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Date: September 26, 1997
Refer to: EM/ER:97-396

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

SUBJECT: SUBMITTAL OF VCM COMPLETION REPORT FOR PRSs 16-013, 16-025(x), 16-031(d), C-16-065, AND C-16-068 IN TA-16 (FORMER OU 1082)

Dear Mr. Garcia:

Enclosed are two copies of the Los Alamos National Laboratory Voluntary Corrective Measures Completion Report for Potential Release Sites 16-013, 16-025(x), 16-031(d), C-16-065, and C-16-068 in Technical Area 16. One report is for your information and the second should go to your technical branch.

If you have any questions, please contact Roy Michelotti at (505) 665-7444 or Joe Mose at (505) 667-5808.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/ss

Enclosures (1) VCM Completion Report for PRSs 16-013, 16-025(x), 16-031(d), C-16-065, and C-16-068 in TA-16
(2) Certification

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CERTIFICATION

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

Document Title: VCM Completion Report for PRSs 16-013, 16-025(x), 16-031(d), C-16-065, and C-16-068 in TA-16

Name: _____ Date: 9-26-97

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Voluntary Corrective Measures Completion Report for Potential Release Sites

16-013
16-025(x)
16-031(d)
C-16-065
C-16-068

Field Unit 3

Environmental Restoration Project

September 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-97-3677

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1.0 INTRODUCTION

This report presents the results of completing part of the work scope discussed in the V-Site Voluntary Corrective Measures (VCM) Plan (Environmental Restoration Project 1997, 1410). The work performed did incorporate changes to the original plan based on (notice of deficiency) NOD comments from the New Mexico Environment Department (NMED) review of the VCM Plan. All work has been completed for five of the PRSs in that plan: 16-013, 16-025(x), 16-031(d), C-16-065, and C-16-068. Work at the remaining 12 sites will be completed in FY 98 and will be summarized in subsequent VCM Completion Reports.

These sites were selected for early submittal because they did not require cleanup and thus could be completed much sooner than the remaining 12 PRSs. Although no cleanup occurred, these sites are addressed in a VCM Completion Report because the decision criteria and scope of work are based on the VCM Plan.

The PRSs addressed in this report are recommended for no further action (NFA) with respect to human health because, where present, contaminants are at low levels and do not pose a significant risk. In some cases, the detected constituents are attributed to non-release sources, such as parking lots. All five PRSs are recommended for human health NFA under Criterion 5: The PRS has been characterized in accordance with current applicable state or federal regulations, and the available data indicate that contaminants of concern are either not present or are present in concentrations that would not pose a risk under the projected future industrial land use.

1.1 Site Type and Description

All sites included in this report are located in Technical Area (TA) 16, at V-Site and near building TA-16-27 in the World War II–era complex of TA-16 (S-Site). TA-16 itself is located in the southwest corner of Los Alamos National Laboratory (LANL). The locations of the TA-16 areas that are addressed in this report are shown with respect to each other in Fig. 1.1-1. The areas consist of PRSs associated with high explosives (HE) processing activities at former TA-25 (V-Site), as well as PRSs associated with buildings TA-16-100 and TA-16-27. PRSs 16-013 and C-16-068 (Fig. 1.1-2) as well as PRS 16-025(x) (Fig. 1.1-3) are located in the vicinity of V-Site. PRSs 16-031(d) and C-16-065 are located in the area surrounding TA-16-27 (Fig. 1.1-4).

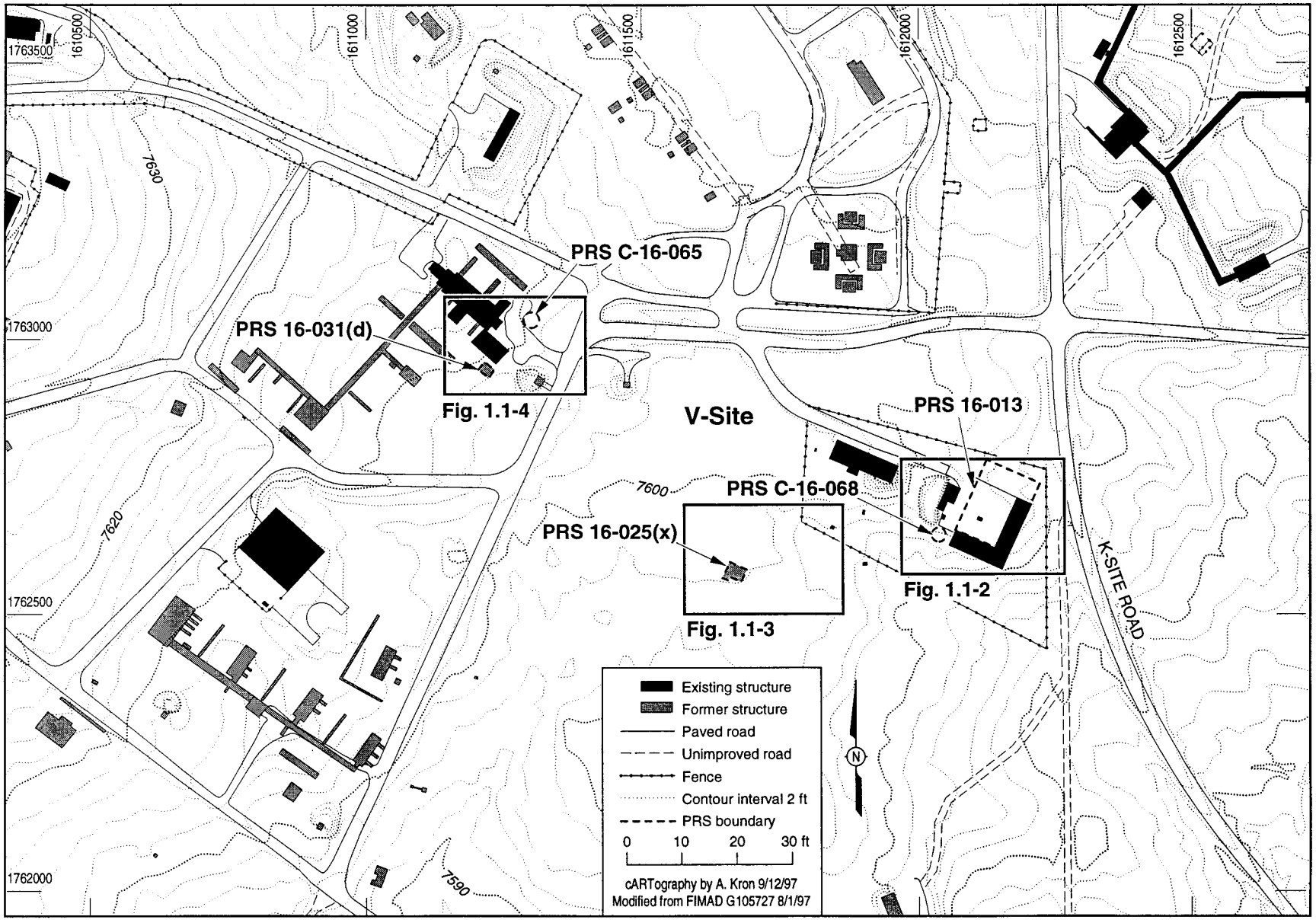

Fig. 1.1-1. Location of the PRSs in this VCM Report.

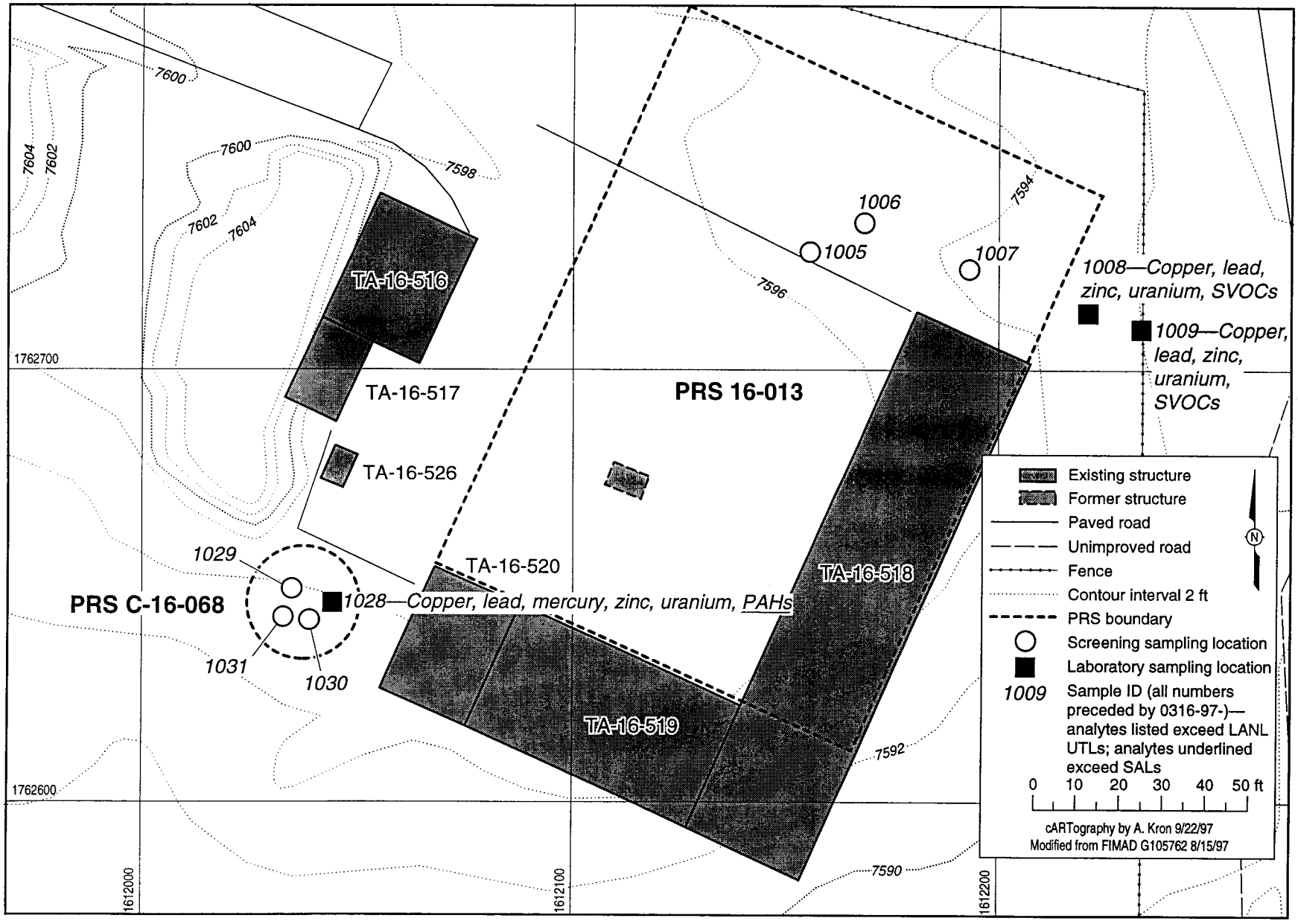

Fig. 1.1-2. Location of PRSs 16-013 and C-16-068 at V-Site.

