Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA

Environmental Restoration

Environmental Restoration Project
MS M992
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505-667-0808/FAX 505-665-4747

Date: June 27, 1996
Refer to: EM/ER:96-369

Mr. Ted Taylor
Los Alamos Area Office
US Department of Energy, MS A316
Los Alamos, NM 87544

SUBJECT: FINAL VOLUNTARY CORRECTIVE ACTION (VCA) PLAN FOR ACTIVITIES AT TECHNICAL AREA (TA) 0, POTENTIAL RELEASE SITE (PRS) 0-016

Dear Ted:

Enclosed for your records please find a copy of the final VCA Plan for activities in TA-0, PRS 0-016. This plan has been modified from the earlier version to meet the latest remediation agreements with the Environmental Protection Agency and New Mexico Environment Department. This activity is planned for completion in Fiscal Year 1996.

Your Field Project Coordinator participated in developing and reviewing this plan. The VCA Checklist and Field Authorization Form have been completed and signed and are included in the enclosed plan. Informational copies of this VCA Plan are being distributed to the regulators.

If you have any questions, please call Garry Allen at (505) 667-3394 or Bonnie Koch at (505) 665-7202. Thank you for your cooperation in this matter.

Sincerely,

Jorg Jansen
Program Manager

JJ/bp

Enclosures: Final VCA Plan for TA-0, PRS 0-016
VCA Checklist and Field Work Authorization Form

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Voluntary Corrective Action Plan for

Potential Release Site

0-016

Inactive Small-Arms Firing Range

Field Unit 1

ENVIRONMENTAL
RESTORATION
PROJECT

June 1996
Revision 0

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY
LA-UR-96-2040

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1.0 INTRODUCTION

The United States Forest Service (USFS) and the County of Los Alamos have requested the cleanup of Potential Release Site (PRS) 0-016, the Former Small-Arms Firing Range, prior to transfer of the land from the USFS to a local developer as part of a larger public-private land exchange. This Voluntary Corrective Action (VCA) plan is being proposed due to time constraints placed on the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) Project by the pending land exchange. The site is located immediately west of Guaje Pines Cemetery (Figure 8.3-1).

An earlier VCA plan was prepared in 1993 and partially executed in 1993 and 1994. The previous VCA plan involved remediation of the firing range berms through soil washing to remove the lead and lead fragments from the soil. Approximately 6000 cubic yards (yd^3) of the lead-contaminated soil was cleaned by soil washing at the end of the 1994 field season, and approximately 5000 yd^3 remain.

At the beginning of the 1995 field season, the active Protection Technology of Los Alamos (PTLA) firing range in Tech Area 72 (TA-72) indicated several thousand cubic yards of soil was needed to improve the berms at the existing ranges. The option of moving the soil to the active PTLA firing range was considered by the New Mexico Environment Department (NMED) to be a cost-effective and "good common-sense" alternative to washing the remaining soil. Approval from the NMED to proceed with this option was not officially granted; however, the soil washing operations were discontinued based on an indication from the NMED that they would approve moving the soil if certain conditions were met. After LANL complied with the conditions of the approval, the NMED and U.S. Environmental Protection Agency (EPA) determined that the soil should not be moved without first being processed to remove the lead, or unless LANL establishes a Corrective Action Management Unit (CAMU) at the active PTLA firing range in TA-72. Due to the time required to prepare and process a CAMU application and a Class 3 permit modification, LANL has determined that the best way to move forward with the site cleanup is to remove and recycle the remaining bullets in the soil. This VCA plan provides the approach to removing a sufficient quantity of the lead from the remaining soil using an equivalent method to facilitate transferring the soil to the active PTLA firing range for re-use.

1.1 Site Type and Description

The Former Small-Arms Firing Range is located on a ridge between two small valleys which converge about one-quarter mile to the east (Figure 8.3-2). The ephemeral streams in these valleys feed into the upper end of Rendija Canyon. The terrain at the site varies from relatively flat on the ridge top to steep grades at the edges of the site which are associated with the valley walls.

With the exception of the areas with soil stockpiles, the site is covered by a thin veneer of soil overlying the Bandelier Tuff. In places, weathered Bandelier Tuff crops out. Soil thickness increases in the colluvial soils on the adjacent valley slopes and is thickest in the alluvial deposits on the valley bottoms.

Ephemeral surface-water conditions occur in the adjacent drainages and are associated with snow-melt runoff in the spring and localized thunderstorms during the period of July through September. The main aquifer beneath the site is approximately 1300 feet below the land surface and occurs within the Puye Formation and Santa Fe Group sediments.

The site is identified in Module VIII of LANL's Resource Conservation and Recovery Act (RCRA) permit, also known as the Hazardous and Solid Waste Amendments (HSWA) permit, as a Solid Waste Management Unit (SWMU) requiring a RCRA Facility Investigation (RFI). This PRS was not included in Table A of the 1990 HSWA permit and was subsequently added to the permit in 1994, via a February 1993 Class 3 permit modification.

1.1.1 Operational History

The Inactive Small-Arms Firing Range was constructed for use by security forces for the Atomic Energy Commission (AEC). Construction of the range was conducted 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 the present firing range in Sandia Canyon was built in the early 1960s. The site has been used unofficially by the general public in the intervening years. The Department of Energy (DOE) released the Inactive Small-Arms Firing Range and surrounding areas to the USFS in 1976.

1.1.2 COPCs and Rationale for Proposed Remedial Action

The composition of the bullets and fragments is predominantly lead with minor amounts of other elements. The extracted lead will be containerized and sent to a recycling center or reclamation facility.

Studies conducted by the Naval Engineering Laboratory indicate that metallic (elemental) lead (Pb) is the prime contaminant in small-arms firing ranges, but copper (Cu) and zinc (Zn) may also be found (Heath, et. al., 1991). Other forms of lead, such as oxidized lead, are not commonly found in small-arms ranges and would not be expected to be present in the arid environment found in Los Alamos. Existing analytical data indicate Cu and Zn are not present in concentrations exceeding 140 and 120 mg/kg, respectively.

2.0 SITE CHARACTERIZATION

2.1 RFI Information/Other Decision Data

The USFS conducted a study of the area in 1991 in which 11 of 21 judgmental samples taken from the backstops and other berms failed the toxicity characteristic leaching procedure (TCLP) test for lead. The data are not available, but a summary is given in Memorandum 7400, USFS, 1992; however, the contamination was attributed to the presence of lead bullets and fragments within the earthen berms. USFS Memorandum 7400 concludes 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 1300 feet below ground surface).

In 1993, the USFS and a private developer reached an agreement on a land exchange that includes the Former Small-Arms Firing Range. To date, only the land adjacent to the range has been exchanged. The agreement calls for the range to be exchanged also, if it could be cleaned up within two years of the initial exchange. Although more than two years has passed, the range land is still available to the developer, but he is now in jeopardy of losing it. The USFS, the private developer, and the County of Los Alamos want the cleanup to be completed in order to open the entire area for development, and have requested DOE to remediate the site immediately.

2.2 Nature and Extent of Contamination

The nature of small-arms ranges dictates that lead bullets and lead fragments be largely restricted to the range itself, with the majority of the lead in the target and backstop berms. At PRS 0-016, bullets were also found to be present in the area immediately behind the backstop berms. Thus, the extent of significant contamination is very limited. The area behind the backstop berms was found to contain a significant number of bullets upon initial investigation, and was subsequently cleaned up in 1994 by removing the soils containing elevated levels of lead. These soils were added to the stockpiled soils in the central portion of the site.

3.0 PROPOSED REMEDY

3.1 Description of the Proposed Remedial Action

Approximately 5000 yd^3 of stockpiled soil will be processed to remove the lead bullets. Most of the bullets in the soil are approximately .38 caliber. A dry screening process will be used to separate out the fraction of the soil that contains bullets of this size. Removal of the bullet-size fraction of the soils will greatly reduce the total lead content and lead leachability. Depending on the amount of oxidation, the bullets could leach on the order of 2 percent of the lead.

The bullets will be separated from the stockpiled soil using a sand and gravel dry-sieving apparatus, referred to as a Shaker Plant, that is equipped with various sizes of slotted wire screens. The soil will be processed through the Shaker Plant twice to facilitate removal of the fraction containing the bullets (bullet-size). First, the soil will be sieved using a 3/16-inch screen which will allow the material that is finer than the bullet-size fraction (fines) to be segregated from the bullets and larger material. The fines will be stockpiled and sampled at regular intervals for waste characterization. This larger fraction, containing the bullets, will then be sieved a second time using a 1/2-inch screen which will allow the bullets and bullet-sized material to pass through, and all materials greater than 1/2-inch (oversize) will be captured by the screen. The bullet-size material consisting predominantly of bullets, will be stockpiled on-site pending recycling or reclamation. The oversize fraction (>1/2 inch) will be considered non-hazardous because the bullets and fines will have been removed from this fraction through the sieving process. The screen sequence may be reversed, if necessary, to increase the efficiency and effectiveness of the process.

The processed soil will be sampled for waste characterization in 25 yd^3 units to ensure adequate characterization and facilitate waste minimization. One representative soil sample will be collected from each 25 yd^3 unit of processed soil at a randomly selected location on each pile and analyzed for lead by TCLP. Sample collection will be conducted using a thin-wall tube sampler with a length of 5 feet and a diameter of 1.5 inches. The sampler will be advanced to its entire length 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, as illustrated on Figure 8.3-5. Because each 25 yd^3 stockpile consists of six loader buckets of material at 4.2 yd^3 per bucket, that are placed consecutively on top of each other, 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 (Figure 8.3-5). The 25 yd^3 stockpiles are 6 feet high and 20 feet wide at the base, therefore, the distance from the middle of the side-slope to the center of the pile is approximately 5 feet. The 5-foot core of soil extracted from each pile of fines

will be thoroughly homogenized before being placed in a sample container for subsequent laboratory analysis. If the TCLP lead concentration in the soil exceeds the RCRA hazardous waste limit of 5 mg/L, the soil will be managed as hazardous waste.

The oversize fraction consisting of boulders, cobbles, and larger gravels (>1/2 inch) will be considered non-hazardous will not require sampling because the bullets and fine lead will have been extracted from this fraction. Visual observation will be used as a guide to determine if uncommonly large lead slugs (>50 caliber) or clods of fine material are present in the oversize fraction.

The bullet-size fraction will be stockpiled on-site pending transport to a recycling or reclamation facility to recover the lead. This fraction will consist of bullets and bullet-sized gravels as discussed in Section 4.1 of this VCA plan. No sampling of the bullet-size material will be required to facilitate recycling/reclamation of the lead.

Visual observations will also be used as a guide to segregating soils with potentially higher lead concentrations. As the soil is processed through the Shaker Plant, observations will be made as to how many bullets accumulate on the screen with respect to the quantity of soil passing through the plant. If observations indicate that there is a relatively high density of bullets in portions of the soil, then these materials will be segregated from soils that yield fewer bullets until analytical results are available to characterize the material.

Soil will be transferred from the soil stockpiles to the Shaker Plant using a front-end loader. The soil and range floor will be sprayed with water, as necessary, to minimize the amount of lofted dust. Total airborne dust will be visually monitored at the site in accordance with the Site-Specific Health and Safety Plan (SSHASP) dated 26 March 1996. Personnel and area monitoring for lead was conducted during the Shaker Plant pilot study to determine if there was a potential for site workers to be exposed to airborne lead during soil processing operations. The results of the personnel and area monitoring indicate that there are no lead inhalation concerns at the site, and monitoring has been discontinued based on this initial negative determination, in accordance with 29 CFR 1926.62 (Lead Standard).

A VCA Report will be prepared and submitted to the EPA when the project is completed. Copies will be provided to the USFS and the future site owner.

3.2 Comparison of Soil Washing and Shaker Plant Processes

A Shaker Plant pilot study was conducted at the site in April 1996 to determine the effectiveness of the dry-sieving process on the soils present at PRS 0-016. The results of the pilot study indicate that the Shaker Plant process is comparable to Soil Washing for removing lead bullets and fragments from the

firing range berm material, and either method would be equally effective for removing lead from the soils to the extent that cleanup levels are achieved. Based on archival data, Soil Washing operations, and the Shaker Plant pilot study, the soils at the Inactive Firing Range do not contain a significant amount of fine lead fragments with respect to the bulk of the lead, that is contained in the bullet-size fraction (>3/16 and ≤1/2-inch). This bullet-size fraction is extracted from the soils through the Shaker Plant process and contains bullets ranging from .22 to .50 caliber, and all fragments greater than 3/16-inch. Although Soil Washing can extract some of the finer lead fragments, there is little benefit over dry sieving because abundant fine lead is not characteristic of the soils at this site. Both Soil Washing and Dry Sieving are physical separation methods that extract lead as a function of size and/or density. Dissolved or leachable lead, if present at elevated concentrations, can not be extracted or otherwise processed out by either method.

A total of 375 cubic yards (15 piles of 25 yd^3 each) of fine soils was generated during the Shaker Plant pilot study. Each of the 15 piles of fines was sampled for total lead by x-ray fluorescence (XRF) and inductively-coupled plasma (ICP)/atomic emission spectroscopy (SW 846 Method 6010), and for TCLP metals. Analytical results for total lead in processed soils from the Shaker Plant were compared to processed soils from soil washing operations conducted at the site in 1994, as illustrated on Figures 8.3-3 and -4, for ICP and XRF, respectively. Total lead concentrations (ICP) in soils processed through the Shaker Plant ranged from 56 to 340 mg/kg with a mean of 99 mg/kg, and by comparison, soils processed through the Soil Washing Plant contained total lead concentrations (ICP) ranging from 5 to 660 mg/kg with a mean of 102 mg/kg. XRF results for total lead in soils processed through the Shaker Plant ranged from below the detection limit of 19 ppm to a maximum of 87 ppm, and XRF results for total lead in soils from the soil washing process ranged from below the detection limit of 19 ppm to a maximum of 268 ppm. This data comparison demonstrates that both methods effectively remove total lead to concentrations well below the target level of 400 ppm.

3.3 Basis for Cleanup Levels

Cleanup levels for the soil stockpiles (following removal of the bullets) will be based on the RCRA hazardous waste determination limit of 5 mg/L for TCLP lead. Processed soils that meet this criteria will be moved to the active PTLA Firing Range in TA-72.

Lead concentrations at the Former Small-Arms Firing Range, following the removal of the soil stockpiles, will be at or below the LANL Screening Action Level (SAL) of 400 ppm. This SAL for chemical constituents is based on EPA Region IX preliminary remediation goals for residential soil, and will ensure that there is minimal health risk to future site residents and to the environment. Verification/confirmation samples will be collected from the range floor to

ensure that all soils containing total lead concentrations above the SAL have been removed from the site.

3.4 Site Restoration

Following VCA activities, the site will be released to the USFS for completion of the land transfer to the land developer. Site restoration activities will be minimal, at the request of the land developer.

4.0 WASTE MANAGEMENT

4.1 Estimated Types and Volumes of Waste

The types of waste and recyclable materials to be generated as a result of the VCA activities will include the bullet-size fraction to be recycled, processed soil (fines) that is non-hazardous; oversize material that is non-hazardous, and possibly, processed soil that is hazardous. All of these materials will be re-used or recycled, with the exception of the processed soil that is determined to be hazardous, if any.

It is estimated that approximately 300 yd^3 of material comprised of bullets and bullet-size gravels will be generated and stored on-site until arrangements are in place to transfer the lead/gravel to a recycling center or reclamation facility. If the bullets comprise less than 50 percent of the gravel mixture by volume, based on visual observation, further separation and processing will be conducted to reduce the amount of gravel in the mixture. The gravel must consist of a minimum of 50 percent bullets by volume to be acceptable for recycling or reclamation.

The processed soil that is determined to be non-hazardous based on TCLP lead analysis, will be stockpiled on-site pending transfer to the active PTLA Firing Range (TA-72) for re-use as firing range berm material.

The soils processed through the Shaker Plant are not expected to exceed the TCLP limit for lead; however, in the event that portions of the material are determined to be hazardous based on TCLP lead analysis, these portions will be segregated, properly contained, and stored on-site until proper shipping and disposal can be arranged.

4.2 Method of Management and Disposal

The processed soil (fines) that is determined to be non-hazardous will be stockpiled on-site pending transfer to the TA-72 PTLA Firing Range. Soil (fines) that is determined to be hazardous will be containerized and stored on-site pending appropriate transportation and disposal at a LANL-approved treatment, storage, and disposal facility (TSDF). The bullet-size fraction will be

stored on-site pending transfer to a recycling center or smelting facility. The oversize fraction will be stockpiled on-site pending transfer to a LANL facility for use as fill material in an industrial application.

4.3 Placement and Management of Processed Soils at TA-72

The processed soils provided to TA-72 will be used to construct firing range berms to improve the current configuration of the active PTLA firing lanes. Concerns regarding the potential for berm material to erode into the wash that passes through the range area have been addressed through development of a Storm Water Pollution Prevention (SWPP) Plan for TA-72 (Attachment A). The SWPP Plan describes the soil placement and structural controls that will be emplaced to divert surface water away from the firing range berms and prevent potential erosion and transport of materials that may contain elevated total lead concentrations.

5.0 DESCRIPTION OF CONFIRMATORY/VERIFICATION SAMPLING

Following removal of the soil stockpiles containing bullets, samples will be collected from the firing range floor and from first-order drainages that originate on the site in accordance with the Sampling and Analysis Plan (Attachment B). If samples indicate the presence of lead concentrations above the cleanup level, the soils will be further excavated and added to the soil to be processed through the Shaker Plant.

Twenty discrete grab samples will be collected from the upper 6 inches of the firing range floor to confirm that all soils containing total lead concentrations above 400 ppm have been removed from the site. Sample locations will be determined through random selection of twenty cells on a grid, with a 50-foot spacing, projected over the entire range area. An additional three discrete grab samples will be collected from the upper 6 inches of sediment in first-order drainages that capture the bulk of the surface water from the site. Locations of channel sediment samples will be determined in the field, based on examination of the surface drainage system.

Confirmation/verification samples will be analyzed by an approved contract laboratory for total lead, copper, and zinc by EPA SW-846 Method 6010.

6.0 ESTIMATED TIME TO COMPLETE THE ACTION AND UNCERTAINTIES

The estimated duration of the VCA activities is 8 weeks. Mobilization of equipment and site preparation will require approximately 1 week and Shaker Plant soil processing will require approximately 6 weeks. Verification sampling will require approximately 1 week. Soil hauling will be conducted simultaneously with Shaker Plant processing operations.

7.0 REFERENCES

Heath, J.C., L. Karr, V. Novstrup, and B. Nelson, 1991, "Environmental Effects of Small Arms Ranges," NCEL Technical Note N-1836, Naval Civil Engineering Laboratory, Port Hueneme, California.

United States Forest Service, Santa Fe National Forest, 13 April, 1992, Memorandum No. 7400, to the U.S. Coast Guard National Response Center.

8.0 ANNEXES

ANNEX 8.1

Risk-Based Cleanup Level Assumptions and Calculations

The cleanup level for PRS 0-016 is based on the LANL Chemical SAL of 400 ppm for lead in soil. SALs for chemical constituents are based on EPA Region IX preliminary remediation goals for residential soil, and will ensure that there is minimal risk to future site residents and to the environment. No site-specific calculations or risk analyses are necessary for this site.

ANNEX 8.2

RFI Analytical Results

This section does not apply because no RFI field investigations have been conducted at this site. VCA analytical results are provided in Section 3.2 of this VCA plan.

ANNEX 8.3

Site Maps and Figures

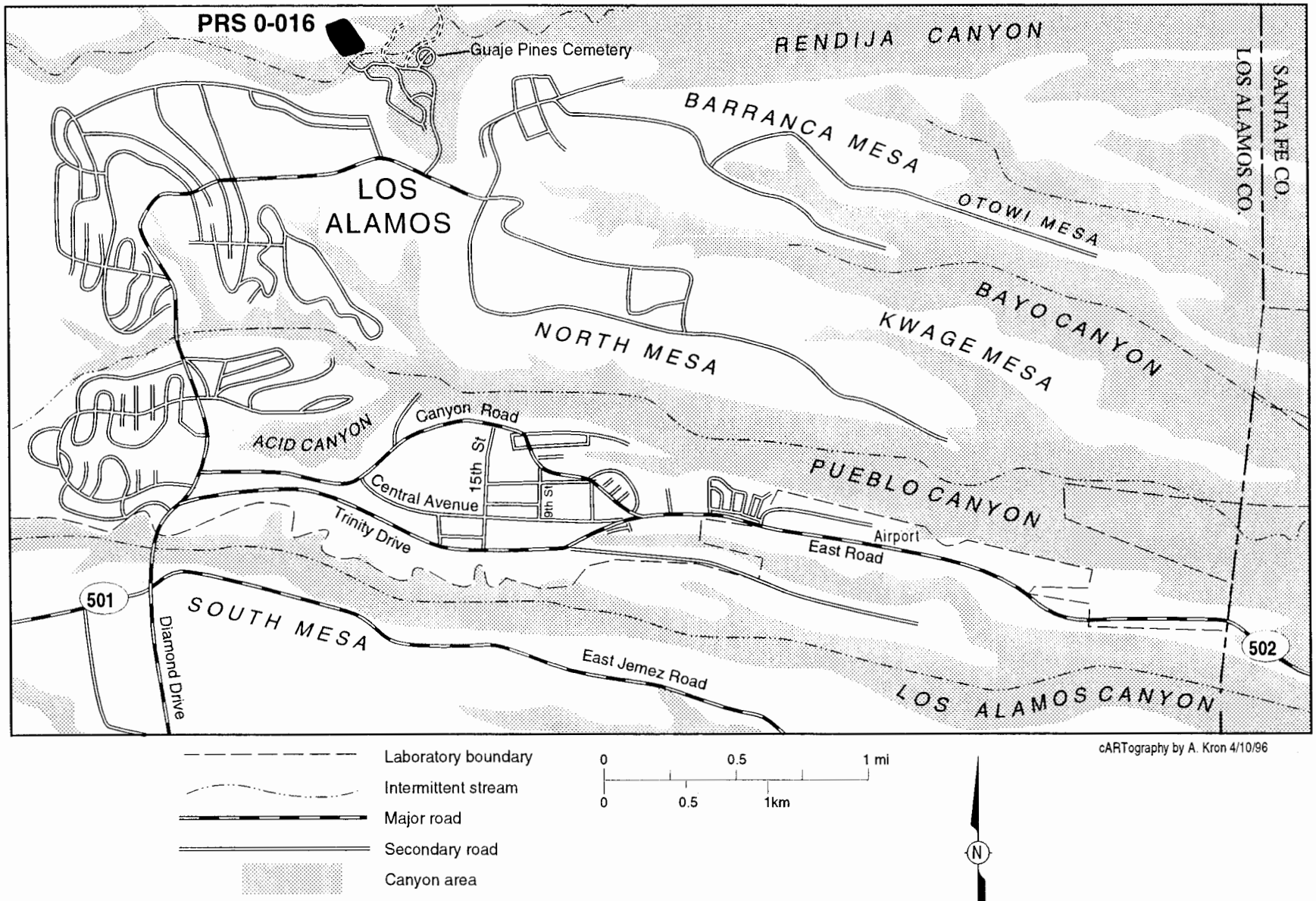
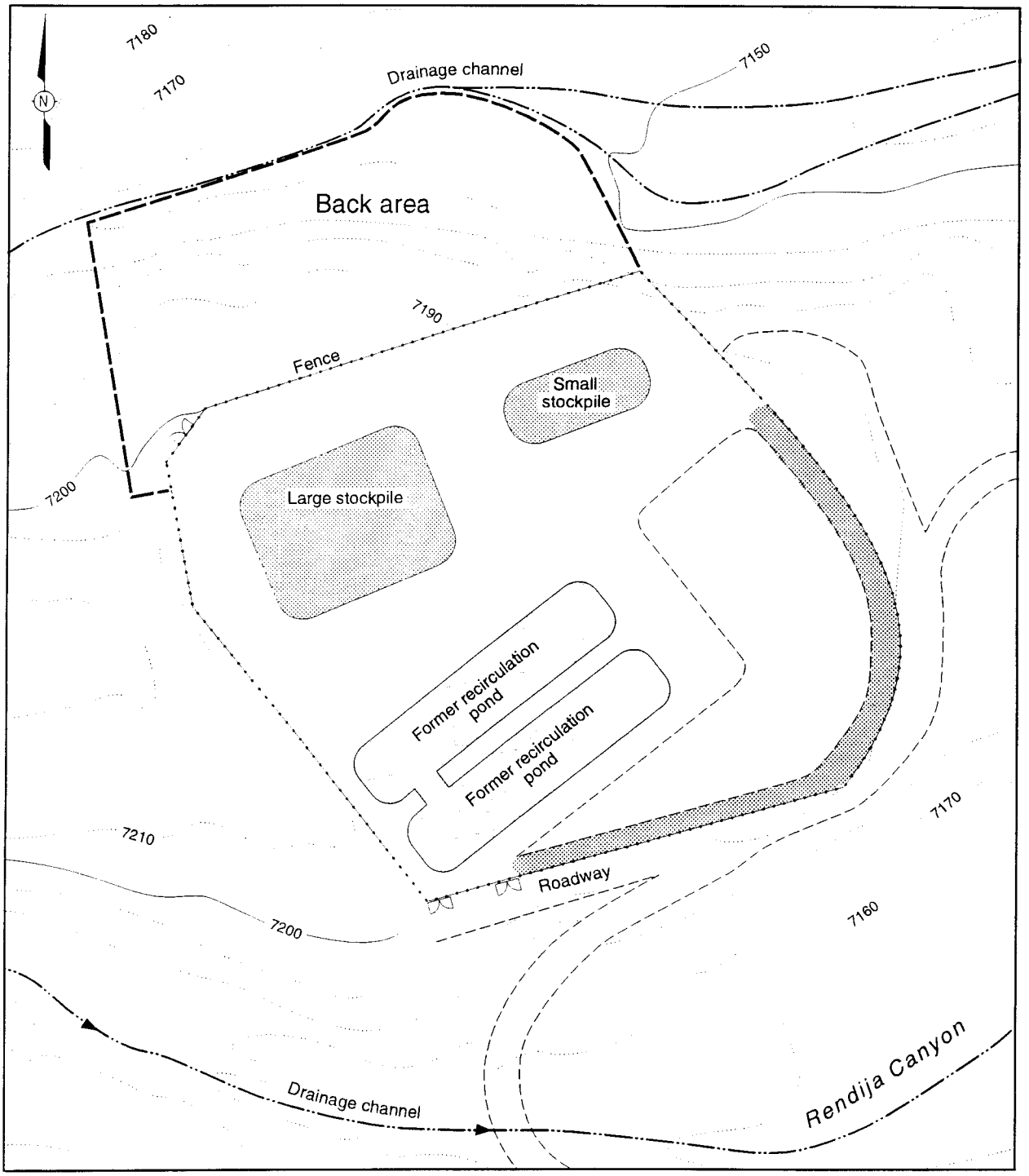


Figure 8.3-1. General location of inactive small-arms firing range (PRS 0-016) at TA-0.



