confirms that PRS 0-012 is not related to the drainage sampling results.

2.3 PRS 0-030(I) Septic System

2.3.1 Site Description and Operational History

PRS 0-030(i) was a septic tank and associated drainlines located on DOE property south of Trinity Drive and east of 35th Street (LANL 1990, 07511.1) (Figure 2.3-1). Engineering drawings showing the facilities connected to this septic tank are not available; however, it is believed that the septic tank served the West Mess Hall and buildings west of the West Mess Hall along Finch Street and south of Trinity Drive. These buildings included dormitories, barracks, a military post office, an officer's lounge, a post exchange, and the Sundt Apartments (Sullivan 1995, 5987.3).

The septic tank was approximately 16.5 ft long by 8 ft wide by 7.5 ft deep with three manhole covers. The inlet drainline was a 6-in. diameter vitrified clay pipe (VCP) that entered the center of the north end of the tank. The outlet drainline was a 6-in.-diameter VCP that exited the center of the south end of the tank. The outlet drainline discharged to a drainage channel approximately 100 ft southwest of the septic tank.

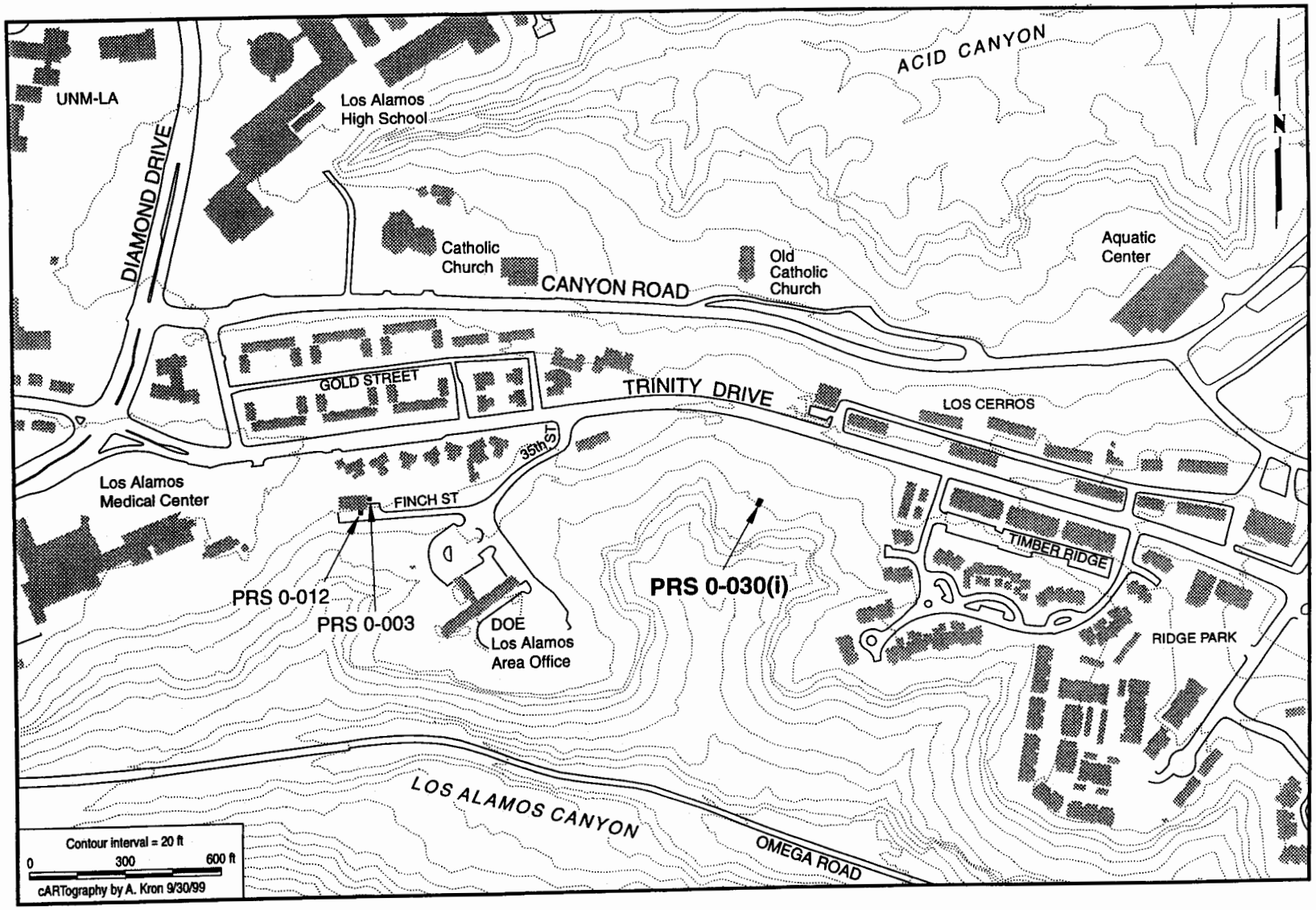

Figure 2.3-1. Location of PRS 0-030(i)

2.3.2 Previous Field Investigations

On April 11, 1996, characterization included removing the three concrete manhole covers of the septic tank. The tank contained tuff boulders, oil filters, stained soil, and backfill material to within approximately 2 ft of the top. Two exploratory boreholes were hand-augured into the septic tank through the manholes, one near the middle and one at the north end near the inlet pipe, to determine the best locations to collect waste characterization samples. Information from these boreholes showed that the tank contained two distinct soil horizons: the upper 24—25 in. was moist, sandy silt; the lower 55—96 in. was saturated sand with silt and traces of clay.

Two waste characterization sample boreholes were subsequently hand-augured near the exploratory borehole locations. Two samples were collected from the north borehole and three from the middle borehole. The sampled intervals were representative of both the upper zone of moist soil and the saturated zone near the bottom of the tank. A sample was also collected from the north characterization borehole from a 2—3 in. layer of clay-like material that had an oil-like odor and detected a PID reading of 20 ppm.

Two soil samples were collected from beneath the VCP inlet and outlet drain lines near their connections to the septic tank. To investigate the outfall area, two soil samples were also collected below the end of the outlet pipe. One final sample was collected beneath a break in the VCP inlet line approximately 100 ft north of the septic tank.

On June 10, 1996, the septic tank was removed as part of a VCA. Two confirmation samples were collected from the bottom of the excavation at the north and south ends. The excavation was then backfilled with clean fill, the area was contoured and restored, and stormwater controls were installed.

Sample locations, not including the waste characterization boreholes, are presented in Figure 2.3-2. Information about the sample depths, analyses conducted, and request numbers for each sample collected is summarized in Table 2.3-1.

All samples were screened in the field for gross alpha, beta, and gamma radioactivity and VOCs to ensure worker health and safety and to help direct the sampling effort. All samples were also screened at the TA-21 radiological analytical laboratory to meet transportation and analytical laboratory acceptance criteria. The results of screening for radiation indicated no detectable activity and VOCs were detected in one waste characterization sample from inside the septic tank. All samples were sent to an off-site fixed laboratory for analysis.

A geodetic survey was conducted to document the sampling locations. All locations were recorded in New Mexico state plane coordinates, and location identification numbers were assigned for entry into the FIMAD database system.

2.3.3 Results of Previous Investigation

The six samples collected from inside the tank for waste characterization were analyzed for SVOCs, pesticides/PCBs, and TAL metals. Two of these samples were also analyzed for VOCs, total uranium, plutonium-238, plutonium-239/240, and americium-241. All of the other characterization and confirmation samples were analyzed for TAL metals, pesticides/PCBs, SVOCs, and radionuclides (isotopic uranium, isotopic plutonium, and americium-241). Three of these other characterization/confirmation samples were also analyzed for VOCs.

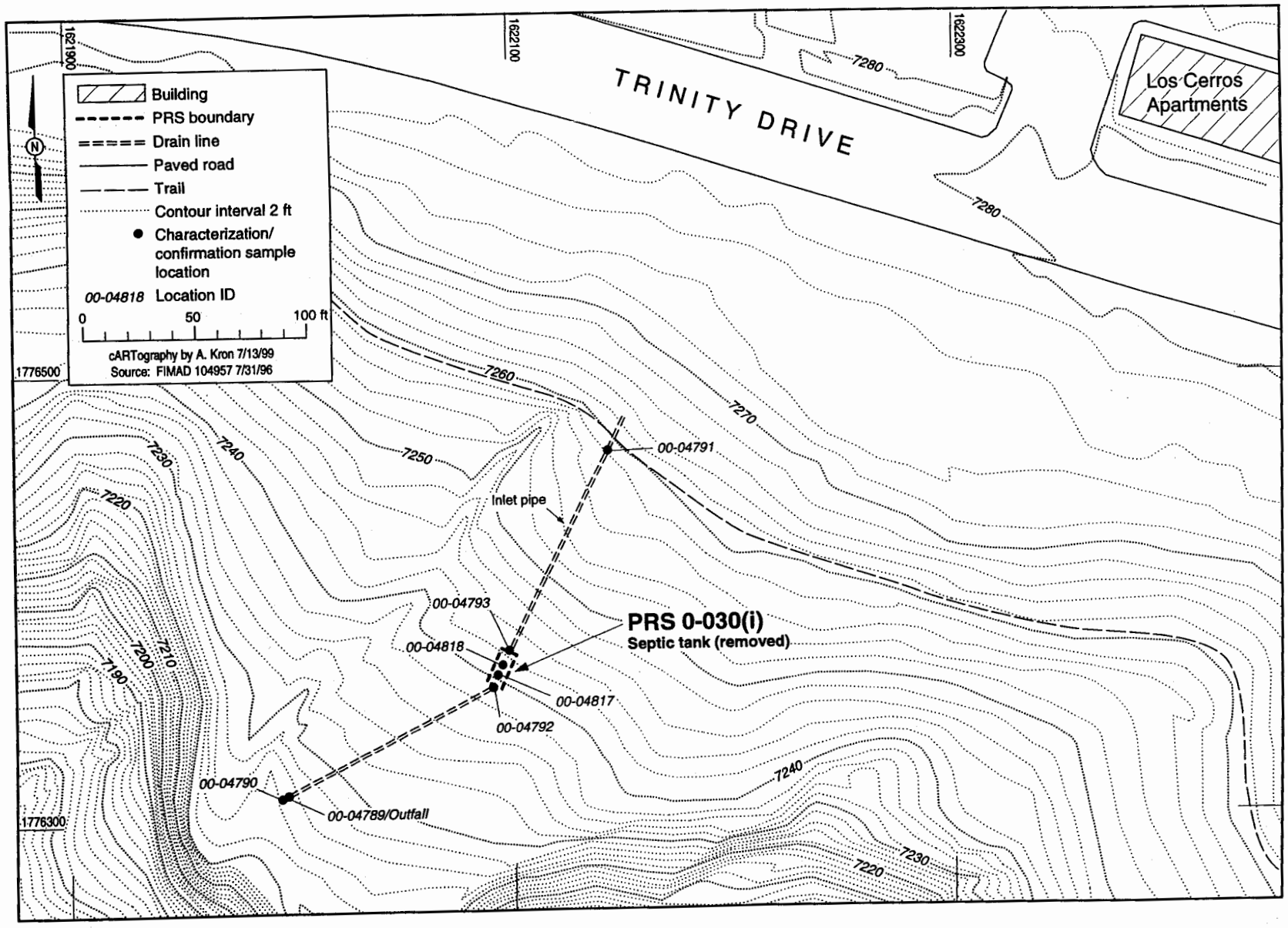

Figure 2.3-2 Locations of samples collected at PRS 0-030(i)

Table 2.3-1
Summary of Characterization and Confirmatory Samples Collected at PRS 0-030(i)

Sample Information				Request Numbers				
Sample ID	Location ID	Location Description	Depth (ft)	VOCs	SVOCs	Pesticides/ PCBs	Inorgs	RAD
0100-96-0201	00-04783	Inside tank near inlet pipe	3.25–4.75	1958	1958	1958	1959	1960
0100-96-0202	00-04783	Inside tank near inlet pipe	5.75–7	1958	1958	1958	1959	1960
0100-96-0204	00-04784	Inside tank near inlet pipe (clay layer)	5.8–7	NR*	1958	1958	1959	NR
0100-96-0207	00-04785	Inside tank near outlet	2.7–3.1	NR	1958	1958	1959	NR
0100-96-0208	00-04785	Inside tank near outlet	3.3–4	NR	1958	1958	1959	NR
0100-96-0209	00-04785	Inside tank near outlet	7–8	NR	1958	1958	1959	NR
0100-96-0219	00-04789	Adjacent to outfall pipe	0.3–0.6	1958	1958	1958	1959	1960
0100-96-0220	00-04790	Downslope from the outfall pipe	0.8–1.25	NR	1958	1958	1959	1960
0100-96-0221	00-04791	North of septic tank where inlet pipe is exposed	0–0.3	NR	1958	1958	1959	1960
0100-96-0222	00-04792	Outside and adjacent to tank under outlet drainline	1.7–1.8	NR	1958	1958	1959	1960
0100-96-0223	00-04793	Outside and adjacent to tank under inlet pipe	1.8–2	NR	1958	1958	1959	1960
0100-96-0229	00-04817	Confirmation sample beneath the south half of tank after removal	8–8.5	2261	2261	2261	2262	2263
0100-96-0230	00-04818	Confirmation sample beneath the north half of tank after removal	8–8.5	2261	2261	2261	2262	2263

*NR = Not Requested

Five inorganic chemicals (calcium, lead, manganese, sodium, and zinc) were detected above the soil or sediment BVs (LANL 1998, 59730) in at least one of the samples collected from outside of the septic tank at PRS 0-030(i) (Figure 2.3-3). Calcium was reported above its soil BV in a sample collected beneath the septic tank. Sodium was detected at a concentration above its soil BV in the sample collected beneath the inlet line to the north of the tank. Manganese was detected above the soil BV in the sample collected beneath the outlet line from the tank. Further evaluation of these concentrations found that the calcium value (7340 mg/kg), the sodium value (1180 mg/kg), and the manganese value (778 mg/kg) were within the range of background concentrations in the background data sets (500–14,000 mg/kg, 58–1800 mg/kg, and 76–1100 mg/kg, respectively) (LANL 1998, 59730). Therefore, these three inorganic chemicals were considered part of laboratory background. Lead was detected above the sediment BV (19.7 mg/kg) in the outfall area as well as above the soil BV (22.3 mg/kg) in the sample collected beneath the inlet line to the north of the tank. Zinc was detected above the sediment BV (60.2 mg/kg) in the outfall area and above the soil BV (48.8 mg/kg) in the sample collected beneath the inlet line to the north of the tank, the sample collected beneath the inlet line at the tank, and in the samples collected below the septic tank. These data are summarized in Appendix F, Table F-1.