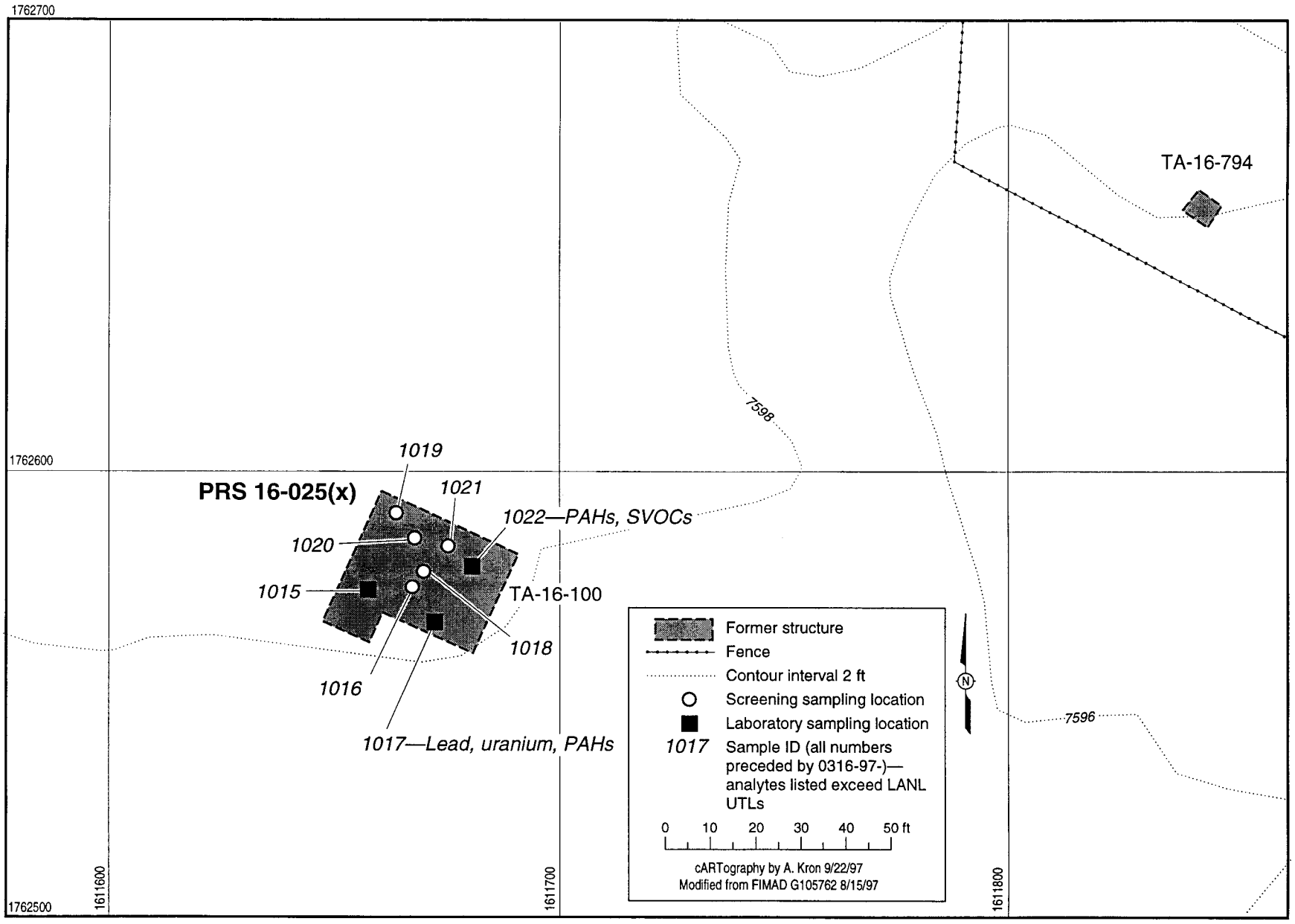

Fig. 1.1-3. Location of PRS 16-025(x).

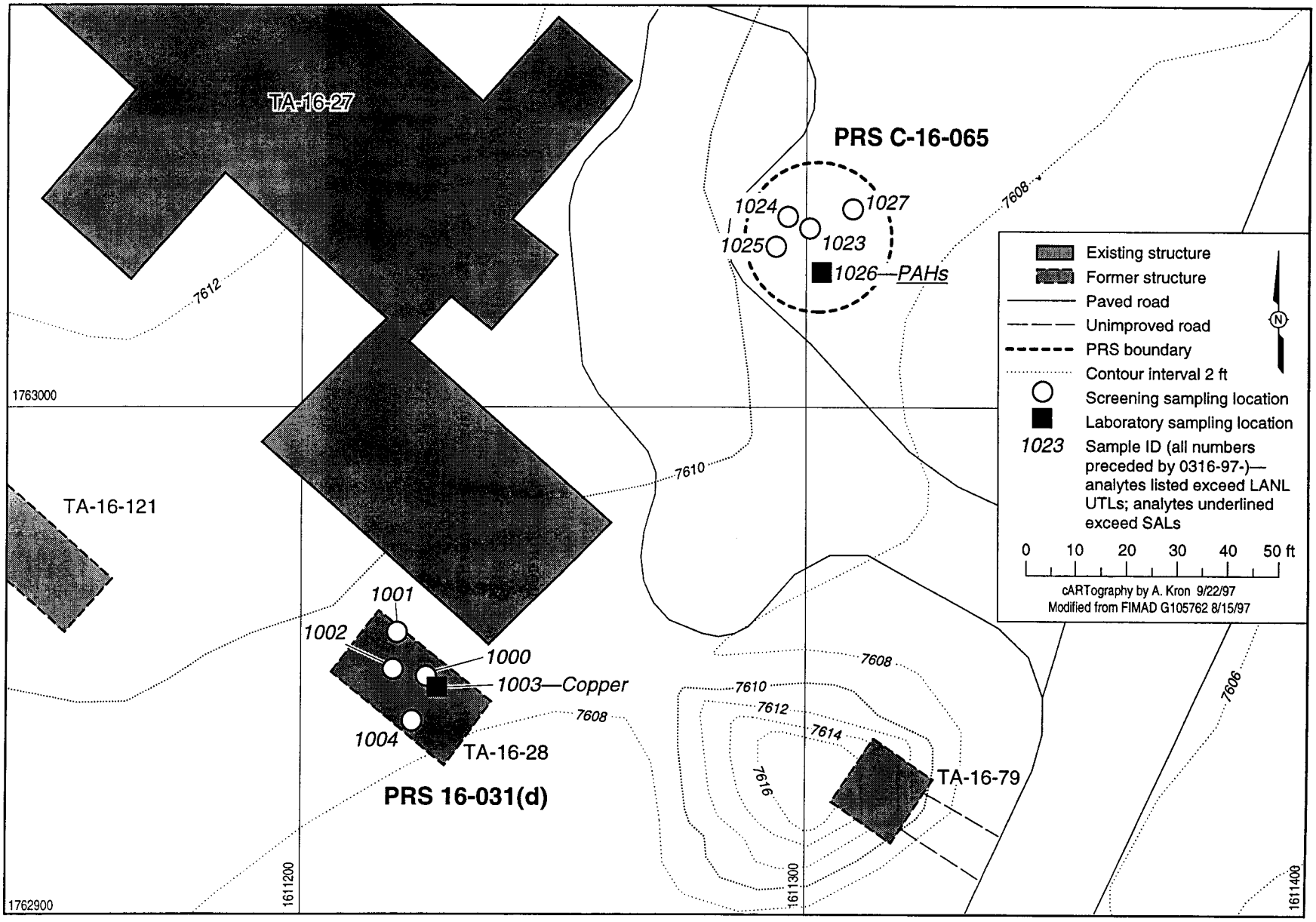

Fig. 1.1-4. Location of PRSs 16-031(d) and C-16-065.

Table 1.1-1 lists each PRS, its description, the area in which it is located, and the section of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plans for Operable Unit (OU) 1082 in which each PRS was originally described (LANL 1993, 1094; LANL 1994, 1160).

TABLE 1.1-1

SUMMARY OF POTENTIAL RELEASE SITES

PRS	DESCRIPTION	LOCATION	WORK PLAN REFERENCE
16-013	V-Site courtyard storage area	V-Site	5.17[a]
16-025(x)	Electroplating laboratory, TA-16-100	V-Site	5.25[b]
16-031(d)	Cooling tower, TA-16-28	Near TA-16-27	5.19[b]
C-16-065	Drum storage platform, TA-16-185	Near TA-16-27	5.19[b]
C-16-068	Laboratory, TA-16-522	V-Site	5.25[b]

a. LANL 1993, 1094
b. LANL 1994, 1160

PRS 16-013 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module of LANL's RCRA Hazardous Waste Facility Permit (EPA 1990, 0306). The remaining PRSs addressed in this report are not in the HSWA Module.