Soil stockpile locations are approximate

Approximate Scale

0 100 200 ft

cARTography by A. Kron 4/2/96

Figure 8.3-2. Inactive Small-Arms Firing Range site map, PRS 0-016.

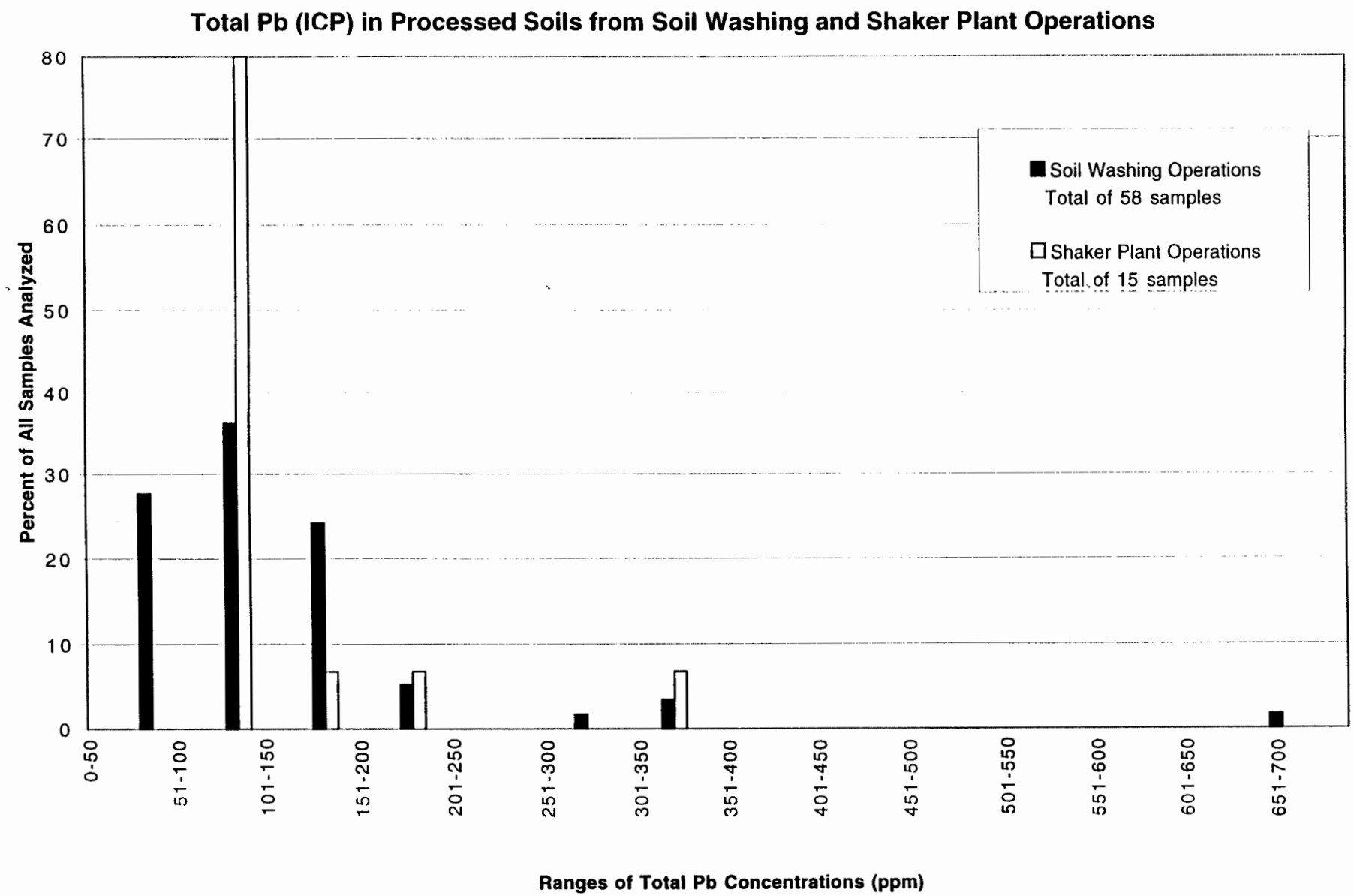


Figure 8.3-3. Comparison of total lead in processed soils by ICP analysis.

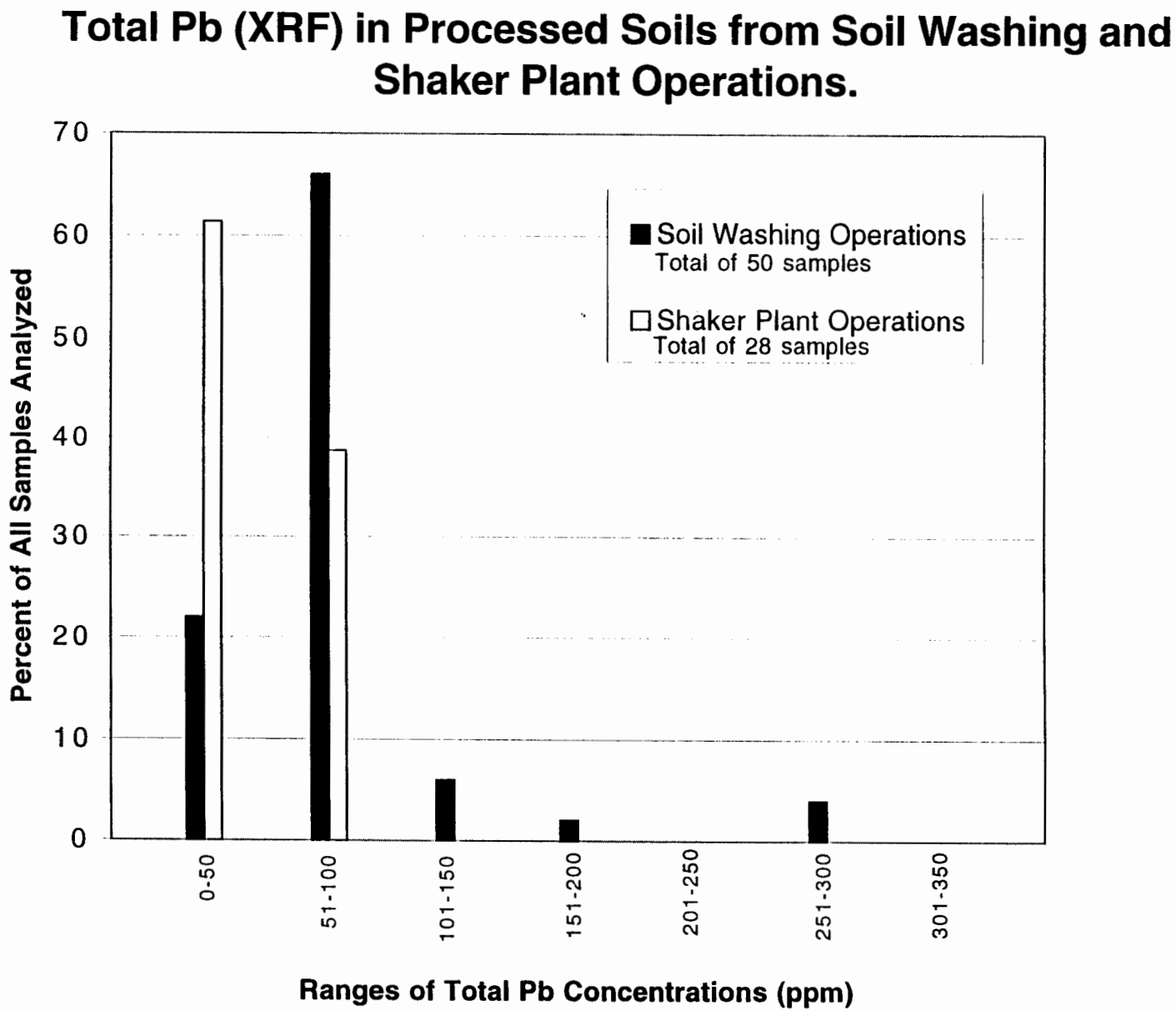


Figure 8.3-4. Comparison of total lead in processed soils by XRF analysis.

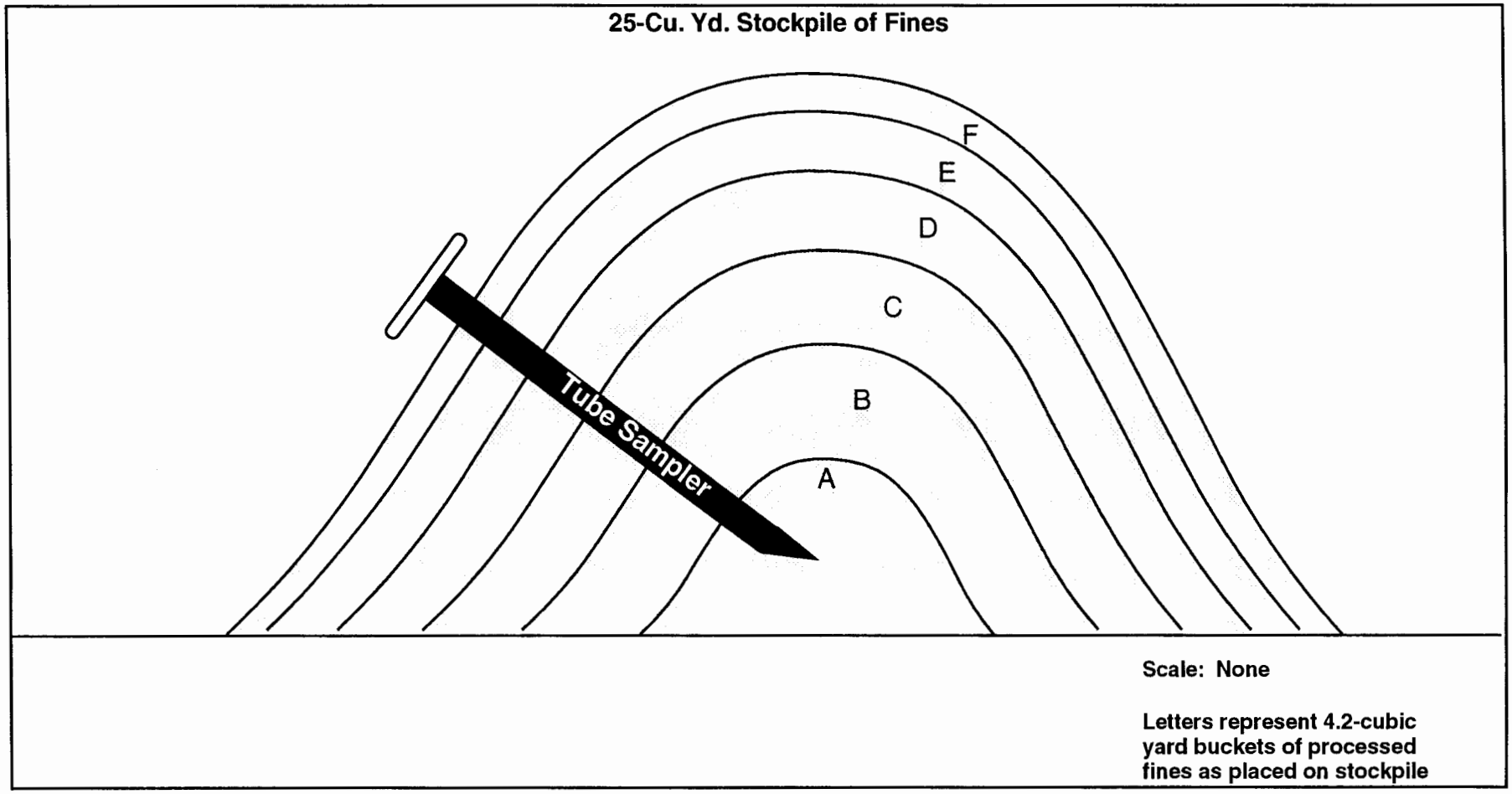


Figure 8.3-5. Stockpile sampling strategy for fine soils processed through Shaker Plant

ANNEX 8.4

Implementation SOPs

See Environmental Restoration Standard Operating Procedures, Volumes I and II, November 17, 1993, Los Alamos National Laboratory.

ANNEX 8.5

Quality Assurance Plan

See Quality Program Plan and Quality Assurance Project Plan for Environmental Restoration, February 1995 revision, Los Alamos National Laboratory.

ANNEX 8.6

Site-Specific Health and Safety Plan

SWMU 0-016, Inactive Firing Range, Mechanical Sieving

LANL ER PROJECT
SITE-SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)

Project Title SWMU 0-016, Inactive Firing Range, Mechanical Sieving

TA(s) 0

This plan addresses the health and safety criteria to be followed during investigation, remediation or decommissioning activities associated with the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL)

Reviewed and Approved by:

Signature	Name/Title	Company	Date
	IVAN WACHWAL FU H&S REP.	ESH-5	3/27/96
Field Unit Health and Safety (HS) Representative*			
	Andrew Crowder, FTM/FTL	ERM/Golder	3/27/96
FTM/DPL or FTL/JS (optional at discretion of FPL)			
	CARL A. NEWTON	EES-3/FU-1	3-27-96
Field Project Leader (FPL)			

Concurrence by:

Signature	Name/Title	Company	Date
	JOHN L. WILLIAMS/WBRD	ERM/Golder	3/27/96
Subcontractor Management or HS Representative			
Subcontractor Management or HS Representative			

**This plan was not reviewed by the FU 1 H&S Representative due to conflict of interest. It was reviewed by other ER/HS Team members.*

The comments of the above reviewers have been incorporated as stipulated, or resolved with written record and copy to the respective reviewer.

Plan Preparer Name/Signature	Group	Date	Mailstop	Phone
Joe Louck/	ESH-5	3/27/96	K494	665-5669

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LIST OF ACRONYMS and ABBREVIATIONS

ACGIH ..... American Conference of Governmental Industrial Hygienists
ALARA ..... As Low As Reasonably Achievable
AL ..... Action Level
ANSI ..... American National Standards Institute
APR ..... Air-Purifying Respirator
AR ..... Administrative Requirements
ATM ..... Atmosphere
°C ..... Degrees Centigrade
CFR ..... Code of Federal Regulations
CGI ..... Combustible Gas Indicator
CP ..... Competent Person
CPR ..... Cardiopulmonary Resuscitation
CRZ ..... Contamination Reduction Zone
DAC ..... Derived Air Concentration
dBA ..... Decibels (A-Weighted Scale)
DOE ..... U.S. Department of Energy
DOT ..... U.S. Department of Transportation
DPL ..... Decommissioning Project Leader
EPA ..... U.S. Environmental Protection Agency
ER ..... Environmental Restoration
ESH ..... Environmental, Safety and Health
ESH-1 ..... Health Physics Operations Group
ESH-2 ..... Occupational Medicine Group
ESH-5 ..... Industrial Hygiene and Safety Group
ESH-12 ..... Policy and Program Analysis Group
eV ..... Electron Volts
EZ ..... Exclusion Zone
°F ..... Degrees Fahrenheit
Fibers/cc ..... Fibers Per Cubic Centimeter
FID ..... Flame Ionization Detector
FPL ..... Field Project Leader
FTL ..... Field Team Leader
FTM ..... Field Team Manager
GET ..... General Employee Training
HASP ..... Health and Safety Plan
HAZWOPER ..... Hazardous Waste Opertations
HEPA ..... High Efficiency Particulate Air
HPT ..... Health Protection Technician

HS ..... Health and Safety
IARC ..... International Agency for Research on Cancer
IDLH ..... Immediately Dangerous to Life or Health
IHT ..... Industrial Hygiene Technician
IP ..... Ionization Potential
JS ..... Job Superintendent
LAMC ..... Los Alamos Medical Center
LANL ..... Los Alamos National Laboratory
LEL ..... Lower Explosive Limit
LP ..... Laboratory Procedure
mg/Kg ..... Micrograms Per Kilogram
mg/m^3 ..... Milligrams Per Cubic Meter
mm ..... Millimeters
MSDS ..... Material Safety Data Sheet
MUC ..... Maximum Use Concentration
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating
OSHA ..... Occupational Safety and Health Administration
PAH ..... Polycyclic Aromatic Hydrocarbons
PEL ..... Permissible Exposure Limit
PF ..... Protection Factor
PID ..... Photoionization Detector
PNA ..... Polynuclear Aromatics
PPE ..... Personal Protective Equipment
PRS ..... Potential Release Site
RCT ..... Radiological Control Technician
RMMA ..... Radioactive Materials Management Area
RSP ..... Radiological Screening Personnel
RWP ..... Radiological Work Permit
SC ..... Spill Containment
SLM ..... Sound Level Meter
SOP ..... Standard Operating Procedures
SSHASP ..... Site-Specific Health and Safety Plan
SSO ..... Site Safety Officer
SUP ..... Supervisor
SWMU ..... Solid Waste Management Unit

SWP ..... Special Work Permit

SZ ..... Support Zone

TA ..... Technical Area

TLD ..... Thermoluminescent Dosimeter

TLV ..... Threshold Limit Value

TWA ..... 8-Hour Time-Weighted Average

1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (SSHASP) has been developed for the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL) to comply with applicable federal and state occupational health and safety (HS) requirements, including those of the U.S. Department of Energy (DOE). The DOE requires LANL to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at LANL are not subject to the jurisdiction of OSHA. The ER Project has developed a generic Health and Safety Plan, the ER Project HASP, which establishes HS information and requirements applicable to ER field operations projectwide. In addition to the HASP, this SSHASP establishes site-specific HS information and requirements applicable to the scope of work described in Section 2.

ER participants are responsible for conducting work in accordance with applicable regulations. The term "ER participants" refers to anyone performing ER work, including LANL, subcontractors to LANL and their lower-tier contractors, consultants, and agents. In some cases in this document, LANL has chosen to invoke OSHA and LANL requirements which ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with LANL's ALARA policy and to clarify LANL's expectations with regard to interpretable requirements of the multiple agencies governing ER work. Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or could unreasonably compromise the safety or health of an individual or the environment, such concerns should be brought to the attention of the Contract Administrator and the Field Unit HS Representative immediately. Failure to comply with terms of HS plans may constitute cause to stop activity or for issuance of a stop work order as specified in Section 3.4.2 of the HASP without cost or penalty to LANL.

This SSHASP shall be reviewed and approved in accordance with Section 1.2 of the HASP. Once this SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix B of the HASP) per Section 1.3 of the HASP. Modifications to this SSHASP may require a change to the terms or scope of a subcontract. Completion of a SSHASP modification form is <u>not</u> the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative under the changes clause and shall not proceed with the change until a change order has been mutually agreed between the parties, or unless unilateral direction is given by the Contract Administrator.

2.0 BACKGROUND INFORMATION

Project Title: SWMU 0-016, Inactive Firing Range, Mechanical Sieving
TA(s): 0
Objective: Removal of lead from lead containing soil through mechanical sieving
Classification of Work: VOLUNTARY CORRECTIVE ACTION (VCA)

TABLE 2-1
SITE DESCRIPTION(S)

DESCRIPTOR	SITE(s)
	SWMU 0-016
Characteristics	
Adjacent Facilities/Structures	
Roads/Highways	X
Topography	
Mesa Top	X
Pathways of Uncontrolled Release Dispersion	*[for land and water indicate direction, e g , N, NE, etc]*
Land	N,NE
Air	X
Water	N,NE
Emergency Accessibility	*[indicate "Y" or "N"]*
Land	Y
Air	Y
Water	N
Previous Onsite Facilities/Operations	
Firing Site	X
Previous ER Information and/or Data Available	
Knowledge of Process	X
Initial Scoping/ Reconnaissance	X
Phase I	X
Analytical Data (screening)	X
Analytical Data (validated)	X
VCA	X
Remediation	X

DESCRIPTOR	SITE(s)
	SWMU 0-016
Previous Substances Used, Disposed, Detected or Suspected	
High Explosives (HE)	
Not applicable	X
Radionuclides	
Not applicable	X
Inorganics	
CORROSIVE ACIDS/BASES	
Not applicable	X
HALOGENS	
Not applicable	X
METALS	
Lead	X
MINERALS	
Silica/Quartz	X
Organics	
Not applicable	X
ALCOHOLS	
Not applicable	X
ALDEHYDES	
Not applicable	X
GASES	
Not applicable	X
HYDROCARBONS (Halogenated)	
Not applicable	X
HYDROCARBONS (Non-Halogenated)	
Not applicable	X
HYDROCARBONS (Petroleum Based)	
Not applicable	X
KETONES	

DESCRIPTOR	SITE(s)
	SWMU 0-016
Not applicable	X
PESTICIDES	
Not applicable	X
PCBs	
Not applicable	X
OTHER	
Not applicable	X

TABLE 2-2
SCOPE OF WORK

Task ID	Task Description	Site ID(s)	Anticipated Dates/Duration
Task 1 - Site Preparation	This task will involve the installation of perimeter security fencing, mobile trailers, electrical power, telephone lines, and sanitation facilities. Associated subtasks include: **1-A Heavy Equipment Operation:** If required, the excavation subcontractor will smooth out the roads, fill in the ponds, and prep the equipment sieving area..	SWMU 0-016	4/3 - 4/5/96
Task 2 - Site Remediation, Mechanical Sieving	This task will involve the use of front-end loaders, a mechanical sieve, and dump trucks to remove lead from lead containing soils. **2-A Mobilization/Demobilization:** Set up and removal of site control boundaries, equipment, and supplies. **2-B Soil Moving/Sieving:** Front-end loaders and other earthmoving equipment will be used to remove stockpiled soil and deposit it in the sieve. Soils not yet stockpiled may be scraped up and added to the pile. Depending on analysis results, the once seived material may be re-sieved. The clean soil will be deposited in dump trucks and reused as appropriate. **2-C Soil Sampling:** Soil sampling will occur throughout the project to determine and verify clean-up levels and clean-up locations. Soils will be analyzed by XRF. **2-D Equipment Decontamination:** At the end of the job, all equipment used on-site shall be rinsed and be visually clean of all dirt.	SWMU 0-016	4/8 - 5/24/96
Task 3 - Site Monitoring	Initial monitoring for lead and noise will be conducted during the first several days of operation. **3-A Lead Monitoring:** For the first three days a representative number of personal and area (hi-vols) samples will be obtained in order to make the initial determination. These samples will be collected and analyzed per NIOSH Method 7300. NOTE: Until an initial determination has been made, this site falls under all applicable sections of 29 CFR 1926.62. If the initial determination comes back positive, then this site will remain a lead site for the duration. If the initial determination is negative, then the site will be appropriately downgraded. If site conditions change or new tasks are added, a new determination shall be made. **3-B Noise Monitoring:** Noise screening will occur the first day of occurrence and whenever operations change warranting monitoring. Screening results will be used to determine the need for PPE and to set boundaries.	SWMU 0-016	Initially 4/8 - 5/12/96 Additional monitoring as conditions warrant

Task ID	Task Description	Site ID(s)	Anticipated Dates/Duration
Task 4 - On-Site Waste Management	On-site coordination of waste management, including identification, handling, transport, and disposition of non-hazardous, potentially hazardous and hazardous wastes. This task will be accomplished according to the Waste Characterization Strategy Plan and may occur simultaneously as Tasks 2 or 3 are occurring. Associated subtasks include: **4-A Containing and Labeling Wastes:** Lead waste will be collected on plastic drop cloths and, either mechanically or by hand, be placed in appropriately labeled drums. **4-B Transporting Waste Containers:** Arrangements will be made to have the drums removed from the site and picked up by an appropriate recycling contractor.	SWMU 0-016	4/8 - 6/7/96
Task 5 - Incident Response	Response to an incident (i.e., rendering first-aid/CPR, hazardous substance release, fire, and spill containment) tasks will be performed as necessary and in accordance with Sections 7, 9 and 10 of the HASP and this SSHASP. This task includes the following subtasks: **5-A First-aid/CPR** **5-B Fire Fighting** **5-C Incident Response** *[in accordance with 29 CFR 1926.65(q)(6)(ii)* **5-D Spill Containment** *[in accordance with 29 CFR 1926.65(q)(6)(ii)*	SWMU 0-016	4/3 - End of Project, as needed

3.0 ORGANIZATION, RESPONSIBILITIES, and AUTHORITY

Definition of HS roles, responsibilities, authorities, and lines of communication for key personnel identified below are defined in Section 3 of the HASP.

