Los Alamos
NATIONAL LABORATORY

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

Date: July 11, 1995
In Reply Refer To: ESH-19/HSW-95-0329
Mail Stop: K498
Telephone: (505) 665-2505

0149
TA-21

Mr. 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 ON SOIL CONTAMINATION AT THE FORMER TA-21 UNDERGROUND STORAGE TANK FARM

This letter transmits a forty-five-day investigation report involving petroleum contaminated soil. The soil contamination associated with the release is from two petroleum fill stations associated with a former underground storage tank farm (also called the DP Tank Farm) located at Technical Area 21. On April 27, 1995, Los Alamos National Laboratory (LANL) notified the New Mexico Environment Department, Underground Storage Tank Bureau of a confirmed petroleum release.

The enclosed forty-five-day investigation report and its associated enclosures will show that LANL has determined the extent of the petroleum contamination at the former DP Tank Farm site. The report also shows the source of the petroleum contamination in the "seep" in DP Canyon Creek is not from the former DP Tank Farm.

Lastly, the forty-five-day report only contains preliminary analytical data. Validated data should be available by July 21, 1995. As soon as this data is available it will be transmitted to NMED. Also, the preliminary data includes several samples that were reported to have contained methyl ethyl ketone (MEK) and acetone. It is believed that the presence of MEK and acetone are from laboratory contamination. LANL will discuss the presence of the MEK and acetone in our letter transmitting the validated data. If you should require any additional information, please contact me at 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
Technical Staff Member
Hazardous & Solid Waste

10197

IMAGING ROOM
5735
97 AUG 29 PM 2:00

JAC:es

Enclosure: Former TA-21 UST Tank Farm Forty-Five-Day Report

Cy: T. Grieggs, ESH-19, MS K498, wo/enc.
P. Shanley, ESH-19, MS K498, wo/enc.
S. Cohen, ESH-19, MS K498, wo/enc.
D. McInroy, EM/ER, MS M992, w/enc.
B. Martin, CIC-12, MS E525, w/enc.
J. Vozella, DOE/LAAO, MS A316, wo/enc.
M. Johansen, DOE/LAAO, MS A316, w/enc.
B. Koch, DOE/LAAO, MS A316, w/enc.
T. Taylor, DOE/LAAO, MS A316, w/enc.
CIC-10, MS A150
ESH-19 Circ. File

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UNDERGROUND STORAGE TANK

FORMER TA-21 UNDERGROUND STORAGE TANK FARM

FORTY-FIVE DAY REPORT

The purpose of this letter 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 June 12, 1995. However, an extension of time was granted by New Mexico Environmental Department (NMED) to submit the report. The report is now due on July 11, 1995.

On April 27, 1995, Los Alamos National Laboratory (LANL) notified the NMED, Underground Storage Tank Bureau of a confirmed petroleum release. The release is from two petroleum fill stations associated with a former underground storage tank (UST) farm (also called the DP Tank Farm) located at Technical Area 21.

Site History and Petroleum Release Information

The former DP Tank Farm site is located on DP Mesa, east-southeast of the Los Alamos townsite (Enclosure 1). The site occupies property near the west end of DP Road bounded by the Knights of Columbus Hall on the west and a Los Alamos County fire station on the east. The DP Tank Farm is the former location of 15 fuel storage tanks and two fill stations (Enclosure 2). The tanks may not have been dedicated to the storage of a single petroleum product and may have contained different substances at different times. One tank was reported to have contained ethanol. There are no known records of any radioactive materials being stored in any of the tanks.

All tanks and structures at the site were decommissioned and removed in 1988. During site decommissioning, one tank was found to have leaked from a deteriorated gasket. Approximately 4 cubic yards of diesel-contaminated soil was excavated to remediate the area in the vicinity of the leaking gasket. The remaining tanks and underground distribution piping were reported to have been in good condition when removed.

In February 1993, the site was designated a Solid Waste Management Unit (SWMU) 21-029 and added to LANL's Hazardous Waste Permit pursuant to Resource Conservation and Recovery Act (RCRA) and amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA Permit). In 1994, LANL's Environmental Restoration (ER) Project performed a Phase I investigation of the site to confirm the absence or presence of contaminants as specified in the HSWA Permit.

The results of the investigation indicated that petroleum hydrocarbons, in the form of total aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylenes isomers [BTEX]), other volatile constituents of gasoline and diesel fuel, and semi-volatile organic compounds (SVOCs), and lead were not present in concentrations above LANL Screening Action Levels (SALs) or the USTR contaminant action levels in the immediate vicinity of the former USTs. However, concentrations of total aromatic hydrocarbons (TAHs) were detected above the USTR action levels in the subsurface surrounding the two former fill stations. The two former fill stations are distinguished as the west fill station and the east fill station.

In 1995, ERM/Golder a subcontractor to LANL continued the investigation at the former DP Tank Farm fill stations. The field work was conducted to determine the vertical and lateral extent of petroleum hydrocarbon contamination.

On-site Investigation and Analytical Data

A total of 13 boreholes were drilled near the two fill station locations, including four vertical borings and one angled boring at the west fill station location and seven vertical borings and one angled at the east fill station location (Enclosure 3). All borings were drilled with a CME 750 drill rig equipped with 8.625-inch (outside diameter) hollow stem auger flights. Samples of subsurface materials were collected on a continuous basis with a 3.5-inch diameter, 5-foot long stainless steel core barrel. Samples submitted for laboratory analysis were collected on approximate 5-foot intervals. A brief summary of each borehole is provided in the following sections.

All samples were analyzed in the on-site Mobile Chemical Analytical Laboratory (MCAL) for benzene, toluene, ethylbenzene, xylenes (BTEX), methyl ethyl ketone (MEK or 2-butanone), and acetone by EPA Method 8020 and total petroleum hydrocarbons (TPH) by modified EPA Method 8015. *This report only contains preliminary data received from the MCAL.* The preliminary data is provided in (Enclosure 4).

Validated data should be available by July 21, 1995. LANL expect no significant changes in the data presented in this report or in its conclusions. The preliminary data also included several samples that were reported to have contained MEK and acetone. It is believed that the presence of MEK and acetone are from laboratory contamination. LANL will discuss the presence of MEK and acetone in its letter transmitting the validated data.

Because a hydrocarbon sheen was observed on the surface of the water in DP Canyon Creek, four surface water samples and seven streambed samples (including duplicates) were collected from the intermittent stream. It appeared that the hydrocarbons entered the stream channel through the "seep." Surface water and streambed samples were collected at the "seep" location as well as upstream and downstream of the "seep." Furthermore, three shallow borings were drilled in the vicinity of a "seep." These borings were drilled with a Bosch "Rotohammer" equipped with 3-foot, 2.5-inch diameter solid stem auger flights. The total depth drilled for each boring was 9 feet below ground surface (bgs). Samples were collected by scooping the pulverized tuff fragments directly off of the auger flights. Several attempts were made to collect samples with a drive sampler and a bucket auger, but the hardness and integrity of the tuff bedrock prevented the successful collection of the samples.

Soil Borings

The following summary includes data from soil samples collected from boreholes drilled in the vicinity of two former fill station locations, data from the streambed, and data from the surface water samples. A brief description of the soils and lithology is included with the borehole descriptions and copies of Core Sample Logs are located in (Enclosure 5). A general summary of the soils and geology of LANL and the site are provided in (Enclosure 6).

West Fill Station

Boring 21-3002 was drilled and sampled approximately 23 feet north of the former west fill station location. The vertical boring was drilled to a total depth of 35 feet bgs. Approximately one foot of fill, consisting of fine sand, silt and clay overlay the tuff bedrock at this location. The remainder of the boring was drilled through nonwelded to moderately welded grey tuff. Low- to moderate-angle fractures were rare. Total BTEX concentrations ranged from below detection levels to 0.89 parts per million (ppm). TPH concentrations were found to be below detection limits throughout the boring. MEK concentrations ranged from below detection limits to 6.43 ppm (at 23 feet bgs).

Boring 21-3003 was located approximately 15 feet east and slightly north of the former west fill station location. The boring was drilled at a 45-degree angle in an east-to-west orientation. Approximately 1.7 feet (corrected for angle) of fill material consisting of fine sand, silt and gravel overlay the tuff bedrock in this location. The remainder of the boring was drilled through nonwelded to moderately welded tuff to a total linear depth of 45 feet, or 32 feet vertical feet bgs. A large proportion of the recovered sample material was completely disaggregated, making the observation of fractures impossible. Concentrations of BTEX compounds were below detection limits throughout the boring. TPH concentrations of greater than 600 ppm and greater than 670 ppm were encountered at sample depths of 14.3 and 19.2 linear feet (10.1 and 13.6 feet bgs, respectively).

Boring 21-3004 was located approximately 20 feet south of the former west fill station location. The vertical boring was drilled to a total depth of 45 feet bgs. This borehole was drilled 10 additional feet bgs (compared to 21-3002 and 21-3003) to compensate for the higher elevation of the site relative to the fill station location. Approximately 7.5 feet of fill, consisting of fine sand, silt and clay, was encountered. The remainder of the boring was drilled through nonwelded to moderately welded grey tuff. Horizontal fractures and partings were common throughout the boring. Total BTEX and TPH concentrations were below detection levels throughout the boring.

Boring 21-3005 was located approximately 20 feet west of the former west fill station location. The vertical boring was drilled to a total depth of 35 feet bgs. Approximately 1.0 to 2.5 feet of fill consisting of silty sand and gravel overlay the tuff bedrock at this location. The remainder of the boring was drilled through nonwelded to moderately welded grey tuff. Low-angle fracturing was noted in the upper 10 feet. High-angle, clay-lined fractures were noted near 31 feet bgs. Total BTEX concentrations ranged from 0.72 to 0.97 ppm. TPH concentrations were not detected above MCAL detection levels. MEK concentrations ranged from 2.78 to 7.72 ppm with the maximum concentration at 4.3 feet bgs.

Boring 21-3014 was located approximately 20 feet east of the former west fill station site. The vertical boring was drilled to a total depth of 35 feet below ground surface. Approximately 2.0 feet of fill consisting of fine sand and silt overlay the tuff bedrock at

this location. The remainder of the boring was drilled through nonwelded to moderately welded grey tuff. Zones of fracturing were noted at 14.0 to 15.0 feet bgs and at 26.0 to 26.5 feet bgs. Total BTEX and TPH concentrations were below detection levels throughout the boring.

East Fill Station

Boring 21-3006 was drilled adjacent to the east fill station location and boring 21-2558 (drilled and sampled in September 1994). The vertical boring was drilled to a total depth of 65 feet bgs. Approximately 4.5 feet of fill consisting of silt, fine sand and gravel overlay the tuff bedrock at this location. The remainder of the boring was drilled in nonwelded to moderately welded tuff. Numerous horizontal to low-angle fractures were noted throughout the boring. Petroleum odors were noted during the initial 45 feet of drilling. Total BTEX concentrations ranged from below the detection limit upwards to 674.3 ppm. Benzene concentrations ranged from below the detection limit upwards to 18.4 ppm. TPH concentrations ranged from below the detection limit to greater than 1800 ppm. The maximum concentrations of each of these analytes were found at 9.8 feet bgs.

Boring 21-3007 was located approximately 20 feet north-northeast of the former east fill station. The vertical boring was drilled to a total depth of 50 feet bgs. Approximately 3.5 feet of fill consisting of silt, fine sand and gravel overlay the tuff bedrock at this location. The remainder of the boring was drilled in nonwelded to moderately welded tuff. No prominent fractures were noted throughout the boring. Total BTEX and TPH concentrations were below detection levels throughout the boring.

Boring 21-3008 was located approximately 15 feet east and slightly north of the former east fill station location. The boring was drilled at a 45-degree angle in an east-to-west orientation. The angled boring was advanced to a total linear depth of 50 feet, or 35 vertical feet bgs. Approximately 4.7 vertical feet of fill consisting of sand, silt and tuff fragments overlay the tuff bedrock in this location. The remainder of the boring was drilled in nonwelded to moderately welded tuff. Numerous horizontal fractures were noted between 30 and 32.5 linear feet. The recovered core was highly fractured by low- to high-angle fractures from 47.0 to 50.0 linear feet. Strong petroleum odors were noted during most of the drilling operation. Total BTEX concentrations ranged from below detection levels to 550 ppm (at 14.2 feet). Benzene concentrations ranged from below detection levels to 18.6 ppm (at 14.2 feet). TPH concentrations ranged from below detection levels to greater than 3300 ppm (at 19.1 feet).

Boring 21-3009 was located on the north-facing slope approximately 20 feet south-southwest of the former east fill station location. The vertical boring was advanced to a total depth of 17.5 feet bgs. Drilling was terminated because of the instability of the drilling rig on the steep slope. Approximately 3.0 feet of fill consisting of fine sand, silt and gravel overlay the tuff bedrock at this location. The remainder of the boring was drilled in moderately welded tuff, which was highly fractured with horizontal and low-angle fractures between 5.0 and 10.0 feet bgs. Slight petroleum odors were noted throughout the boring operation. Total BTEX concentrations ranged from below detection levels to 1.67 ppm. TPH concentrations ranged from 1461 ppm to a high of 2393 ppm. Maximum concentrations were noted at 14.6 feet bgs. An MEK concentration of 3.80 ppm was noted at a depth of 9.3 feet bgs.

Boring 21-3010 was located approximately 20 feet west-northwest of the former east fill station location. The vertical boring was advanced to a total depth of 35 feet bgs. Approximately 6.5 feet of fill consisting of sandy silt and gravel overlay the tuff bedrock at this location. The remainder of the boring was drilled in nonwelded to poorly welded tuff. Much of the tuff intercepted by the boring was completely disaggregated or disaggregated along narrowly spaced horizontal partings. An unusual reddish-brown clay layer was noted between 14.0 and 14.5 feet bgs. Total BTEX and TPH concentrations were below detection levels throughout the boring.

Boring 21-3011 was located approximately 20 feet east-southeast of the former east fill station location. The vertical boring was advanced to a total depth of 40 feet bgs. Approximately 3.3 feet of fill consisting of fine sand, silt and clay overlay the tuff bedrock at this location. The remainder of the boring was drilled in poorly welded to moderately welded tuff. Horizontal to high-angle fractures were noted throughout the boring. Total BTEX concentrations ranged from below detection levels to a high of 2.70 ppm at 19.3 feet bgs. High TPH concentrations were noted at 19.3 feet bgs and 24.4 feet bgs (greater than 2000 ppm and greater than 1500 ppm, respectively). The remainder of the boring contained TPH concentrations below detection levels. Low levels (less than 1 ppm) of MEK and acetone were also detected.

Boring 21-3012 was located approximately 40 feet south-southwest of the former east fill station location. The vertical boring was located on a terrace at a higher elevation than the fill station location. Therefore, it was advanced to a total depth of 55 feet bgs to compensate for the additional elevation. Approximately 6.5 feet of fill material consisting of fine sand, silt and clay overlay the tuff bedrock in this location. The remainder of the boring was drilled in nonwelded to moderately welded tuff. Horizontal to high-angle fractures were noted throughout the boring. Total BTEX and TPH concentrations were below detection levels throughout the boring.

