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Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA

Environmental Restoration

Environmental Restoration Project
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Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

Date: May 30, 1996
Refer to: EM/ER:96-315

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

SUBJECT: FIELD UNIT 2 VOLUNTARY CORRECTIVE ACTION (VCA) AT TECHNICAL AREA (TA) 15

Dear Mr. Garcia:

Field Unit 2 is planning to start VCA activities at TA-15 on or about June 17, 1996 through approximately June 28, 1996. Sampling will be performed as part of the VCA to remove lead-contaminated soil at Potential Release Site (PRS) 15-004(b).

Samples will be collected as shown in the table below.

Location	Number of Samples	Sample Type	Analyses
PRS 15-004(b)	10	surface and subsurface soil confirmatory	high explosives metals isotopic uranium
PRS 15-004(b)	10	waste characterization of surface and subsurface soil	high explosives metals isotopic uranium
PRS 15-004(b)	1	decontamination water	high explosives metals isotopic uranium

3926

TV

The readiness review for this sampling activity was conducted on May 24, 1996.

If you have any questions or concerns, please feel free to give me a call at

(505) 667-0819.

Sincerely,

David McInroy
Environmental Restoration Project

DM/el

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EM/ER File, MS M992
RPF, MS M707

Voluntary Corrective Action Completion Report for

Potential Release Site
15-004(b)
Firing Site A

Field Unit 2

Environmental Restoration Project

September 1996

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-96-3339

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FIGURES

VOLUNTARY CORRECTIVE ACTION COMPLETION REPORT FOR POTENTIAL RELEASE SITE 15-004(b) - INACTIVE FIRING SITE

1.0 Introduction

Potential Release Site (PRS) 15-004(b) is located in an open field north of Building 15-183, which was the site of a small firing site at Technical Area (TA)-15 (Figure 1) at Los Alamos National Laboratory (the Laboratory/LANL). PRS 15-004(b) is listed in Table A of the Hazardous and Solid Waste Amendments (HSWA) Module of the Laboratory's RCRA permit. This report serves as the mechanism to request concurrence to remove this PRS from the HSWA module of the Laboratory's RCRA operating permit in a Class 3 permit modification.

PRS 15-004(b) was used to test explosives from approximately 1945 until 1953. The site was regraded in 1967 when it was decommissioned. Interviews with experimenters who formerly worked at the site indicated that natural uranium, beryllium, lead, mercury, and high explosives (HE) were used. PRS 15-004(b) is described in detail in Section 8.3 of the RFI Work Plan for OU 1086 (LANL 1993, 1087), and in Section 4.1 of the RFI Report for Potential Release Sites at TA-15 (LANL 1995, 1325).

A VCA was conducted for health reasons based on the contaminant of concern (COC), lead, from the Phase I analytical results at this site. Results from field investigations conducted during the 1994 sampling campaign and additional X-Ray Fluorescence (XRF) sampling conducted during the summer and fall of 1995 showed concentrations of lead in the soil at two locations greater than the Preliminary Remediation Goal (PRG) of 1000 mg/kg. The appropriateness of a VCA at PRS 15-004(b) was confirmed in the VCA checklist (presented in the VCA Plan) (LANL 1996, 1341). Because the remedy was obvious, straightforward, and relatively inexpensive, a VCA for this site was recommended.

2.0 Site Characterization Prior to Removal

Sampling data from the 1994 sampling campaign, the data quality evaluation, and the additional XRF samples collected in 1995 are summarized in the Voluntary Corrective Action Plan for PRS 15-004(b) (LANL 1996, 1341), and in the RFI Report for Potential Release Sites at TA-15 (LANL 1995, 1325).

During the 1994 sampling campaign, 30 surface (0 - 6 inches) and subsurface (18 - 24 inches) soil samples were collected from a grid with 100-ft spacing (Figure 1) and analyzed for metals in the LANL mobile chemical laboratory and for gross alpha, beta, and gamma radiation in the mobile radiological laboratory. All of the sample locations were screened for HE prior to sampling, using the HE spot test developed by the Laboratory's DX-2 Division. All HE spot tests were negative. Of the 30 samples collected, 10 (6 surface and 4 subsurface) were submitted to a fixed analytical laboratory for TAL metals and total uranium, based on the results of the mobile laboratories. One sample was submitted for HE analyses.

