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Date: October 17, 1997
Refer to: EM/ER:97-423

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

SUBJECT: VCA COMPLETION REPORT FOR ACTIVITIES AT TA-0, PRS 0-016 (FORMER OU 1071)

Dear Mr. Garcia:

The Los Alamos National Laboratory has completed all remedial activities specified in the Voluntary Corrective Action (VCA) Plan for Potential Release Site (PRS) 0-016, which is located on United States Forest Service (USFS) property near the Guaje Pines Cemetery in Los Alamos. Enclosed with this letter is a copy of the VCA Report for PRS 0-016.

As you will find in reviewing the VCA Report, confirmatory sampling shows that all cleanup levels specified in the VCA Plan have been achieved by the remedial activities at PRS 0-016. We are therefore requesting no further action for PRS 0-016.

Additionally, we would like to request that the New Mexico Environment Department expedite their review of the Report to aid the USFS in a land exchange associated with PRS 0-016. The land exchange has been significantly delayed by the need to intiate and complete remedial activites at the site.

If you have any questions regarding this report, please contact Brad Martin at (505) 667-0808 or Bonnie Koch at (505) 665-7202.

Sincerely,

Brad Martin for
Julie A. Canepa, Program Manager
LANL/ER Project

Sincerely,

for Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/rfr

Enclosures: (1) Final VCA Completion Report for Activities at TA-0, PRS 0-030(d,k) and C-0-043
(2) Certification of Completion
(3) DOE Approval Form

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VCA Report for

PRS 0-016

Field Unit 1

Environmental
Restoration
Project

September 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-97-2745

EXECUTIVE SUMMARY

This report addresses the voluntary corrective action (VCA) activities at potential release site (PRS) 0-016, a former small arms firing range. PRS 0-016 is located on United States Department of Agriculture (USDA) Forest Service property (Figure 1.0-1) at the northern terminus of Range Road, immediately west of Guaje Pines Cemetary, in Los Alamos, New Mexico, as shown in Figure 1.0-2.

The firing range at PRS 0-016 was used by security forces for small-arms target practice from 1947 until the early 1960s when the present firing range in Sandia Canyon (TA-72) was built. The site was then used unofficially by the general public for recreational shooting until 1992. Base on this knowledge, the only source of contamination of the soils at PRS 0-016 was from the use of small arms.

The primary chemical of potential concern (COPC) at PRS 0-016 is elemental lead; however, copper and zinc are also commonly present as minor components of lead bullets associated with small arms firing ranges. Of these COPCs, lead is the only RCRA-regulated metal as well as the only metal detected above Los Alamos National Laboratory (LANL) screening action levels (SALs). Although copper and zinc were not detected above SALs, they remained COPCs throughout the VCA based on their common association with small-arms firing ranges.

The VCA was completed at PRS 0-016 in accordance with VCA plans dated February 1994 and June 1996, and the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan dated May 1992.

Two distinct VCA field activities were conducted at PRS 0-016 between September 1993 and May 1997. These activities included washing the soil to remove the lead bullets and fine lead and mechanically sieving the soil to remove the lead bullets.

Site restoration was completed after final confirmatory sampling. Restoration activities included recontouring, grading, installing permanent storm-water run-off and erosion controls, and conducting revegetation of denuded areas.

Final confirmatory sample results indicate that all soils have been remediated to below the LANL SALs for copper, lead, and zinc, confirming that the VCA has been successfully completed. No further action is recommended for PRS 0-016.

TABLE ES-1

SUMMARY OF PROPOSED ACTIONS

			PROPOSED ACTION				
PRS NUMBER	HSWA[a]	RADIONUCLIDE COMPONENT[b]	NFA CRITERION	FURTHER ACTION[c]	ADD TO HSWA MODULE[d]	RATIONALE	SECTION NUMBER
0-016	X		4			Site has been remediated and conformation sampling indicate that contamination is below SALs.	5.1

[a] An X in this column indicates that the site is listed on the Hazardous and Solid Waste Amendments (HSWA) Module (Module VIII) of the Laboratory's RCRA operating permit.
[b] An X in this column indicates that the site has a radionuclide component.
[c] VCA, EC, further investigation, or CMS.
[d] An X in this column indicates that hazardous constituents were confirmed at a site not already listed on the HSWA Module. The site requires further action; therefore, the site needs to be added to the Module.

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1.0 INTRODUCTION

This report addresses the voluntary corrective action (VCA) activities at potential release site (PRS) 0-016, a former small arms firing range. PRS 0-016 is located on United States Department of Agriculture (USDA) Forest Service property (Figure 1.0-1) at the northern terminus of Range Road, immediately west of Guaje Pines Cemetery, in Los Alamos, New Mexico as shown (Figure 1.0-2).

The PRS 0-016 VCA was completed in accordance with VCA plans dated February 1994 and June 1996 (LANL 1994, 05-0253; LANL 1996, 05-0254) and the Los Alamos National Laboratory (LANL) Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Operable Unit (OU) 1071 (LANL 1992, 0781).

1.1 Process History and Background

The firing range was constructed for Atomic Energy Commission (AEC) security forces sometime after January 1947, when control of all Manhattan Project sites was transferred to the AEC. The range was used by security forces for small arms target practice until it was abandoned in the early 1960s when the present firing range in Sandia Canyon (Technical Area [TA] 72) was built. The Department of Energy (DOE) released PRS 0-016 and surrounding areas to the Forest Service in 1976. The site was used by the general public for recreational shooting until VCA activities were initiated in 1992. Current ownership remains with the Forest Service until site remediation and a land exchange between the Forest Service and a private developer is completed.

1.2 Process Knowledge and COPCs

The firing range at PRS 0-016 was used by AEC security forces for small arms target practice from 1947 until the early 1960s when the present firing range in Sandia Canyon (TA-72) was built. The site was then used unofficially by the general public for recreational target shooting until 1992, when a fence was installed around the area in preparation for site remediation. Based on this knowledge, the only source of contamination of the soil at PRS 0-016 is from the use of small arms.

The primary contaminant of potential concern (COPC) at PRS 0-016 is elemental lead; however, copper and zinc are also commonly present as minor components of lead bullets used with small arms. Of these COPCs, lead is the only hazardous constituent as well as the only metal that was detected above LANL screening action levels (SALs). Although copper and zinc

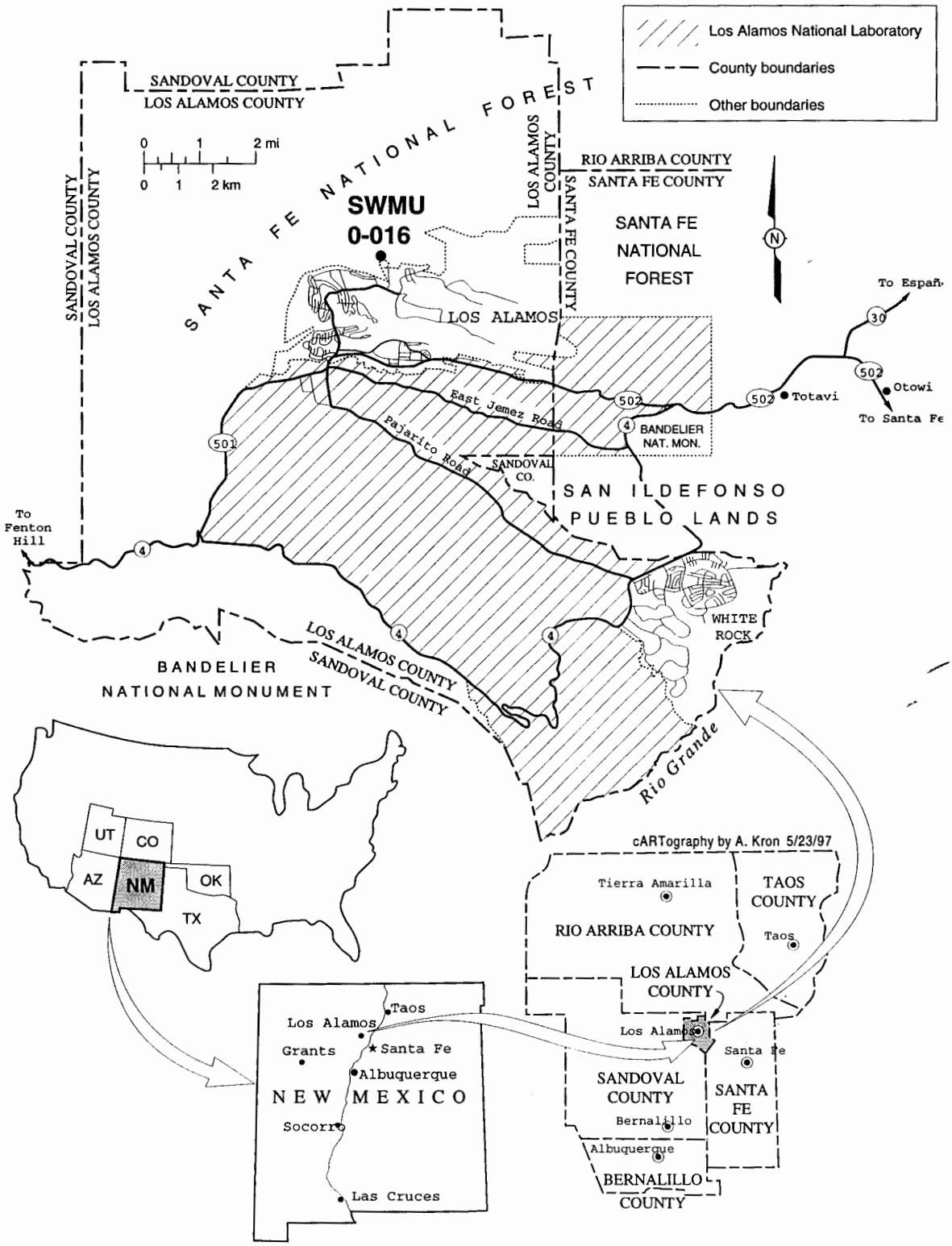

Figure 1.0-1. Location of PRS 0-016 within Los Alamos National Laboratory, Los Alamos County, New Mexico.

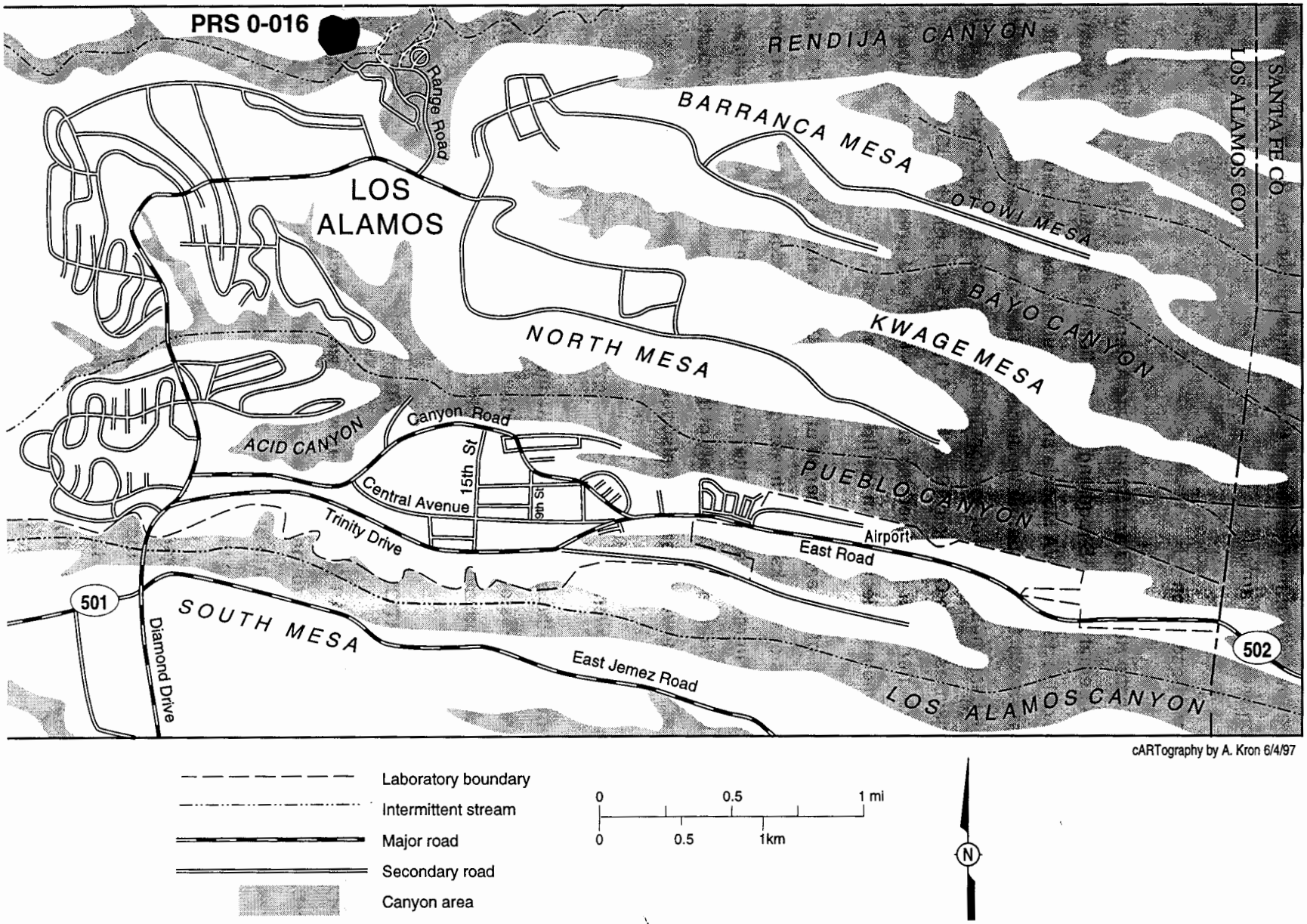

Figure 1.0-2. Location of PRS 0-016.

were not detected above SALs, they remained COPCs throughout the VCA based on their common association with small arms.

1.3 Site Type and Description

The site is identified in the Hazardous and Solid Waste Amendments (HSWA) Module (Module VIII) of LANL's RCRA permit as a PRS requiring a RCRA field investigation. This PRS was not included in Table A of the 1990 HSWA Module and was subsequently added to the permit in 1994, via a February 1993 Class 3 permit modification. The site was added to the HSWA Module following a letter of notification of soil contamination from the Forest Service to the US Coast Guard National Response Center in 1992 (USDA 1992, 05-0256). The US Coast Guard National Response Center letter identified the site as a PRS and presented the results for Forest Service soil samples collected from the firing range berms.

The original configuration of the earthen berms at PRS 0-016 is shown in Figure 1.3-1. The range generally consisted of a backstop berm along the northern edge of the site, side berms along the eastern and western edges of the site, and a medial berm that ran north-south and separated the site into two firing areas. A majority of the lead was concentrated in the backstop berms behind the targets; however, lead was also found in the side and medial berms.