Boring 21-3013 was located approximately 40 feet east-southeast of the former east fill station location. The vertical boring was advanced to a total depth of 35 feet bgs. Approximately 0.5 feet of fill consisting of fine sand and silt overlay the tuff bedrock at this location. The remainder of the boring was drilled in nonwelded to moderately welded tuff. Portions of the tuff were completely disaggregated. Few fractures were noted in the remaining samples. Total BTEX and TPH concentrations were below detection levels throughout the boring.

Records of tightness tests, repairs to the UST system, release detection monitoring results, and other pertinent records for the DP Tank Farm have not been found.

DP Canyon Creek Investigation

The nearest surface water course is approximately 120 feet north of the former DP Tank Farm site. An oil sheen was reported on a pool of water located in DP Canyon directly north of the former west fill station location. LANL has now confirmed the presence of petroleum hydrocarbons in the streambed of DP Canyon Creek.

Boring 21-3015 was located approximately 10 feet north of the north bank of the stream channel in DP Canyon. The vertical boring was drilled to a total depth of 9 feet bgs. Samples were collected on approximately 2- to 2.5-foot intervals and submitted to the MCAL for analysis of volatile organic compounds by Method 8020 and TPH by modified Method 8015. No surficial soil was encountered as the boring was drilled directly into the exposed tuff bedrock. No BTEX compounds were detected above detection levels. TPH concentrations of 131 ppm, 82 ppm, and 51 ppm were detected in

samples collected at depths of 3.5, 5.0, and 7.5 feet bgs, respectively. The remaining sample collected at 9.0 feet bgs did not contain TPH above the method detection limit.

Boring 21-3018 was located approximately 20 feet north of the north bank of the stream channel in DP Canyon and drilled vertically to a total depth of 9 feet bgs. Samples were collected on approximately 2- to 2.5-foot intervals and submitted to the MCAL for analysis of volatile organic compounds by Method 8020 and TPH by modified Method 8015. No surficial soil was encountered as the boring was drilled directly into the exposed tuff bedrock. No BTEX compounds were detected above detection levels. A TPH concentration of 296 ppm was detected in the sample collected at a depths of 2.5 feet bgs. The remaining samples did not contain TPH above the method detection limit. Acetone was detected in concentrations up to 1.90 ppm. MEK was detected in concentrations up to 3.82 ppm. Maximum concentrations for both acetone and MEK occurred at a depth of 2.5 feet bgs.

Boring 21-3019 was located approximately 5 feet south of the south bank of the stream channel in DP Canyon and was drilled vertically to a total depth of 9 feet bgs. Samples were collected on approximately 2- to 2.5-foot intervals and submitted to the MCAL for analysis of volatile organic compounds by Method 8020 and TPH by modified Method 8015. No surficial soil was encountered as the boring was drilled directly into the exposed tuff bedrock. No BTEX compounds or TPH were detected above method detection levels. Acetone at a concentration of 0.41 ppm was detected at 2.5 feet bgs.

Four surface water samples were collected from the creek. Two were collected from the "seep" area (one with the "seep" left undisturbed and one after intentionally disturbing the "seep"), one was collected 250 feet downstream of the "seep," and one was collected 100 feet upstream of the "seep." MCAL results revealed no acetone, MEK, BTEX compounds, or TPH in the water samples in concentrations above their respective detection limits.

Seven surface material, or tuff, samples were collected *from the streambed* at approximately the same locations as the surface water samples. Two samples, including one duplicate collected for QA/QC purposes, were collected downstream of the "seep" and one was collected upstream of the "seep." Analytical results revealed no petroleum constituents in concentrations above the detection limits in either the upstream or the downstream samples. Four samples, including two duplicates, were collected at the "seep" location (two on the north side of the creek and two on the south side). All samples were analyzed by the MCAL for BTEX, MEK, and acetone by EPA Method 8020 and TPH by modified EPA Method 8015. No BTEX, MEK, or acetone were detected above their respective detection limits in the samples collected from the "seep" location. However, TPH was detected in a concentration of 1382 ppm from the sample collected from the south side while the duplicate contained 1796 ppm. TPH was also detected in a concentration of 1042 ppm from the sample collected from the north side while the duplicate contained 569 ppm.

The investigation of potential impact *from the former DP Tank Farm* petroleum release on the surface water in DP Canyon Creek indicates that no impact had occurred. The petroleum contamination on the north bank of DP Canyon, just north of the "seep" has been traced towards privately owned property located on the north side of the canyon. However, this petroleum contamination appears to have no adverse impact to the surface water quality of the creek.

USTR Required Information

The depth to groundwater beneath TA-21 is approximately 1000 feet. There are no private water supply wells or municipal water wells within a mile radius of this UST site. The nearest utility corridor is over 120 feet away from the petroleum release sites, running parallel with DP Road. No gasoline or potentially explosive or harmful vapors have been detected in this corridor 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 7 and 8).

Conclusion

LANL believes there is no threat to human health and the environment from the former DP Tank Farm petroleum release. Based on the data collected, no additional field investigations are proposed for the former Tank Farm or creek in DP Canyon. The data collected shows that the lateral and vertical extent of the petroleum hydrocarbon contamination has been bounded in the vicinity of the fill station locations. In addition, petroleum hydrocarbon contamination was detected in the subsurface on the north side of the creek in the "seep" area but not on the south side. However, the source of the petroleum may originate from off-site. Analytical results of the surface water samples revealed no petroleum constituents in concentrations above the analytical detection limits, indicating that there is no adverse impact to the surface water quality.

As discussed earlier in this report, LANL will transmit copies of validated data as soon as this data is available. Also, the presence of MEK and acetone in some of the soil samples will be discussed in LANL's up coming letter. If you have questions, please contact Jeff Carmichael at 665-2505.

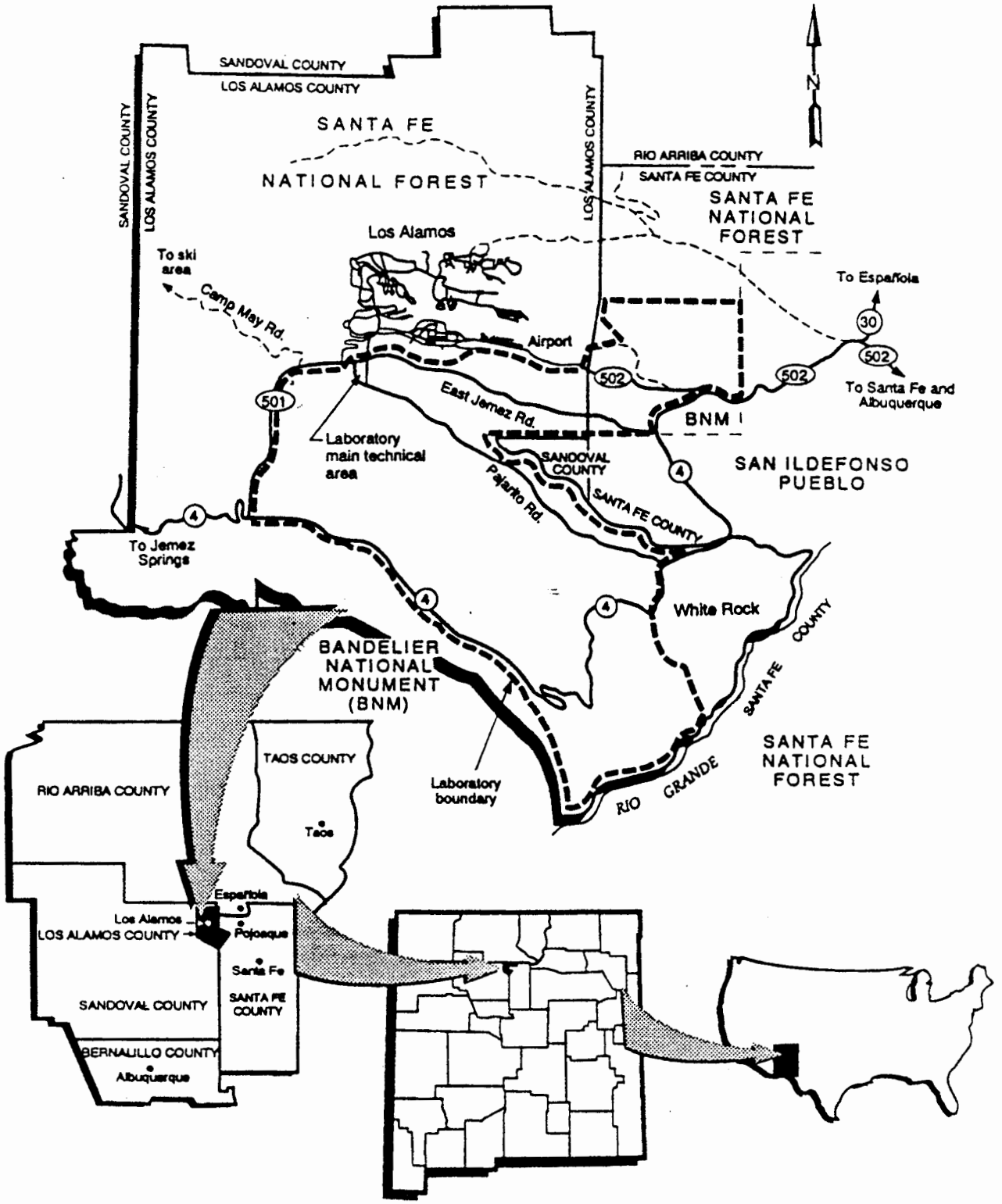
Enclosures:

1. LANL Property Boundaries, Technical Areas, and The Location of The Former UST Tank Farm Located at TA-21
2. List of Former DP Tank Farm USTs and Site Map
3. Corehole Locations
4. Preliminary Soil Analyses
5. Core Sample Logs
6. LANL General Geology and Hydrology Information
7. Engineering Drawings of Utility Lines South of Former TA-21 DP Tank Farm
8. Groundwater Wells and Other Penetrations & Drawings

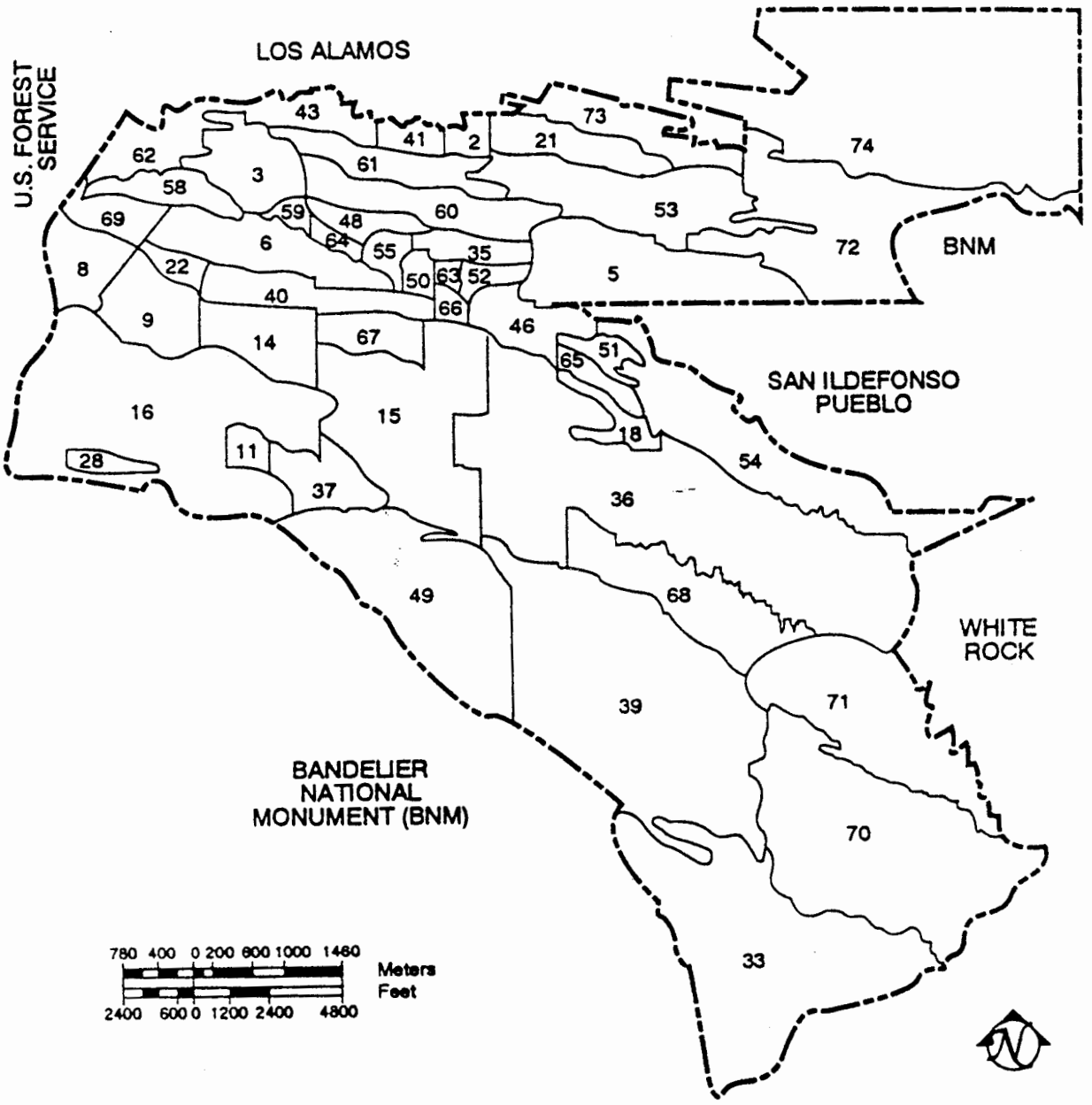
ENCLOSURE 1

LANL PROPERTY BOUNDARIES, TECHNICAL AREAS, AND THE LOCATION OF FORMER UST TA-21 TANK FARM

Note: No surface impoundments, or pit areas reside in the vicinity of this former tank farm.



Regional location of Los Alamos National Laboratory.

