

TA-00



Los Alamos National Laboratory/University of California  
Risk Reduction & Environmental Stewardship (RRES)  
Remediation (R) Program, MS M992  
Los Alamos, New Mexico 87545  
(505) 667-0808/FAX (505) 665-4747



U.S. Department of Energy  
Office of Los Alamos Site Operations, MS A316  
Environmental Restoration Program  
Los Alamos, New Mexico 87544  
(505) 667-7203/FAX (505) 665-4504

Date: January 6, 2003  
Refer to: ER2002-0891

Mr. John Young, Corrective Action Project Leader  
Permits Management Program  
NMED – Hazardous Waste Bureau  
2905 Rodeo Park Drive East  
Building 1  
Santa Fe, NM 87505-6303



**SUBJECT: SUBMITTAL OF RESPONSE TO REQUEST FOR SUPPLEMENTAL INFORMATION (RSI), VOLUNTARY CORRECTIVE ACTION (VCA) PLAN FOR POTENTIAL RELEASE SITES (PRSs) 0-030(b)-00, 0-027, 0-030(a), 0-029(a,b,c), 0-010(a,b), AND 0-033(a); AND THE INTERIM ACTION (IA) AT PRS 21-021, LOS ALAMOS NATIONAL LABORATORY, NM0890010515, HWB-LANL-02-010**

Dear Mr. Young:

Enclosed are two copies of the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) Project's Response to your RSI on the VCA Plan for PRSs 0-030(b)-00, 0-027, 0-030(a), 0-029(a,b,c), 0-010(a,b), and 0-033(a); and the IA at PRS 21-021. The ER Project Office received the RSI on December 6, 2002.

If you have any questions, please contact Terry Rust at (505) 665-8843 or David Gregory at (505) 667-5808.

Sincerely,

*David McInroy*  
David McInroy, Acting Program Manager  
Remediation Program  
Los Alamos National Laboratory

Sincerely,

*Everett Trollinger*  
Everett Trollinger, Project Manager  
Department of Energy  
Office of Los Alamos Site Operations

DM/ET/NR/am



An Equal Opportunity Employer/Operated by the I

Printed on Recycled Paper



7643

Mr. John Young  
ER2002-0891

-2-

January 6, 2003

Enclosure: Response to RSI (ER2002-0874)

Cy:(w/enc)

D. Gregory, OLASO, MS A316  
D. Hickmott, EES-6, MS M992  
N. Quintana, RRES-R, MS M992  
N. Riebe, RRES, MS M992  
T. Rust, RRES, MS M992  
E. Trollinger, OLASO, MS A316  
V. Maranville, NMED-HWB  
J. Davis, NMED-SWB  
J. Kieling, NMED-HWB  
S. Yanicak, NMED-OB  
L. King, EPA Region 6  
RRES-R File, MS M992  
IM-5, MS A150  
CT File, #C870  
RPF MS M707

Cy:(w/o enclosure)

D. McInroy, RRES-R, MS M992  
B. Ramsey, RRES-DO, MS J591  
J. Bearzi, NMED-HWB  
J. Parker, NMED-OB

**Response to  
Request for Supplemental Information (RSI)  
Voluntary Corrective Action Plan for Potential Release Sites (PRSs)  
0-030(b)-00; 0-027; 0-030(a), 0-029(a, b, and c); 0-010(a and b);  
and 0-033(a); and the Interim Action at PRS 21-021  
Los Alamos National Laboratory, NM089001515 HWB-LANL-01-010**

**INTRODUCTION**

To facilitate review of this response, the New Mexico Environment Department Hazardous Waste Bureau's (NMED-HWB's) comments are included verbatim. The comments are divided into general and specific categories as presented in the letter. Los Alamos National Laboratory's (LANL's) responses follow each NMED-HWB comment.

**GENERAL COMMENTS**

**NMED-HWB Comment**

1. *LANL is proposing a no further action (NFA) under criterion 5 for PRS 0-030(a) on the basis of human health and ecological screening assessments using data presented in a Voluntary Corrective Action (VCA) report. At this time, HWB cannot approve a NFA for this site. It appears that contamination in reach DP-IW of DP Canyon is potentially derived from this septic system. LANL shall present and evaluate in the conclusions of the final report for this VCA the data collected in reach DP-IW.*

**LANL Response**

1. Although the septic system now known as PRS 0-030(a) discharged to DP Canyon at one time, it was removed from use no later than 1965 (possibly as early as 1948). The subsurface nature of the septic system and the fact that no outfall from the system could be located suggest that the system has been effectively isolated since at least 1965. Further, Reach DP-1W (and all downstream reaches) of DP Canyon currently receives stormwater effluent from a large portion of the downtown area of the Los Alamos townsite.

In the 1999 reach report for DP Canyon (Reach DP-1, DP-2, DP-3, and DP-4), thorough evaluation of sediment, alluvial groundwater, and stormwater in DP Canyon led to the conclusion that, "inorganic and organic contaminants identified in DP Canyon are interpreted as being derived from non-Laboratory sources in the Los Alamos townsite. These contaminants are not considered indicators of releases from Laboratory PRSs and are not considered key contaminants for the purpose of developing a revised site conceptual model by interpreting their spatial distribution or sediment transport dynamics in DP Canyon". That report further concludes that the minor radiological contamination in DP Canyon is most likely due to "stack emissions or other airborne deposition of these contaminants from TA-21 sources" and from one outfall at PRS 21-011(k).

Therefore, there is no basis for suggesting that contaminants in Reach DP-1W, or any other portion of DP Canyon, are potentially derived from PRS 0-030(a).

**NMED-HWB Comment**

2. *LANL is proposing a NFA under criterion 4 for PRS 0-033(a) on the basis that the site is regulated and has been remediated under another state authority (Underground Storage Tank regulations). At*

*this time, HWB cannot agree with this request for two reasons. The VCA Completion Report for this site does not include the site assessment report detailing the closure activities for the fuel oil tank or the post-removal confirmatory data. In addition, the VCA Completion Report states that a "larger ecological exposure unit" will be considered once all information is obtained from the surrounding PRSs. This has not been completed yet.*

#### **LANL Response**

2. The requested UST removal information was provided to the NMED as Attachment I to the November 18, 1997, "Response to Request for Supplemental Information for VCA Completion Report for PRSs 0-030(l), 0-030(m), and 0-033(a) in TA-0 (Former OU 1071)." Attachment I of that document consisted of the UST Bureau 45-day site-assessment report, which included all UST removal information. The UST Bureau approval letter was included as Attachment H to the same document. For your convenience, both are being included as Attachment 1 to this document, along with the UST Closure form and worksheet.

Although potential ecological exposure will be addressed in detail, as appropriate, in the final VCA completion report, there is currently no viable pathway for residual contaminants at depth under the UST's former location.

#### **SPECIFIC COMMENTS**

##### **NMED-HWB Comment**

1. *Section 1.2 Regulatory History, page 6, paragraph 1:*

*LANL Statement: "Depending upon the type of contaminant(s) and the history of a PRS, either the New Mexico Environment Department (NMED) or the DOE has administrative authority over work performed by the ER Project."*

*HWB Comment: PCB spill, cleanup, and disposal is regulated by the Toxic Substance Control Act (TSCA), the Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and, in some cases, the Clean Water Act and the Clean Air Act. The U.S. EPA has established regulations for and has the authority over PCB spills and cleanup at LANL. In no case does the DOE have the authority to regulate this activity at LANL. LANL must get concurrence from the EPA prior to proposing these sites for NFA.*

##### **LANL Response**

1. Thank you for the comment.

##### **NMED-HWB Comment**

2. *Section 2.1.2.2 PRS 0-030(a), Previous Field Investigations, page 36, paragraph 3:*

*LANL Statement: "The outfall from the septic tank to the drainage in DP Canyon was not sampled, but a sample was collected beneath the outlet pipe location adjacent to the septic tank. The outfall was not located due to the depth of the septic tank and the outlet pipe and to the amount of fill covering this area."*

*HWB Comment: Even though LANL was unable to sample the drainage in DP Canyon, data exist from several reaches in DP Canyon that can be used instead. LANL shall determine if data for reach DP-1W sediments are appropriate to use to determine the extent of contamination from this PRS in the drainage (for example, if there are no other upgradient PRSs). LANL shall use this data in its human health and ecological risk assessments.*

#### **LANL Response**

2. See response to General Comment #1 above. While only PRSs 0-027 and 0-030(a) are in the immediate upstream vicinity of Reach DP-1W, stormwater effluent from the Los Alamos townsite is likely to have (1) flushed sediment and any contained contaminants dating from prior to 1965 and (2) contributed contamination that is not associated with any LANL PRS.

#### **NMED-HWB Comment**

3. *Section 2.5 Non-HSWA PRSs near the 6th Street Warehouses [PRSs 0-010(a and b) and 0-033(a)], page 57:*

*LANL Statement: "PRSs 0-010(a and b) and PRS 0-033(a) are grouped together because they are non-HSWA PRSs that will not have additional sampling."*

*HWB Comment: PRS 0-033(a) is a HSWA PRS and is on Table A of the HSWA module.*

#### **LANL Response**

3. LANL is aware that PRS 0-033(a) is a listed PRS and that the statement to the contrary was in error.

#### **NMED-HWB Comment**

4. *Section 4.2.1 Installation of SVE Wells, page 68, paragraph 2:*

*LANL Statement: "Due to the nature of the tuff at the PRS 0-027 site, it is difficult to predict the ROI that will be induced by [soil vapor extraction] wells before site-specific testing has been performed. Because of the non-homogeneous distribution of fractures in the tuff, it is likely that different radii of influence will be induced by individual wells."*

*HWB Comment: Since LANL admits that the radius of influence of vapor extraction cannot be predicted, LANL shall consider drilling one extraction well and the monitoring wells and then conducting the pilot test before installing the other two extraction wells. LANL shall also explain how it expects to recover volatile organics outside of the fractures since the SVE system will preferentially withdraw air from the fractures.*

#### **LANL Response**

4. A pilot study was conducted in which the effectiveness of extraction from each well was evaluated.

It is not clear whether the SVE system will preferentially withdraw air from the fractures as suggested by HWB's comment; many of the fractures contain clay or fine-grained fill material that may impede vapor extraction from the fractures. However, it is likely that the fractures will strongly influence (in a largely unpredictable way) the distance from an extraction well over which vapor extraction will be effective. This consideration was a major factor in determining the approach of using multiple extraction wells to enlarge the volume from which vapor is extracted.

Over the initial weeks of SVE operation, it is clear, based on GAC canister loading and PID monitoring, that volatile organics are being extracted in significant quantity.

#### **NMED-HWB Comment**

5. *Section 4.2.3 System Pre-operation Data Collection, page 70, paragraph 2:*

*LANL Statement: "The samples will be analyzed for TPH and BTEX by EPA methods 8015B and 8260B, respectively."*

*HWB Comment: Assuming that this is a gasoline-only release, the TPH analysis should be for gasoline-range organics (GRO by EPA Method 8015M) (See HWB's Draft Position Paper Use of Total Petroleum Hydrocarbon (TPH) Test Results for Site Characterization, dated July 2000).*

#### **LANL Response**

5. The operational history of the site (see section 1.1.1 of the plan) is clear and accurate in stating that the site was used initially for storage of fuels and oil, and later for drums of lubricants. Therefore, the assumption of a gasoline-only release is unsupported. Furthermore, the use of only GRO analysis of TPH would provide a less conservative evaluation of the nature of contamination present both before and after the VCA. Methods 8015B and 8260B will provide analytical results for a broader range of analytes. As of October 2002, Method 8015B is EPA's current promulgated method for analysis of nonhalogenated organics using GC/FID.

#### **NMED-HWB Comment**

6. *Section 4.3.1 SVE Pilot Operation, page 70, paragraph 2:*

*HWB Comment: LANL shall add the following to the list of data collected during the pilot operation:*

- *full-system vacuum pressure,*
- *air flow velocity measurements,*
- *individual extraction well flow velocity measurements (if testing multiple wells), and*
- *individual well and full system extraction concentrations (as measured either by a PID with a minimum 10.6 eV lamp or a combustible gas indicator).*

#### **LANL Response**

6. The required data that are listed have been collected during the pilot startup and, periodically, during the initial run of the SVE system.

#### **NMED-HWB Comment**

7. *Section 4.3.2.4 Operation of SVE System, page 72, paragraph 3:*

*LANL Statement: "Following a period of continuous active operation, system operation may be terminated or converted to an active pulsed operation, active or passive bioventing, or barometric pumping operation."*

*HWB Comment: LANL shall not consider "passive bioventing" as an option.*

## LANL Response

7. HWB does not provide a rationale for excluding passive bioventing from consideration. Although passive bioventing is not currently considered a likely course of action, LANL desires to keep open all viable options that could provide effective treatment. Pros and cons of any option such as passive bioventing will be carefully considered, in consultation with the regulatory authority for the site, prior to selection of a course of action for longer-term treatment, if such treatment is necessary.

## NMED-HWB Comment

8. *Section 5.0 Confirmatory Sampling, page 72, paragraph 1:*

*LANL Statement: "The final plan for confirmatory samples will be refined over time, but the current expectation is that confirmatory samples will be collected from seven new boreholes, drilled near the previous SVE and monitoring well boreholes. Confirmatory samples will be collected from the same depths as the previous samples to document whether the SVE system effectively reduced the COPCs."*

*HWB Comment: LANL shall drill boreholes for confirmatory sampling at locations that are not near the extraction wells. Soil grain size (fine-grained soils) and field screening shall be used to determine the soil sampling depths selected for chemical analyses.*

## LANL Response

8. LANL's intent is not to collect confirmation samples in the immediate vicinity or within the "ROI" of the extraction wells, but to obtain confirmation samples that are comparable to the borehole samples collected prior to SVE operation. To do so will require placing the confirmation boreholes within the area of previously identified contamination so that a measure of the effectiveness of SVE treatment can be obtained (i.e., the purpose of confirmatory sampling).

Field screening will be used during confirmation sampling and will be applied to zones of fine-grained soil (e.g., clay fracture fills) to determine if additional samples should be collected from fine-grained material. It should be noted that fine-grained zones were not encountered in any of the current boreholes.

**Attachment 1**



State of New Mexico  
**ENVIRONMENT DEPARTMENT**  
Underground Storage Tank Bureau

Harold Runnels Building  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502  
(505) 827-0188  
(505) 827-0310 Fax

MARK E. WEIDLER  
SECRETARY

EDGAR T. THORNTON, III  
DEPUTY SECRETARY

GARY E. JOHNSON  
GOVERNOR

January 23, 1996

Los Alamos National Laboratory  
Joe Vozella, LAAO  
Environment, Safety & Health Group  
Mailstop A316  
Los Alamos, NM 87545

RE: No Further Action Required at TA-0, 6th Street Site, Los Alamos National Laboratory, Los Alamos, New Mexico

Dear Mr. Vozella:

The New Mexico Environment Department has reviewed the 45 day Minimum Site Assessment Report received on January 18, 1996 for the above-referenced site. The Department has determined that this site does not pose an immediate public health or environmental threat for the following reasons:

1. The horizontal extent of soil contamination has been adequately defined. The vertical extent of soil contamination has been adequately defined and is greater than 900 feet above high static ground water.
2. Contaminated soils have been excavated and properly disposed.
3. Depth to ground water at the site is greater than 1000 feet below ground surface.