Fixed laboratory analytical results indicated that two samples, one each from locations 15-2401 and 15-2406, had lead concentrations approaching the PRG. To determine whether the lead extended farther in the PRS, the sampling team collected additional samples for XRF analyses near the two locations. Based on the results of those XRF analyses, additional XRF samples were collected because readings above both the screening action level (SAL) and above the PRG were detected. To define the extent of contamination, a total of 70 samples were collected for

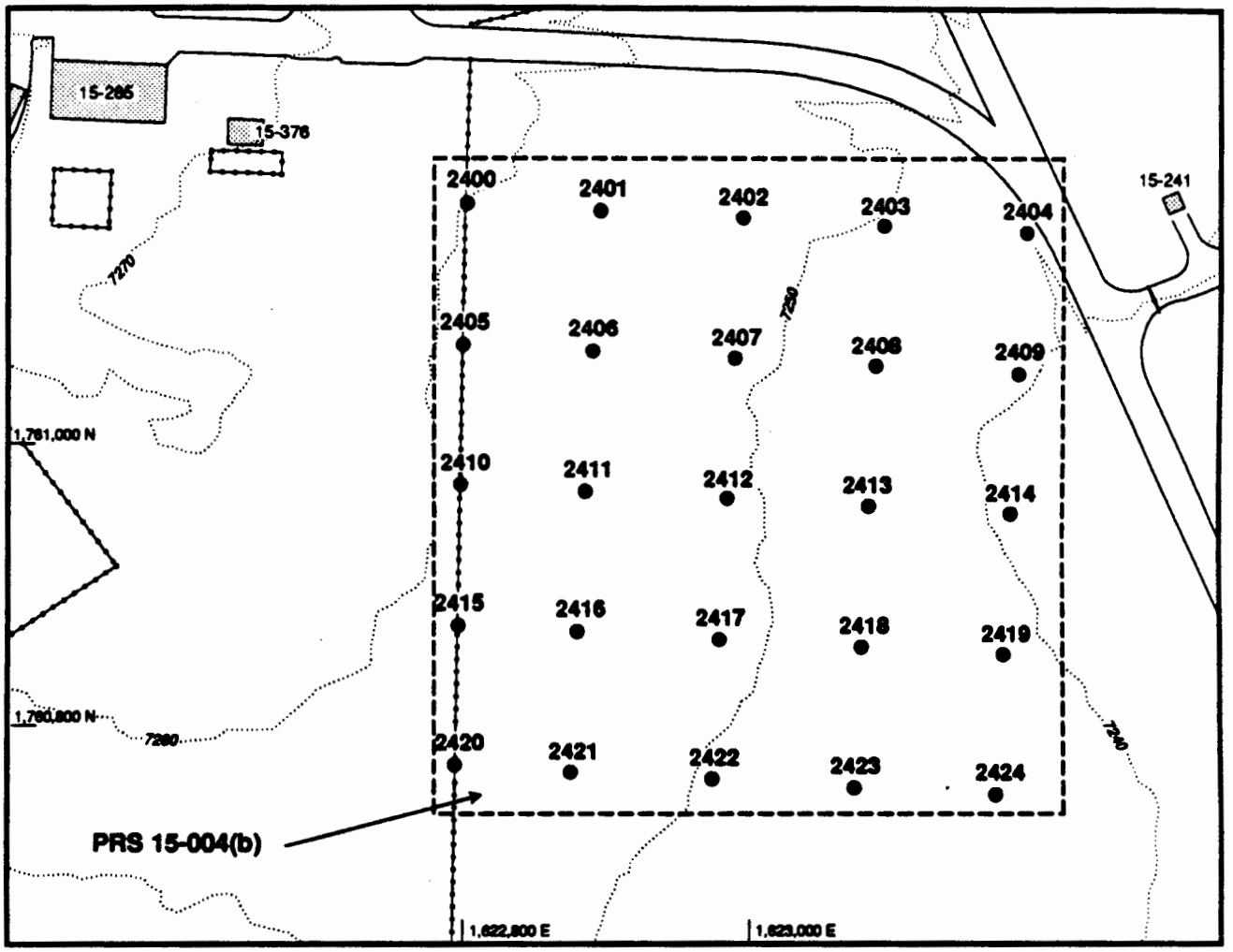

Figure 1. PRS 15-004(b)
Original Grid

XRF analyses in the summer and early fall of 1995 (Figures 2 and 3). Most of the samples were collected on a 5-ft spacing, based on locations of lead concentrations above the SAL.

Prior to the VCA in 1996, a new grid (Figure 4) was surveyed with sample locations 20 ft apart. The new grid was based on a photo found in 1995 (US Air Force, 1958) that showed the former firing sites located farther to the west than the locations shown in the RFI Work Plan for OU 1086 (LANL 1993, 1087). This photo clearly showed that the grid in the original RFI Work Plan was too far to the east to detect all the possible contamination from the firing site.

The new 1996 grid created an additional 194 sampling points, but 18 points were located either on a road or on asphalt, and 25 were located in the area that was sampled in 1995. Therefore, a total of 155 XRF samples were collected in this new area in August 1996 to determine whether the lead contamination extended to the west and to specify how far north it extended. Following DX-4 guidelines, the sample locations were screened for HE using the HE spot test kit developed by the Laboratory's DX-2 Division. All HE spot tests were negative. At the newly located firing points, samples were planned to be collected from the following depths: 0-6 inches, 18-24 inches, 30-36 inches, and soil/tuff interface. At the northern firing point (Firing Point A, location 15-2660), samples were collected from 0-6, 18-24, 30-36, and 56-62 inch depths, but at the southern firing site (Firing Point B, location 15-2733), samples were collected only from 0-6 and 6-12 inch depths because regraded gravel was encountered that prevented the hand auger from removing deeper soil. None of the firing point samples had elevated lead readings (Appendix F, sample locations 15-2660 and 15-2733). Because the new grid samples showed no readings above the PRG and most readings were below the SAL, the VCA was conducted at sample locations 15-2428, 15-2434, 15-2444, and 15-2464 (Figure 5), which had lead readings above or approaching the PRG.