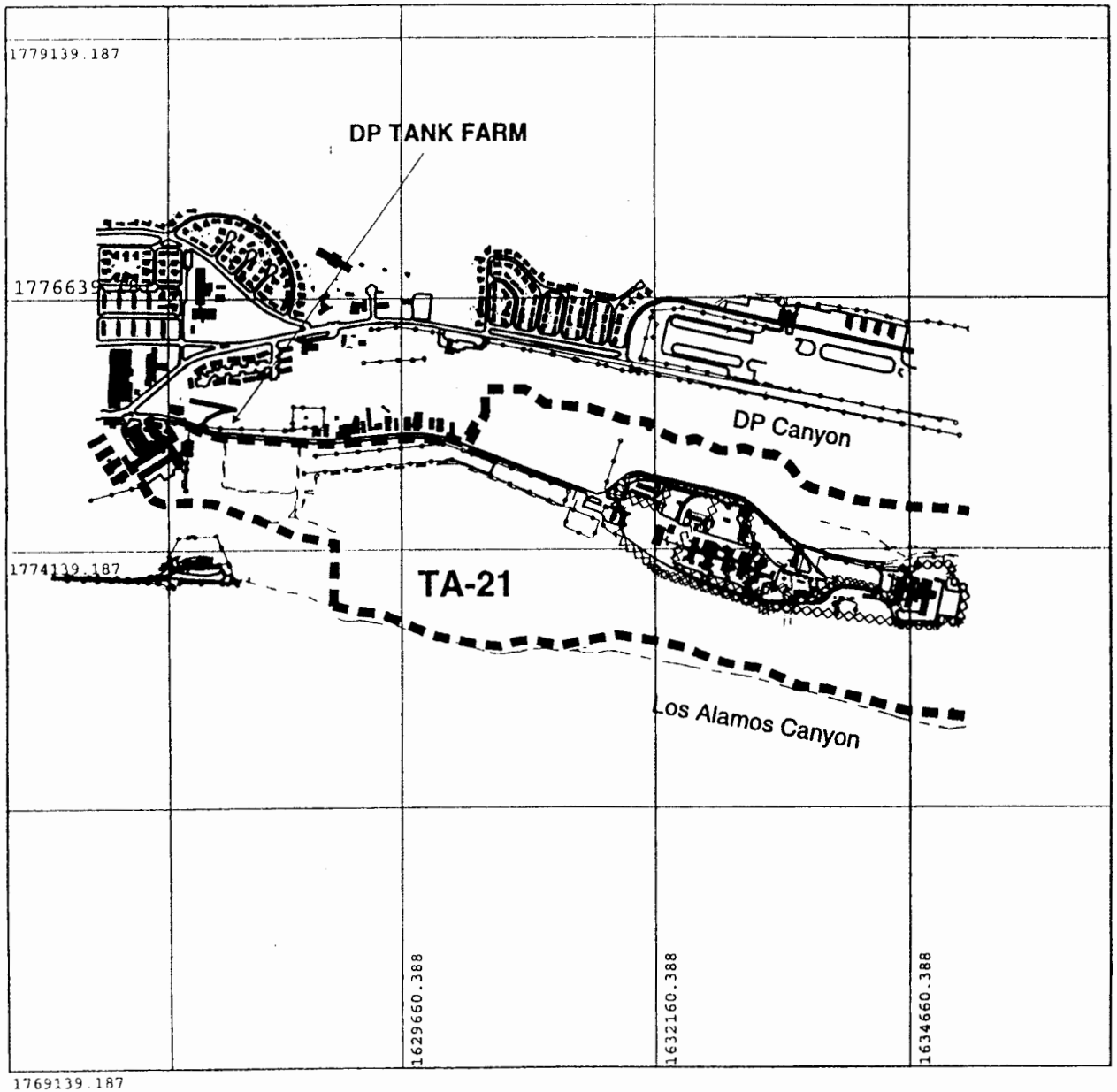


Technical areas (TAs) of Los Alamos National Laboratory in relation to surrounding landholdings.

ENCLOSURE 2

LIST OF FORMER DP TANK FARM

USTs AND SITE MAP



LEGEND

- Dirt Roads
- Road, Paved
- Outline for TA-21
- Industrial Fences
- Security Fences
- Buildings

Produced by: Belinda Scheber, 103248

Modified by: Kirsten Oschwald 5/8/95

State Plane Coordinate System, New Mexico Central Zone
1983 North American Datum

NOTICE: The information on this map is provisional. Features locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1985. Other boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September, 1991.

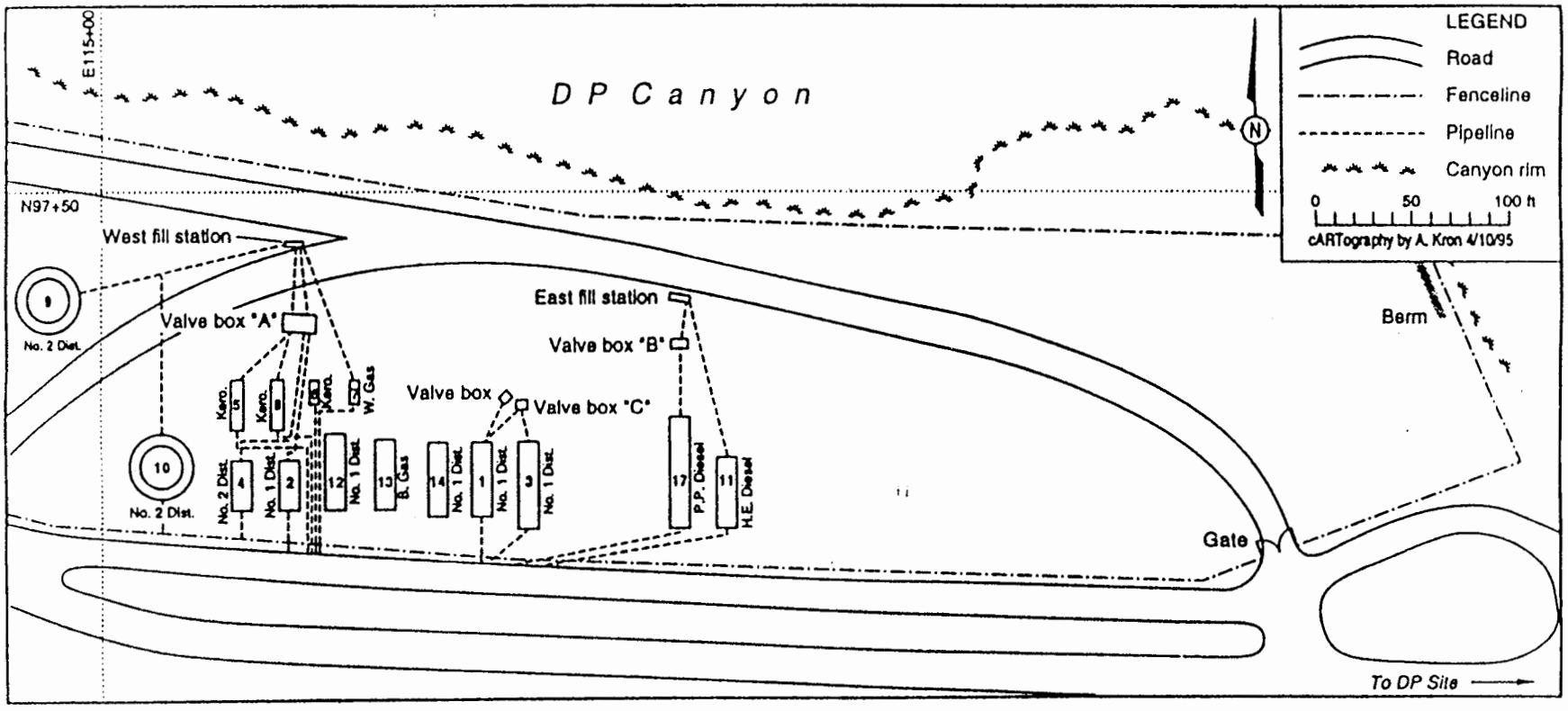
TA-21, DP Tank Farm Site Location

Tank No.	Tank Structure Number	Capacity (gallons)	Substance Stored
12	TA-21-ATF-12	20,200 or 38,000 or 20,266	No. 2 fuel oil or kerosene
13	TA-21-ATF-13	24,700 or 36,000 or 24,770	gasoline or diesel
14	TA-21-ATF-14	20,200 or 26,500 or 20,226	No. 2 fuel oil or diesel
17	TA-21-ATF-17	51,000 or 49,000 or 51,015	diesel or leaded gasoline or gasoline

IT Corp. 1987; LANL 1989a; Pan Am. 1986a; and Zia Co. 1983.

DESCRIPTION OF FORMER STORAGE TANKS AT DP TANK FARM (SWMU 21-030)[a]

Tank No.	Tank Structure Number	Capacity (gallons)	Substance Stored
1	TA-21-ATF-1	28,500 or 21,000	No. 2 fuel oil or diesel
2	TA-21-ATF-2	14,900 or 21,500 or 14,994	No. 2 fuel oil or diesel
3	TA-21-ATF-3	23,900 or 26,000 or 23,967	No. 2 fuel oil or diesel
4	TA-21-ATF-4	14,900 or 22,000 or 14,994	No. 2 fuel oil or diesel
5	TA-21-ATF-5	5100 or 5500 or 5170	kerosene or diesel
6	TA-21-ATF-6	2100 or 3000 or 2099	kerosene or gasoline
7	TA-21-ATF-7	2900 or 2500 or 2978	kerosene or leaded gasoline or gasoline
8	TA-21-ATF-8	5100 or 5500 or 5170	kerosene or diesel
9	TA-21-ATF-9	21,600 or 25,000 or 21,644	No. 2 fuel oil or diesel
10	TA-21-ATF-10	21,600 or 25,000 or 21,644	No. 2 fuel oil or diesel
11	TA-21-ATF-11	23,900 or 38,000 or 23,967	diesel or leaded gasoline or ethanol alcohol

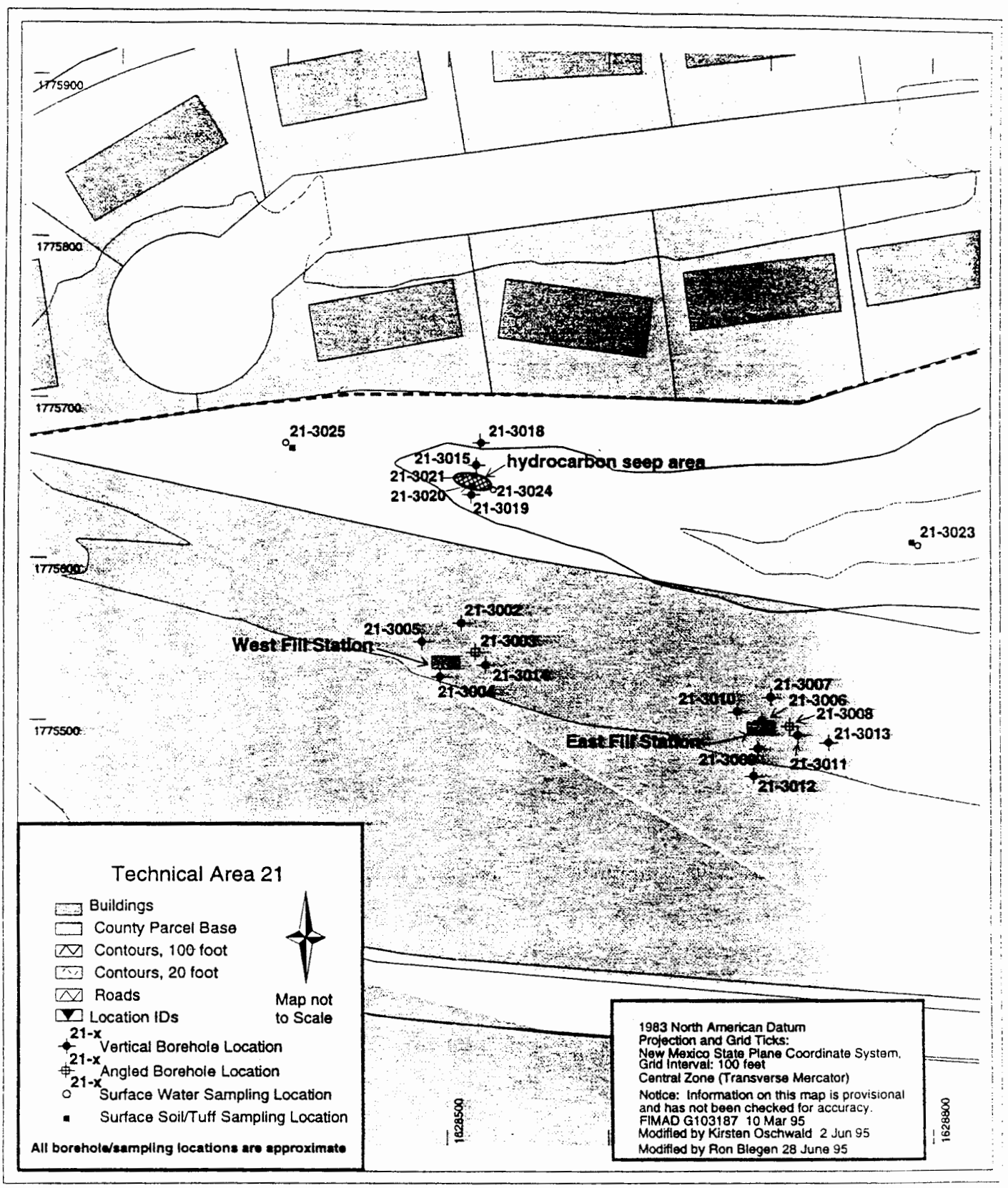


DP Tank Farm (SWMU 21-029) showing layout of tanks, pipelines, and fill stations.

ENCLOSURE 3

COREHOLE

LOCATIONS



Boreholes Drilled at DP Tank Farm

ENCLOSURE 4

PRELIMINARY SOIL ANALYSES

PRELIMINARY ANALYTICAL RESULTS (1)
DP TANK FARM
MAY/JUNE 1995

Borehole 21-3002

May 25, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) (2) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0008	3.9	4.4	0.0	ND (3)	ND	ND	ND	ND	ND	ND	ND	ND
0009	8.8	9.4	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
0010	13.9	14.5	0.0	ND	5.00	0.52	0.24	ND	ND	ND	0.76	ND
0011	19.2	19.8	0.0	ND	3.83	0.59	0.27	ND	ND	ND	0.87	ND
0012	22.5	23.0	0.0	ND	6.43	0.61	0.28	ND	ND	ND	0.89	ND
0139	29.0	29.5	NA (4)	ND	4.39	0.61	0.27	ND	ND	ND	0.87	ND
0140	32.0	32.5	NA	ND	3.93	0.56	0.26	ND	ND	ND	0.82	ND