1.1.1 Operational History

Historical operations at V-Site (constructed in 1944) included handling, loading, and testing of mockups of the atomic bomb. TA-16-27 and surrounding structures were used for HE casting from 1945 to the early 1950s. TA-16-27 was the main production casting facility at TA-16 until approximately 1953. Additional site history is presented in the V-Site VCM Plan (Environmental Restoration Project 1997, 1410).

The chemicals of potential concern (COPCs) are HE, metals, uranium, volatile organic compounds (VOCs), and semivolatile compounds (SVOCs).

1.2 Scope of VCM

The sampling approach used during the VCM was based on the sampling strategy approved in the RFI Work Plans for Operable Unit 1082 (LANL 1993, 1094; LANL 1994, 1160) and proposed in the V-Site VCM Plan (Environmental Restoration Project 1997, 1410). The screening methodology, as described in the V-Site VCM Plan, calls for field screening that can quantitatively detect the most likely contaminants at concentrations less than the proposed industrial cleanup concentrations (see Table 3.1-1). A screening level of 50% of the cleanup level (preliminary remediation goal [PRG]) for HE and metals was used to determine if soil removal was necessary. This conservative approach is used because of the uncertainties associated with field screening. All decisions were based on fixed laboratory results.

Field screening results were also used to bias the location of laboratory samples to the areas of highest contaminant concentration. The analytical results obtained have been compared to cleanup levels and screening action levels (SALs). In some cases, SALs are not available due to the absence of the Environmental Protection Agency (EPA)-accepted toxicity criteria needed to calculate screening values. Because of this, no PRGs can be calculated until EPA-acceptable criteria are identified.

Laboratory analysis confirmed that no soil removal was necessary during the VCM activities at the V-Site and TA-16-27 areas in the PRSs included in this report.

1.3 Deviations

Deviations from the VCM Plan involved additional sample analysis for constituents that were not identified as COPCs in the VCM Plan or work plans: 16-013 and 16-031(d) were analyzed for HE; 16-025(x), for uranium; and C-16-065, for VOCs and SVOCs.

Ensys™ screening for TNB was not performed on all the samples in which trinitrotoluene (TNT) was detected, as was proposed in the VCM Plan. Rationales for this deviation are provided on a PRS basis.

2.0 SITE CHARACTERIZATION PRIOR TO CLEANUP ACTIVITY

2.1 PRS 16-013

PRS 16-013 is a waste storage area formerly located in the courtyard that is formed by buildings TA-16-516, TA-16-517, TA-16-518, TA-16-519, and TA-16-520 (Fig. 1.1-2). This site is proposed for human health NFA because all constituents detected were at levels below SALs and proposed cleanup levels.

2.1.1 History

The buildings and courtyard at V-Site have been used for non-HE programmatic activities and storage since 1945. The area is level, with a shallow drainage ditch that runs east to a roadside drainage.

The COPCs for PRS 16-013 are uranium, metals, VOCs, and SVOCs. These COPCs are based on the 1987 Comprehensive Environmental Assessment and Response Program (CEARP) Report, which noted that some drums stored at the site were leaking (DOE 1987, 0264). Some of the drums were marked "used solvent" while others appeared to contain hydraulic fluid. The report also noted that empty boxes and cans containing radioactive material were in the area, along with open drums containing barium nitrate and what appeared to be empty drums that had contained lithium hydride. PRS 16-013 is described in detail in the RFI Work Plan for Operable Unit 1082 (LANL 1993, 1094).

2.1.2 Previous Investigations

No previous investigations have been performed at this site.

2.1.3 Field Investigation

Five surface soil samples were collected for screening on May 28, 1997, from the drainage just north of the V-Site courtyard. Samples were collected from a depth of 0–6 inches using the spade/scoop sampling method. Sample locations were selected within the drainage based upon geomorphologic characteristics (e.g., sediment traps). The samples were screened with the HE spot test kit and with X-ray fluorescence (XRF) for inorganic chemicals. Half of the samples were screened with D-Tech immunoassay kits for RDX and TNT. Four of the five screening samples with detected results are presented in Table 2.1.3-1.

HE was not detected using the HE spot test kit; however, RDX was detected in two screening samples using the D-Tech kit. Because significant concentrations of TNT (> 4.5 ppm) were not detected during screening, the Ensys kit was not used to detect TNB.

Screening samples 0316-97-1008 and 0316-97-1009 (lab sample 0316-97-0001 and 0316-97-002, respectively) tested positive for HE with the D-Tech kits. However, lab analysis of these samples showed no HE present. A comparative study of HE field-screening kits, such as D-Tech, indicated that at levels of approximately 1 ppm, these kits "...had significant positive bias...sometimes resulting in false positives..." (Crockett et al. 1997, 1411). This positive bias has been attributed to the presence of humic substances—naturally occurring compounds—present in soil. These substances are extracted along with the HE and can interfere with the reflectometer analysis during testing. As a result of this, "...on-site method results are biased high as compared to laboratory results" (Crockett et al. 1996, 1412). However, no false negatives were reported in the comparative study of field-screening methods. Occasional false positives and no false negative ensures that the field-screening methods used for detecting HE err on the more conservative side.

Table 2.1.3-1 lists the quantitative screening results for PRS 16-013.

TABLE 2.1.3-1

SCREENING RESULTS FOR PRS 16-013

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	D-TECH/ TNT (ppm)	D-TECH/ RDX (ppm)	XRF/Ba (ppm)	XRF/Cu (ppm)	XRF/Pb (ppm)
0316-97-1005	16-3005	0–6	Soil/ sediment	< 0.5	< 0.5	439±12	154±59	75±28
0316-97-1007	16-3007	0–6	Soil/ sed	< 0.5	< 0.5	445±12	171±65	93±31
0316-97-1008	16-3008	0–6	Soil/ sed	< 0.5	0.5–1.5	448±12	131±57	ND[a]
0316-97-1009	16-3009	0–6	Soil/ sed	0.5–1.5	0.5–1.5	393±11	145±57	ND

a. ND = Not Detected

A summary of the samples taken is presented in Table 2.1.3-2. Two samples were submitted for laboratory analyses. The location of these samples are shown in Fig. 1.1-2.

TABLE 2.1.3-2

SUMMARY OF REQUEST NUMBERS FOR SAMPLES TAKEN AT PRS 16-013

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	INORGs	RAD	HE	SVOCs
0316-97-0001	16-3008	0–6	Soil	3241R	3243R	3242R	3240R
0316-97-0002	16-3009	0–6	Soil	3241R	3243R	3242R	3240R

2.1.4 Evaluation of Inorganic Chemicals

Copper, lead, and zinc were the only inorganic chemicals detected above UTLs in samples 0316-97-0001 and 0316-97-0002. The results are well below the cleanup levels and SALs, and are presented below in Table 2.1.4-1.

TABLE 2.1.4-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTL FOR PRS 16-013

SAMPLE ID	DEPTH (in.)	SAMPLE MATRIX	COPPER (mg/kg)	LEAD (mg/kg)	ZINC (mg/kg)
LANL UTL(all soil)	N/A[a]	N/A	15.5	23.3	50.8
SAL	N/A	N/A	2800	400	23 000
PRG	N/A	N/A	6300	1000	NC[b]
0316-97-0001	0–6	soil	82.6	49.0	58.2
0316-97-0002	0–6	soil	66.6	36.6	74.0

a. N/A = Not Applicable
b. NC = Not Calculated

2.1.5 Evaluation of Radionuclides

Uranium was detected only slightly above UTL, but well below the cleanup level (PRG) in both samples. The results are presented in Table 2.1.5-1.

TABLE 2.1.5-1

EVALUATION OF RADIONUCLIDES FOR PRS 16-013

SAMPLE ID	DEPTH (in.)	TOTAL URANIUM (mg/kg)
LANL UTL	N/A[a]	1.87
SAL	N/A	29
PRG	N/A	284
0316-97-0001	0–6	3.21
0316-97-0002	0–6	2.19

a. N/A = Not Applicable

2.1.6 Evaluation of Organic Chemicals

No HE was detected in the laboratory samples at this site, although some samples had positive screening results. As noted above, humic substances in sediment samples can yield low-level false positive results on D-Tech screening kits. The only organics detected were common plasticizers: bis(2-ethylhexyl)phthalate in two samples and di-n-butylphthalate in one sample. These constituents are well below cleanup levels and SALs and are listed in Table 2.1.6-1.

TABLE 2.1.6-1

DETECTED ORGANICS FOR PRS 16-013

SAMPLE ID	DEPTH (in.)	BIS(2-ETHYLHEXYL)PHTHALATE (mg/kg)	DI-N-BUTYLPHTHALATE (mg/kg)
SAL	N/A[a]	32	6500
PRG	N/A	140	68 000
0316-97-0001	0–6	2.3	1.9 U[b]
0316-97-0002	0–6	1.7 J[c]	0.97 J

a. N/A = Not Applicable
b. U = Undetected—value given is the estimated quantitation limit (EQL)
c. J = Estimated—value is above detection level but below EQL

2.1.7 Risk-Based Screening Assessment

No multiple constituent evaluation (MCE) is presented because Tables 2.1.4-1 and 2.1.6-1 show that the sum of the normalized maxima for both carcinogens and noncarcinogens would

be much less than the target value of 1, which indicates a low potential for adverse human health effects due to exposure to these analytes. No constituents will be considered for further evaluation.

2.1.8 Human Health Risk Assessment

No analytes were detected above cleanup levels. Those that were found to be greater than LANL UTLs are not found at concentrations that would pose a risk to human health under the projected future industrial land use.