Based on this information, the Department requires no additional work at this time, although it reserves the right to do so should petroleum hydrocarbon contamination resulting in a threat to public health or the environment is discovered.

Thank you for your cooperation in this matter.

Sincerely,

A handwritten signature in cursive script, appearing to read "Anthony Moreland".

Anthony Moreland  
Geologist  
Underground Storage Tank Bureau

cc: NMED District II Office  
NMED Espanola Field Office  
Jeff Carmichael, Los Alamos National Laboratory, ES&H Group,  
Mailstop K490, Los Alamos, New Mexico 87545

# Los Alamos

NATIONAL LABORATORY

Hazardous & Solid Waste Group  
Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

Date: January 11, 1996  
In Reply Refer To: ESH-19:96-0015  
Mail Stop: K498  
Telephone: (505) 665-2505

Anthony Moreland, Geologist  
Remedial Action Section  
Underground Storage Tank Bureau  
New Mexico Environment Department  
1190 St. Francis Drive—  
Harold Runnels Building  
Santa Fe, New Mexico 87502

Dear Mr. Moreland:

**SUBJECT: FORTY-FIVE DAY REPORT FOR FUEL OIL UST RELEASE  
AT TECHNICAL AREA 0, 6TH STREET**

This letter transmits a forty-five day investigation report involving petroleum soil contamination associated with an underground storage tank (UST) located at Technical Area (TA) 0, 6th Street, near Warehouse Number Three. On November 13, 1995, the New Mexico Environment Department was notified that heating fuel oil contamination was discovered in the soil beneath the UST during a routine UST removal. The UST is owned by the Department of Energy.

The enclosed forty-five day investigation report and its associated enclosures will show that Los Alamos National Laboratory has determined the extent of the fuel oil contaminated soil at the TA-0, 6th Street UST site. If you have questions concerning this report, please contact me at (505) 665-2505.

*The foregoing report was prepared under my supervision by qualified staff who are personally familiar with the information submitted in the report and the enclosed documents.*

Sincerely,



Jeff Carmichael  
Hazardous & Solid Waste

JAC:es

Enclosure: UST TA-0, 6th, Street Forty-Five Day Report

Cy: T. Grieggs, ESH-19, MS K498, w/o enc.  
L. Hartman, EM/ER, MS E525, w/enc.  
T. Taylor, LAAO, MS A316, w/enc.  
RPF, EM/ER, MS M707, w/enc.  
ESH-19 Circ File

C. Fesmire, LAAO, MS A316, w/enc.  
J. Vozella, LAAO, MS A316, w/enc.  
S. Calhoun, ERM/Golder, MS M327, w/enc.  
CIC-10, MS A150

# Los Alamos

NATIONAL LABORATORY

Hazardous & Solid Waste Group  
Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

## UNDERGROUND STORAGE TANK

TA-0, 6TH STREET

### FORTY-FIVE DAY REPORT

#### 1.0 INTRODUCTION

The purpose of this report is to fulfill the forty-five day reporting requirements of Part XII, Section 1206 B., of the New Mexico Underground Storage Tank Regulations (USTR). Under this regulation, the forty-five day report was due on January 4, 1995. However, an extension of time was granted to January 11, 1996.

On November 13, 1995, Los Alamos National Laboratory (LANL) notified the New Mexico Environment Department (NMED) of a confirmed petroleum release. The release was discovered during a scheduled underground storage tank (UST) removal located at LANL's Technical Area (TA) 0. See *Enclosure One* for maps of LANL's property boundary, Technical Areas, and of the UST site. The UST is owned by the Department of Energy and was taken out of operation in the late 1960's. This UST was discovered by LANL's Environmental Management/Environmental Restoration Project. Listed below is a data summary regarding this UST and its removal:

#### UST DATA

• Name of UST	TA-0, 6th Street
• Physical Location of UST:	TA-0, North West Side of Warehouse # 3
• Age of UST:	Unknown
• UST Capacity:	5,000 Gallons
• Contents of UST:	Heating Fuel Oil
• Date Removed:	11-13-95
• NMED Inspector Present:	None

A visual inspection of the UST revealed one hole, approximately 2 inches in diameter, in the lower west end of the tank. The soil surrounding and beneath the UST was contaminated with fuel oil, but not highly contaminated. Soil samples collected beneath the UST have total petroleum hydrocarbons (TPH) concentrations ranging from approximately 3,000 to 10,800 mg/kg (ppm).

The excavation was backfilled with clean fill material to avoid structural damage to the adjacent warehouse foundation. Pursuant to Part XII, Section 1206 (B.), of the USTR, five boreholes were drilled and sampled. Analytical data from these boreholes was sufficient to define both the horizontal and vertical extent of the TPH affected area.

## 2.0 UST REMOVAL DETAILS

Excavation support during the UST removal was provided by Keers Environmental of Albuquerque, New Mexico. Oversight of the operations was provided by the Morrison Knudsen Corporation of Los Alamos, New Mexico, ERM/Golder Los Alamos Project Team, and LANL's Hazardous and Solid Waste Group (ESH-19).

An initial inspection found the UST to contain approximately 3,500 gallons of water and fuel oil, with approximately one foot of fuel oil floating on top of the water. These liquids were pumped out of the tank prior to commencing excavation activities and transported to Mesa Oil, Inc. for recycling (*See Manifest in Enclosure Two*).

A visual inspection of the UST revealed one hole, approximately 2 inches in diameter, in the lower west end of the tank. The piping associated with this tank, rose straight up from the tank approximately 18 inches, then made a 90 degree turn south, and penetrated the wall of the adjacent warehouse. The total length of pipe was approximately 15 feet. The UST's piping condition was only slightly corroded except for where the fill pipe attached to the UST. This area had significant corrosion. Furthermore, the fill pipe was found loose where it connected to the tank. It is speculated that surface water from rain events collected on the ground above the UST and over time penetrated into the UST through the loose fill pipe connection filling the tank.

A sufficient amount of tank pit backfill material was excavated to remove the tank and piping. The backfill material was obviously contaminated with fuel oil. Therefore, the remaining backfill material and concrete cradles on which the tank was resting were removed, and the tuff below the tank was excavated to a depth of approximately 11 feet. This tuff removal was voluntary because the tuff was not highly contaminated. The excavation was eventually stopped because of potential structural damage to the warehouse foundation to the south and the concrete utility corridor to the west. The final excavation was approximately 15 feet wide, 30 feet long, and 11 feet deep.

The UST and the concrete cradles were transported off-site by Keers. The UST was shipped to Eidson Steel Products, Inc. for recycling. The concrete cradles were disposed of by Keers. The excavated soil, totaling 55 cubic yards, was transported to Keers Solid Waste Management Facility located in Mountainair, New Mexico, for hydrocarbon soil farming. See *Enclosure Two* for copies of the disposal manifests.

During removal, an underground power line, was encountered above the UST and was temporarily rerouted during construction activities. An underground electric line also runs east-west about 15 feet north of the UST location at a depth of approximately 4 feet. Also, a north-south running sewer line is located about 6 feet west of the UST excavation at a depth of approximately five feet. A concrete encased utility corridor runs north-south immediately west of the UST excavation. No other utilities lines are located near the UST site. Utility corridor investigations revealed that they were not impacted by the TPH soil contamination.

## 3.0 EXCAVATION SAMPLING

Following removal of the UST, the contaminated fill material was removed and the tuff below the tank was removed to a depth of approximately 11 feet. Four samples of tuff from below the tank were then collected and submitted to LANL's mobile chemical analytical laboratory (MCAL) for TPH analysis using EPA SW-846, Method 418.1. Table 1 provides information regarding the sample IDs, depths, and analytical results.

**TABLE 1**  
**Excavation Bottom TPH Results**

Sample ID	Sample Location/Depth	Analytical Data
0100-95-0736	West end / 11 feet	5,163 ppm
0100-95-0737	Southeast Corner / 11 feet	2,989 ppm
0100-95-0738	Northeast Corner / 11 feet	8,215 ppm
0100-95-0739	Southwest Corner / 11 feet	10,822 ppm

All samples were field screened for radioactivity and none was detected.

#### 4.0 ON-SITE INVESTIGATION HORIZONTAL AND VERTICAL EXTENT OF CONTAMINATION

On December 4 through 13, 1995, five boreholes were advanced to a total depth of 40 feet to determine the extent of vertical and horizontal TPH contamination. Chain of custody forms and analytical data sheets are enclosed for all five soil borings as discussed in Tables 2-6 of this report (*See Enclosure Three*). *Enclosure Four* contains a map showing the location of each borehole and *Enclosure Five* contains each corehole sample log.

##### Borehole 01

Borehole #01 was completed on December 4 and 5, 1995, near the center of the UST excavation. The fill material used to backfill the excavation was encountered from 0 to 10 feet. Gray and brown tuff was encountered from 10 to 40 feet. From 10 to 30 feet, the recovered core samples had a fuel oil odor and varied in moisture content. The core was particularly moist with water, although not exhibiting saturated conditions, within the zone from 30 to 35 feet. Samples were collected at approximately five-foot intervals and submitted for analysis of TPH using EPA SW-846, Method 418.1. This analytical method was used for evaluating all subsequent corehole samples. Analytical results showed elevated TPH concentrations from 11 feet to between 30 and 35 feet, with concentrations ranging from 148 to 5818 ppm (Table 2). Samples collected at 35 and 40 feet showed no detectable TPH concentrations.

**TABLE 2**  
**Borehole #01 TPH Results**

Sample ID	Sample Depth (ft)	PID Value (ppm)	Analytical Data
0100-95-0916	11.0	0	4,237 ppm
0100-95-0917	16.0	89	4,541 ppm
0100-95-0918	20.0	24	1,119 ppm

0100-95-0919	25.0	49	5,818 ppm
0100-95-0920	30.0	0	148 ppm
0100-95-0921	35.0	0	ND
0100-95-0922	40.0	0	ND

### Borehole 02

Borehole #02 was completed on December 11, 1995, approximately 15 feet east of the UST excavation. Reddish brown to gray, moderately welded tuff was encountered from near the surface to a depth of 40 feet. Occasional brown stains, believed to be iron oxide, were noticed on the recovered core. However, based on the analytical results these stains proved not to be related to TPH contamination. The recovered core did not have a fuel oil odor and moisture contents were low. Samples were collected at approximately five-foot intervals and where stains or other possible signs of TPH contamination were observed. Sample results showed no detectable TPH concentrations (Table 3).

**TABLE 3**  
**Borehole #02 TPH Results**

Sample ID	Sample Depth (ft)	PID Value (ppm)	Analytical Data
0100-95-0923	3.0	0	ND
0100-95-0924	8.0	0	ND
0100-95-0925	12.0	0	ND
0100-95-0926	13.0	0	ND
0100-95-0927	17.0	0	ND
0100-95-0928	19.0	0	ND
0100-95-0929	23.5	0	ND
0100-95-0930	28.0	0	ND
0100-95-0931	33.0	0	ND
0100-95-0932	36.0	0	ND
0100-95-0933	38.5	0	ND

### Borehole 03

Borehole #03 was completed on December 12, 1995, approximately 20 feet west of the UST excavation. Reddish brown to gray, moderately welded tuff with occasional brown clay lined fractures were encountered from near the surface to a depth of 40 feet. The recovered core had no fuel oil odor and moisture contents were low. Samples were collected at approximately every five-foot interval and where stains or other possible signs of contamination were observed. Sample results showed no detectable TPH concentrations (Table 4).

**TABLE 4**  
**Borehole #03 TPH Results**

Sample ID	Sample Depth (ft)	PID Value (ppm)	Analytical Data
0100-95-0934	3.0	0	ND
0100-95-0935	8.0	0	ND
0100-95-0936	14.0	0	ND
0100-95-0937	19.0	0	ND
0100-95-0938	24.0	0	ND
0100-95-0939	29.0	0	ND
0100-95-0940	34.5	0	ND
0100-95-0941	39.0	0	ND

### Borehole 04

Borehole #04 was completed on December 12, 1995, approximately 10 feet north of the UST excavation. Reddish brown to gray and dusky red, moderately welded tuff was encountered from near the surface to a depth of 40 feet. Reddish clay lined fractures were occasionally noted. Recovered core did not have a fuel oil odor and moisture contents were low. Samples were collected at approximately five-foot intervals and where stains or other possible signs of contamination were observed. Sample results showed no detectable TPH concentrations (Table 5).

**TABLE 5**  
**Borehole #04 TPH Results**

Sample ID	Sample Depth (ft)	PID Value (ppm)	Analytical Data
0100-95-0942	8.0	0	ND
0100-95-0943	12.0	0	ND
0100-95-0944	14.0	0	ND
0100-95-0945	19.0	0	ND
0100-95-0946	23.5	0	ND
0100-95-0947	27.0	0	ND
0100-95-0948	28.5	0	ND
0100-95-0949	31.5	0	ND
0100-95-0950	38.0	0	ND

**Borehole 05**

Borehole #05 was completed on December 13, 1995, approximately 70 feet south of the UST excavation. Since 6th Street Warehouses #3 and #4 are adjacent to the south side of the UST excavation, it was necessary to locate borehole #05 on the south side of the building. Dark and light gray, moderately welded tuff was encountered from near the surface to a depth of 40 feet during drilling. Again samples were collected at approximately five-foot intervals. Recovered core had no fuel oil odor and moisture contents were low. Sample results showed no detectable TPH concentrations (Table 6).

**TABLE 6**  
**Borehole #05 TPH Results**

Sample ID	Sample Depth (ft)	PID Value (ppm)	Analytical Data
0100-95-0951	4.0	0	ND
0100-95-0952	8.5	0	ND
0100-95-0953	14.5	0	ND
0100-95-0954	19.0	0	ND

0100-95-0955	23.0	0	ND
0100-95-0956	27.0	0	ND
0100-95-0959	34.0	0	ND
0100-95-0960	37.0	0	ND

#### 4.1 Corehole Investigation Summary

Based on the analytical data, both the horizontal and vertical extent of TPH affected tuff have been defined, and at depth, the TPH concentrations do not exceed 5,818 ppm. Borehole #01 provides evidence that the TPH plume extends vertically to no deeper than 30 to 35 feet. The four surrounding boreholes indicate that there has been little if any horizontal movement of the TPH plume. There appears to be three primary reasons for this apparent lack of significant migration of the fuel oil: first, the moderately welded tuff lacks sufficient permeability for significant migration, second, the observed fractures in the tuff were mostly clay filled, thus inhibiting migration, and third, the moisture zone at a depth of 30 to 35 feet in borehole #01 has acted as a barrier to vertical migration.