Borehole 21-3003

May 30, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0015	4.0	4.6	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0016	8.7	9.3	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0017	13.5	14.3	165.0	ND	ND	ND	ND	ND	ND	ND	ND	>600
0018	18.5	19.2	181.0	ND	ND	ND	ND	ND	ND	ND	ND	>670
0019	23.8	24.5	13.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
0020	28.4	29.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0021	34.0	34.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0022	38.7	39.2	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0141	44.0	44.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3004 May 30-31, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0023	3.1	3.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0024	9.1	9.6	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0025	13.8	14.3	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0026	17.0	17.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0027	23.5	24.2	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0028	28.7	29.3	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
0029	33.9	34.4	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0030	38.5	39.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0031	42.5	43.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3005 May 26, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0032	3.8	4.3	0.0	ND	7.72	0.53	0.19	ND	ND	ND	0.72	ND
0033	8.4	9.2	0.1	ND	2.78	0.61	0.22	ND	ND	ND	0.83	ND
0034	13.6	14.1	0.0	ND	4.32	0.65	0.23	ND	ND	ND	0.89	ND
0035	18.9	19.3	0.0	ND	3.37	0.65	0.24	ND	ND	ND	0.89	ND
0036	22.0	23.0	0.1	ND	4.88	0.70	0.26	ND	ND	ND	0.96	ND
0037	22.0	23.0	0.1	ND	4.80	0.70	0.26	ND	ND	ND	0.97	ND
0038	29.0	29.5	NA	ND	4.92	0.61	0.23	ND	ND	ND	0.84	ND
0039	34.0	34.5	NA	ND	3.95	0.67	0.26	ND	ND	ND	0.93	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3006 May 17-19, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0041	4.0	4.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0042	9.3	9.8	8400.0	ND	ND	18.4	158.9	72.6	300.4	124	674.3	>1800
0043	14.0	14.5	331.0	ND	ND	6.3	61.2	27.9	147	66.8	309.2	>1600
0044	19.0	19.5	NA	ND	ND	6.9	117.9	63	272.3	131	591.1	>700
0045	24.0	24.5	702.0	ND	ND	ND	37.8	15.3	108.4	54.1	215.6	>550
0046	29.3	29.5	98.0	ND	ND	0.053	ND	ND	ND	ND	0.053	ND
0047	34.0	34.5	395.0	ND	0.75	0.062	ND	ND	ND	ND	0.062	503
0048	39.0	39.5	219.0	ND	ND	0.065	ND	ND	ND	ND	0.065	ND
0121	43.4	43.9	133.0	0.64	0.35	ND	ND	ND	ND	ND	ND	ND
0122	49.0	49.5	2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
0123	54.1	54.5	4.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0124	57.0	57.3	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0125	59.4	59.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0126	64.2	64.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3007 May 19, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0049	4.0	4.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0050	9.0	9.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0051	14.3	14.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0052	19.0	19.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0053	24.0	24.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0054	29.2	29.7	154.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
0055	34.2	34.6	205.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
0056	39.2	39.6	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
0127	44.0	44.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0129	48.7	49.1	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3008 May 22-23, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0057	3.0	3.5	52.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
0130	6.2	6.8	1452.0	ND	ND	ND	0.45	0.13	2.60	2.70	5.88	>1500
0058	8.8	9.4	1853.0	ND	ND	ND	ND	ND	3.40	2.90	6.30	>900
0059	13.8	14.2	NA	ND	ND	18.60	115.00	75.00	218.00	123.00	549.60	>2000
0060	18.5	19.1	NA	ND	ND	12.80	55.00	34.70	101.00	56.20	259.70	>1200
0131	18.5	19.1	NA	ND	ND	9.40	52.40	31.50	91.90	52.10	237.30	>3300
0061	24.0	24.5	NA	ND	ND	6.80	65.20	48.40	161.00	87.30	368.70	>1200
0062	29.0	29.5	NA	ND	ND	ND	0.71	ND	2.60	1.40	4.71	ND
0063	34.0	34.5	517.0	0.60	ND	ND	ND	ND	ND	ND	ND	ND
0064	38.4	39.0	47.0	0.70	ND	ND	ND	ND	ND	ND	ND	ND
0132	43.8	44.2	4.9	1.40	ND	ND	ND	ND	ND	ND	ND	ND
0133	49.1	49.6	12.6	ND	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3009 May 24, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0065	4.3	4.9	290.0	ND	ND	ND	ND	ND	ND	ND	ND	1461
0066	8.8	9.3	1098.0	ND	3.80	ND	ND	ND	ND	ND	ND	1678
0067	14.3	14.6	NA	ND	ND	ND	0.03	0.21	0.60	0.83	1.67	2393

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3010

May 22, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0074	4.0	4.7	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
0075	9.0	9.5	1.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
0076	13.5	14.0	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
0077	19.0	19.4	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
0078	23.7	24.4	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
0079	26.8	27.6	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
0080	33.5	34.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3011

May 23, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0082	3.2	3.7	91.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0083	8.4	8.9	210.0	ND	0.44	ND	ND	ND	ND	ND	ND	ND
0084	13.1	13.6	57.0	ND	ND	ND	ND	ND	0.12	0.14	0.26	ND
0085	19.0	19.3	665.0	ND	ND	ND	ND	ND	1.30	1.40	2.70	>2000
0086	23.6	24.4	560.0	ND	ND	ND	ND	0.03	0.29	0.34	0.66	>1500
0087	29.0	29.4	227.0	0.27	0.86	ND	ND	ND	ND	ND	ND	ND
0088	33.5	34.4	121.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0089	33.5	34.4	NA	ND	0.68	ND	ND	ND	ND	ND	ND	ND
0135	39.0	39.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3012 May 24, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0090	3.2	3.6	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
0091	8.6	9.2	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0092	14.0	14.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0093	16.7	17.3	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0094	23.8	24.6	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0095	26.3	26.8	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0096	33.9	34.7	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0097	38.9	39.4	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0136	43.0	43.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0137	49.0	49.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0138	54.0	54.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3013 May 25, 1994

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0098	3.5	4.2	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0099	8.4	9.1	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
0100	14.0	14.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0101	18.8	19.4	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0102	24.0	24.5	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
0104	29.0	29.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0105	32.7	33.2	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3014

May 31, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0160	3.8	4.5	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0161	8.4	9.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0162	13.7	14.4	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0163	18.5	19.2	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0164	18.5	19.2	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0165	21.4	22.0	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND
0168	29.0	29.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0169	31.5	32.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3015

Shallow Borehole Approximately 10 Feet North of Seep

June 1, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0171	3.0	3.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	131
0172	4.5	5.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	82
0173	7.0	7.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	51
0174	8.5	9.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Borehole 21-3018

Shallow Borehole Approximately 20 Feet North of Seep — June 8, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0218	1.5	2.5	NA	1.90	3.82	ND	ND	ND	ND	ND	ND	296
0219	4.0	4.5	NA	0.90	1.71	ND	ND	ND	ND	ND	ND	ND
0220	6.0	7.0	NA	ND	1.66	ND	ND	ND	ND	ND	ND	ND
0221	8.0	9.0	NA	0.54	ND	ND	ND	ND	ND	ND	ND	ND

Borehole 21-3019

Shallow Borehole Approximately 5 Feet South of Seep — June 8, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0223	1.5	2.5	NA	0.41	ND	ND	ND	ND	ND	ND	ND	ND
0224	4.0	5.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0225	6.0	7.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0226	8.0	9.0	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Surface Soil/Tuff Sample Sites 21-3023, -3024, and -3025

June 14, 1995

Sample Number	Approximate Sample Location (relative to seep)	Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
			Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0185	250' downstream	NA	0.76	ND	ND	ND	ND	ND	ND	ND	ND
0186	250' downstream	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
-	At Seep (see sample sites 21-3020 and 21-3021 below)										
0187	100' upstream	NA	0.71	ND	ND	ND	ND	ND	ND	ND	ND

Surface Sample Site 21-3020

Sample collected from stream bed at seep just above waterline. South bank.

June 14, 1995

Sample Number	Sample Interval (ft)		Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
	From	To		Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0228	0.0	0.4	NA	ND	ND	ND	ND	ND	ND	ND	ND	>1382
0229	0.0	0.4	NA	ND	ND	ND	ND	ND	ND	ND	ND	>1796

Surface Sample Site 21-3021

Sample collected from stream bed at seep just above waterline. North bank.

June 14, 1995

Sample Number	Sample Interval (ft)		Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
	From	To		Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0233	0.0	0.4	NA	6.29	ND	ND	ND	ND	ND	ND	ND	>1042
0234	0.0	0.4	NA	8.21	ND	ND	ND	ND	ND	ND	ND	>569

PRELIMINARY ANALYTICAL RESULTS (con't)
DP TANK FARM

Surface Water Samples

June 1, 1995

Sample Number	Approximate Sample Location (relative to seep)	Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
			Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0243	250' downstream	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0244	At Seep	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0245	100' upstream	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
0247*	At Seep	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

* Sample 0247 (collected 6/8/95) was collected downgradient of the seep after intentionally disturbing the seep to produce a visible sheen on the water.

Footnotes:

(1) All data is preliminary, pending validation

(2) ppm - parts per million

(3) ND - Not detected above the MCAL detection limits, which are as follows:

Acetone: 0.2 ppm
MEK: 0.2 ppm
Benzene: 0.05 ppm
TPH: 50 ppm
Toluene: 0.05 ppm
Ethylbenzene: 0.05 ppm
Xylenes: 0.05 ppm

(4) NA - Not analyzed

Note that, for investigation purposes, the UST action level for total BTEX is 100 ppm. For remediation purposes, UST action levels are 50 ppm for total BTEX and 10 ppm for benzene, or 100 ppm for TPH. These remediation action levels are used at sites contaminated with "highly contaminated" or saturated soils and contaminated soils that are 50 feet or less above the seasonal high groundwater level.

ENCLOSURE 5

CORE SAMPLE LOGS

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3008 TA/~~OU~~ FUDC 21/1 Drill Depth From 0.0 To 50.0 Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-22-95/1608 End Date/Time 5-23-95/0917

Drilling Equip./Method CME-75C/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger w/ 5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	2.0/3.5		βγ=Meta OVM=60ppm	—	0-2.5' Very Fine Sand, silt (clay) and grey Pieces of Tuff to ~1.0cm. (Fill material). No Recovery: 2.0-2.5'			Run#1 1504 hrs Roll 3 Photo —
2.5	1.5/2.5	CM-95-0057-01 CM-95-0057-02 3.0-3.5	βγ=140ppm OVM=63ppm HS=52.5ppm	—	2.5-4.0 Fill material as above. (5YR 6/1) Tuff Pieces to 4.5cm. 4.0-5.0 No Recovery		Fill Material	Run#2 1524 hrs Roll 3 Photo 9
5.0	2.5/2.5 100%	6.2-6.4 CM-95-0130	βγ=149ppm OVM=304ppm HS=1452.100	—	5.0-6.7 Fill material as Above. (moist) 6.7-7.5 Pale Red Tuff. 5R 6/2 w/ Grey Pumice to 2.5 cm (unaltered). ~9% crystals in ashy matrix.			Run#3 Petrol. odors. Roll 3 Photo 10
	2.5/2.5 100%	CM-95-0058-02 CM-95-0058-01 6.9-7.4	βγ=183ppm OVM=774ppm HS=1552ppm	—	7.5-10.0 Pale Red Tuff as above. Core is horizontally fractured due to drilling.			Run#4 1538 hrs odors present Roll 3 Photo —
10.0	5.0/5.0 100%		βγ=1[illegible] OVM=[illegible]	>17ppm	10.0-15.0 Pale Red Tuff as above (5R-6/2).		Tuff	Run#5 1610 odors Roll 3 Exp 12
		CM-95-0059-01 CM-95-0059-02	βγ= — OVM= — HS=	—				Run#5 Roll 3 Exp 11
15.0	5.0/5.0 100%	[illegible]	βγ=205ppm OVM=308ppm	—	15.0-20.0 Poorly-Moderately Welded Dark grey Tuff. (N6), Pumice as large as 3.5cm. Matrix ~15% crystals		Member of The Bandelier	Run#6 1635 odors Roll 3 Exp —
		CM-95-0060-01 CM-95-0060-02 0121-95-131 (QHP)	βγ= — OVM= —	—				Run#6 Roll 3 Exp 13
20.0	5.0/5.0 100%		βγ= — OVM= —	—	20.0-22.5' Grey Tuff as above. Somewhat moist, does moist at bottom of Run. Pumice as large as 2.5cm ~12% crystals in ash matrix.			Run#7 ~~1445~~ 1650 odors Roll 3 Exp 15/16
		CM-95-0061-01 CM-95-0061-02	βγ=184ppm OVM=435ppm	—	(10R 6/2)		Unit 3 Tshirege	Run#7 Roll 3 Exp 14
25.0	5.0/5.0 100%		βγ= — OVM= —	—	25.0-30.0. Pinkish grey Tuff. Pumice are altered to a reddish yellow and as large as 4.0 cm. ~14% crystals in ash matrix			Run#8 1705 Petrol odors Roll 3. Exp 18
		CM-95-0062-01 CM-95-0062-02	βγ=189ppm OVM=574ppm	—				Run#8 Roll 3 Exp 17
30.0								

Prepared by J. Crenkel Date 5-23-95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3005 TA/~~OU~~ PUBC 21/1 Drill Depth From ~~0.0~~ 30.0 ft To 35.0 Page 2 of 2

Driller Stewart Bros. Box #(s) — Start Date/Time 5-24-95/1015 End Date/Time 5-26-95/1130

Drilling Equip./Method CME 750 - Hollow Stem Auger Sampling Equip./Method 3.5" Stainless Steel Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	5.0/5.0 100%	0121-95-0037 340-34.5	BT= 189 OVM= 0.0	—	30.0 - 35.0 TUFF. Medium gray (N5). Moderately welded. 5% elongated pumice to 2 cm., many lined with iron-oxidized material. 5% lithics. High angle fractures at 30.8' and 31.5' lined with iron-oxide stained clays.			Run # 8 1128 Headspace - None
32.5	—	—	BT= OVM=	—				Run # 1115 Photos of fractures Roll 5, #20 + #21
35.0			BT= OVM=	—	TD Borehole @ 35 ft. 365			Run #
			BT= OVM=	—				Run #
40.0			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
50			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
60			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
70			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
0.0			BT= OVM=	—				Run #

Prepared by R. Bleyen Date 5/26/95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3006 TA/~~OU~~ FUPC 21/1 DP Tank Farm Lib Slabs Drill Depth From 0.0 To 65.0 Page 1 of 3

Driller Stewart Bros. Box #(s) ——— Start Date/Time 5-17-95 0950 End Date/Time 5/19/95 (0830 hrs)