1.4 Site Match of VCA Criteria

A VCA was determined to be the appropriate approach to address the time constraints placed on the LANL Environmental Restoration (ER) Project by a pending land exchange between the USDA Forest Service and a private land developer.

2.0 SITE CHARACTERIZATION BEFORE REMOVAL

Although PRS 0-016 is a HSWA PRS, no RFI activities were conducted before initiating the VCA (Appendix B). This was due to the fact that significant contamination at small arms firing ranges is typically very limited (Heath et al. 1991, 05-0255) and an expedited cleanup of the site was necessary before finalizing the land exchange.

However the Forest Service conducted a study of PRS 0-016 in 1991 in which 11 of 21 judgmental soil samples taken from the surface of the backstops and other berms failed the toxicity characteristic leaching procedure (TCLP) test for lead. These analytical reports are not available but a summary is given in USDA Forest Service Memorandum 7400 (USDA 1992, 05-0256). Contamination was attributed to the presence of abundant lead bullets on the surface of the earthen berms at the sample locations. Forest Service Memorandum 7400 concludes

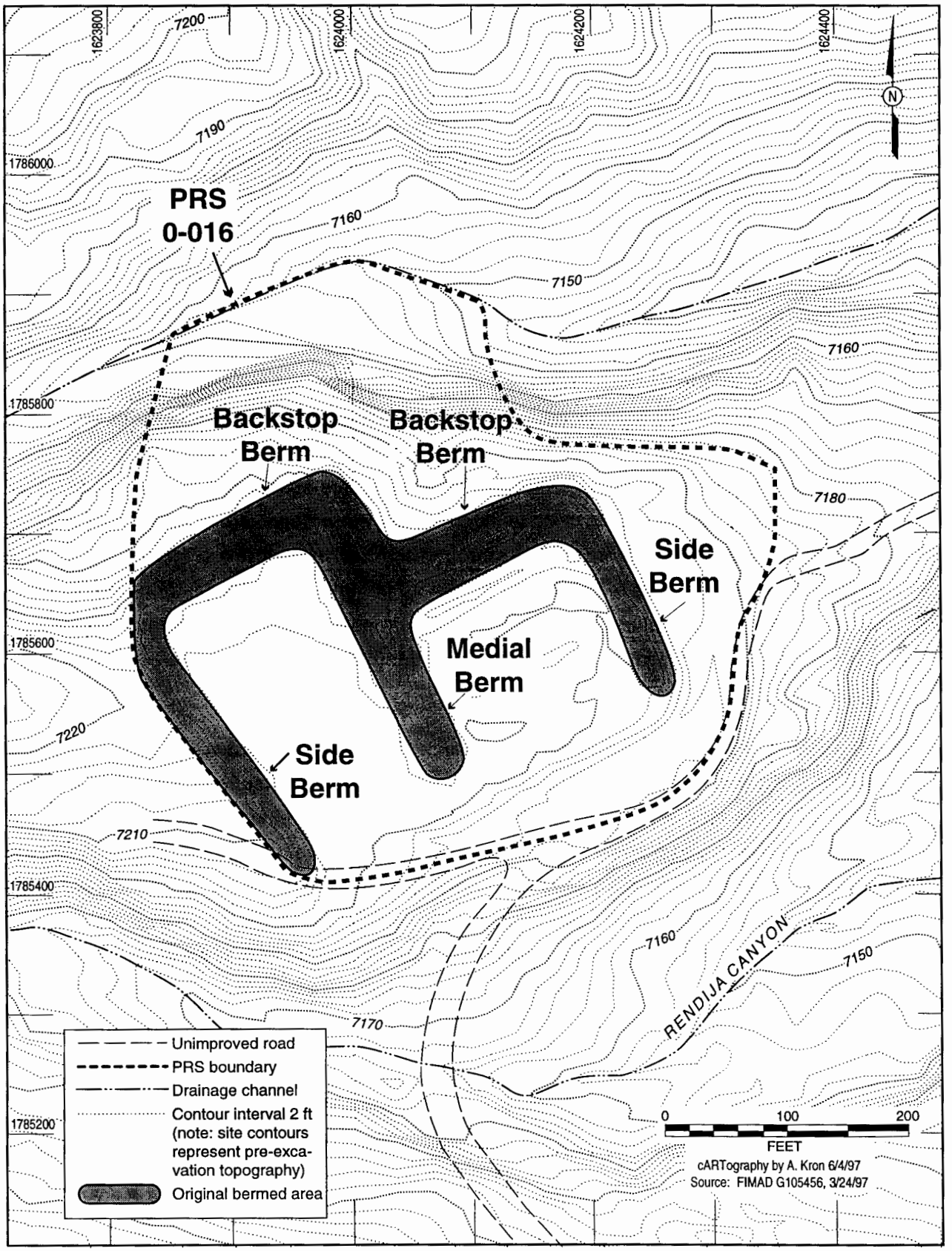

Figure 1.3-1 Original firing range berm configuration.

that because the TCLP test did not reproduce the essentially pH-neutral soil conditions at the site, the lead-contaminated soil does not constitute a release of a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Forest Service memorandum further maintains that the lead in the earthen berms does not constitute a threat to the ground water in the area due to the great depth to water (approximately 1 300 feet below ground surface).

2.1 Field Activities

The extent of the contaminated soil was not determined by direct sampling of the firing range area before excavation (as described in the RFI Work Plan) because all potentially contaminated soils within the bounds of the site were consolidated in preparation for processing to remove the lead. Field operations were initiated by preparing the site for on-site processing of the firing range soils to remove the lead. The soil washing contractor prepared the site by consolidating the side berms, medial berm, backstop berms, and surface-soil from the upper 12 in. of the range floor into a single large stockpile along the northern edge of the site. Essentially, all materials to be processed were placed on top of the backstop berms (Figure 1.3-1). These materials were considered to be the most likely to contain lead from historical firing range operations and were included in material to be processed by soil washing. Later, lead-contaminated soils excavated from the hillside north of the site, called the back area, were added to this stockpile.

After initiating VCA activities, preliminary metal detector screening was conducted in the back area following a visual inspection during the site survey. The results of the metal detector survey indicated that a significant number of bullets were present in the back area soils. Subsequent x-ray fluorescence (XRF) screening confirmed that the back area also contained lead concentrations above the SAL of 500 mg/kg. The PRS boundary was expanded to include the back area (see Fig. 2.1-1) and was included in the extent of the VCA activities. The presence of lead on the range floor and in the backstop berms was apparent based on field surveys, visual observation of bullets in berm soils, and Forest Service soil sampling results (USDA 1992, 05-0256).

COPCs at PRS 0-016 include elemental lead, copper, and zinc. These are the three metals most commonly associated with small arms firing ranges (Heath et al. 1991, 05-0255). Of these COPCs, lead is the only hazardous constituent and the only metal that was detected above LANL SALs.

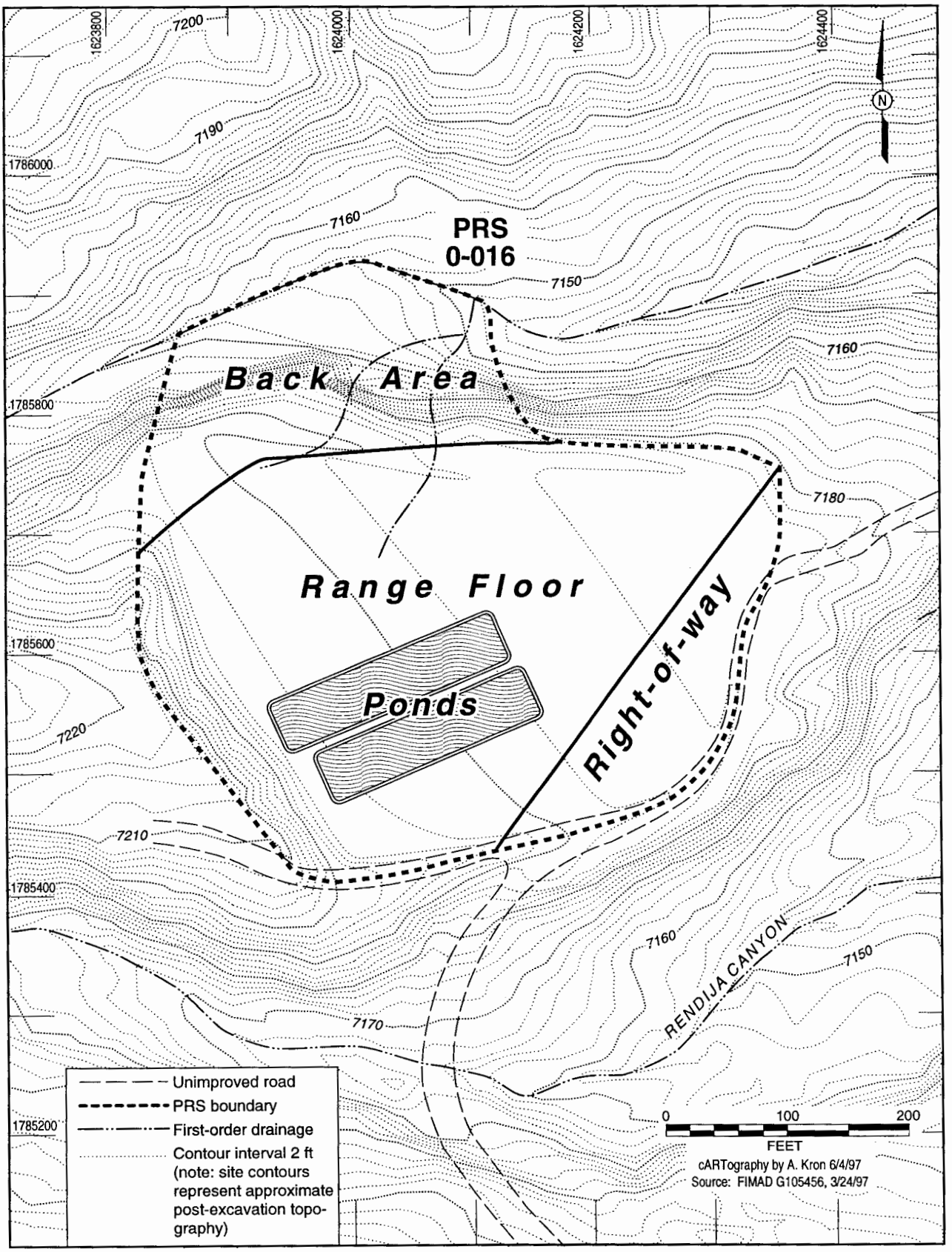

Figure 2.1-1 **Locations of range floor, back area, right-of-way, recirculation ponds, and first-order drainages.**

2.2 Nature and Extent of Contamination

The nature and extent of soil contamination in the back area and on the range floor were determined during the VCA using metal detectors, XRF field screening, and fixed-laboratory analysis to confirm the screening results.

Thirty-six 3-ft by 3-ft squares were established in the back area to determine the average lead concentrations in each section of the grid. A metal detector survey was conducted over each square using White's model 4900/DL Pro metal detectors to determine the density of bullets in the soil. Following the metal detector survey, a series of soil samples were collected for XRF analysis from several locations within each square. These sample locations included adjacent to a bullet, in the center of the square at nine discreet locations evenly spaced throughout the square, and from the center of the square once the bullets had been removed.

Based on the results of the survey discussed above, a correlation was established between the number of metal detector responses and the total lead concentration in the soil. According to the correlation, 29 metal detector responses within a 6-ft by 6-ft square was indicative of a total lead concentration of 500 ppm in the soil. Using this correlation, an extensive metal detector survey was initiated to determine the outer boundary of the PRS. A grid was set up on the back area using a 6-ft spacing and these squares were grouped into 18, 90-ft by 90-ft squares. A statistical sampling plan was developed and included in the 1994 VCA plan (LANL 1994, 05-0253) which called for surveying 24 of the 225 six-ft by six-ft squares in each of the larger 90-ft by 90-ft squares. Using this information and the correlation between metal detector responses and soil-lead concentration, and average lead concentration would then be determined for each 90-ft by 90-ft square.

This screening method was used to delineate the northern extent of the back area and not necessarily for determining the average lead concentration within each 90-ft by 90-ft grid as initially intended. The back area was surveyed and metal detector responses were recorded for each 6-ft by 6-ft square and plotted on a map of the back area. Based on the results of the survey, the PRS boundary was extended northward to include all of the smaller squares that yielded 29 or more metal-detector responses which was based on the SAL at that time.

3.0 REMEDIAL ACTIVITIES AND RESULTS OF CONFIRMATORY SAMPLING

The VCA activities at PRS 0-016 were conducted intermittently between September 1993 and May 1997. This VCA was conducted under two separate VCA plans because of a change in the method of lead removal. The VCA was initially conducted in accordance with a VCA plan

method of lead removal. The VCA was initially conducted in accordance with a VCA plan prepared in 1993 and was partially completed during the 1994 field season. This initial VCA plan involved processing the firing range berm soils through a soil washing apparatus to remove the lead bullets and associated fragments. About half of the 13 700 yd^3 of lead-contaminated soil was cleaned by soil washing at the end of the 1994 field season. At the beginning of the 1995 field season, the active Protection Technology of Los Alamos (PTLA) firing range in TA-72 indicated several thousand cubic yards of soil were needed to improve the backstop berms at their existing ranges. Subsequently, a second VCA plan was developed in 1996 to present an approach to removing a sufficient quantity of lead from the remaining soil to allow transfer of the material to the active PTLA firing range for reuse. The method presented in the 1996 VCA plan was dry sieving using a shaker plant system to remove bullet-sized fractions from the soil. This method was selected because it was comparable to soil washing and was expected to require far less mobilization time, labor, and processing time. A pilot study was conducted in April and May of 1996 to prove the effectiveness of the shaker plant process, and the results were subsequently incorporated into a revised VCA plan. The dry-sieving method was subsequently implemented, and the remaining soil was processed.

3.1 Basis for Cleanup Levels

Cleanup levels for PRS 0-016 were based on LANL SALs. The SALs for chemical constituents are based on EPA Region IX preliminary remediation goals for residential soil and will ensure that there is a minimal health risk to future site residents. The back area was cleaned up in 1994 and used the former SALs of 500 parts per million (ppm) for lead, 3 000 ppm for copper, and 24 000 ppm for zinc as target clean-up levels; however, in 1995 the SALs were revised. The range floor was cleaned up in 1996 and 1997 to the revised SALs of 400 ppm for lead, 2 800 ppm for copper, and 23 000 ppm for zinc. Confirmatory samples were collected from the back area and the range floor to ensure that all soils containing total copper, lead, and zinc concentrations above their respective SALs had been removed from the site. The maximum copper, lead, and zinc concentrations detected in confirmatory samples from the back area and range floor were 14 mg/kg, 210 mg/kg, and 120 mg/kg, respectively. These levels were below either of the target clean-up levels.