3.0 Remedial Activities and Results of Confirmatory Sampling

3.1 Risk Calculation and/or Cleanup Level Derivation

The site-specific cleanup goals or PRGs presented in Table 3.1-1 are calculated based on the expected land use at the site, i.e., an industrial exposure scenario. In general, site-specific PRGs are calculated using the modified EPA equations and Laboratory site-specific parameters. The human health risk-based cleanup level for lead in soil is based on information obtained from EPA Region VI (EPA 1995). LANL has adopted a PRG for lead of 1000 mg/kg for an industrial exposure scenario (Table 3.1-1). This soil PRG considers the fetal effects when a pregnant female adult worker is exposed; this is the reasonable maximum-exposed individual for this VCA.

Table 3.1.1
PRG for Industrial Exposure Scenario for PRS 15-004(b)

COPC	PRG (mg/kg)	Rationale
Lead	1000	Based on EPA Region VI guidance

3.2 Remedial Implementation

This VCA was done in accordance with the approved VCA plan. The VCA Plan included field screening of samples by XRF followed by soil removal. This action continued until soil with lead contamination below the 1000 ppm PRG was encountered. Collection of the 155 XRF samples began on August 14, 1996 and was completed on August 15, 1996. The VCA began on August 16, 1996, and was completed on August 28, 1996.

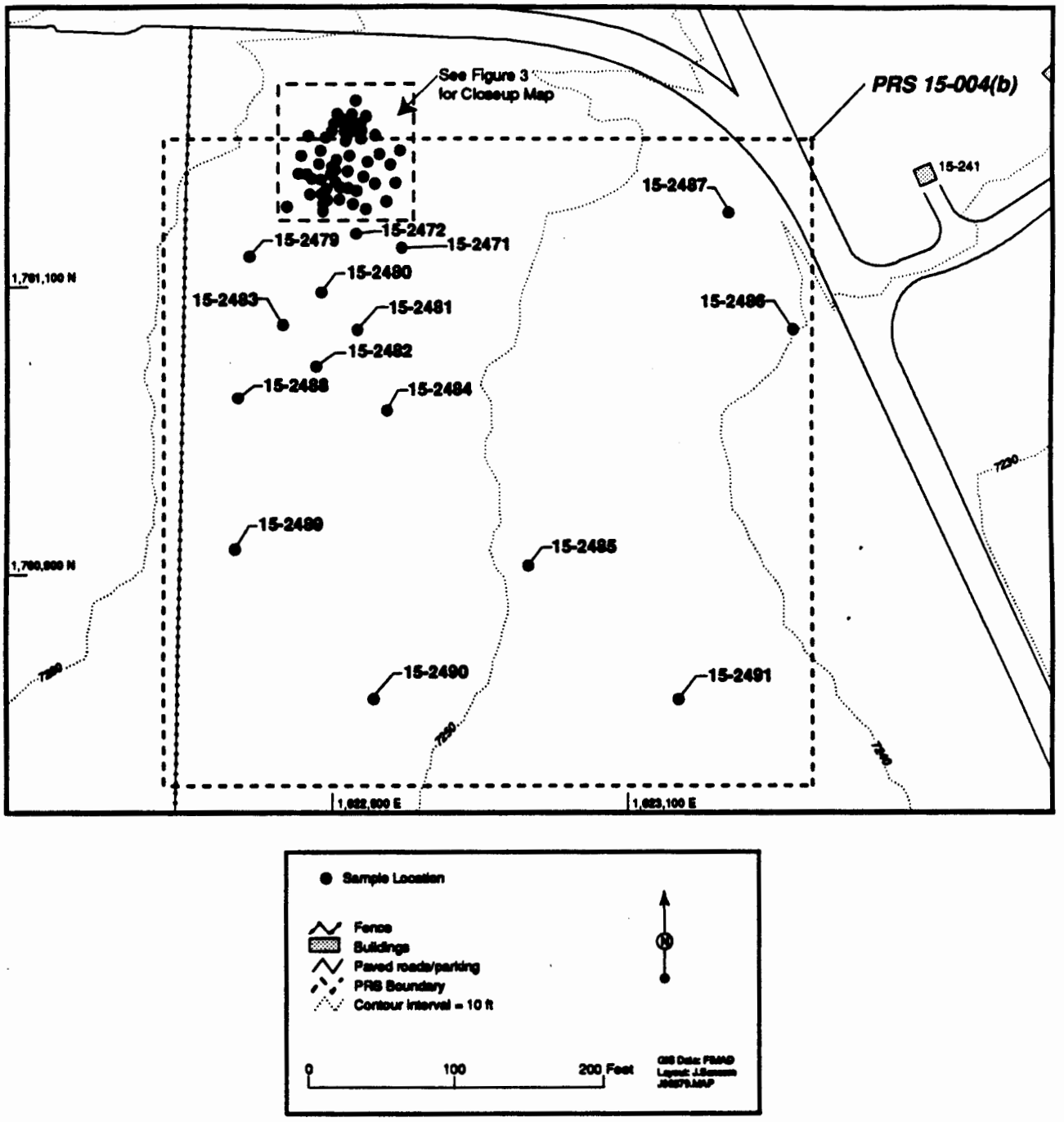

Figure 2. PRS 15-004(b)
Additional XRF Samples Collected During the Summer and Fall, 1995