Drilling Equip./Method CME 750 Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger w/ 5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes	
0.0	2.4'/2.5' 96%		βγ=249 cpm OVM=0.0 ppm	—	Fill Material. Reddish Brown (10R 4/6). Silt, Fine Sand and pebbles to ~.25cm. No Odors.			Run # 1 0950 hrs ~~Photo #20 Roll #1~~ DC 5-17-95 DC 5-17-95	
2.5	2.5'/2.5' 100%	0121-95-0041-01 0121-95-0041-02 (4.5'-5.0')	βγ=250 cpm OVM=510 ppm HS. 0 ppm	—	2.5'-4.5' Fill material as above. Notice Petrol odors. 4.5'-5.0' grey poorly welded Tuff. (N5). Pumice to ~0.5 cm. Matrix of ash and ~10% crystals.	Fill		Run #2 1005 hrs Photo #20 Roll #1	
5.0	2.5'/2.5' 100%		βγ=245 cpm OVM=710 ppm	—	5.0-7.5 Grey Tuff (N5). No Fractures. Pumice lighter grey (N7) as large as 1.0 cm.			Run #3 Photo #21 Roll #1 Petrol. odors.	
7.5	2.5'/2.5' 100%	0121-95-0042-01 0121-95-0042-02 (9.3-9.8') ~~(4.5'-10.0')~~	βγ=258 cpm OVM=978 ppm HS=8400 ppm	—	7.5-10.0 Grey poorly welded Tuff (N5), Pumice as large as 4.0 cm are light grey (N8). ~10% crystals in matrix.			Run #4 1050 Petrol. odors Photo #22 Roll #1	5-17
10.0	2.5'/2.5' 100%		βγ=240 cpm OVM=1356.0 ppm	—	10.0-12.5 Grey Tuff (N5) with both light grey pumice (N8) and possibly altered pumice (reddish) as large as 4.0 cm. moderate angle clay filled fracture w/ minor carbonate(?). At 11-13'			Run # 5 Petrol odors. (strong.) Photo: #23 Roll #1	~~5-18~~
12.5	2.5/2.5 100%	0121-95-0043-01 0121-95-0043-02 (14.0'-14.5')	βγ=166 OVM=365 HS=931	—	12.5-15.0 Grey Tuff N5 Rubble 12.5-13.2 Pumice light grey, poorly welded. ~13% crystals. 13.4 low angle w/ CO3 14.0 Horiz No CO3 minor oxides			Run #6 0800 Photo # — Roll # —	5-19
15.0	2.5/2.5 100%		βγ=210 OVM=56	—	15-17.5 Non welded grey Tuff N5 Multiple moderate + Horiz. Fracts @ 16.5-17.0 15-17% cryst. in matrix.			Run #7 0804 (5- Photo 24 Roll #1	
17.5	2.5/2.5 100%	0121-95-0044-01 0121-95-0044-02 (19.0-19.5')	βγ=167 OVM=493 HS[illegible]	—	17.5-20 Grey Tuff (N5) ~7% cryst in ash matrix Pumice to ~1.25 cm Horiz Fract 18.0' Minor silt Fill			Run # 8 0810 Phot 25 Roll	
20.0	2.5/2.5 100%		βγ=210 OVM=545	—	20-22.5 Grey Tuff (N5) Pumice ~1.5 cm and 15% of Tuff. ~12% crystals in ash matrix Low L Fract @ 22.0' No Fill material			Run #9 0815 Photo 26 Roll #1	
22.5	2.5/2.5 100%	0121-95-0045-01 0121-95-0045-02 (24.0-24.5)	βγ=238 OVM=498 HS=702	—	22.5-25.0 Grey Tuff as above. Pumice sugary appearance crystals ~7% of matrix Horiz fract @ Minor Fe oxides, No silt or other Fill (23.0 and High Horiz + Mod L w/ oxides No Fill 24.5			Run #10 0827 Photo 28 Roll #1	
25.0	5.0/5.0 100%		βγ=230 OVM=298	—	25.0-30 Grey Tuff N5. Pumice to 2.0 cm have a reddish color and a sugary appearance, matrix ~9% crystals. Multiple Horiz fractures @ 27.5-28.5 No Fill materials		Unit 3 of Tshirege Member of Bandelier Tuff	Run # 11 0835 Photo 24 Roll #1	
27.5		0121-95-0046-01 0121-95-0046-02 (29.3-29.8)	βγ=220 OVM=316 HS=98	—				Run # 11	
30.0									

Prepared by John Crocker Date (5-17/5-19) 1995 Checked By [signature] Date 5/23/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3006 TA/~~OU~~ FUDC 21^/FU-1 Drill Depth From 0.0 To 65.0 Page 2 of 3

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-17-95/0918 hrs End Date/Time 5-19-95/ 0830 hrs

Drilling Equip./Method CME-750/ Hollow Stem Augers Sampling Equip./Method Hollow Stem Auger w/ 5' Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	5.0/5.0 110%		βγ=210 OVM=220	—	Grey Tuff N5, Pumice To 2.0 cm, reddish color and sugary Texture. ~7% crystals in matrix. 31.5' mod ∠ fract w/ No Fill material. 32.0-32.3 Horiz fract. Tuff is ~~a~~ slightly welded.	|| || ||		Run# 12 0911
.5		0121-95-0047 -01 0121-95-0047 -02 (34.0'-34.5')	βγ=210 OVM=220 HS 395	—		|| || ||		Run# —
.0	5.0/5.0 100%		βγ=197 OVM=	—	Grey Tuff (N5) 35-40.0 Pumice To 2.5 cm w/ sugary appearance. Matrix ~8% crystals. 35.5-36.5 low ∠ fracts w No Fill Material 38.5-39.0 Core disaggregated Possibly low ∠ Fracture	|| || ||	Unit 3 of Tshirege Member of The Bandelier Tuff	Run# 13 0939 Petrol odors
		0121-95-0048 -01 0121-95-0048 -02 (39.0-39.6)	βγ=~~20~~ 236 OVM=~~76~~ 319 HS 319	—		|| || ||		Run# —
0	4.0/5.0 80%	0121-95-0121 -01 0121-95-0121 -02 (43.4-43.8)	βγ=~~220~~ 240 OVM=43 ppm ~~NA~~	—	40-45.0 grey Non welded Tuff. Completely disaggregated moderate angle fract at 43.5-44.0 No Fill material Grey N5 ~7% cryst in Matrix, No large Pumice observed	|| || ||		Run# 14 1116 1.0' No Rec. 44.0-45.0 slight odor Photo #32 Roll #1
			βγ=NA OVM=NA HS-133	—	~~NA~~	|| || ||		Run# —
	2.5/2.5 100%	0121-95-0122 -01 0121-95-0122 -02 49.0-49.8'	βγ=170 OVM=21	—	45.0-47.5 Grey Non Welded Tuff as above Completely disaggregated	|| ||		Run# 15 1135 No Strong odors
	2.5/2.5 100%		βγ=220 OVM=1.1 HS=27	—	47.5-50 Non Welded, disaggregated Tuff as above. @ 48.5-49.0 Possible fract. Moderate ∠ W/abundant oxides.	|| || ||		Run# 16 1130 No Strong odors Photo #33 Roll #1
.0	2.5/2.5 100%		βγ=230 OVM=26.0 (3.0)	—	50.0-52.5 Non Welded Grey (N5) Tuff. Completely disaggregated. oxide Trace of low ∠ fract.	|| || ||		Run# 17 Photo 33 Roll 1 Fract Trace = 26 ppm 1144 3.0 ppm elsewhere
	2.5/2.5 100%	0121-95-0123 -01 0121-95-0123 -02 (54.1-54.5)	βγ=234 OVM=2.4 HS 4.0	—	52.5 to 55.0 as Above No Fractures	|| || ||		Run# 18 1155 No Photo
0	2.5/2.5 100%	0121-95-0124 -01 0121-95-0124 -02 57.0-57.3'	βγ=NA OVM=0.0 ppm HS=0.0 ppm	—	55.0-57.5 Non-Weld Grey Tuff (N5), ~7% pumice To 1.0 cm. Completely disaggregated. No Fractures.	|| || ||		Run# 19 1300 Photo #35 Roll #1 No odors
	2.5/2.5 100%	0121-95-0125 -01 0121-95-0125 -02 59.4-59.7	βγ=145 OVM=0.0 HS=0.0 ppm	—	57.5-60.0 Non-Welded Tuff as above. W/ Pumice To 3.0 cm	|| ||		Run# 20 0815 No odors Photo 36
.0								

5/18/95
5/19/95

Prepared by John Crocker Date 5-19-95 Checked By [signature] Date 5/23/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | CORE SAMPLE LOG

Borehole ID 21-30006 TA/~~OU~~ FUSE Of Technical Area 21 / FU-1 Drill Depth From 0.0 To 65.0 Page 3 of 3

Driller Stewart Bros Box #(s) — Start Date/Time 5-17-95 / 0956 hrs End Date/Time 5-19-95 / 0930 hrs

Drilling Equip./Method CME 750 / Hollow Stem Augers Sampling Equip./Method Hollow stem auger w/ 5' 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
60.0	2.5/5.0 100%		BV=240cpm CM=2.0ppm		60.0-62.5 Grey Tuff as above (NG). Core is disaggregated. Brown staining present at 60.5' (possible fracture?)		Tshirege	Run 21 0815 hrs. No odors.
62.5	2.5/5.0 50%	0121-95-0032-01 0121-95-0126-02	BV=176cpm CM=13.6 HS=26.6ppm		62.5-65.0 Grey Tuff (NG). Core disaggregated. Abt. pumice to 1.0cm. No fractures.			Roll #1 Photo #37
65.0	0.3/3.0 10%	64.2 64.5			End of Hole. TD = 65.0'		Unit 3	Run 22 0830 hrs. 0.3' less. No Recovery 64.7-65.0.

Prepared by John Crocker Date 5-19-95 Checked By [signature] Date 5/23/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3007 TA/~~OU~~ FUDS OF TA-21 / FU-1 Drill Depth From 0.0 To 50.0' Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-19-95 (@ 11:00) End Date/Time 5/19/95 1500 hrs

Drilling Equip./Method CME 750 Hollow Stem Auger Sampling Equip./Method Hollow Stem Augers w/ 5' core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	1.5/2.5 60%	~~0121-95-0048~~ JC	βγ= OVM=0.0	—	0-1.5' Fill material. Fine sand and silt with pebbles to ~1.0 cm. No Recovery 1.5' to 2.5'	· · ·	Fill material	Run#1 1100 hrs 0-2.5' Roll 2 Exp 2
2.5	2.5/2.5 100%	0121-95-0049 -01 0121-95-0049 -02 4.0'-4.8'	βγ=180 cpm OVM=0.0 ppm HS=0.0 ppm	—	2.5'-3.5' Fill material as above. (N5) 3.1'-5.0' Grey, moderately-welded Tuff. Pumice to ~3.0 cm. matrix ~15% crystals quartz and sanidine (blue iridescente).	· · · / ||		Run#2 1105 hrs 2.5'-5.0' Roll 2 Exp 3
5.0	~~4.~~ JC 5.0/5.0 100%		βγ=-NA- OVM=-NA-	—	5.0'-10.0' Grey (N5) poorly-moderately welded Tuff. Pumice to ~1.0 cm are lighter grey in color w/ a few having a sugary texture.	||	Bandelier TUFF	Run#3 1115 hrs 5.0'-10.0' Roll 2 Exp 4
		0121-95-0050 -01 0121-95-0050 -02 9.6'-9.8'	βγ=171 cpm OVM=0.0 ppm HS=0.0 ppm	—		||		Run#3
0.0	5.0/5.0 100%		βγ=-NA- OVM=-NA-	—	10-15' Grey Tuff as above.	||	Tshirege Member	Run#4 1146 hrs 10.0'-15.0' Roll 2 Exp 8
		0121-95-0051 -01 0121-95-0051 -02 14.3'-14.8'	βγ=184 cpm OVM=0.0 ppm HS=0.0 ppm	—		||		Run#4 Roll 2 Exp 7
5.0	5.0/5.0 100%		βγ=-NA- OVM=-NA-	—	15.0-20.0: Grey Tuff as above. Locally non-welded and disaggregated (15.0'-16.5') Pumice as large as 3.0 cm. Some pumice have a sugary texture due to phenocrysts. Rare reddish grey coloration is	||		Run#5 1145 hrs 15.0'-20.0'
		0121-95-0052 -01 0121-95-0052 -02 19.0'-19.5'	βγ=190.0 cpm OVM=0.0 ppm HS=0.0 ppm	—	present in some pumice and as "stringers" in the matrix (possibly along bedding planes) (vapor phase alteration?) Crystal content of matrix ~20%	||	UNIT 3	Run#5
0.0	5.0/5.0 100%		βγ=-NA- OVM=-NA-	—	20.0-25.0 Grey Tuff as above. Pumice to 6.0 cm in an ash (80%) and crystal (20%) matrix.	||		Run #6 1155 hrs 20.0'-25.0' Roll 2 Exp 10
		0121-95-0053 -01 0121-95-0053 -02 24.0'-24.8'	βγ=163.0 cpm OVM=0.0 ppm HS=0.0 ppm	—		||		Run#6 Roll 2 Exp 9
5.0	5.0/5.0 100%		βγ=179 cpm OVM=38.0 ppm	—	25.0-30.0 Grey (N5) poorly to moderately welded Tuff. Pumice are grey to reddish brown (vapor phase altered?) and as large as 3.0 cm. Matrix is grey and locally altered (vapor phase?) to reddish brown.	||		Run #7 1200 hrs 25.0'-30.0' Roll 2 Exp 12
		0121-95-0054 -01 0121-95-0054 -02 29.2-29.7	βγ=179 cpm OVM=38.0 HS=154.9	—	(Most prominent at 25.2')	||		Run#7 Roll 2 Exp 11
10.0								

Prepared by J. Crocker Date 5-19-95 Checked By [signature] Date 5/21/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3007 TA/~~OU~~ FUDC 21/1 Drill Depth From 0.0 To 50.0 Page 2 of 2

Driller Stewart Bros. Box #(s) ——— Start Date/Time 5-19-95 1100 hrs End Date/Time 5/19/95 1500 hrs

Drilling Equip./Method CME Hollow Stem Augers Sampling Equip./Method Hollow Stem augers 4x5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	~~2.5'~~ / ~~5.0~~ 5.0 / 100%		βT=0 cpm OVM=10 ppm	—	Grey Tuff as Above (30.0-35.0). Tuff is non-welded to poorly welded at bottom of run. Pumice to 3.0cm. matrix ~12% crystals.			Run # 8 1340 hrs 30.0-35.0' Roll 2 Exp 14
2.5		0131-95-0066-01 0131-95-0066-02 34.2-34.6	βT=-NA- OVM=-NA- HS=3056 ppm	—			Tuff	Run # 8 ~~1350 hrs~~ QC Roll 2 Exp 13
35.0	2.5' / 5.5 / 100%		βT=144 cpm OVM=16.1 ppm	—	Non-Welded Grey Tuff (35.0-37.5') N6. ~15% crystals in matrix. Pumice as large as ~1.6cm, core is mostly disaggregated.			Run # 9 1350 hrs 35.0'-37.5' Roll 2 Exp 15
37.5	2.5' / 5.5 / 100%	0131-95-0066-01 0131-95-0066-02 34.2-34.6	βT=186 cpm OVM=0.9 ppm HS=1.2 ppm	—	37.5-40.0 Poorly Welded Grey Tuff (N5). Core is almost completely disaggregated. Pumice are greyish white to altered and reddish brown in color and as large as 2.5cm. matrix ~ 40% crystals and ~60% ash.		Bandelier	Run # 10 1400 hrs 37.5'-40.0' Roll 2 Exp 16
40.0	2.5' / 5.5 / 100%		βT=139 cpm OVM=0.0 ppm	—	40.0-42.5 Non Welded Grey Tuff as above. Pumice alteration to reddish brown color more common. Pumice to 3.5cm. ~40% crystals and 40% ash matrix.		Tshirege Member	Run # 11 40.0'-42.5' Roll 2 Exp 17
42.5	2.5' / 5.5 / 100%	0131-95-0133-01 0131-95-0133-02 44.0-44.7	βT=170 cpm OVM=0.0 ppm HS=0.0 ppm	—	42.5-45.0 Grey non-welded Tuff as above, Pumice to 2.0cm and ~12% crystals in matrix.			Run # 12 1440 hrs 42.5'-45' Roll 2 Exp 18
45.0	2.5' / 5.5 / 100%		βT=207 cpm OVM=0.0 ppm	—	45.0-47.5 Non Welded Grey Tuff as above. Alteration of Pumice and stringers of matrix change color to reddish brown ~~10R5/2~~ (10R6/5/3). Pumice To 2.0cm. ~12% crystals in ash matrix.			Run # 13 45.0'-47.5' Roll 2 Exp 19
47.5	3.0' / 5.5 / 80%	0131-95-0134-01 0131-95-0134-02 48.7-49.1	βT=219 cpm OVM=0.0 ppm HS=0.0 ppm	—	47.5-49.5 Non-Welded Tan to Reddish brown Tuff. ~20% crystals in rose colored matrix. LOSS: 0.5' @ 49.5-50.0' (No Recovery)		UNIT 3	Run # 14 1500 hrs 47.5'-50.0' Roll 2 Exp 20
50.0 ~~50.0~~ QC			βT= OVM=	—	End of Hole: TD=50.0'			Run #
QC ~~49.5~~			βT= OVM=	—				Run #
50.0 ~~50.0~~ QC			βT= OVM=	—				Run #
QC ~~49.5~~			βT= OVM=	—				Run #
60.0 ~~50.0~~ QC								