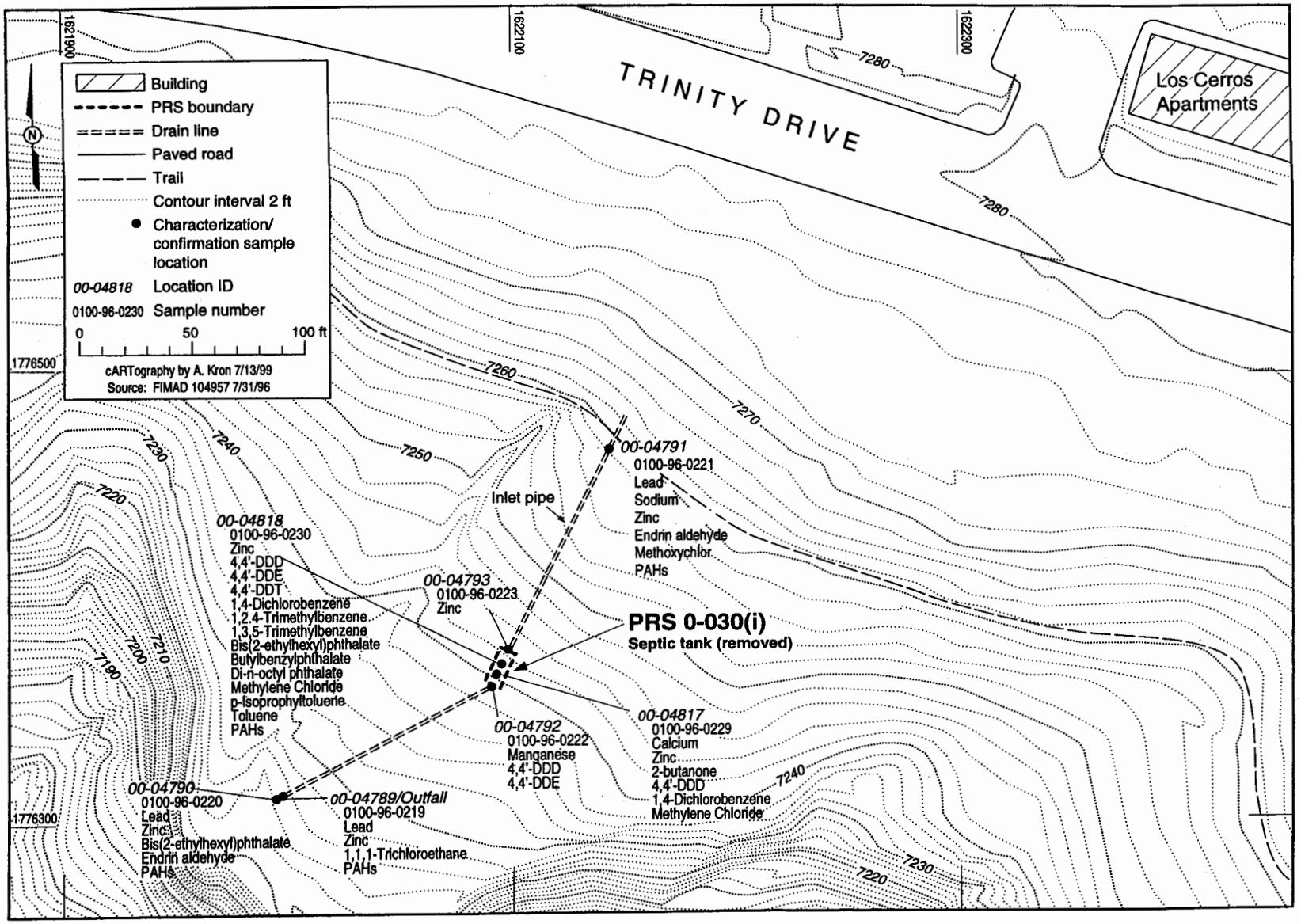

Figure 2.3-3. Characterization/confirmatory sample locations showing inorganic analytes above background screening values and detected organic chemicals for PRS 0-030(i)

No radionuclides were detected above background/fallout values in the soil samples collected at PRS 0-030(i).Twenty-eight organic chemicals (pesticides, PAHs, phthalates, and VOCs) were detected in the soil and/or sediments in at least one of the samples collected outside of the septic tank at PRS 0-030(i) (Figure 2.3-3). The sample collected beneath the inlet line to the north of the tank had concentrations of chrysene, endrin aldehyde, fluoranthene, methoxychlor, phrenanthrene, and pyrene above the detection limits. The samples beneath the septic tank had concentrations of 2-butanone, 2-methylnaphthalene, 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, 1,4-dichlorobenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzo(a)anthracene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, di-n-octyl phthalate, fluoranthene, methylene chloride, 4-isopropyltoluene, pyrene, and toluene above the detection limits. The sample collected beneath the inlet line at the septic tank had no detectable concentrations of organic chemicals, while the sample collected beneath the outlet line at the tank had detectable concentrations of 4,4'-DDE, and 4,4'-DDD.

The samples collected below and downgradient from the septic tank outfall had concentrations of 1,1,1-trichloroethane, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenzo(a,h)anthracene, endrin aldehyde, fluoranthene, indeno(1,2,3-cd)pyrene, phrenanthrene, and pyrene above detection limits. The concentrations of organic chemicals generally increased from the sample collected below the outfall to the sample collected downgradient from the outfall (approximately 5–6 ft from the outfall). These data are summarized in Appendix F, Table F-2.

The existing data have adequately defined the nature of contamination associated with PRS 0-030(i). Although a human health screening assessment was conducted on these data extent was not defined. Therefore, the assessment is not presented here but is available in the VCA Completion Report for PRSs 0-030(h,i,n,o,p) (LANL 1996, 62416). The extent of contamination, in particular the extent of lead, zinc, selected pesticides, PAHs, phthalates, and VOCs (as identified in the previous paragraph), will be defined by the sampling proposed in this plan. Following the definition of extent, the data will be reevaluated in the human health and ecological screening assessment sections in the subsequent VCA completion report for this PRS.

3.0 BASIS FOR CLEANUP LEVELS

The primary objectives of this VCA are to remove the PRS 0-012 blowoff tank and associated piping, to remove the lines associated with the former 0-030(i) septic tank, and to collect additional samples to define the extent of potential contamination at these PRSs and at PRS 0-003. Because the extent of potential contamination has not yet been adequately defined, it is unclear whether soil removal will be required as part of this VCA. The data does not indicate any contamination that warrants soil removal. Therefore, cleanup levels for human health and ecological concerns have not been developed at this time.

After the proposed supplemental and confirmatory sampling is done, the previous and proposed data from these PRSs will be evaluated using screening levels for human and ecological receptors to determine if an unacceptable risk remains at these sites. If an unacceptable potential risk to human health and/or the environment is identified and remediation is warranted, cleanup levels will be developed to determine what concentrations of COPCs and chemicals of potential ecological concern (COPECs) may remain. The cleanup levels for human health will be based upon appropriate future land use and will be calculated using the most current guidance from EPA Region 9 (EPA 1998, 58751) for nonradionuclides. For ecological purposes, cleanup levels may be derived from the ecological screening levels (ESLs). Cleanup levels used in any remediation conducted at these PRSs will be presented along with the rationale and equations in the VCA completion report for these PRSs.

4.0 PROPOSED CORRECTIVE ACTION

4.1 Conceptual Model

The conceptual models for PRSs 0-003 and 0-012, and 0-030(i) are presented in Chapters 5.1 and 5.10, respectively, of the RFI Work Plan for OU 1071 (LANL 1992, 59731). The conceptual models are similar and assume surface contamination and near-surface liquid releases that might result in contamination of the soil, channel sediments, tuff, and/or air. Human exposure to contaminants may occur through inhalation of suspended particulates, incidental ingestion, or dermal contact with soil. Figure 4.1-1 presents a conceptual model for all three PRSs.

The ecological conceptual site model (ECSM) identifies which exposure pathways represent major, minor, unlikely, or no pathway to ecological receptors (terrestrial and aquatic). In general, exposure pathways to terrestrial receptors can occur through air (inhalation or deposition of vapor or particulate), surface soil (root uptake and rain splash on plants, food web transport via plants and/or animals, incidental ingestion of soil, dermal contact with soil, and external radiation), and surface water or active channel sediments (root uptake and rain splash on plants, food web transport to plants and animals, incidental ingestion of sediment, dermal contact with sediment, and external radiation from sediment). In general, exposure pathways to aquatic receptors include bioconcentration of contaminants from uptake by aquatic organisms from water or sediment, bioaccumulation from uptake by aquatic organisms from water or sediment, and external irradiation from sediment.

For PRS 0-003, there are no ecological receptors present and, therefore, no complete exposure pathways to receptors on-site or transport to receptors off-site. The PRS is paved with asphalt and does not have any evidence of a release from the 55-gal. drums stored there, i.e., no stains or residues on the asphalt. Transport of any surface releases would have flowed down the driveway to the LAAO parking lot during storms and discharged into the storm sewer. There was no impact on any ecological systems or receptors in the area. Elevated levels of PAHs were detected in the soil/fill beneath the pavement and are associated with the asphalt that covers the entire area. PAHs are common components of asphalt and tar and would be expected to be present in the soil immediately beneath the pavement. PAHs were detected in all of the soil samples collected immediately beneath the asphalt but not at deeper intervals. Therefore, they are not related to a release from the storage area and the extent of these chemicals is limited to the soil beneath the asphalt. There was also one detect of lead above the soil background value and one detect of dibenzofuran beneath the asphalt at different locations. The source of these contaminants is unclear given the type of materials stored at this site [sodium hydroxide, hexameta phosphate, an oxygen scavenger (sodium sulphite), and chelating compounds that were added to the boiler feed water]. Given that the site was also used for loading and unloading materials and that vehicles probably parked in the area, these chemicals may be residual contamination from vehicle exhaust or leaks that seeped through cracks in the asphalt. The data shows that there is no vertical migration of any of these materials (lead, dibenzofuran, and PAHs).

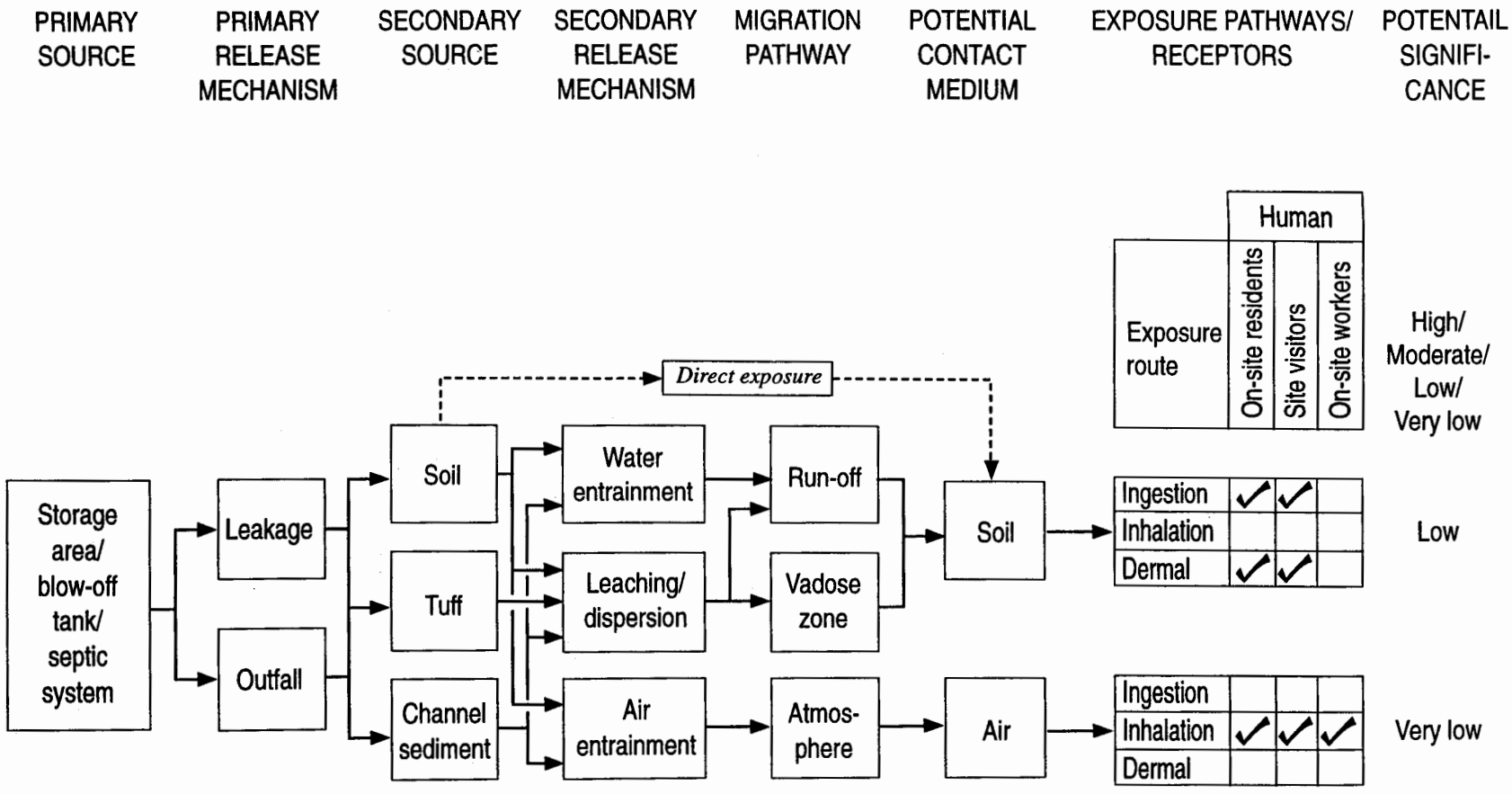

Figure 4.1-1. Conceptual model of PRSs 0-003, 0-012, and 0-030(i)