TABLE 3-1

KEY PERSONNEL HAVING HS RESPONSIBILITY

Title	Name	Organization	Phone/Pager
Field Project Management			
Field Project Leader (FPL)	Garry Allen	CST-18	667-3394
Alternate to FPL	Carl Newton	EES-3	665-9259 104-8207
Field Team Manager (FTM)	Andy Crowder	ERM/Golder	662-3700 820-4413
Field Team			
Field Team Leader (FTL)	Andy Crowder	ERM/Golder	662-3700 820-4413
Supervisor	Bill Parker	Paul Parker Construction	662-7456
Site Safety Officer (SSO)	TBD (Level 2)		
Support Personnel			
Field Unit HS Representative	Joe Louck	ESH-5	665-5669 104-6959
Subcontractor HS/Management Rep.	Paul Parker	Paul Parker Construction	662-7456
Subcontractor HS/Management Rep.	Kevin Hyde	ERM/Golder	662-3700
Alternate Personnel			
Alternate SSO	TBD (Level 2)		

Note: To access LANL pagers dial 665-9800

4.0 HAZARD ANALYSIS

Provided in this section are the task-specific hazard analysis information and requirements in accordance with Section 4 of the HASP.

4.1 PROJECT PERSONNEL

The personnel identified below by role are expected to perform the task(s) indicated.

TABLE 4-1
PROJECT PERSONNEL BY TASK

PERSONNEL ROLE	TASK(s)				
	1	2	3	4	5
FPL [includes alternate]	AN	AN	AN	AN	AN
FTM	AN	AN	AN	AN	AN
FTL	AN	FT	AN	AN	AN
Supervisor *(Paul Parker Construction)*	AN	AN	AN	AN	AN
SSO	AN	FT	FT	AN	AN
Onsite Waste Management Coordinator	AN	AN	AN	AN	AN
Trenching/Excavation Competent Person	AN	AN			
Sampler		AN			
Laborer	AN	AN	AN	AN	AN
Heavy Equipment Operator	FT	FT		AN	

AN = As needed or as required by site conditions, activities being performed
FT = Full time, this person will be on-site full time during these tasks

Note: During site operations the FTL or the SSO shall be on-site at all times

4.2 HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Not all chemical products used to accomplish a task or contaminants at a particular site may pose an occupational health threat. The hazardous substances of occupational health concern are identified in this section by task and by class of substance, in accordance with Section 4.1 of the HASP. Results of a health hazard assessment of each chemical product and site contaminant identified in Table 2-1 and associated rationales are provided in Appendix B. Substances that have a hazard assessment resulting in either "possibly could occur", "probably will occur", or "likely to occur" and which are expected to result in injury or illness having a hazard severity of "minor", "major", or "catastrophic" are considered to pose an occupational health threat to personnel who may be exposed to these substances, and are included in Table 4-2. The key to the hazard assessment ratings is provided below. The chemical, physical and toxicological properties for each hazardous chemical substance of occupational health concern are provided in Appendix C. For each class of substances included in Table 4-2, the most hazardous substance is identified in Table 4-3 together with corresponding administrative and engineering controls.

Key to hazard assessment ratings:

Hazard Severity	Mishap Probability			
	Likely to Occur	Probably will Occur	Possibly could Occur	Unlikely to Occur
Catastrophic (i.e., death or life-threatening injury/illness from a single encounter)	Imminent	Imminent	Serious	Minor
Major (i.e., significant injury/illness resulting in irreversible harm)	Imminent	Serious	Moderate	Minor
Minor (i.e., injury or illness resulting in reversible harm - not likely to threaten mobility, vision)	Serious	Moderate	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

TABLE 4-2

HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Hazardous Chemical Products to be Used During Field Operations

The chemical products listed below are likely to be used for the tasks indicated, onsite or at satellite locations where field support operations occur. MSDSs for each product shall be kept readily available to users of these products, and shall be shared with other employer's employees onsite who may be affected by the hazardous products in accordance with 29 CFR 1926.65(b)(1)(iv) and (v) and 1926.65(i) and Section 4.2.2.3 of the HASP. It is LANL's policy that whenever feasible a less toxic product should be substituted for a more toxic product, especially for products having a carcinogen constituent.

HAZARDOUS SUBSTANCE	TASK(s)				
	1	2	3	4	5
Fuels/Lubricants (Petroleum-Based Hydrocarbons)					
Diesel	Min	Min		Min	
Gasoline	Min	Min		Min	
Oil	Min	Min		Min	
Site Contaminants					
METALS					
Lead	Mod	Mod	Mod	Mod	

4.3 HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Hazards included in this section are those expected to result in one of the hazard assessment ratings defined below and could pose an occupational health threat to workers performing the associated task(s). The hazard assessments and rationales are indicated below with the corresponding administrative and engineering controls for protection from and mitigation of the hazards. *[Check the applicable hazards in the Table and fill in the corresponding blank boxes.]*

Key to hazard assessment ratings:

Hazard Severity	Mishap Probability			
	Likely to Occur	Probably will Occur	Possibly could Occur	Unlikely to Occur
Catastrophic (i.e., death or life-threatening injury/illness from one encounter)	Imminent	Imminent	Serious	Minor
Major (i.e., significant injury/illness resulting in irreversible harm)	Imminent	Serious	Moderate	Minor
Minor (i.e., injury or illness resulting in reversible harm - not likely to threaten mobility, vision)	Serious	Moderate	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

TABLE 4-3

HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures)
Safety Hazards and Health Concerns				
EXCAVATION/ TRENCHING	PERMIT REQUIRED for excavating/trenching > 1 foot; A&E controls shall be implemented in accordance with applicable LANL excavation permit (per LANL AR 1-12) and as specified below; contact Field Unit HS Representative to initiate permit process			
General	1,2	Major, unlikely to occur = Minor	Site will be scaped down with heavy equipment. Trenches > 1 foot are not anticipated	No personnel entry into trench/excavation Inspections by a competent person shall be made prior to start of work, as needed throughout shift and after every rain storm or other hazard increasing occurrence (29 CFR 1926.651) Appropriate engineering controls shall be implemented in accordance with 29 CFR 1926.651 whenever the stability of a structure adjoining an excavation may be endangered Excavated materials (spoils) shall be kept at least 2 ft. away from edge of excavation

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures)
Underground utilities - elec./fire/explosion hazards	1,2	Major, unlikely to occur = Minor	No known utilities in the area of excavation activities. If trenching > 1 foot, implement excavation permit and engineering controls as per 29 CFR 1926.651.	Estimated locations of utilities (i.e., sewer, telephone, gas, electric, water lines, etc.) shall be determined prior to excavating. Notify utility owners of intended work and request they demarcate on ground surface location(s) of underground utilities; have a field team member accompany utility owner rep. to identify intended excavation location(s) and to find out specifics of utility location(s). If utility owner cannot establish exact location of utility installation(s), excavating may proceed with caution and provided detection equipment or other acceptable means to locate utility installation(s) are used. As excavating operations approach estimated location of underground utility, exact location of the installation shall be determined by safe and acceptable means (i.e., using hand held excavating equipment). While excavation is open, undergound installations shall be protected, supported or removed as necessary to safeguard site personnel
DRILLING/HEAVY EQUIPMENT OPERATION				
General Controls	• Per DOE (Drilling Safety Manual, 1983 and Construction Safety Reference Guide, 1993), drilling rigs shall be designed, manufactured, erected, used, and maintained in accordance with appropriate American Petroleum Institute (API) Specifications and Recommended Practices, as a minimum, and with applicable sections of 29 CFR 1926.251, Subpart N of 29 CFR 1926, and Title 8 of the California Administrative Code (8 CAC). • Hoists, hooks, wires, ropes, slings, and rigging accessories shall be designed, installed, operated, inspected, and tested in accordance with applicable requirements of the DOE Hoisting and Rigging Manual (April 1993, DOE/ID-10500), and with applicable sections of 29 CFR 1926.251 and Subpart N of 29 CFR 1926. • There shall be no apparent damage, excessive wear, or deformation of any part of the drilling equipment. Equipment shall be inspected by a qualified person according to Section 12.1 and the frequencies indicated below. Defective equipment shall be removed from service and any defects shall be corrected or repaired before equipment is put into service. Records of each inspection shall be kept at the rig readily available for review. Reduction of original strength shall be noted and taken into account for determining when equipment shall be taken out of service. - Rigs and masts shall be inspected at least weekly. - Hoists, hooks, wires, ropes, slings, and rigging accessories shall be inspected at the beginning of each shift in which they are to be used and as necessary during use to ensure safety. - Hoisting lines shall be inspected visually each day, and thoroughly at a minimum of 30-day intervals. - Guy wires in use shall be thoroughly inspected at least once a year. - Anchors shall be pull-tested along an angle approximating the wind-guy working plane within 12 months prior to use; test shall be made at poundage determined by anchor location • Each derrick or mast, and hoist shall be permanently marked with its rating capacity. • Drill rigs must be leveled, anchored, and guyed in accordance with manufacturer's recommendations or where there are none, with API Specification 4E. • Pressure-hose connections shall be secured with safety chains or clamped to prevent whipping in the event of a break. • When engaged in work at a location 10 feet or more above the derrick floor or other working surface, the worker shall wear a safety belt with attached lanyard secured to the derrick, except during rig-up/rig-down when workers other than the rig operator shall stand clear. Safety belts, lifelines, and lanyards shall be used in accordance with 29 CFR 1926.104 and Section 7.			

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures)
Pinch points in rotating parts	1,2,4-B	Major, unlikely to occur = Minor	Sieve does have the potential for multiple pinch hazards, however, personnel would have to physically enter the machine to access them.	Heavy equipment shall be inspected for engineering controls in compliance with applicable sections of Subparts O of 29 CFR 1926 and 29 CFR 1910 Barrier tape will be erected around the sieve to prevent personnel from accessing moving parts. Sieve shall be tagged out when maintenance is required.
Vehicle operation/ vehicular traffic accident	ALL	Major, unlikely to occur = Minor	As with all construction sites, the potential for a vehicular accident exists. Personnel shall not enter the heavy equipment operation area unless the operator is aware or their presence.	Field team personnel exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material Heavy equipment shall be inspected for engineering controls in compliance with applicable sections of Subparts O of 29 CFR 1926 and 29 CFR 1910
WELDING/CUTTING/ BRAZING	PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable LANL special work permit (SWP) per Section 4.2.2.12 of the HASP and as specified below for spark/flame-producing operations; contact Field Unit HS Representative to initiate permit process Welding/Cutting/Brazing is not anticipated on the site. If it becomes necessary, a SSHASP modification with hazard assessment will be required.			
ELECTRICAL	PERMIT REQUIRED; A&E controls shall be implemented in accordance with applicable requirements of Sections 4.2.2.1 and/or 4.2.2.8 of the HASP and as specified below for lockout/tagout of energized equipment; contact Field Unit HS Representative to initiate permit process			
Electrocution - working with energized equipment (e.g., generator)	ALL	Major, unlikely to occur = Minor	The only electrical systems on site are associated with heavy equipment. These systems will be locked and tagged out before maintenance operations	Take preventative measures and identify and correct deficiencies in accordance with Subpart K of 29 CFR 1926 and Sections 4.2.2.1 and/or 4.2.2.8 of the HASP, as applicable
MISCELLANEOUS				
Sanitation	ALL	Minor, possibly could occur = Minor	Unsanitary work conditions could pose a minor threat.	Showers and change rooms shall be provided on-site in the CRZ or SZ, and used by field team members working within EZ or CRZ, whenever the duration of hazardous waste operations (under 29 CFR 1926.65) will last ≥ 6 months. Showers shall meet requirements of 29 CFR 1926.51(f)(4). Change rooms shall meet requirements of 29 CFR 1926.51(i) At least one toilet shall be provided on site for ≤ 20 field team personnel unless transportation is readily available to nearby off-site toilet facilities **All personnel are required to wash hands and face at the end of the shift and prior to eating, drinking, smoking, or chewing tobacco**
Uneven terrain, slips, trips, falls	ALL	Minor, possibly could occur = Minor	Minor slips and falls are always a possiblity on a construction site. No steep slopes, no falls > 4 feet.	Use caution and be observant while moving in areas of potential concern; minimize threat of slick surfaces
Biological Hazards				
General	ALL	Minor	Snakes and insects are always present in the outdoors.	Refer to Table 1 of the HASP for information concerning various general hazards associated with occupational exposure to toxic and/or hazardous biological agents
Occupational Exposure to Bloodborne Pathogens	5	Catastrophic, unlikely to occur = Minor	Exposure to others body fluids can be life threatening, however, with proper training and equipment exposure can be minimized.	Refer to Table 1 and Section 4.2.2.2 of the HASP

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering (A&E) Controls (Prevention/Mitigation Measures)
Physical Health Hazards				
Excessive Noise	ALL	Minor, probably will occur = Moderate	Sieve machine is very loud. Noise monitoring will be used to set up boundaries, personal inside these boundaries shall wear hearing protection.	Whenever voice(s) must be raised to communicate between two or more persons located ≤ 3 feet of each other noise level likely exceeding PEL; conduct noise monitoring per Section 6; also refer to Section 4.2.2.7 of HASP for additional requirements
Chemical Health Hazards				
Chemical splashes - exposure to corrosives and/or substances toxic by skin absorption	1,2,4	Major, unlikely to occur = Minor	Slight possibility for fuels to splash in eyes during refueling	PPE (chemical protective clothing and/or eye/face protection) shall be used as specified in for Section 7 the corresponding task(s)/site(s) Portable emergency: Eyewash Emergency eyewashe must be located within 10 seconds and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous flushing for the duration of time necessary to sufficiently flush the most hazardous substance for which the device is being specified. They also shall be inspected and flushed at least weekly by the SSO or designee. Refer to ANSI Z358.1-1990 for further information.
Airborne Toxic Dust, Vapors, and/or Fumes - General	1,2,3,4	Moderate	Past personal monitoring done at this site under similar construction activities did not indicate an exposure issue. However, since the process has changed slightly we do not know the exact HA until a new determination has been done. Until this has been completed the site will be treated as a lead site with a HA = Moderate. Based on the analytical results, the hazard will be reassessed and downgraded, as appropriate.	First line of defense: implement engineering controls [e.g., local ventilation in accordance with 29 CFR 1926.55(b), 1926.57], and/or other applicable chemical-specific standard (Table 2 of the HASP) to limit airborne levels of contaminants to below action levels set in Section 6. Refer also to Section 6, 7 and Appendix C of this SSHASP and to Sections 6 and 7 of the HASP Other: Refer to 29 CFR 1926.62

5.0 SITE CONTROLS

In accordance with Section 5 of the HASP, the required site control measures are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from requirements of the HASP are noted below. Site map(s) are provided in Appendix A to show where the following site control measures will be located. Since some zone or facility locations may change as site work progresses due to daily variability in site conditions and/or operations (e.g., wind or access), actual locations are to be explained to field team members by the SSO, or the FTL or JS during daily HS tailgate meetings and documented in the logbook kept by the SSO.

TABLE 5
SITE CONTROL MEASURES

CONTROL MEASURES	TASK(S)
	ALL
Exclusion Zone (EZ)	Per 29 CFR 1926.62
Localized at work site	X
Demarcated by:	
Barrier Tape	X
Fence	X
Posting(s): Other Chemical-Specific Standard (Table 2 of the HASP); Posting shall be in accordance with 29 CFR 1926.62 Description(s): Until an initial determination has been made the following signage is required; **"WARNING LEAD WORK AREA POISON NO SMOKING OR EATING"**	
Contamination Reduction Zone (CRZ)	Until the initial negative determination has been made, a change room will be made available at the end of the support trailer.
Support Zone (SZ)	Per 29 CFR 1926.62
Localized at work site	X
Demarcated by:	
Other	The SZ is defined as any area outside the perimeter security fence
Equipment Staging Area	All equipment will be staged either in the SZ or the EZ. Contamination and/or cross-contamination are not issues at this site.
Equipment Decon Pad/Facility	It is not anticipated that equipment decon will be necessary at this site. If equipment becomes excessively dirty, they will be rinsed down at the east end of the site. Done at the discretion of the supervisor and SSO.
Temporary Waste Storage Area	
Located onsite	X
Demarcated by:	
Security Access	X

CONTROL MEASURES	TASK(s)
	ALL
Support Trailer(s)	
Located at work site in SZ	X
Access identified/limited by:	
Unnecessary	X
Mobile Laboratory	Samples will be analyzed in the support trailer by portable XRF or sent off-site
Located at work site SZ	X
Hand Wash Facility	Per 29 CFR 1926.62(l)(5); All employees must wash their hands and face prior to eating, drinking, smoking, or chewing tobacco and at the end of the shift
Located onsite in SZ	X
Toilet Facility	Per 29 CFR 1926.65(n)
Portable located onsite in SZ	X
Shower Facility	Per 29 CFR 1926.62 (d)(v)
Not applicable	Shower facilities are not required during the initial determination per 29 CFR 1926.62(d)(v), required if PEL is met or exceeded.
Clothing Change Facility	Per 29 CFR 1926.62(d)(v) and (i)(2)
Required for personnel decon	Refer to 29 CFR 1926.62(i)(2)
Located at work site SZ	X
Access identified/limited by:	
Unnecessary	X

6.0 EXPOSURE MONITORING AND CORRESPONDING ACTIONS

In accordance with Section 6 of the HASP, personnel exposure monitoring requirements, action levels, and the corresponding actions to be taken are specified in the tables in this section (Tables 6-1, 6-2, and 6-3) for each task or group of tasks having different requirements.

6.1 DIRECT-READING INSTRUMENTS

Requirements for exposure monitoring using direct-reading instruments and the corresponding action levels and response actions are specified in Table 6-1 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
HEALTH PHYSICS: NOT APPLICABLE							
PHYSICAL CONDITIONS							
Noise	1,2,3,4	Noise level meter	ER Project *Manual for Site HS Activities*	Only monitor non-LANL employees; contact Field Unit HS Rep. if LANL employees need monitoring Noise measurements required when voice must be raised to communicate between two persons located ≤ 3 feet of each other; monitor hearing zone(s) of employees affected by excessive noise 1st day of occurrence & whenever operations change warranting monitoring: initial measurement and at 30 minute intervals while excessive noise condition persists	85 dBA (Non-LANL employees only) 80 dBA (Hearing Conservation Program - LANL employees only) 84 dBA (Hearing protection required - LANL employees only)	≥ Action Level: Implement appropriate engineering control(s) per Table 4-3; if unable to lower noise levels below AL, demarcate/post zones of excessive noise and limit access only to employees having sufficient hearing protection training, medical surveillance, and hearing protection per this SSHASP	OSHA 29 CFR 1910.95 for non-LANL employees Per DOE and LANL requirements for LANL employees

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
INDUSTRIAL HYGIENE (CHEMICALS)							
Total Airborne Dust	1,2,3,	Mini-ram MIE/PDM-3	ER Project *Manual for Site HS Activities* NIOSH and ACGIH Guide Books	Soil Sampling: Continuously near point of dust generation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion Excavation/Trenching: Continuously near point(s) of excavation; periodically in employees' breathing zones, & downwind/ upwind as needed to characterize source/dispersion	2.0 mg/m^3	≥ action level (AL) in employee breathing zone implement dust suppression methods to control dust levels below AL If unable to lower levels below AL, demarcate/post zones of excessive exposure and limit access only to employees having sufficient chemical-specific PPE, training, and medical surveillance per this SSHASP	The OSHA PEL for total dust is 15 mg/m^3, however, we must take lead into consideration. Thus far, the maximum amount of lead in soil has been 4100 mg/kg. Use of the Marlowe Equation gives a DAL of 2.0 mg/m^3.

6.2 PERSONAL DOSIMETRY

Requirements for personal dosimetry and the corresponding action levels and response actions are specified in Table 6-2 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP and with the chemical-specific standards listed in Table 2 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

TABLE 6-2
PERSONAL DOSIMETRY REQUIREMENTS

Hazardous Substance/ Condition	Task(s)	Action Level(s)	Dosimetry Requirement	Action Level(s) Rationale
HEALTH PHYSICS (RADIATION)				
External Sources of Radiation Exposure	ALL	Potential to exceed 100 mREM/year dose limit	Monthly TLD Badge	10 CFR 835

Hazardous Condition	Task(s)	Procedure	Instrument/ Supplies	Action Level(s)	Action Level Rationale	Response Action(s)
PHYSICAL CONDITIONS						
Noise	In the hearing zone of employees incurring excessive noise levels per Table 6-1 monitoring	ER Project *Manual for Site HS Activities*	Personal noise dosimeter(s)	Refer to Table 6-1		
INDUSTRIAL HYGIENE (CHEMICALS)						
Lead	2,3	29 CFR 1926.62 *NIOSH 7300*	Sampling method and cassette per NIOSH, personal air pumps, brand TBD	30 ug/m^3	This is the AL prescibed by OSHA	Sufficient personal samples will be obtained to make the initial determination as defined in 29 CFR 1926.62. If the AL is not approached, this site will be downgraded from a lead site. If the AL is met, then full compliance with the lead standard will be required.

6.3 AREA SAMPLING

Requirements for area sampling and the corresponding action levels and response actions are specified in Table 6-3 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable. Note that the requirements of this table only pertain to occupational exposure monitoring. Environmental sampling requirements, if any, to evaluate spread of contamination to off-site locations should be provided in a site-specific document separate from this SSHASP.

TABLE 6-3
AREA SAMPLING REQUIREMENTS

Hazardous Condition/ Task(s)	Task(s)	Instrument/ Supplies	Location and Duration of Monitoring	Sampling/ Analytical Method	Action Level(s)/ Rationale	Response Action(s)
INDUSTRIAL HYGIENE (CHEMICALS)						
Lead	1,2,3	Hi-Vol samples using either portable pumps (i.e., ALPHA) or giraffe pumps	Pumps will be set up on each side of the sieve for 3 complete shifts (6 samples total)	NIOSH 7300	OSHA prescribed AL of 30 ug/m^3	If AL is met or exceeded then full compliance with the lead standard required

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In accordance with Section 7 of the HASP, PPE requirements are specified below for each task or group of tasks having different requirements. Only personnel who are trained and qualified to use the equipment in accordance with Section 7 of the HASP and Section 10 of the HASP and SSHASP are allowed to use the equipment specified. Any exceptions or deviations from requirements of these sections are noted below.

TABLE 7
PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE REQUIREMENTS	TASK(s)				
	1	2	3	4	5
Head	(per 29 CFR 1910.135, ANSI Z89.1-1986, or Z89.2 for electrical shock protection)				
Cap	Caps are recommended when working outside in areas where hard hats are not required				
Hard Hat	Hard hats shall be worn at all times while in the EZ				
Eyes	(per 29 CFR 1910.133, ANSI Z87.1-1989)				
Safety Glasses (with sideshields)	X	X	X	X	AR per BBP Standard
Chemical Goggles	Will be worn when refueling equipment/generators on-site				
Face	(per 29 CFR 1910.133, ANSI Z87.1-1989)				
Welding Helmet	No welding/cutting/brazing is anticipated. If these type operations are done, welding helmet required				
Body					
Coveralls	Until the initial determination has been made everyone entering the EZ is required to wear either disposable or cotton coveralls. These coveralls shall be removed at the end of each shift and stored apart from personnel's street clothes. If the determination is positive this practice will be required on an ongoing basis, if it is negative then this practice will be optional and no body protection will be required. See 29 CFR 1926.62(i)(2)				
WELDING:	No welding/cutting/brazing is anticipated, if these type operations are done appropriate body PPE will be required				
Hands	(per 29 CFR 1910.137 and 138, ASTM D 120-87)				
INNER GLOVES:					
None	X				
OUTER GLOVES:					
Cotton or Leather (As Needed)	X	X	X	X	
Feet	(per 29 CFR 1910.136, ANSI Z41-1991)				
SHOES OR BOOTS					
Steel-toed	X	X	X	X	X

PPE REQUIREMENTS	TASK(s)				
	1	2	3	4	5
COVERS:					
None	X	X	X	X	X
Ears	(per 29 CFR 1910.95, ANSI Z87.1-1989) As required by screening/monitoring results				
Plugs: NRR = 29	X	X	X		
Respiratory Protection	(per Section 7.1 of the HASP, 29 CFR 1910.134, and ANSI Z88.2-1992) Not applicable, do not anticipate exceeding action levels				
Fall Protection	(per 29 CFR 1926 20, 27(d)(5), 104, 105, 250(b)2, 451(i)(8) and (p)(9), 500(g)(1-6), 951(b)) Not applicable , no falls greater than 4 feet				
Miscellaneous	Not applicable				

8.0 DECONTAMINATION

In accordance with Section 8 of the HASP, personnel and/or equipment decontamination requirements are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from Section 8 of the HASP are noted below.

TABLE 8 PERSONNEL AND EQUIPMENT DECONTAMINATION
Not applicable; rationale: Personnel decon is covered under hygiene practices (29 CFR 1926.62(i)(2), no EME to be deconned
Sampling and Heavy Equipment
Other Procedure: Heavy equipment will be deconned at the discretion of the SSO and Supervisor. If necessary the equipment will be taken to the east side of the site and rinsed off with water.