3.1.1 Lead Removal Criteria for Processed Soils

Target lead concentrations in soil processed by soil washing were based on the SAL of 500 mg/kg for total lead in accordance with the VCA plan (LANL 1994, 05-0253). Although not

required by the VCA plan, samples were also periodically collected and analyzed for lead by TCLP in addition to total lead to assure that the lead leachability did not exceed the RCRA TCLP limit of 5 mg/L. Soils processed by soil washing were used as road fill. No hazardous waste was generated as a result of soil washing operations.

Target lead concentrations in soil processed by dry sieving (after removing the bullets) were based on the RCRA hazardous waste determination limit of 5 mg/L for lead by TCLP. Processed soils that met this criteria were transferred off-site for reuse as backstop berm material at TA-72.

3.2 Remedial Implementation

Two distinct VCA field activities were conducted at PRS 0-016 between September 1993 and May 1997. These activities included washing the soil to remove the lead bullets and fine lead and mechanically sieving the soil to remove the lead bullets.

A total of approximately 13 700 yd^3 of stockpiled soil was processed to remove the lead bullets and associated fragments at PRS 0-016. The first 6 700 yd^3 of soil was processed through a soil washing plant in 1994, and the remaining 7 000 yd^3 was processed by dry sieving in 1996 and 1997.

3.2.1 Soil Washing Operations

Soil remediation and lead recycling efforts at PRS 0-016 began in September of 1993, and consisted of a soil washing operation designed to separate the denser lead bullets and fragments from the lighter soil. Preparing the site and moving the soil washing equipment began in September 1993 and was completed on May 9, 1994, following shutdown for four months during winter. Soil washing operations were conducted between May 9 and October 18, 1994 (1994 field season); 6 695 yd^3 of soil were processed.

The soil washing apparatus used to remove lead from the firing range soils in 1994 consisted of a modified sand and gravel plant designed to separate fine and coarse lead from soil. Larger lead fragments and bullets were separated from the coarser fraction of the soil by automated sieves and the fine lead was separated out using a centrifugal separator.

The washed soil and associated water then flowed along a drag tank, where most of the soil was removed. Next, the water flowed into one of two recirculation ponds, connected by a weir, that were used to settle out the fine sediment suspended in the water, and to act as reservoirs to recirculate the water used during the soil washing process. The recirculation ponds

(Figure 2.1-1) were excavated during site preparation and were approximately 200 ft long, 40 ft wide, 7 ft deep, and lined with 60-mil plastic liners to prevent the release of any water used in the soil washing process. Fine sediment accumulations in the ponds were periodically removed, as needed.

During soil washing operations, the washed soil discharged from the plant was sampled on an hourly basis for XRF screening to monitor the efficiency of the lead-removal process. These samples provided essential data for making adjustments to the soil-washing system to address changing lead concentrations in the berm material as it was fed into the plant.

Washed soils were stockpiled on-site and allowed to dry out sufficiently to ease sample collection for total lead analysis. Washed soils were placed in stockpiles of approximately 125 yd^3. Each stockpile was sampled by running a sampling scoop along the surface of the stockpile from the bottom to the top of the pile. Samples of washed soil were submitted to a fixed analytical laboratory for analysis in accordance with the VCA plan (LANL 1994, 05-0253). In addition, several samples were also submitted for TCLP analysis as an additional assurance that the washed soils were suitable for off-site transfer.

In addition to sampling the washed soils, daily water/sediment (slurry) samples were collected at the point of discharge into the recirculation ponds, and the ponds were sampled directly on a weekly basis to monitor the lead concentrations. Water/sediment samples were also periodically collected from the pump trucks that were used to remove the sediment from the ponds before leaving the site. These samples consisted of a slurry that was allowed to settle, so the water and the solids (sediment) could be analyzed independently. Sediments were analyzed on-site by XRF and submitted to a fixed laboratory for TCLP analysis. Water samples were submitted to a fixed laboratory for total metals (unfiltered sample) and dissolved metals (filtered sample) in accordance with New Mexico ground-water and surface-water standards. This data is summarized in Appendix F, Table 1.

3.2.1.1. Back Area Excavation

The back area of PRS 0-016 was found to contain a significant number of bullets upon initial screening conducted from October 15 through November 1, 1993. To determine the extent to which the back area contained lead bullets, an extensive metal detector survey was conducted between April 1 and September 12, 1994. The soils and forest litter containing elevated levels of lead were removed between July 8 and September 21, 1994. The soil was added to the stockpile of berm material and processed to remove the bullets. All loose, organic material

(forest litter) was raked from the site and all trees smaller than 8-in. diameter were cut down and removed from the area. The forest litter, which consisted of pine needles and humic soil, was raked up and placed in plastic bags for subsequent disposal because it was not compatible with the soil washing system. On August 24, and September 14, 1994, five confirmation samples and one duplicate sample were collected from the back area. These confirmation samples are discussed in greater detail in Section 3.3. Restoration of the back area began on August 29, 1994 and was completed on September 28, 1994.

3.2.2 Shaker Plant Operations

Dry sieving the soil to remove the fraction that contained the bullets was determined to be a relatively quick, effective, and inexpensive method for removing a majority of the lead. Most of the bullets observed in the firing range soils ranged in size from .22 to .45 caliber (11/50-in. to 9/20-in.). The dry-sieving process was designed to separate out the fraction of the soil that contained bullets of this size by selecting one set of screens with openings slightly smaller than .22 caliber bullets and another set slightly larger than .45 caliber bullets.

A pilot study was conducted from April 29 to May 6, 1996 to ensure that the dry-sieving method was effective. The shaker plants consisted of sand and gravel dry-sieving equipment equipped with various sizes of slotted wire screens. The screens used were slotted harp wire screens with 3/16-in. and 1/2-in. openings (equivalent to .19 and .50 caliber, respectively). The slotted screen design allows the larger bullets to pass through by their smallest dimension. The material processed during the pilot study was first sieved with a 1/2-in. screen to separate bullet-sized and finer material from the oversize material. Then the screens were changed to 3/16-in. and the material was rescreened to separate the bullet-size from the fine material. Approximately 600 yd^3 of berm material was sieved and yielded 375 yd^3 of material finer than the bullet-sized fraction (fines), 175 yd^3 of material larger than the bullet-sized fraction, and 50 yd^3 of bullet-sized material. The results of this pilot study indicated that bullet-size fraction containing a majority of the lead in the soils could be effectively isolated from the coarser and finer fractions.

Full-scale sieving operations began on July 31 and were completed on September 27, 1996. Material that was finer than the bullet-sized fraction (less than 3/16 in.) and determined to be nonhazardous was transported to the active firing range at TA-72 for reuse as berm material. The fine-grained material that was determined to be hazardous by TCLP analysis was shipped off-site for disposal. Material coarser than the bullet-sized fraction (greater than 1/2 in.) was transported to TA-16 for use as industrial fill material. After processing all the contaminated

material on-site, the bullet-sized fraction consisted of approximately 1 200 yd^3 of gravel containing all the recovered bullets. The bullet content in the gravel was too low to facilitate recycling of the lead and further processing to concentrate the lead to recyclable levels was required.

On January 2, 1997 shaker plant operations were remobilized to further process the 1 200 yd^3 of bullet-sized material that consisted predominantly of gravel. Reprocessing of this material occurred between January 3 and February 3, 1997, and began with resieving the bullet-sized material using a 3/16-in. screen to remove all of the residual fines in the gravel. Because most of the gravel consisted of soft volcanic tuff, a significant amount of fines were generated in the process of resieving. Following resieving, an impact crusher was used to further reduce the gravel to fine material. Crushing and resieving operations reduced the 1 200 yd^3 of bullet-sized material to approximately 80 yd^3 of bullet-sized material consisting of bullets and hard-rock gravel.

Although the lead content in the gravel was increased dramatically through the crushing and resieving process, the lead content in the 80 yd^3 of bullet-sized gravel was only about 5% by volume, which was still not acceptable to recycling facilities. Following a thorough investigation of alternatives, it was determined that the most effective method for producing clean lead for recycling entailed using a vacuum-truck system to lift the lighter gravel away from the heavier lead. The vacuum truck operations were conducted between March 12 and March 24, 1997. Three tons of clean lead were recovered using the vacuum system.

Soil processed by dry-sieving was sampled for waste characterization in 25 yd^3 units to ensure adequate characterization and facilitate waste minimization. One representative, composite soil sample was collected from each 25 yd^3 unit of fines at a randomly selected location on each pile and analyzed for lead by TCLP. Sample collection was conducted by digging into each of the 25 yd^3 stockpiles with a shovel to expose a vertical cross-section of the pile from the base of the pile to the top. The exposed cross-section was then scraped into a bowl to provide a representative composite sample for waste-characterization analysis by TCLP.

The gravel remaining from the vacuum truck processing was sampled for waste characterization by the same methodology. However, the sample piles were approximately 7 yd^3 in volume because of the volume capacity of the vacuum truck, the gravel that passed TCLP was taken to TA-72.

The 1996 VCA plan (LANL 1996, 05-0254) specified that a tube sampler would be used to collect composite samples from a cross-section of the 25 yd^3 stockpiles. However, because the

fine soil fraction was very loose, moist, and rich in clay, the tube sampler would clog and was ineffective in sampling the center of the pile. The tube sampler was to be advanced to its entire length of 5 ft, into each stockpile at a single location, to collect a composite sample of soil ranging from the middle of the outer flank (side-slope) to the center of the pile. Because each 25 yd^3 stockpile consisted of six loader buckets of material at 4.2 yd^3 per bucket the first bucket load removed from the shaker is located at the bottom center of the stockpile and the last bucket load is essentially the outer surface of the pile. The 25 yd^3 stockpiles are 6 ft high and 20 ft wide at the base; therefore, the distance from the middle of the side-slope to the central interior of the pile is approximately 5 ft. Collecting an equivalent sample was achieved by using a shovel to expose a 5-ft deep cross-section of each stockpile and sampling the length of the cross-section.

3.2.2.1 Screening Methods Used to Guide Range-Floor Excavation

Before final confirmatory sampling of the range floor, the entire area was screened using a metal detector and XRF to identify areas requiring further excavation and processing. Metal detector screening was conducted over the entire site using White's model 4900/DL Pro metal detectors, and served as a guide for identifying soils on the range floor that contained a significant number of bullets, indicating the potential for elevated concentrations of lead. Based on the correlation established for the back area survey, if 22 or more positive metal detector responses were received within a 6-ft by 6-ft square, additional soil was excavated from the range floor in that area. Twenty-two metal detector responses was determined by the correlation to indicate a total lead concentration of 396 mg/kg, which is nearly equivalent to the current SAL of 400 mg/kg. Excavation of surface soils that failed the metal-detector survey was performed by scraping the surface in 2- to 4-in. lifts. Final confirmatory sampling for fixed laboratory analysis showed the metal detector survey to be an effective screening method to guide excavation. Soils scraped from the range floor were processed through the shaker plant.

Following completion of the metal detector survey and additional scraping of the range floor, the entire site was sampled and screened for lead using field-portable XRF unit. Locations of samples analyzed by XRF were based on a grid with a 50-ft spacing projected over the entire range-floor area. Five grab samples were collected from each grid-section (from each corner plus the center of the section), and analyzed on-site by XRF. Grid sections that exhibited lead concentrations above the SAL, based on XRF screening results, were to be further excavated and resampled until lead concentrations detected by XRF analysis were below 400 mg/kg; however, all of the sections passed XRF screening during the first round of sampling.

3.3 Confirmatory Sampling

Confirmatory sampling was conducted in the back area and on the range floor following excavation and processing of contaminated soils to confirm that all materials containing elevated concentrations of copper, lead, and zinc had been removed from the site. Locations of confirmatory samples are shown in Figure 3.3-1. Sample locations were randomly selected from a statistically-based grid pattern. All confirmatory samples were submitted to a fixed analytical laboratory for analysis of total recoverable copper, lead, and zinc by EPA SW-846 Method 6010 (EPA 1992, 1207) and validated for quality assurance/quality control (Appendix A). A comparison of confirmatory-sample analytical results to background upper tolerance limits (UTLs) and SALs is presented in Table 3.3-1. Final confirmatory sample results indicate that all soils have been remediated to below the LANL SALs for copper, lead, and zinc, and the VCA has been successfully completed. Analytical results for confirmatory samples are summarized in Appendix D.

3.3.1 Back Area Confirmatory Sampling

Six confirmatory samples were collected from back-area soils on August 24, 1994 and September 14, 1994, following removal of all materials that failed field-screening criteria to ensure that all soils containing lead concentrations above the cleanup-level of 500 mg/kg had been removed. A summary of samples collected from the back area is presented in Appendix D, Table D-1. Locations of these samples are shown on Figure 3.3-1. The confirmatory sampling strategy involved collection of six grab samples from the most contaminated areas, based on previous screening results, for on-site analysis by XRF. The three samples that exhibited the highest lead concentrations based on XRF analysis were then submitted to a fixed laboratory for total recoverable copper, lead, and zinc analysis. In addition, one confirmatory grab sample and a field duplicate were collected from the most contaminated area, based on previous screening results, and another confirmatory sample was collected from a randomly-selected location. Analytical results of back-area confirmatory sampling indicate that all soils containing lead concentrations above the SAL have been removed. Lead concentrations in these confirmation samples ranged from 8.2 mg/kg (sample no. AAB2426) to 210 mg/kg (sample no. AAB2415). All copper concentrations detected in back area confirmation samples were below the background UTL. One sample exceeded the UTL for zinc with a concentration of 120 mg/kg (sample no. AAB2415). All copper, lead, and zinc concentrations in confirmatory samples were well below the SALs for these elements (Table 3.3-1).