PRS 0-012 is beneath the asphalt driveway/parking area and discharges to the sanitary sewer system. Because no vegetation exists on-site and the tank is a below-ground closed system, there are no ecological receptors and no complete pathways to ecological receptors. There are also no transport pathways to off-site receptors because the tank is below ground and does not daylight anywhere. The drainages from the facility, identified in the SWMU report as 0-012 outfalls, actually receive runoff from the roof drains and asphalt pavement, but not PRS 0-012. Detection of PAHs and metals in the drainage channels are related to the roof materials as well as the asphalt driveway/parking area. The water sample from the tank contained detected metals but no organics. Surface-water runoff does not result in materials from the tank or associated lines being present in the drainages.

Because there were no releases to the surface soil from the septic tank itself at PRS 0-030(i), there are no ecological soil-related exposure pathways. However, releases beneath the inlet and outlet to the septic tank as well as beneath the inlet line to the north of the septic tank were found. The potential exposure pathways at these locations are minor and may include root uptake, food web transport, and incidental ingestion of soils. The major potential exposure pathways are from water and/or sediment at the outfall from the septic tank. These pathways include root uptake/rain splash from water/sediment for terrestrial plants, food web transport for terrestrial animals, ingestion of water and suspended sediments in drainage, and dermal contact with water and/or sediments for terrestrial animals. There are no minor pathways for surface water/sediment exposure and no pathways for radionuclides. In addition, no pathways exist for aquatic receptors because the drainage area is ephemeral, containing water only following storms. Although the drainage may have small pools of standing water present for periods of time following storms, there are no aquatic communities present below the outfall, in the drainage, or on the bench below the outfall. The ECSM for PRS 0-030(i) and the associated rationale are presented in Part C of the Ecological Scoping Checklist (Appendix D).

4.2 Supplemental Sampling

4.2.1 PRS 0-003

The results of previous RFI sampling at PRS 0-003 indicated that lead and dibenzofuran were the only contaminants not attributable to the overlying asphalt. The vertical extent of these contaminants under the asphalt storage area, as well as the vertical extent of the PAHs under the asphalt storage area, has been defined. The horizontal extent of dibenzofuran has been defined by the current sampling data, but the horizontal extent of lead has not. Therefore, one additional sampling location (downgradient of the elevated lead detection) is proposed for PRS 0-003 because extent has been defined laterally in the other directions (Figure 4.2-1). Additional locations will be sampled to further define the extent of lead, if necessary.

Sampling will be conducted downgradient (south) of where lead was detected (Location ID 00-05917) (Figure 4.2-1). As in the previous sampling event, the asphalt and coated base coarse will be removed before sampling. One shallow sample will be collected from the 0.5-ft interval, depending on the thickness of the asphalt and coated base course, and a second sample will be collected from approximately 2 ft below the shallow sample. Samples will be analyzed for TAL metals and SVOCs. During cleanup activities associated with PRS 0-012, an excavator will be available to aid in the removal of asphalt and in the deeper sampling. Table 4.2-1 identifies the sample types and depths, and describes the samples to be collected at the proposed locations.

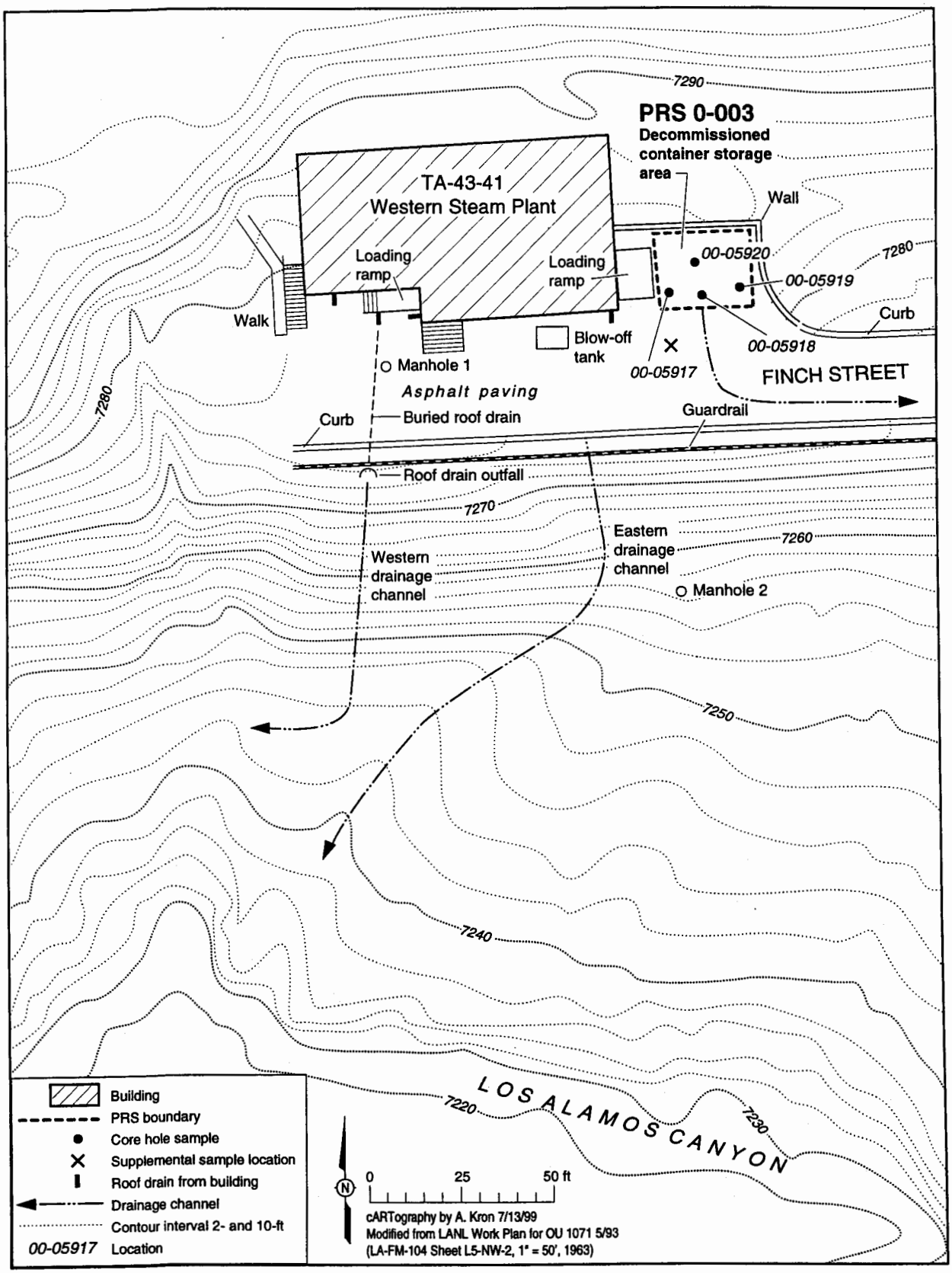

Figure 4.2-1. Supplemental sampling locations at PRS 0-003

Table 4.2-1
Supplemental Samples for PRS 0-003

Sample Types	Samples Description and Depth	Requested Analyses
Subsurface Soil	Downgradient of sample containing elevated lead, immediately below coated base coarse	TAL metals and SVOCs
Subsurface Soil	Beneath previous sample (2 ft deeper)	TAL metals and SVOCs

4.2.2 PRS 0-012

The only supplemental sample to be collected at PRS 0-012 will be a water sample from inside the blowoff tank. This sample will be analyzed to provide current data for the purpose of waste characterization as discussed in Section 6.1.1. The sample will be analyzed for gross alpha, beta, gamma, and tritium, SVOCs, VOCs, inorganics, PCBs, Microtox, pH, chemical oxygen demand (COD), temperature, total nitrogen, oil and grease, total phosphorus, TSS, and total residual chlorine.

4.2.3 PRS 0-030(i)

Supplemental samples will be collected from beneath the location of the former septic tank and in the vicinity of the outfall.

A hollow-stem auger drill rig will be used to collect two deeper samples beneath Location 00-04818, sampled during the previous field investigation (LANL 1997, 62528) (Figure 4.2-2). These deeper samples will be used to define the vertical extent of contamination beneath the former septic tank (Table 4.2-2).

Four samples will be collected in the outfall drainage. One surface sample will be collected from the drainage upgradient from the outfall, and three (one surface and two subsurface) samples will be collected from the drainage below the outfall (Figure 4.2-2) (Table 4.2-2). Except for a small sediment catchment area immediately below the outfall, from which the two original outfall samples were collected, the downgradient drainage channel is incised into tuff with no significant sediment catchments until beyond the base of the tuff outcrop, approximately 80 ft from the outfall. The most downgradient samples will be collected from the first sediment catchment beyond the base of the tuff outcrop. The former septic tank location and all drainage samples will be analyzed for TAL metals, SVOCs, and pesticides. The former septic tank location and subsurface drainage samples will also be analyzed for VOCs. VOCs will not be collected from the surface because operational releases would not be expected to be present at the surface 50 y ears after cessation of operations.

Table 4.2-2
Former Septic Tank Location and Septic Tank Outfall
Supplemental Samples

Sample Types	Sample Description and Depth	Requested Analyses
Subsurface Soil	Borehole at Location 00-04818. Sample depths at 2-ft intervals below previous sample	TAL metals, VOCs, SVOCs, and pesticides
Surface and Subsurface Soil	In drainage upgradient from outfall	TAL metals, SVOCs, and pesticides (add VOCs to subsurface sample only)
Surface and Subsurface Soil	Location 00-04790 in drainage downgradient from outfall (soil/tuff interface)	TAL metals, SVOCs, and pesticides (add VOCs to subsurface sample only)
Surface and Subsurface Soil	In drainage at base of tuff outcrop, downgradient from outfall and prior sample	TAL metals, SVOCs, and pesticides (add VOCs to subsurface sample only)