#### 5.0 UST REQUIRED INFORMATION

Depth to groundwater beneath TA-0 is approximately 1,000 feet. There are no private water supply wells within a 1000 foot radius or municipal water wells within an one mile radius of this UST removal site. Additionally, there are no surface water courses within 500 feet of this UST removal site. LANL has determined that the surrounding utility corridors were not impacted by the petroleum soil contamination. No potentially explosive fuel oil or harmful vapors have been detected in these corridors or in the vicinity of the release. This report also contains information that is required in Part XII, §1206 B., of the USTR (*See Enclosures 6 and 7*).

#### 6.0 CONCLUSIONS

LANL has determined that there is no threat to human health and the environment from the fuel oil soil contamination. The extent of the contamination has now been defined. No highly contaminated soil was encountered during this investigation. Because the UST was abandoned in the late 1960's, LANL has no tank tightness or repair data on this UST. If you should require any additional information, please contact me at 665-2505.

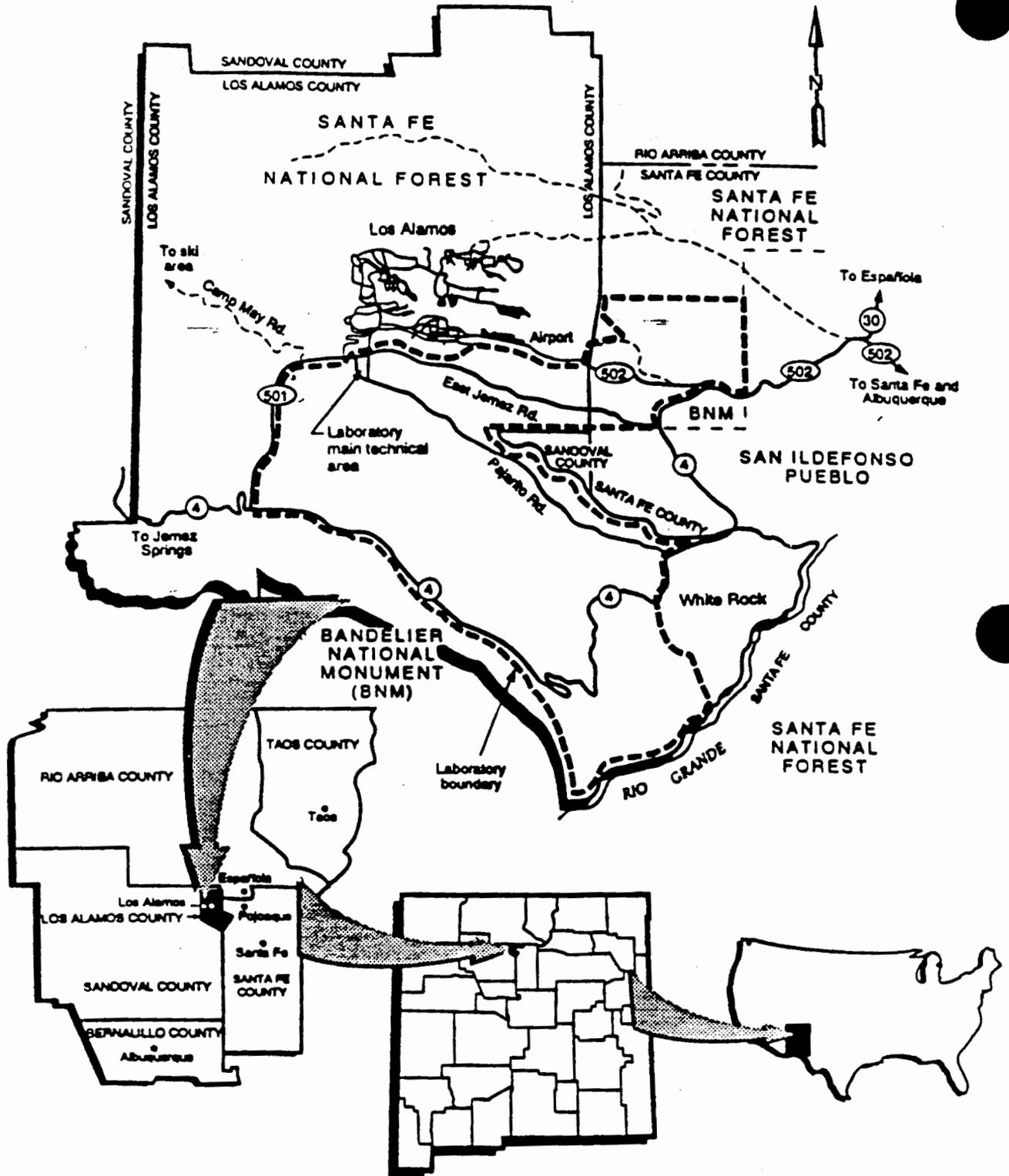
#### Enclosures:

1. Maps of LANL's Property Boundary, Technical Areas, and of the UST Site
2. Disposal Manifests
3. Chain of Custody and Corehole Sample Analytical Data Sheets
4. Corehole Locations
5. Corehole Sample Logs
6. LANL General Geology and Hydrology Information
7. Groundwater Wells and Other Penetrations and Drawings

**ENCLOSURE ONE**

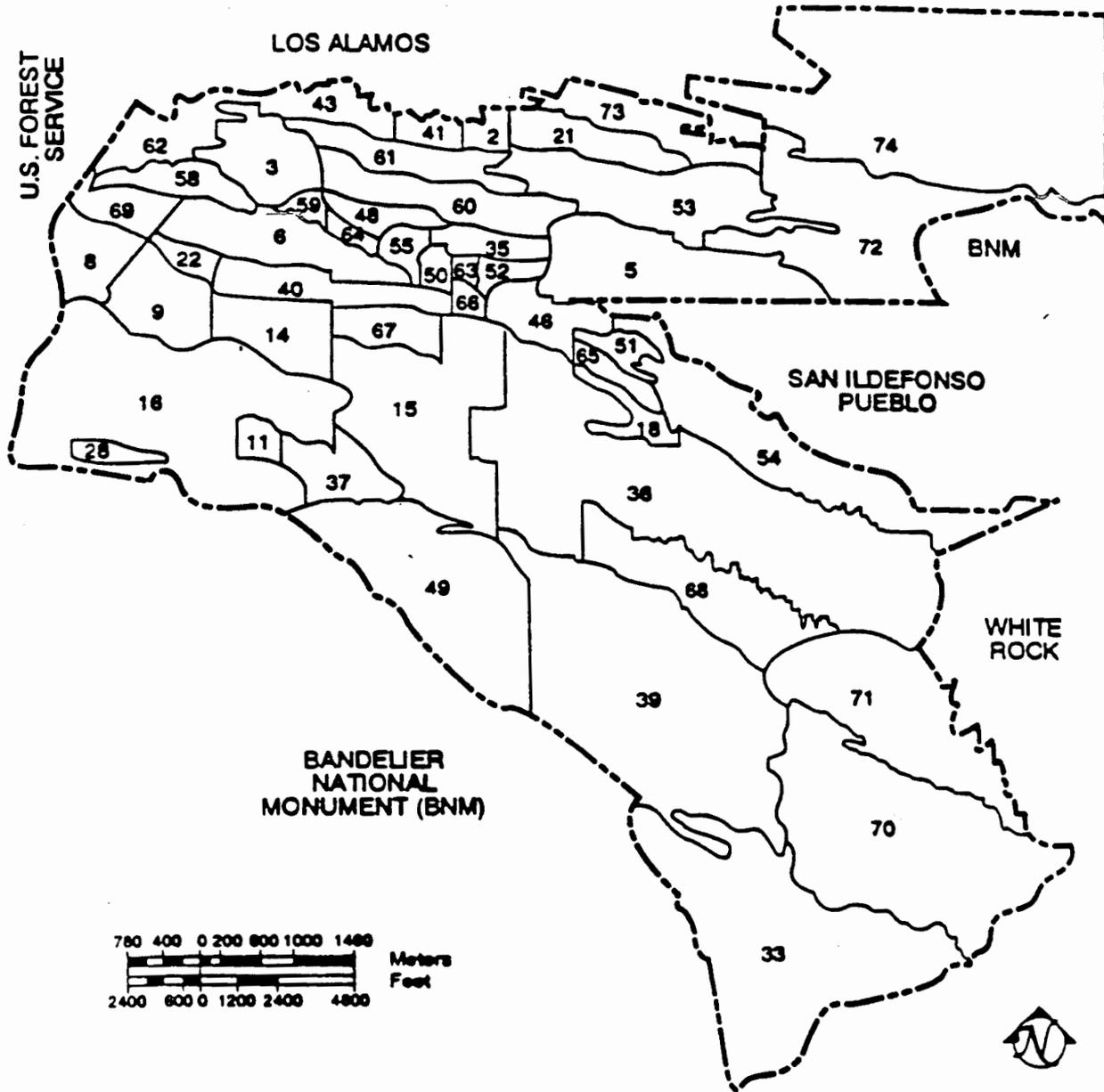
**MAPS OF LANL'S-PROPERTY BOUNDARY,  
TECHNICAL AREAS, AND UST SITE**

**Note: No surface impoundments or pit areas reside in the vicinity of this former UST.**

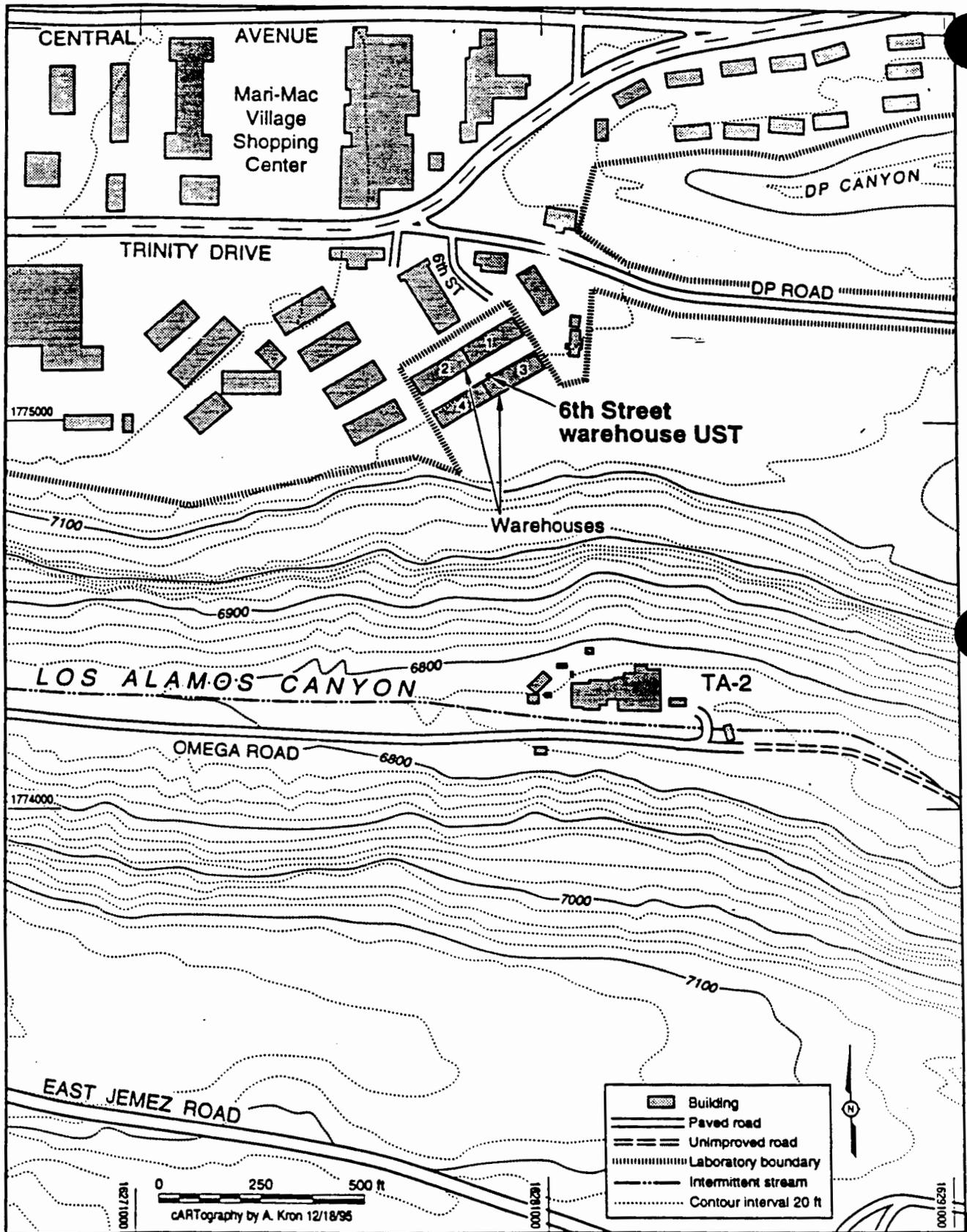


Regional location of Los Alamos National Laboratory.

TA-0 Is Located In The Town Site.



Technical areas (TAs) of Los Alamos National Laboratory in relation to surrounding landholdings.



Location of the 6th Street warehouse area (SWMU Group 0-1) in Los Alamos.

**ENCLOSURE TWO**

**DISPOSAL MANIFESTS**

5904 FLORENCE AVE. NE  
SANTO DOMINGO, NM 87113  
(505) 823-9006  
1-800-327-2766  
FAX (505) 823-2766

KEERS HYDROCARBON SOIL LAND FARM  
14 MILES SOUTH ON HWY 55 FROM  
MOUNTAINAIR, NEW MEXICO

GROUND WATER DISCHARGE PERMIT  
MANIFEST 00219

**HYDROCARBON CONTAMINATED SOIL MANIFEST**

**PART I**

GENERATOR NAME Los Alamos National Laboratory  
GENERATOR ADDRESS P.O. Box 1463 MSJ593  
CITY/STATE/ZIP Los Alamos /NM/ 87545  
TELEPHONE 505-667-7579 FAX \_\_\_\_\_  
TECHNICAL FIRM Keers  
TECHNICAL CONTACT Dan Gray  
TELEPHONE 823-9006 FAX 823-2766  
KEERS HYDROCARBON CONTAMINATED SOIL PROFILE SHEET NUMBER 00168

QUANTITY 20 CUBIC YARDS  DRUMS \_\_\_\_\_ OTHER Bulk

GENERATORS CERTIFICATION: I HEREBY CERTIFY THAT THE ABOVE DESCRIBED MATERIAL IS NOT A HAZARDOUS WASTE AS DEFINED BY THE FEDERAL AND STATE AND/OR LOCAL REGULATIONS, DOES NOT CONTAIN REGULATED RADIOACTIVE MATERIALS OR REGULATED SUBSTANCES OR POLYCYCLOPOLYMERIZATION PRODUCTS OF PCB'S (POLYCHLORINATED BIPHENYLS), AND THIS MATERIAL DOES NOT CONTAIN FREE LIQUIDS. I ALSO CERTIFY THAT THE MATERIAL BEING REPRESENTED IN THIS MANIFEST CORRESPONDS WITH AND IS THE SAME AS THE MATERIAL REFERENCED IN THE HYDROCARBON CONTAMINATED SOIL PROFILE SHEET SHOWN ABOVE:

NAME OF GENERATOR OR AUTHORIZED AGENT (PRINT) Henry Paul Nunes  
SIGNATURE OF GENERATOR OR AUTHORIZED AGENT Henry Paul Nunes  
RECEIPT DATE 11-22-95

**PART II**

TRANSPORTER CERTIFICATION: I HEREBY CERTIFY THAT NO OTHER MATERIAL HAS BEEN PLACED IN THIS TRUCK SINCE ACCEPTANCE OF THE MATERIAL AS DESCRIBED IN PART I OF THIS DOCUMENT.