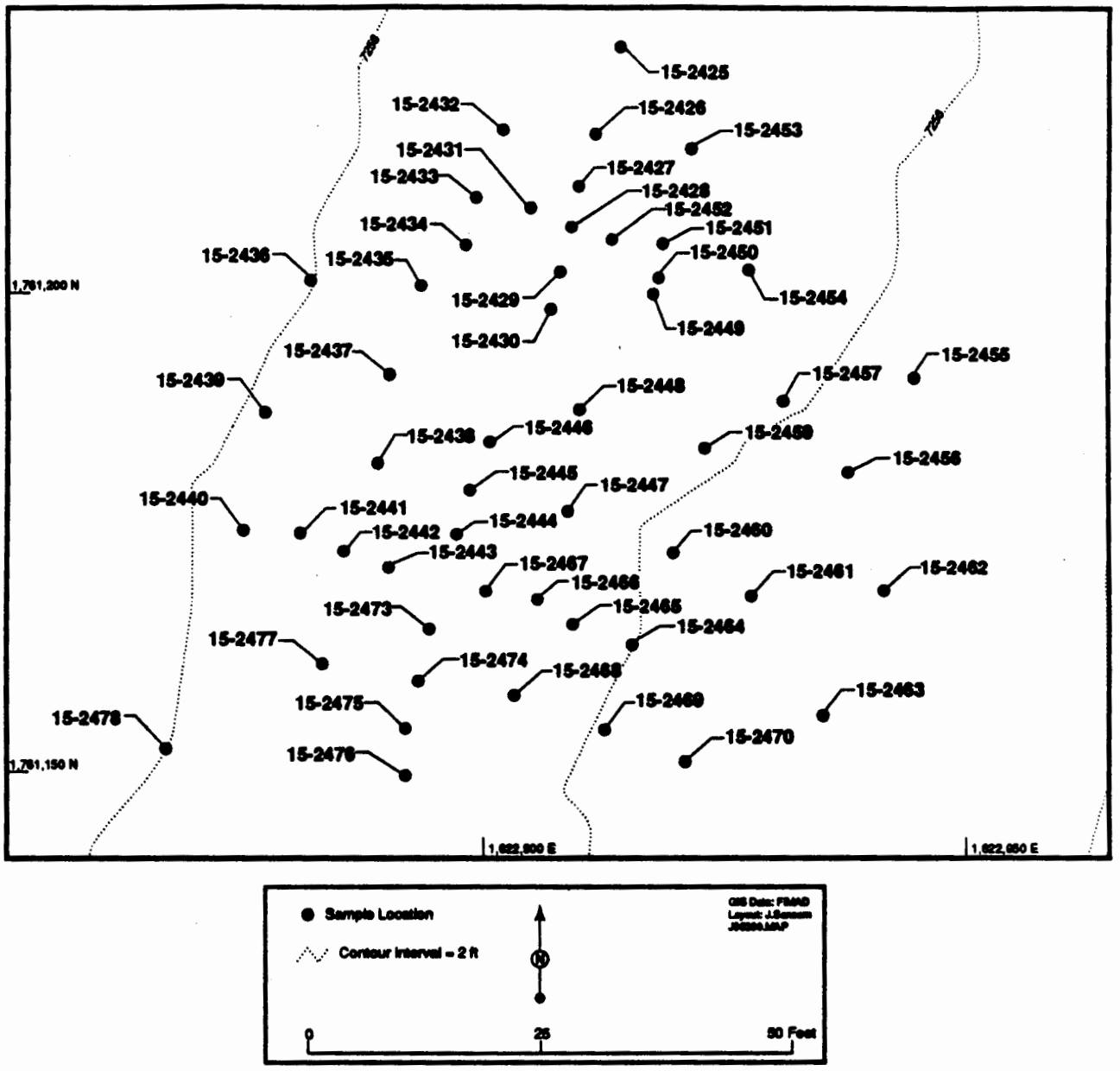

Figure 3. PRS 15-004(b)
Close-up of Figure 2 in the Area of Lead Concentrations Approaching the PRG