2.1.9 Preliminary Ecological Assessment

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

2.1.10 Conclusions and Recommendations

Five screening locations were selected in the shallow drainage ditch where runoff from the paved portion of 16-013 courtyard could have accumulated. The selection of two laboratory samples was biased using the results of the field screening.

The data for 16-013 clearly indicate analytes above LANL UTLs but well below proposed cleanup levels and SALs; therefore, this PRS is recommended for human health NFA.

2.2 PRS 16-025(x)

PRS 16-025(x) is the building footprint of a former electroplating laboratory and is proposed for human health NFA because no analytes were detected above SALs and proposed cleanup levels.

2.2.1 History

PRS 16-025(x) is the former location of a laboratory, TA-16-100, which was located about 400 ft southwest of V-Site in a level area. The building underwent decontamination and decomissioning (D&D) and was burned in 1960. A former site worker suggested that HE charges were directly electroplated here (Martin and Hickmott 1993, 15-16-498). Engineering drawing ENG-C 596 indicates that this wood-frame building was 25 ft long × 33 ft wide, contained a utility room and a work room, and was set on concrete piers.

The COPCs for 16-025(x) are HE, uranium, metals, VOCs, and SVOCs. These COPCs are based on the plating operations that were performed at TA-16-100. PRS 16-025(x) is described in detail in the RFI Work Plan for Operable Unit 1082, Addendum 1 (LANL 1994, 1160).

2.2.2 Previous Investigations

No previous investigations have been performed at this site.

2.2.3 Field Investigation

The former building's location was accurately surveyed using a Trimble Global Positioning System (GPS) Total Station. Aerial photographs were used to determine the building's position. The corners of the building were surveyed to an estimated accuracy of 2 feet. Screening sample locations were further determined and surveyed relative to the corner points and within the known dimensions of the building.

Eight screening samples were collected from PRS 16-025(x) to a depth of 12 inches. Work was conducted on May 20, 1997. The samples were collected using a hand auger. All samples were screened for HE using the HE spot test kit; no HE was detected. Half the samples were screened for HE using D-Tech immunoassay kits for RDX and TNT. Four of the eight screening samples with detected results are presented in Table 2.2.3-1. The samples were also screened for inorganic chemicals using XRF. Of the four samples screened for RDX, only one sample, 0316-97-1015, screened positively for RDX and TNT (4.0–5.0 ppm). This sample has a corresponding lab sample identification of 0316-97-0003.

Table 2.2.3-1 lists the quantitative screening results for PRS 16-025(x).

TABLE 2.2.3-1

SCREENING RESULTS FOR PRS 16-025(x)

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	D-TECH/RDX (ppm)	D-TECH/TNT (ppm)	ENSYS/TNT/TNB (ppm)	XRF/Ba (ppm)	XRF/Cu (ppm)	XRF/Pb (ppm)
0316-97-1015	16-3015	0–12	Soil	4.0–5.0	0.5–1.5	< 0.7	313±10	ND[a]	ND
0316-97-1017	16-3017	0–12	Soil/Qbt4 tuff	< 0.5	< 0.5	N/A[b]	272±10	50±48	57±27
0316-97-1019	16-3019	0–12	Soil/Qbt4 tuff	< 0.5	< 0.5	N/A	317±10	ND	ND
0316-97-1021	16-3021	0–12	Soil/Qbt4 tuff	< 0.5	< 0.5	N/A	264±9	ND	43±26

a. ND = Not Detected
b. N/A = Not Applicable

Table 2.2.3-2 presents laboratory samples taken at this site. Locations of these samples are shown on Fig. 1.1-3.

TABLE 2.2.3-2

SUMMARY OF REQUEST NUMBERS FOR SAMPLES TAKEN AT PRS 16-025(x)

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	INORGs	RAD	HE	SVOCs	VOCs
0316-97-0003	16-3015	0–12	Soil	3238R	3239R	3237R	3236R	3236R
0316-97-0004	16-3017	0–12	Soil	3238R	3239R	3237R	3236R	3236R
0316-97-0005	16-3022	0–12	Soil	3238R	3239R	3237R	3236R	3236R

2.2.4 Evaluation of Inorganic Chemicals

Lead was the only inorganic constituent detected above its UTL, but it is well below the cleanup level (Table 2.2.4-1).

TABLE 2.2.4-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTL FOR PRS 16-025(x)

SAMPLE ID	DEPTH (in.)	SAMPLE MATRIX	LEAD (mg/kg)
LANL UTL (all soil)	N/A[a]	N/A	23.3
SAL	N/A	N/A	400
PRG	N/A	N/A	1000
0316-97-0004	0-12	Soil	25

a. N/A = Not Applicable

2.2.5 Evaluation of Radionuclides

Uranium was detected above its UTL, but well below the cleanup level in two samples (Table 2.2.5-1).

TABLE 2.2.5-1

EVALUATION OF RADIONUCLIDES FOR PRS 16-025(x)

SAMPLE ID	DEPTH (in.)	TOTAL URANIUM (mg/kg)
LANL UTL	N/A[a]	1.87
SAL	N/A	29
PRG	N/A	284
0316-97-0003	0–12	10.3
0316-97-0004	0–12	5.13

a N/A = Not Applicable

2.2.6 Evaluation of Organic Chemicals

HE was not detected in laboratory analysis of samples at this site, although HE was detected during screening with the RDX D-Tech kit. This false positive result is due to the positive bias attributed to the presence of humic substances present in the soil. These substances interfere with the HE analysis (Crockett et al. 1996, 1412).

Various SVOCs and polycyclic aromatic hydrocarbons (PAHs) were detected at low levels (Table 2.2.6-1).

TABLE 2.2.6-1

DETECTED ORGANIC CHEMICALS FOR PRS 16-025(x)

SAMPLE ID	DEPTH (in.)	ANTHRACENE (mg/kg)	DIBENZO-FURAN (mg/kg)	FLOURENE (mg/kg)	2-METHYL-NAPHTHALENE (mg/kg)	NAPHTHALENE (mg/kg)	PHENAN-THRENE (mg/kg)
SAL	N/A[a]	18 000	250	2300	NC[b]	NC	NC
PRG	N/A	5.7	140	41 000	NC	240	NC
0316-97-0003	0–12	0.4 U[c]	0.4 U	0.4 U	1.1 J[d]	1.8 J	0.4 U
0316-97-0004	0–12	1.2 J	0.4 U	0.4 U	0.4 U	0.4 U	1.1 J
0316-97-0005	0–12	3.4	.64	1.9	0.4 U	0.4 U	3.0

a. N/A = Not Applicable
b. NC = Not Calculated
c. U = Undetected—value given is the EQL
d. J = Estimated—value is above detection level but below EQL

2.2.7 Risk-Based Screening Assessment

Lead was detected above the LANL UTL but well below the cleanup level. Low levels of uranium and SVOCs were also detected. Inspection of the data sets indicates that an MCE screening calculation would yield a value less than the target limit of 1 for both the carcinogenic and noncarcinogenic groups.

2.2.8 Human Health Risk Assessment

Analytical results for 16-025(x) indicate that no contaminants of concern are at levels that pose a risk to human health under the projected future industrial land use.

2.2.9 Preliminary Ecological Assessment

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

2.2.10 Conclusions and Recommendations

Eight locations were investigated; three samples were sent for fixed laboratory analyses. Screening locations were selected at random in the footprint of the former laboratory TA-16-100, and selection of the laboratory samples was biased using screening results.

The available data for PRS 16-025(x) indicate that COPCs were not detected above cleanup levels and SALs; this site is therefore recommended for human health NFA.

2.3 PRS 16-031(d)

PRS 16-031(d) is the site of a former cooling tower, structure TA-16-28, and is proposed for human health NFA because all constituents detected are below both SALs and proposed cleanup levels.

2.3.1 History

The cooling tower was located approximately 70 ft south of building TA-16-27. The tower was of wood-frame construction and measured 28 ft long × 28 ft wide × 46 ft high. It stored water

for the cooling jackets used in casting at TA-16-27. TA-16-28 was built in 1945. The building underwent D&D and was burned in 1968. The area is level.

The COPCs for 16-031(d) are HE and metals. The COPCs are based on the operation of the cooling tower, which would have included chromium as a chemical of potential concern. PRS 16-031(d) is described in detail in the RFI Work Plan for Operable Unit 1082, Addendum 1 (LANL 1994, 1160).

2.3.2 Previous Investigations

No previous investigations have been performed at this site.

2.3.3 Field Investigation

The structure's former location was accurately surveyed using a Trimble GPS Total Station. Aerial photographs were used to determine the structure's position. The corner of the structure was surveyed to an estimated accuracy of 2 feet. Screening sample locations were further determined and surveyed relative to the center point and within the known dimensions of the structure.

Five screening samples were collected from the former cooling tower on April 11, 1997. Sample locations were randomly located within a four-celled stratified grid, with one location placed within each cell. The fifth sample was collected from the center of the grid where all four cell corners meet. Samples were collected from depths of 0–6 in. using the spade/scoop sampling method.

The samples were screened for HE in accordance with the general cleanup strategy described in the VCM plan. All samples were first screened using the HE spot test kit; no HE was detected with the D-Tech RDX kit. The D-Tech TNT kit detected low levels of HE. These samples were then screened for inorganic chemicals using XRF. One sample was sent for fixed laboratory analysis for inorganic chemicals.

Although the VCM plan (Table 1.1-1) incorrectly lists HE as a COPC for 16-031(d), the sample was analyzed only for metals, as stated in the 1993 RFI Work Plan, Table 5-93 (LANL 1993, 1094). Because of the nature of cooling tower operations, HE is not a likely COPC. Table 2.3.3-1 lists the quantitative screening results for PRS 16-031(d).