9.0 EMERGENCY/INCIDENT ACTION PLAN

Incident/emergency action requirements, equipment, and supplies are specified below for each task or group of tasks having different requirements. Response to an incident or emergency shall occur according to Section 9 of the HASP and this section. Any exceptions or deviations from requirements of the HASP are noted below.

In the event of an incident or emergency, the FTL or JS will function as the site emergency/incident coordinator, as necessary, and will arrange for immediate notification of LANL emergency response personnel to take control of the scene and/or arrange for immediate notification of appropriate authorities. Other key onsite incident/emergency response personnel are identified below. Only personnel who are trained and certified in accordance with Sections 7, 9, and 10 of the HASP and SSHASP are allowed to respond and use the equipment specified. Incident/emergency contacts and telephone numbers and a map indicating the route to the nearest hospital and medical clinic from each investigational site are included in Appendix D. Both these items shall be posted onsite where readily accessible to field team personnel. Site-specific muster areas shall be determined by the SSO prior to the start of field operations each day and shall be communicated to individuals onsite during the HS Tailgate meeting and as other individuals arrive at the site. Location(s) of muster areas may vary from day-to-day depending upon variable site operations and conditions, and shall be documented daily by the SSO or FTL.

9.1 ADJACENT FACILITIES OF CONCERN

There are no facilities adjacent to SWMU 0-016 which pose a concern

TABLE 9 INCIDENT/EMERGENCY ACTION REQUIREMENTS
Incident Responders: All spills and incidents other than minor first-aid will be handled by EM&R and/or LAFD.
First-Aid/CPR Provider(s): TBD when SSO is selected

Note: This site is within 1/2 mile from LAFD Station 4. Station 4 has agreed to provide emergency response, therefore, having someone who is first-aid/CPR trained on-site at all times is not required. If a trained person is going to be on-site and has agreed to provide emergency help, then the following items must be kept on-site (Does not apply to communications equipment, which must always be on-site).

REQUIREMENTS	TASK(S)
	ALL
Communications	
Cellular phone	X
Air Horn(S)	X
Description of Air Horn Signals: Two blasts on the air horn means assemble in the SZ	
Hand/Body Signals	X
Description of Hand/Body Signals: Hands to the throat = Choking/Lack of air	
Incident Response Equipment	
Industrial first-aid kit[1]	X
Bio. pathogen and waste disposal kit[2]	X
Antiseptic	X
Cold compress	X
Portable emergency eyewash[3] *[specify type and capacity]*	X
Transport Vehicle *[Required if emergency medical attention not within 4 minutes response time]*	X
Fire Fighting Equipment	
A:B:C fire extinguisher *20 Lb*	X
Spill Containment Equipment	There are no hazardous chemicals on-site which could pose a spill hazard. If the heavy equipment leaks hydraulic oil, it shall be parked on plastic and the oil scooped up and drummed.

1 The first-aid supplies shall be approved by a consulting physician and be kept in a weatherproof container. The contents are to be checked weekly and resupplied by SSO or designee. Contents shall meet the *American National Standard Minimum Requirements for Industrial Unit-Type First Aid Kits* (ANSI Z308.1-1978).

2 This kit shall be kept in a weatherproof container. Contents are to be checked weekly and resupplied by SSO or deligate. Contents shall include at least the following: *[specify]*

3 Emergency eyewashes and showers must be located within 10 seconds travel time and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous flushing for the duration of time necessary to sufficiently flush the most hazardous substance for which the device is being specified (usually minimum of 15 minutes and 16 gallon capacity). They also shall be inspected and flushed at least weekly by the SSO or designee. Refer to ANSI Z358.1-1990 for further information.

10.0 TRAINING

Training requirements are specified below by job title for each task or group of tasks having different requirements. Personnel shall be trained in accordance with Section 10 of the HASP and as specified below. Any exceptions or deviations from requirements of the HASP are noted below. Personnel performing the roles indicated below shall have completed and have current documentation of the training specified. The SSO, or the FTL or JS, shall verify that personnel have met the training requirements prior to authorizing individuals to enter controlled zones of the work site.

TABLE 10
TRAINING REQUIREMENTS

(Sup = Supervisors; CP = Competent Person for that subject; R = Read training; C = Classroom training; F = Field training; AN = As needed per the HASP or applicable regulatory requirement depending upon the intended duties of the personnel role; ER = Employer required)

Applicable Task(s): ALL

Training Requirement	Personnel Role							
	FPL	FTM	FTL	Sup	SSO	Heavy Equip. Op	Laborer	Sampler
HASP	R	R	R	R	R	R	R	R
SSHASP	R	R	R	R	R	R	R	R
Pre- Job Start HS Briefing	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C
Daily HS Tailgate Mtgs	F	F	F	F	F	F	F	F
General Employee Training (GET) - LANL provided only *[Required for anyone on site >10 consecutive work days]*	C	C	C	C	C	C	C	C
Employer's Hazard Communication Program [29 CFR 1926.59(e)]	C	C	C	C	C	C	C	C
Conduct of Operations & Occurrence Reporting	R	R	R	R	R	R	R	R
OSHA Rights & Responsibilities	R	R	R	R	R	R	R	R
Health Physics Checklist Indoctrination	AN	AN	AN	AN	AN	AN	AN	AN
40 hr. HAZWOPER	Recommended	Recommended	Recommended	Recommended	Recommended			
24 hr. Supervised Fieldwork	Recommended	Recommended	Recommended	Recommended	Recommended			

Training Requirement	Personnel Role							
	FPL	FTM	FTL	Sup	SSO	Heavy Equip. Op	Laborer	Sampler
8 hr. Annual Refresher	AN	AN	AN	AN	AN			
8 hr. HAZWOPER Supervisor	Recommended	Recommended	Recommended	Recommended	Recommended			
SSO					F/C			
1st Aid			Recommended		Recommended			
CPR			Recommended		Recommended			
First Responder Awareness Level			Recommended		Recommended			
PPE (per Section 7.1 of HASP)		F or C	F or C	F or C	F or C	F or C	F or C	F or C
Fire Extinguisher Use [per 29 CFR 1926.150(c)(1)(xi)]			F or C		F or C			
Hearing Conservation [Per Section 4.2.2.7 of HASP]		AN/C	AN/C	AN/C	AN/C	AN/C	AN/C	AN/C
Sanitation *[29 CFR 1926.51]*		AN	R	R	R			
Materials Handling, Storage, Use, Disposal *[29 CFR 1926.250 and 252]*		AN	R	R	R	R		
Signs, Signals, Barricades *[29 CFR 1926.200]*		AN	R	R	R	R		
Traffic Flagging and Safety *[29 CFR 1926.201]*			R	R	R	R		
Tools - Hand and Power *[29 CFR 1926.302(e)(1)]*		AN	R	R	R	R	R	R
Excavation/Trenching Competent Person *[29 CFR 1926.651(k)(1) and 32(l)]*		AN/C or R	AN/C or R	AN/C or R	AN/C or R			
Electrical Safety Awareness *[Subpart K of 29 CFR 1926]*		AN/C or R	AN/C or R	AN/C or R	AN/C or R	AN/C or R	AN/C or R	
Lockout/Tagout (Booklet)		AN/C or R	AN/C or R	AN/C or R	AN/C or R	AN/C or R	AN/C or R	
Lockout/Tagout (Red) Control of Hazardous Energy Sources [per 29 CFR 1926.416(a)(4) and 417(a) and 32(m)]		AN/C	AN/C	AN/C	AN/C	AN/C	AN/C	

Training Requirement	Personnel Role							
	FPL	FTM	FTL	Sup	SSO	Heavy Equip. Op	Laborer	Sampler
Motor Vehicles, Mechanized Equipment, and/or Material Handling Equipment *[specify equip. type and training requirement per Subparts O and W of 29 CFR 1926]*		R	R	R	R	R		
Welding and Cutting *[29 CFR 1926.350(d) and 351(d) and 354(a)]*		AN/R	AN/R	AN/R	AN/R		AN/R	
Bloodborne Pathogens *[29 CFR 1910.1030]*			Recommended		Recommended			
Lead *[29 CFR 1926.62]*		C	C	C	C	C	C	C

11.0 MEDICAL SURVEILLANCE

The medical surveillance requirements of this section have been established in accordance with Section 11 of the HASP, unless noted otherwise below.

TABLE 11
MEDICAL SURVEILLANCE REQUIREMENTS

Hazard	Task(s)	Exposure Level Triggering Medical Surveillance Requirement	Requirement
Bloodborne Pathogens (Or Potentially Infectious Materials)	5	Any occupational exposure	29 CFR 1910.1030(f)
Hearing Protection	1,2,3,4	≥ 85 dBA	29 CFR 1910.95(g)
Lead	1,2,3,4	≥ 30 ug/m^3	29 CFR 1926.62(j)

12.0 QUALITY CONTROL & QUALITY ASSURANCE (QC/QA)

12.1 SITE INSPECTIONS

In accordance with Section 12 of the HASP, the FTL shall see that the following inspections are conducted and documented, and that appropriate actions are taken and documented to rectify identified deficiencies, if any.

TABLE 12
INSPECTION REQUIREMENTS

Inspection	Inspector	Task(s)
Job Site, Material and Equipment (in accordance with 29 CFR 1926.20(b)(2))	SSO	All
General Sanitation (i.e., potable and non-potable water, toilets, washing facilities, eating and drinking areas, vermin control, and/or change rooms; in accordane with 29 CFR 1926.51)	SSO	All
Materials handling, storage, use and disposal (in accordance with 29 CFR 1926.250 and 252)	SSO	1,2,4
Signs, Signals and Barricades (in accordance with 29 CFR 1926.200)	SSO	1.2
Motor vehicles and mechanized equip. (in accordance with Subpart O of 29 CFR 1926)	SSO, QP or CP as required	1,2,4
Material handling equipment (e.g., rubber-tired scraper, loader and dozers] equipped with rollover protective structures and overhead protection (in accordance with Subpart W of 29 CFR 1926)	QP or CP as required	1,2,4
Excavations/Trenches(per 29 CFR 1926.651(k))	QP or CP as required	AR
PPE (Section 7 and 29 CFR 1926.95)	User	All
Incident/emergency response equipment (prior to each use and at least monthly)	SSO	5
Fire fighting equipment (per 29 CFR 1926.150(a) and (c))	SSO	5
Tools - hand and power (in accordance with Subpart I of 29 CFR 1926)	User and SSO	1,2,3,4
Welding and cutting equipment (in accordance with Subpart J of 29 CFR 1926)	QP or CP as required	AR
Electrical equipment (per 29 CFR 1926.403(b) and/.or 416(f)(8))	QP or CP as required	AR

QP = Qualified Person; CP = Competent Person (per 29 CFR 1926.32(f) or (m)); AR = As Required

13.0 RECORDKEEPING

In addition to recordkeeping requirements of Section 13 of the HASP, the HS records specified below shall be completed in accordance with Section 13 of the HASP and kept onsite as indicated below.

TABLE 13

RECORDKEEPING REQUIREMENTS

Record/Form	Requirement Reference	Keep Onsite
HASP	HASP Section 1	X
This SSHASP	HASP Section 1	X
Completed Modification Forms	HASP Section 1	X
SSOs Daily Logbook	HASP Section 13.1	X
Documentation of Training Requirements	HASP Section 10	
Documentation of Medical Surveillance	HASP Section 11	
Exposure Monitoring Records	Section 6 of the HASP and applicable exposure monitoring methods in the ER Project *Manual for Site HS Activities*	X
HS Inspection Records	HASP Section 12.1	X
Negative Determination	29 CFR 1926.62	X

APPENDIX A

MAP(S) OF SITE LOCATIONS, ADJACENT FACILITIES AND SITE CONTROL ZONES/FACILITIES

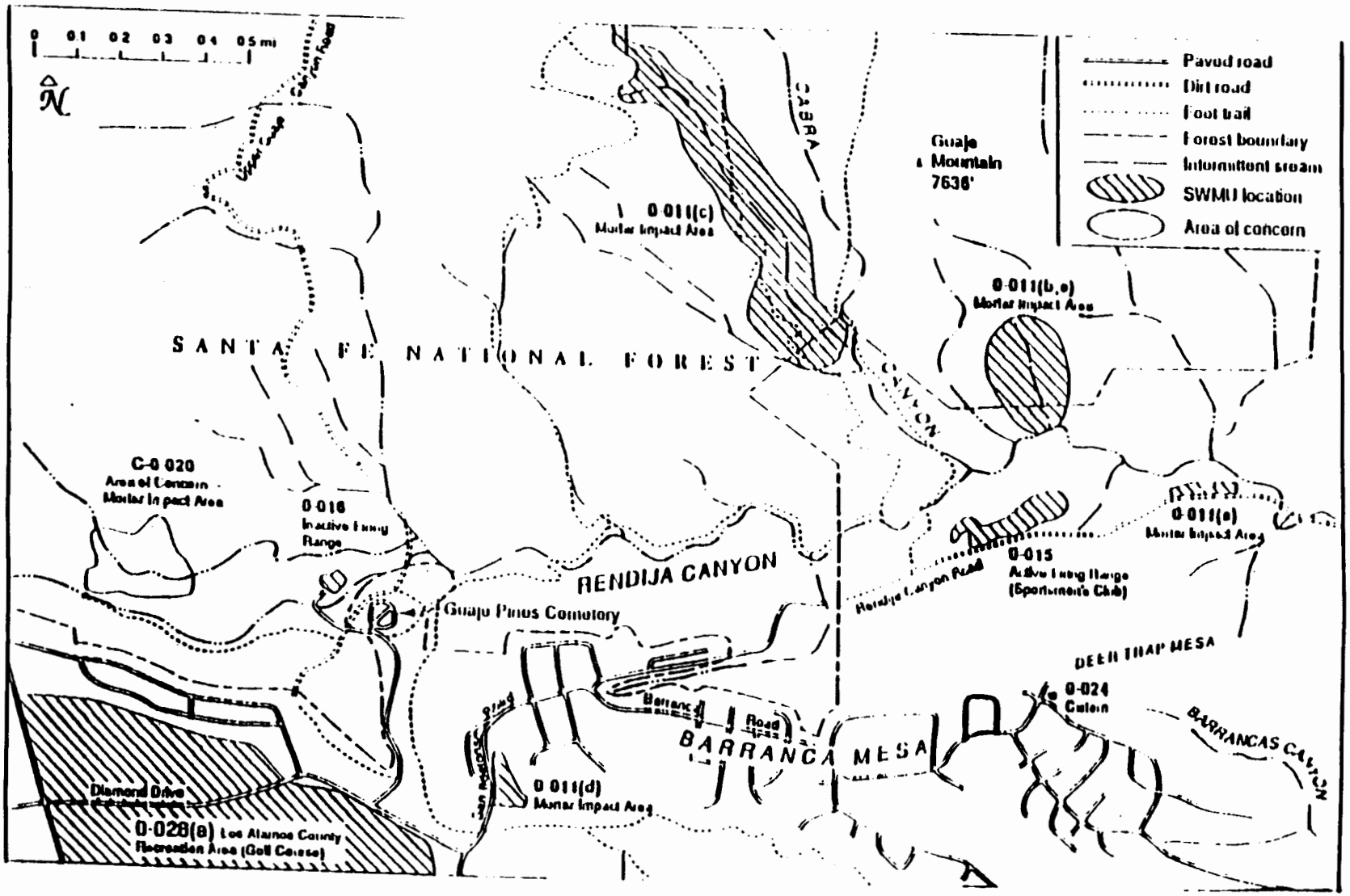

FIGURE 13.2

Location of SWMU 0-016 Inactive Firing Range

APPENDIX B

HAZARDOUS SUBSTANCE - HAZARD ASSESSMENT

APPENDIX B
HAZARDOUS SUBSTANCE - HAZARD ASSESSMENT

This table includes a health hazard assessment, and associated rationales, of each chemical product and site contaminant listed in Table 2-1. This hazard assessment was completed in accordance with Section 4.1 of the HASP.

Substance/ Synonym	Maximum Data[1]		Hazard Assessment Rating/Rationale
	Value	Location	
CHEMICAL SUBSTANCES			
Air Monitoring or Sampling Results			
Lead	ND	Refer to 1994-95 exposure data	Personal and area monitoring results from the past few years taken at this site have never indicated a lead exposure problem, however, since this is a slightly new process which could generate more dust we will perform a new initial determination. A hazard assessment rating of moderate will be used until the results of the new determination are reviewed. A new hazard assessment will be performed based on the new data and the HA will be downgraded, as appropriate.
Silica	< 0.07 mg/m^3	Refer to 1994-95 exposure data	Negligible; maximum value is far below PEL. Monitoring for silica at LANL was given high priority in the past few years with samples collected at a wide variety of sites and conditions. Results have never indicated a silica exposure issue.

[1] Reference resources where data reported, and either here or in the "location" column include a brief description of the sample location (e.g., borehole number, depth, etc).

APPENDIX C

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES OF HAZARDOUS CHEMICAL SUBSTANCES

Substance/ Synonym(s)	Exposure Limit [1,2] / IDLH[1] (ppm)			Physical Characteristics[1]	Route(s) of Entry [1,3]	Signs/Symptoms of Toxicity [1,3]	Carcino-genicity [1,3]	Flash Point [1,3]	Vapor Press./ Density [1]	IP [1,4]	SC[5]
	PEL or REL	TLV	IDLH								

APPENDIX C

PHYSICAL, CHEMICAL, AND TOXICOLOGICAL PROPERTIES OF HAZARDOUS CHEMICAL SUBSTANCES

The following physical, chemical, and toxicological reference materials shall be maintained on-site:

1. *NIOSH Pocket Guide to Chemical Hazards.*
2. *ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.*
3. *Quick Selection Guide to Chemical Protective Clothing*
4. *29 CFR 1926.62*

APPENDIX D

EMERGENCY CONTACTS
AND
ROUTE(S) TO MEDICAL SERVICES

EMERGENCY CONTACTS AND PHONE NUMBERS

(post on-site in Support Zone)

MEDICAL EMERGENCY/FIRE:

Los Alamos Fire Dept.....LANL phone: **911** Cellular phone: **667-7080**

HAZARDOUS RELEASE/SPILL:

LANL HAZMAT Team (EM&R).....**667-6211**

LANL Occupational Medicine Clinic (ESH-2).....**667-0660**
Los Alamos Medical Center Hospital.....**662-4201**
Security OS/Pro Force.....**667-6534**
Los Alamos Police.....**662-8224**
LANL Health and Safety - ESH-5.....**665-7221**
LANL Radiation - ESH-1.....**667-7137**
FPL: Garry Allen.....**667-3394**
Alternate FPL: Carl Newton.....**665-9259/106-8207**
FTM/FTL: Andy Crowder.....**662-3700/470-2497(cell)**
820-4413 (pager)
Field Unit HS Rep.: Joe Louck.....**665-5669/104-6959**

Management Contacts:

John Williams, ERM/Golder: 662-3700 or 470-2485

Al Funk, ERM/Golder: 662-3700

Paul Parker, Paul Parker Construction: 662-7456

EMERGENCY REPORTING INFORMATION:

When calling for emergency services, have the following information available to report:

- Site name/location/phone #
- Caller ID
- Nature of emergency
- Number of personnel involved
- Name and condition of affected employees
- Actions taken and assistance required

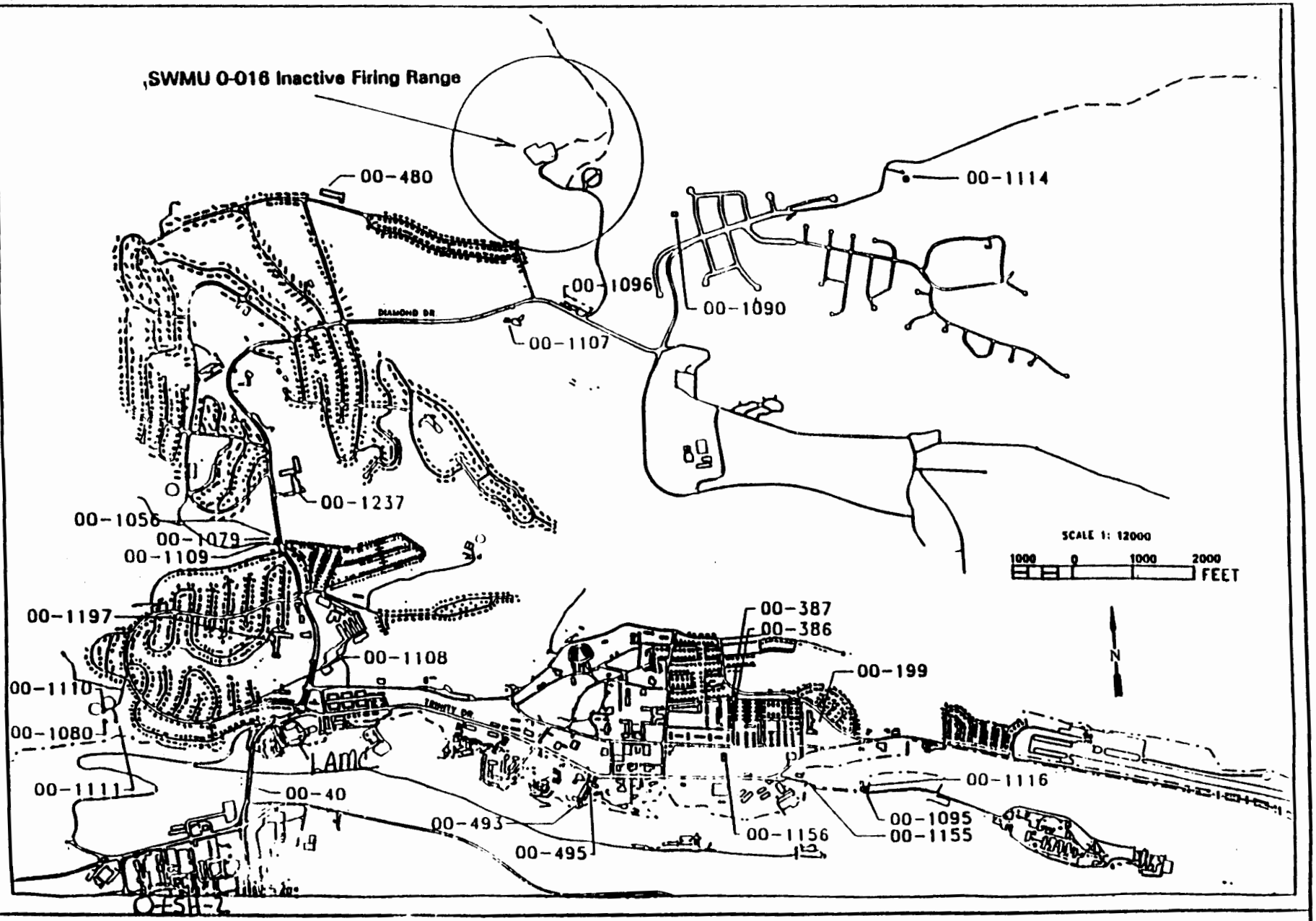

FIGURE 13.3

Location of SWMU 0-016 Inactive Firing Range in relation to Los Alamos New Mexico

ANNEX 8.7

Waste Management Plan
SWMU 0-016, Inactive Firing Range

ENVIRONMENTAL RESTORATION PROGRAM

OPERABLE UNIT 1071, SWMU 0-016

WASHING OF LEAD-CONTAMINATED SOIL AT INACTIVE FIRING RANGE

WASTE MANAGEMENT PLAN

LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

September 1993

REVISION 2

LANL WASTE MANAGEMENT PLAN REVIEW
ER PROGRAM, OU 1071, SWMU 0-016
1993 FIELD WORK

Pat Shanley EM-6	Signature	9-30-93 Date
Robert Weeks EM-7	Signature EM-7	10-5-93 Date
Robert Gonzales EM-13	FOR Signature	10-1-93 Date
Jim Aldrich OU 1071 Programmatic Project Leader	Signature	30 SEP 93 Date
Robert Vocke EM-13 Group Leader	Signature	9-30-93 Date

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2.1 Lead Bullets and Shot	3
2.2 Plastic Sheeting	3
2.3 Protective Clothing	3
2.4 Non-Hazardous Waste	4
3.0 WASTE MINIMIZATION	4

FIGURES **Following Page 4**

FIGURE 1: Location of SWMU 0-016

FIGURE 2: Site Map of SWMU 0-016

PLAN FOR THE HANDLING OF WASTE GENERATED AT SWMU 0-016 DURING FALL 1993 FIELD WORK

1.0 INTRODUCTION

This plan applies only to waste generated as a result of 1993 remediation field work at Solid Waste Management Unit (SWMU) 0-016, Inactive Firing Range. This SWMU is located within TA-0, which is a part of Operable Unit (OU) 1071. SWMU 0-016 is located west of Guaje Pines Cemetery (Figures 1 and 2).

The inactive firing range was used for small-arms target practice from the late 1940s until the 1960s. Lead bullets, shot, and casings have not been removed from the site, and lead projectiles are embedded in the earthen berms. The extent of the soil contamination is unknown. This plan addresses wastes associated with the soil washing field activities at SWMU 0-016. The objectives of the field work planned at SWMU 0-016 are to wash the soil that contains lead bullets and shot remaining in the berms and to recover and recycle the lead materials found. All excavated soils will be scanned after washing for possible contamination using a portable field X-ray fluorescence (XRF) detector, and appropriate quality assurance samples will be analyzed by an EPA-certified laboratory.