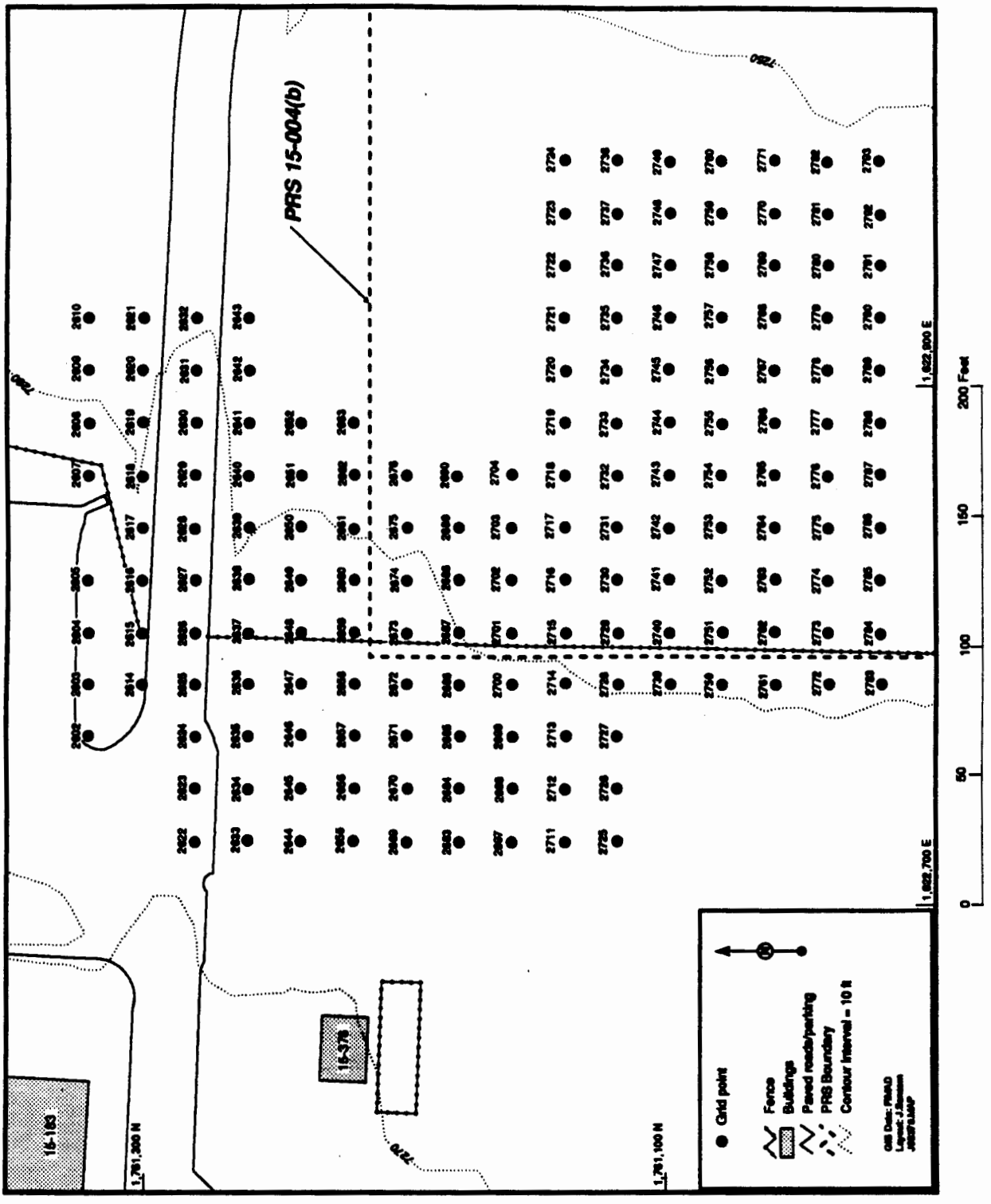

Figure 4. PRS 15-004(b)
1996 Western Grid

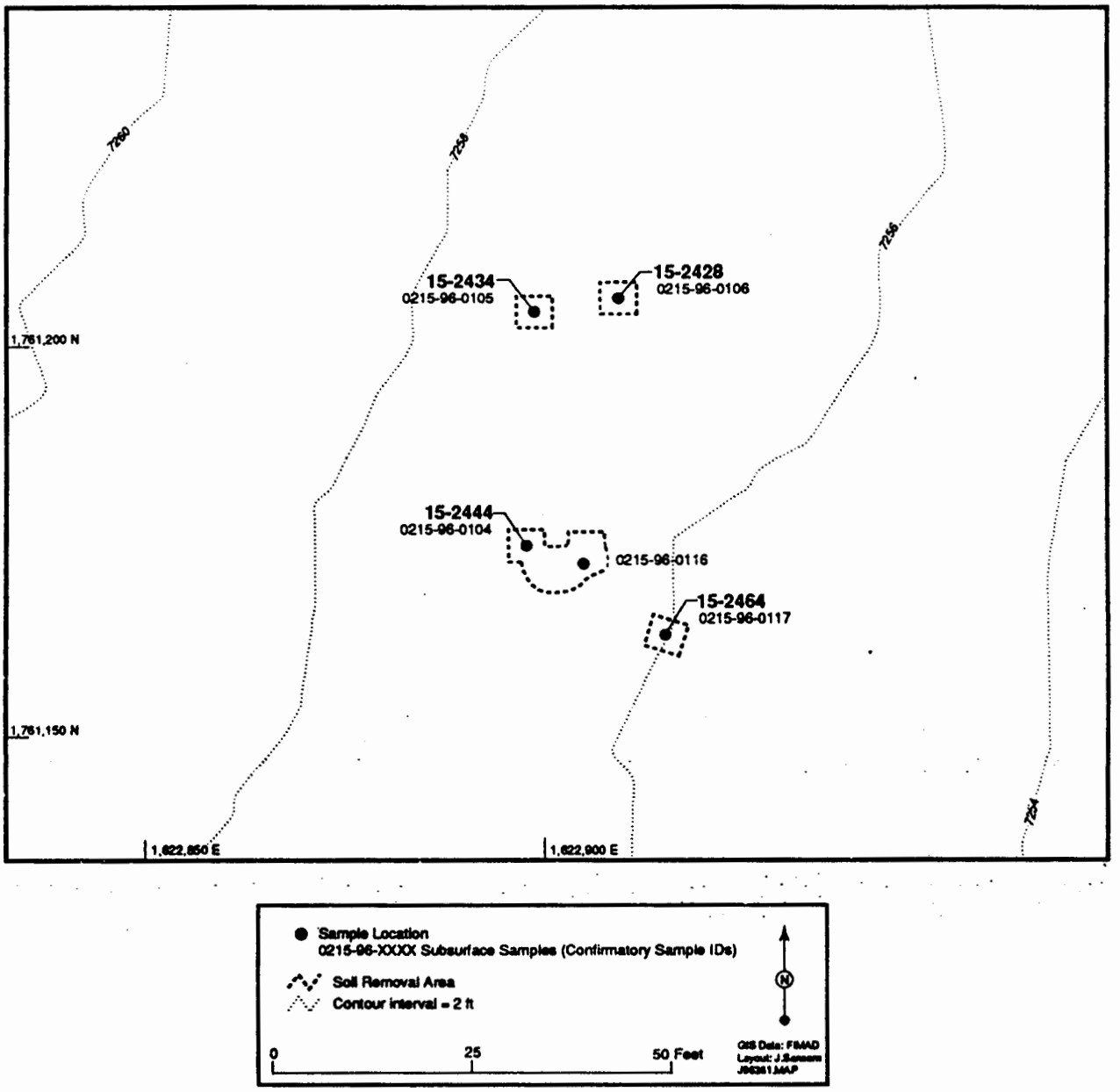

Figure 5. PRS 15-004(b)
Contaminated Soil Excavation Areas and Confirmatory Sample Locations

An XRF Spectrace 9000 was used to screen the soil for lead. A Performance Evaluation (PE) sample was run at the start of each day and after approximately 20 samples. Appendix F lists all the XRF sample results, including the PE samples.

Four locations with concentrations of lead approaching the PRG for lead were staked, and the soil extending outward 2 ft in four directions from the center stake was removed (Figure 5). XRF samples were then collected from the corners and the bottom of the excavation. Locations 15-2428 and 15-2434 were retested by XRF after the top 8 inches of soil was removed and had concentrations of 9.1 and 46 ppm, respectively.

At a depth of 8 inches, location 15-2464 had a lead concentration of 695 ppm, so additional material was removed, followed by XRF screening until the concentration was below background lead levels of approximately 300 ppm (after analyzing two XRF confirmation samples from the base of the excavation). The total depth of this excavation was 2'9".

Soil extending outward 2 ft in all directions from location 15-2444 was removed. Lead concentrations of 620 and 728 ppm were reported from the XRF samples collected from the SW and NW corners of the excavation. Since these concentrations were greater than background and approached the PRG, an additional 1 ft