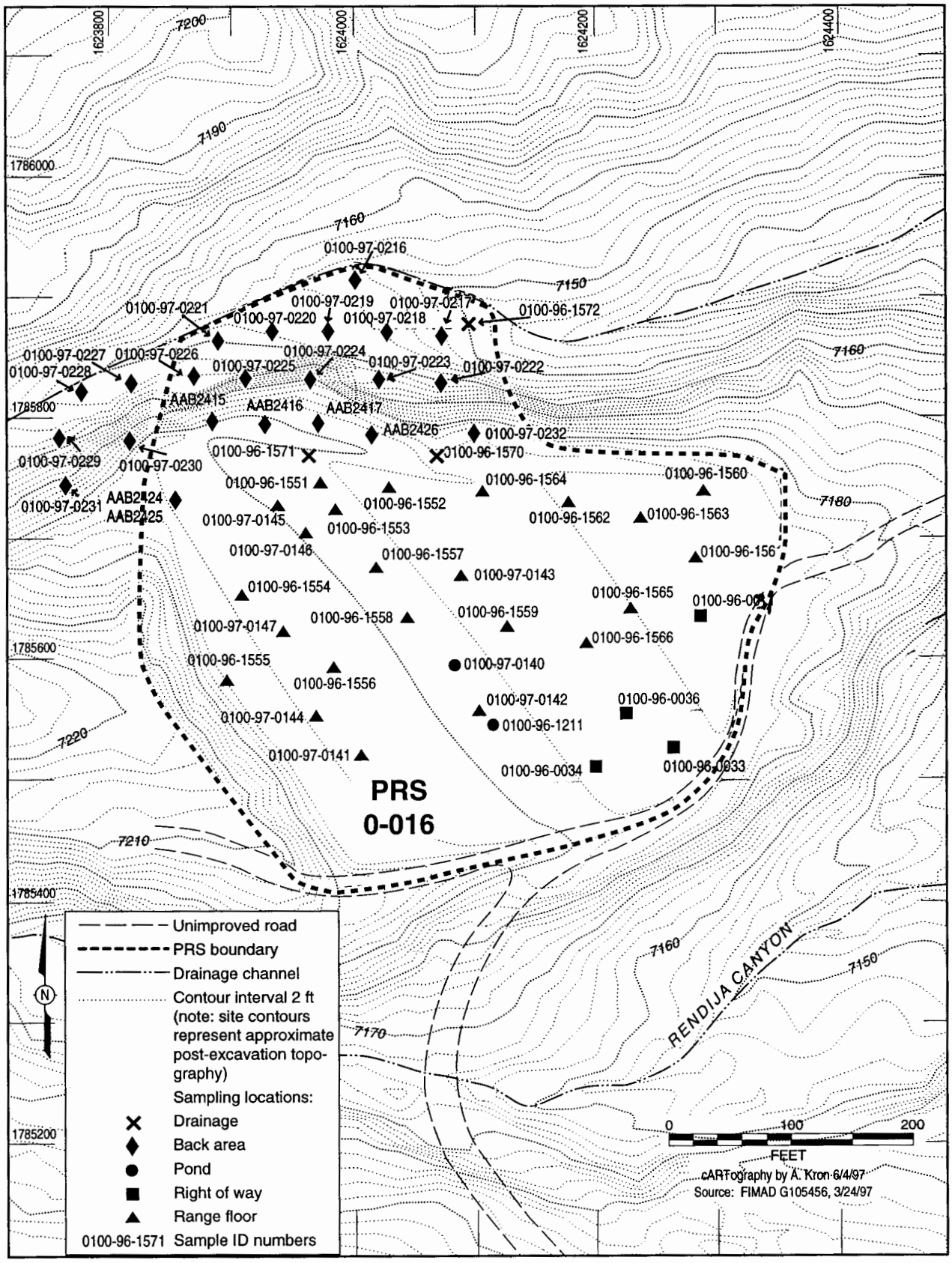

Figure 3.3-1 Locations of confirmatory samples.

TABLE 3.3-1

CONFIRMATORY SAMPLES WITH COPPER, LEAD, OR ZINC CONCENTRATIONS EXCEEDING BACKGROUND SCREENING VALUES AT PRS 0-016

LOCATION ID	Sample ID	Copper [a]	Lead [a]	Zinc [a]
N/A [b]	UTL [b]	15.5	23.3	50.8
N/A	SAL [b]	2800	400	23000
00-01441	AAB2415	13	**210** [c]	**120**
00-01442	AAB2416	6.7	**97**	19
00-01443	AAB2417	6.6	**68**	21
00-04738	0100-96-0031	4.5(UJ)[d]	**45.6(P)** [e]	30.5
00-04740	0100-96-0033	3.6(UJ)	**39.0(P)**	30.2
00-04741	0100-96-0034	4.8(UJ)	**81.8(P)**	31.7
00-05451	0100-96-1551	6.8	**51.3(J)** [f]	31.3
00-05453	0100-96-1553	9.0	**42.4(J)**	31.3
00-05456	0100-96-1556	7.6	**63.1(J)**	42
00-05457	0100-96-1557	8.0	**63.8(J)**	32.5
00-05458	0100-96-1558	8.6	**64.8(J)**	34.4
00-05460	0100-96-1560	6.5	**42.8(J)**	26.5
00-05465	0100-96-1565	7.0	**60(J)**	31.7
00-05466	0100-96-1566	4.2	**85.6(J)**	29.8
00-05470	0100-96-1570	7.2	**40.8**	28.9
00-05471	0100-96-1571	9.5	**70.6**	31.2
00-05472	0100-96-1572	7.0	**58.6**	29.3
00-05948	0100-97-0143	7.7(U)	**66**	24

[a] All SAL, UTL, and sample values are in mg/kg
[b] N/A = Not applicable
[c] Values in bold are above background screening values
[d] (UJ) = Analyte not detected, value is estimated
[e] (P) = Laboratory duplicate not in control due to sample heterogeneities
[f] (J) = Estimated value

A second set of confirmatory samples was collected in August 1997 to ensure the entire back area met current cleanup levels. Locations of these samples were based on a grid with a 50-ft spacing projected over the back area. Grid size used was based on original grid size specified in the 1996 VCA plan. One grab sample was collected from the center of each of the grid spaces. Locations of back area confirmation samples are shown on Figure 3.3-1. Analytical results are summarized in Table D-1. Analytical results for copper, lead, and zinc were well below the current LANL SALs for these elements. The lead concentrations in these samples ranged from 8.8 mg/kg (sample no 0100-97-0224) to 52.7 mg/kg (sample no 0100-97-0229).

3.3.2 Range Floor Confirmatory Sampling

After completing the initial full-scale shaker plant operations, 16 discrete grab samples were collected on September 26, 1996 from the upper 6 in. of the firing range floor. These samples were to confirm that all soils containing total lead concentrations above 400 ppm were removed from the site, with the exception of the 1 200 yd^3 of bullet-sized material awaiting determination of its final disposition. Locations of confirmatory samples collected from the range floor are shown on Figure 3.3-1. A summary of these samples is presented in Table 3.3-2-1. Sample locations were randomly selected based on a 50-ft grid projected over the range-floor area in accordance with the Sampling and Analysis Plan (SAP) for confirmation/verification sampling, which is found in the 1996 VCA plan (LANL 1996, 05-0254). For the purpose of acquiring a representative distribution of random sample locations, the site was divided into four distinct areas. These areas included the perimeter area, the pond area, the soil-stockpile area, and the soil-washing plant area. Each area is distinct with respect to the types of materials and activities that were associated with it. A random selection of sample grid locations was performed individually for each area to ensure sufficient sample coverage for final confirmation/ verification of VCA completion as described in the SAP (LANL 1996, 05-0254). If the site was treated as single area, some distinct areas could have remained unsampled as a result of randomly selecting sample locations. Total lead concentrations in these range-floor samples ranged from 10.5 mg/kg (sample no. 0100-96-1555) to 85.6 mg/kg (sample no. 0100-96-1566), copper concentrations ranged from 2.5 mg/kg (sample no. 0100-96-1555) to 11.5 mg/kg (sample no. 0100-96-1564), and zinc ranged from 26.4 mg/kg (sample no. 0100-96-1562) to 42.0 mg/kg (sample no. 0100-96-1556). Copper, lead, and zinc concentrations were well below SALs in all of these samples (Table 3.3-1).

As discussed in Appendix A, lead was qualified J- in sixteen out of sixteen samples because of a low recover in the matrix spike sample. A low recovery suggests either incomplete recovery of an analyte in these procedures or sample heterogeneity. The maximum concentration of 85.6 mg/kg is J- qualified and this value is below the background screening value of 400 mg/kg. The next highest value of lead reported is 70.6 mg/kg, which is also J- qualified. The other fourteen samples are all below one-fourth the SAL. All of the reported concentrations of lead are consistent, and samples were collected where the highest contamination was expected; therefore, a possible low bias does not indicate that lead is above SAL.

A second confirmatory sampling event was conducted after reprocessing the 1 200 yd^3 of bullet-sized material and removing all material from the site. Locations of these confirmatory samples collected from the range floor are shown on Figure 3.3-1. A summary of these samples

is presented in Table 3.3.2-1. Seven additional samples were collected from three distinct areas identified on the range floor. These areas include the shaker plant area, the 1 200 yd^3 of bullet-size material area, and the fine-soil stockpile area. Before collecting these samples, the entire site area was screened with metal detectors and scraped to remove material that was potentially above SAL. XRF screening was not conducted before this confirmatory sampling event. Total lead concentrations in these range-floor samples ranged from 3.7 mg/kg (sample no. 0100-97-0142) to 66 mg/kg (sample no. 0100-97-0143), copper concentrations ranged from 1.9 mg/kg (sample no. 0100-97-0142) to 10.0 mg/kg (sample no. 0100-97-0146), and zinc ranged from 23.0 mg/kg (sample no. 0100-97-0142) to 34.0 mg/kg (sample no. 0100-97-0146). Copper, lead, and zinc concentrations were well below SALs in all of these samples (Table 3.3-1).

TABLE 3.3.2-1

SUMMARY OF CONFIRMATORY SAMPLES COLLECTED FROM THE RANGE FLOOR AT PRS 0-016

SAMPLE INFORMATION				ANALYTICAL SUITE AND REQUEST NUMBER
LOCATION ID	SAMPLE ID	LOCATION	DEPTH	
00-05451	0100-96-1551	Range Floor	0 - 0.5	2653
00-05452	0100-96-1552	Range Floor	0 - 0.5	2653
00-05453	0100-96-1553	Range Floor	0 - 0.5	2653
00-05454	0100-96-1554	Range Floor	0 - 0.5	2653
00-05455	0100-96-1555	Range Floor	0 - 0.5	2653
00-05456	0100-96-1556	Range Floor	0 - 0.5	2653
00-05457	0100-96-1557	Range Floor	0 - 0.5	2653
00-05458	0100-96-1558	Range Floor	0 - 0.5	2653
00-05459	0100-96-1559	Range Floor	0 - 0.5	2653
00-05460	0100-96-1560	Range Floor	0 - 0.5	2653
00-05461	0100-96-1561	Range Floor	0 - 0.5	2653
00-05462	0100-96-1562	Range Floor	0 - 0.5	2653
00-05463	0100-96-1563	Range Floor	0 - 0.5	2653
00-05464	0100-96-1564	Range Floor	0 - 0.5	2653
00-05465	0100-96-1565	Range Floor	0 - 0.5	2653
00-05466	0100-96-1566	Range Floor	0 - 0.5	2653
00-05946	0100-97-0141	Range Floor	0 - 0.5	3025
00-05947	0100-97-0142	Range Floor	0 - 0.5	3025
00-05948	0100-97-0143	Range Floor	0 - 0.5	3025
00-05949	0100-97-0144	Range Floor	0 - 0.5	3025
00-05950	0100-97-0145	Range Floor	0 - 0.5	3025
00-05951	0100-97-0146	Range Floor	0 - 0.5	3025
00-05952	0100-97-0147	Range Floor	0 - 0.5	3025

Four confirmatory samples were collected from the range floor along the eastern edge of the PRS boundary on March 4, 1996 to allow the release of this portion of the site to the private developer (Figure 3.3-1). A summary of utility right-of-way samples is provided in Table 3.3.2-2. Sampling was conducted in accordance with the SAP for confirmation/verification sampling of the range floor and the SAP for release of right-of-way (LANL 1996, 05-0254). Originally the site boundary was extended to the east to provide additional space to accommodate soil-washing operations. This portion of the site encroached on the private developer's utility right-of-way. Because soil washing had been discontinued and the space was no longer needed for completing the VCA, the area was field screened with metal detectors and XRF and scraped to remove areas with elevated lead concentrations. Confirmatory samples were also collected. A 50-ft grid was established over the area to be released, and soil samples were collected from each of the grid spaces for XRF screening. Once all XRF screening indicated lead concentrations below SALs, confirmatory samples were collected from four randomly selected sample locations within the grid. One of the four samples indicated a lead concentration above the SAL with a value of 618 mg/kg (sample no. 0100-96-0032). This grid was subsequently scraped and resampled (sample no. 0100-96-0036). Total lead concentrations in final confirmation samples from the right-of-way area ranged from 24.8 mg/kg (sample no. 0100-96-0036) to 81.8 mg/kg (sample no. 0100-96-0034). Copper and zinc concentrations were below the background UTLs in all right-of-way samples (Table 3.3-1).

As discussed in Appendix A, copper was qualified UJ and J- in four out of four samples because of a low recover in the matrix spike sample. A low recovery suggests either incomplete recovery of an analyte in these procedures or sample heterogeneity. The maximum concentration of 10.0 mg/kg is J- qualified and this value is below the background screening value of 15.5 mg/kg. The next highest value of copper reported is 4.8 mg/kg, which is also J- qualified. The other two samples are also below UTL. All of the reported concentrations of copper are consistent, and samples were collected where the highest contamination was expected; therefore, a possible low bias does not indicate that copper is above UTL.

3.3.3 First-Order Drainage Confirmatory Sampling

Three discrete grab samples were collected from the upper 6 in. of sediment in the primary first-order drainages that captured the bulk of surface water run-off from the site during VCA operations. Locations of channel sediment samples are shown on Figure 3.3-1. A summary of these samples is presented in Table 3.3.3-1. These locations were determined in the field, based on examination of the surface-water drainage system. These drainages are located in

the central and western portion of the back-area hillside and originate on the range floor. Analytical results for copper, lead and zinc were well below the LANL SALs for these elements. The lead concentrations in these samples ranged from 40.8 mg/kg (sample no. 0100-96-1570) to 70.6 mg/kg (sample no. 0100-96-1571) (Table 3.3-1).

3.4 Site Restoration

Site restoration was completed in the back area and range floor after completing confirmatory sampling. Restoration activities included recontouring, grading, installing permanent storm water run-off and erosion controls, and revegetating denuded areas.

3.4.1 Back Area Site Restoration

Restoration of the back area began on August 29 and was completed on September 28, 1994. After confirmation samples (Table 3.3-1) verified that concentrations of lead on the back area hillside were below the cleanup level of 500 mg/kg, top soil was imported from LANL TA-16 to replace what had been removed during remediation of the area and facilitate revegetation of the hillside. A seed mixture was planted and the entire area was covered with biodegradable erosion-control matting. By 1996 the area was well vegetated and no significant erosion was observed on the hillside.