Lead-contaminated soil at SWMU 0-016 will be cleaned of all cartridges and lead bullets and lead particles to a maximum concentration of 500 ppm for any given volume of soil. The lead will be removed through a soil washing process that is done by a modified sand and gravel plant. Heavy equipment will be used to move the soil into and out of the soil washing apparatus. The soil washing task will be completed by Sierra Rock, Inc., an environmental contractor based in Reno, Nevada.

The plant operates on the principle that most soil particles have average densities in the range of 3 to 4 g/cc while lead is 11.4 g/cc. The plant setup includes two circulation ponds which are lined with impermeable liners. Because all previous small-arms range cleanups performed with this system have resulted in final lead concentrations considerably below 500 ppm, the soil cleaned at this SWMU will also probably fall well below this level. The soil washing machinery and the twin settling ponds form a closed system. All lead washed from the soil is output to 55-gallon storage drums from the soil washing machinery. All lead generated during the soil washing process will be sent to a recycling center by Johnson Controls, Inc. (JCI).

Soil will be sampled and analyzed on-site by X-ray fluorescence (XRF) methods. Soil samples will be collected throughout the course of the project. An initial phase of sampling will be done to compare background lead levels to those of the berms and to delineate any areas of elevated lead concentrations.

During processing, the cleaned soil will be sampled every 30 to 90 minutes, depending on the rate soil is moving through the system, and analyzed to ensure that it meets specifications. To confirm that all lead-contaminated soil has been removed, the range floor and locations of the former berms will be sampled judgmentally to confirm that the remaining soil is below 500 ppm lead. If the confirmation sampling reveals any location that exceeds the 500 ppm level, the soil in the area of the elevated lead level will be processed and additional confirmation samples taken. This will be repeated until all confirmation samples show levels below 500 ppm.

Soil from the circulation ponds will be gathered and analyzed on a daily basis to ensure that lead levels are below the cleanup levels. Previous experience with this plant has shown that little, if any, lead is released into the recirculating ponds.

For additional information about site background, the soil washing process, and the sampling and analysis strategy, see the attached Voluntary Corrective Action Plan.

2.0 WASTES GENERATED

Up to four types of wastes may be generated during the field work at SWMU 0-016:

lead bullets and shot embedded in the berms;

plastic sheeting used in the containment of recirculating ponds;

protective clothing (e.g., gloves, dust masks) worn during the soil washing operations;

non-hazardous and sanitary waste generated during the field activities.

2.1 Lead Bullets

Excavation of the berms will result in the recovery of spent bullet fragments that are likely to include lead bullets and lead shot. The materials that are recovered will be collected and stored in 55-gallon drums before being sent to a recycling center by JCI.

The volume of lead requiring recycling is unknown.

2.2 Plastic Sheeting

The circulation ponds will be lined with 30-mil continuous plastic sheeting to form an impermeable barrier. The two circulation ponds will be 200 ft x 43 ft x 6 ft and will be lined with approximately 20,000 sq ft of plastic. The plastic sheeting will be disposed according to the type of waste that it contacted. If the field monitoring shows no hazardous constituents are present on the plastic sheeting, it will be treated as non-hazardous waste (see Section 2.4). If necessary, a Waste Profile Request (WPR) form will be completed to identify the waste. The WPR form will be submitted to EM-8 to characterize the waste materials. If the materials are contaminated, a Chemical Waste Disposal Request form will be prepared and submitted to EM-7 for review before any material is shipped.

As appropriate, a Hazardous Materials Transfer form will be completed for MAT-2 approval prior to shipment of materials. Shipping arrangements will be made through MAT-2.

2.3 Protective Clothing

The type of disposal for personnel protective equipment will be dictated by the type of waste generated. If necessary a WPR form will be submitted to EM-8 to characterize the waste materials. If necessary a Chemical Waste Disposal Request form will be prepared and submitted to EM-7 for completeness and correctness review before any material is shipped.

If hazardous constituents are present, a Hazardous Material Transfer form will be completed for MAT-2 approval prior to shipment of materials. Shipping arrangements will be made through MAT-2.

The volume of used protective clothing and disposable sampling equipment that might be generated is unknown. For purposes of planning, it is assumed that one 55-gallon container should be sufficient to contain protective clothing and related material.

2.4 Non-Hazardous Waste

All material known to be uncontaminated, such as lunch wrappers, cans, office paper, coffee grounds, and other waste generated by personnel not engaged in the excavation activities, will be placed in separate on-site waste receptacles and properly disposed.

For purposes of planning, four large trash cans should be sufficient to contain the non-hazardous waste generated during the field activity.

3.0 WASTE MINIMIZATION

Steps to minimize the generation of waste will be taken by the field team. The use of disposable sampling equipment and personal protective equipment will be minimized throughout the remediation. The waste material will be segregated, whenever possible, to minimize the total volume of waste generated. Steps will be taken to avoid the generation of wastes, particularly those associated with the equipment decontamination procedure.

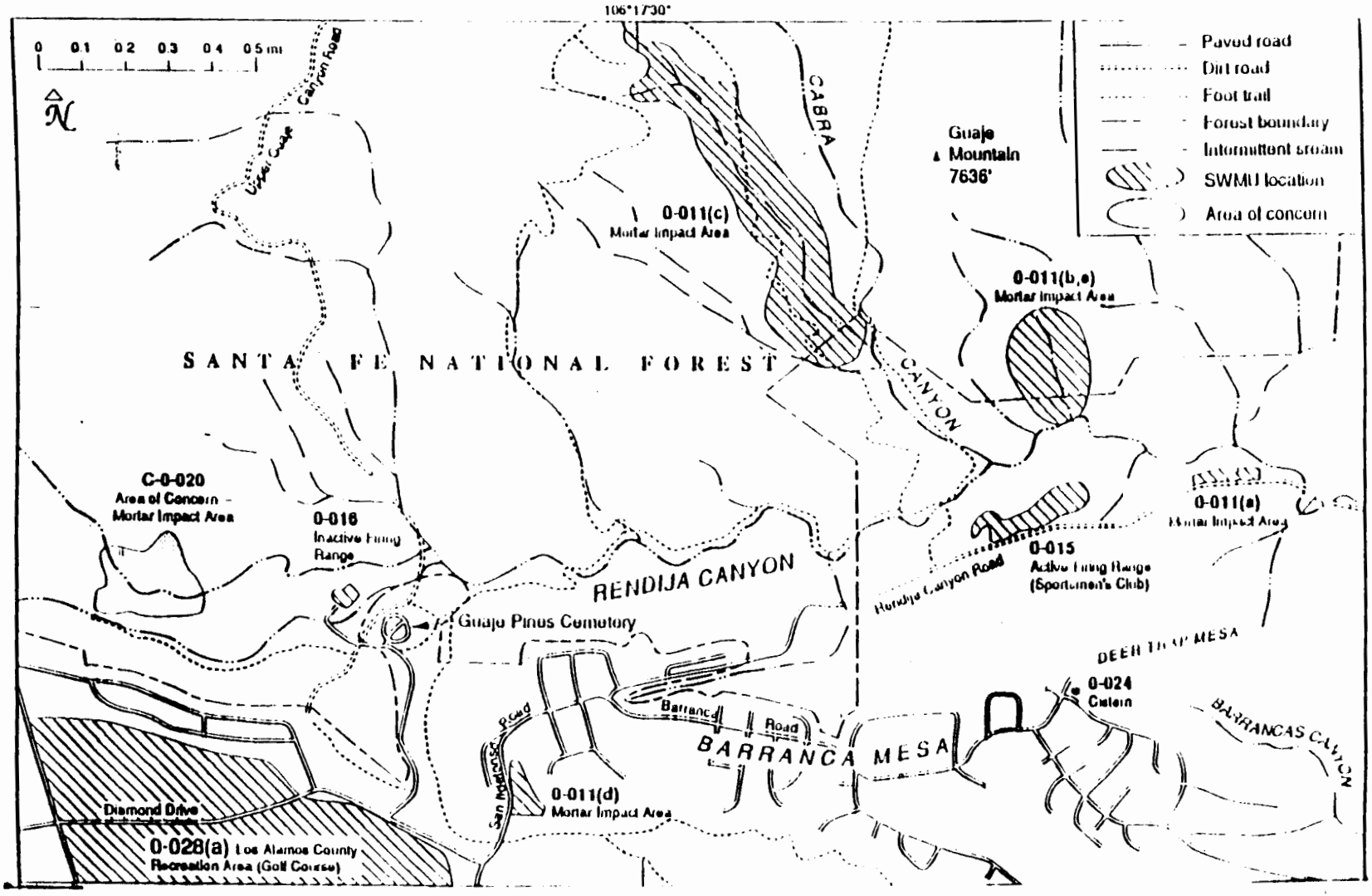


Figure 1. Location of SWMU 0-016 Inactive Firing Range

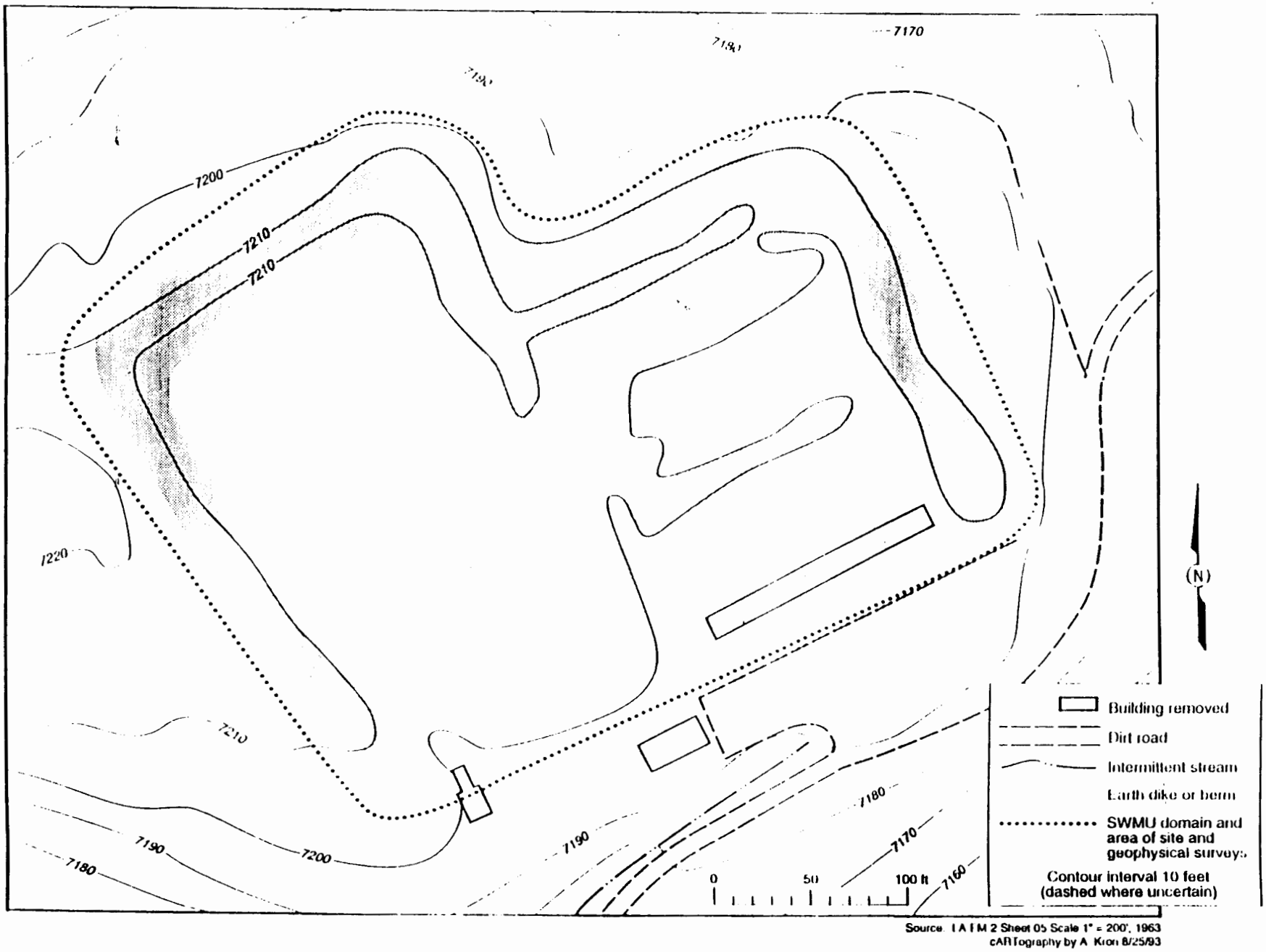


Figure 2. Site map for SWMU 0-016 Inactive Firing Range

ADDENDUM 1
to
WASTE MANAGEMENT PLAN
for
FIELD UNIT 1, TA-0, PRS 0-016
INACTIVE SMALL-ARMS FIRING RANGE
VOLUNTARY CORRECTIVE ACTION

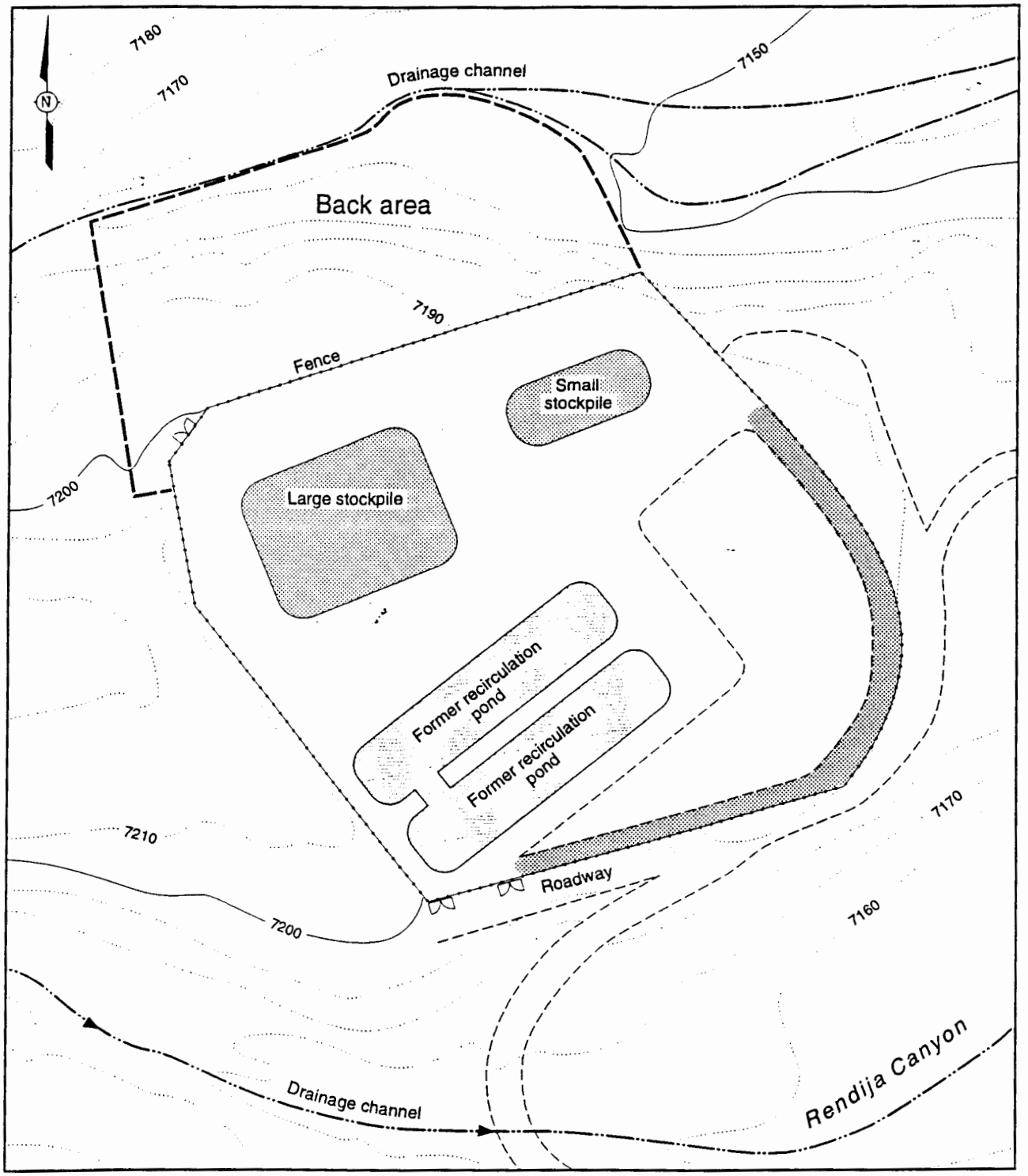
1.0 INTRODUCTION

This addendum to the *Waste Management Plan for Washing of Lead-Contaminated Soil at Inactive Firing Range, September 1993, Revision 2*, was prepared to address a change in the method to be used for removal of lead from the stockpiled soils on-site. The current site configuration is illustrated on Figure 1-1. All activities will be similar to those discussed in the Waste Management Plan with the exception of the use of a dry-sieving process (Shaker Plant) instead of soil washing. Other wastes, including PPE, plastic sheeting, and non-hazardous sanitary waste will be generated and managed as discussed in the Waste Management Plan and using best management practice.

2.0 MODIFICATION TO LEAD REMOVAL METHOD

The initial approach to removing the bullets and associated lead fragments from the former firing range berms involved soil washing in accordance with an earlier VCA plan prepared in 1993, which was partially executed in 1993 and 1994. Approximately 6000 cubic yards (yd^3) of the lead-contaminated soil was cleaned by soil washing at the end of the 1994 field season, and approximately 5000 yd^3 of unprocessed soil remain. The remaining soil will be processed using a Shaker Plant to remove the bullets by size-separation (dry-sieving); thereby, reducing the lead content in the soil as discussed in the new VCA Plan, June 1996, Revision 0.

At the beginning of the 1995 field season, the active Protection Technology of Los Alamos (PTLA) firing range in Tech Area 72 (TA-72) indicated several thousand cubic yards of soil was needed to improve the berms at the existing ranges. The option of moving the soil to the active PTLA firing range was considered by the New Mexico Environment Department (NMED) to be a cost-effective and "good common-sense" alternative to washing the remaining soil. Approval from the NMED to proceed with this option was not officially granted; however, the soil washing operations were discontinued based on an indication from the NMED that they would approve of moving the soil if certain conditions were met. After LANL



Soil stockpile locations are approximate

Approximate Scale

0 100 200 ft

cARTography by A. Kron 4/2/96

Figure 1-1. Inactive Small-Arms Firing Range site map, PRS 0-016.

complied with the conditions of the approval, the NMED and U.S. Environmental Protection Agency (EPA) determined that the soil should not be moved without first being processed to remove the lead, unless LANL establishes a Corrective Action Management Unit (CAMU) at the active PTLA firing range in TA-72. Due to the time required to prepare and process a CAMU application and a Class 3 permit modification, LANL has determined that the best way to move forward with the site cleanup is to remove the remaining bullets in the soil by separation of the bullet-size fraction of the soil using a sieving process. The June 1996 VCA plan provides the approach to removing a sufficient quantity of the lead from the remaining soil using an equivalent method to facilitate transferring the soil to the active PTLA firing range for re-use as range berm material.

3.0 DESCRIPTION OF SHAKER PLANT SIEVING OPERATIONS

Approximately 5000 yd^3 of stockpiled soil will be processed to remove the lead bullets. Most of the bullets in the soil are approximately .38 caliber. A dry screening process will be used to separate out the size-fraction of the soil that contains bullets of this size. Removal of the bullet-size fraction of the soils will greatly reduce the total lead content and lead leachability. Depending on the amount of oxidation, the bullets could leach on the order of 2 percent of the lead.

The bullets will be separated from the stockpiled soil using a sand and gravel dry-sieving apparatus, referred to as a Shaker Plant, that is equipped with various sizes of slotted wire screens. The soil will be processed through the Shaker Plant twice to facilitate removal of the size-fraction containing the bullets (bullet-size). First, the soil will be sieved using a $^3/_{16}$-inch screen which will allow the material that is finer than the bullet-size fraction (fines) to be segregated from the bullets and larger material. The fines will be stockpiled and sampled at regular intervals for waste characterization. This larger fraction, containing the bullets, will then be sieved a second time using a $^1/_2$-inch screen which will allow the bullets and bullet-sized material to pass through, and all materials greater than $^1/_2$-inch (oversize) will be captured by the screen. The screen sequence may be reversed, if necessary, to increase the efficiency and effectiveness of the process. The oversize fraction consisting of boulders, cobbles, and larger gravels (>$^1/_2$ inch) will be considered non-hazardous because the bullets and fines will have been removed from this fraction through the sieving process. Visual observation will be used as a guide to determine if uncommonly large lead slugs (>50 caliber) or clods of fine material are present in the oversize fraction.

The processed soil will be sampled for waste characterization in 25 yd^3 units to ensure adequate characterization and facilitate waste minimization. One representative soil sample will be collected from each 25 yd^3 unit of processed

soil at a randomly selected location on each pile and analyzed for lead by TCLP. Sample collection will be conducted using a thin-wall tube sampler with a length of 5 feet and a diameter of 1.5 inches. The sampler will be advanced to its entire length into each stockpile at a single location, to collect a composite sample of soil ranging from the outer flank (side-slope) to the center of the pile, as illustrated on Figure 8.3-5. Because each 25 yd3 stockpile consists of six loader buckets of material at 4.2 yd^3 per bucket, that are placed consecutively on top of each other, 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 (Figure 8.3-5). The 25 yd^3 stockpiles are 6 feet high and 20 feet wide at the base, therefore, the distance from the middle of the side-slope to the center of the pile is approximately 5 feet. The 5-foot core of soil extracted from each pile of fines will be thoroughly homogenized before being placed in a sample container for subsequent laboratory analysis. If the TCLP lead concentration in the soil exceeds the RCRA hazardous waste limit of 5 mg/L, the soil will be managed as hazardous waste.

Visual observations will also be used as a guide to segregating soils with potentially higher lead concentrations. As the soil is processed through the Shaker Plant, observations will be made as to how many bullets accumulate on the screen with respect to the quantity of soil passing through the plant. If observations indicate that there is a relatively high density of bullets in portions of the soil, then these materials will be segregated from soils that yield fewer bullets until analytical results are available to characterize the material.

Soil will be transferred from the soil stockpiles to the Shaker Plant using a front-end loader. The soil and range floor will be sprayed with water, as necessary, to minimize the amount of lofted dust. Personnel and area monitoring for lead was conducted during the Shaker Plant pilot study to determine if there was a potential for site workers to be exposed to airborne lead during soil processing operations. The results of the personnel and area monitoring indicate that there are no lead inhalation concerns at the site, and monitoring has been discontinued based on this initial negative determination, in accordance with 29 CFR 1926.62 (Lead Standard).

4.0 WASTE CHARACTERIZATION

4.1 Estimated Types and Volumes of Waste

The types of waste and recyclable materials to be generated as a result of the VCA activities will include the bullet-size fraction to be recycled, processed soil (fines) that is non-hazardous; oversize material that is non-hazardous,

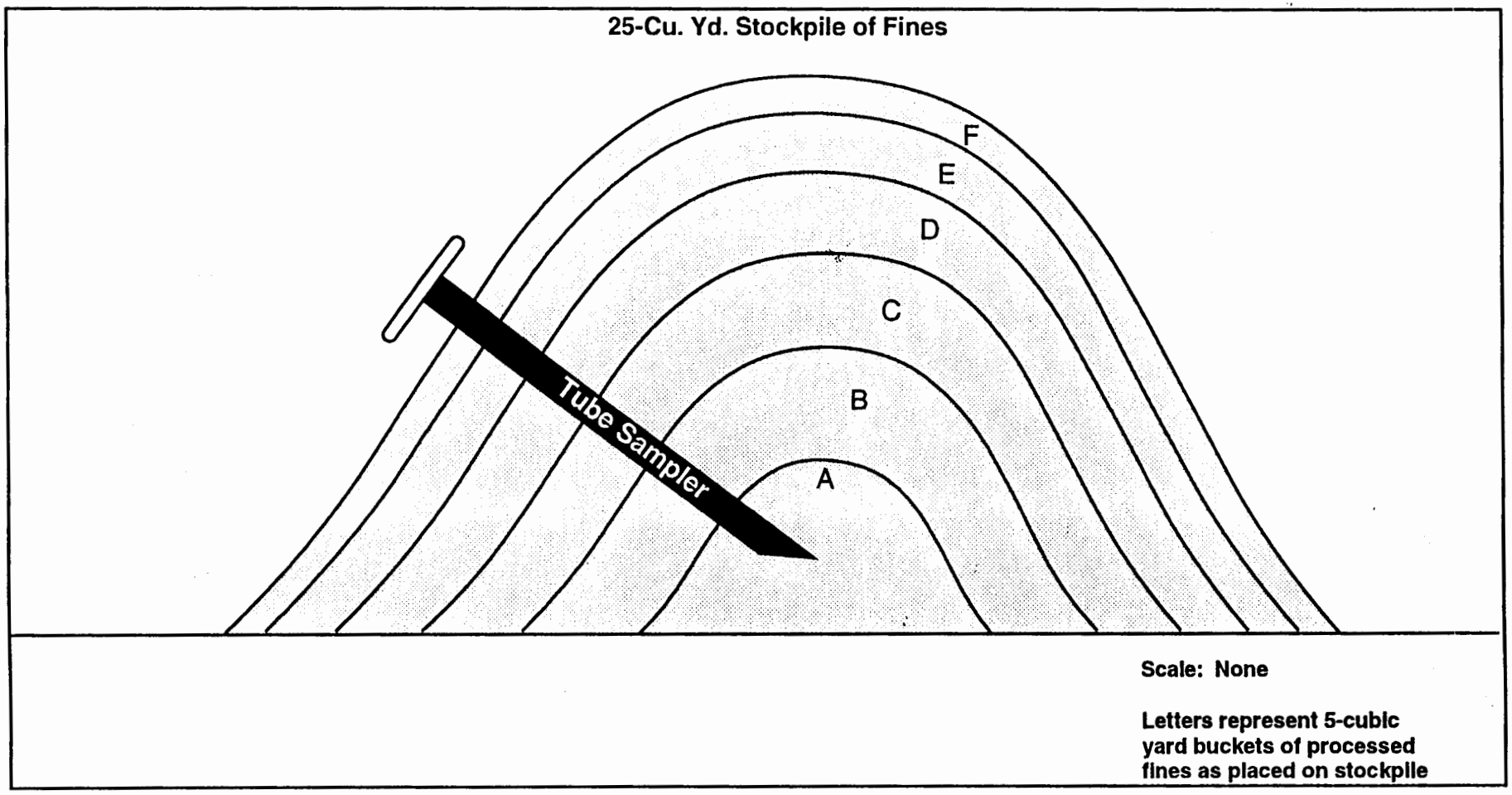


Figure 8.3-5. Stockpile sampling strategy for soils processed through Shaker Plant

and possibly, processed soil that is hazardous. All of these materials will be re-used or recycled with the exception of the processed soil that is determined to be hazardous, if any.