NAME OF TRANSPORTER (PRINT) \_\_\_\_\_  
SIGNATURE OF TRANSPORTER \_\_\_\_\_  
RECEIPT DATE \_\_\_\_\_

**PART III**

THIS IS TO CERTIFY THAT KEERS HYDROCARBON CONTAMINATED SOIL LAND FARM, OPERATING UNDER N.M.E.D GROUND WATER DISCHARGE PERMIT #DP-1012 HAS ACCEPTED THE ABOVE MATERIAL.

NAME OF AUTHORIZED AGENT (PRINT) \_\_\_\_\_  
NATURE OF AUTHORIZED AGENT \_\_\_\_\_  
RECEIPT DATE \_\_\_\_\_  
MATERIAL DEPOSITED IN CELL # \_\_\_\_\_ LOCATION \_\_\_\_\_



# NMED GROUND WATER DISCHARGE PERMIT

5904 FLORENCE AVE. NE  
ALBUQUERQUE, NM 87113  
P 823-9006  
1-800-327-2766  
FAX (505) 823-2766

KEERS HYDROCARBON SOIL LAND FARM  
14 MILES SOUTH ON HWY 55 FROM  
MOUNTAINAIR, NEW MEXICO

GROUND WATER DISCHARGE PERMIT  
MANIFEST 00222

## HYDROCARBON CONTAMINATED SOIL MANIFEST

PART I

GENERATOR NAME Los Alamos National Laboratory  
GENERATOR ADDRESS P.O. Box 1663 MS J593  
CITY/STATE/ZIP Los Alamos NM / 87545  
TELEPHONE 505-667-7577 FAX \_\_\_\_\_  
TECHNICAL FIRM Keers  
TECHNICAL CONTACT Dan Gay  
TELEPHONE 823-9006 FAX 823-2766  
KEERS HYDROCARBON CONTAMINATED SOIL PROFILE SHEET NUMBER 00168

QUANTITY 35 CUBIC YARDS \_\_\_\_\_ DRUMS \_\_\_\_\_ OTHER Bulk

GENERATORS CERTIFICATION: I HEREBY CERTIFY THAT THE ABOVE DESCRIBED MATERIAL IS NOT A HAZARDOUS WASTE AS DEFINED BY US EPA AND/OR STATE AND LOCAL REGULATIONS, DOES NOT CONTAIN REGULATED RADIOACTIVE MATERIALS OR REGULATED CONCENTRATIONS OF PCB'S (POLYCHLORINATED BIPHENYLS), AND THIS MATERIAL DOES NOT CONTAIN FREE LIQUIDS. I ALSO CERTIFY THAT THE MATERIAL BEING REPRESENTED IN THIS MANIFEST CORRESPONDS WITH AND IS THE SAME AS THE MATERIAL REFERENCED IN THE HYDROCARBON CONTAMINATED SOIL PROFILE SHEET SHOWN ABOVE.

NAME OF GENERATOR OR AUTHORIZED AGENT (PRINT) Henry Paul Nunes  
SIGNATURE OF GENERATOR OR AUTHORIZED AGENT [Signature]  
RECEIPT DATE 11-14-95

PART II

TRANSPORTER CERTIFICATION: I HEREBY CERTIFY THAT NO OTHER MATERIAL HAS BEEN PLACED IN THIS TRUCK SINCE ACCEPTANCE OF THE MATERIAL AS DESCRIBED IN PART I OF THIS DOCUMENT.

NAME OF TRANSPORTER (PRINT) Paul M Chavez  
SIGNATURE OF TRANSPORTER [Signature]  
RECEIPT DATE 11/21/95

PART III

THIS IS TO CERTIFY THAT KEERS HYDROCARBON CONTAMINATED SOIL LAND FARM, OPERATING UNDER N.M.E.D GROUND WATER DISCHARGE PERMIT #DP-1012 HAS ACCEPTED THE ABOVE MATERIAL.

NAME OF AUTHORIZED AGENT (PRINT) J Shannon  
SIGNATURE OF AUTHORIZED AGENT [Signature]  
RECEIPT DATE 11-21-95  
MATERIAL DEPOSITED IN CELL # 5 LOCATION Middle - south side



STEEL PRODUCTS, INC.

8301 BROADWAY, S.E., ALBUQUERQUE, NM 87105  
TELEPHONE (505) 873-0160 FAX (505) 873-0167

TANK DISPOSAL

DATE: 11/14/95

TO WHOM IT MAY CONCERN:

PLEASE BE ADVISED THAT THE FOLLOWING TANK(S) WILL BE PROPERLY  
DISPOSED OF AND/OR RECYCLED BY EIDSON STEEL PRODUCTS, INC. IN  
ACCORDANCE WITH APPLICABLE RULES AND REGULATIONS:

TANK SIZE:	GALLONS	<u>3500</u>	DIMENSIONS	<u>8 X 25</u>	LABEL #	<u>UNKNOWN</u>
		<u>          </u>		<u>          </u>		<u>          </u>
		<u>          </u>		<u>          </u>		<u>          </u>
		<u>          </u>		<u>          </u>		<u>          </u>

PREVIOUS LOCATION OF TANK(S) 6TH STREET WAREHOUSE, LOS ALAMOS, NM

OWNER KEERS ENVIRONMENTAL

DISPOSAL REQUESTED BY KEERS ENVIRONMENTAL

RESPECTFULLY,

*Michael A. Moore*  
EIDSON STEEL PRODUCTS, INC.

ENVIRONMENTAL

Service Order # 085265

82 A DIVISION OF MESA OIL, INC.
Mailing Address
Keers Environmental Inc
5904 Florence Ave NE
Accts Payable - Emily Sanchez
Albq NM 87113

Service Address
Keers Environmental Inc
600 6th St
Robbi
Los Alamos NM 87544

(505) 823-9006 Ext. 0000

(505) 288-0079 Ext. 0000

Contact: Sterling Johnson

Account Number P.O. Number Order Date Terms
KEERS01 11/08/95 Net 30 days

Description Ordered Unit Price
Used Oil Removal 1 Gal-Tank 0.2000
Oily Water Removal 1 Gal-Tank 0.7200
Meet Robbi Across The Street From
The Hilltop In In Los Alamos
At 7:30 Am.

Table with 2 columns: Quantity, Total. Row 1: 2,500, 2,500

SPECIAL INSTRUCTIONS

APPROVAL:

JOB #:

CAT:

CLASS:

FORM OF PAYMENT

CREDIT APP. #

MC/VISA

CASH:

CHECK:

APPROVED BY VENDOR

P.O.#

SALES TAX

TOTAL DUE MESA OIL \$

GENERATORS CERTIFICATION: This material is described to the best of my ability. This material has not been mixed with PCB's or hazardous waste listed in 40 C.F.R. part-262. I acknowledge the accuracy of the total due on this receipt. If to be charged on account I understand that an invoice will follow with terms of NET 30 DAYS.

Printed / Typed Name

Signature

Date

TRANSPORTER, STORER AND RECYCLER

MESA OIL, INC. - PLANT
Belen, NM
EPA# NMD 000096024
TEXAS TWC ID# 40849

Mailing Address:
Mesa Oil, Inc.
7239 Bradburn Blvd.
Westminster, CO 80030
(303) 426-4777

IN CASE OF SPILL CONTACT: MESA OIL, INC. 1-800-USED-OIL

MESA OIL, INC. - PLANT
Golden, CO
EPA# COD 983772955

TRANSPORTER ACKNOWLEDGMENT OF RECEIPT OF MATERIALS:
I certify materials have been tested and are below 1,000 PPM halogens.

D.O.T. REQUIREMENT - MAXIMUM LOAD 7000 GALLONS OIL N.O.S. COMBUSTIBLE LIQUID

Printed / Typed Name

Signature

Date

TREATMENT FACILITY OPERATOR:

Described materials were handled by me, the treatment facility named above, and were accepted.

Printed / Typed Name

Signature

Date

**ENCLOSURE THREE**

**CHAIN OF CUSTODY AND COREHOLE  
SAMPLE ANALYTICAL DATA SHEETS**

Los Alamos National Laboratory Environmental Restoration (Los Alamos, NM 87545)

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS

Technical Area 00	Send Lab Report to Janet Brewer	Field Unit Leader Garry Allen
Operable Unit 1071	E525	(505)667-3394
Date 12/05/95	LANL Destination Chem Van	Turnaround 45 days
OU Contact Rebecca C. Eaton	LANL Contact John Miglio	Lab Report Required 01/19/96
Contact Phone No (505) 662-1358	LANL Mail Stop	Charge Code MA1CB0400000

Relinquished by: Dave Frank ALEX MORA (Signature): <i>[Signature]</i> Affiliation: ERM/Golder	Date: 12/04/95	Relinquished by: CST-1.2 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Date: 12/14/95	Relinquished by: (Signature): Affiliation:	Date:
Received by: CST-1.2 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Time: 1145 TO 1515	Received by: ALEX MORA (Signature): <i>[Signature]</i> Affiliation: ERM	Time: 1530	Received by: (Signature): Affiliation:	Time:
POSSIBLE HAZARD IDENTIFICATION: (please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances): Radiological___ Highly Toxic___ Flammable___ Skin Irritant___ Non-Hazard <input checked="" type="checkbox"/> Other___			SCREENING METHOD: Rad Van/Chem Van		
			SAMPLE DISPOSAL: Return to Client		
Comments: BHOI					

Field Unique Sample #/ID	Cont ID	Date & Time Collected	Sample Container Volume/Material	Matrix	Preserv	ANALYSIS REQUESTED: (SMO Order Codes)	REMARKS (Conditions of receipt, etc.)
0100-95-0916	01	12/04/95 1145	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0917	01	12/04/95 1320	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0918	01	12/04/95 1520	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0919	01	12/05/95 1040	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0920	01	12/05/95 1150	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0921	01	12/05/95 1420	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0922	01	12/05/95 1515	125 ml Septum Amber G	Soil	Ice	CVTPH	

tal Petroleum Hydrocarbons in Soil.  
CST-12 Mobile Analytical Laboratory  
Analytical Results

Analyst: LAK

Date: 12/4/95

Sample #	Weight(g)	Dilution	ABS	Soil oncentration (mg/kg)
Daily Std.	10	1	0.268	58
0100-95-0916	10.2	100	0.201	4237
0100-95-0917	10.7	100	0.226	4541
0100-95-0918	9.8	100	0.051	1119

ily Std. Recovery: 105%

Total Petroleum Hydrocarbons in Soil.

CST-12 Mobile Analytical Laboratory

Analytical Results

Analyst: LAK

Date: 12/5/95

Sample #	Weight (g)	Dilution	ABS	Soil
				Concentration (mg/kg)
Daily Std.	10	1	0.045	10
0100-95-0919	10.2	100	0.276	5818
0100-95-0920	10.4	1	0.714	148
0100-95-0921	10.8	1	-0.008	<1
0100-95-0922	10.6	1	-0.001	<1

Daily Std. Recovery:

88%

Los Alamos National Laboratory Environmental Restoration (Los Alamos, NM 87545)

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS

Technical Area 00	Send Lab Report to Janet Brewer	Field Unit Leader Garry Allen
Operable Unit 1071	E525	(505)667-3394
Date 12/11/95	LANL Destination Chem Van	Turnaround 45 days
OU Contact Rebecca C. Eaton	LANL Contact John Miglio	Lab Report Required 01/25/96
Contact Phone No (505) 662-1358	LANL Mail Stop	Charge Code MA1CB0400000

Relinquished by: <i>Dave Frank ALEX MORRIS</i> (Signature): <i>[Signature]</i> Affiliation: ERM/Golder	Date: 12-11-95	Relinquished by: <i>CST-12 Laura Kelly</i> (Signature): <i>[Signature]</i> Affiliation: <i>Laura Kelly</i>	Date: 12/11/95	Relinquished by: (Signature): Affiliation:	Date:
Received by: <i>CST-12 Laura Kelly</i> (Signature): <i>[Signature]</i> Affiliation: <i>Laura Kelly</i>	Time: 1630 to 1445	Received by: <i>ALEX MORRIS</i> (Signature): <i>[Signature]</i> Affiliation: ERM	Time: 1500	Received by: (Signature): Affiliation:	Time:
POSSIBLE HAZARD IDENTIFICATION: (please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances): Radiological___ Highly Toxic___ Flammable___ Skin Irritant___ Non-Hazard <input checked="" type="checkbox"/> Other___			SCREENING METHOD: Rad Van/Chem Van SAMPLE DISPOSAL: Return to Client		
Comments: <i>B1702</i>					

Field Unique Sample #/ID	Cont ID	Date & Time Collected	Sample Container Volume/Material	Matrix	Preserv	ANALYSIS REQUESTED: (SMO Order Codes)	REMARKS (Conditions of receipt, etc.)
0100-95-0923	01	12/11/95 1030	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0924	01	12/11/95 1100	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0925	01	12/11/95 1120	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0926	01	12/11/95 1305	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0927	01	12/11/95 1315	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0928	01	12/11/95 1340	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0929	01	12/11/95 1350	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0930	01	12/11/95 1415	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0931	01	12/11/95 1430	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0932	01	12/11/95 1440	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0933	01	12/11/95 1445	125 ml Septum Amber G	Soil	Ice	CVTPH	

Total Petroleum Hydrocarbons in Soil.