Prepared by J. Crocker Date 5-19-95 Checked By Rick P. [illegible] Date 5/21/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3008 TA ~~OU~~ FUDC 21/1 NB 6/6/95 Drill Depth From 0.0 To 50.0 Page 1 of 2

Driller Stewart Bros. Box #(s) ——— Start Date/Time 5-22-95/1408 End Date/Time 5-23-95/0917

Drilling Equip./Method CME-75C/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger w/ 5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	2.0/2.5		BT=14cpm OVM=60ppm	—	0-2.5' Very fine sand, silt (2.5Y 5/2) and grey pieces of Tuff to ~1.5cm. (Fill material). No Recovery: 2.0-2.5'			Run #1 1504 hrs Roll 3 Photo —
2.5	1.5/2.5	CNW-95-0057-01 GW-95-0057-02 3.0-3.5	BT=140cpm OVM=203ppm HS=52.5ppm	—	2.5-4.0 Fill Material as above. (5YR 5/2) Tuff pieces to 4.5cm. 4.0-5.0 No Recovery		Fill Material	Run #2 1534 hrs Roll 3 Photo 9
5.0	2.5/2.5 100%	5.0-5.4 GW-95-0130	BT=144cpm OVM=384ppm HS=145.2ppm	—	5.0-6.7 Fill Material as Above. (moist) 6.7-7.5 Pale Red Tuff. 5R 6/2 w/ Grey Pumice to 2.5 cm (unaltered). ~9% crystals in ashy matrix.			Run #3 Petrol. odors. Roll 3 Photo 10
	2.5/2.5 100%	GW-95-0131-01 GW-95-0131-02 7.4-7.9 10.2-10.7	BT=180cpm OVM=374ppm HS=165.2ppm	—	7.5-10.0 Pale Red Tuff as above. Core is horizontally fractured due to drilling.			Run #4 1538 hrs others present Roll 3 Photo —
10.0	5.0/5.0 100%		BT=218cpm OVM=>1000ppm	>1000ppm	10.0-15.0 Pale Red Tuff as above (5R-6/2).		Bandelier Tuff FP	Run #5 1610 odors Roll 3 Exp 12
		GW-95-0132-01 GW-95-0132-02	BT= — OVM= — HS=	—				Run #5 Roll 3 Exp 11
15.0	5.0/5.0 100%		BT=206cpm OVM=308ppm	—	15.0-20.0 Poorly-Moderately Welded Dark grey Tuff. (N6), Pumice as large as 3.5cm. Matrix ~15% crystals			Run #6 1635 odors Roll 3 Exp —
		GW-95-0133-01 GW-95-0133-02 01-21-95-131 (QHP)	BT= — OVM= —	—				Run #6 Roll 3 Exp 13
20.0	5.0/5.0 100%		BT= — OVM= —	—	20.0-22.5' Grey Tuff as above. Somewhat moist, very moist at bottom of Run. Pumice as large as 2.5cm ~12% crystals in ash matrix.		Unit 3 Tshirege Member of The	Run #7 ~~1450~~ 1650 odors Roll 3 Exp 15/16
		GW-95-0061-01 GW-95-0061-02	BT=184cpm OVM=352ppm	—	(10R 6/2)			Run #7 Roll 3 Exp 14
25.0	5.0/5.0 100%		BT= — OVM= —	—	25.0-30.0. Pinkish grey Tuff. Pumice are altered to a reddish yellow and as large as 4.0cm. ~14% crystals in ash matrix			Run #8 1705 Petrol odors Roll 3. Exp 18
		GW-95-0062-01 GW-95-0062-02 0062	BT=119cpm OVM=574ppm	—				Run #8 Roll 3 Exp 17
30.0								

Prepared by J. Crenkel Date 5-23/23-95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3008 TA/~~OU~~ FUDC Op Tsankawi 21^/FU-1 Drill Depth From 0.0 To 500 Page 2 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-22-95/1504 End Date/Time 5-23-95/0917

Drilling Equip./Method CME 750/Hollow Stem Auger Sampling Equip./Method Hollow Stem w/ 5' Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes 5-23-95
30.0	2.5/2.5 100%		BT=1.74ppm OVM=2.4ppm	—	30.0-32.5 Pinkish grey TUFF (10R 8/2). Pumice to 6.5cm are grey (N8), ~12% crystals in ash matrix, Run is fractured by multiple horizontal fractures.	II II		Run #9 0750 hrs Rig Setup exp 1.4 Roll 3 exp 20
32.5	2.5/2.5 100%	0121-95-0823 -01 and -02 34.0-34.4	BT=.201ppm OVM=93ppm HS=617ppm	—	32.5-35.0 Greyish Brown (5YR 6/1) moderately Welded Tuff. Pumice to 6.0cm. Some with altered rims and sugary interiors. ~17% crystals in ash matrix.	II II		Run #10 0909 Roll 3 exp 21
35.0	4.5/5.0 90%		BT: — OVM: —	—	35.0-40.0 Greyish Red Tuff as above. Interval is highly fractured by horizontal fractures. Pumice to 2.5cm, ash matrix ~20% crystals. No Recovery 39.0-39.5	II II		Run #11 0920 Roll 3 exp 23
37.5		0121-95-0824 -01 and -02 38.4-39.0	BT=.16ppm OVM=.72ppm HS=47ppm	—		II II		Run #11 Roll 3 exp 22
40.0	5.0/5.0 100%		BT=.120ppm OVM=.54ppm	—	40.0-45.0 Greyish Red Tuff as above. Pumice as large as 1.5cm and matrix ~20% crystals.	II II		Run #12 0950 Roll 3 exp 25
42.5		0121-95-0132 -01 and -02 43.8-44.2	BT=.12ppm OVM=.62ppm HS=4.9ppm	—		II II		Run #12 Roll 3 exp 24
45.0	5.0/5.0 100%		BT=.200ppm OVM=.72ppm	—	45.0-50.0 Greyish Red Tuff as above. Pumice as large as 2.0cm. Some are altered red (5R 5/4) Matrix ~20% crystals. Core is highly fractured by low, moderate and	II II		Run #13 0917 Roll 4 exp 2
		0121-95-0133 -01 and -02 44.1-44.6	BT: — OVM: —	—	high angle fractures from 47.0-50.0 End of Hole TD 50.0'	II II		Run #13 Roll 4 exp 1
50.0			BT: OVM:	—				Run #
			BT: OVM:	—				Run #
~~55.0~~			BT: OVM:	—				Run #
			BT: OVM:	—				Run #
60.0								

Unit 3, Tshirege Member of The Bandelier Tuff

Prepared by John C Crockett Date 5-22/23-95 Checked By Rick P. Ch Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3009 TA-~~0U~~ PUBS Structure 21 / FH-1 Drill Depth From 0.0 To 17.5 Page 1 of 1

Driller Stewart Bros. Box #(s) ——— Start Date/Time 5-24-95/0938 End Date/Time 5-24-95/1030

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	1.3/2.5		BT=176 ppm OVM=60 ppm	—	0.0-2.5 Fine sandy silt, clay and pebbles to 1.0 cm of grey TUFF, moist. (10R 3/4). No Recovery 1.3'-2.5'		Fill	Run #1 0938
2.5	2.5/2.5	0121-95-0008	BT=142 ppm OVM=70 ppm	—	2.5-3.0 Fill material as above. 3.0-5.0 Grey Tuff (N7). Pumice are as large as 0.75 cm are mostly altered reddish brown (10R 3/4). matrix is ash with ~17% crystals.		Tuff	Run #2 0948 slight petrol odor Roll 4 Exp 18
5.0	5.0/5.0		BT=203 ppm OVM=139 ppm	—	5.0-10.0 Grey Tuff as above. Pumice are altered and as large as 3.5 cm. Ash matrix is ~20% crystals. Tuff is moderately welded. 5.0-10.0 Highly Fractured by low and Horizontal fracts, with Fe			Run #3 1000 slight petrol odor Roll 4 Exp 20
		0121-95-0010 9.6'-9.3'	BT=203 ppm OVM=399 ppm	—	10.0-15.0 Grey (N7) moderately welded Tuff. Matrix is ash with approximately 20% crystals. Pumice as large as 2.0 cm.		Unit 3 of Tshirege Member of Bandelier	Run #3 Roll 4 Exp 19
10.0	5.0/5.0		BT= - OVM= -	—				Run #4 1018 Roll 4 Exp 22
		0121-95-0007 14.3-14.6	BT= OVM=	—				Run #4 odor Roll 4 Exp 21
15.0	2.5/2.5		BT= OVM=	—	15.0-17.5 Grey Tuff as above. Becomes non-welded and disaggregated from 16.5-17.5			Run #5 1030 odor Roll 4 Exp 23
17.5			BT= OVM=	—	End of Hole 17.5'			Run#
~~20.0~~ QC			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
~~15.0~~ QC			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
~~20.0~~ QC								

Prepared by John Crocker Date 5-24-95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3010 TA/~~OU~~ FUDC Pajarito SMF/FU-1 Drill Depth From 0.0 To 30.0 Page 1 of 1

Driller Stewart Bros. Box #(s) —— Start Date/Time 5/24/95 1035 End Date/Time 5/25/95 1157

Drilling Equip./Method CME 750 w/ Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger w/ core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	1.7/2.5 64%		BT=165 cpm OVM=0.0 ppm	—	0-2.5' Fill material, Reddish Brown (10R 5/4), S.;lT, very Fine sand w/ pebbles to ~~2~~ 1.5cm. Loss: 0.8' No recovery. 1.7'-2.5'. (Fill is moist).			Run #1 1035 hrs Roll 2 #21
2.5	2.5/2.5 100%	0121-95-0074-01 0121-95-0074-02 4.0-4.7	BT=147 cpm OVM=0.7 ppm	—	2.5-5.0 Fill material as above.		Fill Material	Run #2 1040 hrs Roll 2 #22
5.0	5/5 100%		BT: — OVM: —	—	5.0-6.5 Fill as above. 6.5-10.0 Greyish Red Tuff (5R 4/2) w/ Grey Pumice (N8) To 1.5cm. Small pumice altered dark Red (5R 4/2).			Run #3 1052 hrs Roll 2 #24
	—	0121-95-0075-01 0121-95-0075-02 9.0-9.5	~~BT=203 cpm OVM=0.9 ppm~~ HS=1.9 ppm	—	~~6.5-10.0 Greyish Red Tuff 5R 4/2 w/ Pumice~~			Run #3 Roll 2 #23
10.0	~~5/5~~ 4.5/5.0 90%	910%	BT: — OVM: —	—	10.0-14.0 Greyish Red Tuff as above - Highly Fractured. Pumice to 4.0cm. Crystals in ash matrix ~ 13%			Run # 4 1105 hrs
	—	0121-95-0076-01 0121-95-0076-02 13.5-14.0	BT=199 OVM=0.0 HS 0.6	—	14-14.5' Clay. Orange-brown 10R 4/6 w/ deep red mottling 5R 3/4. Slightly moist. No Recovery: 14.5 — 15.0			Run #4 Roll 2 #24
15.0	1.7/2.5 64%		BT: — OVM: —	—	15.0 — 16.2 Clay as above. Slightly moist. 16.2-16.7 Grey Non-Welded Tuff. Disaggregated. 16.7-17.5: No Recovery		Member of	Run #5 1120 hrs Roll 3 Photos 1+2
20.0	3.5/3.5 100%	0121-95-0077-01 0121-95-0077-02 19.0-19.4	BT=167 OVM=0.0 HS=0.3	—	17.5-20.0. Grey Non-Welded Tuff as above. Disaggregated along Horizontal Partings. Color= N5. Pumice to 2.5cm. w/ Sugary Texture. ~15% crystals in ash matrix. Some Pumice altered		Tshirege	Run #6 ~1130 hrs Roll 3 #3
	2.5/2.5 100%		BT: OVM:	—	reddish Brown (5R 3/4). ~~20~~ 20-22.5: Grey Tuff as above. Pumice to 4.0cm (N8). Other Pumice are altered reddish Brown.		Unit 3,	Run # 7 1140 hrs Roll 3 #4
25.0	2.5/2.5 100%	0121-95-0078-01 0121-95-0078-02 33.7-34.4	BT=44 OVM=0.0 HS=0.3	—	22.5-25.0 Non Welded Grey Tuff. Disaggregated along Horizontal Partings from 22.5-24.5. Matrix ~ 14% dryer. and 86% ash.			Run #8 1150 hrs Roll 3 #5
	5.0/5.0 100%		BT: — OVM: —	—	25-30.0 Grey Tuff as above. Completely disaggregated. Pumice to 2.0cm (N8). Small <0.5cm are altered reddish Brown. ~12% crystals in ash matrix			Run #9 1157 hrs Roll 3 JC (#22)
30.0	—	0121-95-0079-01 0121-95-0079-02 26.8-27.6	BT=195 OVM=0.0 ppm HS=0.3 ppm	—				Run #9 Roll 3 #6

Prepared by John Crocker Date 5-25-95 Checked By [signature] Date 5/25/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3010 TA/~~OU~~ FUBC of Task Force 21/FU-1 Drill Depth From 0.0 To 35.0 Page 2 of 2

Driller Stewart Bros. Box #(s) ——— Start Date/Time 5-22-95/1035 End Date/Time 5/22/95/1218 hrs

Drilling Equip./Method CME 750 w/ Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger w/ 5' core barrel.