of material was removed from all four sides. Confirmatory XRF results from the SE corner showed a lead concentration of 663 ppm. A decision was made to continue collecting XRF samples from the southeast corner east to Location 15-2464 (approximately 18 feet), to the south 6 feet, to the southeast 14 feet, to the west 2 feet, and to the north 2 feet. The decision logic was if a location had a lead concentration above 600 ppm, then approximately 6-10 inches of soil was removed, and another XRF sample was collected from the base of the hole. Most of the locations were one foot apart, but starting six feet from the southeast corner of 15-2444, the new locations were two feet apart. Based on the XRF results from the surrounding samples, the team could sample at one-ft intervals if the lead concentrations warranted such close spacing.

During the beginning of the excavation at 15-2444, a piece of lead measuring 4" x 5" x 1/4" was removed from the NE quadrant approximately 1" below ground surface. This piece of lead was surveyed and smeared for radioactivity and found not to be radioactive, then returned to the LANL operating group, DX-4 (Appendix G).

Clean soil has been obtained and used to refill the excavations. The area will be reseeded.

3.3 Confirmatory Sampling

Five confirmation samples were collected from the four excavations and submitted to a fixed laboratory for analysis. Two were collected from the excavation around location 15-2444, one beneath 15-2444, and one from the east side of the hole (Figure 5).