It is estimated that approximately 300 yd3 of material comprised of bullets and bullet-size gravels will be generated and stored on-site until arrangements are in place to transfer the lead/gravel to a recycling center or reclamation facility. If the bullets comprise less than 50 percent of the gravel mixture by volume, based on visual observation, further separation and processing will be conducted to reduce the amount of gravel in the mixture. The gravel must consist of a minimum of 50 percent bullets by volume to be acceptable for recycling or reclamation.

The processed soil that is determined to be non-hazardous based on TCLP lead analysis, will be stockpiled on-site pending transfer to the active PTLA Firing Range (TA-72) for re-use as firing range berm material.

The soils processed through the Shaker Plant are not expected to exceed the TCLP limit for lead; however, in the event that portions of the material are determined to be hazardous based on TCLP lead analysis, these portions will be segregated, properly contained, and stored until proper shipping and disposal can be arranged.

4.2 Method of Management and Disposal

The processed soil (fines) that is determined to be non-hazardous will be stockpiled on-site pending transfer to the TA-72 PTLA Firing Range. Soil (fines) that is determined to be hazardous will be containerized and stored on-site pending appropriate transportation and disposal at a LANL-approved treatment, storage, and disposal facility (TSDF). The bullet-size fraction will be stored on-site pending transfer to a recycling center or smelting facility. The oversize fraction will be stockpiled on-site pending transfer to an LANL facility for use as fill material in an industrial application.

4.3 Placement and Management of Processed Soils at TA-72

The processed soils provided to TA-72 will be used to construct firing range berms to improve the current configuration of the active PTLA firing lanes. Concerns regarding the potential for berm material to erode into the wash that passes through the range area have been addressed through development of a Storm Water Pollution Prevention (SWPP) Plan for TA-72. The SWPP Plan describes the soil placement and structural controls that will be emplaced to divert surface water away from the firing range berms and prevent potential erosion and transport of materials that may contain elevated total-lead concentrations.

Voluntary Corrective Action (VCA)
Checklist and Fieldwork Authorization Form
PRS No. 0-016 HSWA or AOC

Y COPC(s) defined.

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

Y Remedy is obvious.

Y Time for removal is less than 6 months.

Y Remedy is final.

Y Land use assumptions straightforward.

Y Treatment, Storage, Disposal Facilities are available for waste type and volume.

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

Explain criteria not checked above. _____

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

FPL Beverly Martin for ga Date 6/20/96

FPC [signature] for B. Koch Date 6/20/96

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

FPL Beverly Martin for ga Date 6/20/96

FPC [signature] for B. Koch Date 6/20/96

Through reviewing the VCA Plan, for site(s) 0-016, and believing that the above criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager [signature] Date 6/20/96

EM/ER:96-134

ANNEX 8.9

VCA Cost Estimate

(Assumption: Processed soil will be non-hazardous)

Pre-Field Activities

Field Preparation/Readiness Review	$ 20,000
Subtotal	$ 20,000

Field Activities

Field Team (FOM, FTM, FTL/Sampler/Waste Manager, SSO)	$ 50,000
Geodetic Surveys	$ 1,500
Shaker Plant Operating Costs	$ 40,000
Transportation of Processed Soil for Re-Use (non-hazardous)	$ 70,000
Site Restoration	$ 5,000
Subtotal	$ 166,500

Analytical Costs

XRF Rental (Pilot study and verification sampling)	$ 6,000
Waste Characterization Samples	$ 35,000
Verification Sampling	$ 5,000
Subtotal	$ 46,000

Post Field Activities

Acceptance Inspection	$ 1,000
Final Report	$ 20,000
Subtotal	$ 21,000
Total Estimated Cost	**$252,500**

ATTACHMENTS

ATTACHMENT A

Storm Water Pollution Prevention Plan
Technical Area 72, Protective Force Live Firing Range

STORM WATER POLLUTION

PREVENTION PLAN

Prepared for:

TECHNICAL AREA 72
Protective Force Live Firing Range

Los Alamos National Laboratory

a requirement of the

NPDES GENERAL STORM WATER PERMIT

Prepared by:
Santa Fe Engineering, Ltd.
2204 Brothers Road
Santa Fe, New Mexico 87505
(505) 988-7438
under subcontract 609EE0004-31

May 1996

STORM WATER POLLUTION PREVENTION PLAN
FOR TECHNICAL AREA 72
LOS ALAMOS NATIONAL LABORATORY

PREFACE

This Storm Water Pollution Prevention Plan (SWPPP) was developed in accordance with the provisions of the Clean Water Act (33 U.S.C. §§1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4), and the regulations established by the U.S. Environmental Protection Agency (EPA) for National Pollutant Discharge Elimination System (NPDES) General Permits for Storm Water Discharges Associated with Industrial Activity (EPA, 1992c at 41235). The NPDES general permits authorize the discharge of storm water runoff from industrial facilities to the waters of the United States, and define the limitations and conditions applicable to the discharge of storm water runoff from the regulated facilities. The applicable Storm Water Discharge Permit for most industrial storm water discharges in the state of New Mexico, including storm water discharges from Los Alamos National Laboratory (the Laboratory), is EPA General Permit Number NMR00A384 (EPA, 1992c at 41299-41300).

This SWPPP is also intended to meet the requirements of applicable U.S. Department of Energy (DOE) orders, including:

- DOE Order 5400.1: General Environmental Protection Program;
- DOE Order 5480.1B: Environment, Safety, and Health Program for Department of Energy Operations; and
- DOE Order 5480.4: Environmental Protection, Safety, and Health Protection Standards.

This SWPPP applies to discharges of storm water from Technical Area 72. At present, the facility is used as a firing range by the Laboratory security force. The range has been operational since 1966.

This SWPPP describes potential sources of storm water contamination at TA-72, and steps that have been undertaken by the Laboratory to minimize the potential for storm water contamination in the area. A Pollution Prevention Team whose members are knowledgeable about activities at TA-72 has been established to oversee implementation of the SWPPP. Protection Technology Los Alamos (PTLA) personnel will perform periodic inspections at TA-72 for potential sources of storm water pollution. The Pollution Prevention Team will conduct an annual Comprehensive Site Compliance Evaluation for storm water pollution prevention and document the results in this SWPPP.

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Appendix D	Records of Site Compliance Evaluations

STORM WATER POLLUTION PREVENTION PLAN / CERTIFICATION STATEMENT OF AUTHORIZATION

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

Gene Tucker, FSS-DO

Steve Rivera, PTLA Pollution Prevention Team Leader

NON-STORM WATER DISCHARGE ASSESSMENT AND CERTIFICATION	Completed by: Santa Fe Engineering Title: Engineering Field Staff Date: October of 1993

Date of Test or Evaluation	Outfall Directly Observed During the Test (Location)	Method Used to Test or Evaluate Discharge	Describe Results from Test for the Presence of Non-Storm Water Discharge	Identify Potential Significant Sources	Name the Person Who Conducted the Test or Evaluation
10/93	72-0008-OPN-001	Visual	Visual inspection and review of engineering drawings verified results.	Water Heater PRV	SFE
10/93	72-0039-OPN-003	Visual	Visual inspection and review of engineering drawings verified results.	Water Heater PRV	SFE
10/93	72-0039-OPN-005	Visual	Visual inspection and review of engineering drawings verified results.	Air Compressor Condensate	SFE
		Visual	Visual inspection and review of engineering drawings verified results.	Steam Condensate	SFE

CERTIFICATION

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

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
Gene Tucker (FSS-DO) Facilities Safeguard & Security	(505) 665-0455
C. Signature	D. Date Signed

1. POLLUTION PREVENTION TEAM

This Storm Water Pollution Prevention Plan (SWPPP) is applicable to operations at Technical Area 72 (TA-72) in Los Alamos County, New Mexico. Staff members from Facilities Safeguard & Security Division Office (FSS-DO) and Protection Technology Los Alamos (PTLA) have established a Pollution Prevention Team whose members are responsible for the development and implementation of the SWPPP.

1.1. Designation of Pollution Prevention Team

The FSS-DO, who is responsible for activities in TA-72, has appointed four representatives to the Pollution Prevention Team. The Pollution Prevention Team membership is selected on the basis of their familiarity with activities in the area and the potential impacts of these activities on storm water runoff. The team includes a representative of the Laboratory's Water Quality & Hydrology Group (ESH-18). Each member of the Pollution Prevention Team must receive the annual training described in Section 3.5. A list of Pollution Prevention Team members for TA-72 is included in Appendix A.

1.2. Responsibilities of Team Members

Members of the Pollution Prevention Team have specific duties applicable to the implementation of the SWPPP. Respective duties include:

- *Pollution Prevention Team Leader*: One of the Pollution Prevention Team members is designated as the Team Leader. He is responsible for revising and updating the SWPPP as required under Section 5.4 of this SWPPP. The Team Leader will perform the annual Comprehensive Site Compliance Evaluation described in Section 5.1 of this SWPPP. The Team Leader will also ensure that all team personnel receive the training specified in Section 3.5 of this SWPPP.

- *Team Members*: Other members of the team are responsible for periodic inspections of TA-72, as described in Section 3.4 of this SWPPP. In the event of a spill or release, a team member will also incorporate documentation of the spill and cleanup procedures into Appendix C of the SWPPP. Any team member may perform the annual Comprehensive Site Compliance Evaluation of TA-72.

1.3. Appointment of New Team Members

The Pollution Prevention Team members are appointed by and will serve at the discretion of the FSS-DO. A list of current team members is included in Appendix A of this SWPPP, and will be revised by the Pollution Prevention Team Leader whenever a member is added to or removed from the team. The FSS-DO may appoint additional members to the Pollution Prevention Team at any time.

2. SITE ACTIVITIES AND POTENTIAL POLLUTION SOURCES

This section of the SWPPP describes the site activities and potential pollution sources that have been present at TA-72. TA-72 is located on the north edge of East Jemez Road, adjacent to Sandia Canyon. Specific locations of major site activities and potential pollution sources are described in Section 2.2.

2.1. Site Activities at TA-72

TA-72 lies at elevations ranging from 6,900 feet above sea level near the western boundary to about 6,300 feet above sea level near its eastern boundary. It is located on the eastern boundary of the Laboratory, mostly in Santa Fe County and includes parts of Sandia and Los Alamos Canyons surrounding Mesita de Los Alamos.

TA-72 is currently used as a firing range by the Laboratory security force. This range has been operational since 1966. Structures on this site include a guard house and associated structures from the former TA-20 (which were abandoned in 1957 when access to East Jemez Road became unrestricted), and some structures added as part of the firing range. In addition, two Laboratory water supply wells, each with associated facilities (chlorinator and pump station), are located within TA-72.

2.1.1. Erosional Processes

At TA-72, the significant erosional processes include sediment transport by surface runoff from the mesa into adjacent canyons and from Potential Release Sites (PRS) on the canyon bottom in the stream or drainage channel in Sandia Canyon. Additional erosional processes include the potential exposure of PRSs located near the mesa edge by cliff retreat and erosional deposition of sediments in the bottom of Sandia Canyon. Minor amounts of wind erosion may also be occurring in the area. Rates of erosion and landscape change caused by these processes are unknown.

The primary erosional process at the bottom of Sandia Canyon is the movement of sediments during stream flow and floods. Thickness, detailed stratigraphy, and ages of alluvium in canyon bottoms are not well known, and therefore rates of deposition, erosion, and transport of potentially contaminated sediments through canyons are largely unknown.

2.1.2. Surface Water Runoff

Run-off in the ephemeral streams of the Pajarito Plateau occurs due to effluent releases, summer thunderstorms, and spring snowmelt. Effluent releases result in flow along limited segments. Run-off from summer storms reaches a maximum discharge in less than 2 hours and has a duration generally less than 24 hours. The high discharge rate carries large masses of suspended and bed sediments for long distances that may include the full stream length. Spring snowmelt occurs over a period of several weeks to several months at a low discharge rate. Although the long duration of flow results in the movement of significant masses of suspended and bed sediment, the mass transported by snowmelt run-off is small compared to that carried by summer run-off events. (Purtyman, 1974)

2.2. Inventory of Exposed Materials

"Significant materials" as defined in 40 CFR 122.26(b)(12), are substances related to industrial activities and include process chemicals, raw materials, fuels, pesticides, etc. When these substances are exposed to storm water runoff, they may be carried to a receiving stream with the surface water flow. To address this contamination potential, a brief description of materials, known to have been present at TA-72, is provided below.

2.2.1. CURRENT SIGNIFICANT MATERIALS LOCATED AT TA-72

Waste generated at TA-72 includes sanitary wastewater, hazardous wastes, and office trash. Sanitary wastewater, generated from rest rooms and sinks, is discharged to a septic tank. Hazardous wastes include materials used to clean weapons and solvents used in recirculating systems. Hazardous wastes, including solvent- and oil-contaminated rags, are collected at a satellite storage unit and are periodically removed for disposal. Office trash is accumulated in dumpsters and removed to the Los Alamos County landfill.

An active small-arms firing range is maintained at TA-72. Four firing ranges are used to conduct security related exercises. Lead is known to be present at the firing ranges. Bullets are scattered around the base of the cliffs and bullet backstops, and lead shot from skeet shooting is visible on the ground surface. The bullet backstops are located within the Sandia Canyon floodplain. Information pertaining to sediment samples taken downstream from the firing range is pending.

2.2.2. SOLID WASTE MANAGEMENT UNITS

The Laboratory's 1990 Solid Waste Management Units identified two potential solid waste management units (SWMUs) under the Resource Conservation and Recovery Act of 1976 (RCRA). The SWMUs or Potential Release Sites (PRS) identified at TA-72 include the following:

- PRS 72-001 - includes a 175-feet by 250-feet firing range surrounded by earthen berms, an adjacent skeet range, and some administrative buildings. It is located within the active facilities of TA-72 in Sandia Canyon. Lead is the primary contaminant of concern.
- PRS 72-003(b) was renamed as PRS 20-004 - consists of an inactive septic tank, a leach field, and connecting drain lines. The septic system served building 72-8 (formerly 20-47) beginning in 1952. It is unlikely that it has ever received wastes other than sanitary wastes. The PRS is recommended for No Further Action because there is no evidence of a release of contaminants into the environment.

Continuing data-gathering and evaluation activities by ESH-18 and the Laboratory's Environmental Restoration Group may lead to some revision of the SWMU listing for TA-72.

2.2.3. OTHER POTENTIAL SOURCES

Other potential sources of pollutants located at the facility include:

Ammunition Bunker 72-37 - The bunker houses all ammunition used at the Live Fire Range Facility. The bunker is secured and totally enclosed.

Storage Cabinets - Storage cabinets are located at all firing range canopies. The cabinets contain paint, gun cleaning supplies, bar oil, and miscellaneous solvents.

Active Septic System - Located north of 72-39 has a 2,000-gallon septic tank and an associated seepage pit (permit # SF 890025).

Upstream sources from TA-53 - Surface runoff from the eastern portion of TA-53 discharge directly into a tributary of Sandia Canyon. The tributary is located northwest of the Live Fire Range Facility that is adjacent to the TA-53 sanitary lagoons.

Upstream sources in Sandia Canyon - Surface water flows from upper Sandia Canyon into portions of the Live Firing Range Facility. The potential upstream sources include; historic TA-20 SWMUs, the TA-3 Asphalt Batch Plant, the TA-3 Steam Power Plant, the TA-46 Sanitary Waste Water Treatment Facility and the Los Alamos County Landfill. These sources are located one to four miles upstream.

Water System Chlorinator - Located within 72-9 used to chlorinate well water used at the facility.

A less than 90-day Satellite Storage area is located under canopy 72-12. A 55-gallon drum is used for disposal of rags and patches.

2.3. Non-Storm Water Discharges

In October of 1993, Santa Fe Engineering conducted a Wastewater Stream Characterization (WSC) of the entire Technical Area 72. The characterization included interviews, review of engineering drawings and dye test studies of all piping discharging into the environment from buildings. Non-storm water discharges at TA-72 were identified and are summarized below.

2.3.1. Sources of Non-Storm Water Discharges

Known sources of non-storm water discharges at TA-72 include:

- *Potable water discharges.* Drip irrigation system used to irrigate plants and trees along East Jemez Road.
- *Discharge from man-made pond.* A pond located on the eastern portion of the facility was installed to support wildlife in the area. Potable water is used to fill the pond.
- The following pipes were identified as periodic dischargers of non-storm water by the WSC project. WSC Report #75 details the characterization.

Table 2-1 - Non-Storm Water Discharges

Outlet Piping No.	Sources	Permit Status
72-0008-OPN-001	Water Heater PRV	NPDES General Permit
72-0039-OPN-003	Water Heater PRV	NPDES General Permit
72-0039-OPN-005	Air Comp. Condensate	NPDES General Permit

2.3.2. Certification

As stated in the General Permit for Storm Water Discharges Associated with Industrial Activity (EPA, 1992c), the SWPPP must include a certification that all storm water outfalls have been evaluated for the presence of non-storm water discharges. The non-storm water discharge assessment and certification form (page v) meet this requirement.

2.4. Documented Spills and Leaks

There have been no documented spills or leaks to the soil or to surface water at TA-72. In the event that a hazardous material spill or leak does occur at TA-72, ESH-18 will be notified and the Pollution Prevention Team Leader will document the incident in Appendix C of the SWPPP.

2.5. Site Drainage Map

The site drainage map illustrates the overall site location and indicates property boundaries, buildings and operation or process areas, as well as providing information on drainage, storm water control structures, and receiving streams. These features are located on the map to help assess where potential storm water pollutants are located on the site, where they mix with storm water, and where storm water leaves the site.

All of this information is essential in identifying the best opportunities for storm water pollution prevention or control. The site maps include the following features:

- An outline of the drainage area for each storm water outfall and a prediction of the direction of flow,
- Area topography (showing 10 foot) contour intervals,
- Each existing structural control measure to reduce pollutants in storm water runoff (e.g., diversion ditches),
- Surface water bodies (e.g., canyon name),
- Locations where significant materials are exposed to storm water,
- Locations where major spills or leaks have occurred since October 1, 1989,
- Locations of the following activities where such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance and/or cleaning areas, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas and storage areas.
- Locations of sanitary, storm water and other pipelines. Location of SWMUs, NPDES outfalls and other potential sources of pollutants.

See Figure 1 on page 2-6 for the site drainage map of this facility.

2.6. Drainage Patterns

TA-72 is located on the north edge of Jemez Road that slopes gradually to the north. Surface water runoff from the facility is typically "sheet flow" within the Sandia Canyon flood plain. There are also upstream drainage sources from TA-53 and Upper Sandia Canyon that discharge directly into TA-72 (Figure 1). The following table lists the areas of concern and the appropriate flow directions from the facility.

Table 2-2 - Description of Drainage Patterns and Flow Directions

Drainage Area	Activity Area	Flow Direction	Activities and Potential Contaminants
TA-72	Live Firing Range	East	Active firing range exercises which produce potential lead contaminants
TA-53	Eastern TA-53 around Lagoons, storm drain	East-Southeast	Access roads and lagoon activity located at TA-53 eastern boundary
Upper Sandia	Former TA-20 firing site experiments	East	Areas have been decommissioned but potential contaminants of concern include beryllium, uranium, and HE
Upper Sandia	Los Alamos County Landfill	East	Burial of non-hazardous wastes from Los Alamos townsite and LANL.
Upper Sandia	TA-3 Asphalt Batch Plant	East	Sediment piles and potential hydrocarbon releases
Upper Sandia	TA-46 Waste Water Treatment Facility	Effluent pumped to TA-3 for discharge into Sandia Canyon	Treated sanitary effluent
Upper Sandia	TA-3 Steam Power Plant	East	Cooling tower discharges, diesel fuel tanks

2.7. Sampling and Analysis of Other Media

The Laboratory has implemented an ongoing sampling and analytical program to identify potential radiological and chemical contamination of soils, stream sediment, vegetation, and the atmosphere. Data collected from this program are available in Annual Surveillance Report prepared and distributed by ESH-20 personnel. The Pollution Prevention Team Leader will review all environmental data collected in and around TA-72 to identify any potential concerns not already addressed in the SWPPP and will ensure that the SWPPP is modified, as necessary, to address any concerns. (See Appendix B)

2.8. Risk Identification and Summary of Potential Pollution Sources in TA-72

TA-72 contains minimal storage, access and operations areas. A summary of operational areas by type of operation, and an assessment of their potential for contributing to storm water pollution, is contained in this section of the SWPPP.

Active firing range activities present the main risk of potential pollutant loading. The firing site targets and bullet backstops are located within the Sandia Canyon drainage channel. Firing site debris, projectiles, fragments, bullet residues and powder residues could potentially be transported downstream during large runoff events.

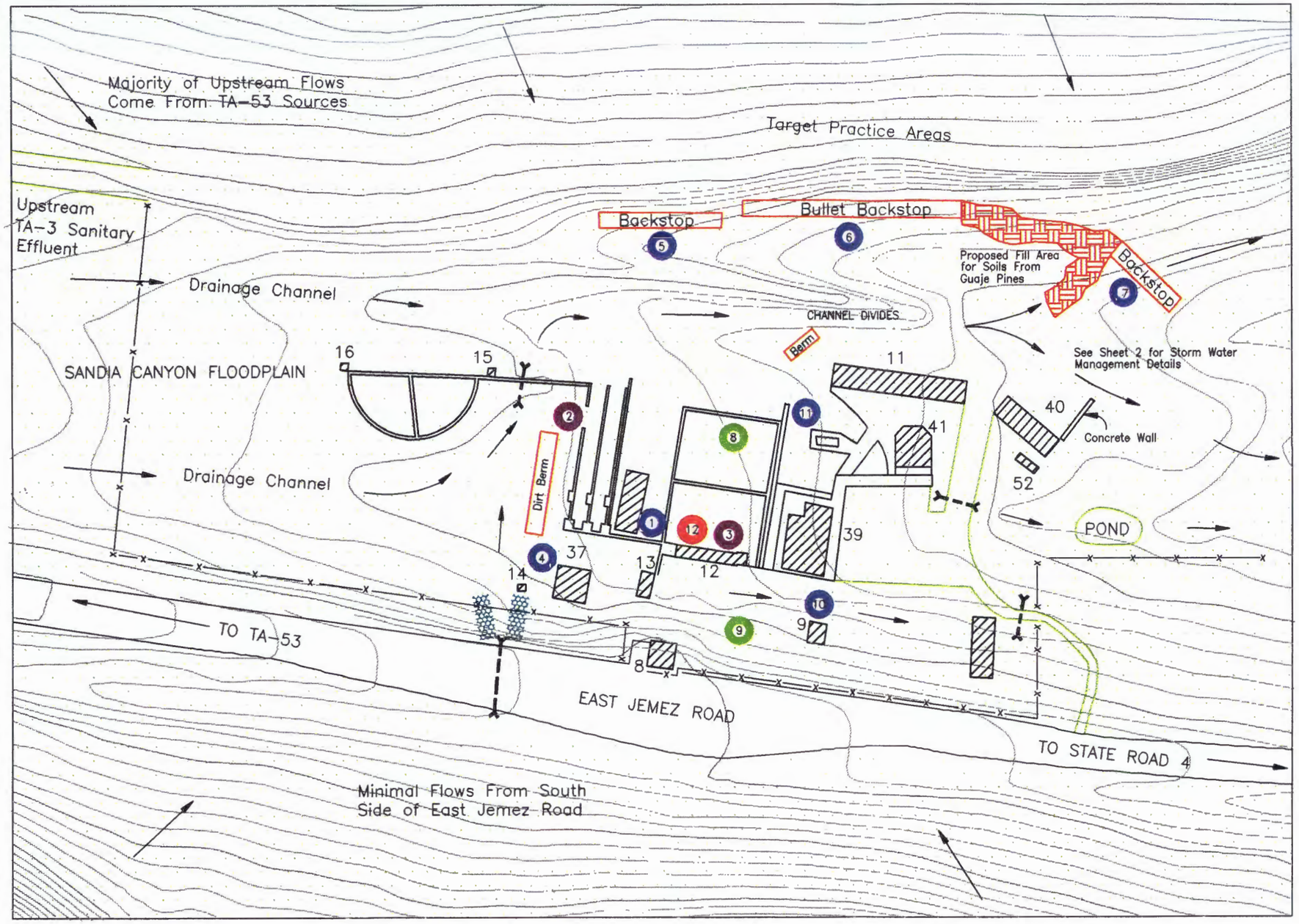
SWMUs listed within the drainage area described in Section 2.2.2. and SWMUs found immediately upstream could potentially transport contaminants onsite.