TABLE 2.3.3-1

SCREENING RESULTS FOR PRS 16-031(d)

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	D-TECH/ RDX (ppm)	D-TECH/ TNT (ppm)	ENSYS/ TNB (ppm)	XRF/ Ba (ppm)	XRF/ Cu (ppm)	XRF/ Pb (ppm)
0316-97-1000	16-3000	0–6	Soil	< 0.5	0.5–1.5	N/A[a]	800±14	1055±56	19±3
0316-97-1001	16-3001	0–6	Soil	< 0.5	< 0.5	N/A	702±13	954±52	24±3
0316-97-1002	16-3002	0–6	Soil	< 0.5	< 0.5	N/A	922±17	842±50	21±3
0316-97-1003	16-3003	0–6	Soil	< 0.5	0.5–1.5	< 0.7	608±12	823±48	5±1
0316-97-1004	16-3004	0–6	Soil	< 0.5	< 0.5	N/A	286±8	846±48	14±2

a. N/A = Not Applicable

Information about the one laboratory sample taken is presented in Table 2.3.3-2. All sample locations are shown in Fig. 1.1-4.

TABLE 2.3.3-2

REQUEST NUMBER FOR LABORATORY SAMPLE TAKEN AT PRS 16-031(d)

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	INORGs
0316-97-0141	16-3003	0–6	Soil	3064R

2.3.4 Evaluation of Inorganic Chemicals

Copper was the only inorganic chemical detected slightly above the LANL UTL (Table 2.3.4-1).

TABLE 2.3.4-1

INORGANIC CHEMICAL WITH A CONCENTRATION GREATER THAN BACKGROUND UTL FOR PRS 16-031(d)

SAMPLE ID	DEPTH (in.)	SAMPLE MATRIX	COPPER (mg/kg)
LANL UTL (all soil)	N/A[a]	N/A	15.5
SAL	N/A	N/A	2800
PRG	N/A	N/A	6300
0316-97-0141	0–6	Soil	17

a. N/A = Not Applicable

2.3.5 Evaluation of Radionuclides

Radionuclides were not analyzed at this PRS.

2.3.6 Evaluation of Organic Chemicals

Organics were not analyzed at this PRS.

2.3.7 Risk-Based Screening Assessment

Multiple constituents were not found; therefore, an MCE was not performed.

2.3.8 Human Health Risk Assessment

Copper was the only constituent found above LANL UTL but well below the cleanup level. The concentration is not found at a level that would pose a risk to human health.

2.3.9 Preliminary Ecological Assessment

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

2.3.10 Conclusions and Recommendations

Five locations were screened within the footprint of the cooling tower; one sample was submitted for fixed laboratory analysis to verify screening results.

Analytical results for PRS 16-031(d) indicate no contaminants at concentrations greater than the cleanup level; therefore, this PRS is recommended for human health NFA.

2.4 C-16-065

C-16-065 is associated with a former drum storage platform, TA-16-185, and is proposed for human health NFA because detected contaminants are due to a non-release scenario, such as an adjacent asphalt parking lot.

2.4.1 History

The platform was used to store drums of HE-contaminated waste from the nearby HE processing buildings. This structure was a concrete platform with dimensions of 13.5 ft × 8.7 ft × 4.5 ft. It was located approximately 50 ft east of TA-16-27. It was built in 1948, in a level area, and abandoned in place in 1960. The platform was probably removed in 1968, concurrently with the D&D of nearby buildings.

The COPCs for C-16-065 are HE and metals. This area of concern (AOC) is described in detail in the RFI Work Plan for Operable Unit 1082, Addendum 1 (LANL 1994, 1160).

2.4.2 Previous Investigations

No previous investigations have been performed at this site.

2.4.3 Field Investigation

The structure's former location was accurately surveyed using a Trimble GPS Total Station. Aerial photographs were used to determine the structure's position. The corners of the structure were surveyed to an estimated accuracy of 2 feet. Screening sample locations were further determined and surveyed relative to the corner points and within the known dimensions of the platform.

Five samples were collected from the former drum storage platform to a depth of 12 in. using the spade and scoop method of sample collection. Work was conducted on May 20, 1997. Sample locations were randomly located within a grid, with the exception of the center point. The samples were screened in accordance with the general cleanup strategy in the VCM Plan. All samples were first screened using the HE spot test kit; no HE was detected. Approximately half of the spot test–screened samples were screened using the D-Tech kits for TNT and RDX. The samples were also screened using the D-Tech kit for BTEX (benzene, toluene, ethylene, xylene). Two of the five screening samples with detected results are presented in Table 2.4.3-1.

Screening sample 0316-97-1026 (lab sample 0316-97-0006) tested positive for HE with the D-Tech kits. However, lab analysis of this sample showed no HE present. According to the comparative study of HE field screening kits referenced earlier in this report, "...on-site method results are biased high as compared to laboratory results" (Crockett et al. 1996, 1412).

Significant concentrations of TNT (> 4.5 ppm) were not detected during screening; therefore, the Ensys screening kit, which detects TNB, was not used.

Table 2.4.3-1 lists the quantitative screening results for PRS C-16-065.

TABLE 2.4.3-1

SCREENING RESULTS FOR PRS C-16-065

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	D-TECH/ TNT (ppm)	D-TECH/ RDX (ppm)	D-TECH/ BTEX (ppm)	XRF/ Ba (ppm)	XRF/ Cu (ppm)	XRF/ Pb (ppm)
0316-97-1024	16-3024	0–12	Soil	< 0.5	< 0.5	2.5–5.0	354±7	751±31	ND[a]
0316-97-1026	16-3026	0–12	Soil	0.5–1.5	3.0–4.5	5.0–10	367±7	685±30	66±4

a. ND = Not Detected

One sample was submitted for fixed laboratory analyses. A summary of the samples taken is presented in Table 2.4.3-2. Sample locations are shown in Fig. 1.1-4.

TABLE 2.4.3-2

SUMMARY OF REQUEST NUMBERS FOR SAMPLES TAKEN AT PRS C-16-065

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	INORGs	HE	SVOCs	VOCs
0316-97-0006	16-3026	0–12	Soil	3086R	3088R	3085R	3085R

2.4.4 Evaluation of Inorganic Chemicals

No inorganic chemicals were detected above LANL UTLs.

2.4.5 Evaluation of Radionuclides

Radionuclides were not analyzed at this PRS.

2.4.6 Evaluation of Organic Chemicals

Several PAHs were detected at low levels (Table 2.4.6-1). Benzo(a)pyrene is the only organic chemical above its SAL; however, the result is below the cleanup level. No HE was detected. Field screening indicated BTEX at a concentration of 5–10 ppm for sample 0316-97-1026 (corresponding laboratory ID 0316-97-0006). However, no volatiles were detected in this sample from the laboratory.

TABLE 2.4.6-1

DETECTED ORGANIC CHEMICALS FOR C-16-065

SAMPLE ID	DEPTH (in.)	BENZO(A)-ANTHRACENE (mg/kg)	BENZO(A)-PYRENE (mg/kg)	BENZO(B)-FLOURANTHENE (mg/kg)	CHRYSENE (mg/kg)	FLOURAN-THENE (mg/kg)	PHENAN-THRENE (mg/kg)	PYRENE (mg/kg)
SAL[a]	N/A[b]	0.61	0.061	0.61	61	2600	NC[c]	1900
PRG	N/A	2.6	0.26	2.6	7.2	27 000	NC	100
0316-97-0006	0–12	0.12 J	0.14 J[d]	0.19 J	0.17 J	0.25 J	0.20 J	0.24 J

a. SAL = Screening Action Level
b. N/A = Not Applicable
c. NC = Not Calculated
d. J = Estimated—value is above detection level but below EQL

2.4.7 Risk-Based Screening Assessment

Benzo(a)pyrene was the only constituent present above SAL; however the level is below the cleanup level, which is the decision criterion for this VCM. Inspection of the data sets for all other constituents indicates that an MCE screening, excluding bezo(a)pyrene, would yield a value less than the target limit of 1. PAHs were the only chemicals of concern detected at the site and are attributed to non-point source runoff from surrounding asphalt and nearby roads.

2.4.8 Human Health Risk Assessment

Benzo(a)pyrene was the only constituent detected above SAL but below cleanup level. Phenanthrene was detected at 0.20 ppm. This constituent is a member of the noncarcinogenic PAHs (ATSDR 1995, 1408). The concentration detected is orders of magnitude below the PRGs for other members of this group. These PAHs are attributable to the asphalt road adjacent to the PRS; therefore, it will not be kept as a COPC.

The most likely explanation for the observation of PAHs is that they represent nonspecific contamination associated with general industrial activities, such as asphalt roadways, asphalt parking areas, and motor vehicle use. The "Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)" by the Agency of Toxic Substances and Disease Registry shows that soil concentrations of PAHs in urban/industrial areas commonly range from the tens to hundreds of mg/Kg (ATSDR 1995, 1408). The concentration detected at C-16-065 is less than 1 ppm.

The sources of these signatures include combustion products from organic materials and fossil fuels and runoff from asphalt. The observed concentrations are elevated above residential

screening values, but do not indicate the potential for unacceptable human health risk under the industrial land use scenario appropriate for this PRS.

2.4.9 Preliminary Ecological Assessment

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

2.4.10 Conclusions and Recommendations

Five locations were investigated; one sample was selected for fixed laboratory analyses based on screening results. The sample location was selected to detect maximum concentration of any contaminants present.

Benzo(a)pyrene, which is not a COPC at this site, was the only constituent detected above SAL but below cleanup level. There is no indication that PAHs were used at this site. C-16-065 is recommended for human health NFA because the only contaminant detected comes from a continuing source and is not PRS-specific.

2.5 C-16-068

C-16-068 is associated with the site of former building TA-16-522 and is proposed for human health NFA because constituents that are present are not attributable to this PRS but rather to a continuing source from nearby asphalt or telephone poles.