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	2.5/5.5 100%		BT= — OVM= —	—	30.0-30.5 Grey (N6) as Above. Pumice to 1.5cm are altered (10Y 6/2). ~ 12% crystals in ash matrix.			Run# 10 Roll #3 Photo 7
32.5	2.5/5.5 100%	21-01-95-0040 thru 21-01-95-0042	BT=193 cpm OVM= 0.0 ppm HS 0.0 ppm	—	30.5-35.0 Grey (N5) Poorly Welded TUFF. Pumice are ltgrey (N8). Some altered (10R4/2) on Rims			Run# 11 1218 hrs Roll #3 Photo 8
35.0			BT= OVM=	—	End of hole. TD 35.0'			Run#
~~35.0~~			BT= OVM=	—				Run#
			BT= OVM=	—				Run#
~~35.0~~			BT= OVM=	—				Run#
			BT= OVM=	—				Run#
~~35.0~~			BT= OVM=	—				Run#
			BT= OVM=	—				Run#
~~35.0~~			BT= OVM=	—				Run#
			BT= OVM=	—				Run#
~~35.0~~ 200			BT= OVM=	—				Run#

Prepared by John C Cooper Date 5-22-95 Checked By [signature] Date 6/8/95

LOS ALAMOS N/ NAL LABORATO../ ENVIRONMENTAL RE ORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3011 TA/~~OU~~ PUBC or TANKFARM 21 / LFU-1 Drill Depth From 0.0 To 40.0 Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-23-95/1400 End Date/Time 5-23-95/1630

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology / Soil	Graphic Log	Lithologic Unit	Notes
0.0	1.5/2.5 60%		βT=147 cpm OVM=0.3 ppm	—	0.0 – 2.5' Dark reddish-Brown Fill (10R 3/4) Fine sand, silt and clay with pebbles as large as 1.00 cm. No Recovery (1.5' – 2.5')		Fill Material	Run #1 1417 Roll 4 Photo 3
2.5	2.5/2.5 100%	0121-95-0082 3.2'-3.7'	βT=182 cpm OVM=0.8 ppm HS=91.0 ppm	—	2.5' – 3.3' Fill material as above. 3.3 – 5.0 Reddish grey Tuff (5R 4/2) moderately welded. Pumice are grey and as large as 0.76 cm. Matrix is ash with ~12% crystals.			Run # 2 1425 Roll 4 Photo 4
5.0	4.2/5.0 84%		βT: — OVM: —	—	5.0 – 10.0 Reddish grey poorly welded Tuff (5R 4/2). Light grey pumice (N8) are as large as 4.0 cm. Ashy matrix has ~ 12% crystals. No Recovery 9.2' – 10.0 FT.			Run # 3 1437 Roll 4 Photo 6
	—	0121-95-0083 8.4'-8.9'	βT: 160 cpm OVM: 52.3 ppm HS: 30 ppm	—	@ 6.4' Horizontal fracture with oxide fill, @ 6.1' Intersecting high angle vertical and low angle fractures with minor oxides.		Tuff	Run #3 Roll 4 Photo 5
10.0	5.0/5.0 100%		βT: — OVM: —	—	10.0 – 15.0 Reddish grey Tuff as above. Pumice to 6.0 cm. ~12% crystals in ash matrix. 10.5 – 11.0' moderate angle fracture w/ oxide fill.		Bandelier	Run # 4 1448 Roll 4 Photo 8
	—	0121-95-0084 13.1'-13.6'	βT: 187 cpm OVM: 130 ppm 57.0 HS: 240 ppm	—	11.5 Low angle fracture w/ Lite oxide fill (also at 11.8, 12.0, 12.8) 13.0 Low angle fracture w/ Heavy oxide fill.		of the	Run # 4 Roll 4 Photo 7
15.0	5.0/5.0 100%		βT: — OVM: —	—	15.0 – 20.0 Greyish Pink (5YR 7/2) moderately Welded Tuff. Pumice are light grey (N8) and as large as 2.0 cm. Matrix is ash With ~ 15% crystals.		Member	Run # 5 1504 Roll 4 —
		0121-95-0085 19.0-19.3	βT: 220 cpm OVM: 71.9 ppm HS: 665 ppm	—	15.0 – 15.5 Moderate and Low angle fractures with no fill. ~15.5 – 16.2 Multiple Horizontal Fractures (Rubble)			Run # 5 Roll 4 Photo 9
20.0	5.0/5.0 100%		βT: — OVM: —	—	20.0 – 25.0 Grey (5YR 7/1), moderately welded Tuff. Pumice are grey and as large as 4.0 cm. Matrix is ash with ~ 15% crystals.		Tshirege	Run # 6 1515 Roll 4 Photo 11
		0121-95-0086 23.6-24.4	βT: 142 cpm OVM: 96.5 ppm HS: 540 ppm	—	Note: Fractures in middle of Run are not natural.		Unit 3	Run # 6 Photo 10
25.0	5.0/5.0	—	βT: — OVM: —	—	25.0 – 30.0 Greyish Pink (5YR 7/2) moderately Welded Tuff. Large Pumice to 5.00 cm are grey (N9), Smaller Pumice are altered to Greenish grey (5Y6/1).			Run # 7 1530 Roll 4 Photo 13
		0121-95-0087 29.0-29.4	βT: 203 cpm OVM: 74.0 ppm	—	26.0 Horizontal fracture, minor oxides. 28.3 – 28.5 Horizontal Fracture, No Fill. 29.5 Low angle fracture, No Fill			Run # 7 Roll 4 Photo 12
30.0								

Prepared by John C Cooper Date 5/23/95 Checked By [illegible] Date 6/6/95

LOS ALAMOS NATIONAL LABORATC.. / ENVIRONMENTAL RES.. ORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3011 TA/~~OU~~ FUDS Spark Farm 21/FU-1 Drill Depth From 0.0 To 40.0 Page 2 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-23-95/1400 End Date/Time 5/23/95/1630

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	5.0/5.0		BT= — OVM= —	—	30.0-35.0 Moderately Welded greyish pink (5YR 7/2) Tuff. Pumice are grey (N8) and as large as 5.0 cm. Matrix is ash with ~15% crystals	||		Run # 8 Roll 4 Photo 15
32.5	—	0111-95-0068 0121-95-0069 (duplicate) 33.5-34.4	BT=220 ppm OVM=50.0 ppm HS= 101 ppm	—	32.6' Horizontal fracture, Minor calcite. 31.4' Low angle fracture, No Fill 32.7' Moderate angle fracture, No fill. 33.6'-34.3' Vert. fracture, No Fill	||		Run # 8 Roll 4 Photo 17
35.0	5.0/5.0 100%		BT= — OVM= —	—	35.0 - 40.0 Moderately Welded pinkish grey (5YR 7/2) Tuff. Pumice are grey (N8) and as large as 4.0 cm. Matrix is ash with ~15% crystals.	||	Unit 3 of Tshirege	Run # 9 Roll 4 Photo 16
	—	0111-95-0070 37.0-37.5	BT= 198 OVM=	—	36.2' Horizontal fracture, No fill. 36.0' Horizontal fracture, No fill. 36.6' Low angle fracture, No Fill. 37.7 - 38.0 multiple Low angle and Horizontal Fractures.	||		Run # 9 1630 Roll 4 Photo 17
40.0			BT= OVM=	—	END of Hole. 40.0'			Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
			BT= OVM=	—				Run #

Prepared by John A Dooker Date 5-23-95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | **CORE SAMPLE LOG**

Borehole ID 21-3012 TA/~~OU~~ FUDS OF TANK Farm 21/FU-1 Drill Depth From 0.0 To 55.0 Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-24-95/1300 End Date/Time 5-24-95/1612

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	~~Rec~~ 1.2 / 2.5 / 46%		BT=139 cpm OVM=0.0 ppm	—	0.0-2.5 Fill material very fine sand, silt and clay. Reddish Brown (10R 3/4), Slightly moist. No Recovery (1.2'-2.5')		Fill Material	Run#1 1303 hrs Roll4 Exp 24
2.5	1.2 / 2.5 / 62%	0121-95-0046 32-3.6	BT=200 cpm OVM=0.0 HS=0.0 ppm	—	2.5'-6.5' Fill material as above. Fill has a piece of Grey Tuff 0.2' from 3.6-3.8'. No Recovery 3.8'-5.0' (1.2' Loss)			Run#2 1307 hrs 1.2' Loss (No Recov.)
5.0	1.4 / 2.5 / 72%		BT=178 cpm OVM=0.0 ppm	—	6.5-6.4 Grey (N7) Non-Welded and disaggregated Tuff. No visible pumice clasts. ~20% crystals in ash matrix. No Recovery 6.8'-7.5' (0.7' loss).			Run#3 1320 hrs Roll4 Exp 25
7.5	2.2 / 2.5 / 88%	0121-95-0047 8.6-9.2	BT=163 cpm OVM=0.0 ppm HS=0.0 ppm	—	7.5'-9.7' Grey (N7) Non-Welded and disaggregated Tuff. Pieces of pumice are lacking. Matrix is ash with ~25% crystals. No Recovery: 9.7'-10.0' (0.3' Loss)			Run#4 1325
10.0	2.1 / 2.5 / 84%		BT=192 cpm OVM=0.0 ppm	—	10.0-12.5 Grey Non-Welded Tuff as above. Core is disaggregated. ~18% crystals in ashy matrix. No Recovery 12.1-12.5 (0.4' Loss).		Member of Bandelier Tuff	Run#5 1330
12.5	2.5 / 2.5 / 100%	0121-95-0048 14.8-14.7	BT=196 cpm OVM=0.0 ppm HS=0.0 ppm	—	12.5'-15.0' Grey (N7) Tuff as above. Becomes moderately welded at 13.5 to end of Run. 14.0' intersection Vert. and Horiz. Fractures. (No Fill)			Run#6 1337 Roll5 Exp 1
15.0	2.5 / 5.0 / 56%		BT=206 cpm OVM=0.0 ppm	—	15.0-20.0 Grey Tuff as above. Partly welded from 15.0-15.5; Non-Welded 15.5-17.5. Pumice are lacking. ~18% crystals in ash matrix.			Run#7 Roll5 Exp 3
17.5	—	0121-95-0049	BT= — OVM= — HS=0.0 ppm	—	17.5-18.5 Horizontal partings. No fill material. 17.0-17.5 core disaggregated. No Recovery 17.5-20.0' (2.5' loss)			Run#7 Roll5 Exp 2
20.0	2.0 / 2.5 / 80%		BT=164 cpm OVM=0.0 ppm	—	20.0-21.3 Grey Tuff separated along horizontal partings. (as Above). 21.3-22.0 Grey Non-Welded and disaggregated Tuff. (N7), Pumice Altered (10R 4/4) and as large as 1.5 cm			Run#8 22.0-22.5 No Recovery. Roll5 Exp 4
22.5	2.5 / 0.5 / 10%	0121-95-0050 23.4-23.6	BT=196 cpm OVM=0.0 ppm	—	~15% crystals in ash matrix 22.5-25.0 Moderately Welded grey (N7) Tuff. Grey (N6) pumice to 5.0 cm ~17% crystals in ash matrix 23.6 Horiz Fracture, Minor oxide Fill.		Unit 3 of Tshirege	Run#9 1420 Rd 11 5 Exp 5
25.0	2.5 / 5.0 / 50%		BT=216 cpm OVM=0.0 ppm	—	25.0-30.0 Grey (N7) Tuff. Non-Welded and disaggregated along horizontal partings. Pumice to 1.0 cm. ~17% crystals in			Run#10 1430 RdN 5 Exp 6
27.5	/	0121-95-0051 26.3-26.9	BT= — OVM= —	—	ash matrix with stringers of alteration (5YR 6/4)			Run#10
30.0								

Prepared by John Crocker Date 5/24/95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY | CORE SAMPLE LOG

Borehole ID 21-3012 TA/~~OU~~ PUPC DP Tank Farm 21 / FU-1 Drill Depth From 0.0 To 550 Page 2 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-24-95/1300 End Date/Time 5-24-95/1612

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' 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
30.0	2.5/0.5' 100%		BT=116 ppm OVM=0.0 ppm	—	30.0-32.5 Grey TUFF (NT) Non-Welded and completely disaggregated. (Except 30.2-30.6 which is moderately welded). Pumice are light grey (N8) and as large as 5 cm. Matrix is ash with ~14% crystals			Run# 11 Roll 5 Exp 7
32.5	2.5/2.5' 100%	0121-95-0096 33.9-34.7	BT=167 ppm OVM=0.0 ppm	—	32.5-35.0 Grey TUFF (NT). Moderately Welded. Pumice are grey (N8) and as large as 0.75 cm. Matrix is ash with ~15% crystals. 32.7 Horizontal Fract (No Fill) — Also at 34.7'.			Run# 12 1509 Roll 5 Exp 8
35.0	5.0/5.0 100%		BT: — OVM: —	—	35.0-40.0 Grey TUFF (NT), Moderately Welded Pumice are light grey (N8) To ~1.0 cm. Matrix is ashy with ~15% crystals.			Run# 13 1523 Roll 5 Exp 9
37.5	—	0121-95-0097 38.9-39.4	BT=144 ppm OVM=0.0 ppm HS 0.0 ppm	—	38.0-38.5 High angle fracture cut by a horizontal fracture. (Oxide Fill.)			Run# 13 Roll 5 Exp 10
40.0	4.0/5.0 80%		BT=204 ppm OVM=0.0 ppm	—	40.0-44.0 Non-Welded and completely disaggregated Grey (NT) TUFF. Pumice as large as 1.0 cm. and altered reddish-Brown (10R 5/4). Matrix is ash with ~15% crystals.		Bandelier Tuff	Run# Run 14 1540 Roll 5 Exp 11
42.5	0121-95-0136 43.0-43.4		BT: OVM:	—	42.5-44.0 Disaggregation in this interval may be due to vert. fracture(s).			Run #14 Roll 5 Exp 12
45.0	2.5/2.5' 100%		BT=167 ppm OVM=0.0 ppm	—	44.0-45.0 No Recovery (1.0' lost) 45.0-47.5 Poorly/Non-Welded Grey (NT) TUFF. Matrix is ash with ~20% crystals. Pumice to 1.5 cm. 46.6-Oxid Stains; 45.5-46.0 Non-Welded (No Fract.)		Member of	Run# 15 ~~1452~~ 1552
47.5	2.5/2.5' 100%	0121-95-0137 49.0-49.5	BT=205 ppm OVM=0.0 ppm	—	47.5-50.0 Grey TUFF (NT), Pumice to 0.75 cm. Matrix is ash with ~15% crystals. Run was in Brass Sleeves. Completly broken up by the time I Got the core out.)			Run# 16 1600 Roll 5 Exp 13
50.0	2.5/2.5' 100%		BT=203 ppm OVM=0.0 ppm	—	50.0-52.5 Grey (NT) Tuff as above. Completely disaggregated. Pumice as large as 3.0 cm. Matrix is ash with ~15% cryst.		Unit 3 of Tshirege	Run # 17
52.5	2.5/2.5' 100%	0121-95-0138 54.0-54.5	BT=196 ppm OVM=0.0 ppm	—	52.5-55.0 Grey Tuff as above. Core run in Brass and completely disaggregated.			Run# 18 1612
55.0			BT= OVM:	—	END of hole. TD. 55.0'			Run #
			BT= OVM:	—				Run #
QC								

Prepared by John Crocker Date 5/24/95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-~~02~~3013 TA/~~OU~~ FUDS DP TAAK Form 21 /FH-1 Drill Depth From 0.0 To 35.0' Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time ~~5/25-95~~/1010 End Date/Time 5/25/95/1155