3.4.2 Range Floor Site Restoration

Restoration of the range floor was conducted between April 11 and April 29, 1997. After analytical results for the range floor confirmation samples verified that all soils containing lead above cleanup levels had been removed, the site was cut to a grade desired by the future land owner, sloped for proper surface water drainage, and contoured to match the surrounding topography in accordance with Forest Service specifications. The site was then covered with a 1-ft thick layer of base coarse material in preparation for the future land-owner's use as a heavy-equipment staging area. The only erosion-prone slope associated with the range floor area is along the inside of the north fence line, immediately above the back area hillside. This narrow strip of land was tilled, seeded, fertilized, and mulched with straw to facilitate revegetation and prevent erosion.

3.4.3 Conclusions and Recommendations

Analytical results for confirmatory samples collected from the back area, the range floor, and the first-order drainages were all well below the LANL SALs (Table 3.3-1). Lead, which was the

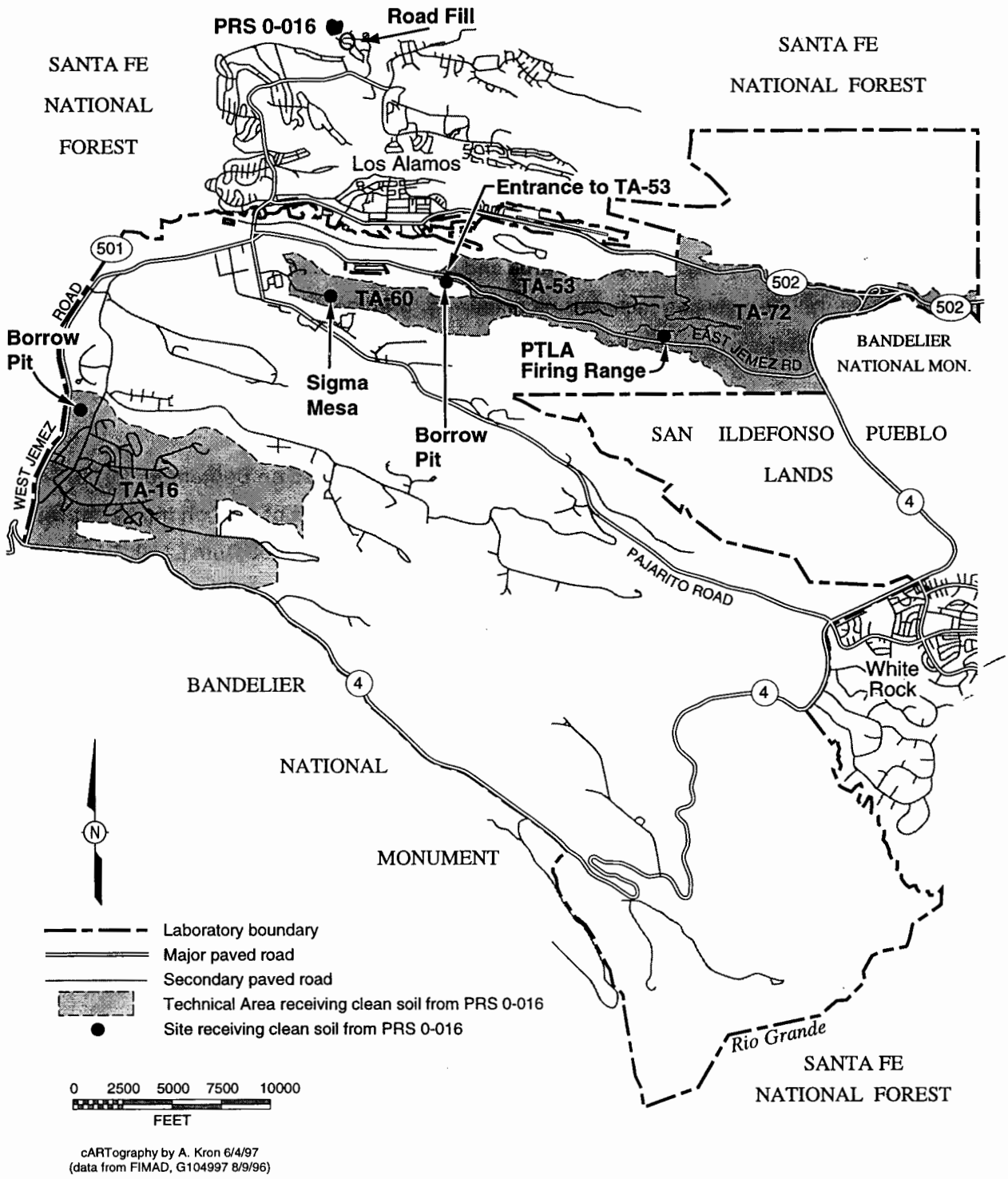

Figure 4.0-1 Locations receiving clean soil from PRS 0-016.

primary COPC, ranged in concentration from 3.7 mg/kg (sample no. 0100-97-0142) to 210 mg/kg (sample no. AAB2415) in final confirmatory samples (the current SAL for lead is 400 mg/kg). Copper concentrations in confirmatory samples ranged from 1.9 mg/kg to 14 mg/kg (the current SAL for copper is 2 800 mg/kg). Zinc concentrations in confirmatory samples ranged from 15 mg/kg to 120 mg/kg (the current SAL for zinc is 23 000 mg/kg). The analytical results for all final confirmatory samples are presented in Appendix D of this VCA completion report.

Final confirmatory sample results indicate that all soils have been remediated to below the LANL SALs for copper, lead, and zinc, confirming that the VCA has been successfully completed. No further action is recommended for PRS 0-016.

4.0 WASTE MANAGEMENT

Waste management activities were conducted in accordance with the VCA plans and the site-specific Waste Management Plan (LANL 1994, 05-0253; LANL 1996, 05-0254). Some of the anticipated volumes, types of waste, and waste-characterization methods differ considerably from those initially anticipated, as discussed below. Total cost also reflected the increased volumes processed (Appendix C). Locations within and around LANL that received clean soil from VCA activities are shown on Figure 4.0-1. Analytical results for waste-characterization samples are summarized in Appendix F.

4.1 Material Volumes

The volume of the material processed included an additional 10 700 yd^3 more than the 3 000 yd^3 estimated in the original VCA plan (LANL 1994, 05-0253). It was originally anticipated that little or none of the soils would fail TCLP following removal of the bullets through shaker plant processing or soil washing; however, a total of 495 yd^3 of fine soils generated by dry sieving failed TCLP and were disposed of as hazardous waste. In addition, the 60 yd^3 of pine needles removed from the back area failed TCLP and were disposed of as hazardous waste.

Stockpiles of clean soil that passed TCLP analysis were transferred to TA-72 and used for improving their existing backstop berms. The berms in ranges No. 3 and No. 4 were built up from a height of approximately 6 ft to a height of approximately 20 ft to comply with revised regulatory requirements for firing ranges.

Slurry that accumulated in the recirculation ponds as a result of the soil washing process was pumped out and transported to a staging area at Sigma Mesa (TA-60) and a borrow pit in

Sandia Canyon across from the entrance to TA-53. The locations of these areas are shown on Figure 4.0-1. Approximately 900 000 gal. of slurry was pumped from the ponds and transferred off-site. The slurry was sampled at the point of discharge from the soil-washing plant, directly from the ponds, and from the pump-truck tanks before transporting off-site. Analytical results are summarized in Appendix F, Table 1. Far more sediment accumulated in the ponds than anticipated due to the increase in the volume of material processed through the soil-washing plant and the high clay-content in the soils.

Oversized fractions from shaker plant operations consisting of boulders, cobbles, and coarser gravel (greater than 1/2-in.) was considered nonhazardous based on knowledge of process because the bullets and finer lead fragments had been removed. Visual observation and metal detectors were used to determine if uncommonly large lead slugs (greater than .50 caliber) or clods of fine material potentially containing bullets were present in the oversized fraction. Oversized material was then transferred off-site to the TA-16 borrow pit (Figure 4.0-1) for future use as fill material in industrial applications within LANL boundaries.

Some materials were generated during VCA activities that required disposal and not reuse. These materials included processed soils that failed TCLP for lead, the pond liners from the soil-washing recirculation ponds, miscellaneous refuse, and plastic sheeting used to cover soil stockpiles. Of these materials, only the materials that failed TCLP for lead were disposed of as hazardous waste. Processed soil that failed TCLP was disposed of at a LANL-audited and approved RCRA-permitted hazardous waste treatment, storage, and disposal (TSD) facility.

Lead recovered during soil washing and shaker plant operations was contained and transferred to a LANL-approved and contracted recycling facility by Johnson Controls International (JCI). A total of 8.4 tons of clean lead was recovered. The composition of the bullets was predominantly lead with minor amounts of other elements such as copper and zinc.

A portion of the gravel processed by vacuum separation failed TCLP analysis for lead and was disposed of as hazardous waste. It was determined that small lead fragments were picked up by the vacuum along with the gravel at higher suction levels. To reprocess these gravels at a lower suction level to remove the remaining lead was not timely or cost-effective.

After removing the pond liner from the southern recirculation pond, a composite sample was collected from the sediment associated with the liner and determined by TCLP analysis to be nonhazardous. The southern pond was the first of the two ponds to receive water and sediment from the soil washing plant discharge, while the northern pond which was connected by a wier, received relatively little sediment. Therefore, by design, most of the sediment, particularly the

heavier particles such as lead, settled out in the southern pond. Analytical results for the south pond sediment would therefore be a worst-case scenario for the north pond sediments, which would have a lower potential for lead accumulation. Based on this knowledge of process, the northern pond liner was also disposed of as nonhazardous waste based on the southern pond sediment/liner sample. The combined weight of the two pond liners was approximately 30 tons.

Water in the recirculation ponds was expected to evaporate over time and not require discharge; however, only the south pond dried out. Typically the south pond was pumped out to a lower level during soil washing operations, allowing it to evaporate to dryness. The north pond continued to retain water accumulated from precipitation and surface water run-off, and it eventually became necessary to pump out the water to allow removal of the liner and backfilling of the pond during site restoration. Water samples were collected from the pond to ensure that New Mexico water standards for metals were not exceeded. All concentrations of metals detected in the water samples were below New Mexico surface water and ground-water standards. A notice of intent to discharge water was filed and approximately 3 000 gallons were discharged to the ground surface at the site.

4.1.1 Waste Minimization

The primary waste management objective for PRS 0-016 was to minimize waste and maximize reusable and recyclable materials. Processing the material to remove the lead facilitated recycling of the lead and reuse of the clean soils as fill and firing range berm material. The volume of potentially hazardous waste at PRS 0-016 was reduced from 13 700 yd^3 to 555 yd^3. Of the 13 700 yd^3 of soils containing lead, only 555 yd^3 of material were required to be disposed of as hazardous waste after processing. Initially all of the soils associated with firing range operations were conservatively considered hazardous waste based on biased sampling from initial soil sampling by the Forest Service (USDA 1992, 05-0256).

Although the overall volume of soil processed was greater than anticipated in the initial VCA plan (LANL 1994, 05-0253), the volume of soil containing lead and deemed a hazardous waste was reduced from 13 700 yd^3 to 555 yd^3. This is a 2 500% reduction in the volume of material that may have otherwise been required to be disposed of as hazardous waste at a RCRA landfill.

Recycling and reuse activities at PRS 0-016 produced approximately 8.4 tons of recyclable lead, 4 660 yd^3 of fine soil for reuse at TA-72 as firing range berm material, 1 730 yd^3 of coarse gravel and rock for use as industrial fill material, and 6 700 yd^3 of washed soil for reuse as road fill.

Waste avoidance practices conducted during VCA activities included continuous efforts to minimize generating additional soil to be processed. Excavating additional material was conducted by scraping the range floor and back area hillside with a bulldozer or grader in lifts of a few inches at a time in an effort to avoid excessive over-excavation, resulting in generating larger volumes of material that would have to be processed.

4.3 Waste-Characterization Data

Waste characterization samples collected during VCA activities included samples of washed soil for total lead and TCLP metals analysis; samples of fines generated by dry sieving; samples of water and slurry for total metals, total dissolved metals, and TCLP metals analysis; and samples of the pine needles and pond liners for TCLP metals analysis.

Waste characterization data for materials generated during VCA activities is presented in Appendix F of this VCA completion report.

5.0 REFERENCES

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APPENDIX A. Results of Quality Assurance/Quality Control (QA/QC) Activities

Inorganic Analysis

Soil samples were analyzed for copper, lead, and zinc in request 1856. There was one quality control (QC) problem that affected the data in this request. It was that copper had a low recovery in the matrix spike sample. Matrix spike samples are used to assess the quality of the sample digestion, extraction, and analysis procedures. A low recovery suggests that either there was incomplete recovery of an analyte in these procedures or sample heterogeneity. To address this problem, a post-digestion spike, which is used to assess the sample extraction and analysis procedures, was performed for copper. The recovery for the post-digestion spike was within the limits allowed in USEPA SW846 guidelines. As required in LANL data validation guidelines, UJ and J- qualifiers were added to all copper data in this request. All data are valid and usable as qualified.

Sixteen soil samples were analyzed for TAL metals in request 19338. There was one QC problem which affected the data in this request. It was that lead (63%) had a low recovery in the matrix spike sample. Matrix spike samples are used to assess the quality of the sample digestion, extraction and analysis procedures. A low recovery suggests that either there was incomplete recovery of an analyte in these procedures or sample heterogeneity. To address this problem, a post-digestion spike, which is used to assess the sample extraction and analysis procedures, was performed for lead. The recovery for the post-digestion spike was within the limits allowed in USEPA SW846 guidelines. As required in LANL data validation guidelines, J- qualifiers were added to all lead data in this request. All data are valid and usable as qualified.

Seventeen soil samples were analyzed for copper, lead, and zinc in request 3631. There were no QC problems with this request, therefore all data are valid and usable without added qualifiers.

Organic Analysis

None required for this site.

Radiochemical Analysis

None required for this site.

TABLE A-1

RESULTS OF QA/QC ACTIVITIES

ANALYSIS DATE	SAMPLE ID	Matrix	ANALYTE SUITE	QUALITY CONTROL (QC) COMMENTS
3/9/96	0100-96-031	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
3/9/96	0100-96-032	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
3/9/96	0100-96-033	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
3/9/96	0100-96-034	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1551	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1552	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1553	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1554	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1555	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1556	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1557	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1558	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1559	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1560	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1561	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1562	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1563	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1564	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1565	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1566	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1570	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1571	Soil	Cu, Pb, Zn	All data are valid and usable with qualification
10/15/96	0100-96-1572	Soil	Cu, Pb, Zn	All data are valid and usable with qualification

APPENDIX B. RFI CHARACTERIZATION DATA

No RFI data were collected before initiation of the VCA. A summary of analytical data for samples collected by the USDA Forest Service before VCA activities is available from the RPF under Correspondence, USDA Forest Service Memorandum 7400.