Table 3.3-1 shows the results of the confirmatory samples. Data validation showed no qualifiers. One sample, 0215-96-0116, was analyzed for toxicity characteristic leaching procedure (TCLP) metals, in addition to total analyte list (TAL) metals. The analyses showed that the lead analyzed by the TCLP method was not detected, and the lead concentration from TAL analyses was 370 mg/kg.

Table 3.3-1
Confirmatory Samples

Sample ID #	Lead (mg/kg)	TCLP Lead (mg/L)
0215-96-0104	100	NA
0215-96-0105	88	NA
0215-96-0106	50	NA
0215-96-0116	370	ND
0215-96-0117	13	NA

NA = Not Analyzed
ND = Not Detected

From the results of the confirmatory samples, it is apparent that lead above the PRG was removed from this PRS.

4.0 Waste Management

4.1 Waste Management Activities

The volume of waste projected in the VCA Plan was ten 55-gallon drums. However, twelve 55-gallon drums were generated. This discrepancy was due to the additional volume of soil removed because lead concentrations were close to or above the PRG.

The waste was characterized by collection of composite samples as the drums were being filled, followed by fixed laboratory analyses for TCLP metals, HE, and isotopic uranium. After reviewing the waste characterization results, all of the twelve drums were managed as low-level radioactive waste since uranium was used historically at the site and no leachable lead was detected.

The waste was disposed at the Laboratory's low level radioactive storage facility at TA-54. The waste will be removed from the <90 day storage area by October 4, 1996. Although the waste was not RCRA hazardous waste, it was placed in a <90 day storage area as a precautionary measure when it was generated.

Waste minimization activities included sorbing the small amount of water (<10 gallons) generated during decontamination procedures onto the soil in the 55-gallon drums. This is an acceptable practice, as the Waste Acceptance Criteria (WAC) for TA-54 requires that liquids constitute <1% of the volume of the container.

4.2 Waste Characterization Data

Table 4.2-1 shows the results of the waste characterization samples. Data validation showed no qualifiers for the analyses.

Table 4.2-1
Waste Characterization Samples

Sample ID Number	Compound	Result	Units	Result Qual
0215-96-0100	U234	1.38 +/-0.20	pCi/g	
	U235	0.08+/-0.03	pCi/g	
	U238	1.49+/-0.21	pCi/g	
	Barium	3.8 *	mg/l	
0215-96-0101	U234	1.81+/-0.24	pCi/g	
	U235	0.07+/-0.03	pCi/g	
	U238	1.93+/-0.26	pCi/g	
	Barium	6 *	mg/l	
0215-96-0102	U234	1.90+/-0.27	pCi/g	
	U235	0.08+/-0.04	pCi/g	
	U238	1.98+/-0.28	pCi/g	
	Barium	11 *	mg/l	
0215-96-0103	U234	6.06+/-0.75	pCi/g	
	U235	0.26+/-0.06	pCi/g	
	U238	6.13+/-0.76	pCi/g	
	Barium	0.9 *	mg/l	
0215-96-0111	U234	1.59+/-0.24	pCi/g	
	U235	0.07+/-0.04	pCi/g	
	U238	1.64+/-0.25	pCi/g	
	Barium	10 *	mg/l	
	Lead	1 *	mg/l	
0215-96-0112	U234	2.03+/-0.27	pCi/g	
	U235	0.07+/-0.03	pCi/g	
	U238	2.12+/-0.28	pCi/g	
	Barium	11 *	mg/l	
	Lead	2 *	mg/l	
0215-96-0113	U234	1.29+/-0.19	pCi/ pCi/g	
	U235	0.06+/-0.03	pCi/g	
	U238	1.35+/-0.19	pCi/g	
	Barium	9.9 *	mg/l	
	Lead	1 *	mg/l	
0215-96-0114	U234	1.42+/-0.22	pCi/g	
	U235	0.03+/-0.02	pCi/g	
	U238	1.42+/-0.22	pCi/g	
	Barium	4.8 *	mg/l	
0215-96-0115	U234	1.67+/-0.25	pCi/g	
	U235	0.09+/-0.04	pCi/g	
	U238	1.68+/-0.26	pCi/g	
	Barium	9.7 *	mg/l	
0215-96-0118	U234	1.42+/-0.23	pCi/g	
	U235	0.07+/-0.04	pCi/g	
	U238	1.30+/-0.21	pCi/g	
	Barium	11 *	mg/l	
	Lead	2 *	mg/l	
0215-96-0119	U234	1.20+/-0.17	pCi/g	
	U235	0.06+/-0.02	pCi/g	
	U238	1.36+/-0.19	pCi/g	
	Barium	8.1 *	mg/l	
	Cadmium	0.1 *	mg/l	
0215-96-0120	U234	1.09+/-0.16	pCi/g	
	U235	0.05+/-0.02	pCi/g	
	U238	1.14+/-0.16	pCi/g	
	Barium	9.6 *	mg/l	

* = TCLP Analyses

5.0 References

Los Alamos National Laboratory, "RFI Work Plan for Operable Unit 1086," Final Draft, Los Alamos National Laboratory Report LA-UR-92-3968, Los Alamos, New Mexico, May 1993 (LANL 1993, 1087).