CST-12 Mobile Analytical Laboratory

Analytical Results

Analyst: LAK

Date: 12/11/95

Sample #	Weight (g)	Dilution	ABS	Soil Concentration (mg/kg)
Daily Std.	10	1	0.053	11
0100-95-0923	10.4	1	-0.01	<1
0100-95-0924	9.7	1	-0.004	<1
0100-95-0925	10	1	-0.007	<1
0100-95-0926	9.9	1	-0.006	<1
0100-95-0927	10.4	1	0.001	<1
0100-95-0928	10.3	1	-0.002	<1
0100-95-0929	10.3	1	-0.03	<1
0100-95-0930	10	1	-0.008	<1
0100-95-0931	10.6	1	-0.009	<1
0100-95-0932	10.7	1	-0.007	<1
0100-95-0933	10.5	1	-0.011	<1

Daily Std. Recovery:

104%

Los Alamos National Laboratory Environmental Restoration (Los Alamos, NM 87545)

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS

Technical Area 00	Send Lab Report to Janet Brewer	Field Unit Leader Garry Allen
Operable Unit 1071	E525	(505)667-3394
Date 12/12/95	LANL Destination Chem Van	Turnaround 45 days
OU Contact Rebecca C. Eaton	LANL Contact John Miglio	Lab Report Required 01/26/96
Contact Phone No (505) 662-1358	LANL Mail Stop	Charge Code MA1CB0400000

Relinquished by: Dave Frank ALEX MORAN (Signature): <i>[Signature]</i> Affiliation: ERM/Golder	Date: 12-12-95	Relinquished by: CST-12 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Date: 12/12/95	Relinquished by: (Signature): Affiliation:	Date:
Received by: CST-12 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Time: 0900 to 1130	Received by: ALEX MORAN (Signature): <i>[Signature]</i> Affiliation: ERM	Time: 1130	Received by: (Signature): Affiliation:	Time:
POSSIBLE HAZARD IDENTIFICATION: (please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances): Radiological___ Highly Toxic___ Flammable___ Skin Irritant___ Non-Hazard <input checked="" type="checkbox"/> Other___			SCREENING METHOD: Rad Van/Chem Van SAMPLE DISPOSAL: Return to Client		
Comments: BH 03					

Field Unique Sample #/ID	Cont ID	Date & Time Collected	Sample Container Volume/Material	Matrix	Preserv	ANALYSIS REQUESTED: (SMO Order Codes)	REMARKS (Conditions of receipt, etc.)
0100-95-0934	01	12/12/95 0900	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0935	01	12/12/95 0915	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0936	01	12/12/95 0930	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0937	01	12/12/95 1007	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0938	01	12/12/95 1018	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0939	01	12/12/95 1100	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0940	01	12/12/95 1116	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0941	01	12/12/95 1130	125 ml Septum Amber G	Soil	Ice	CVTPH	

Los Alamos National Laboratory Environmental Restoration (Los Alamos, NM 87545)

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS

Technical Area 00	Send Lab Report to Janel Brewer	Field Unit Leader Garry Allen
Operable Unit 1071	E525	(505)667-3394
Date 12/12/95	LANL Destination Chem Van	Turnaround 45 days
OU Contact Rebecca C. Eaton	LANL Contact John Miglio	Lab Report Required 01/26/96
Contact Phone No (505) 662-1358	LANL Mail Stop	Charge Code MA1CB0400000

Relinquished by: <del>Dave Frank</del> ALEX MORAN (Signature): Affiliation: ERM/Golder	Date: 12-12-95	Relinquished by: CST-12 (Signature): Laura Kelly Affiliation: ERM	Date: 12/12/95	Relinquished by: (Signature): Affiliation:	Date:
Received by: CST-12 (Signature): Laura Kelly Affiliation: ERM	Time: 1400 TC	Received by: ALEX MORAN (Signature): Affiliation: ERM	Time: 1500	Received by: (Signature): Affiliation:	Time:
POSSIBLE HAZARD IDENTIFICATION: (please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances): Radiological___ Highly Toxic___ Flammable___ Skin Irritant___ Non-Hazard <input checked="" type="checkbox"/> Other___			SCREENING METHOD: Rad Van/Chem Van SAMPLE DISPOSAL: Return to Client		
Comments: B11 04					

Field Unique Sample #/ID	Cont ID	Date & Time Collected	Sample Container Volume/Material	Matrix	Preserv	ANALYSIS REQUESTED: (SMO Order Codes)	REMARKS (Conditions of receipt, etc.)
0100-95-0942	01	12/12/95 1400	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0943	01	12/12/95 1420	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0944	01	12/12/95 1420	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0945	01	12/12/95 0000	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0946	01	12/12/95 1500	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0947	01	12/12/95 1520	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0948	01	12/12/95 1520	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0949	01	12/12/95 1548	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0950	01	12/12/95 1550	125 ml Septum Amber G	Soil	Ice	CVTPH	

Los Alamos National Laboratory Environmental Restoration (Los Alamos, NM 87545)

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS

Technical Area 00	Send Lab Report to Janet Brewer	Field Unit Leader Garry Allen
Operable Unit 1071	E525	(505)667-3394
Date 12/13/95	LANL Destination Chem Van	Turnaround 45 days
OU Contact Rebecca C. Eaton	LANL Contact John Miglio	Lab Report Required 01/27/96
Contact Phone No (505) 662-1358	LANL Mail Stop	Charge Code MA1CB0400000

Relinquished by: Dave Frank ALEX MOZA (Signature): <i>[Signature]</i> Affiliation: ERM/Golder	Date: 12-13-95	Relinquished by: CST-12 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Date: 12-13-95	Relinquished by: (Signature): Affiliation:	Date:
Received by: CST-12 (Signature): <i>[Signature]</i> Affiliation: <i>[Signature]</i>	Time: 1000 to 1145	Received by: ALEX MOZA (Signature): <i>[Signature]</i> Affiliation: ERM	Time: 1145	Received by: (Signature): Affiliation:	Time:

POSSIBLE HAZARD IDENTIFICATION: (please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances): Radiological___ Highly Toxic___ Flammable___ Skin Irritant___ Non-Hazard <del>K</del> ___ Other___	SCREENING METHOD: Rad Van/Chem Van
	SAMPLE DISPOSAL: Return to Client

Comments: B11 05

Field Unique Sample #/ID	Cont ID	Date & Time Collected	Sample Container Volume/Material	Matrix	Preserv	ANALYSIS REQUESTED: (SMO Order Codes)	REMARKS (Conditions of receipt, etc.)
0100-95-0951	01	12/13/95 1000	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0952	01	12/13/95 1015	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0953	01	12/13/95 1033	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0954	01	12/13/95 1100	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0955	01	12/13/95 1100	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0956	01	12/13/95 1120	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0959	01	12/13/95 1140	125 ml Septum Amber G	Soil	Ice	CVTPH	
0100-95-0960	01	12/13/95 1145	125 ml Septum Amber G	Soil	Ice	CVTPH	

Total Petroleum Hydrocarbons in Soil.  
CST-12 Mobile Analytical Laboratory  
Analytical Results

Analyst: LAK

Date: 12/12/95

Sample #	Weight(g)	Dilution	ABS	Soil Concentration (mg/kg)
Daily Std.	10	1	0.052	11
0100-95-0934	10.2	1	-0.002	<1
0100-95-0935	10	1	-0.008	<1
0100-95-0936	9.7	1	-0.005	<1
0100-95-0937	10.2	1	-0.007	<1
0100-95-0938	9.8	1	-0.005	<1
0100-95-0939	10.4	1	0	<1
0100-95-0940	10.3	1	-0.003	<1
0100-95-0941	10.2	1	-0.002	<1
0100-95-0942	10.4	1	0.002	<1
0100-95-0943	10.2	1	-0.002	<1
0100-95-0944	10.5	1	0.003	<1
0100-95-0945	10.2	1	0	<1
0100-95-0946	9.5	1	0.003	<1
0100-95-0947	10.6	1	-0.001	<1
0100-95-0948	10.6	1	-0.002	<1
0100-95-0949	9.6	1	-0.003	<1
0100-95-0950	10.2	1	0	<1

Daily Std. Recovery: 102%

Total Petroleum Hydrocarbons in Soil.  
CST-12 Mobile Analytical Laboratory  
Analytical Results

Analyst: jbr

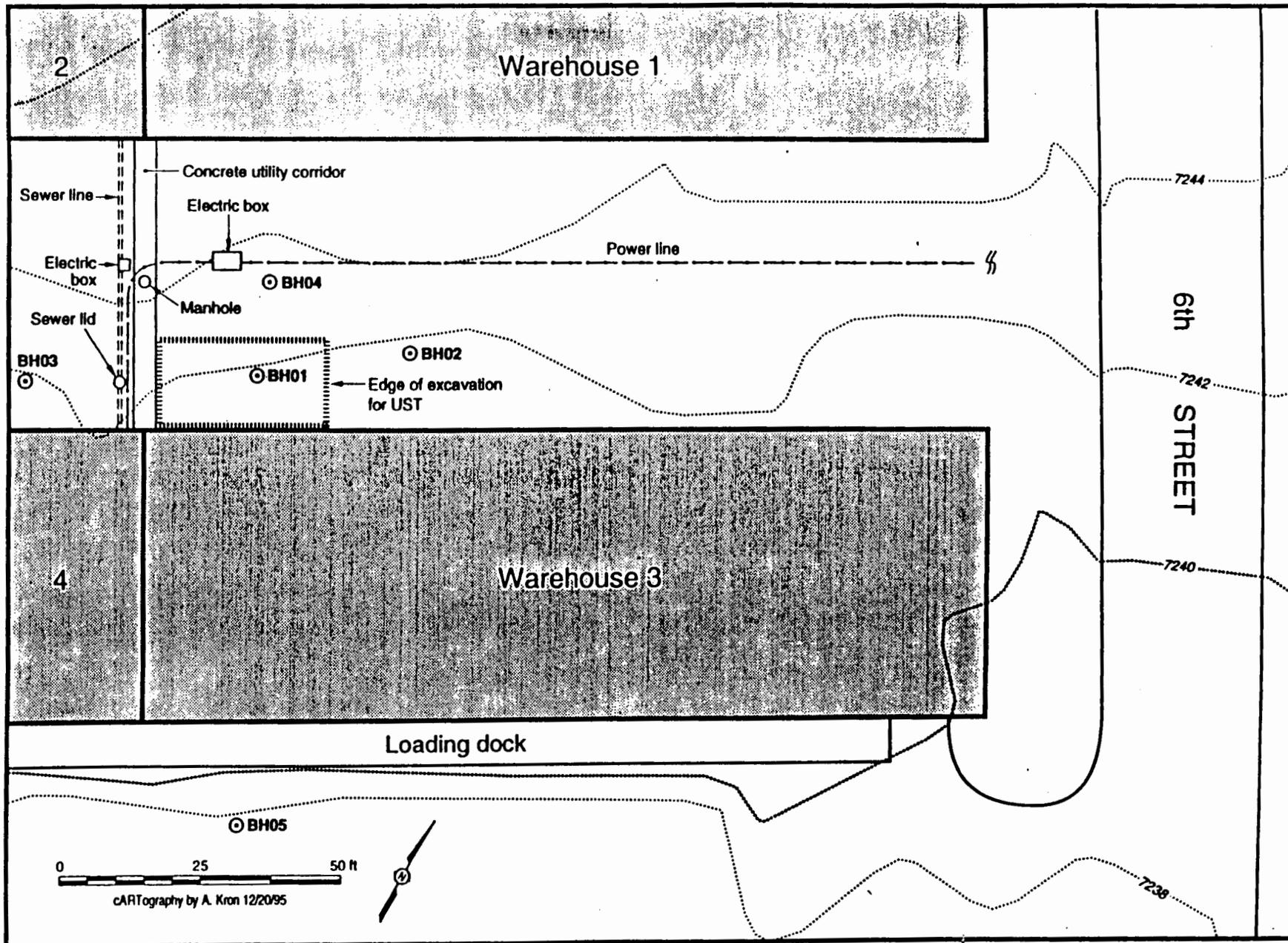
Date: 12/13/95

Sample #	Weight (g)	Dilution	ABS	Soil Concentration (mg/kg)
Daily Std.	10	1	0.052	11
0100-95-0951	10.3	1	0.013	3
0100-95-0952	10.6	1	-0.001	<1
0100-95-0953	10.2	1	-0.002	<1
0100-95-0954	10.1	1	-0.003	<1
0100-95-0955	10.2	1	-0.001	<1
0100-95-0956	10.4	1	-0.002	<1
0100-95-0959	10	1	-0.001	<1
0100-95-0960	10.1	1	-0.001	<1

Daily Std. Recovery: 102%

**ENCLOSURE FOUR**

**COREHOLE LOCATIONS**



Locations of boreholes at the underground storage tank, 6th Street warehouse.

**ENCLOSURE FIVE**

**COREHOLE SAMPLE LOGS**

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID TAOU Drill Depth From 0 To 35 Page 2 of 2

Driller VE WERNE Box #(s) VA Start Date/Time 12/12/95 End Date/Time 12/12/95

Drilling Equip./Method ... Sampling Equip./Method ...

All samples from this location are for ...

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0					FILL MATERIAL FROM 3-033 TANK EXCAVATION. THIS MATERIAL WAS NOT SAMPLED			
10	2.0 / 2.1 100%	J100-95-0916	JVM-03 X=ND P/Y=ND	NA	RUN #1, 10.3-11.2, 11.45, SAMPLE TAKEN FROM 10 FT. LOOSE TO CONSOLIDATED, VERY LT. GRAY TO WHITE TUFF - TRUNCATED, WET TO DRY, POLYCRYSTALLINE			SAMPLE FOR TPH ONLY VIA CHEM VAN METHOD 415.1
12	2.0 / 2.1 100%	J100-95-0917	JVM-04 X=ND P/Y=	NA	RUN #2, 14.7-16.7, 13.20, SAMPLE COLLECTED FROM THE 15 FT. MARK. CORE IS LOOSE TO CONSOLIDATED, LOOSE GRADIENT TO CONSOLIDATED LIGHT GRAY TO DARK GRAY TUFF, NO PRICES VISIBLE, PRESENT CORE IS WET GRADIENT TO DRY.			TPH VIA CHEM VAN.
15								
20	2.0 / 2.1 100%	J100-95-0918	JVM-24 X=NDA P/Y=NDA	NA	RUN #3, 19.0-20.4, 15.20, SAMPLE COLLECTED FROM THE 20 FT. MARK, SAME LITHOLOGY AS THE FIRST TWO SAMPLES.			
20					S. F. FILLING 15.0 12.4 95			
25	2.0 / 2.1 100%	J100-95-0919	JVM-49 X=NDA P/Y=NDA	NA	RUN #4, 23.0-25.0, 19.40, SAMPLE WAS COLLECTED AT THE 25 FT. MARK. CORE IS CONSOLIDATED, DARK GRAY TO LIGHT GRAY, PRICES FOR ASH FROM TUFF, HYDROCARBON JOX, DAPI.			WEATHER FOR 10'S IS CALM, 65°F, SLIGHT BREEZE, SOME HIGH CLOUDS, NO PRECIPITATION.
25	2.0 / 2.1 100%	J100-95-0920	JVM-14 X=ND P/Y=ND	NA	RUN #5, 29-31 FT. 11.50, SAMPLED FROM THE 30 FT. INTERVAL. CORE IS CONSOLIDATED, COARSE, PRICES FOR ASH FROM TUFF (GRAY TO LIGHT BROWN WET, FINE CRYSTS TO 2MM SLIGHT HYDRATED JOX.			BREAK FOR LUNCH 11:00
30								
35	2.0 / 2.1 100%	J100-95-0921	JVM-ND X=ND P/Y=ND	NA	RUN #6, 33.5-35.0, 19.40, SAMPLE FROM THE 35 FT. INTERVAL. CONSISTENT, CONSOLIDATED, BROWN (LATE) TUFF, PLATT STRUCTURE, LITTLE VISIBLE PRICES, NO FEEL JOX, WET.			END OF DRILLING FOR THE DAY

Weather clear, some high clouds, no breeze - 68°F (noon)

Borehole ID: TAOU, Depth: 35 FT, Location: ...