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APPENDIX C. COST COMPARISON

TABLE C-1

BEFORE AND AFTER COST COMPARISON FOR PRS 0-016 VCA

ACTIVITIES	ESTIMATED COST	ACTUAL COST
Pre-field activities	$ 39,000	$ 54,000
Field activities	$ 177,300	$ 1,164,200
Analytical costs	$ 23,600	$ 51,400
Waste Management	$ 23,800	$ 162,000
Post-field activities	$ 36,300	$ 41,000
TOTAL	**$ 300,000**	**$ 1,472,600**

Cost affected by volume increase from 3 000 yd^3 (1994 VCA plan) to 13 700 yd^3 at project completion.

The esitmated cost was based on the orginal volume of soil of 3 000 yd^3. The final amount of soil processed was 13 700 yd^3. the actual cost reflects this increased volume.

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APPENDIX D. CONFIRMATORY SAMPLING RESULTS TABLE

TABLE D-1

CONFIRMATORY SAMPLING RESULTS TABLE

LANL Sample Number	Location ID	Sample Depth (inches)	Total Metals		
			Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
LANL SAL	NA	NA	2800	400	23000
AAB2415	00-01441	0 - 2	13.0	210.0	120.0
AAB2415	00-01441	0 - 2	11.0	140.0	26.0
AAB2416	00-01442	0 - 2	6.7	97.0	19.0
AAB2417	00-01443	0 - 2	6.6	68.0	21.0
AAB2424	00-01444	0 - 2	11.0	17.0	52.0
AAB2424	00-01444	0 - 2	12.0	17.0	63.0
AAB2425	00-01444	0 - 6	14.0	20.0	51.0
AAB2426	00-01445	0 - 6	3.0	8.2	21.0
0100-96-0031	00-04738	0 - 6	4.5 UJ	45.6	30.5
0100-96-0033	00-04740	0 - 6	3.6 UJ	39.0	30.2
0100-96-0034	00-04741	0 - 6	4.8 UJ	81.8	31.7
0100-96-0036	00-04739	0 - 6	10.0 UJ	24.8	39.2
0100-96-1551	00-05451	0 - 6	6.8	51.3 J-	31.3
0100-96-1552	00-05452	0 - 6	10.6	13.2 J-	32.0
0100-96-1553	00-05453	0 - 6	9.0	42.4 J-	31.3
0100-96-1554	00-05454	0 - 6	2.7	21.4 J-	32.0
0100-96-1555	00-05455	0 - 6	2.5	10.5 J-	33.4
0100-96-1556	00-05456	0 - 6	7.6	63.1 J-	42.0
0100-96-1557	00-05457	0 - 6	8.0	63.8 J-	32.5
0100-96-1558	00-05458	0 - 6	8.6	64.8 J-	34.4
0100-96-1559	00-05459	0 - 6	7.4	18.2 J-	30.8
0100-96-1560	00-05460	0 - 6	6.5	42.8 J-	26.5
0100-96-1561	00-05461	0 - 6	6.0	23.7 J-	33.6
0100-96-1562	00-05462	0 - 6	6.9	12.5 J-	26.4
0100-96-1563	00-05463	0 - 6	10.2	16.9 J-	31.4
0100-96-1564	00-05464	0 - 6	11.5	14.9 J-	30.2
0100-96-1565	00-05465	0 - 6	7.0	60.0 J-	31.7
0100-96-1566	00-05466	0 - 6	4.2	85.6 J-	29.8
0100-96-1570	00-05470	0 - 6	7.2	40.8 J-	28.9
0100-96-1571	00-05471	0 - 3	9.5	70.6 J-	31.2
0100-96-1572	00-05472	0 - 6	7.0	58.6 J-	29.3
0100-97-0141	00-05946	0 - 6	1.9	6.2	29.0
0100-97-0142	00-05947	0 - 6	1.9	3.7	23.0
0100-97-0143	00-05948	0 - 6	7.7	66.0	24.0
0100-97-0144	00-05949	0 - 6	2.2	6.0	30.0
0100-97-0145	00-05950	0 - 6	9.1	17.0	29.0

TABLE D-1 (continued)

CONFIRMATORY SAMPLING RESULTS TABLE

LANL Sample Number	Location ID	Sample Depth (inches)	Total Metals		
			Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
0100-97-0146	00-05951	0 - 6	10.0	13.0	34.0
0100-97-0147	00-05952	0 - 6	3.9	13.0	31.0
0100-97-0216	00-05971	6	6.0	11.7	26.5
0100-97-0217	00-05972	6 - 8	6.3	38.1	25.8
0100-97-0218	00-05973	6 - 8	4.4	8.0	18.2
0100-97-0219	00-05974	4 - 6	5.5	28.4	21.4
0100-97-0220	00-05975	4 - 6	3.3	8.2	15.8
0100-97-0221	00-05976	10 - 12	5.9	29.0	22.5
0100-97-0222	00-05977	8 - 10	6.4	35.5	22.6
0100-97-0223	00-05978	10 - 12	4.4	15.4	18.6
0100-97-0224	00-05979	8 - 12	3.6	5.8	12.6
0100-97-0225	00-05980	8 - 10	4.4	18.8	18.5
0100-97-0226	00-05981	8 - 10	5.7	12.6	27.6
0100-97-0227	00-05982	11 - 12	5.3	12.5	28.0
0100-97-0228	00-05983	10 - 12	5.3	18.6	27.6
0100-97-0229	00-05984	10 - 12	6.8	52.7	30.1
0100-97-0230	00-05985	10 - 12	5.6	12.8	27.8
0100-97-0231	00-05986	12 - 14	4.0	10.8	18.7
0100-97-0232	00-05987	6 - 10	6.1	6.8	16.3

APPENDIX E. CERTIFICATION OF COMPLETION

CERTIFICATION OF COMPLETION

I certify that all the work pertaining to the Voluntary Corrective Action Report has been completed in accordance with the Department of Energy approved VCA plan entitled VCA Plan for Potential Release Site 0-016, (Old Firing Range). Based on my personal involvement or inquiry of the person or persons who managed this cleanup, a review of all data gathered and a visit to the site, to the best of my knowledge and belief, all criteria of the plan have been met or exceeded. I believe that the completion of this VCA is both protective to human health and the environment. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

GR Allen Garry Allen
Field Unit One Field Project Leader
Environmental Restoration Project
Los Alamos National Laboratory

1 July 97
Date Signed

APPENDIX F. WASTE CHARACTERIZATION DATA

TABLE F-1
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-95-0761	2-Aug-95	NR	NR	NR	NR	NR	NR	2.17	Pine needles after segregation from soil
0100-96-0111	21-Feb-96	NR	NR	NR	NR	NR	NR	0.252	Pine Needles
0100-96-0112	21-Feb-96	NR	NR	NR	NR	NR	NR	0.151	Pine Needles
0100-96-0113	21-Feb-96	NR	NR	NR	NR	NR	NR	302	Pine Needles
0100-96-0114	21-Feb-96	NR	NR	NR	NR	NR	NR	54.5	Pine Needles
0100-96-0115*	21-Feb-96	NR	NR	NR	NR	NR	NR	1.11	Duplicate of 0100-96-0113
0100-96-0813	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #1
0100-96-0814	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #2
0100-96-0815	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #3
0100-96-0816	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #4
0100-96-0817	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #5
0100-96-0818	2-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #6
0100-96-0819	3-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #7
0100-96-0820	3-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #8
0100-96-0821	3-May-96	NR	NR	NR	NR	NR	NR	3.0	Stockpile Fines #9
0100-96-0822	3-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #10
0100-96-0823	15-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #13
0100-96-0824	15-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #14
0100-96-0825	15-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #11
0100-96-0849	7-May-96	NR	NR	NR	6.8	56	32	ND	Stockpile Fines #6
0100-96-0850	7-May-96	NR	NR	NR	6.5	63	33	ND	Stockpile Fines #2
0100-96-0851	7-May-96	NR	NR	NR	6.7	62	30	3.2	Stockpile Fines #3
0100-96-0852	7-May-96	NR	NR	NR	6.5	75	30	ND	Stockpile Fines #4
0100-96-0853	7-May-96	NR	NR	NR	10	120	34	ND	Stockpile Fines #5
0100-96-0854	7-May-96	NR	NR	NR	7.6	70	38	ND	Stockpile Fines #1
0100-96-0855	7-May-96	NR	NR	NR	6.3	1200	33	ND	Stockpile Fines #7

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-0856	7-May-96	NR	NR	NR	7.6	77	33	ND	Stockpile Fines #8
0100-96-0857	8-May-96	NR	NR	NR	7.5	83	34	16	Stockpile Fines #9
0100-96-0858	8-May-96	NR	NR	NR	7.5	180	36	ND	Stockpile Fines #10
0100-96-0859	8-May-96	NR	NR	NR	7.1	69	35	ND	Stockpile Fines #11
0100-96-0860	8-May-96	NR	NR	NR	9.3	82	36	3	Stockpile Fines #12
0100-96-0861	8-May-96	NR	NR	NR	8.1	340	35	ND	Stockpile Fines #13
0100-96-0862	8-May-96	NR	NR	NR	7.8	75	38	ND	Stockpile Fines #14
0100-96-0863	8-May-96	NR	NR	NR	7.5	65	35	8	Stockpile Fines #15
0100-96-0864	15-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #12
0100-96-0865	15-May-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #15
0100-96-0876	6-Jun-96	NR	NR	NR	NR	NR	NR	ND	Waste sample from soil on liner after removal
0100-96-1651	1-Aug-96	NR	NR	NR	NR	NR	NR	0.24	Stockpile Fines #16
0100-96-1652	6-Aug-96	NR	NR	NR	NR	NR	NR	0.04	Stockpile Fines #17
0100-96-1653	6-Aug-96	NR	NR	NR	NR	NR	NR	0.09	Stockpile Fines #18
0100-96-1654	6-Aug-96	NR	NR	NR	NR	NR	NR	0.05	Stockpile Fines #19
0100-96-1655	6-Aug-96	NR	NR	NR	NR	NR	NR	0.06	Stockpile Fines #20
0100-96-1656	6-Aug-96	NR	NR	NR	NR	NR	NR	0.07	Stockpile Fines #21
0100-96-1657	6-Aug-96	NR	NR	NR	NR	NR	NR	0.17	Stockpile Fines #22
0100-96-1658	7-Aug-96	NR	NR	NR	NR	NR	NR	0.03	Stockpile Fines #23
0100-96-1659	7-Aug-96	NR	NR	NR	NR	NR	NR	1.2	Stockpile Fines #24
0100-96-1660	7-Aug-96	NR	NR	NR	NR	NR	NR	0.16	Stockpile Fines #25
0100-96-1661	7-Aug-96	NR	NR	NR	NR	NR	NR	3	Stockpile Fines #26
0100-96-1662	7-Aug-96	NR	NR	NR	NR	NR	NR	0.06	Sediment pile in W. end of S. pond
0100-96-1663	8-Aug-96	NR	NR	NR	NR	NR	NR	0.04	Stockpile Fines #27
0100-96-1664	8-Aug-96	NR	NR	NR	NR	NR	NR	0.09	Stockpile Fines #28
0100-96-1665	8-Aug-96	NR	NR	NR	NR	NR	NR	0.04	Stockpile Fines #29

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1666	8-Aug-96	NR	NR	NR	NR	NR	NR	0.1	Stockpile Fines #30
0100-96-1667	8-Aug-96	NR	NR	NR	NR	NR	NR	0.11	Stockpile Fines #31
0100-96-1668	8-Aug-96	NR	NR	NR	NR	NR	NR	1.9	Stockpile Fines #32
0100-96-1669	8-Aug-96	NR	NR	NR	NR	NR	NR	0.06	Stockpile Fines #33
0100-96-1670	8-Aug-96	NR	NR	NR	NR	NR	NR	0.05	Stockpile Fines #34
0100-96-1671	8-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #35
0100-96-1672	8-Aug-96	NR	NR	NR	NR	NR	NR	0.8	Stockpile Fines #36
0100-96-1673	8-Aug-96	NR	NR	NR	NR	NR	NR	0.04	Stockpile Fines #37
0100-96-1674	8-Aug-96	NR	NR	NR	NR	NR	NR	0.2	Stockpile Fines #38
0100-96-1675	9-Aug-96	NR	NR	NR	NR	NR	NR	0.09	Stockpile Fines #39
0100-96-1676	9-Aug-96	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #40
0100-96-1677	9-Aug-96	NR	NR	NR	NR	NR	NR	0.59	Stockpile Fines #41
0100-96-1678	12-Aug-96	NR	NR	NR	NR	NR	NR	3.9	Stockpile Fines #42
0100-96-1679	12-Aug-96	NR	NR	NR	NR	NR	NR	0.11	Stockpile Fines #43
0100-96-1680	12-Aug-96	NR	NR	NR	NR	NR	NR	0.2	Stockpile Fines #44
0100-96-1681	12-Aug-96	NR	NR	NR	NR	NR	NR	4.2	Stockpile Fines #45
0100-96-1682	12-Aug-96	NR	NR	NR	NR	NR	NR	1.7	Stockpile Fines #46
0100-96-1683	12-Aug-96	NR	NR	NR	NR	NR	NR	2.4	Stockpile Fines #47
0100-96-1684	12-Aug-96	NR	NR	NR	NR	NR	NR	5.2	Stockpile Fines #48
0100-96-1685	12-Aug-96	NR	NR	NR	NR	NR	NR	0.91	Stockpile Fines #49
0100-96-1686	12-Aug-96	NR	NR	NR	NR	NR	NR	3.5	Stockpile Fines #50
0100-96-1687	12-Aug-96	NR	NR	NR	NR	NR	NR	3	Stockpile Fines #51
0100-96-1688	13-Aug-96	NR	NR	NR	NR	NR	NR	4.3	Stockpile Fines #52
0100-96-1689	13-Aug-96	NR	NR	NR	NR	NR	NR	3.8	Stockpile Fines #53
0100-96-1690	13-Aug-96	NR	NR	NR	NR	NR	NR	2.1	Stockpile Fines #54
0100-96-1691	13-Aug-96	NR	NR	NR	NR	NR	NR	2.7	Stockpile Fines #55