2.5.1 History

Structure TA-16-522 was constructed in 1944 and removed in 1945. This building has not been located on any existing drawings or photographs. Interviews with early site workers have not provided any useful information about the building. An unidentified foundation west of TA-16-519 is presumed to be the former site of this building. A former site worker suggests that TA-16-522 was contaminated with beryllium (Blackwell 1983, 15-16-076).

The COPCs for C-16-068 are HE, uranium, metals, VOCs, and SVOCs. This AOC is described in detail in the RFI Work Plan for Operable Unit 1082, Addendum 1 (LANL 1994, 1160).

2.5.2 Previous Investigations

No previous investigations have been performed at this site.

2.5.3 Field Investigation

Four samples were collected from the former location of TA-16-522. A concrete foundation filled with soil remains at the site. Samples were collected within the building foundation from a depth of 6 in. using the spade/scoop sampling method. Work was conducted on May 20, 1997. Sample locations were randomly located within a four-celled stratified grid, with one location placed within each cell. The samples were screened for HE in accordance with the general cleanup strategy outlined in the VCM plan. All samples were first screened using the HE spot test kit; no HE was detected. Two samples were screened using the D-Tech kits for TNT and RDX. Two of the four screening samples with detected results are presented in Table 2.5.3-1. Significant concentrations of TNT (> 4.5 ppm) were not detected during screening; therefore, the Ensys kit, which detects TNB, was not used.

Table 2.5.3-1 lists the quantitative screening results for PRS C-16-068.

TABLE 2.5.3-1

SCREENING RESULTS FOR PRS C-16-068

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	D-TECH/TNT (ppm)	D-TECH/RDX (ppm)	XRF/Ba (ppm)	XRF/Cu (ppm)	XRF/Pb (ppm)
0316-97-1028	16-3028	0-6	Soil	< 0.5	0.5–1.5	300±8	1099±53	60±5
0316-97-1030	16-3030	0-6	Soil	< 0.5	< 0.5	291±8	703±41	62±5

A summary of samples submitted are presented in Table 2.5.3-2. Sample locations are shown in Fig. 1.1-2.

TABLE 2.5.3-2

SUMMARY OF REQUEST NUMBERS FOR SAMPLES TAKEN AT PRS C-16-068

SAMPLE ID	LOCATION ID	DEPTH (in.)	SAMPLE MATRIX	INORGs	RAD	HE	SVOCs	VOCs
0316-97-0007	16-3028	0–6	Soil	3086R	3087R	3088R	3085R	3085R

2.5.4 Evaluation of Inorganic Chemicals

Several inorganics were detected above UTLs, but all were well below SALs and cleanup levels (Table 2.5.4-1).

TABLE 2.5.4-1

INORGANIC CHEMICALS WITH CONCENTRATIONS GREATER THAN BACKGROUND UTLs FOR PRS C-16-068

SAMPLE ID	DEPTH (in.)	SAMPLE MATRIX	COPPER (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	ZINC (mg/kg)
LANL UTL (all soil)	N/A[a]	N/A	15.5	23.3	N/A	50.8
SAL	N/A	N/A	2800	400	23	23 000
PRG	N/A	N/A	6300	1000	NC[b]	NC
0316-97-0007	0–6	Soil	17.8	43.0	0.102	58.6

a. N/A = Not Applicable
b. NC = Not Calculated

2.5.5 Evaluation of Radionuclides

Uranium was detected above UTLs, but is well below the cleanup level (Table 2.5.5-1).

TABLE 2.5.5-1

EVALUATION OF RADIONUCLIDES FOR PRS C-16-068

SAMPLE ID	DEPTH (in.)	TOTAL URANIUM (mg/kg)
LANL UTL	N/A[a]	1.87
SAL	N/A	29
PRG	N/A	284
0316-97-0007	0–6	2.66

a. N/A = Not Applicable

2.5.6 Evaluation of Organic Chemicals

High explosives were not detected. Various PAHs and benzene were detected and are presented in Table 2.5.6-1. Benzo(e)pyrene was detected as a tentatively identified compound (TIC) at a level of less than 1 ppm.

TABLE 2.5.6-1

DETECTED ORGANIC CHEMICALS FOR PRS C-16-068

SAMPLE ID	DEPTH (in.)	ACENAPHTHENE (mg/kg)	ACENAPHTHYLENE (mg/kg)	BENZO(A)ANTHRECENE (mg/kg)	BENZO(A)PYRENE (mg/kg)	BENZO(B)FLOURANTHENE (mg/kg)	BENZO(G,H,I)PERYLENE (mg/kg)	BENZO(K)FLOURANTHENE (mg/kg)	BIS(2-ETHYLHEXYL)PHTHALATE (mg/kg)	CHRYSENE (mg/kg)	DI-N-BUTYLPHTHALATE (mg/kg)	FLOURANTHENE (mg/kg)	INDENO(1,2,3-CD)PYRENE (mg/kg)	PYRENE (mg/kg)
SAL[a]	N/A[b]	2200	NC[c]	0.61	0.061	0.61	NC	6.1	32	61	NC	2600	0.61	1900
PRG	N/A	NC	NC	2.6	0.26	2.6	NC	26	140	7.2	68 000	27 000	2.6	100
0316-97-0007	0–6	0.048 J	0.094 J[d]	0.12 J	0.27 J	0.30 J	0.18 J	0.12 J	0.37	0.21 J	0.22 J	0.15 J	0.15 J	0.19 J

a. SAL = Screening Action Level
b. N/A = Not Applicable
c. NC = Not Calculated
d. J = Estimated—value is above detection level but below EQL

2.5.7 Risk-Based Screening Assessment

Benzo(a)pyrene was the only constituent detected above its cleanup level and SAL. It is attributable to a continuing source: asphalt or creosoted telephone poles. Visual inspection of the data sets for noncarcinogenic and carcinogenic groups indicates that an MCE screening, with the exception of benzo(a)pyrene, would yield a value less than the target limit of 1. Therefore, a potential human health risk based on additive effects is not identified for this site.

2.5.8 Human Health Risk Assessment

The only constituent detected above its cleanup level and SAL was benzo(a)pyrene. This PAH was detected at low levels and is not attributable to the PRS because there is no indication that PAHs were used at this site. While the concentration detected is above the cleanup level, it does not pose an unacceptable human health risk under the industrial land use scenario appropriate for this PRS.

The PRG values are based on human health exposure resulting in a cancer risk of 10^{-6}; therefore, the ratio of benzo(a)pyrene detected in the sample (0.27 ppm) to the PRG value (0.26 ppm) results in a nominal cancer risk associated with the sample result on the order of 1.04×10^{-6}.

2.5.9 Preliminary Ecological Assessment

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

2.5.10 Conclusions and Recommendations

Four samples were screened and one was submitted for fixed laboratory analyses based on screening results. Locations were selected within a grid.

Analytical results for C-16-068 show that benzo(a)pyrene is above its SAL and slightly above the proposed cleanup level. However, there is no indication that PAHs were used at this site. Furthermore, this constituent is not attributable to a release; therefore, PRS C-16-068 is proposed for NFA.

3.0 REMEDIAL ACTIVITIES AND RESULTS OF CONFIRMATORY SAMPLING

VCM activities were conducted in April and May of 1997. The five PRSs addressed in this report were characterized according to the approved RFI Work Plan (LANL 1993, 1094), RFI Work Plan Addendum 1 (LANL 1994, 1160), and the submitted VCM Plan (Environmental Restoration Project 1997, 1410).

3.1 Risk Calculations and/or Cleanup Level Derivation

The cleanup levels derived in the VCM plan were developed so that risks from possible future exposure to residual contamination could be reduced to levels that are protective of human health. The proposed cleanup levels are based on industrial land use and are shown in Table 3.1-1.

TABLE 3.1-1

PROPOSED SOIL CLEANUP LEVELS

CHEMICAL	RECOMMENDED CLEANUP LEVEL (mg/kg)	RATIONALE/NOTES
Barium	10 000	HI [a] = 0.1
Beryllium	11	Risk = 10^{-5}
Cadmium	85	HI = 0.1
Chromium (total)[b]	450	Risk = 10^{-6}
Copper	6300	HI = 0.1
Cyanide	1400	HI = 0.1
DNB mixture	6.8	HI = 0.1
DNT mixture	2.8	Risk = 10^{-6}
HMX	3400	HI = 0.1
Lead	1000	EPA Region 6 guidance[c]
Nickel	3400	HI = 0.1
RDX	17	Risk = 10^{-6}
TNB	3.4	HI = 0.1
TNT	64	Risk = 10^{-6}

a. HI = Hazard Index
b. Total chromium value assumes 1/6 of total chromium is chromium (VI)
c. EPA (EPA no date, 1413)

3.2 Remedial Implementation

No remediation was necessary for the five PRSs in this report because analytical results determined that either no contaminants were found at greater than SALs or that those low-level contaminants detected above SALs (PAHs) were not due to a release but rather to a continuing source.

3.3 Confirmatory Sampling

Soil removal was not necessary; therefore, no confirmatory samples were collected for the five PRSs in this report.

4.0 WASTE MANAGEMENT

4.1 Estimated Waste Types and Volumes

No waste was generated during the VCM activity for these five PRSs.

4.2 Waste Characterization Data

Waste characterization data was not collected because no environmental media waste was generated during the VCM activity for the five PRSs addressed in this report.