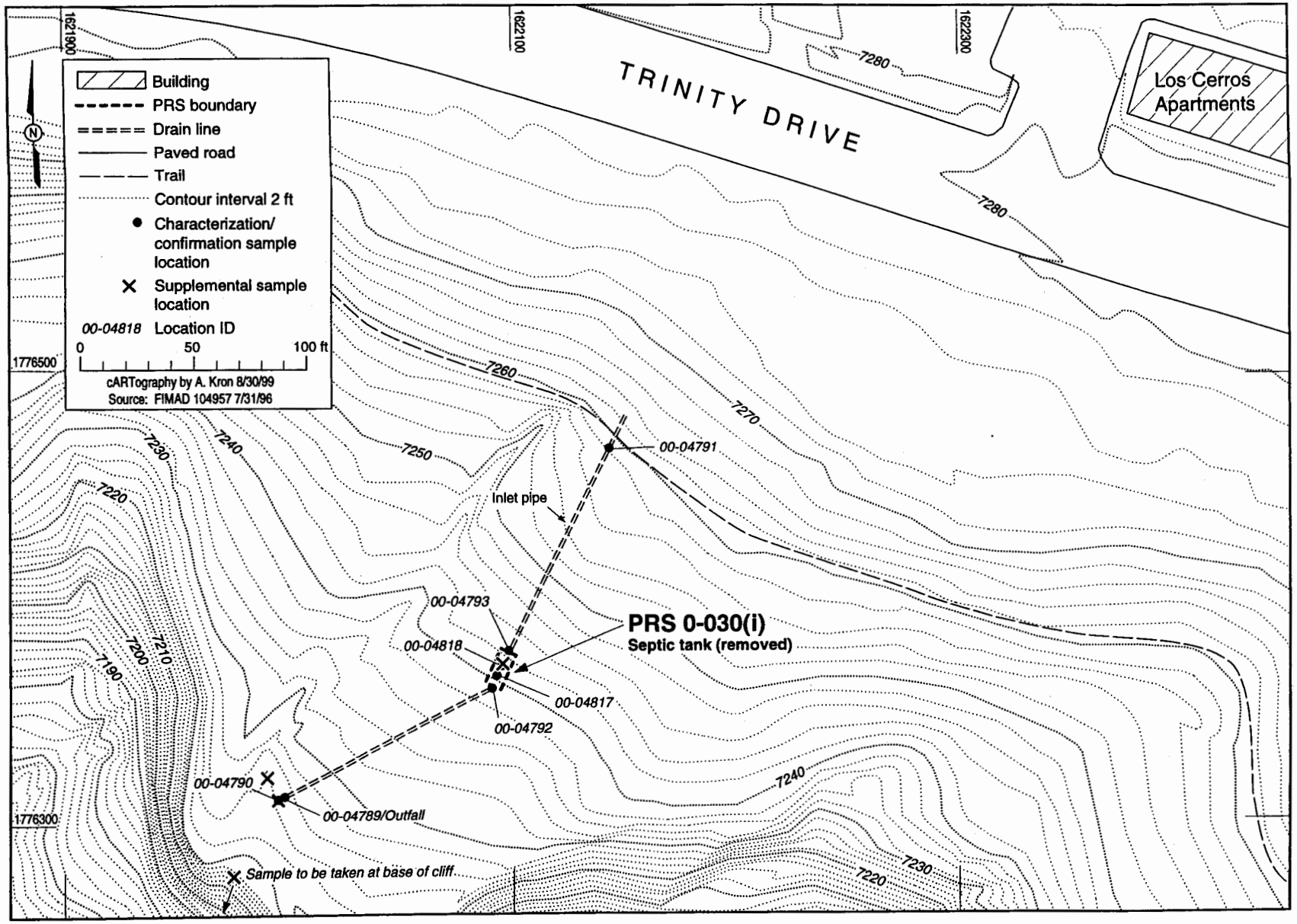

Figure 4.2-2.. Supplemental sampling locations at PRS 0-030(i)

4.4.3 PRS 0-030(i)

Photographs will be taken to record the conditions of the site before activities begin. Following VCA activities, the site will be restored to its original contours. Excavations will be backfilled and compacted, and the affected areas will be contoured to pre-existing conditions and seeded with an acceptable mix of native grasses. Stormwater best management practices (BMPs) will be installed as needed after remedial activities are completed, inspected and maintained in accordance with ER requirements.

5.0 CONFIRMATORY SAMPLING

5.1 Confirmation Sampling for PRS 0-003

Confirmation sampling is not required for this PRS because no cleanup or removal activities are proposed.

5.2 Confirmation Sampling for PRS 0-012

Figure 5.2-1 presents proposed post-excavation confirmatory sampling locations. To help select potential sampling locations, the tank and piping will be inspected for breaks or leaks and the fill or tuff will be inspected for staining. In the absence of any potential contamination indicators, ER Project personnel will collect two samples at each of the five proposed locations. The first sample will be collected immediately beneath the piping or tank, and the second sample will be collected two feet below the first. Table 5.2-1 identifies the type and description of proposed samples to be collected beneath the removed tank and piping. Because only metals were detected in the original water sample from the tank, only metals will be analyzed in the confirmatory samples. Because the process water had a high pH, soil pH will also be measured to help determine if a release occurred from the tank and piping. However, the analyte list may be adjusted based on the analytical results from the additional tank water sample that will be collected and analyzed before the water is disposed.

Table 5.2-1
Blowoff Tank, and Inlet and Outlet Line Confirmation Sample Locations

Sample Type	Sample Location	Sample Depth	Requested Analyses
Subsurface Soil	Immediately beneath elbow in piping near SE corner of building	Immediately beneath pipe and 2 ft below	TAL Metals and pH
Subsurface Soil	Immediately beneath east end of tank (below inlet port)	Immediately beneath tank and 2 ft below	TAL Metals and pH
Subsurface Soil	Immediately beneath west end of tank (below outlet port)	Immediately beneath tank and 2 ft below	TAL Metals and pH
Subsurface Soil	Immediately beneath outlet line to sewer (10-20 ft west of tank)	Immediately beneath pipe and 2 ft below	TAL Metals and pH
Subsurface Soil	Immediately beneath outlet line/sewer connection	Immediately beneath pipe and 2 ft below	TAL Metals and pH

4.3 Cleanup Activities

Equipment that is mobilized for excavation at one PRS could be used, if needed, at the other PRSs.

4.3.1 PRS 0-003

No cleanup activities are currently proposed for PRS 0-003. The proposed sampling is intended to define the extent of soil contamination. Following receipt and assessment of all the new analytical data, the need for corrective action will be evaluated.

4.3.2 PRS 0-012

The blowoff tank and associated inlet and outlet lines will be removed as part of this VCA. Before excavating the tank, ER Project personnel will sample the water in the tank and they will analyze it for the chemicals and water quality parameters necessary to determine the proper method of its disposal (see Section 4.2.2). The water will then be disposed appropriately, as discussed in Section 6.0. The asphalt above the tank and pipeline traces will be removed and set aside. The fill above and around the tank and piping will be removed and stockpiled on high-density polyethylene (HDPE). Piping will be cut or disconnected from the tank and cut or disconnected as close as is feasible to the building and sanitary sewer. The remaining exposed pipe ends will be plugged with concrete grout. The tank and piping will then be removed from the excavation and inspected for leaks. The tank and piping will be disposed pursuant to the provisions of the waste characterization strategy form, which will be prepared and approved before the fieldwork begins. Handling the asphalt and excavated soil is discussed in Section 6.0, "Waste Management."

4.3.3 PRS 0-030(i)

The inlet and outlet lines associated with the former septic tank 0-030(i) will be removed during the cleanup activities. Both lines are thought to be approximately 100 ft long. However, the inlet line may be slightly longer. Both ends of the outlet line are exposed at the ground surface, indicating that the at the deepest point of the line may not be buried more than 2–3 ft below grade. The depth of the inlet line is unknown. Excavated overburden (soil) will be placed on HDPE. The VCP will also be removed and placed on HDPE. The excavated soil and VCP will be handled and disposed pursuant to the provisions of the waste characterization strategy form, which will be prepared and approved before the fieldwork begins. The current waste management plan is discussed in Section 6.0.

4.4 Site Restoration

4.4.1 PRS 0-003

Because no cleanup activities are currently planned for PRS 0-003, there are no site restoration activities currently anticipated. The supplemental sample hole will be backfilled and the asphalt will be replaced.

4.4.2 PRS 0-012

Photographs will be taken to record the conditions of the site before activities begin. Following VCA activities, the site will be restored to its original contours. Excavations will be backfilled and properly compacted to prevent settling under vehicular traffic loads, and the asphalt will be replaced.

5.3 Confirmation Sampling for PRS 0-030(i)

Figure 5.3-1 presents proposed confirmatory sampling locations. To help select potential sampling locations, the VCP will be examined for pre-existing cracks and breaks as it is removed, and the trench floors will be examined for staining and other evidence of leaks. Field screening readings will also be used to identify areas of potential contamination. In the absence of any potential contamination indicators, the confirmation sampling will consist of samples collected at four proposed locations at approximately 28-ft intervals along both the inlet and outlet lines (Table 5.3-1). These locations will be selected to coincide with joints in the VCP Two samples will be collected at each location. The first sample will be collected immediately beneath the VCP, and the second sample will be collected two feet below the first.

Table 5.3-1
Confirmatory Samples Below Septic Inlet and Outlet Lines

Sample Type	Sample Location	Estimated Sample Depth	Requested Analyses
Subsurface Soil	Beneath original sample at Location 00-0479	4-4.5 ft and 6.5-7 ft	VOCs, SVOCs, Pesticides/PCBs, TAL Metals
	Beneath outlet line 28 ft from septic tank	Immediately beneath pipe and 2 ft below	
	Beneath outlet line 56 ft from septic tank		
	8 ft from the end of and beneath outlet line		
	Beneath inlet line 28 ft from septic tank		
	Beneath inlet line 56 ft from septic tank		
	Beneath inlet line 88 ft from septic tank		
	Near the end of and beneath inlet line 120 ft from septic tank		