Prepared by ... Date 12/12/95 Checked By MEX MOIR Date 12/12/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 221 TAOU 22 Drill Depth From 35 To 40 Page 2 of 2  
 Driller M. HENZI Box #(s) 1A Start Date/Time 150000-15 End Date/Time 170010-15  
 Drilling Equip./Method 100-1100 Sampling Equip./Method 100-1100

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
35	2.0 / 2.1 / 100%	0100-015 / 0422	UVI ND / V=ND / P/I-ND	NA	REN #7, 35-40, 1550, SAMPLED AT 40' CONSOLIDATED, COHESIVE, LT BRN TO LT GRAY TUFF. SOMEWHAT FLAT STRUCTURE NO VISIBLE CLASTS OR ROOTS, MOIST.			
40					FINISH DRILLING FOR THE DAY			
45								
50								

Prepared by V. FRANK Date 12-4-95 Checked By ALEX MORRIS Date 12-28-95



LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 02 TAUOU O. FU-1 Drill Depth From 10 To 20 Page 2 of 4

Driller STUART CROSS Box #(s) NA Start Date/Time 12-11-95/1:50 End Date/Time 12-11-95/14:30

Drilling Equip./Method 6" HOLLOW STEEL ROSSER Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes	
10	50/50	215-05 0935 at 12'	P10:0	NA	10-15 IRREGULARLY WELDED TERNITE 1-3 FT TO PALE BROWNISH-GRAY, AND RICH IN PHOSPHATES. WELL INDURATED. - 5% PHOSPHATE (7/16) RANGING FROM 2 TO 3 CM AND INCLUDING 2 CM IN SIZE. - 25% PHOSPHATE (20%) 2-3 CM CLEAR, 1 TO 3 MM AND 2 MM AROUND IN SIZE. OTHER NOT IDENTIFIED PHOSPHATES (10%) - LITHICS NOT OBSERVED - MATRIX VERY LIGHT BROWN TO MODERATELY COHESIVE.			1100	
11	RUN 3	215-05 0936 at 13'							
12	0	0							
13	0	0							
14									
15	50/50	215-05 0937 at 17'	P10:10	NA	15-20 IRREGULARLY WELDED TERNITE, WITH 1-3 FT TO PALE BROWNISH-GRAY, AND RICH IN PHOSPHATES. WELL INDURATED. - 10% PHOSPHATE (7/16) RANGING FROM 4 TO 1 CM AND INCLUDING 2 CM IN SIZE. - 15% PHOSPHATE (20%) 2-3 CM CLEAR, 1 TO 3 MM AND 2 MM AROUND IN SIZE. OTHER NOT IDENTIFIED PHOSPHATES (15%) - LITHICS NOT OBSERVED - MATRIX LIGHT RED (2.5-2.5/10) BROWN. MODERATELY COHESIVE.			1300	
16	RUN 4	215-05 0938 at 17'							
17	0	0							
18									
19									
20									

Prepared by ALEX MORA

Date 12-18-95

Checked By [Signature]

Date 12/21/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 02 TAOU 0, SW 1 Drill Depth From 20 To 30 Page 3 of 4

Driller STEWART GROSS Box #(s) UA Start Date/Time 12-11-95/1400 End Date/Time 12-11-95/1430

Drilling Equip./Method 6" HOLLOW STEM AUGER Sampling Equip./Method CONTINUOUS CORE OF RMC

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
20	50/50	0100-45 0929	P10-0		20-25 S.M.A. SWAPT: KIMM'S REG STRONG.			1400
21	RUN 5	22 33.5'						
22								
23								
24								
25	50/50	0100-45 0930	P10-0		25-30 SLIGHTLY TO MODERATELY WELDED IGNEARITE WITH VITRIFIED PUMICE AND MODERATE FUSION CONTENT. WELL INDURATED. - 10% PUMICE LAPID, VITRIFIED, BROWN (SYR. 5/2) BOUNDING FROM 1704 CM AND AVERAGING 3 IN IN SIZE. - 20% PHENOCRYSTS, QUARTZ (20%) CLEAR, 1704 MM AND AVERAGING 2MM IN SIZE - LITHICS NOT OBSERVED. - MATRIX IS REDDISH GRAY (SYR. 5/2), ASH, MODERATELY COHESIVE.		1420 28' APPROX 45" STANDARDIZATION	
26	RUN 6	22 23'						
27								
28								
29								
30								

Prepared by ALEX MOIRA

Date 12-18-95

Checked By [Signature]

Date 12/19/95

**LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM**  
**SAMPLE MANAGEMENT FACILITY** **CORE SAMPLE LOG**

Borehole ID 02 TAOU 0, FO-1 Drill Depth From 30' To 40' Page 4 of 4  
 Driller STEVE BATES Box #(s) NA Start Date/Time 12-11-95/1440 End Date/Time 12-11-95/1440  
 Drilling Equip./Method 5" HOLLOW STEEL TUBER Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	50/50	1180-115 0931 at 33'	FIG 70	NA	30-35 T.A.A.			1430
31	RUN 7							
32								
33								
34								
35	50/50	1180-115 0932 at X <sub>0</sub> 010-115 0433 at 38.5'	FIG 70	NA	35-40 LIGHTLY TO MODERATELY WEATHERED MAGNETITE (WITH VITRIFIED SAND) CONTAINING FLAKES AND MOTTLED IN PRESENCE OF CONTACT WITH INDURATED. - 5-10% FINE GRAINED VITRIFIED SAND SOME OF WHICH IS 1-2 mm RANGING FROM 1 TO 4 cm AND MOTTLED ACT. IN SIZE. - 20% PREHOMOPHIS QUARTZ (3-5%) UNHOMOPHIS TRANSITION TO 20% QUARTZ FROM 2mm IN SIZE. - LITTLE MOTTLED - MATRIX IS BROWN GRAY (S/S, S/YR) OF FINELY GRAINED.			1440 35-37 0932 1180-115 0932
36	RUN 8							
37								
38								
39								
40								
					BOTTOM OF BOREHOLE AT 40'			

Prepared by ALEX MORA Date 12-19-95 Checked By [Signature] Date 12/21/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 03 TAOU 0, FU-1 Drill Depth From 0 To 10 Page 1 of 4  
 Driller STEWART BROSS Box #(s) NA Start Date/Time 12-12-95/8AM End Date/Time 12-12-95/0930  
 Drilling Equip./Method 6" HOLLOW STEM ROSS Sampling Equip./Method CONTINUOUS CORE BR-105L

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	50/50	0100-95 0934 at 3'	PIU-0	NA	0-3'0" REDDISH BROWN TO REDDISH BROWN CLAY INTERBEDDED TO BOTTOM. SANDY NE.			0400
1	50/50							
2								
3								
4								
5	50/50	0100-95 0935 at 8'	PIU-0	NA	5.0-10.0 MODERATELY WELOD KIMMURITE WITH DEVITRIFIED FUMES AND MODERATE TO HIGH IN PHENOLAMITE. SLIGHTLY INDURATED. - 5% FINE GRAIN, DEVITRIFIED REDDISH BROWN (SYD 4.5) BRANING FROM 2 TO 5 CM AND BRANING 3 CM IN SIZE. - 20% PHENOLAMITE QUARTZ (70%) FINE GRAIN TRANSPARENT, 3 MM IN SIZE. - LITHO NOT OBSERVED. - MATRIX IS REDDISH BROWN (SYD 4.5) AND SLIGHTLY TO MODERATELY COHESIVE.			0915
6								
7								
8								
9								
10								

Prepared by ALEX MORI

Date 12-18-95

Checked By [Signature]

Date 12/27/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 03 TAOU 0 FO-1 Drill Depth From 10 To 20 Page 2 of 4

Driller THOMAS BRASS Box #(s) 14 Start Date/Time 12-12-95/0430 End Date/Time 12-12-95/1010

Drilling Equip./Method 6" HORIZONTAL CORE MOWER Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
10	50% E.O.	010045 0436	PIU - 0	NA	10-15 F.A.A. EXCEPT MATRIX IS GRAY (5YR 5/1)			0436 14 FIBRES, METAL RECOVERY THROUGH 12-14 FIBRES WITH STAINING.
11	Box 3							
12								
13								
14								
15	50% C	010045 0437	PIU - 0	NA	15-20 LIGHTLY WEATHERED VOLCANIC REUNITED, MODERATE TO HIGH IRON OXIDE CONTENT, TENDS TO WEAKLY CRACK. 5% FINE GRained, REUNITED CLAY (5YR), 5% MANGANESE - 20% FINE GRAINED, SUPERFINE SAND 1 TO 4mm D SIZE. - NO USABLE FIBRES - MATRIX IS GRAY (5M), MOD. SLIGHTLY COHESIVE.		1000	
16	Box 4							
17								
18								
19								
20								

Prepared by ALEX MOZA

Date 12-19-95

Checked By [Signature]

Date 12/20/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 53 TAOU 0.50-E Drill Depth From 20 To 30 Page 3 of 4

Driller STEPHANE BROSS Box #(s) 1A Start Date/Time 12-12-95/1010 End Date/Time 12-12-95/1100

Drilling Equip./Method WALLOW STEEL ROSSER Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
20	50/50	0100-15 0933	P10 = 0	NA	20-25 S.A.M. - FOMITES UP TO 5CM IN SIZE.			1010 85' FRACTURE, KETA OLIVE STRIPS 20.5' FRACTURE HORIZ. OLIVE STRIPS
21	RUN 5	at 24'						
22								
23								
24								
25	50/50	0100-15 0939	P10 = 0	1A	25-30 S.A.M. - SANDWICH PRESENT (5% OF TOTAL PHENOLIC ACID CONTENT).			1100
26	RUN 6	at 29'						
27								
28								
29								
30								

Prepared by ALEX MORA

Date 12-18-95

Checked By [Signature]

Date 12/18/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 03 TAOU 0.502 Drill Depth From 30 To 40 Page 4 of 4

Driller EDWARD P. MOSE Box #(s) NA Start Date/Time 12/15/11 End Date/Time 12/15/11

Drilling Equip./Method 5" HOLESS OPEN ROSSER Sampling Equip./Method CONTINUOUS CORE SYSTEM

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology/Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	57/57	0153-45 0143	PD=0	NA	30-35 S.A.A.			1110
31	RUN 7	02345						34.5' FRACTURE, 45° EDDITH CLAY SANDS.
32								
33								
34								
35	50/50	0100-25 0941.	PD=0		35-40 S.A.A. - MATRIX BRIND TO G. REDUCED BRIND 27.5 FINELY GRAINED, SANDSTONE			1130
36	RUN 5							36.1 FRACTURE, 45° EDDITH CLAY SANDS
37								39' FRACTURE 45° EDDITH CLAY SANDS
38								39.5' FRACTURE 45° EDDITH CLAY SANDS
39								
40					BOTTOM OF BOREHOLE.			

Prepared by ALEX MORA

Date 12/15/11

Checked By [Signature]

Date 12/15/11



LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 04 TAOU 0 F-1 Drill Depth From 10 To 20 Page 2 of 4

Driller STUART CROSS Box #(s) NA Start Date/Time 12/13/95 End Date/Time 12/13/95

Drilling Equip./Method CORROD AREA ROSS Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
10	50% 100%	G100 45- 0943 at 12'	P10 = 0	NA	10-12 S.A.A. EXCEPT TUNING ARE FROM 10-12 AND 11'	●		1400
11	60%	G100 45- 0944 at 11'			AT 11:15	●		11-12 FRACTURE, 40° FILLING WITH FINE BROWN CLAY CLAY PLATE AND MIST. 12-13 FRACTURE, 45° S.G.A. FRACTURE.
12						●		
13						●		
14						●		
15	50% 150%	G100 45- 0945 at 17'	P10 = 0	NA	15-20 S.A.A.	●		1475
16	60%					●		
17						●		
18						●		
19						●		
20						●		

Prepared by ALEX MESA

Date 12/20/95

Checked By [Signature]

Date 12/20/95

**LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM**  
**SAMPLE MANAGEMENT FACILITY** **CORE SAMPLE LOG**

Borehole ID 04 TAOU 0 501 Drill Depth From 20 To 30 Page 3 of 4  
 Driller STEWART CROSS Box #(s) 4A Start Date/Time 12/05/1990 End Date/Time 12/05/1990  
 Drilling Equip./Method 6" HOLLOW STEEL CASE Sampling Equip./Method POUGHOLE CORE BITEREC

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
20	50% / 5.0	060-45-2746	PID=10	NA	20-23 SA A MATHX BBK (SOUTH GRAY (SYR 4/2).			1500
21	R/N 5	at 23.5'						
22								
23								
24								
25	50% / 5.0	060-45-0947 at 27.0	PID=10	NA	25-27 MODERATELY WASHED ILLUMINATE COLO. DEVIATED FINE AND MODERATE IN ILLUMINATE TOUBLY TO MODERATELY INDURATED. - 8% FUMIC GRAIN, DEVATED SPK BROWN GRAY (10R 7/1) RANGING FROM 1 TO 3 CM. AND MATRICES 2 CM IN SIZE. - 10% SANDSOME (SPK 2/10) TEMPERATE, CLEAR 1-2 MM IN SIZE AND MATRICES 2 TO 4 IN SIZE. - LUMINOUS NOT OBSERVED - MATRICES IN DUSKY RED (1.5YR 5/3)			1500
26	R/N 6	060-45-0948 at 28.5'						
27								
28								
29								
30					27-30 SA A SAFFR FUMIC SPK (RED/WHITE) (SOUTH GRAY (SYR 4/2).			