5.0 REFERENCES

ATSDR (Agency for Toxic Substances and Disease Registry), August 1995. "Polycyclic Aromatic Hydrocarbons (PAHs) Update," in ATSDR Toxicological Profiles, Copyright 1997, prepared by Research Triangle Institute under contract 205-93-0606 for ATSDR, US Department of Health and Human Services, Washington D.C. **(ATSDR 1995, 1408)**

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LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1082," Los Alamos National Laboratory Report LA-UR-93-1196, ER ID No. 52910, Los Alamos, New Mexico. **(LANL 1993, 1094)**

LANL (Los Alamos National Laboratory), May 1994. "RFI Work Plan for Operable Unit 1082, Adddendum 1," Los Alamos National Laboratory Report LA-UR-94-1580, Los Alamos, New Mexico. **(LANL 1994, 1160)**

Martin, B. and D. Hickmott, May 6, 1993. "Early S-Site History: Melvin Brooks Interview," Los Alamos National Laboratory Memorandum CLS-ER/BM-93:022 to File from B. Martin (CLS-DO) and D. Hickmott (EES-1), Los Alamos, New Mexico. **(Martin and Hickmott 1993, 15-16-498)**

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APPENDIX A. QUALITY ASSURANCE/QUALITY CONTROL

The following tables summarize the results of quality assurance/quality control data validation for all analytical results used to support recommendations in this report. Tables are presented in order of request number for each sample delivery group sent for laboratory analysis. The tables are grouped by analytical suite. Tables in this appendix cover inorganic analysis (Table A-1), HE analysis (Table A-2), VOC analysis (Table A-3), SVOC analysis (Table A-4), and radiochemical analysis (Table A-5).

The data qualifiers that are used in the LANL ER Project baseline validation process, and that are relevant to this report, follow:

- U—The analyte was not positively identified in the sample, and the associated value is the sample-specific EQL/EDL.
- J—The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
- UJ—The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific EQL/EDL.
- P—Professional judgment should be applied to using the data in decision-making.
- PM—Professional judgment should be applied to using the data in decision-making. A manual review of raw data is recommended to determine if the defect impacts data use for decision-making.

TABLE A-1

DATA QUALITY EVALUATION FOR INORGANIC ANALYSES AT TA-16, V-SITE

SUITE	REQUEST NUMBER	COMMENTS
Inorganics	3064R	Spike recoveries were well below the acceptable range for antimony and selenium. These elements were not detected during analysis. They are not COPCs at this site. A duplicate was not present with samples and was provided by the analytical laboratory. All data are accepted as valid and useable.
Inorganics	3086R	Aluminum values were P-qualified because the duplicate analysis for aluminum was not within the 20% acceptable value. Aluminum values in these samples are not high enough for this problem to be significant. A solid laboratory control standard was used for these samples instead of an aqueous standard. All values were in control except for aluminum and iron, which are not COPCs, and antimony, which was not detected. All data are accepted as valid and useable.
Inorganics	3238R	Mercury and antimony were UJ-qualified due to poor spike recovery. Spike recoveries for mercury and antimony were 73% and 36%, respectively. This is below the acceptable limit of 75%, although only slightly below for mercury. Mercury and antimony are not COPCs at this site and these data are useable with qualification. Barium and manganese were qualified as J+ because the spike recovery for barium was 130% and the spike recovery for manganese was 188%. Even if the high bias is taken into consideration, the values of barium and manganese are not great enough for the spike recovery to affect the decision based on these data. A duplicate was provided by the analytical laboratory. All data are accepted as valid and useable.
Inorganics	3241R	Barium, calcium, and zinc were present in the laboratory blank but do not affect results. All data are accepted as valid.

TABLE A-2

DATA QUALITY EVALUATION FOR HIGH EXPLOSIVES ANALYSES AT TA-16, V-SITE

SUITE	REQUEST NUMBER	COMMENTS
High explosives	3088R	All data are valid without qualification.
High explosives	3237R	All data are valid without qualification.
High explosives	3242R	All data are valid without qualification.

TABLE A-3

DATA QUALITY EVALUATION FOR VOC ANALYSES AT TA-16, V-SITE

SUITE	REQUEST NUMBER	COMMENTS
VOC	3085R	Acetone and methylene chloride were present in the blank due to laboratory contamination. Benzene was also present in the blank associated with sample 0316-97-0007. One internal standard was out of control, below the acceptable 50% value, for sample 0316-97-0007, causing all the data for this sample to be qualified as PM. However, this did not significantly impact the detection limits for this sample since blank contaminants were detected in the sample at levels similar to those found in the blank itself. No other compounds were detected in sample 0316-97-007. PM-qualifiers should be replaced with U qualifiers. All data are accepted as valid.
VOC	3236R	All data are valid without qualification.

TABLE A-4

DATA QUALITY EVALUATION FOR SVOC ANALYSES AT TA-16, V-SITE

SUITE	REQUEST NUMBER	COMMENTS
SVOC	3085R	Benzo[e]pyrene was recorded as a tentatively identified compound at a level of less than 1 ppm in sample 0316-97-0007. All data are valid.
SVOC	3236R	All data are valid without qualification.
SVOC	3240R	Bis(2-ethylhexyl)phthalate was present in the blank samples due to laboratory contamination. Samples containing more than ten times the amount in the blank are qualified as estimated (J). Samples containing less then ten times the amount in the blank are qualified as undetected. All data are accepted as valid.

TABLE A-5

DATA QUALITY EVALUATION FOR RADIOCHEMICAL ANALYSES AT TA-16, V-SITE

SUITE	REQUEST NUMBER	COMMENTS
Total Uranium	3087R	All data are valid.
Total Uranium	3239R	Spike and duplicate analyses were conducted with an unknown sample provided by the analytical laboratory. Spike and duplicate values were in control. All data are accepted as valid.
Total Uranium	3243R	All data are valid.

APPENDIX B. CHARACTERIZATION DATA

The characterization data collected for the five PRSs addressed in this report are available in FIMAD and/or provided upon request.

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APPENDIX C. BEFORE AND AFTER COST COMPARISON

ACTIVITY	ESTIMATED COST	ACTUAL COST
Pre-field activities	$136 136	$39 563
Fieldwork	$280 151	$126 085
Sampling/analytical	$278 414	$12 381
Waste management disposal	$149 185	N/A[a]
Post-field activities	$57 536	$5280
Final report	$53 874	$41 824
Contingency	$47 809	N/A
Total Estimated Cost*	$1 003 105	$225 133

a. N/A = Not Applicable

* The actual cost for the above activities is for the five PRSs addressed in the report. The estimated cost, as it appears in the VCM Plan, is for 17 PRSs.

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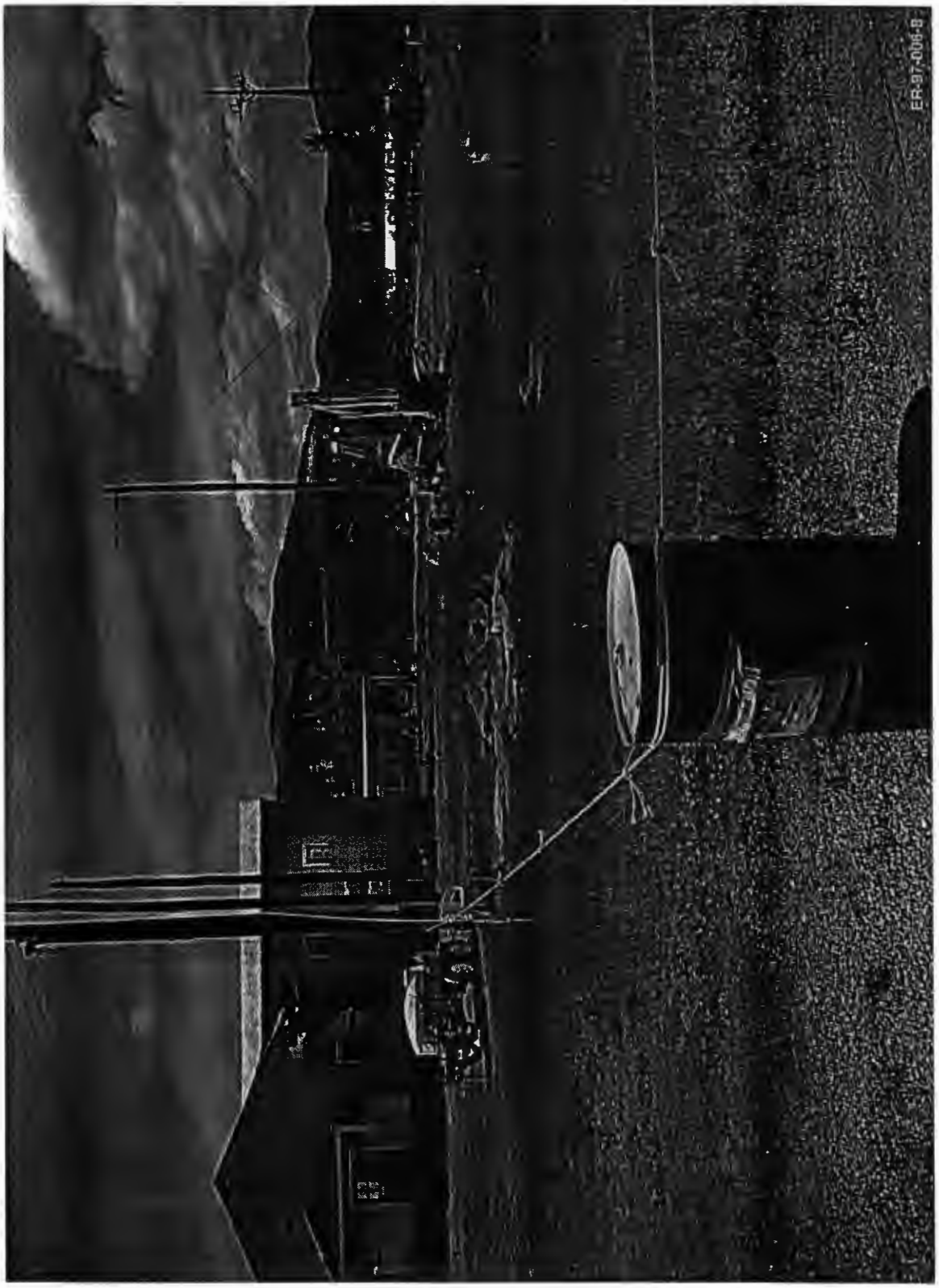
APPENDIX D. VCM PHOTOGRAPHS