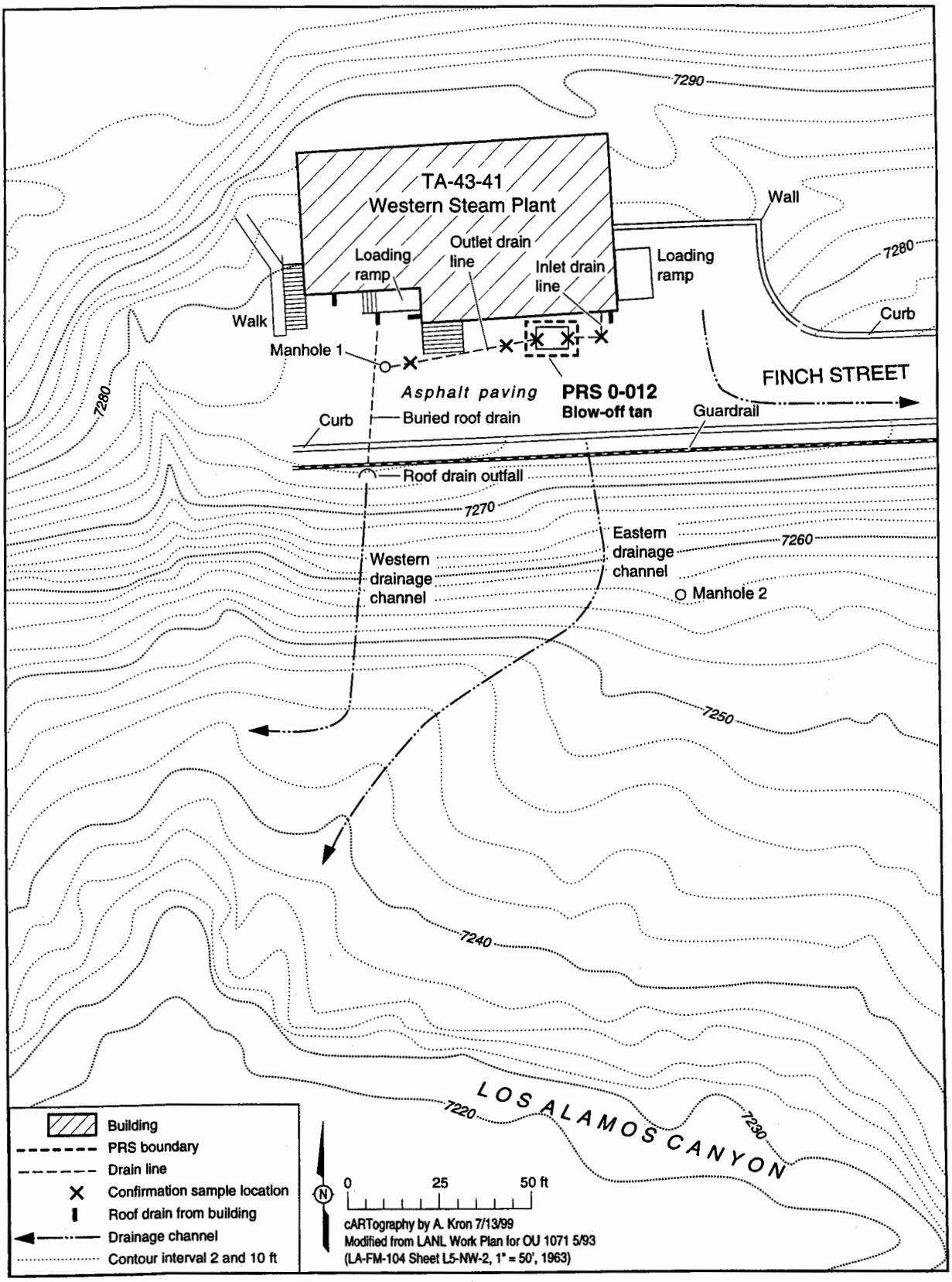

Figure 5.2-1. Confirmation sampling locations at PRS 0-012

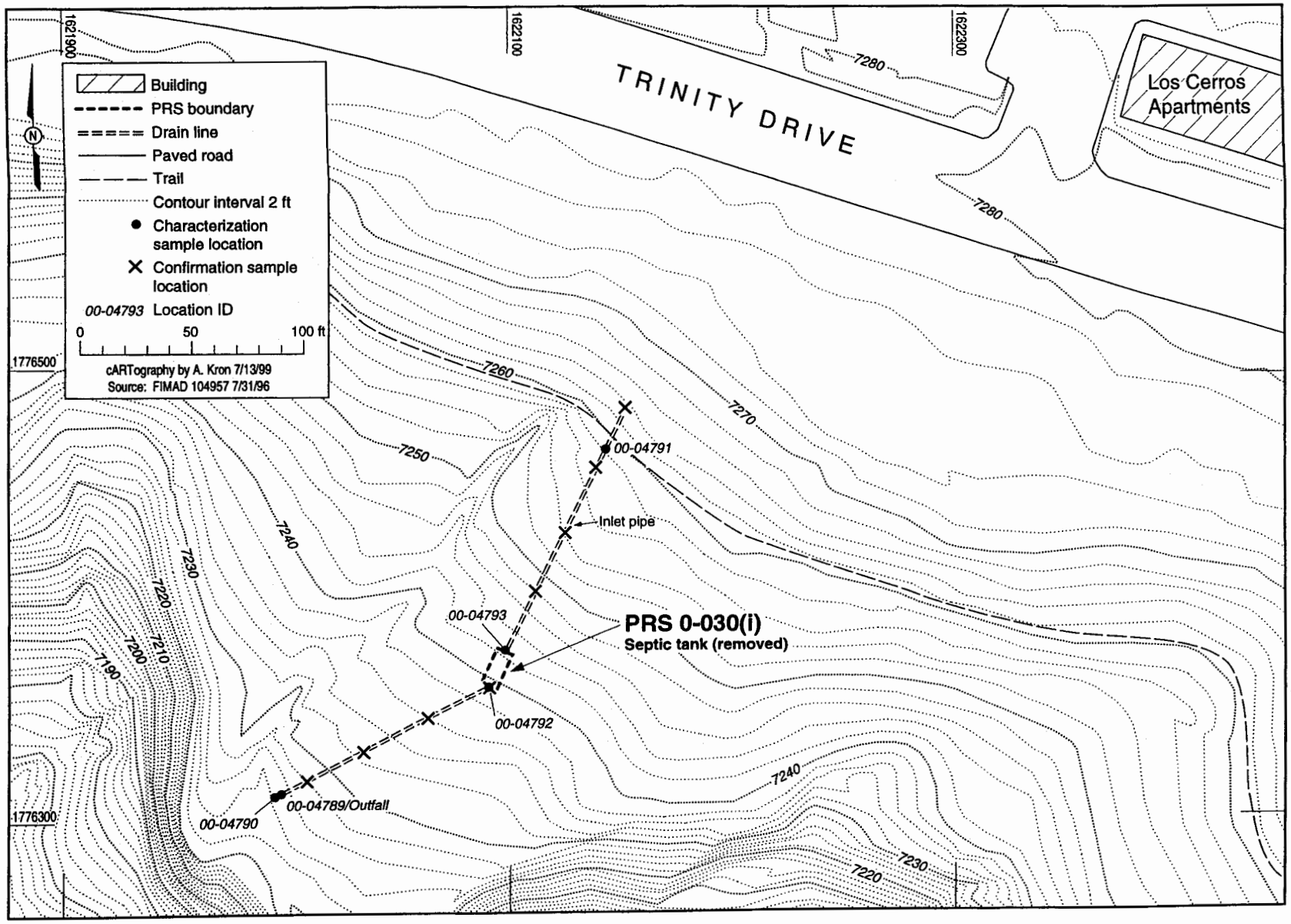

Figure 5.3-1. Confirmation sampling locations at PRS 0-030(i)

6.0 WASTE MANAGEMENT

6.1 Estimated Types and Volumes of Waste

6.1.1 PRS 0-003 and 0-012

Five separate waste streams are anticipated from the VCA at PRSs 0-003 and 0-012. The waste streams, and expected waste types and volumes are summarized in Table 6.1-1. Waste stream descriptions, including the principal components of the waste, are described in the paragraphs that follow.

Table 6.1-1
Anticipated Waste Streams, Types,
Disposal Path, and Volumes for PRSs 0-003 and 0-012

Waste Stream	Waste Type/Disposal Path	Anticipated Volume
Water from the blowoff tank	Liquid/discharge or SWS[a]	< 750 gal.
Asphalt debris	Solid/reuse or recycle	5.2 yd^3 (bcy[b])
Metal debris	Recyclable material/recycle	1000-gal. capacity tank and ~62 linear ft pipe
Soil	Solid/Industrial waste landfill	~ 2.5 yd^3
Plastics, PPE[c], sampling waste	Solid/Los Alamos County Landfill	< 1 yd^3

[a]SWS = Sanitary Wastewater System

[b]bcy = bank cubic yards (while in the ground)

[c]PPE = personal protective equipment

Water: This waste stream will consist of the water that will be removed from the underground blowoff tank at PRS 0-012. This water was discharged from the Western Steam Plant into the blowoff tank as part of the boiler descaling. The source of the water to the Western Steam Plant was the municipal drinking water line. The anticipated volume is estimated to be less than 750 gal. (based on 1997 field measurements).

Asphalt Debris: This waste stream will consist of the asphalt that will be removed to access the underground blowoff tank and its associated inlet and discharge lines at PRS 0-012. Waste characterization of the asphalt is based on knowledge of activities at the site. The asphalt has not been in contact with hazardous or radioactive substances.

Metal Debris: This waste stream will consist of the underground steel blowoff tank, the sediment it contains (less than 1 in. thick), and the steel pipe inlet and discharge lines from PRS 0-012. Based on acceptable historical knowledge that radiological constituents were not used at the Western Steam Plant, this waste is preliminarily characterized as non-radioactive. The metal debris will be recycled after confirmation that it is not radioactive.

If the sediment thickness in the tank is found to be greater than 1 in., it will be sampled for RCRA characterization. This scenario is unlikely, because less than 0.5 in. of sediment was measured in the tank during the 1997 RFI. This sediment will be pumped out of the tank when the water is removed.

Soil: Waste soil generation is not anticipated, however; if it does occur, this potential waste stream will include excavated soils below the inlet and discharge lines, as well as any soils requiring removal from below or around the tank at PRS 0-012.

Plastic Sheeting, PPE, and Sampling Wastes: This waste stream will include various types of plastic sheeting, dry decontamination waste, disposable gloves, and sampling supplies which will have contacted environmental media and debris at PRSs 0-003 and 0-012. Characterization of this waste will be determined based on the associated waste stream with which it came in contact. It is anticipated that the PPE will be characterized as nonhazardous / nonradioactive based on previous samples.

6.1.2 PRS 0-030(i)

Three separate waste streams are anticipated from the VCA at PRS 0-030(i). The waste streams and expected waste types and volumes are summarized in Table 6.1-2. Waste stream descriptions, including the principal components of the waste, are described in the paragraphs that follow.

Table 6.1-2
Anticipated Waste Streams, Types, Disposal Paths, and Volumes at PRS 0-030(i)

Waste Stream	Waste Type and Disposal Path	Anticipated Volume
VCP	Solid, C&D[a] / Los Alamos County Landfill	<2 yd^3
Soil	Solid/Industrial waste landfill	~ 4.5 yd^3
Plastics, PPE, Sampling Waste	Solid / Los Alamos County Landfill	< 0.5 yd^3

[a]C&D = Construction and Demolition

VCP: This waste stream is comprised of the VCP and any miscellaneous internal material removed with the VCP at PRS 0-030(i). Based on the sample collected from the soil and sludge found in the associated septic tank at PRS 0-030(i), this waste stream will be characterized as nonhazardous/nonradioactive construction and demolition debris.

Soil: Waste soil generation is not anticipated, however; if it does occur, this potential waste stream will include excavated soils from below the VCP lines at PRS 0-030(i).

Plastic Sheeting, PPE, and Sampling Wastes: This waste stream will include various types of plastic sheeting, dry decontamination waste, disposable gloves, and sampling supplies which will have contacted environmental media and debris at PRS 0-030(i). Characterization of this waste will be determined by the associated waste stream with which it came in contact. It is anticipated that the PPE will be characterized as nonhazardous/nonradioactive based on previous sample results.

6.2 Method of Management and Disposal

6.2.1 PRS 0-003 and 0-012

This subsection describes plans for managing the waste from PRS 0-003 and 0-012 from its generation to final disposal.

Water: The water will remain in the blowoff tank until the appropriate disposal path is chosen. If the analytical results of the water meet the ESH-18 discharge criteria and if approval is given, then the water will be pumped out of the tank onto the ground at a location and rate as instructed by ESH-18. If the water

fails the discharge criteria, then the analytical results will be used to profile the water for disposal at the SWS.

Asphalt Debris: The removed asphalt will be either reused at the site (as clean fill or base course immediately beneath the new asphalt), or it will be released from the site and recycled through an asphalt batch plant.

Metal Debris: The metal debris will be loaded onto a flatbed or into an end-dump truck, released directly from the site, and taken to be recycled.

Soil: The results of soil analyses are anticipated to be within background concentrations. If so, the soil will remain onsite. However, if the soil analytical results show that contaminant concentrations are greater than background concentrations, the soil will be characterized and managed appropriately. Any soils that require remediation will be excavated from below the tank and pipelines. The contaminated soils will be packaged in 55-gal.-drums or roll-off containers, depending on the final volume of the waste stream. Final disposal of contaminated soils will be based on soil sample results.

Plastic Sheeting, PPE, and Sampling Wastes: Plastic sheeting, PPE, and miscellaneous sampling wastes will be collected in lined, 55-gal drums and stored in a temporary waste storage area pending disposal with associated waste streams.

6.2.2 PRS 0-030(i)

This subsection describes plans for managing the waste from PRS 0-030(i) from its generation to final disposal.

VCP: The VCP debris will be loaded into an end-dump truck. The debris, characterized as a solid waste, will be transported to either the Los Alamos County Landfill or the Rio Rancho Landfill.

Soil: The results of soil analyses are anticipated to be within background concentrations, therefore; the soil will probably remain onsite. However, if the soil analytical results are greater than background concentrations, the soil will be characterized and managed appropriately. Any soils that require remediation will be excavated from below the VCP lines. The contaminated soils will be packaged in 55-gal drums or roll-off containers, depending on the final volume of the waste stream. Final disposal of contaminated soils will be based on soil sample results.

Plastic Sheeting, PPE, and Sampling Wastes: Plastic sheeting, PPE, and miscellaneous sampling wastes will be collected in lined, 55-gal drums and stored in a temporary waste storage area pending disposal with associated waste streams.

7.0 PROPOSED SCHEDULE AND UNCERTAINTIES

The fieldwork portion of this VCA is expected to begin in early FY 2000 and to end on mid-2000 (see Table 7.0-1).

Seven days have been allotted to complete the readiness review and field preparation. Fifteen days have been allotted for supplemental sampling, tank and pipeline removal, and confirmation sampling. This includes ten days for laboratory analysis of a water sample from the blowoff tank. This sample must be collected in order to determine the proper method of disposal for the water within the blowoff tank.

Thirty days have been allotted for waste disposition and disposal. To achieve this schedule, the existing data may have to be used to profile the waste streams and select an appropriate disposal option before wastes are generated.

Site restoration will require no more than four days to complete.

Table 7.0-1
VCA Fieldwork Schedule

Activity	Duration (days)	Start	Finish
Readiness review and preparation	7	1/22/2000	1/30/2000
Supplemental sampling, tank and pipeline removal, confirmation sampling	15	2/1/2000	2/21/2000
Laboratory analysis	30	2/22/2000	4/2/2000
Waste management/disposal	30	4/3/2000	5/13/2000
Site restoration	4	4/2/2000	4/7/2000
Overall	86	1/22/2000	5/13/2000

8.0 REFERENCES

The following list includes all of the documents cited in the body and appendixes of this report. The parenthetical information following each reference provides the author, publication date, and ER ID number. This information is also included in the citations in the text. This information can be used to locate documents on this list.

The ER ID number is a number assigned by the Laboratory's ER Project to track material associated with Laboratory PRSs. This number can be used to locate the actual document at the ER Project's Records Processing Facility. All cited documents are assigned ER ID numbers.

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Appendix A

ACRONYMS AND ABBREVIATIONS

AOCs	Areas of Concern
BMPs	Best Management Practices
BVs	Background Values
COPCs	Chemicals of Potential Concern
COPECs	Chemicals of Potential Ecological Concern
DOE	Department of Energy
ECSM	Ecological Conceptual Site Model
EPA	Environmental Protection Agency
ER	Environmental Restoration
ESLs	Ecological Screening Levels
FIMAD	Facility for Information Management, Analysis, And Display
HDPE	High-Density Polyethylene
HSWA	Hazardous And Solid Wastes Amendments Of 1984
IWP	Installation Work Plan
LAAO	Los Alamos Area Office
LANL	Los Alamos National Laboratory
NMED	New Mexico Environment Department
PAHs	Polycyclic Aromatic Hydrocarbons
PPE	Personal Protective Equipment
PRSs	Potential Release Sites
QA	Quality Assurance
RCRA	Resource Conservation And Recover Act
RFI	RCRA Facility Investigation
SVOCs	Semivolatile Organic Compounds
SWMUs	Solid Waste Management Units
SWS	Sanitary Wastewater System
TA	Technical Area
TAL	Target Analyte List

TDS	Total Dissolved Solids
TSS	Total Suspended Solids
VCA	Voluntary Corrective Action
VCP	Vitrified Clay Pipe
VOCs	Volatile Organic Compounds
WAC	Waste Acceptance Criteria

Appendix B

VCA CHECKLIST AND FIELDWORK AUTHORIZATION FORM

Voluntary Corrective Action (VCA)
Checklist And Fieldwork Authorization Form
PRS 0-003 and 0-012

COPC(s) Defined (only for 0-003).

___ Nature and extent defined or field-screening method available to guide where not defined.

√ Remedy is obvious.

√ Time for removal is less than 6 months.

√ Remedy is final.

√ Land use assumptions straightforward.

√ Treatment, storage, disposal facilities are available for waste type and volume.

√ Cleanup cost is reasonable for the planned action, and meets accelerated decision logic criterion for decision to proceed with VCA.

___ Explain criteria not checked above: historical information indicates no hazardous materials should have been present. Confirmatory sampling will be done and extent will be defined, if necessary.

Through reviewing the above criteria associated with this site, I believe that a VCA is the appropriate accelerated cleanup approach.

FPL _____ Date _____

FPC _____ Date _____

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate accelerated cleanup approach.