Los Alamos National Laboratory, "RFI Report for Potential Release Sites 15-004(a-d, f), 15-007(b), 15-008(a, b), 15-009(e, j), 15-012(b), and C-15-004 (located in former Operable Unit 1086), Field Unit 2," Final Draft, Los Alamos National Laboratory Report LA-UR-95-3738, Los Alamos, New Mexico, November 1995 (LANL 1995, 1325).

Los Alamos National Laboratory, "Voluntary Corrective Action Plan for Potential Release Site 15-004(b) Firing Site A, Field Unit 2," Final Draft, Los Alamos National Laboratory Report LA-UR-96-1016, Los Alamos, New Mexico, May 1996 (LANL 1996, 1341).

US Air Force 1958: Photograph, VM486, 1372MCSUSAF, AF59-25-5 Roll 3, 11000 FT, LANL Photography 316.

APPENDIX A
QA/QC

Data Quality Evaluation for Soil Samples at PRS 15-004 (b)

The analytical data generated from the soil samples collected from PRS 15-004 (b) at TA-15 were analyzed for inorganics (TAL and TCLP metals), radionuclides (isotopic uranium only), and high explosives. The data quality and usability were determined by the analysis of a variety of QA/QC samples, including blanks, internal standards, duplicates, surrogates, laboratory control samples, and spikes. The sample data were compared to the QA/QC sample data using numerical acceptance criteria established by the analytical laboratory. The data that do not meet these criteria are qualified to indicate to the data user those sample results that may have potential deficiencies associated with sampling handling and analysis. These qualifiers include U (undetected), J (estimated), UJ (undetected estimated), and R (unusable).

The QA/QC data indicated that 100% of the sample data were acceptable and defensible. The QA/QC problems included spike recoveries and duplicate relative percent differences (RPDs) for the inorganic analyses that were outside of the QC limits. The data are qualified as UJ, if undetected, and J, if detected, based on these deficiencies and are representative of the concentrations of materials that should be present. The matrix spike recoveries associated with the TAL metals analyses of soil samples 0215-96-0104, 0215-96-0105, and 0215-96-0106 for antimony, chromium, lead, manganese, mercury, selenium, vanadium, and zinc were outside of the control limits (75-125%). The matrix spike recoveries associated with the TAL metals analyses of soil samples 0215-96-0116 and 0215-96-0117 for antimony was also outside of the control limits (75-125%). However, post-digestion matrix spikes were analyzed for these analytes and recoveries were within the control limits so none of the data are qualified.

Duplicate analyses associated with the TCLP analyses of soil samples 0215-96-0100, 0215-96-0101, 0215-96-0102, and 0215-96-0103 for cadmium had a RPD greater than the control limit of 20%. Duplicate analysis associated with the TCLP analyses of soil samples 0215-96-0111 through 0215-96-0120 for chromium also had a RPD greater than the control limit of 20%. The cadmium and chromium data should be qualified as UJ and are usable because the RPD is a reflection of the soil heterogeneity and does not affect method precision. In addition, cadmium and chromium were undetected at <0.1 mg/L and <0.2 mg/L, respectively, which are an order of magnitude below the regulatory limits. Duplicate analyses associated with the TAL metals analyses of soil samples 0215-96-0104, 0215-96-0105, and 0215-96-0106 for antimony, cadmium, copper, mercury, silver, and thallium had RPDs greater than the control limit of 20%. Duplicate analyses associated with the TAL metals analyses of soil samples 0215-96-0116 and 0215-96-0117 for antimony, cobalt, lead, mercury, selenium, thallium, and zinc also had RPDs greater than the control limit of 20%. The results for cadmium and silver in soil samples 0215-96-0104, 0215-96-0105, and 0215-96-0106 and all metals except selenium in soil samples 0215-96-0116 and 0215-96-0117 should not be qualified because the RPDs met EPA's control limits for soil (±35%, ± 2X CRDL). The antimony, copper, mercury, and thallium data from soil samples 0215-96-0104, 0215-96-0105, and 0215-96-0106 and selenium data from soil samples 0215-96-0116 and 0215-96-0117 should be qualified as J and are usable because the RPDs are a reflection of the soil heterogeneity and do not affect method precision. All other inorganic data are usable as reported.

Uranium-234 in soil samples 0215-96-0100 through 0215-96-0106 was detected in the associated method blank. Uranium -234 and uranium-238 in soil samples 0215-96-0111 through 0215-96-0120 were detected in the associated method blank. The sample values for these analytes in all the samples were greater than 5X the blank values indicating that detections were

valid and not the result of blank contamination. Therefore, the sample values should not be qualified are as usable as reported. All other radionuclide data are usable as reported.

The high explosives data did not have any QA/QC problems, are qualified as U, and are usable as reported.