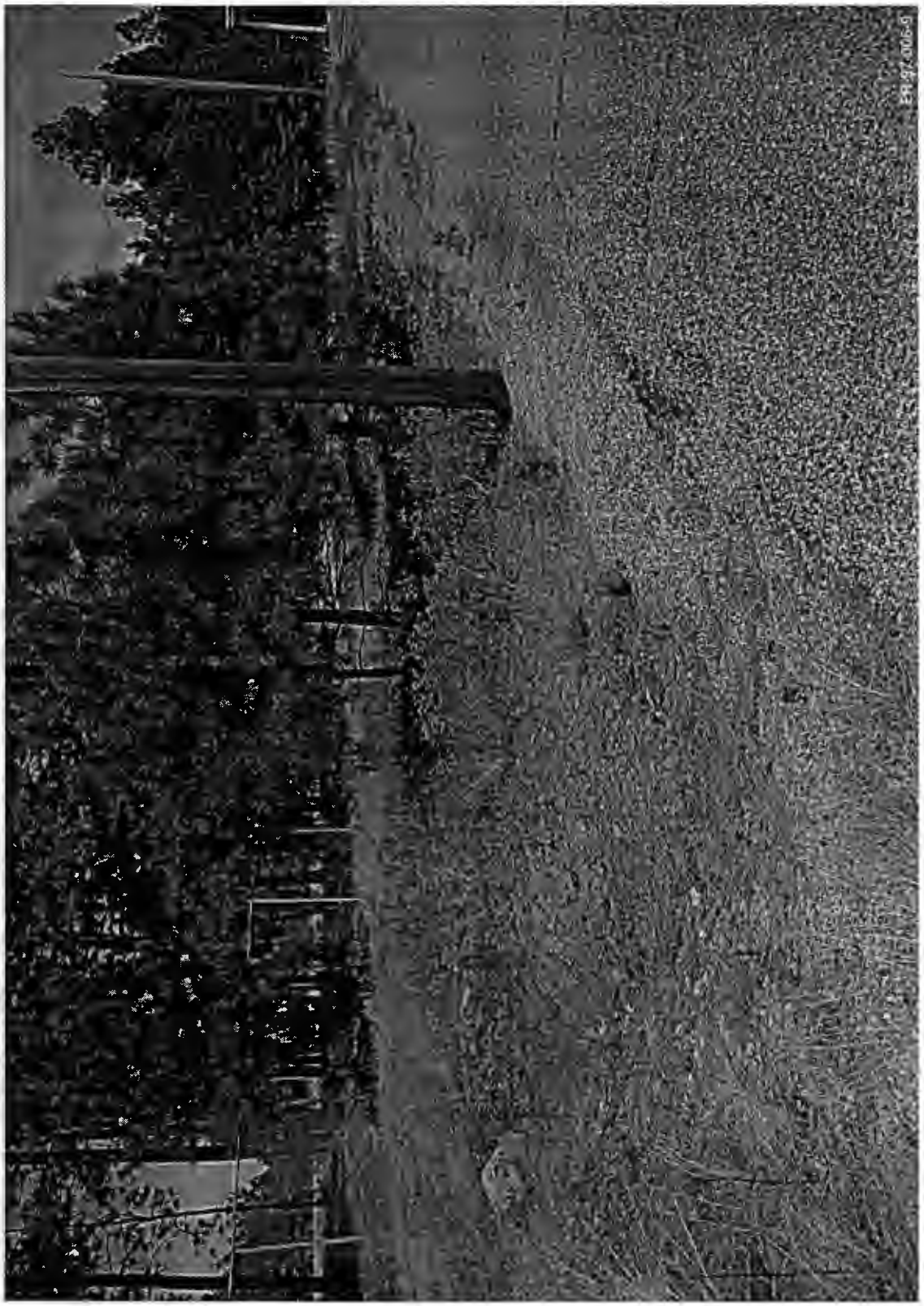
PRS C-16-068—Former Laboratory Building.



PRS C-16-065—Storage Area.

PRS 16-031(d)—Location of Former Cooling Tower.

PRS 16-025(x)—Electroplate Lab (Abandoned)



PRS 16-013—Drainage from Container Storage Area.

APPENDIX E. ANALYTICAL SUITES

Results of analyses can be found in FIMAD. Hard copies of supporting information will be provided upon request.

Chemicals that are reported by analytical laboratories as nondetects have not been included in the tables of this report. Nonetheless, nondetected chemicals are often part of the decision-making process, and it is important to note that analyses for these chemicals were performed. This appendix provides a list of the target analytes in each analytical suite for which samples were taken.

Inorganic Suite

Aluminum	Calcium	Lead	Selenium
Antimony	Chromium	Magnesium	Silver
Arsenic	Cobalt	Manganese	Sodium
Barium	Copper	Mercury	Thallium
Beryllium	Cyanide	Nickel	Vanadium
Cadmium	Iron	Potassium	Zinc

Volatile Organic Suite

Acetone	Chloromethane	1,3-Dichloropropane	1,1,1,2-Tetrachloroethane
Benzene	2-Chlorotoluene	2,2-Dichloropropane	1,1,2,2,-Tetrachloroethane
Bromobenzene	4-Chlorotoluene	1,1-Dichloropropene	Tetrachloroethene
Bromochloromethane	1,2-Dibromo-3-chloropropane	c-1,3 Dichloropropene	Toluene
Bromodichloromethane	1,2-Dibromoethane	t-1,3-Dichloropropene	Trichlorotrifluoro-ethane
Bromoform	Dibromomethane	Ethylbenzene	Trichloroethene
Bromomethane	1,2-Dichlorobenzene	2-Hexanone	Trichlorofluoro-methane
2-Butanone	1,3-Dichlorobenzene	Iodomethane	1,2,3-Trichloro-propane
n-Butylbenzene	1,4-Dichlorobenzene	Isopropylbenzene	1,2,4-Trimethyl-benzene
sec-Butylbenzene	Dichlorodifluoromethane	p-Isopropyltoluene	1,3,5-Trimethyl-benzene
tert-Butylbenzene	1,1-Dichloroethene	4-Methyl-2-pentanone	Vinyl chloride
Carbon disulfide	1,2-Dichloroethane	Methylene chloride	o,m,p-Xylene (mixed)
Carbon tetrachloride	1,1-Dichloroethane	n-Propylbenzene	
Chlorobenzene	c-1,2-Dichloroethene	Styrene	
Chlorodibromomethane	t-1,2-Dichloroethene	1,1,1-Trichloroethane	
Chloroethane	1,2-Dichloropropane	1,1,2-Trichloroethane	
Chloroform			

Semivolatile Organic Suite

Acenaphthene
Acenaphthylene
Aniline
Anthracene
Azobenzene
Benzo(a)anthracene
Benzoic acid
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benzo(a)pyrene
Benzyl alcohol
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
4-Bromophenylphenyl ether
Butylbenzylphthalate
4-Chloroaniline
4-Chloro-3-methylphenol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenylphenyl ether
Chrysene
Dibenzo(a,h)anthracene
Dibenzofuran
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
Diethylphthalate
Dimethyl phthalate
2,4-Dimethylphenol
2,4-Dinitrophenol
Di-n-butylphthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octylphthalate
Bis(2-ethylhexyl)phthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Naphthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
2-Nitrophenol
4-Nitrophenol
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitroso-di-n-propylamine
2,2'-oxybis(1-Chloropropane)
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

High Explosive Suite

2-Amino-4,6-dinitrotoluene (2-AM-DNT)
4-Amino-2,6-dinitrotoluene (2-Am-DNT)
1,3-Dinitrobenzene (1,3-DNB)
2,4-Dinitrotoluene (2,6-DNT)
2,6-Dinitrotoluene (2,6-DNT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
Nitrobenzene (NB)
2-Nitrotoluene (2-NT)
3-Nitrotoluene (3-NT)
4-Nitrotoluene (4-NT)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
1,3,5-Trinitrobenzene (1,3,5-TNB)
2,4,6-Trinitrotoluene (2,4,6-TNT)

Radiochemical Suite

Uranium-234, 235, & 238

ATTACHMENT A. CERTIFICATION OF COMPLETION AND VCM COMPLETION REPORT APPROVAL/DISAPPROVAL FORM

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CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the Voluntary Corrective Measure Report has been completed in accordance with the Department of Energy approved VCM plan entitled VCM Plan for Potential Release Sites 16-013,16-025(x), 16-031(d), C-16-065, and C-16-068. Based on my personal involvement or inquiry of the person or persons who managed this cleanup, a review of all data gathered and a visit to the site, to the best of my knowledge and belief, all criteria of the plan have been met or exceeded. I believe that the completion of this VCM is both protective to human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Field Unit 3 Field Project Leader
Environmental Restoration Project
Los Alamos National Laboratory

9/5/97
Date Signed

VOLUNTARY CORRECTIVE MEASURES (VCM) COMPLETION REPORT APPROVAL/DISAPPROVAL FORM

PRS(s) 16-013, 16-025(x), 16-031(d), C-16-065, C-16-068

The undersigned have reviewed the VCM Completion Report and believe that the intent and goals of the VCM plan have been met.

FPL _____ Date 9/8/97

FPC _____ Date 9/23/97

.....

I, Theodore J. Taylor, DOE-LAAO, **APPROVE** ✓, **DISAPPROVE** _____ the accompanying Voluntary Correction Measures Report for PRS(s) 16-013, 16-025(x), 16-031(d), C-16-065, and C-16-068.

The following reasons reflect the decision for disapproval:

_____

_____

_____

_____

_____

_____

_____

Signed: _____ Date: 9/23/97