FPL _____ Date _____

FPC _____ Date _____

Through reviewing the VCA Plan, for Site(s) _____, and believing that the above criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager

_____ Date_____

INFORMATION COPY ONLY

Voluntary Corrective Action (VCA)
Checklist and Fieldwork Authorization Form
PRS 0-030(i)

√ COPC(s) Defined.

___ Nature and extent defined or field-screening method available to guide where not defined.

√ Remedy is obvious.

√ Time for removal is less than 6 months.

√ Remedy is final.

√ Land use assumptions straightforward.

√ Treatment, storage, disposal facilities are available for waste type and volume.

√ Cleanup cost is reasonable for the planned action, and meets accelerated decision logic criterion for decision to proceed with VCA.

___ Explain criteria not checked above: this VCA plan describes sampling to define extent, as necessary.

Through reviewing the above criteria associated with this site, I believe that a VCA is the appropriate accelerated cleanup approach.

FPL _____ Date _____

FPC _____ Date _____

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate accelerated cleanup approach.

FPL _____ Date _____

FPC _____ Date _____

Through reviewing the VCA Plan, for Site(s) _____, and believing that the above criteria have been met, i authorize the fieldwork to proceed.

DOE ER Program Manager

_____ Date _____

INFORMATION COPY ONLY

Appendix C

SOP 2.01

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 00-003

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			5.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	1.9
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			7.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	17.5

REVISED PART B

Report Printed 01/13/2000 9:04:43 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

Revised Part B. Please discard previous.

SITE INFORMATION

1a) PRS Number 00-003 **1b) Structure Number** 43-41 **1c) FMU Number** 80

2. Date/Time (M/D/Y H:M am/pm) 07/24/1999

SITE SETTING (check all that apply)

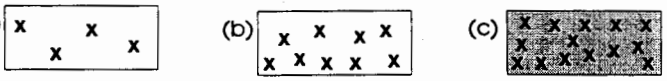
3. ◉ **On mesa top (a).** ○ **In the canyon floor, but not in an established channel (c)**

○ **Within a bench of a canyon (b).** ○ **Within established channel in the canyon floor (d).**

Explanation: Surface disposal area near Western steam plant, located above a small subcanyon of LA Canyon (north side).

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a) (b) (c)

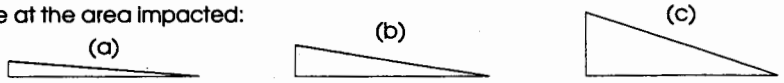


Estimated % of ground/canopy cov ○ 0% to 25% ○ 25% to 75% ◉ 75% to 100%

Explanation: Asphalt covered.

5. Steepest slope at the area impacted:

(a) (b) (c)



◉ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Flat parking area next to old steam plant.

RUNOFF FACTORS

Y / N

☑ ☐ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☑ ☐ 6a) Is runoff channelized? If yes, describ ◉ Man-made channel. ○ Natural channel.

Explanation: Asphalt with curbing, no visible erosion.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ **Drainage or wetland (name)**
- ○ **Within bench of canyon setting (name)**
- ◉ **Other (i.e., retention pond, meadow, mesa top)** parking lot

Explanation: Drainage terminates within curbed parking area (behind the DOE complex) on the north side of LA canyon.

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain belo ○ Sheet ○ Rill ○ Gully

Explanation: None observed.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☑ ☐ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: Parking area and roof drains across PRS.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: No operational impact

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: None observed.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Jeff Walterscheid

11. Signature of Water Quality/Hydrology Representative

GV Initials of independent reviewer.

Check here when information is entered in database: ☑

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

○	○	Are BMPs being properly maintained? If no, describe in "Other Internal Notes."
○	○	Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Listed as 0-003(g) in 8/18/98 letter.
Area is covered in asphalt. Runoff termination point was re-evaluated due to new information provided by ER. Original assessment performed 12/98.

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 00-012

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			7.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	10.6

REVISED PART B

Report Printed 01/13/2000 9:05:00 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

Revised Part B. Please discard previous.

SITE INFORMATION

1a) PRS Number 00-012 **1b) Structure Number** **1c) FMU Number** 80

2. Date/Time (M/D/Y H:M am/pm) 01/20/1999

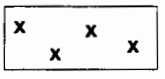
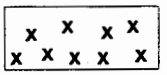
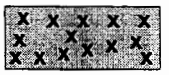
SITE SETTING (check all that apply)

3. ◉ **On mesa top (a).** ○ **In the canyon floor, but not in an established channel (c)**

○ **Within a bench of a canyon (b).** ○ **Within established channel in the canyon floor (d).**

Explanation: Western Steam Plant located near DOE/LAO. PRS is an underground valve box and tank which has no outfall or other pathways to the environment.

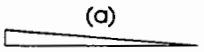
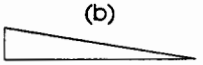
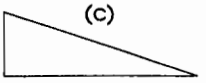
4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

(illustration) (a)  (b)  (c) 

Estimated % of ground/canopy cov ○ 0% to 25% ○ 25% to 75% ◉ 75% to 100%

Explanation: Flat area covered with asphalt south of building.

5. Steepest slope at the area impacted:

(a)  (b)  (c) 

◉ Less than 10% ○ 10% to 30% ○ 30% and greater

Explanation: Flat parking area south of building.

RUNOFF FACTORS

Y / N

☐ ☑ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☐ ☑ 6a) Is runoff channelized? If yes, describ ○ Man-made channel. ○ Natural channel.

Explanation: Surface runoff would not be in contact with underground site.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ **Drainage or wetland (name)** Los Alamos Canyon
- ○ **Within bench of canyon setting (name)**
- ○ **Other (i.e., retention pond, meadow, mesa top)**

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain belo ◉ Sheet ○ Rill ○ Gully

Explanation: None due to underground location

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation:

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☑ ☐ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: Sheet flow from surrounding area.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Steve Veenis

11. Signature of Water Quality/Hydrology Representative

SV Initials of independent reviewer.

Check here when information is entered in database: ☑

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

○ ◉ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

○ ◉ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

This site was re-evaluated since it was determined that the wrong site had been assessed. The original assessment was completed 8/5/97 and was performed at a site in Rendia Canyon.

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 00-030(i)

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			
Within bench of canyon	4				4.0
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	13.0
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			5.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	19.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			7.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			*
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	54.5**

** Indicates BMPs in place. Erosion potential without BMPs may be greater.

Report Printed 01/13/2000 9:04:24 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

SITE INFORMATION

1a) PRS Number 00-030(i) **1b) Structure Number** **1c) FMU Number** 80

2. Date/Time (M/D/Y H:M am/pm) 06/25/1999

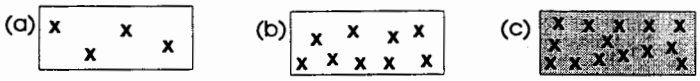
SITE SETTING (check all that apply)

3.
- ○ **On mesa top (a).**
- ◉ **Within a bench of a canyon (b).**
- ○ **In the canyon floor, but not in an established channel (c)**
- ○ **Within established channel in the canyon floor (d).**

Explanation: Septic formerly located on bench with outfall on cliff edge.

4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

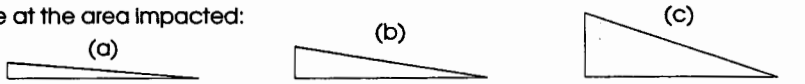
(Illustration)



Estimated % of ground/canopy cov ○ 0% to 25% ◉ 25% to 75% ○ 75% to 100%

Explanation: Mixed vegetation with some canopy coverage and oxposed tuff.

5. Steepest slope at the area impacted:



◉ Less than 10% ○ 10% to 30% ◉ 30% and greater

Explanation: Septic location mostly flat, outfall discharged over cliff face into canyon.

RUNOFF FACTORS

Y / N

☑ ☐ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☑ ☐ 6a) Is runoff channelized? If yes, describ ○ Man-made channel. ○ Natural channel.

Explanation: Runoff from septic mostly sheetflow. Outfall discharged into channel at mesa edge.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- (●) **Drainage or wetland (name)** Los Alamos Canyon
- ( ) **Within bench of canyon setting (name)**
- ( ) **Other (i.e., retention pond, meadow, mesa top)**

Explanation: Outfall discharged directly into LA Canyon

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain belo ( ) Sheet ( ) Rill ( ) Gully

Explanation: None observed, mostly onto exposed tuff.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☑ ☐ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: Run-on from Trinity Road commingles with outfall discharges.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: None

☑ ☐ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: Upslope run-on

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Veenis, Steve

11. Signature of Water Quality/Hydrology Representative

SV Initials of independent reviewer.

Check here when information is entered in database: ☑

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

Straw bales and erosion matting were in place during septic tank removal. Have mostly deteriorated and the site seems to be stable.

◉ ○ Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

◉ ○ Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

Rebar used as stakes for straw bales are still in place and should be removed.

Appendix D

ECOLOGICAL CHECKLIST

Part A—Scoping Meeting Documentation

Site ID	PRS 0-003
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	The PRS is a former container storage area used to store 55-gal. steel drums containing chemicals used to treat boiler water. The drums were placed on wooden pallets on the asphalt at the eastern end of the Western Steam Plant building. The RFI work plan suggested that waste oil and algaecides used to treat boiler water were stored in the drums. However, algaecides were not used and there is no documentation that waste oil was ever stored in the area. The types of processes at the Western Steam Plant would have precluded the use or generation of large volumes of oils and waste oils. The drums contained chemicals that were added to the boiler feed water to raise the pH and to prevent the buildup of deposits on the boiler. It was determined that sodium hydroxide and hexameta phosphate were added to the boiler water as well as an oxygen scavenger (sodium sulphite) and chelating compounds. Although no releases were known to have occurred, releases may have been either in liquid or solid form from the drums resulting from spills or leaks. The area of release would have been the asphalt at the eastern end of the building.
List of Primary Impacted Media (Indicate all that apply.)	**Surface soil –** **Surface Water/Sediment –** **Subsurface –** May have been impacted if releases seeped through the asphalt or through cracks in the asphalt. **Groundwater –** **Other, explain –** Releases would have been from the drums to the asphalt pavement under the wooden pallets.
FIMAD vegetation class based on Arcview vegetation coverage (Indicate all that apply.)	**Water –** **Bare Ground/Unvegetated –** **Spruce/fir/aspen/mixed conifer –** **Ponderosa pine –** The area to the south of the building and asphalt drive/parking area is ponderosa pine forest. This forest extends south and west towards LA Canyon. **Piñon juniper/juniper savannah –** **Grassland/shrubland –** **Developed –** The site was part of the Western Steam Plant.
Is T&E Habitat Present? If applicable, list species known or suspected to use the site for breeding or foraging.	The PRS is entirely within an area of potential Mexican spotted owl nesting habitat and within an area in which the spotted owl can be conservatively assumed to forage at a relatively high frequency. It is also in the vicinity of potential peregrine falcon nesting habitat, approximately 2900 ft away and within an area in which the falcon can conservatively be assumed to forage at a relatively high frequency. The PRS is within an area in which the bald eagle is conservatively assumed to forage at a relatively low frequency.
Provide list, of Neighboring/ Contiguous/ Up-gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate.	The only neighboring PRS is PRS 0-012, the blow down tank for the boiler. This tank is below the asphalt pavement and is connected to the sewer system. COPCs include metals. It does not influence PRS 0-003. There are no other PRSs in the area of the Western Steam Plant.

Surface Water Erosion Potential Information **Summarize information from SOP 2.01, including the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.**	The Erosion Matrix score for this PRS is 25.1, with 14.5 for runoff and 7.0 run-on scores. The score reflects the fact that it is a mesa top site (1.0), ground cover is >75% (1.3), and slope is 0-10% (1.3). No potential exists for soil erosion at this site.

Part B—Site Visit Documentation

Site ID	PRS 0-003
Date of Site Visit	6/16/99
Site Visit Conducted by	Richard Mirenda, Linda Causey, Steve Calhoun

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = none; the area of the PRS is not vegetated. The area to the south away from the building is ponderosa pine. **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc. cover (high, medium, low, none)** = The site is part of the Western Steam Plant and consists of asphalt pavement on which 55-gal. steel drums were stored.
Field notes on the FIMAD vegetation class to assist in ground-truthing the Arcview information	FIMAD vegetation class for this area is developed with some ponderosa pine forest adjacent to it. The site visit confirmed that the area is generally developed and that mature ponderosa pine forest exists near the mesa edge above LA Canyon.
Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	The PRS is part of an asphalt parking lot/driveway and does not provide any nesting or foraging habitat for the spotted owl and the peregrine falcon. The area to the south, which is ponderosa pine, provides potential nesting and foraging habitat for the spotted owl but marginal habitat for the falcon. There is no foraging habitat for the bald eagle in this area.
Are ecological receptors present at the site? (yes/no/uncertain) **Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.**	No. The area is paved over with asphalt and provides no forage or nesting habitat for terrestrial receptors. The area to the south of the building and PRS is ponderosa pine forest and does provide excellent habitat for terrestrial receptors. As a result, small birds and mammals may traverse the area but there is no evidence that this occurs.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water runoff occurs from the PRS down the driveway to the LAAO parking lot where it flows into the storm sewer. The driveway is bounded by an asphalt curb along the edge of the facility. Runoff from the drum storage area does not appear to overflow the curb. A portion of the curb to the southwest of the site does show evidence of overflow and there is a shallow drainage channel present on the slope below this area. However, because of the slope of the area, runoff from the storage area does not flow in this direction. The terminal point of the surface water runoff in this area is the LAAO parking lot.

Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain) Provide explanation	Yes. Surface water runoff would be an off-site transport pathway during storms. As described above, the runoff from the PRS flows down the paved driveway to the LAAO parking lot. Other potential pathways would be unlikely. Transport via the wind is unlikely because of the lack of soil in the area. The data shows that migration to ground water has not occurred.
Interim action needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation to project lead for IA SMDP.	No. The site is abandoned and no evidence of residual contamination remains.

Ecological Effects Information:

Physical Disturbance (Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)	No. Other than the buildings and debris associated with the previous activities no physical disturbance is evident.
Are there obvious ecological effects? (yes/no/uncertain) Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).	The area is developed and the natural vegetation has been removed. No other obvious ecological effects are present.
Interim action needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.	No. There are no apparent ecological effects other than the physical structures remaining.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include likelihood that future construction activities could make contamination more available for exposure or transport.

There are no complete exposure pathways to receptors on-site or transport to receptors off-site. The PRS is paved with asphalt and does not have any evidence of a release from the 55-gal.-drums stored there, i.e., no stains or residues on the asphalt. Transport of any surface contamination would have flowed down the driveway to the LAAO parking lot during storms and would not have impact any ecological systems or receptors in the area. Elevated levels of PAHs were detected in the soil/fill beneath the pavement and are associated with the asphalt that covers the entire area. PAHs are common components of asphalt and tar and would be expected to be present in the soil beneath the pavement. PAHs were detected in all of the soil samples collected immediately beneath the asphalt but not at deeper intervals. Therefore, they are not related to a release from the storage area and the extent of these chemicals is limited to the soil beneath the asphalt. There was also one detect of lead above the soil background value and one detect of dibenzofuran beneath the asphalt at different locations. The source of these contaminants is unclear given the type of materials stored at this site [sodium hydroxide, hexameta phosphate, an oxygen scavenger (sodium sulphite), and chelating compounds were added to the boiler feed water]. Given that the site was also used for loading and unloading materials and that vehicles probably parked in the area, these chemicals may be residual contamination from vehicle exhaust that seeped through cracks in the asphalt. The data shows that there is no vertical migration of any of these materials (lead, dibenzofuran, and PAHs) from beneath the asphalt. Based on this information, the PRS is recommended for ecological no further action (NFA).

Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: MK/PMC
Phone number: (505)662-1329

Date Completed: **6/18/99**

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): LARS F. SOLBERT
Name (signature): Lars F. Solbert
Organization: EP/ER
Phone number: 667-2256

Part A—Scoping Meeting Documentation

Site ID	PRS 0-012
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	The PRS was originally thought to be composed of the Western Steam Plant including the blowoff tank, floor drains, and surface drainage channels. The SMWU report states that the PRS is actually comprised of only the blowoff tank. The tank is made of cylindrical steel and is 4 ft in diameter and 10 ft long. Access was through a 24-in. diameter manhole in the pavement and water was discharged to the sanitary sewer system. Any release would have been as liquid from the tank or the inlet and outlet lines due to leaks in the lines. The area of release would have been the beneath the tank and lines.
List of Primary Impacted Media (Indicate all that apply.)	**Surface soil –** **Surface Water/Sediment –** **Subsurface –** XX – The tank and lines are below grade and are covered with asphalt. Any release would have been to the subsurface. **Groundwater –** **Other, explain –**
FIMAD vegetation class based on Arcview vegetation coverage (Indicate all that apply.)	**Water –** **Bare Ground/Unvegetated –** **Spruce/fir/aspen/mixed conifer –** **Ponderosa pine –** The area to the south of the Western Steam Plant is ponderosa pine forest. **Piñon juniper/juniper savannah –** **Grassland/shrubland –** **Developed –** The site is developed consisting of a building that comprised the Western Steam Plant and a driveway/parking area that is paved with asphalt.
Is T&E Habitat Present? If applicable, list species known or suspected to use the site for breeding or foraging.	The PRS is entirely within an area of potential Mexican spotted owl nesting habitat and within an area in which the spotted owl can be conservatively assumed to forage at a relatively high frequency. It is also in the vicinity of potential peregrine falcon nesting habitat, approximately 2900 ft away and within an area in which the falcon can conservatively be assumed to forage at a relatively high frequency. The PRS is within an area in which the bald eagle is conservatively assumed to forage at a relatively low frequency.
Provide list, of Neighboring/ Contiguous/ Up-gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. (Use this information to evaluate the need to aggregate sites for screening.)	The only nearby PRS is 0-003 a former container storage area used to store 55-gal. steel drums containing chemicals used to treat boiler water. The drums were placed on wooden pallets on the asphalt at the eastern end of the Western Steam Plant building. The drums contained chemicals that were added to the boiler feed water to raise the pH and to prevent the buildup of deposits on the boiler. No releases were known to have occurred at this PRS.
Surface Water Erosion Potential Information Summarize information from SOP 2.01, including the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.	The Erosion Matrix score for this PRS is 10.6, with 0.0 for runoff and 7.0 for run-on (natural drainages onto site) scores. The score also reflects that it is a mesa top site (1.0), ground cover is >75% (1.3), and slope is 0-10% (1.3). No potential exists for soil erosion at this site. The terminal point of any runoff is the LA Canyon drainage.

Part B—Site Visit Documentation

Site ID	PRS 0-012
Date of Site Visit	6/16/99
Site Visit Conducted by	Richard Mirenda, Linda Causey, Steve Calhoun

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = none; the site has no vegetation growing on it. The area to the south of the site is ponderosa pine forest. **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc. cover (high, medium, low, none)** = high; the PRS is on the site of the Western Steam Plant and consists of an abandoned building with machinery and equipment still inside and the associated driveway/parking lot.
Field notes on the FIMAD vegetation class to assist in ground-truthing the Arcview information	FIMAD vegetation class for this area is developed with some ponderosa pine forest adjacent to it. The site visit confirmed that the area is generally developed and that mature ponderosa pine forest exists near the mesa edge above LA Canyon.
Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	The PRS is part of an asphalt parking lot/driveway and does not provide any nesting or foraging habitat for the spotted owl and the peregrine falcon. The area to the south, which is ponderosa pine, probably does provide some nesting and foraging habitat for the spotted owl but marginal habitat for the falcon. There is no foraging habitat for the bald eagle in this area.
Are ecological receptors present at the site? (yes/no/uncertain) Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.	No. The area is paved over with asphalt and provides no forage or nesting habitat for terrestrial receptors. The area to the south of the building and PRS is ponderosa pine forest and does provide excellent habitat for terrestrial receptors. As a result, small birds and mammals may traverse the area but there is no evidence that this occurs.

Contaminant Transport Information:

Surface water transport Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).	Because the tank and lines are below grade there is no surface water transport. No erosion is present related to the blow-down tank and associated lines.
Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain) Provide explanation	No. The PRS is below ground and not subject to air or surface water transport. Although any release would have been to the subsurface, transport to the ground water is unlikely because of the distance to the aquifer and the lack of any hydraulic driver to move materials downward.
Interim action needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation to project lead for IA SMDP.	No. The tank and lines are below the asphalt paved driveway/parking area and there is no evidence of any off-site transport from this PRS.

Ecological Effects Information:

Physical Disturbance (Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)	The only physical disturbance is the building with its associated equipment and the asphalt paved driveway/parking area. There is some erosion on the slopes beyond the perimeter of the Western Steam Plant complex and some evidence of runoff from the roof drains of the building.
Are there obvious ecological effects? (yes/no/uncertain) Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).	The area is developed and the natural vegetation has been removed. The only ecological effects are associated with the abandoned building and the paved area adjacent to it. No other obvious ecological effects are present.
Interim action needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.	No. There are no apparent ecological effects other than the physical structures remaining.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include likelihood that future construction activities could make contamination more available for exposure or transport.

The PRS is below the asphalt driveway/parking area and discharges to the sanitary sewer system. Because no vegetation exists on-site and the tank is below ground, there are no complete pathways to ecological receptors. There are also no transport pathways to off-site receptors because the tank is below ground and discharged to the sanitary sewer system. The drainages from the facility are the result of the roof drains and asphalt pavement, but not the PRS. Detection of PAHs and metals in the drainage channels are related to the roof materials as well as the asphalt driveway/parking area. In water samples from the tank, metals were detected but not organics. Surface water runoff does not result in materials from the tank or lines being present in the drainages. Therefore, based on this information, the PRS is recommended for ecologicalNFA.

Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: MK/PMC
Phone number: (505)662-1329

Date Completed: **6/18/99**

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): LARS F. SCHOLZ
Name (signature): Lars F. Scholz
Organization: LFR
Phone number: 505/667-2252

Part A—Scoping Meeting Documentation

Site ID	PRS 0-030(i)
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	The PRS was a septic tank located on Los Alamos County property south of Trinity Road and east of 35th Street. It probably served the West Mess Hall (WAC) and buildings west of the West Mess Hall including dormitories, barracks, a military post office, and Sundt Apartments. Releases from the septic tank would have been in the form of liquid from the discharge at the outfall. The discharge flows down the slope to the bench below the PRS and above LA Canyon.
List of Primary Impacted Media (Indicate all that apply.)	**Surface soil –** **Surface Water/Sediment –** XX – Impacted by the discharge at the outfall and down the drainage from this point. **Subsurface – X – Potentially impacted if the septic tank leaked.** **Groundwater –** **Other, explain –**
FIMAD vegetation class based on Arcview vegetation coverage (Indicate all that apply.)	**Water –** **Bare Ground/Unvegetated –** **Spruce/fir/aspen/mixed conifer –** **Ponderosa pine –** The area is mature ponderosa pine forest with an understory of small trees and shrubs. **Piñon juniper/juniper savannah –** **Grassland/shrubland –** **Developed –**
Is T&E Habitat Present? If applicable, list species known or suspected to use the site for breeding or foraging.	The PRS is entirely within an area of potential Mexican spotted owl nesting habitat and within an area in which the spotted owl can be conservatively assumed to forage at a relatively high frequency. It is also in the vicinity of potential peregrine falcon nesting habitat, approximately 1900 ft away and within an area in which the falcon can conservatively be assumed to forage at a relatively high frequency. The PRS is within an area in which the bald eagle is conservatively assumed to forage at a relatively low frequency.
Provide list, of Neighboring/ Contiguous/ Up-gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. (Use this information to evaluate the need to aggregate sites for screening.)	The nearest PRSs to the septic tank are those associated with Western Steam Plant located approximately .25 mi to the west of the site. These PRSs (0-003 and 0-012) were a surface storage area and the blowoff tank for the boiler. The COPCs were inorganics and organics (solvents) and are not associated or influenced by the septic tank.
Surface Water Erosion Potential Information Summarize information from SOP 2.01, including the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.	The Erosion Matrix score for this PRS is 54.5, with 24 for runoff [visible evidence of runoff discharge (5.0) and terminates in drainage (19.0)] and 7.0 for run-on (structures adversely affecting run-on) scores. The score also reflects that it is within a bench (4.0), ground cover is 25-75% (6.5), and slope is >30% (13). No potential exists for soil erosion at this site. The terminal point of any runoff is LA Canyon drainage.

Part B—Site Visit Documentation

Site ID	PRS 0-030(i)
Date of Site Visit	6/16/99
Site Visit Conducted by	Richard Mirenda, Linda Causey, Steve Calhoun

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none)** = high; the area is mature ponderosa pine forest providing excellent vegetative cover with an understory trees and shrubs. **Relative wetland cover (high, medium, low, none)** = none **Relative structures/asphalt, etc. cover (high, medium, low, none)** = none
Field notes on the FIMAD vegetation class to assist in ground-truthing the Arcview information	FIMAD presents this area as ponderosa pine forest. The site visit confirms that this classification is correct and is representative of the vegetation at the PRS.
Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	The PRS is within a ponderosa pine forest and provides potential nesting and foraging habitat for the spotted owl. Nesting and foraging habitat for the falcon are marginal for this area but may be adequate further south, closer to the canyon wall. There is no foraging habitat for the bald eagle in this area.
Are ecological receptors present at the site? (yes/no/uncertain) Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.	Yes. The area provides excellent habitat for terrestrial receptors. The mature ponderosa pine forest would provide nesting and forage habitat for a variety of receptors including birds (robin and other songbirds) and small mammals (rodents, cottontail, etc.). No aquatic receptors are present because there are no permanent surface water systems present in the area.

Contaminant Transport Information:

Surface water transport Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).	Surface water transport would occur in the well-defined drainage channels in the area. There does not appear to be any erosion problems in the vicinity of the septic tank. Any runoff probably occurs as sheet flow. The outfall discharges to a distinct drainage channel that has eroded into the tuff and joins with a major drainage channel slightly to the west. This drainage channel originates approximately 200 ft to the north near Trinity Road. The terminal point of the surface water would be the bench below the outfall and above LA Canyon.
Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain) Provide explanation	Yes. Surface water transport is the primary off-site pathway for materials from this PRS. This occurs at the outfall from the septic tank that discharges to a distinct drainage channel that terminates on the bench below. Other pathways are unlikely due to the excellent ground cover and the distance from the ground water.
Interim action needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation to project lead for IA SMDP.	No. Some straw bales have been put in place below the septic tank location. Jut matting has also been installed in the area to impede runoff and erosion.