Regrading and dredging activities at TA-72 disturb sediments within the drainage channel. These activities will increase the potential for sediments being transported offsite during a storm event.

Transport of soils from the Guaje Pines inactive firing range (Permit # NMR104277) is scheduled for the summer of 1996. The soil will be processed through dry sieving prior to transport to TA-72. The soils will be used to fortify existing bullet backstops.

There are no other known sources of potential contaminants at TA-72.

TA-72 PROTECTIVE FORCE LIVE FIRING RANGE



SYMBOLS LEGEND	
	DRAINAGE BOUNDARY (off map area)
	DIRECTION OF STORM WATER FLOW
	DIRT ROAD
	SOILS COVERED
	RIP-RAP
	EXISTING BUILDING
	CULVERT
-x-x-x-	FENCE

POTENTIAL POLLUTANT LEGEND
LIQUID CHEMICAL STORAGE
SWMU LOCATIONS
OTHER SOURCE
TREATMENT, STORAGE, DISPOSAL AREA

DRAINAGE AREAS	
TA-72 SHOWN ON MAP	+\- 21 acres
FROM TA-53	UNDETERMINED
FROM UPSTREAM SANDIA	UNDETERMINED

1. Storage shed for misc. items at the firing ranges
2. Storage cabinents for misc. gun cleaning supplies
3. Cleaning tanks/safety solvents (3) w/2nd Containment
4. Ammunition storage bunker 72-37
5. Range #1 target area and earth berm
6. Range #3 target area and earth berm
7. Range #4 target area and earth berm
8. Potential Release Site 72-001 from past & present firing range activities
9. Potential Release Site 72-003(b) renamed PRS 20-004 is old inactive septic system
10. Water chlorination system 72-9
11. Active septic tank and leach field for facility
12. <90 satellite storage unit

N

REVISIONS			
NO.	BY	DATE	REMARKS
		4/96	SWPPP DEVELOPMENT

DRAWN	SJV	SCALE:	1"=100'-0"
DESIGNED	SJV	PLOT DATE	05/15/96
CHECKED	SJV	CREATION DATE	01/11/96
APPROVED		DRAWING FILE NAME	SW-72.DWG

Santa Fe Engineering Limited
2204 Brothers Rd. Santa Fe, NM 87505
(505) 988-7438 fax: (505)983-5608

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

REQUESTING GROUP ESH-18

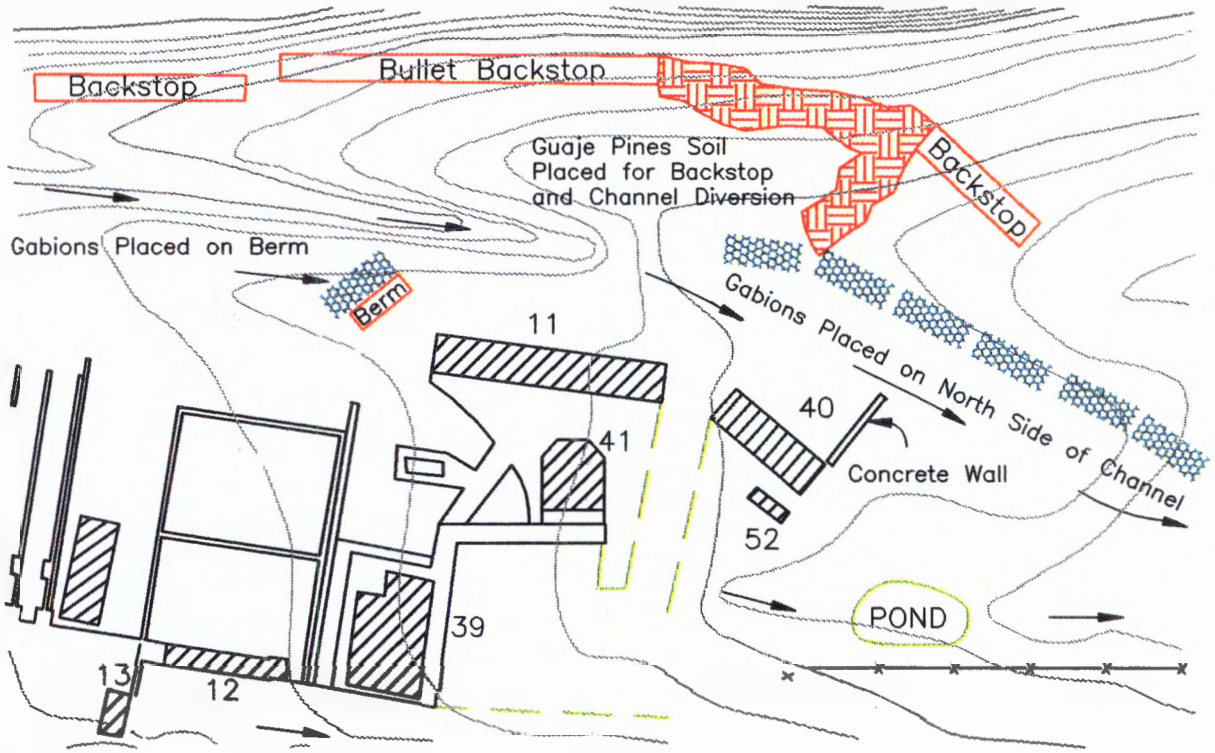
LAB JOB NO.

TA-72
SITE DRAINAGE MAP
LIVE FIRE RANGE

DRAWING NUMBER

SHEET 1 OF 2

REV 0



REVISIONS							
NO.	BY	DATE	REMARKS	DRAWN S-V	SCALE: 1"=100'-0"	Santa Fe Engineering Limited	Los Alamos National Laboratory, Los Alamos, New Mexico 87545
				DESIGNED AAA	PLOT DATE 5/1/96		
				CHECKED AAA	CREATION DATE 01/01/94		
				APPROVED	DRAWING FILE NAME TA-72.DWG	2204 Brothers Rd. Santa Fe, NM 87505 (505) 988-7438 fax: (505)983-5608	REQUESTING GROUP ESH-8
							LAB JOB NO. 5030.02

TA-72
SITEMAP
CONTROLS

SHEET 2 OF 2

DRAWING NUMBER FIGURE1

REV 0

3. BEST MANAGEMENT PRACTICES TO PREVENT STORM WATER POLLUTION

Standard operating and maintenance procedures at the TA-72 are designed to minimize the potential for spills, releases, exposure of materials, or any other events that could adversely affect the quality of water and sediment that may be transported out of the area by storm water runoff. Procedures comply with the Laboratory's Spill Prevention Control and Countermeasure Plan, the Environment, Safety and Health section of the Laboratory Manual, and applicable DOE directives and orders (see Preface).

3.1. Good Housekeeping

Good Housekeeping practices specifically applicable to storm water contamination at TA-72 include:

- Standard Operating Procedure (SOP) 40106 "Range Operations Procedures", specifies appropriate methods for handling materials so that they are not exposed to storm water,
- Placement of solid targets within the channel,
- Maintenance of operational areas in a clean and orderly state,
- Designation of specified areas for equipment maintenance activities, and
- Regular inspections to ensure that procedures are properly followed and that no potential contaminants are present in exposed areas.

3.2. Preventive Maintenance Program

Routine building maintenance is performed at TA-72 facilities. Adjunct facilities, such as fences, gates, windows, bullet backstops, etc. will be repaired in the event of damage. Storage areas, pressure release valves and external building piping are periodically inspected for signs of leakage.

Regrading operations performed in Sandia Canyon will follow all procedures set forth in the New Mexico Water Control Commission Regulations, Section 401, Water Quality Application for Dredge and Fill, and Federal Water Quality Act Section 404, Nationwide Permit for Dredge and Fill.

3.3. Spill Prevention and Response Procedures

Although the probability of spills and releases is minimized by the application of good housekeeping procedures and appropriate operational methods, a small contaminant spill is conceivable at certain locations within TA-72. Appropriate response measures for a spill or release of hazardous materials are described in the Los Alamos National Laboratory Spill Prevention Control and Countermeasure Plan. The specific spill response and cleanup procedures will depend on the nature of the spilled material and the location of the release. Spill cleanup materials and safety equipment are stored on the site ready for rapid response in the event of a spill.

3.4. Inspections

TA-72 will be inspected periodically by a Pollution Prevention Team member to ensure that site drainage is not impeded by sedimentation or erosion and that no changes affecting the potential for storm water pollution have occurred at facilities within TA-72. Inspections may become frequent if any activities (such as excavation of soil) occur that may increase the probability of storm water pollution at TA-72.

The Pollution Prevention Team member performing the inspection will document any potential storm water pollution problems that are encountered during the inspection. The Pollution Prevention Team, will review the documents to verify that they are complete and that any problems have been resolved. The records will be retained in the FSS-DO for a period of at least six years after the date that the deficiency was corrected.

3.5. Employee Training

All employees will receive a minimum of two hours of storm water pollution prevention training annually. The following topics must be incorporated, as a minimum, into an employee training program at the Live Firing Range Facility:

- Goals of the Storm Water Pollution Prevention Plan,
- Spill response and cleanup,
- Good housekeeping and material management practices to prevent storm water pollution, and
- A review of Best Management Practices that are intended to prevent storm water pollution.

Annual training may be combined with SPCC training. The topics covered in each annual training session will be documented. The list of topics covered and the names of personnel present at the training session will be maintained at the Administration Office at building 72-39.

3.6. Recordkeeping and Documentation

The Pollution Prevention Team Leader is responsible for keeping the SWPPP current, so that it accurately reflects present conditions and practices at TA-72. The Pollution Prevention Team will initiate revision of the SWPPP whenever changes in TA-72 conditions require it. Conditions that may require revision of the SWPPP are described in Section 5.3.

Other items that must be documented to ensure adequacy of the SWPPP include the following:

- Inspection results, including those of the annual Comprehensive Site Compliance Evaluation,
- TA-72 environmental sampling and analytical data (soil, sediment, or other environmental media),
- Additions to and changes in operational areas and exposed materials,
- Land surface changes or structures affecting the directions of drainage during storm events,
- The occurrence and cleanup of spills or releases, and
- Any other factors that may influence the quality of storm water runoff from TA-72.

4. CONTROLS TO REDUCE POLLUTANTS

No waste management activities presently occur at TA-72. However, bullet fragments and powder residue that may be present in the area due to current or past activities could be mobilized in storm water or sediment transported from the site.

4.1. Sediment and Erosion Control

Specific actions that may be used to control erosion and sediment transport include reshaping of contours, construction of berms, installation of riprap or other appropriate water control structures, revegetation of exposed areas, and, if necessary, paving of some areas that are prone to erosion. Backstops have been placed behind all firing range targets at the facility. The backstops are created with sediment available within the drainage channel.

4.2. Management of Runoff

In general, no attempt is made to eliminate or minimize the natural flow of storm water through TA-72 and Sandia Canyon. Instead, emphasis is placed on preventing contamination of the runoff by minimizing its contact with wastes, containers, equipment, and by diverting it from the locations in which firing range operations regularly take place.

Past grading activities have caused the drainage channel to divide in the area between Firing Ranges #3 and #4. Treated soil (sieved) from the Guaje Pines area within Los Alamos townsite will be moved to TA-72 to construct backstop berms in this area. The berm and riprap will also divert surface water runoff into the natural drainage channel.

The following storm water run-on/runoff practices will be performed for the Live Firing Range activities.

- Stabilize channel within the active firing range areas. Gabions made with steel wire mesh and round river cobbles should be installed along the northern channel boundary in front of the 72-11 and 72-40 firing canopies. Flat lying gabions (9' L x 3' W x 1' H) installed along a 100'-130' section would provide stability within the natural channel. See site drainage map (Sheet 2) for locations.
- Placement of soil from Guaje Pines site (behind gabions) to divert channel away from long range firing range area #4. All soil will be placed in berms used to receive bullets and to control the disposition of lead. The size of the berms will be engineered to meet both bullet containment and personnel safety requirements. Before the soil is transported to TA-72, a verification must be made that the soil is free of (RCRA regulated substances).
- Regrading is performed within the channel after large runoff events or on an as needed basis (under the 404 Nation Wide permit). A small berm has been created from channel sediments to divert runoff away from canopy 72-11. Flat lying gabions (12' L x 3' W x 1' H) should be placed on the existing berm to provide channel stability in this area.

4.3. Documentation of Runoff Control Activities

The Pollution Prevention Team will document any actions recommended or undertaken to control the flow of storm water runoff or to limit erosion and sedimentation by storm water at TA-72. A Pollution Prevention Team Member will supply copies of all such records to the FSS-DO.

During annual inspections of TA-72, the Pollution Prevention Team will observe the outfall locations and the unpaved areas near the building for any evidence of erosion. If evidence of significant erosion damage is encountered, the Pollution Prevention Team will recommend appropriate actions to minimize future erosion. The recommended actions could include the following:

- Constructing berms or channels to deflect the flow of water,
- Installing riprap or small check dams to reduce the runoff speed,
- Seeding areas to provide vegetative growth to minimize erosion, or
- Installing other structural controls, as appropriate.

5. COMPREHENSIVE SITE COMPLIANCE EVALUATION

A Comprehensive Site Compliance Evaluation of the TA-72 facility will be performed once a year, during August or September by the Pollution Prevention Team. This time frame was selected for the annual evaluation because it falls at the end of the period when heavy thunderstorms are common in the Los Alamos area.. Consequently, precipitation and runoff problems are most apparent during these two months. Any problems that may be identified during an inspection in August or early September can be corrected within 12 weeks with a relatively low probability for delay because heavy snowfall is infrequent before December.

5.1. Evaluation Procedures

During the Comprehensive Site Compliance Evaluation, the Pollution Prevention Team will examine all operational and non-operational areas for any conditions that may contribute to excessive sedimentation or the presence of contaminants in the runoff. The Pollution Prevention Team will use a Site Compliance Evaluation Checklist to ensure that significant conditions are not overlooked during the inspection.

Areas inspected in detail will include all material storage areas, firing range berms, drainage channels, and sources where non-storm water discharges are located. Specific items that will be evaluated during the inspection of each area will include:

- Exposed materials that may contribute to contamination of storm water runoff,
- Any evidence of spills that may have occurred in the operational areas, and their potential for contributing contamination to runoff,
- Drainage channels or other evidence of erosion and sediment transport; and
- Any other factors that may require modification of either TA-72 operating procedures or the contents of the SWPPP.

In addition, the Pollution Prevention Team will examine all structural features designed to convey runoff or minimize erosion (such as berms, culverts, curbs and outfalls) to ensure that they are in good working condition and are serving their intended purpose. Observations made during the inspection will be documented on the Site Compliance Evaluation Checklist.

5.2. Report on Results of the Comprehensive Site Compliance Evaluation

Within two weeks after completing the Comprehensive Site Compliance Evaluation, the Pollution Prevention Team will report the results of the inspection and any irregularities encountered during the evaluation. The report will include, as a minimum, the following items:

- Date(s) of the evaluation;
- The personnel who performed the evaluation;
- A written summary of major observations relating to implementation of the SWPPP; and
- A description of any incidents of non-compliance with the SWPPP and the recommended actions to correct them.

The report will also include one of the following items:

- Either a certification, signed by a member of the Pollution Prevention Team, that TA-72 is, to the best of his or her knowledge, in compliance with the SWPPP; or
- A statement signed by a member of the Pollution Prevention Team describing non-compliance with the SWPPP, and the actions taken to bring the facility into compliance.

All reports describing results of the annual Comprehensive Site Compliance Evaluation into Appendix D of the SWPPP. These reports will be retained as part of the SWPPP for as long as the SWPPP remains in effect.

5.3. Revision of Storm Water Pollution Prevention Plan

The SWPPP will be amended whenever there is a change in the design, construction, operation, or maintenance procedures at TA-72 that has a significant effect on the potential for discharge of contaminants in storm water runoff or sediment derived from the area. Examples of such a change could include changes in the types of operations performed in the area, or significant changes in the direction of runoff due to construction or modification of roads, drainage channels, buildings, or other structural features. The SWPPP will also be amended whenever a Comprehensive Site Compliance Evaluation or other inspection identifies any significant changes in operational areas, procedures, or materials handled that may affect the potential for contaminant migration from the site in storm water or sediment.

Certain specific events trigger requirements for modification of the SWPPP either by revision of existing sections or by incorporation of new material into the document. Some events requiring modification of the SWPPP and sections of the SWPPP that typically would be modified following the event are listed in Table 5-1. However, Table 5-1 is not exhaustive, and any event that has the potential for significantly affecting storm water runoff or sediment transport from TA-72 may require modification of the SWPPP, whether or not it is listed in Table 5-1.

The Pollution Prevention Team is responsible for timely revision of the SWPPP whenever required. Responsibility for evaluating changes in procedures, activities, or other conditions at TA-72 that may require amendment of the SWPPP rest primarily with the Pollution Prevention Team. However, any employee or observer at TA-72 who observes any such changes should report them to the Pollution Prevention Team promptly.

Any required changes to the SWPPP section describing potential pollution sources (Section 2.0 and its subsections, and Appendices C, D, and E) must be made within two weeks after the need for the change is reported to the Pollution Prevention Team. If the modification of the SWPPP requires any changes in operational procedures, inspections or structural features for the control of runoff and sediment, those changes must be implemented within 12 weeks after the modification is incorporated into the SWPPP.

TABLE 5-1 Events Requiring Modification of the Storm Water Pollution Prevention Plan for TA-72

Event Leading to Modification of the SWPPP	Actions Required to Modify the SWPPP	Portions of the SWPPP Affected by Changes
Change in members or duties of the TA-72 Pollution Prevention Team	Amend the list of team members and their duties in the SWPPP.	Appendix A
Significant changes in TA-72 operational procedures or locations of operations	Modify map and text sections of the SWPPP to reflect the changes.	Sections 2.2 and 2.8
Significant changes in the types of materials handled at TA-72	Review to determine whether changes in SWPPP procedures are required; add the new materials to the inventory list in the SWPPP.	Sections 2.2 and 2.8
Spill or leak of waste, water, or other materials at TA-72	Document the release and cleanup procedures; incorporate the documentation in the SWPPP.	Section 2.4 and Appendix C
Receipt of laboratory analytical results for storm water discharge, soil, sediment, or other environmental sampling	Review to determine whether there are abnormal values for any constituent; take corrective action if appropriate; incorporate the analytical results in the SWPPP.	Appendix B
Completion of Comprehensive Site Compliance Evaluation	Review the entire SWPPP to ensure that it is still accurate and complete; correct any deficiencies found during the Site Compliance Evaluation; document the Evaluation and any follow-up actions.	Appendix D; other parts of the SWPPP as appropriate

6. REFERENCES

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U.S. Department of Energy, 1990b, "General Environmental Protection Program," DOE Order 5400.1, November 9, 1988, and Change 1, June 29, 1990, Washington, D.C.

U.S. Environmental Protection Agency, 1992a, "EPA National Pollutant Discharge Elimination System Permit Regulations," 40 CFR Part 122.

U.S. Environmental Protection Agency, 1992c, "Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity; Notice," 57 Federal Register No. 175, pp. 41235-41342, September 9, 1992.

APPENDIX A

Members of the Storm Water
Pollution Prevention Team for TA-72
Los Alamos National Laboratory
(See text, Section 1.1)

1.	Pollution Prevention Team Leader:	Steve Rivera - PTLA Range Master
2.	Team Member:	David Martinez - PTLA Logistics Manager
3.	Team Member:	Henry Nunes - FSS Staff
4.	Team Member:	Mike Alexander - ESH-18 Staff or designee

APPENDIX B

Sampling and Analytical Data
(Any future data obtained should be placed in this Appendix)

15/96 09:41 ☎5056654632 LANL CST ER PROJ 009

SAMPLE ID 0272-95-	ANALYTE	VALUE	UNITS	UTL	SAL	CUL(I)	> UTL ?	> SAL ?	> CUL (I) ?
0005	Manganese	184	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0006	Manganese	219	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0003	Manganese	261	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0006	Selenium	1.2	mg/kg	1.7	380	2920	no	no	no
0001	Zinc	19.3	mg/kg	50.8	23000	175000	no	no	no
0003	Zinc	19.3	mg/kg	50.8	23000	175000	no	no	no
0010	Zinc	20.2	mg/kg	50.8	23000	175000	no	no	no
0009	Zinc	21.5	mg/kg	50.8	23000	175000	no	no	no
0004	Zinc	22.2	mg/kg	50.8	23000	175000	no	no	no
0002	Zinc	24.4	mg/kg	50.8	23000	175000	no	no	no
0006	Zinc	26.3	mg/kg	50.8	23000	175000	no	no	no
0005	Zinc	26.7	mg/kg	50.8	23000	175000	no	no	no
CHEMICALS OF POTENTIAL CONCERN: none									

Footnote: Sediment data collected from streambed below and east of PRS 72-001. Data is not currently available from FIMAD. Data is draft, retrieved from hard copy reports and has not undergone a validity check or QA/QC analysis.

Attachment 3

DRAFT

November 28, 1995

PRS 72-001 DETECTS (SEDIMENT CATCHMENTS ONLY)

SAMPLE ID 0272-95-	ANALYTE	VALUE	UNITS	UTL	SAL	CUL(I)	> UTL ?	> SAL ?	> CUL (I) ?
0001	Aluminum	1440	mg/kg	38700	77000	467000	no	no	no
0010	Aluminum	1530	mg/kg	38700	77000	467000	no	no	no
0003	Aluminum	1710	mg/kg	38700	77000	467000	no	no	no
0005	Aluminum	2130	mg/kg	38700	77000	467000	no	no	no
0009	Aluminum	2140	mg/kg	38700	77000	467000	no	no	no
0002	Aluminum	2150	mg/kg	38700	77000	467000	no	no	no
0004	Aluminum	2220	mg/kg	38700	77000	467000	no	no	no
0006	Aluminum	2250	mg/kg	38700	77000	467000	no	no	no
0009	Barium	50.1	mg/kg	315	5300	7680	no	no	no
0010	Chromium	4.2	mg/kg	19.3	210	113333	no	no	no
0001	Chromium	4.4	mg/kg	19.3	210	113333	no	no	no
0003	Chromium	5.3	mg/kg	19.3	210	113333	no	no	no
0005	Chromium	5.7	mg/kg	19.3	210	113333	no	no	no
0006	Chromium	5.9	mg/kg	19.3	210	113333	no	no	no
0004	Chromium	6.1	mg/kg	19.3	210	113333	no	no	no
0002	Chromium	6.4	mg/kg	19.3	210	113333	no	no	no
0009	Chromium	6.8	mg/kg	19.3	210	113333	no	no	no
0001	Iron	2440	mg/kg	21300	n/a	n/a	no	n/a	n/a
0003	Iron	2500	mg/kg	21300	n/a	n/a	no	n/a	n/a
0009	Iron	2580	mg/kg	21300	n/a	n/a	no	n/a	n/a
0010	Iron	2620	mg/kg	21300	n/a	n/a	no	n/a	n/a
0004	Iron	2790	mg/kg	21300	n/a	n/a	no	n/a	n/a
0005	Iron	3060	mg/kg	21300	n/a	n/a	no	n/a	n/a
0006	Iron	3620	mg/kg	21300	n/a	n/a	no	n/a	n/a
0002	Iron	3830	mg/kg	21300	n/a	n/a	no	n/a	n/a
0003	Lead	7.8	mg/kg	23.3	400	1000	no	no	no
0001	Lead	8.2	mg/kg	23.3	400	1000	no	no	no
0006	Lead	9.1	mg/kg	23.3	400	1000	no	no	no
0002	Lead	9.2	mg/kg	23.3	400	1000	no	no	no
0004	Lead	9.9	mg/kg	23.3	400	1000	no	no	no
0010	Lead	10.2	mg/kg	23.3	400	1000	no	no	no
0009	Lead	10.8	mg/kg	23.3	400	1000	no	no	no
0005	Lead	11.4	mg/kg	23.3	400	1000	no	no	no
0010	Manganese	114	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0001	Manganese	116	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0002	Manganese	125	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0009	Manganese	151	mg/kg	714	(380) UTL	(504) UTL	no	no	no
0004	Manganese	160	mg/kg	714	(380) UTL	(504) UTL	no	no	no

Footnote: Sediment data collected from streambed below and east of PRS 72-001. Data is not currently available from FIMAD. Data is draft, retrieved from hard copy reports and has not undergone a validity check or QA/QC analysis.