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1692	13-Aug-96	NR	NR	NR	NR	NR	NR	1.2	Stockpile Fines #56
0100-96-1693	13-Aug-96	NR	NR	NR	NR	NR	NR	0.56	Stockpile Fines #57
0100-96-1694	13-Aug-96	NR	NR	NR	NR	NR	NR	1.2	Stockpile Fines #58
0100-96-1695	13-Aug-96	NR	NR	NR	NR	NR	NR	2.8	Stockpile Fines #59
0100-96-1696	13-Aug-96	NR	NR	NR	NR	NR	NR	0.83	Stockpile Fines #60
0100-96-1697	13-Aug-96	NR	NR	NR	NR	NR	NR	2.1	Stockpile Fines #61
0100-96-1698	13-Aug-96	NR	NR	NR	NR	NR	NR	0.34	Stockpile Fines #62
0100-96-1699	14-Aug-96	NR	NR	NR	NR	NR	NR	ND	South pond backfill material
0100-96-1700	14-Aug-96	NR	NR	NR	NR	NR	NR	0.99	Stockpile Fines #63
0100-96-1701	14-Aug-96	NR	NR	NR	NR	NR	NR	0.5	Stockpile Fines #64
0100-96-1702	14-Aug-96	NR	NR	NR	NR	NR	NR	0.15	Stockpile Fines #65
0100-96-1703	14-Aug-96	NR	NR	NR	NR	NR	NR	0.47	Stockpile Fines #66
0100-96-1704	14-Aug-96	NR	NR	NR	NR	NR	NR	0.34	Stockpile Fines #67
0100-96-1705	14-Aug-96	NR	NR	NR	NR	NR	NR	1.6	Stockpile Fines #68
0100-96-1706	14-Aug-96	NR	NR	NR	NR	NR	NR	0.25	Stockpile Fines #69
0100-96-1707	14-Aug-96	NR	NR	NR	NR	NR	NR	0.13	Stockpile Fines #70
0100-96-1708	14-Aug-96	NR	NR	NR	NR	NR	NR	0.14	Stockpile Fines #71
0100-96-1709	14-Aug-96	NR	NR	NR	NR	NR	NR	0.25	Stockpile Fines #72
0100-96-1710	14-Aug-96	NR	NR	NR	NR	NR	NR	0.56	Stockpile Fines #73
0100-96-1711	14-Aug-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #74
0100-96-1712	14-Aug-96	NR	NR	NR	NR	NR	NR	8.4	Stockpile Fines #75
0100-96-1712*	14-Aug-96	NR	NR	NR	NR	NR	NR	0.32	Stockpile Fines #75 Reanalysis
0100-96-1712*	14-Aug-96	NR	NR	NR	NR	NR	NR	0.33	Stockpile Fines #75 Reanalysis
0100-96-1713	15-Aug-96	NR	NR	NR	NR	NR	NR	0.93	Stockpile Fines #76
0100-96-1714	15-Aug-96	NR	NR	NR	NR	NR	NR	15	Stockpile Fines #77
0100-96-1714*	15-Aug-96	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #77 Reanalysis

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1714*	15-Aug-96	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #77 Reanalysis
0100-96-1715	15-Aug-96	NR	NR	NR	NR	NR	NR	1.4	Stockpile Fines #78
0100-96-1716	15-Aug-96	NR	NR	NR	NR	NR	NR	0.47	Stockpile Fines #79
0100-96-1717	15-Aug-96	NR	NR	NR	NR	NR	NR	0.88	Stockpile Fines #80
0100-96-1718	15-Aug-96	NR	NR	NR	NR	NR	NR	0.94	Stockpile Fines #81
0100-96-1719	15-Aug-96	NR	NR	NR	NR	NR	NR	0.56	Stockpile Fines #82
0100-96-1720	15-Aug-96	NR	NR	NR	NR	NR	NR	2.7	Stockpile Fines #83
0100-96-1721	15-Aug-96	NR	NR	NR	NR	NR	NR	0.93	Stockpile Fines #84
0100-96-1722	15-Aug-96	NR	NR	NR	NR	NR	NR	9.2	Stockpile Fines #85
0100-96-1722*	15-Aug-96	NR	NR	NR	NR	NR	NR	1.5	Stockpile Fines #85 Reanalysis
0100-96-1722*	15-Aug-96	NR	NR	NR	NR	NR	NR	1.5	Stockpile Fines #85 Reanalysis
0100-96-1723	16-Aug-96	NR	NR	NR	NR	NR	NR	78	Stockpile Fines #86
0100-96-1723*	16-Aug-96	NR	NR	NR	NR	NR	NR	0.56	Stockpile Fines #86 Reanalysis
0100-96-1723*	16-Aug-96	NR	NR	NR	NR	NR	NR	0.57	Stockpile Fines #86 Reanalysis
0100-96-1724	16-Aug-96	NR	NR	NR	NR	NR	NR	1.6	Stockpile Fines #87
0100-96-1725	16-Aug-96	NR	NR	NR	NR	NR	NR	0.95	Stockpile Fines #88
0100-96-1726	16-Aug-96	NR	NR	NR	NR	NR	NR	13	Stockpile Fines #89
0100-96-1726*	16-Aug-96	NR	NR	NR	NR	NR	NR	2.2	Stockpile Fines #89 Reanalysis
0100-96-1726*	16-Aug-96	NR	NR	NR	NR	NR	NR	2.2	Stockpile Fines #89 Reanalysis
0100-96-1727	16-Aug-96	NR	NR	NR	NR	NR	NR	0.38	Stockpile Fines #90
0100-96-1728	16-Aug-96	NR	NR	NR	NR	NR	NR	0.92	Stockpile Fines #91
0100-96-1729	16-Aug-96	NR	NR	NR	NR	NR	NR	1.8	Stockpile Fines #92
0100-96-1730	16-Aug-96	NR	NR	NR	NR	NR	NR	0.88	Stockpile Fines #93
0100-96-1731	16-Aug-96	NR	NR	NR	NR	NR	NR	1.3	Stockpile Fines #94
0100-96-1732	16-Aug-96	NR	NR	NR	NR	NR	NR	0.55	Stockpile Fines #95
0100-96-1733	16-Aug-96	NR	NR	NR	NR	NR	NR	0.59	Stockpile Fines #96

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1734	16-Aug-96	NR	NR	NR	NR	NR	NR	1.3	Stockpile Fines #97
0100-96-1735	16-Aug-96	NR	NR	NR	NR	NR	NR	0.38	Stockpile Fines #98
0100-96-1736	16-Aug-96	NR	NR	NR	NR	NR	NR	4.1	Stockpile Fines #99
0100-96-1737	16-Aug-96	NR	NR	NR	NR	NR	NR	0.86	Stockpile Fines #100
0100-96-1738	16-Aug-96	NR	NR	NR	NR	NR	NR	0.30	Stockpile Fines #101
0100-96-1739	16-Aug-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #102
0100-96-1740	16-Aug-96	NR	NR	NR	NR	NR	NR	1.10	Stockpile Fines #103
0100-96-1741	16-Aug-96	NR	NR	NR	NR	NR	NR	0.54	Stockpile Fines #104
0100-96-1742	16-Aug-96	NR	NR	NR	NR	NR	NR	0.24	Stockpile Fines #105
0100-96-1743	19-Aug-96	NR	NR	NR	NR	NR	NR	0.10	Stockpile Fines #106
0100-96-1744	19-Aug-96	NR	NR	NR	NR	NR	NR	0.38	Stockpile Fines #107
0100-96-1745	19-Aug-96	NR	NR	NR	NR	NR	NR	1.80	Stockpile Fines #108
0100-96-1746	19-Aug-96	NR	NR	NR	NR	NR	NR	7.20	Stockpile Fines #109
0100-96-1746*	19-Aug-96	NR	NR	NR	NR	NR	NR	1.80	Stockpile Fines #109 Reanalysis
0100-96-1746*	19-Aug-96	NR	NR	NR	NR	NR	NR	1.80	Stockpile Fines #109 Reanalysis
0100-96-1747	19-Aug-96	NR	NR	NR	NR	NR	NR	1.10	Stockpile Fines #110
0100-96-1748	19-Aug-96	NR	NR	NR	NR	NR	NR	3.00	Stockpile Fines #111
0100-96-1749	19-Aug-96	NR	NR	NR	NR	NR	NR	1.70	Stockpile Fines #112
0100-96-1750	19-Aug-96	NR	NR	NR	NR	NR	NR	3.20	Stockpile Fines #113
0100-96-1771	19-Aug-96	NR	NR	NR	NR	NR	NR	3.00	Stockpile Fines #114
0100-96-1772	19-Aug-96	NR	NR	NR	NR	NR	NR	4.50	Stockpile Fines #115
0100-96-1773	19-Aug-96	NR	NR	NR	NR	NR	NR	0.78	Stockpile Fines #116
0100-96-1774	20-Aug-96	NR	NR	NR	NR	NR	NR	0.1	Stockpile Fines #117
0100-96-1775	20-Aug-96	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #118
0100-96-1776	20-Aug-96	NR	NR	NR	NR	NR	NR	0.6	Stockpile Fines #119
0100-96-1777	20-Aug-96	NR	NR	NR	NR	NR	NR	0.68	Stockpile Fines #120

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1778	20-Aug-96	NR	NR	NR	NR	NR	NR	4.3	Stockpile Fines #121
0100-96-1779	20-Aug-96	NR	NR	NR	NR	NR	NR	0.21	Stockpile Fines #122
0100-96-1780	20-Aug-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #123
0100-96-1781	20-Aug-96	NR	NR	NR	NR	NR	NR	0.35	Stockpile Fines #124
0100-96-1782	20-Aug-96	NR	NR	NR	NR	NR	NR	1.8	Re-sample of stockpile fines-#48
0100-96-1783	20-Aug-96	NR	NR	NR	NR	NR	NR	0.08	Re-sample of stockpile fines-#48
0100-96-1784	21-Aug-96	NR	NR	NR	NR	NR	NR	0.63	Stockpile Fines #125
0100-96-1785	21-Aug-96	NR	NR	NR	NR	NR	NR	0.12	Stockpile Fines #126
0100-96-1786	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #127
0100-96-1787	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #128
0100-96-1788	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #129
0100-96-1789	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #130
0100-96-1790	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #131
0100-96-1791	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #132
0100-96-1792	21-Aug-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #133
0100-96-1793	21-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #134
0100-96-1800	22-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #135
0100-96-1800*	22-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #135 Reanalysis
0100-96-1801	22-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #136
0100-96-1801*	22-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #136 Reanalysis
0100-96-1802	23-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #137
0100-96-1802*	23-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #137 Reanalysis
0100-96-1803	23-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #138
0100-96-1803*	23-Aug-96	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #138 Reanalysis
0100-96-1804	23-Aug-96	NR	NR	NR	NR	NR	NR	0.79	Stockpile Fines #139
0100-96-1804*	23-Aug-96	NR	NR	NR	NR	NR	NR	0.79	Stockpile Fines #139 Reanalysis

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1805	26-Aug-96	NR	NR	NR	NR	NR	NR	5.3	Stockpile Fines #140
0100-96-1805*	26-Aug-96	NR	NR	NR	NR	NR	NR	5.2	Stockpile Fines #140 Reanalysis
0100-96-1806	27-Aug-96	NR	NR	NR	NR	NR	NR	0.13	Stockpile Fines #141
0100-96-1806*	27-Aug-96	NR	NR	NR	NR	NR	NR	0.13	Stockpile Fines #141 Reanalysis
0100-96-1807	27-Aug-96	NR	NR	NR	NR	NR	NR	0.77	Stockpile Fines #142
0100-96-1807*	27-Aug-96	NR	NR	NR	NR	NR	NR	0.76	Stockpile Fines #142 Reanalysis
0100-96-1808	27-Aug-96	NR	NR	NR	NR	NR	NR	0.25	Stockpile Fines #143
0100-96-1808*	27-Aug-96	NR	NR	NR	NR	NR	NR	0.25	Stockpile Fines #143 Reanalysis
0100-96-1809	27-Aug-96	NR	NR	NR	NR	NR	NR	0.22	Stockpile Fines #144
0100-96-1809*	27-Aug-96	NR	NR	NR	NR	NR	NR	0.22	Stockpile Fines #144 Reanalysis
0100-96-1810	27-Aug-96	NR	NR	NR	NR	NR	NR	0.84	Stockpile Fines #145
0100-96-1810*	27-Aug-96	NR	NR	NR	NR	NR	NR	0.85	Stockpile Fines #145 Reanalysis
0100-96-1811	28-Aug-96	NR	NR	NR	NR	NR	NR	1.2	Stockpile Fines #146
0100-96-1812	28-Aug-96	NR	NR	NR	NR	NR	NR	0.04	Stockpile Fines #147
0100-96-1813	28-Aug-96	NR	NR	NR	NR	NR	NR	0.38	Stockpile Fines #148
0100-96-1814	29-Aug-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #149
0100-96-1815	29-Aug-96	NR	NR	NR	NR	NR	NR	0.14	Stockpile Fines #150
0100-96-1816	29-Aug-96	NR	NR	NR	NR	NR	NR	0.12	Stockpile Fines #151
0100-96-1817	30-Aug-96	NR	NR	NR	NR	NR	NR	11	Stockpile Fines #152
0100-96-1817*	30-Aug-96	NR	NR	NR	NR	NR	NR	0.06	Stockpile Fines #152 Reanalysis
0100-96-1817*	30-Aug-96	NR	NR	NR	NR	NR	NR	0.17	Stockpile Fines #152 Reanalysis
0100-96-1818	3-Sep-96	NR	NR	NR	NR	NR	NR	0.12	Stockpile Fines #153
0100-96-1819	4-Sep-96	NR	NR	NR	NR	NR	NR	2.4	Stockpile Fines #154
0100-96-1820	4-Sep-96	NR	NR	NR	NR	NR	NR	0.36	Stockpile Fines #155
0100-96-1821	5-Sep-96	NR	NR	NR	NR	NR	NR	0.1	Stockpile Fines #156
0100-96-1822	5-Sep-96	NR	NR	NR	NR	NR	NR	0.06	Stockpile Fines #157

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-96-1823	5-Sep-96	NR	NR	NR	NR	NR	NR	15	Stockpile Fines #158
0100-96-1824	5-Sep-96	NR	NR	NR	NR	NR	NR	0.23	Stockpile Fines #159
0100-96-1825	5-Sep-96	NR	NR	NR	NR	NR	NR	0.19	Stockpile Fines #160
0100-96-1826	30-Sep-96	NR	NR	NR	NR	NR	NR	0.662	Stockpile Fines #161
0100-96-1827	30-Sep-96	NR	NR	NR	NR	NR	NR	0.231	Stockpile Fines #162
0100-96-1870	16-Oct-96	NR	NR	NR	NR	NR	NR	0.861	Pine needles remaining in dumpster
0100-97-0001	23-Jan-97	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #163
0100-97-0002	23-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #164
0100-97-0003	23-Jan-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #165
0100-97-0004	27-Jan-97	NR	NR	NR	NR	NR	NR	21	Stockpile Fines #166
0100-97-0005	27-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #167
0100-97-0006	27-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #168
0100-97-0007	30-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #169
0100-97-0008	30-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #170
0100-97-0009	30-Jan-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #171
0100-97-0010	6-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #172
0100-97-0011	6-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #173
0100-97-0012	6-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #174
0100-97-0013	6-Feb-97	NR	NR	NR	NR	NR	NR	3	Stockpile Fines #175
0100-97-0014	6-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #176
0100-97-0015	11-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #177
0100-97-0016	11-Feb-97	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #178
0100-97-0017	11-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #179
0100-97-0018	11-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #180
0100-97-0019	13-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #181
0100-97-0020	13-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #182