Ecological Effects Information:

Physical Disturbance (Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)	No. Erosion is not a problem and the activities associated with the removal of the septic tank have been ameliorated.
Are there obvious ecological effects? (yes/no/uncertain) Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).	No. The area is relatively undisturbed and does not display any ecological effects from past activities.
Interim action needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.	No. There are no apparent ecological effects at this PRS.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include likelihood that future construction activities could make contamination more available for exposure or transport. Not applicable.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature, rate and extent of contamination? (yes/no/uncertain) Provide explanation (Consider if the maximum value was captured by existing sample data.)	Yes. The previous sampling at this PRS has not adequately defined the extent of contamination below the tank and below the outfall. Proposed sampling as part of the VCA will address these areas and provide data to define the extent of the contamination. The area of the outfall drainage may present a problem in that the confluence with a main drainage from above the PRS occurs within a few feet of the outfall. This may prevent the clear definition of the extent from the septic tank outfall.
Do existing or proposed data for the site address potential transport pathways of site contamination? (yes/no/uncertain) Provide explanation (Consider if other sites should aggregated to characterize potential ecological risk.)	Yes. Existing and proposed sampling data will attempt to address the surface water transport pathway. However, as mentioned above, the outfall drainage joins with a main drainage a few feet below the outfall. A clear definition of extent may not be possible because of the influence of this main drainage.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.

Part C—Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors via vapors?

Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant $>10^{-5}$ atm-me/mol and molecular weight <200 g/mol).

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Although one volatile organic was detected at the outfall, the detected concentration was only slightly above the detection limit. At this concentration, exposure to vapors is unlikely.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

Soil contamination would have to be on the actual surface of the soil to become available for dust.

In the case of dust exposure to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Releases near the surface occurred at one location and the area is well vegetated. Releases from the septic tank were subsurface and unavailable via fugitive dust. No burrowing activity was observed in the area because of the shallow soil on the slope.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

If the SOP 2.01 run-off score* for each PRS included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* Note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).

If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There are no aquatic communities below the outfall at the terminal point of surface water transport.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

Known or suspected presence of contaminants in groundwater.

The potential for contaminants to migrate via groundwater and discharge into habitats and/or surface waters.

Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).

Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There are no seeps or springs in the area.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

Suspected ability of contaminants to migrate to groundwater.

The potential for contaminants to migrate via groundwater and discharge into habitats and/or surface waters.

Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).

Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Subsurface contamination may infiltrate into the underlying tuff. However, deep penetration is considered unlikely because of the high evaporative potential of the upper tuff units and the low moisture content of the tuff. As a result, there is no hydraulic driver to promote the movement of materials by infiltration/percolation. In addition, there is no evidence of either alluvial or perched aquifers in the area and the regional aquifer is several hundreds to several thousands of feet below the mesa top.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

This question is only applicable to release sites located on or near the mesa edge.

Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Although the outfall is near the mesa edge, the slopes are stable and do not appear to be subject to mass wasting events.

Question G:

Could airborne contaminants interact with receptors through respiration of vapors?

Contaminants must be present as volatiles in the air.

Consider the importance of inhalation of vapors for burrowing animals.

Foliar uptake of organic vapors is typically not a significant exposure pathway.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Although 1,1,1-trichloroethane was detected at the outfall, the concentration was 0.008 mg/kg. At this low concentration, contaminants released from the soil would be rapidly dissipated in the air. In addition, no burrowing activity was observed in the area probably due to the shallow nature of the soil.

Question H:

Could airborne contaminants interact with plants through deposition of particulates or with animals through inhalation of fugitive dust?

Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.

Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: No release to the surface soil was found and no burrowing activity was observed.

Question I:

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

Contaminants in bulk soil may partition into soil solution, making them available to roots.

Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Provide explanation: The shallow subsurface releases (1.7–2.0 ft) may be available for root uptake, but is limited due to the depth of the release and the small area affected.

Question J:

Could contaminants interact with receptors through food web transport from surficial soils?

The chemicals may bioaccumulate in animals.

Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Potential bioaccumulators (DDT and metabolites) were detected in the shallow subsurface samples and may be available through the food web. However, this pathway is minor because of the depth and limited area affected. A near surface sample also detected several potential bioaccumulators (PAHs) that may be available.

Question K:

Could contaminants interact with receptors via incidental ingestion of surficial soils?

Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Some contaminants detected at one location were near the surface and may be incidentally ingested with soil.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

Significant exposure via dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: No release to the surface soil was found at this PRS.

Question M:

Could contaminants interact with plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters.

Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.

Contaminants in sediment may partition into soil solution, making them available to roots.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 3

Provide explanation: The outfall area had standing water after a rain event and sediments are present in this area as well as down drainage. This may potentially result in plants coming in contact with contaminants in the water or sediment.

Question O:

Could contaminants interact with receptors through food web transport from water and sediment?

The chemicals may bioconcentrate in food items.

Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 3

Provide explanation: Lead and PAHs were detected in the sediment at the outfall. These contaminants are potential bioaccumulators.

Question P:

Could contaminants interact with receptors via ingestion of water and suspended sediments?

If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.

Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 3

Provide explanation: Contaminants were detected in the sediment below the outfall from the septic tank.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.

Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 3

Provide explanation: PAHs are lipophilic and were detected in the sediment below the outfall.

Question R:

Could contaminants interact with plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

Question S:

Could contaminants bioconcentrate in free floating aquatic, attached aquatic plants, or emergent vegetation?

Aquatic plants are in direct contact with water.

Contaminants in sediment may partition into pore water, making them available to submerged roots.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: There is no aquatic vegetation growing in the outfall area or below the discharge.

Question T:

Could contaminants bioconcentrate in sedimentary or water column organisms?

Aquatic receptors may actively or incidentally ingest sediment while foraging.

Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.

Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic animals present in the drainage or below the outfall area.

Question U:

Could contaminants bioaccumulate in sedimentary or water column organisms?

Lipophillic organic contaminants and some metals may concentrate in an organism's tissues

Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: There are no aquatic animals present in the drainage or below the outfall area.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

The water column acts to absorb radiation, thus external irradiation is typically more important for sediment dwelling organisms.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

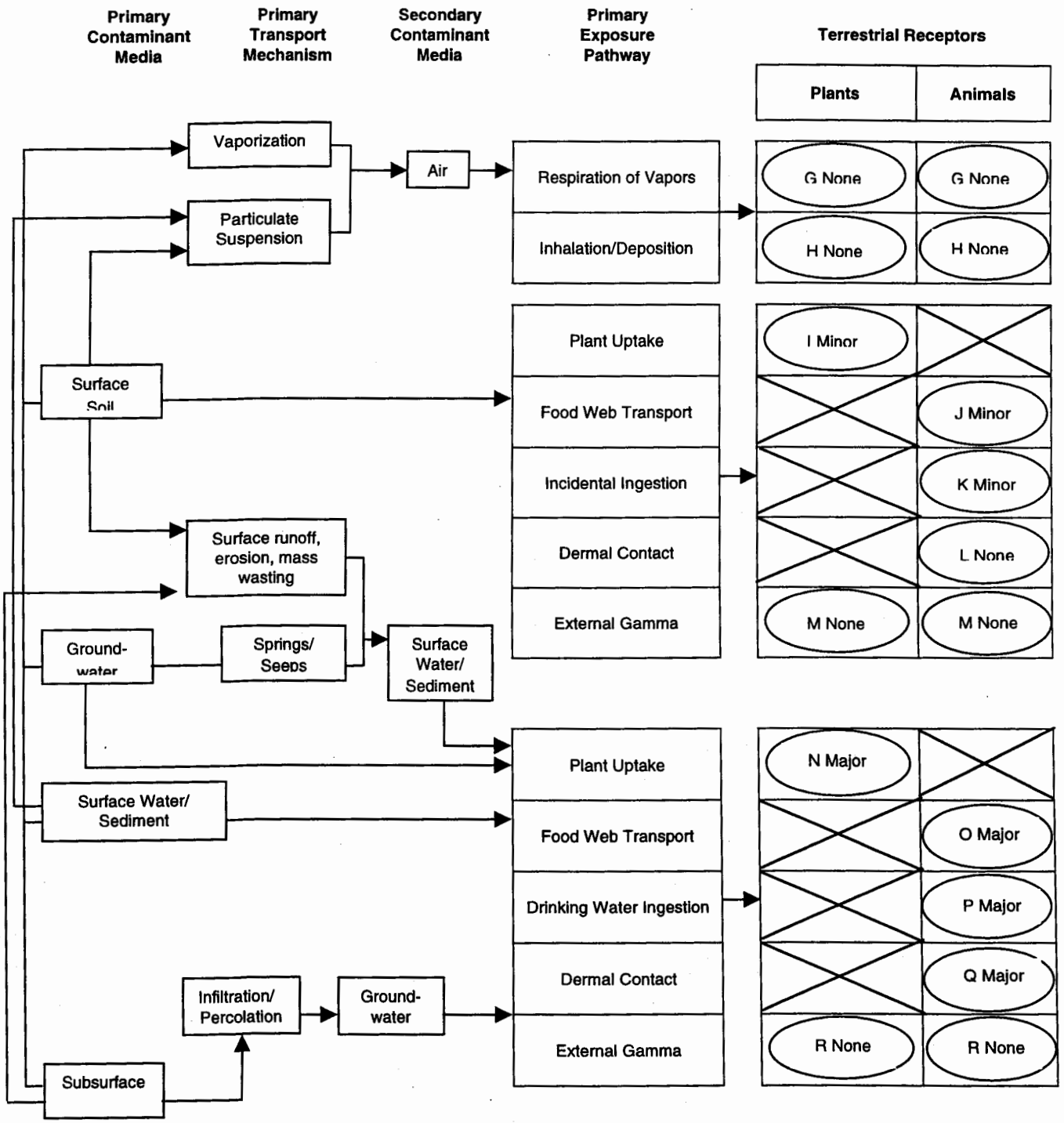
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

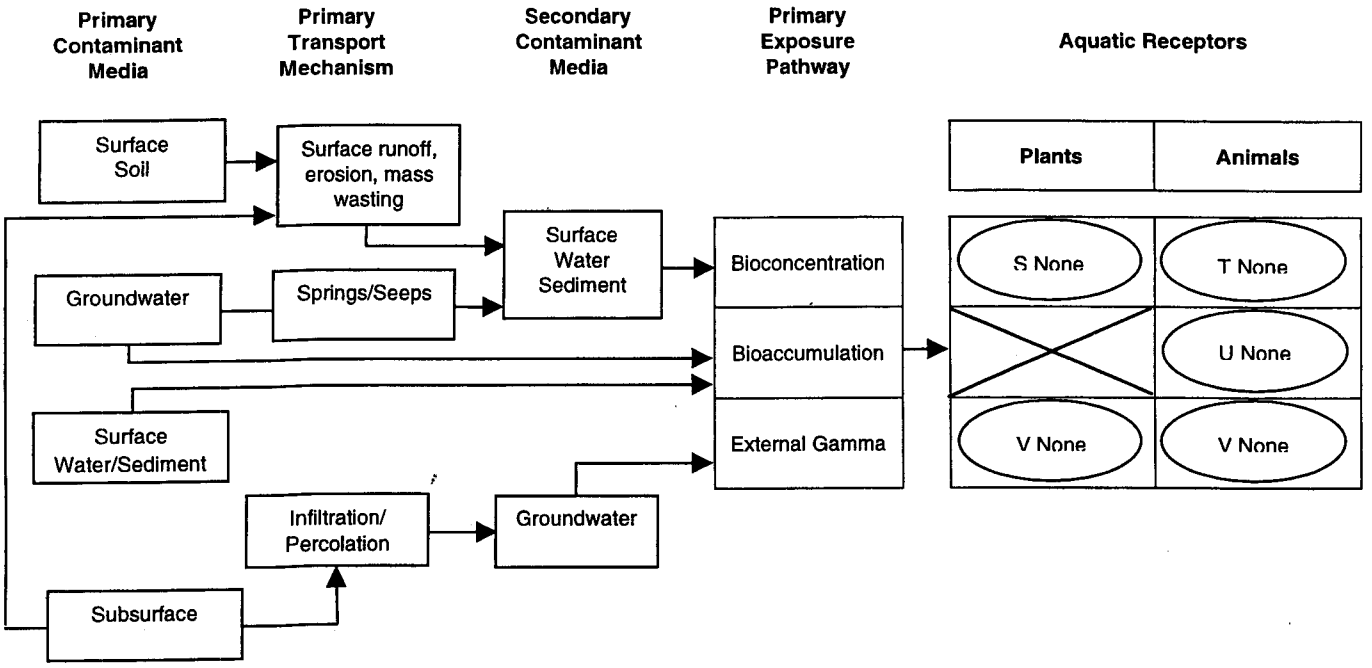
NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model



NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed): Richard Mirenda, Ph.D.
Name (signature): Richard Mirenda
Organization: MK/PMC
Phone number: (505)662-1329

Date Completed: **6/18/99**

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed): LARS P. SOHOLT
Name (signature): Lars P. Soholt
Organization: KTLA
Phone number: 505/667-2852

Appendix E

ESTIMATED COSTS

Activity	PRSs 0-003 and 0-012	PRS 0-030(i)	Subtotals
Pre-field activities (includes data collection and review, VCA plan preparation, readiness review, and field preparation.)	$70,000.00	$45,000.00	$115,000.00
Field activities (includes all sampling, tank and pipeline removal, site restoration, and waste management and disposal)	$49,000.00	$24,000.00	$73,000.00
Post-field activities (includes VCA report and program support)	$87,000.00	$56,000.00	$143,000.00
Analytical costs	$75,000.00	$61,000.00	$136,000.00
Total	$281,000.00	$186,000.00	$467,000.00