APPENDIX C

Records of Past and Future Spills or Leaks
(Use the following Table to track future spills)

Table for Tracking Future Spills

Date	Spill Location	What Spilled	Quantity Spilled	Corrective Action Taken	Plans to Prevent Recurrence

APPENDIX D

Records of Comprehensive Site Compliance Evaluations

STORM WATER ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION REPORT

Name of Facility: _____ **Date of Inspection:** _____

Name of Inspector(s): _____

_____

Scope:

This evaluation was conducted by first reviewing the current SWPP Plan and developing a list of those areas covered by the Plan that have the potential to contribute pollutants to storm water runoff. This list also contains all equipment, secondary containment and storm water diversion structures. Facility operations for the past year were reviewed and determination made if any additional areas, or if modifications to existing areas, require a Plan modification. In addition, all storm water pollution prevention measures were evaluated to insure that they were accurately identified in the Plan, and were in place and working properly.

This comprehensive site compliance evaluation included;

- Whether there is evidence of, or the potential for, pollutants entering the facility's storm drain system.
- Evaluation of the effectiveness of control measures to reduce pollutant loading in the runoff and whether additional measures are needed.
- Observation of the structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures and best management practices.
- Availability of the equipment needed to implement this SWPP Plan, such as spill prevention, spill response, and waste storage equipment.

Major Observations:

_____

_____

_____

_____

Actions Taken:

_____

_____

_____

_____

Incidents of Non-compliance:

_____

_____

_____

_____

ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION
CHECKLIST OF
AREAS REQUIRED TO BE EVALUATED

I. Areas Potentially Contributing Pollutants to Storm Water Discharges

Yes/No, N/A			
			New areas, materials or physical features including;
❑	❑	❑	loading/unloading areas,
❑	❑	❑	outdoor storage,
❑	❑	❑	outdoor manufacturing or processing,
❑	❑	❑	dust or particulate generating processes,
❑	❑	❑	on-site waste disposal activities,
❑	❑	❑	SWMUs, and
❑	❑	❑	soil erosion.
❑	❑	❑	Inventory of materials exposed to storm water up-to-date.
❑	❑	❑	Materials management practices to minimize storm water exposure.
❑	❑	❑	New non-storm water discharges.
❑	❑	❑	New spills or leaks since last inspection.

Comments:_____

_____

_____

_____

_____

_____

II. Measures and Controls

Evaluate the effectiveness of existing programs or procedures to reduce pollutant loading into storm water discharges, ensure these are implemented correctly, and whether additional programs or procedures are needed. The following programs should be evaluated;

Yes/No, N/A			**Good Housekeeping**
❑	❑	❑	Are areas clean and orderly?
❑	❑	❑	Are there established protocols/procedures?
❑	❑	❑	Is training provided?
❑	❑	❑	Are there procedures for improvement of:
❑	❑	❑	operation/maintenance of equipment,
❑	❑	❑	storage practices,
❑	❑	❑	material inventory,
❑	❑	❑	routine area cleanup,
❑	❑	❑	organized work areas, and
❑	❑	❑	educational programs?

Yes/No, N/A			**Preventive Maintenance**
❑	❑	❑	Does the PM program include the protection of the environment?
❑	❑	❑	Was the PM program expanded to include storm water?
❑	❑	❑	Does current PM program include;
❑	❑	❑	identification of equipment or systems to be inspected,
❑	❑	❑	schedule for inspections,
❑	❑	❑	appropriate/timely repairs, and
❑	❑	❑	maintenance of records on inspections and equipment?

Measures and Controls *(continued)*

Yes/No, N/A			**Visual Inspections**
❑	❑	❑	Is there an existing inspection program.?
❑	❑	❑	Is it expanded to include storm water?
❑	❑	❑	Are inspection documented?
❑	❑	❑	Are there follow-up procedures?
❑	❑	❑	Are there procedures for reporting problems to ESH-18?
			Employee Training
❑	❑	❑	Is training provided on SWPP Plan?
❑	❑	❑	Is there a schedule for training?
			Review and Revisions
❑	❑	❑	Are there procedures for review and revision of Plan?
❑	❑	❑	Are the responsibilities of SWPP Plan Team Members assigned?

III. Structural Storm Water Management Measures

Observe structural control measures, erosion control measures and/or other structural pollution prevention measures identified in the Plan, to ensure that they are adequate and functioning correctly. The following structural controls are to be observed;

Yes/No, N/A			**Erosion Controls**
❑	❑	❑	Are there new areas of erosion or the potential for erosion?
❑	❑	❑	Are erosion controls provided for storm water and other discharges?
❑	❑	❑	Are containment and diversion structures in place?
❑	❑	❑	Are vegetated areas maintained?
			Management of Runoff:
❑	❑	❑	Are runoff controls described correctly?

IV. Visual Inspection of Equipment

This inspection should include a visual inspection of equipment needed to implement the Plan, such as spill response equipment, silt fences, inlet controls, oil/water separators, pumps, etc.

Yes/No, N/A
Is spill control equipment available?
Are silt fences being used as an erosion control method?
If yes, are silt fences in good condition?
What other equipment is inspected?

Comments: _____

_____

_____

_____

_____

COMPREHENSIVE SITE COMPLIANCE EVALUATION

Certification of Compliance

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

_____

Gene Tucker Date
FSS-DO

ATTACHMENT B

Sampling and Analysis Plan
for
Confirmation/Verification Sampling and
Department of Transportation Compliance Sampling
at
Solid Waste Management Unit 0-016, Inactive Small-Arms Firing Range

LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL RESTORATION PROJECT
SAMPLING AND ANALYSIS PLAN

for

CONFIRMATION/VERIFICATION SAMPLING AND DEPARTMENT OF TRANSPORTATION COMPLIANCE SAMPLING

at

SOLID WASTE MANAGEMENT UNIT 0-016, INACTIVE SMALL-ARMS FIRING RANGE

8 April, 1996
Revision 1

SAMPLING AND ANALYSIS PLAN
for
CONFIRMATION/VERIFICATION SAMPLING AND DEPARTMENT OF TRANSPORTATION COMPLIANCE SAMPLING
at
SOLID WASTE MANAGEMENT UNIT 0-016, INACTIVE SMALL-ARMS FIRING RANGE

08-APR-96

Prepared By: Andrew J. Crowder, Task Manager — Date

Carl A. [illegible] for Garry Allen — 9 April 96

Approved By: Garry Allen, Field Project Leader — Date

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1.0 INTRODUCTION

This plan addresses the requirements for verification sampling and analysis of the firing range floor and site drainages at PRS 0-016 (Inactive Firing Range), and pre-shipment sampling and analysis of the lead-contaminated soil for determination of Department of Transportation (DOT) requirements.

2.0 SAMPLING AND ANALYSIS PROCEDURES

2.1 DOT Sampling and Analysis Requirements

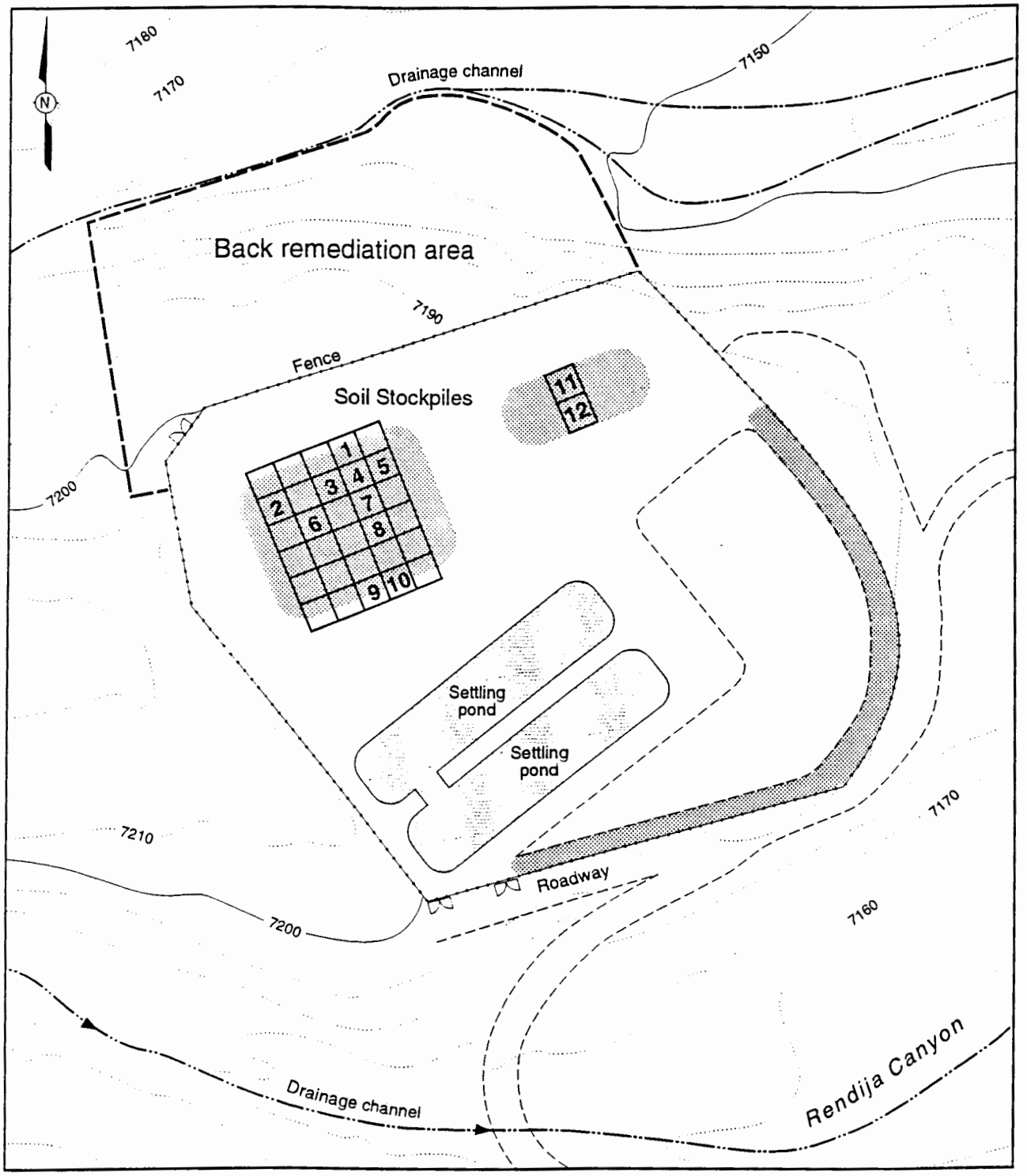
Per 49 CFR 172.101, the reportable quantity (RQ) for lead is 10 pounds of the metal having a diameter smaller than 100 micrometers (0.004 inches). To evaluate whether the lead-contaminated soil at PRS 0-016 would fall into an RQ category, the following sampling and analysis procedures shall be followed.

2.1.1 Sampling

Twelve composite samples will be randomly collected from the lead-contaminated soil stockpiles. Five grab samples will be randomly collected from each of the 12 grids identified in Figure 1 and composited. Each grab will be collected with a 4 ounce plastic scoop and composited in a 1-gallon resealable plastic bag. Sampling is equally as important as the testing, and the sampler shall use every precaution to obtain samples that will show the nature and condition of the materials which they represent. For sample grids located at the edge of the soil berm, sampling shall follow the guidance in ASTM Method D 75, "Standard Practice for Sampling Aggregates", under "Sampling from Stockpiles". This guidance states that samples should be made up of at least three increments taken from the top third, at the mid-point, and at the bottom third of the volume of the berm. The outer layer of the sampling area, which may have become segregated, should be removed and the sample taken from the material beneath. The 12 composite samples will be properly labeled and delivered to JCI/JENV under chain-of-custody (per LANL-ER-SOP-01.04, "Sample Control and Field Documentation"), for particle size distribution and XRF screening for lead.

2.1.2 Sample Size Reduction

If it is necessary to reduce the sample obtained in the field to a convenient size for conducting testing, ASTM Method C 702, "Standard Practice for Reducing Field Samples of Aggregate to Testing Size", will be followed. Failure to carefully follow the procedures in this practice could result in providing a non-representative sample to be used in subsequent testing. All field sample reduction procedures shall be performed in a laboratory facility, not at the sampling site. All sample residue shall be returned to the samplers (ERM/Golder) for placement back on the soil berm at PRS 0-016.



Soil Stockpile locations are approximate.

Approximate Scale

0 100 200 ft

cARTograpny by A. Kron 3/29/96

Figure 1. Sampling grids for determination of DOT shipping requirements, PRS 0-016.

2.1.3 Particle Size Distribution

The 12 composite samples will be sieved per ASTM Method C 136, "Standard Method for Sieve Analysis of Fine and Coarse Aggregates", following LANL-ER-SOP-11.02, "Particle Size Distribution of Soil/Rock Samples", to determine the weight of lead (less than 100 microns in diameter) in each sample. These values, together with XRF lead screening, will be used to determine the average weight of lead (less than 100 microns in diameter) in a shipment of lead-contaminated soil from PRS 0-016. This determination will dictate shipping protocol for the 5000 cubic yards of soil to be transported to TA-72. All sample residue shall be returned to the samplers (ERM/Golder) for placement back on the soil berm at PRS 0-016.

2.1.4 XRF Screening

Following the sieve analysis, XRF screening will be conducted on the smallest fractions (less than 100 microns) in each of the 12 soil samples to determine the lead concentrations. To ensure representative samples are being screened, proper homogenization of each sample is necessary prior to lead XRF screening.

A duplicate will be collected from the first sample and screened for lead using XRF. If there is greater than 25% variance in the results of the two samples, the collection, preparation, and analysis will be re-examined for adherence to procedures, and another sample and duplicate (from the same site material) will be screened.

All applicable LANL ER procedures shall be followed during the screening process. All sample residue shall be returned to the samplers (ERM/Golder) for placement back on the soil berm at PRS 0-016.

2.2 Verification Sampling and Analysis

Following removal of the soil stockpiles containing bullets, samples will be collected from the firing range floor and from first-order drainages that originate on the site. If samples indicate the presence of lead concentrations above the cleanup level, the soils will be further excavated and added to the soil to be processed through the Shaker Plant, in accordance with the VCA Plan dated April 1996.

2.2.1 Range Floor Screening

Prior to final confirmation/verification sample collection, the range area will be screened using a metal detector and XRF to identify areas that may require further excavation to remove residual soil containing bullets and elevated lead concentrations. Excavation of surface soils that fail the metal detector survey, XRF screening, or final verification sampling will be performed by

scraping off the surface soil in 4 to 6-inch lifts. Soils scraped from the range floor will be processed through the Shaker Plant to remove the bullets and will be characterized by the same method as the stockpiled soil.

2.2.1.1 Metal Detector Survey

Metal detector screening will be conducted over the entire site and will serve as a guide for identifying soils on the range floor that may contain elevated concentrations of lead. A determination will be made based on the number of positive metal detector responses within a given area. If 22 or more positive metal detector responses are received within a 6-foot by 6-foot square, additional soil will be excavated from the range floor in that area. This decision value is based on the criteria used for remediation of the "back area" soils, and has proven to be an effective guide. Based on the correlation established between the number of metal detector responses in 6-foot by 6-foot square, and the total lead concentration of soils within that area, 22 metal detector responses would indicate a total lead concentration of 396 mg/kg, which is nearly equivalent to the SAL of 400 mg/kg. The cleanup level for the "back area" was 500 mg/kg (the SAL at that time) which corresponds with 29 metal detector responses.

2.2.1.2 XRF Screening

Following completion of the metal detector survey, the entire site will be sampled and screened for lead by XRF as a preliminary confirmation that soils on the range floor do not contain total lead concentrations above 400 ppm. XRF screening sample locations will be based on a grid with a 50-foot spacing projected over the entire site area as illustrated in Figure 2. One grab sample will be collected from the center of each of the 49 grid-spaces, and analyzed on-site by XRF. Grid sections that exhibit lead concentrations above 400 ppm will be further excavated and re-sampled until all soils containing elevated lead concentrations are removed. Samples will be collected following LANL-ER-SOP-06.09, "Spade and Scoop Method for Collection of Soil Samples".

2.2.2 Range Floor Confirmation/Verification Sampling and Analysis

Twenty discrete grab samples will be collected from the upper 6 inches of the firing range floor to confirm that all soils containing total lead concentrations above 400 ppm have been removed from the site. Sample locations will be determined through random selection of twenty points on a grid, with a 50-foot spacing, projected over the entire range area, as illustrated in Figure 3. For the purpose of acquiring a representative distribution of random sample locations, the site was divided into four distinct areas, or strata. The strata include the perimeter stratum, the pond stratum, the soil stockpile stratum, and the soil washing plant stratum. Each of these strata are distinct due to the types of activities associated with different portions of the site. A random

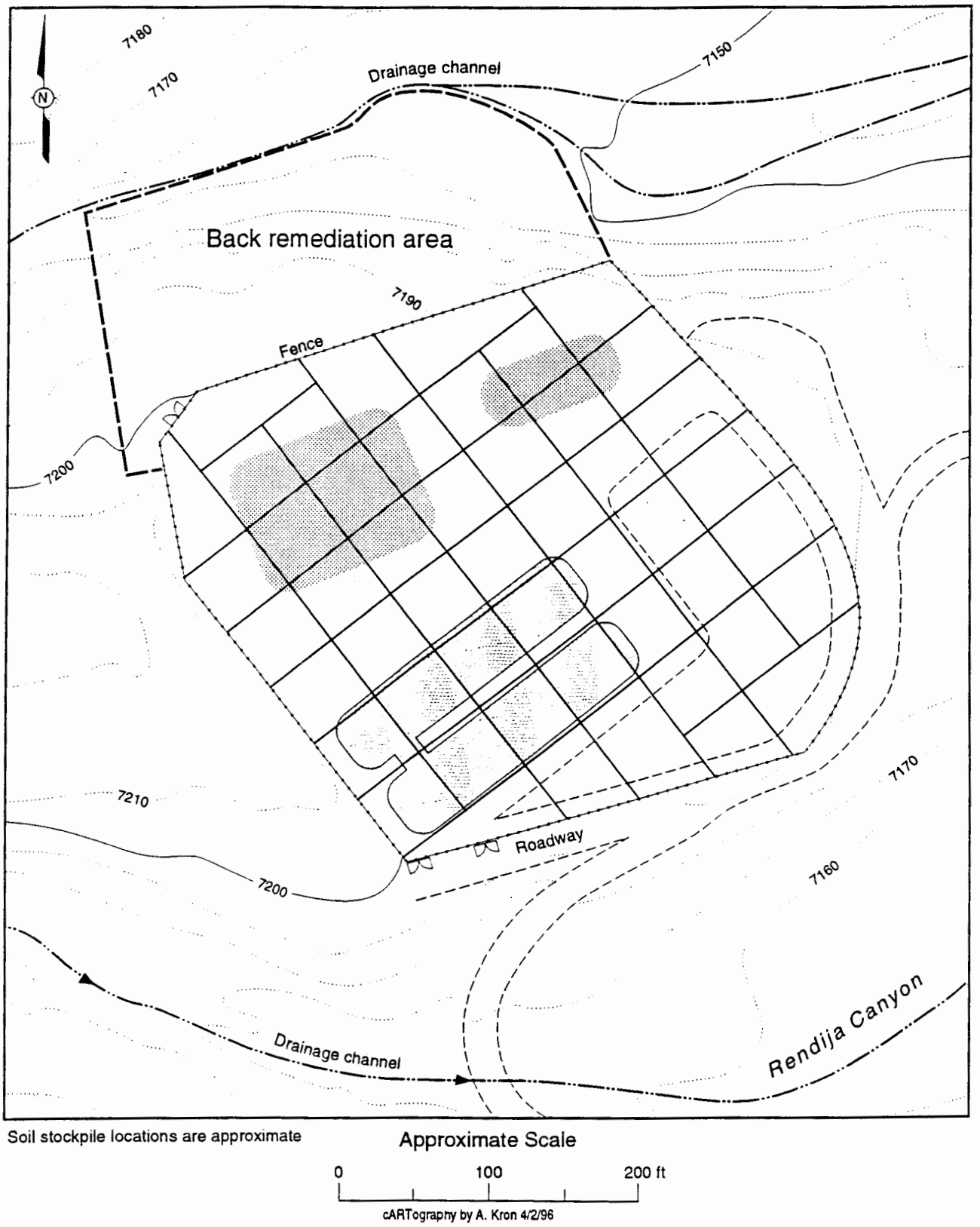
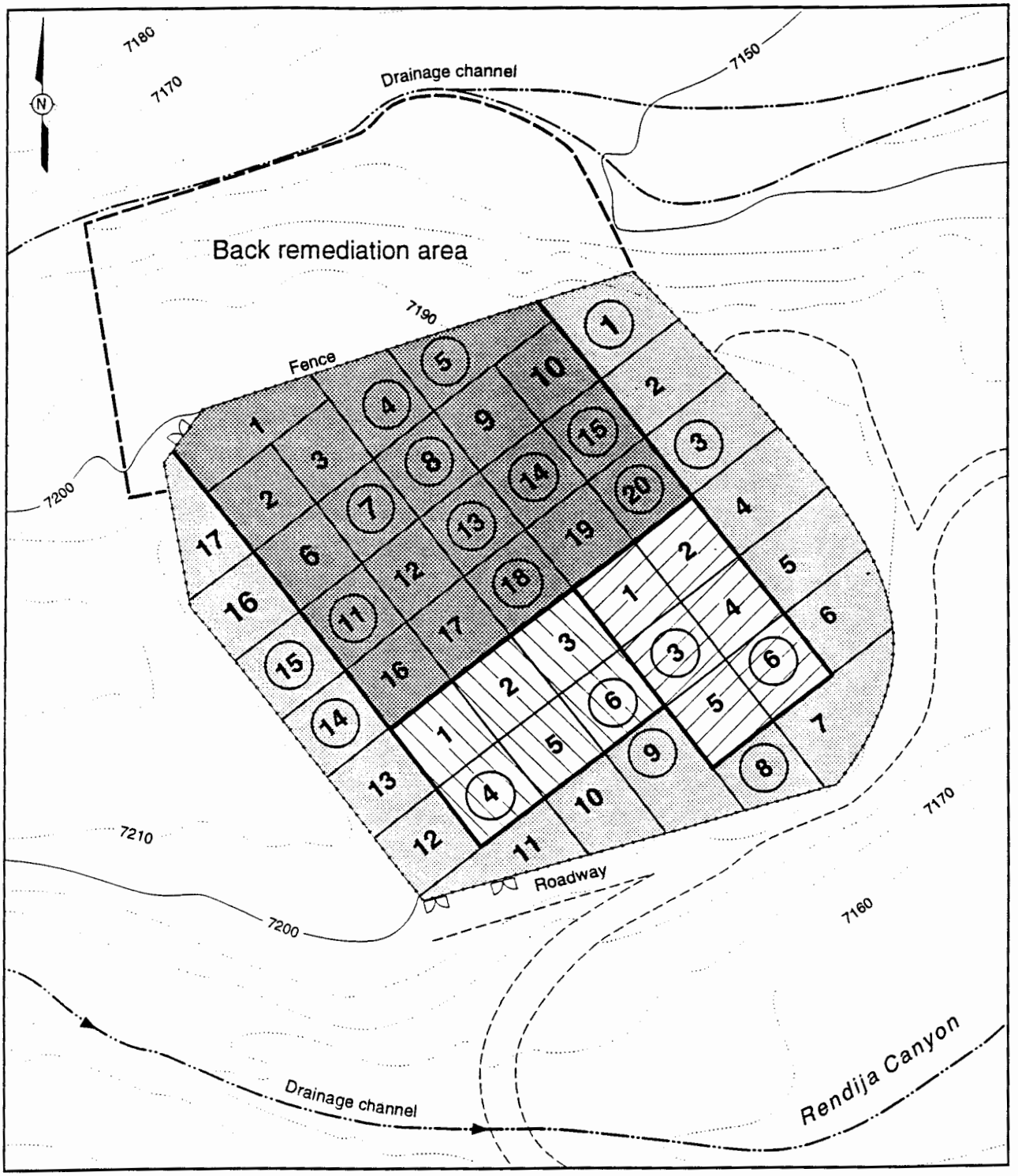


Figure 2. Sampling grids for XRF screening, PRS 0-016.



Approximate Scale

0 100 200 ft

cARTography by A. Kron 4/2/96

LEGEND

- Pond stratum
- Soil stockpile stratum
- Perimeter stratum
- Soil washing plant stratum
- (5) Circled grid numbers are randomly selected sample locations.

Figure 3. Final confirmation/verification sample locations, PRS 0-016.

selection of sample grid locations was performed for each stratum to ensure that all areas are sufficiently sampled for final confirmation/verification of VCA completion. If the site were treated as single stratum, there would be a potential for some areas to remain unsampled.

All verification samples will be properly containerized per LANL-ER-SOP-01.02, "Sample Containers and Preservation", and delivered to the LANL Sample Management Office (SMO) under chain-of-custody, in accordance with LANL-ER-SOP-01.04, "Sample Control and Field Documentation", for analysis of total recoverable lead, copper, and zinc by EPA SW-846 Method 6010.

Confirmation/verification samples will be analyzed by a LANL approved contract laboratory for total lead, copper, and zinc by EPA SW-846 Method 6010.

2.2.3 Drainage Sampling

Three discrete grab samples will be collected from the upper 6 inches of sediment in first-order drainages that capture the bulk of the surface water from the site. Locations of channel sediment samples will be determined in the field, based on examination of the surface-water drainage system. Samples will be analyzed by a LANL approved contract laboratory for total lead, copper, and zinc by EPA SW-846 Method 6010.