Prepared by ALEX MOBA Date 12/05/90 Checked By [Signature] Date 12/11/90

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 04 TAOU 0 F1-1 Drill Depth From 30 To 40 Page 4 of 4

Driller STEWART CROSS Box #(s) NA Start Date/Time 12/19/95 End Date/Time 12/20/95

Drilling Equip./Method ROTARY CORE DRILL Sampling Equip./Method ROTARY CORE DRILL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology - Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30	50/50	0100-45 0744	PIG:0	NA	30-35 SNA EXCEPT MATRIX IS DARK REDDISH GRAY (SYR 4/2).	●		1545
31	20/17					●		
32						●		
33						●		
34						●		
35	50/50	0100-45 0950	PIG:0	NA	35-40 SNA	●		1600
36	20/8					●		
37						●		
38						●		
39						●		
40						●		
					BOTTOM OF BOREHOLE AT 40'			

Prepared by ALEX MORAN

Date 12/19/95

Checked By [Signature]

Date 12/20/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 05 TAVOU 0 FU-1 Drill Depth From 0 To 10 Page 1 of 4

Driller STEWART CROSS Box #(s) NA Start Date/Time 12-13-95/1000 End Date/Time 12-13-95/1030

Drilling Equip./Method G HOLLOW STEM M3506 Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0	3.5/5.0 Run 1	0100-95-0951 at 4'	PIU: 0	NA	0-1.5' ASPHALT 1.5-3.0 NR 3.0-5.0 BROWN CLAY WITH YELLOWISH SAND. DRY LOW PLASTICITY.		1000	
5	5.0/5.0 Run 2	0100-95-0952 at 8.5'	PIU: 0	NA	5'-6' BROWN CLAY WITH YELLOWISH SAND 6'-10' SLIGHTLY TO MODERATELY WELOED ICHIMBEITE WITH VITRIC PUMICE AND POOR TO MODERATE IN PHENOCRYSTS. SLIGHTLY INDURATED. 5% PUMICE LAPILLI, VITRIC. LIGHT OLIVISH GRAY (7%), RANGING FROM 1 TO 3 CM, AND AVERAGING 1.5 CM IN SIZE. 5% PHENOCRYST, QUARTZ (90%) SEMI-ANGULAR TRANSLUCID, RANGING FROM 1 TO 3 MM IN SIZE. OTHERS (10%). LITHICS NOT OBSERVED. MATRIX IS OLIVISH GRAY (6%), ASH SLIGHTLY COHESIVE, AND BECOMING SLAY (5% 6%) TOWARD BOTTOM.		1015.	FRACTURE. AT 7', 30' CLAY LINED. BROWN CLAY WITH WHITE CALCITE.

Prepared by ALEX MORH

Date 12-18-95

Checked By

Date 12/1/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM  
 SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 05 TAOU 2 FU-1 Drill Depth From 10 To 20 Page 2 of 4  
 Driller STEWART CROSS Box #(s) NA Start Date/Time 12-13-95/1025 End Date/Time 12-13-95/1100  
 Drilling Equip./Method 6" HOLLOW STEM PAPER Sampling Equip./Method CONTINUOUS CORE GRABBER

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
10	5.0 / 6.0 RBN 3	0100-95-0953 at 4.5'	P10-20	NA	10-15' S.A.A. EXCEPT: - MATRIX IS GRAY (7.5YR 6/1) AND - PHENOCRYSTS AVERAGE 4MM IN SIZE	●		1025
11						●		
12						●		
13						●		
14						●		
15						●		
16	5.0 / 5.0 RBN 4	0100-95-0954 at 19'	P10-20	NA	15-20' S.A.A. EXCEPT: - FUMICE LAPILLI BROWN (7.5YR 4/2)	●		1030
17						●		
18						●		
19						●		
20						●		
NO ENTRIES - SEE NEXT PAGE								

Prepared by ALEX KOSKA

Date 12-13-95

Checked By [Signature]

Date 12/20/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 05 TA/OU 0 FU-1 Drill Depth From 20 To 30 Page 3 of 4  
 Driller STEWART GROSS Box #(s) NA Start Date/Time 12-13-95/1100 End Date/Time 12-13-95/1130  
 Drilling Equip./Method 6 HOLLAND JENSEN AUGER Sampling Equip./Method SO? 06.24 - CONTINUOUS CORE REC.

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
20	50/50 RUN 5	0100-95-0955 at 23'	PIG - 0	NA	20'-25' S.A.A. EXCEPT: - MATRIX IS GRAY (5/N).			1100 FRACTURE - FROM 21' TO 23' 50", SLIGHTLY STAINED BROWN.
21								
22								
23								
24								
25	50/50 RUN 6	0100-95-0956 at 27'	PIG - 0	NA	25'-30' - SLIGHTLY WELDED IGNIMBRITE, WITH VITRIC AND DEVITRIFIED PUMICE, AND MODERATE IN PHENOCRYSTS. SLIGHTLY INDURATED. - 5% PUMICE (APICLI, VITRIC AND DEVITRIFIED) GRAY (5YR 6/1) RANGING FROM 1 TO 3 CM, AND AVERAGING 2 CM IN SIZE. ALSO DARK GRAY (5YR 4/1) PUMICES. - 10% PHENOCRYSTS, QUARTZ (~10%), ANGULAR TO SEMI-ANGULAR, TRANSPARENT, AVERAGING 2 MM IN SIZE. - LITHICS NOT OBSERVED. - MATRIX IS GRAY (5YR 6/1) ASH, SLIGHTLY COHESIVE.			1120
26								
27								
28								
29								
30								

Prepared by ALEX MORZA

Date 12-18-95

Checked By

Date 12/21/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 55 TAOU 0, 50-1 Drill Depth From 30 To 40 Page 4 of 4

Driller STEWART PROSS Box #(s) NA Start Date/Time 12-13-95/1130 End Date/Time 12-13-95/1200

Drilling Equip./Method GILBERT DRY DRILL Sampling Equip./Method CONTINUOUS CORE BARREL

Depth (feet)	Recovery (feet per foot / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil -	Graphic Log	Lithologic Unit	Notes
30	50/50	0100-95 0959	PIU=0	NA	30-35 S.A.A			1130
31	REV 7	02 34'			31.5-32.5 POORLY INDURATED			
32								
33								
34								
35	30/50	0100-95 0960	PIU=0	NA	35-37' NR.			1140
36	REV 9	02 37'			37-40 S.A.A POORLY TO NON INDURATED GREY (5%) SAND-LIKE IGNEOUSITE			
37								
38								
39								
40					BOTTOM OF BOREHOLE AT 40'			1200

Prepared by ALEX MOZA

Date 12-19-95

Checked By [Signature]

Date 12/20/95

**LANL ENCLOSURE SIX**

**LANL GENERAL GEOLOGY AND  
HYDROLOGY INFORMATION**

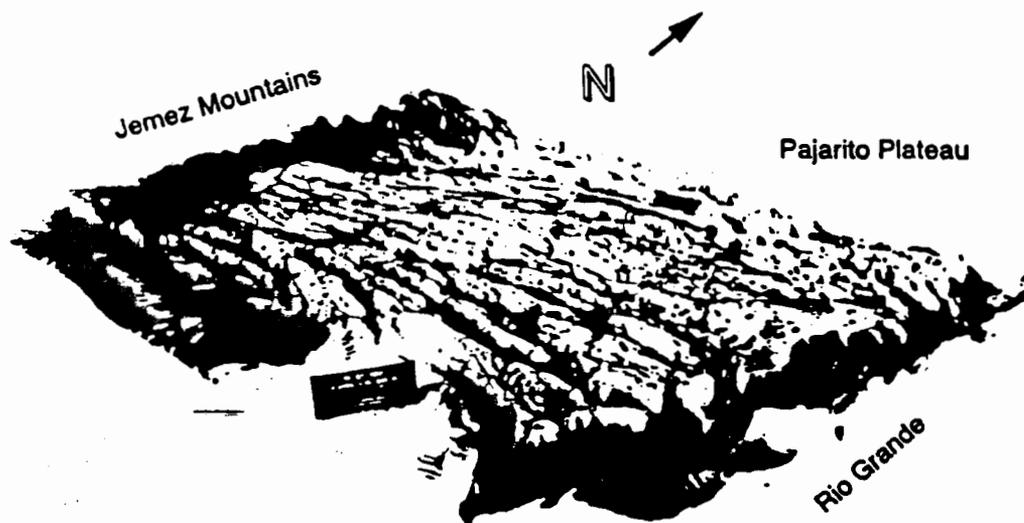


Figure II-3. Topography of the Los Alamos area.

The report provided environmental input for decisions regarding continuing activities at the Laboratory. It also provided more detailed information on the environment in and around Los Alamos. DOE is planning to prepare a new site-wide EIS for the Laboratory within the next several years.

### C. Geology and Hydrology

Most of the finger-like mesas in the Los Alamos area are Bandelier Tuff, ash fall, ash fall pumice, and rhyolite tuff (Figure II-6). The tuff, ranging from nonwelded to welded, is over 300 m (1,000 ft) thick in the western part of the plateau and thins to about 80 m (260 ft) eastward above the Rio Grande. It was deposited as a result of a major eruption of a volcano in the Jemez Mountains about 1.1 to 1.4 million years ago.

The tuff overlaps onto the Tschicoma Formation, which consists of older volcanics that form the Jemez Mountains. The tuff is underlain by the conglomerate of the Puye Formation (Figure II-6) in the central and eastern edge along the Rio Grande. Chino Mesa basalts interfinger with the conglomerate along the river. These formations overlay the sediments of the Santa Fe Group, which extends across the Rio Grande Valley and is more than 1,000 m (3,300 ft) thick. The Laboratory is bordered on the east by the Rio Grande, within the Rio Grande Rift. Because the rift is slowly widening, the area experiences frequent but minor seismic disturbances.

Surface water in the Los Alamos area occurs primarily as ephemeral or intermittent reaches of streams. Perennial springs on the flanks of the Jemez Mountains supply base flow into upper reaches of some canyons, but the volume is insufficient to maintain surface flows across the Laboratory site before they are depleted by evaporation, transpiration, and infiltration. Run-off from heavy thunderstorms or heavy snowmelt reaches the Rio Grande several times a year in some drainages. Effluents from sanitary sewage, industrial waste treatment plants, and cooling-tower blowdown enter some canyons at rates sufficient to maintain surface flows for varying distances.

Groundwater in the Los Alamos area occurs in three modes: (1) water in shallow alluvium in canyons, (2) perched water (a body of groundwater above an impermeable layer that separates it from the underlying main body of groundwater), and (3) the main aquifer of the Los Alamos area.

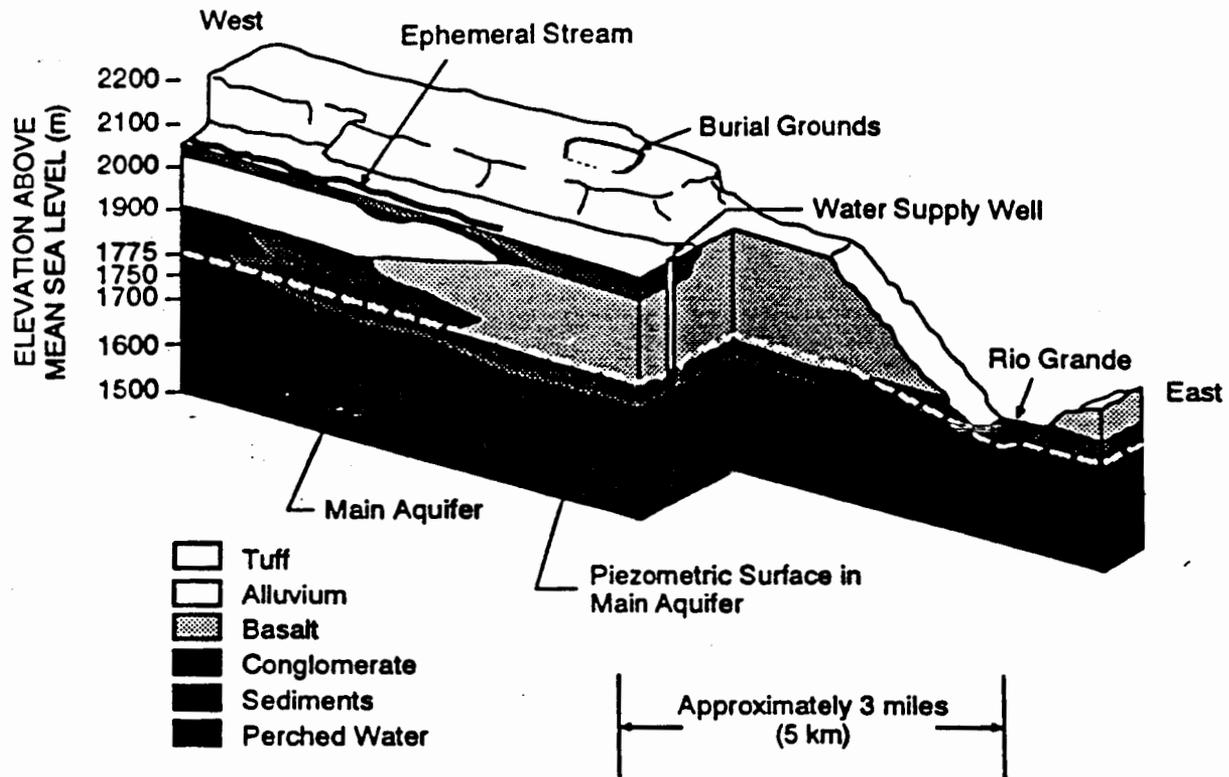


Figure II-6. Conceptual illustration of geologic and hydrologic relationship in Los Alamos area.

Ephemeral and interrupted streams have deposited alluvium that ranges from less than 1 m (3 ft) to as much as 30 m (100 ft) in thickness. Run-off in canyons infiltrates the alluvium until its downward movement is impeded by layers of weathered tuff and volcanic sediment that are less permeable than the alluvium. This creates shallow bodies of perched groundwater that move down gradient within the alluvium. As water in the alluvium moves down gradient, it is depleted by evapotranspiration and movement into underlying volcanics (Purtymun 1977). The perched alluvial groundwaters show the effects of discharges from the Laboratory.

Perched groundwater occurs at intermediate depths in conglomerates and basalts beneath the alluvium in portions of Pueblo, Los Alamos, and Sandia canyons. It has been found at depths of about 37 m (120 ft) in the midreach of Pueblo Canyon, about 45 to 60 m (150 to 200 ft) beneath the surface in lower Pueblo and Los Alamos canyons near their confluence in basalts in Los Alamos Canyon at 61 to 76 m (200 to 250 ft) (Figure II-6), and in Sandia Canyon near the eastern Laboratory boundary at a depth of about 137 m (450 ft). This intermediate depth perched water has one known discharge point at Basalt Spring in Los Alamos Canyon. The intermediate depth groundwaters communicate with the overlying perched alluvial groundwaters and show the effects of radioactive and inorganic contamination from Laboratory operations.

The main aquifer of the Los Alamos area is the only aquifer in the area capable of serving as a municipal water supply. The surface of the aquifer rises westward from the Rio Grande within the Tesuque Formation into the lower part of the Puye Formation beneath the central and western part of the plateau. Depth to the main aquifer is about 300 m (1,000 ft) beneath the mesa tops in the central part of the plateau. The main aquifer is separated from alluvial and perched waters by about 110 to 190 m (350 to 620 ft) of tuff and volcanic sediments with low (<10%) moisture content.