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-97-0021	13-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #183
0100-97-0022	13-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #184
0100-97-0023	13-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #185
0100-97-0024	18-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #186
0100-97-0025	18-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #187
0100-97-0026	18-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #188
0100-97-0027	24-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #189
0100-97-0028	24-Feb-97	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #190
0100-97-0029	24-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #191
0100-97-0030	24-Feb-97	NR	NR	NR	NR	NR	NR	1	Stockpile Fines #192
0100-97-0031	24-Feb-97	NR	NR	NR	NR	NR	NR	2	Stockpile Fines #193
0100-97-0032	24-Feb-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #194
0100-97-0033	6-Mar-97	NR	NR	NR	NR	NR	NR	4S	Stockpile Fines #195
0100-97-0034	6-Mar-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #196
0100-97-0035	6-Mar-97	NR	NR	NR	NR	NR	NR	110	Stockpile Fines #197
0100-97-0036	6-Mar-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Fines #198
0100-97-0037	18-Mar-97	NR	NR	NR	NR	NR	NR	270	Stockpile Gravel #1
0100-97-0038	18-Mar-97	NR	NR	NR	NR	NR	NR	10	Stockpile Gravel #2
0100-97-0039	18-Mar-97	NR	NR	NR	NR	NR	NR	54	Stockpile Gravel #3
0100-97-0040	18-Mar-97	NR	NR	NR	NR	NR	NR	39	Stockpile Gravel #4
0100-97-0041	18-Mar-97	NR	NR	NR	NR	NR	NR	3	Stockpile Gravel #5
0100-97-0042	18-Mar-97	NR	NR	NR	NR	NR	NR	5.5S	Stockpile Gravel #6
0100-97-0043	18-Mar-97	NR	NR	NR	NR	NR	NR	110	Stockpile Gravel #7
0100-97-0044	18-Mar-97	NR	NR	NR	NR	NR	NR	48	Stockpile Gravel #8
0100-97-0045	25-Mar-97	NR	NR	NR	NR	NR	NR	250	Stockpile Gravel #9
0100-97-0046	25-Mar-97	NR	NR	NR	NR	NR	NR	75	Stockpile Gravel #10

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
0100-97-0047	25-Mar-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Gravel #11
0100-97-0048	25-Mar-97	NR	NR	NR	NR	NR	NR	ND	Stockpile Gravel #12
0100-97-0049	25-Mar-97	NR	NR	NR	NR	NR	NR	290	Stockpile Gravel #13
0100-97-0050	2-Apr-97	NR	NR	NR	NR	NR	NR	ND	Range Floor Scrapings #1
0100-97-0051	2-Apr-97	NR	NR	NR	NR	NR	NR	280	Range Floor Scrapings #2
0100-97-0052	2-Apr-97	NR	NR	NR	NR	NR	NR	ND	Range Floor Scrapings #3
0100-97-0053	2-Apr-97	NR	NR	NR	NR	NR	NR	ND	Range Floor Scrapings #4
0100-97-0054	2-Apr-97	NR	NR	NR	NR	NR	NR	ND	Range Floor Scrapings #5
0100-97-0055	2-Apr-97	NR	NR	NR	NR	NR	NR	ND	Range Floor Scrapings #6
AAA6260	18-May-94	<36	61J	39J	3.7	46	22	NR	Composite Processed Soil Sample
AAA6260*	18-May-94	NR	NR	NR	3.7	66	13	NR	Duplicate Analysis
AAA6261	23-May-94	<36	92	66J	8.7	260	19	NR	Composite Processed Soil Sample
AAA6261*	23-May-94	NR	NR	NR	9.2	76	24	NR	Duplicate Analysis
AAA6262	24-May-94	<36	61J	38J	6.5	41	16	NR	Composite Processed Soil Sample
AAA6262*	24-May-94	NR	NR	NR	5.3	5	39	NR	Duplicate Analysis
AAA6263	26-May-94	<36	66	<36	5.4	22	18	NR	Composite Processed Soil Sample
AAA6263*	26-May-94	NR	NR	NR	5.1	33	16	NR	Duplicate Analysis
AAA6264	6-Jun-94	<36	73	52J	3.9	58	20	NR	Composite Processed Soil Sample
AAA6264*	6-Jun-94	NR	NR	NR	5.3	66	23	NR	Duplicate Analysis
AAA6265	16-May-94	<36	94	47J	3.3	65	18	NR	Composite Processed Soil Sample
AAA6266	6-Jun-94	<36	83	92J	4.1	65	20	NR	Composite Processed Soil Sample
AAA6267	27-Jun-94	<36	163	77J	5.4	160	26	NR	Composite Processed Soil Sample
AAA6267*	27-Jun-94	NR	NR	NR	4.3	130	22	NR	Duplicate Analysis
AAA6268	27-Jun-94	<36	268	41J	6	130	24	NR	Composite Processed Soil Sample
AAA6269	5-Jul-94	<36	144	68J	4.3	340	22	NR	Composite Processed Soil Sample
AAA6269*	5-Jul-94	<36	86	73J	130	110	25	NR	Duplicate Analysis

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
AAA6270	11-Jul-94	<36	76	52J	12	46	29	NR	Composite Processed Soil Sample
AAA6271	12-Jul-94	<36	187	51J	9.8	100	27	NR	Composite Pond Sediment
AAA6279	24-Jul-94	<36	92	68J	4	150	17	0.85	Composite Processed Soil Sample
AAA6279*	24-Jul-94	NR	NR	NR	140	150	30	0.91	Duplicate Analysis
AAA6280	24-Jul-94	<36	87	<36	4	200	22	0.69	Composite Processed Soil Sample
AAA6281	24-Jul-94	<36	77	36J	3.8	81	16	0.2	Composite Processed Soil Sample
AAA6282	24-Jul-94	<36	65	51J	3.8	100	15	0.11	Composite Processed Soil Sample
AAA6283	24-Jul-94	<36	89	68J	3.8	150	21	1.5	Composite Processed Soil Sample
AAA6284	24-Jul-94	<36	81	53J	4.1	140	20	1.3	Composite Processed Soil Sample
AAA6669	12-Jul-94	<36	163	109J	9.8	60	28	NR	Composite Pond Slurry Sample
AAA6669*	12-Jul-94	NR	NR	NR	9.8	58	27	NR	Duplicate Analysis
AAA6670	13-Jul-94	41J	356	98J	NR	168	NR	0.95	South Pond Sediment Grab Sample
AAA6671	6-Jul-94	<36	268	66J	NR	310	NR	6.6	Composite Processed Soil Sample
AAA6671*	6-Jul-94	NR	NR	NR	NA	NA	NA	6.6	Duplicate Analysis
AAA6672	18-Jul-94	<36	72	42J	4	59	30	1.3	Composite Processed Soil Sample
AAA6672D	18-Jul-94	<36	85	54J	3	69	25	0.37	Duplicate Analysis
AAA6673	22-Jul-94	<36	73	81J	4.8	150	28	NR	Composite Processed Soil Sample
AAA6674	24-Jul-94	<36	46J	58J	3.6	140	15	0.25	Composite Processed Soil Sample
AAA6675	24-Jul-94	<36	46J	88J	4.1	45	20	0.03	Composite Processed Soil Sample
AAA6676	24-Jul-94	<36	91	64J	13	85	17	0.27	Composite Processed Soil Sample
AAA6698	23-Jul-94	<36	167	100J	9.7	150	44	0.28	South pond sediment
AAA6699	23-Jul-94	<36	241	132	15	290	60	0.44	South pond sediment
AAA6700	23-Jul-94	<36	311	113J	15	260	79	0.3	South pond sediment
AAB2413	11-Aug-94	<36	95	41J	2.2	660	22	NR	Composite Processed Soil Sample
AAB2413*	11-Aug-94	<36	60	<36	NA	125	NA	NR	Duplicate Analysis
AAB2414	11-Aug-94	<36	105	68J	2.6	81	24	NR	Composite Processed Soil Sample

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
AAB2414*	11-Aug-94	<36	92	74J	<2.0	160	31	NR	Duplicate Analysis
AAB2418	31-Aug-94	<36	84	60J	3.3	110	17	NR	Composite Processed Soil Sample
AAB2418*	31-Aug-94	<36	79	47J	NA	NA	NA	NR	Duplicate Analysis
AAB2419	31-Aug-94	<36	123	63J	NR	NR	NR	0.39	Composite Pond Slurry Sample
AAB2419*	31-Aug-94	NR	NR	NR	NR	NR	NR	0.43	Duplicate Analysis
AAB2420	8-Sep-94	<36	118	108J	NR	NR	NR	0.13	Composite Pond Slurry Sample
AAB2420*	8-Sep-94	NR	NR	NR	NR	NR	NR	0.13	Duplicate Analysis
AAB2421	8-Sep-94	<36	76	84J	5.3	110	33	NR	Composite Processed Soil Sample
AAB2421*	8-Sep-94	<36	91	50J	5.4	81	31	NR	Duplicate Analysis
AAB2422	9-Sep-94	<36	55J	83J	3.7	90	28	NR	Composite Processed Soil Sample
AAB2422*	9-Sep-94	<36	43J	105J	NA	NA	NA	NR	Duplicate Analysis
AAB2423	13-Sep-94	<36	46J	54J	3.4	400	29	NR	Composite Processed Soil Sample
AAB2423*	13-Sep-94	<36	86	104J	3	110	29	NR	Duplicate Analysis
AAB2427	15-Sep-94	<36	70	83J	3.5	51	31	NR	Composite Processed Soil Sample
AAB2427*	15-Sep-94	<36	50J	59J	4.2	70	29	NR	Duplicate Analysis
AAB2428	15-Sep-94	<36	160	115J	NA	NA	NA	NA	Composite Pond Slurry Sample
AAB2429	19-Sep-94	<36	61J	76J	4.7	89	39	140	Composite Processed Soil Sample
AAB2429*	19-Sep-94	47J	50J	60J	NR	NR	NR	130	Duplicate Analysis
AAB2430	20-Sep-94	54J	39J	69J	5.5	73	40	NR	Composite Processed Soil Sample
AAB2430*	20-Sep-94	<36	45J	73J	4.5	66	41	NR	Duplicate Analysis
AAB2431	20-Sep-94	<36	63	89J	NR	NR	NR	0.17	South Pond Sediment Sample
AAB2431*	20-Sep-94	NR	NR	NR	NR	NR	NR	0.11	Duplicate Analysis
AAB2432	20-Sep-94	NR	NR	NR	0.01	0.002	<0.010	NR	South Pond Sediment Sample
AAB3545	22-Sep-94	<36	45J	35J	1.9	24	17	NR	Composite Processed Soil Sample
AAB3546	27-Sep-94	<36	40	76J	3.4	34	17	<0.03	South Pond Sediment Sample
AAB3547	27-Sep-94	<36	44	74J	<0.004	<0.03	<0.02	NR	South Pond Sediment Sample

TABLE F-1 (continued)
WASTE CHARACTERIZATION DATA

Sample ID	Sample Date	XRF Analysis			Totals Analysis			TCLP Analysis	Comments
		Cu (ppm)	Pb (ppm)	Zn (ppm)	Cu (mg/kg) SAL = 2800 mg/kg	Pb (mg/kg) SAL = 400 mg/kg	Zn (mg/kg) SAL = 23000 mg/kg	Pb (mg/L) RCRA Limit = 5 mg/L	
AAB3548	27-Sep-94	<36	30J	67J	3.4	34	17	NR	Composite Processed Soil Sample
AAB3549	28-Sep-94	<36	18J	60	1.3	60	29	NR	Composite Processed Soil Sample
AAB3550	28-Sep-94	<36	57J	62J	<0.5	44	46	NR	Composite Processed Soil Sample
AAB3550*	28-Sep-94	NR	NR	NR	<0.5	54	21	NR	Duplicate Analysis
AAB3551	5-Oct-94	<36	55J	27J	2.3	22	19	NR	Composite Processed Soil Sample
AAB3551*	5-Oct-94	NR	NR	NR	3.6	50	20	NR	Duplicate Analysis
AAB3552	5-Oct-94	<36	75	99J	NR	NR	NR	0.24	South Pond Sediment Sample
AAB3552*	5-Oct-94	NR	NR	NR	NR	NR	NR	0.127	Duplicate Analysis
AAB3553	5-Oct-94	<36	65	83J	0.005	<0.03	<0.02	NR	South Pond Sediment Sample
AAB3554	7-Oct-94	<36	64J	44J	4.6	110	42	NR	Composite Processed Soil Sample
AAB3555	11-Oct-94	<36	85	93J	NR	NR	NR	NR	South Pond Sediment Sample
AAB3555*	11-Oct-94	NR	NR	NR	NR	NR	NR	NR	Duplicate Analysis
AAB3556	11-Oct-94	NR	NR	NR	<0.004	<0.03	0.028	<0.03	South Pond Sediment Sample
AAB3558	13-Oct-94	NR	NR	NR	<0.5	38	30	NR	Composite Processed Soil Sample
AAB3558*	13-Oct-94	NR	NR	NR	<0.5	41	16	NR	Duplicate Analysis

*Sample Reanalysis
**Based on dupilcate sample results and reanalysis of sample material, this value is apparently erroneous\
NR = Not Requested
S = Analyzed By Method Of Standard Addition

TABLE F-2
POND WATER DATA

Analyte	Sample Number 0100-96-1573 Unfiltered (mg/L)	Sample Number 0100-96-1573 Filtered (mg/L)
Aluminum	4.96	0.0854
Arsenic	0.005	0.0043
Barium	0.136	0.13
Cadmium	ND	ND
Chromium	0.0062	ND
Cobalt	ND	ND
Copper	0.0122	ND
Lead	0.0231	0.0137
Mercury	ND	0.0001
Selenium	0.0014	0.0017
Silver	ND	ND
Vanadium	0.0051	ND
Zinc	0.0228	0.0143

Samples collected on 10 October, 1996 as part of an Notice Of Intent sent to the State of New Mexico for approval to discharge the North Pond water onto the range floor.
ND = Analyte not detected above the laboratory detection limit shown in parentheses.

VOLUNTARY CORRECTIVE ACTION (VCA) COMPLETION REPORT APPROVAL/DISAPPROVAL FORM

PRS(s) 0-016

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

FPL BR Allen Date 26 Sept 97

FPC [illegible] Date 9/26/97

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I, Theodore J. Taylor, DOE-LAAO, **APPROVE** ✓, **DISAPPROVE** _____ the accompanying Voluntary Correction Action Report for PRS(s) 0-016, TA-0.

The following reasons reflect the decision for disapproval:

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Signed: TJ Taylor Date: 10/21/97