Water in the main aquifer is under artesian conditions in the eastern part and along the Rio Grande (Purtymun 1974b). Continuously recorded data on water levels collected in test wells since fall 1992 indicate that the main

aquifer exhibits confined aquifer response to barometric and earth tide effects throughout the Plateau. Major recharge to the main aquifer is probably from the west because the piezometric surface slopes downward to the east. The main aquifer discharges into the Rio Grande through springs in White Rock Canyon. The 18.5 km (11.5 mi) reach of the river in White Rock Canyon between Otowi Bridge and the mouth of Rito de Frijoles receives an estimated  $5.3$  to  $6.8 \times 10^6$  m<sup>3</sup> (4,300 to 5,500 ac-ft) annually from the aquifer.

#### D. Climatology

Climatological averages for atmospheric state variables (temperature, pressure, and moisture) and precipitation are based on observations made at the official Los Alamos weather station from 1961 to 1991. Extremes are based on the 1911 to 1991 period. Although the location of the official weather station has changed over the years, all locations are within 30 m (100 ft) of each other in elevation and 5 km (3 mi) in distance. The meteorological conditions described here are representative of conditions on the Pajarito Plateau at an elevation of approximately 2,250 m (7,400 ft) above sea level.

Statistics on wind do not vary significantly from year to year; it may be helpful to refer to the wind roses for 1992 (Figures II-7 and II-8) along with the following text. In these diagrams, the length of each spoke is proportional to the amount of time that the wind blew from the indicated direction; circles of a probability of 6% and 12% are shown for reference. The spoke representing each wind direction sector is partitioned into segments, and the length of each segment is proportional to percentage of time the wind speed fell within the indicated range. Unless otherwise noted, the following discussion is based on winds observed at 11 m (36 ft) above the ground. The average time for wind gusts is approximately 1 s.

Los Alamos winds are generally light, averaging 2.8 m/s (6.3 mi/h). Strong winds are most frequent during the spring when sustained winds exceeding 11 m/s (25 mi/h) with peak gusts exceeding 22 m/s (50 mi/h) are common. The highest wind gust in the record is 34.4 m/s (77 mi/h).

Winds over the plateau show considerable spatial structure and temporal variability. The semiarid climate promotes strong surface heating by day and strong radiative cooling by night. Because the terrain is very complex, heating and cooling rates are uneven over the Los Alamos area, and this results in diurnal thermally generated local flows. However, it is often difficult to explain observed winds completely in terms of the simple conceptual models of slope and valley flows.

During sunny, light-wind days, an upslope flow often develops over the plateau in the morning hours. This flow is more pronounced along the western edge of the plateau, where it is 200 to 500 m (650 to 1650 ft) deep. By noon, southerly flow usually prevails over the entire plateau.

At measurement sites closer to the eastern edge of the plateau, wind roses show a weak secondary peak in the daytime wind direction in the northeast sector. These northeasterlies also show up in the wind roses for observations made at 92 m (300 ft) and 510 m (1,670 ft) above the ground. They are thought to result from cold air drainage down the Rio Grande Valley that persists into the early morning hours.

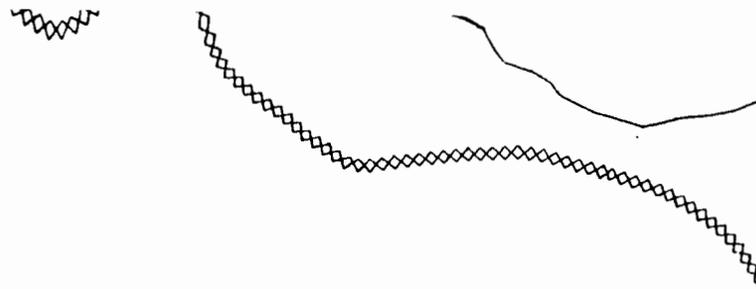
The prevailing nighttime flow along the western edge of the plateau is west-southwesterly to northwesterly. These nighttime westerlies result from cold air drainage off the Jemez Mountains and the Pajarito Plateau; the drainage layer is typically 50 m (165 ft) deep in the vicinity of TA-3. At sites farther from the mountains, the nighttime direction is more variable but usually has a relatively strong westerly component. Just above the drainage layer, the prevailing nighttime flow is southwesterly, with minor peaks in the distribution around northwest and northeast. At 510 m (1,673 ft) above the ground, the wind direction distribution exhibits a broad, flat peak covering the whole western half of the compass.

Atmospheric flow in the canyons is quite different than over the plateau. Data collected from Los Alamos Canyon suggest that at night a cold air drainage fills the lower portion of the canyon. The flow is steady and continues for about an hour after sunrise when it ceases abruptly and is followed by an unsteady up-canyon flow for a couple of hours. This up-canyon flow often gives way to the development of a rotor that fills the canyon when the wind over the plateau has a strong cross-canyon component. When the rotor occurs, southwesterly (or southeasterly) flow over the plateau results in northwesterly (or northeasterly) flow at the canyon bottom. Down-canyon flow begins again around sunset, but the onset time appears to be more variable than cessation time in the morning.

## **ENCLOSURE SEVEN**

# **GROUNDWATER WELLS AND OTHER PENETRATIONS AND DRAWINGS**

**Note: The nearest public supply well is PM-5 which is approximately 8,800 feet southeast of former UST TA-0, 6th Street.**



# LEGEND

1748

PERCHED ALLUVIAL MONITORING WELLS  
(Old wells are pre-1990; new wells installed  
since 1990 according to EPA guidelines)

- New Dry Well
- ⊖ Old Dry Well
- New Saturated Well
- ◐ Old Saturated Well

# Los Alamos

NATIONAL LABORATORY

Hazardous & Solid Waste Group  
Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

Date: February 22, 1996  
In Reply Refer To: ESH-19:96-0056  
Mail Stop: K498  
Telephone: (505) 665-2505

Ruben Baca  
Prevention/Inspection Section  
Underground Storage Tank Bureau  
New Mexico Environment Department  
1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Dear Mr. Baca:

**SUBJECT: TRANSMITTAL OF UNDERGROUND STORAGE TANK  
CLOSURE FORM AND TANK CLOSURE WORK SHEET**

The purpose of this letter is to transmit the official notification form (Environmental Protection Agency [EPA] Form 7530-1) indicating the closure date of an Underground Storage Tank (UST) located at Technical Area (TA) 0. I have enclosed for your records a copy of a completed Tank Closure Worksheet for this UST removal.

This UST was never registered with the New Mexico Environment Department (NMED) because it was taken out of operation in the late 1960's. Recently, the UST was discovered by Los Alamos National Laboratory's (LANL), Environmental Management/Restoration Project. LANL has named this UST TA-0-6th Street. UST TA-0-6th Street, before its removal was owned by the Department of Energy, had a 3500-gallon fuel capacity, and held heating fuel oil. When the UST was removed, it was found to be full of water with approximately one foot of fuel oil floating on top of the water.

Upon removal of the UST it was determined that the tank was leaking. LANL initiated corrective actions and eventually received a NMED no further action letter for this UST site. A copy of the letter is enclosed.

If you should require additional information or if you have questions, please contact me at 665-2505.

Sincerely,



Jeff Carmichael  
Hazardous & Solid Waste

JAC:em

Ruben Baca  
ESH-19:95-0056

-2-

February 22, 1996

Enclosure: EPA Form 7530-1, and NMED's Tank Closure Work Sheet, NMED No  
Further Action Letter.

Cy: T. Grieggs, ESH-19, MS K498, w/o enc.  
J. Vozella, LAAO, MS A316, w/enc.  
C. Fesmire, LAAO, MS A316, w/enc.  
RPF, EM/ER, MS M707, w/enc.  
ESH-19 Circ File

L. Hartman, EM/ER, MS E525, w/enc. &  
T. Taylor, LAAO, MS A316, w/enc.  
S. Calhoun, ERM/Golder, MS M327, w/enc.  
CIC-10, MS A150

# Notification for Underground Storage Tanks

FORM APPROVED  
OMB NO. 2050-0049  
APPROVAL EXPIRES 6-30-88

FOR  
TANKS  
IN  
NM

RETURN  
COMPLETED  
FORM  
TO

New Mexico Environment Department  
UNDERGROUND STORAGE TANK BUREAU  
1190 St. Francis Drive  
Harold Runnels Bldg. N2164  
Santa Fe, New Mexico 87503

I.D. Number STATE USE ONLY

Date Received

## GENERAL INFORMATION

Notification is required by Federal law for all underground tanks that have been used to store regulated substances since January 1, 1974, that are in the ground as of May 8, 1986, or that are brought into use after May 8, 1986. The information requested is required by Section 9002 of the Resource Conservation and Recovery Act (RCRA), as amended.

The primary purpose of this notification program is to locate and evaluate underground tanks that store or have stored petroleum or hazardous substances. It is expected that the information you provide will be based on reasonably available records, or, in the absence of such records, your knowledge, belief, or recollection.

**Who Must Notify?** Section 9002 of RCRA, as amended, requires that, unless exempted, owners of underground tanks that store regulated substances must notify designated State or local agencies of the existence of their tanks. Owner means—

(a) in the case of an underground storage tank in use on November 8, 1984, or brought into use after that date, any person who owns an underground storage tank used for the storage, use, or dispensing of regulated substances, and

(b) in the case of any underground storage tank in use before November 8, 1984, but no longer in use on that date, any person who owned such tank immediately before the discontinuation of its use.

**What Tanks Are Included?** Underground storage tank is defined as any one or combination of tanks that (1) is used to contain an accumulation of "regulated substances," and (2) whose volume (including connected underground piping) is 10% or more beneath the ground. Some examples are underground tanks storing: 1. gasoline, used oil, or diesel fuel, and 2. industrial solvents, pesticides, herbicides or fumigants.

**What Tanks Are Excluded?** Tanks removed from the ground are not subject to notification. Other tanks excluded from notification are:

1. farm or residential tanks of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes;
2. tanks used for storing heating oil for consumptive use on the premises where stored;
3. septic tanks;

4. pipeline facilities (including gathering lines) regulated under the Natural Pipeline Safety Act of 1968, or the Hazardous Liquid Pipeline Safety Act of 1970, which is an intrastate pipeline facility regulated under State laws;
5. surface impoundments, pits, ponds, or lagoons;
6. storm water or waste water collection systems;
7. flow-through process tanks;
8. liquid traps or associated gathering lines directly related to oil or gas production or gathering operations;
9. storage tanks situated in an underground area (such as a basement, mine-working, drift, shaft, or tunnel) if the storage tank is situated upon or above surface of the floor.

**What Substances Are Covered?** The notification requirements apply to underground storage tanks that contain regulated substances. This includes any substance defined as hazardous in section 101.14 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), with the exception of those substances regulated as hazardous waste under Subtitle C of RCRA. It includes petroleum, e.g., crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds-square inch absolute).

**When To Notify?** Completed notification forms should be sent to the addressee given at the top of this page.

**When To Notify?** 1. Owners of underground storage tanks in use or that have taken out of operation after January 1, 1974, but still in the ground, must notify by May 8, 1986. 2. Owners who bring underground storage tanks into use after May 8, 1986, must notify within 30 days of bringing the tanks into use.

**Penalties:** Any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed \$10,000 for each tank for which notification is not given or for which false information is submitted.

## INSTRUCTIONS

Please type or print in ink all items except "signature" in Section V. This form must be completed for each location containing underground storage tanks. If more than 5 tanks are owned at this location, photocopy the reverse side, and staple continuation sheets to this form.

Indicate number of continuation sheets attached

### I OWNERSHIP OF TANK(S)

Owner Name (Corporation, Individual, Public Agency, or Other Entity)

U. S. Department of Energy, LAAO

Street Address

528 35th Street

County

Los Alamos

City

Los Alamos

State

NM

ZIP Code

87544

Area Code

(505)

Phone Number

667-5105

Type of Owner (Mark all that apply)

Current

State or Local Gov't

Private or Corporate

Former

Federal Gov't (GSA facility I.D. no.)

Ownership uncertain

### II LOCATION OF TANK(S)

(If same as Section I, mark box here )

Facility Name or Company Site Identifier, as applicable

Los Alamos National Laboratory

Street Address or State Road, as applicable

Box 1663

County

Los Alamos

City (nearest)

Los Alamos

State

NM

ZIP Code

87545

Indicate number of tanks at this location

13

Mark box here if tank(s) are located on land within an Indian reservation or on other Indian trust lands

### III CONTACT PERSON AT TANK LOCATION

Name (If same as Section I, mark box here )

Jeff Carmichael

Job Title

Environmental Scientist

Area Code

(505)

Phone Number

665-2505

### IV TYPE OF NOTIFICATION

Mark box here only if this is an amended or subsequent notification for this location.

### V CERTIFICATION (Read and sign after completing Section VI)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and official title of owner or owner's authorized representative

Jeff CARMICHAEL Envir. Scientist

Signature

Jeff Carmichael

Date Signed

2-20-95

CONTINUE ON REVERSE SIDE

TANK CLOSURE WORKSHEET  
(COMPLETE AFTER CLOSURE)

Tank Owner U.S. Dept. of Energy Phone (505) 667-5288  
Mailing Address 528 35th Street, Los Alamos, NM 87544  
Tank Address \_\_\_\_\_  
Contractor Name Los Alamos National Laboratory Phone (505) 665-2505  
Address P.O. Box 1663, Los Alamos, NM 87545  
Contractor Name \_\_\_\_\_ Phone \_\_\_\_\_  
Address \_\_\_\_\_

Tank Closure Date November 13, 1995 # of Tanks Closed 1  
.....

I. Tank Closure Initial Procedures (check measures complied with):

- Obtain recommended safety equipment for all personnel
- Contact Fire Marshall or other fire officials
- Bond or ground equipment
- Drain product from piping and tank
- Disconnect, then cap or remove piping
- Remove all residual product from tank
- Excavate to tank top
- Remove all tank fixtures
- Properly purge or inert tank of all flammable vapors using approved method
- Continually monitor for explosive vapors while tank is being removed

II. Tank Removal

- Create vent hole
- Excavate tank using all safety precautions
- Clean and inspect tank
- Check excavation for evidence of leaks and notify EID and other proper authorities if leak is found
- Check vapor levels in tank before transporting
- Dispose of tank in approved manner

Tank disposal location Edison Steel Products, Inc. Albuquerque, NM  
City State

How did you assess site for leakage? Visual/Soil Samples  
Closure report kept at Jeff Carmichael's Office, LANL, TA-59

NOTE: Immediately report any evidence of leakage to EID at 827-0188

I hereby state that the above information is correct

Jeff Carmichael Feb 20, 1996  
Signature of owner or contractor performing work  
.....

FOR EID USE ONLY

Notification Received \_\_\_\_\_ Approved By \_\_\_\_\_  
Inspection Date \_\_\_\_\_ Inspector \_\_\_\_\_