Drilling Equip./Method CME 750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	1.0/2.5 40%		BT=184 OVM=0.0	—	~~Surf~~ PC Loss 1.0-2.5 (5YR4/4) 0.0 - 0.5 Fill, Biotite rich Fine sand + silt w/ Pumice to 1.0 cm 0.5-2.5 Disaggregated Grey(N7) Tuff. Pumice to 2.0cm. ~10% crystals in ash matrix		Fill	Run # 1 1017 hrs Roll 5 Exp ~~+~~
2.5	2.5/2.5 100%	~~0131-95-0070 -01 and -02~~ 3.5-4.2	BT=167 OVM= HS=0.0	—	2.5-3.5 Grey Tuff. Non Welded To 3.3'. 3.3-4.3 Moderately welded grey TUFF (N7). Pumice to 1.5 altered reddish Weak crystals in ash matrix 3.3 matrix clean 4.3 Low Fe oxide			Run # 2 1025 hrs Roll — Exp —
5.0	4.5/5.0 40%		BT=194 OVM=0.0	—	0.5 Loss (4.5-16.0) 5.0-10.0 Grey Tuff as above. Run is highly Fractured Because the driller had to repeatedly pull up.			Run # 3 1037 hrs Roll — Exp —
		~~0131-95-0071 -01 and -02~~ 6.4-9.1	BT: — OVM= — HS= 0.1	—				Run # 3 Roll — Exp —
10.0	5.0/5.0 100%		BT=175 OVM=0.0	—	10-15 Grey. (N7) Tuff Moderately welded To 13.0. 13.0-15 Non Welded and disaggregated. Pumice to 2.0cm unaltered Lt. Grey (N8) ~23% crystals in ash matrix			Run # 4 ~~0110 hrs~~ 1100 Roll — Exp —
		~~0131-95-0100 -01 and -02~~ 14.0-14.5	BT= OVM= HS 0.0	—	13.0-14.0 Horiz clean 14.0 Horiz clean 14.5-13.0 Multiple Horiz fractures, Micro cracks			Run # 4 Roll — Exp —
15.0	2.5/5.0 50%		BT=205 OVM=0.0	—	15.0-17.5 Grey Tuff (N7) Completely disaggregated. ~20% crystals in ash matrix. Pumice To 2.0 cm.		Unit 3 Tshirege member of Bandelier Tuff	Run # 5 1105 Roll — Exp —
		~~0131-95-0101 -01 and -02~~ PC 16.3-16.9 ~~16.9-17.4~~	BT= — OVM= — HS 0.0	—	17.5-20 No Recovery (N7)			Run # 5 Roll —
20.0	2.5/2.5 100%		BT=191 OVM=1.0	—	20.0-22.5 Grey/Nea-Welded Tuff. disaggregated. Matrix ~20% crystals w/ Stringers of Tan alteration (5YR6/4) Pumice To 0.5 altered To Reddish Tan.			Run # 6 1115 Roll —
	2.5/2.5 100%	~~0131-95-0102 -01 and -02~~ 24.0-24.5 PC	BT=219 OVM=0.0 HS=0.0	—	22.5-24.0 Unlitely disaggregated grey Tuff. Tan Stringers of alteration in matrix. 24.0-25.0 moderately welded grey Tuff (N7) Pumice to 1.0cm. Altered. ~15% crystals in matrix			Run # 7 1125 Roll —
25.0	5.0/5.0 100%	~~0131-95-0103 -01 and -02~~ MS 4	BT=190 OVM=0.0	—	24-25 Vertical fracture No Fill 25.0-30.1 moderately welded grey Tuff (N7) Grey(N8) Pumice to 4.5cm. (some have thin alteration rims). ~15% crystals in ash matrix.			Run # 8 1140 Roll —
30.0		~~0131-95-0104 -01 and -02~~ 29.0-29.5	BT= — OVM= — HS=0.0	—	(No Fractures.)			Run # 8 Roll —

Prepared by [signature] Date 5/25/95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATORY ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3013 TA ~~OU~~ FUDC DP Tank Farm 21 /FU-1 Drill Depth From 0.0 To 35.0' Page 2 of 2

Driller Stewart Bros. Box #(s) — Start Date/Time 5-25-95/1010 End Date/Time 5-25-95/1155

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' Core Barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	4.3/5.0 86%		BT=17# OVM=0.0	—	30-35.0 Moderately to ~~to~~ Non welded Tuff. Gray (N7) Pumice To 1.5cm are white to reddish (when altered.) ~15% clinoptilolite in ash matrix		Unit 3 of Tsankawi Member of Tuff	Run # 9 1133
32.5		-01 and -02	BT= — OVM= —	—				Run # 9
35.0		327332	BT= OVM=	—	No Recovery 34.7 To 35.0 End of hole. TD = 35.0'			Run #
			BT= OVM=	—				Run #
DC 40.0			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
DC 45.0			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
DC 50.0			BT= OVM=	—				Run #
			BT= OVM=	—				Run #
DC 55.0			BT= OVM=	—				Run #
DC 60.0			BT= OVM=	—				Run #

Prepared by John C Crocker Date 5/25/95 Checked By [signature] Date 6/8/95

LOS ALAMOS NATIONAL LABORATC.. / ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3014 TA/~~OU~~ FUDC DP TANK Farm 21 / FU-1 Drill Depth From 0.0 To 35.0 Page 1 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-31-95/1134 End Date/Time 5-31-95/1300

Drilling Equip./Method CME-750/Hollow Stem Augers Sampling Equip./Method Hollow Stem augers/ 5' core barrel

Depth (feet)	Recovery (feet per feet / %)	Field Analytical Sample Number	Field Screening Results	Top/Bottom of Core In Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
0.0	2.5/2.5 100%		βT=178 cpm OVM=0.0 ppm	—	0.0-2.0 FT. Fine Sand, Silt and abundant clay with Pebbles To 3.0cm. Moist. (10R 3/4) 2.0-2.5 Greyish Red Tuff (5R 4/2), Grey Pumice (N8) To 3.0cm. Matrix is ash with 20% crystals and 2% lithics		Fill Material	Run #1 1134 hrs
2.5	3.5/2.5 100%	OU1-95-0160 3.8-4.5	βT= OVM=	—	2.5-5.0 Greyish Red Tuff (5R 4/2). Pumice are grey (N8) And unaltered. Matrix is ash with 22% crystals and 1-2% Lithics. 3.5-5.0: Tuff is altered to moderate orangish pink on one side of a clay/oxide-filled Fracture (High angle)			Run #2 Roll 5 (Calculation across fractures). Photos 26 and 27
5.0	4.7/5.0 94%		βT=197 cpm OVM=0.0 ppm	—	5.0-10.0 Greyish brown Tuff. Pumice are grey (N8) and as large as 6.0 cm. (Most have a sugary Texture). Matrix is ash with ~17% crystals and 3% lithic fragments.			Run #3 1152 hrs
		OU1-95-0161 9.4-9.8	βT: — OVM= —	—			Tuff	Run #3
10.0	5.0/5.0 100%		βT=149 cpm OVM=0.0 ppm	—	10.0-15.0 Greyish Brown Tuff (5YR 4/1). Pumice are as large as 3.0cm, are Grey (N8) and sugary Textured. Rare pumice <1.0 cm are altered to a Reddish brown hue (10R 3/4). Matrix is ash with 25% crystals and 2% lithics. Tuff moderately			Run #4 1203 hrs
		OU1-95-0162 13.7-14.4	βT= — OVM= —	—	Welded. ~~15.0-20.0~~ 14.0-15.0' High angle and moderate angle fractures. No Fill material.		Member of Bandelier	Run #4
15.0	5.0/5.0		βT=175 cpm OVM=0.0 ppm	—	15.0-20.0 moderately welded Greyish Brown Tuff (5YR 4/1). Pumice to 4.6 cm average ~2.0cm, most are at least partly altered to reddish Brown (10R 3/4). Matrix is ash with ~25% crystals and 2% lithics.			Run #5 1220 hrs
		OU1-95-0163 OU1-95-0164 16.5-17.2	βT= — OVM= —	—				Run #5
20.0	5.0/5.0		βT=147 cpm OVM=4.0 ppm	—	20.0-25.0 Non-welded and completely disaggregated Brownish Grey Tuff (5YR 4/1). Pumice To 1.5 cm, most are altered To reddish brown color (10R 3/4). Matrix is ash with 17% crystals and 1% lithics.		Unit 3 of Tshirege	Run #6 1230 hrs
		OU1-95-0165 21.4-22.0	βT= — OVM= —	—				Run #6
25.0	2.5/2.5 100%		βT=174 cpm OVM=4.0 ppm	—	25.0-27.5 Moderately Welded Brownish-grey Tuff (5YR 4/1). Pumice To 1.5 cm, most are altered To a reddish Brown (10R 3/4) color. Matrix is ash With ~17% crystals and 1% Lithics. 26' and 26.5' Horizontal Fractures w/ no fill material.			Run #7 1248 hrs
	2.5/2.5 100%	OU1-95-0166 27.0-27.5	βT=142 cpm OVM=0.0 ppm	—	27.5-30.0 Brownish Grey Tuff (5YR 4/1). Non-Welded and Disaggregated. Pumice are altered Reddish-Brown (10R 3/4) and are as Large as 1.5 cm. Matrix is ash with 15% crystals and 2% Lithics.			Run #8 1256 hrs
30.0								

Prepared by John C Cooper Date 5-31-95 Checked By [illegible] Date 6/6/95

LOS ALAMOS NATIONAL LABORATORY / ENVIRONMENTAL RESTORATION PROGRAM

SAMPLE MANAGEMENT FACILITY

CORE SAMPLE LOG

Borehole ID 21-3014 TA/~~OU~~ PUPG DP Tank Farm 21 / PH-1 Drill Depth From 0.0 To 35.00 Page 2 of 2

Driller Stewart Bros. Box #(s) —— Start Date/Time 5-31-95/1134 End Date/Time 5-31-95/1300

Drilling Equip./Method CME-750/Hollow Stem Auger Sampling Equip./Method Hollow Stem Auger/5' Split barrel

Depth (feet)	Recovery (feet per feet / %)	Field Anaytical Sample Number	Field Screening Results	Top/Bottom of Core in Box	Lithology-Petrology - Soil	Graphic Log	Lithologic Unit	Notes
30.0	2.5 / 5.0 / 50%	[illegible]	BT: — OVM: —	—	30.0-35.0 Grey TUFF (NS), Non-Welded and disaggregated. Pumice to 0.75 cm are altered reddish brown (10R 3/4) Matrix is ash with ~15% crystals.	11 / 11	Tshirege Unit 3 # Member of Bandelier Tuff	Run #9 1257
32.5		21N-95-0169 31.5-32.0	BT: 147 OVM: 0.0	—		11 / 1 / 1		Run #9
35.0			BT: — OVM: —	—				Run #
PC 40.0			BT: — OVM: —	—				Run #
			BT: — OVM: —	—				Run #
PC 45.0			BT: — OVM: —	—				Run #
			BT: — OVM: —	—				Run #
PC 50.0			BT: — OVM: —	—				Run #
			BT: — OVM: —	—				Run #
PC 55.0			BT: — OVM: —	—				Run #
			BT: — OVM: —	—				Run #
PC 60.0			BT: — OVM: —	—				Run #

Prepared by John C Nocken Date 5-31-95 Checked By [signature] Date 6/8/95

ENCLOSURE 6

LANL GENERAL GEOLOGY AND HYDROLOGY INFORMATION AND SURFICIAL GEOLOGY AT THE DP TANK FARM SITE

Surficial Geology - DP Tank Farm Site

According to the "Soil Survey of Los Alamos County, New Mexico" (LASL, LA-6779-MS), the surface soils found at the site are composed of the Hackroy sandy loam. The surface layer of this soil is typically described as follows: brown and moist; weak fine subangular blocky structure; hard and friable moist; common fine angular pores; mildly alkaline; and abrupt smooth boundary. ERM/Golder observed the surficial soils in the vicinity of the two fill station locations to be thin and poorly developed fine sand, silt and gravel overlaying the tuff bedrock. Soil thicknesses ranged from less than 1 foot at boring 21-3013 located near the east fill station to approximately 7.5 feet at boring 21-3004 located south of the former west fill station.

In all areas of the site, the soils overlay Unit 3 of the Tshirege Member of the Bandelier Tuff. This unit is typically described as a grey, nonwelded to moderately welded tuff containing pumice fragments up to 3 cm in diameter with up to 15 percent crystals and lithic fragments embedded in the matrix. Horizontal to high-angle fractures are common. Many of the fractures were lined with carbonate materials or clays. Much of the core recovered was completely disaggregated, making accurate lithologic descriptions and fracture characterization difficult to impossible.

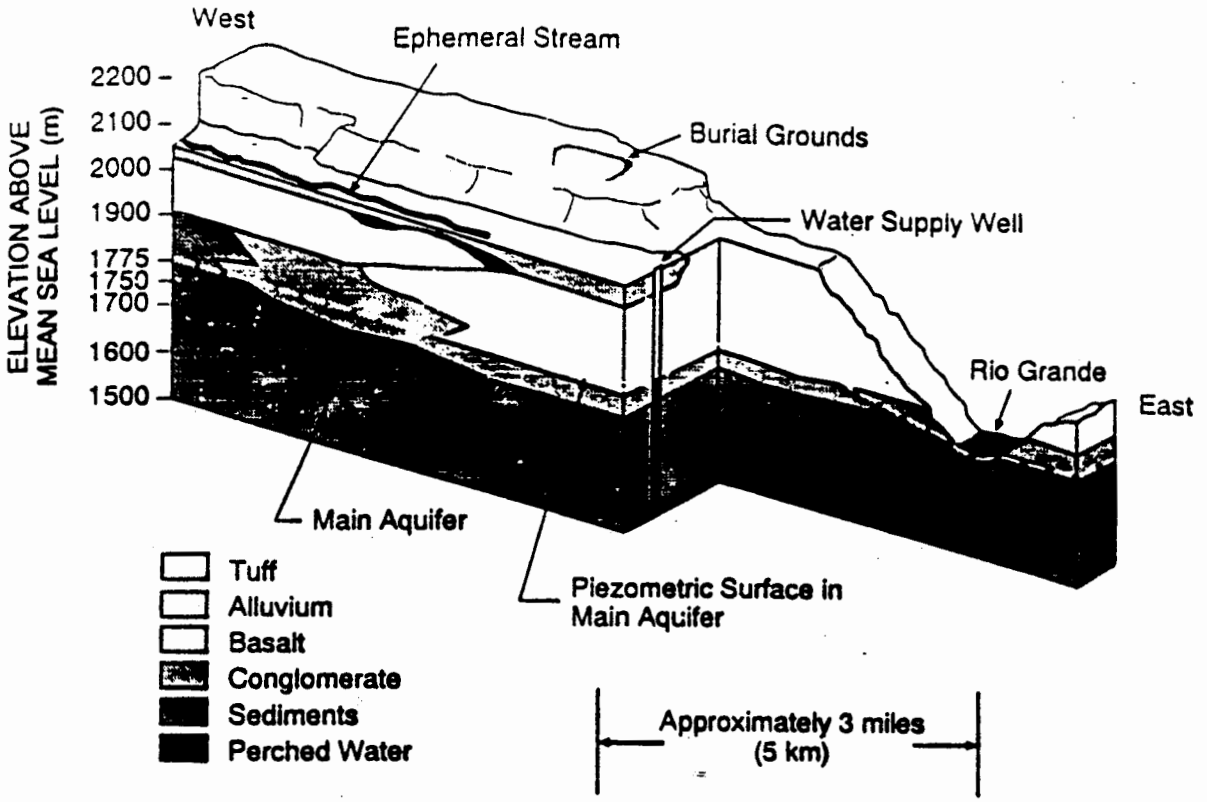


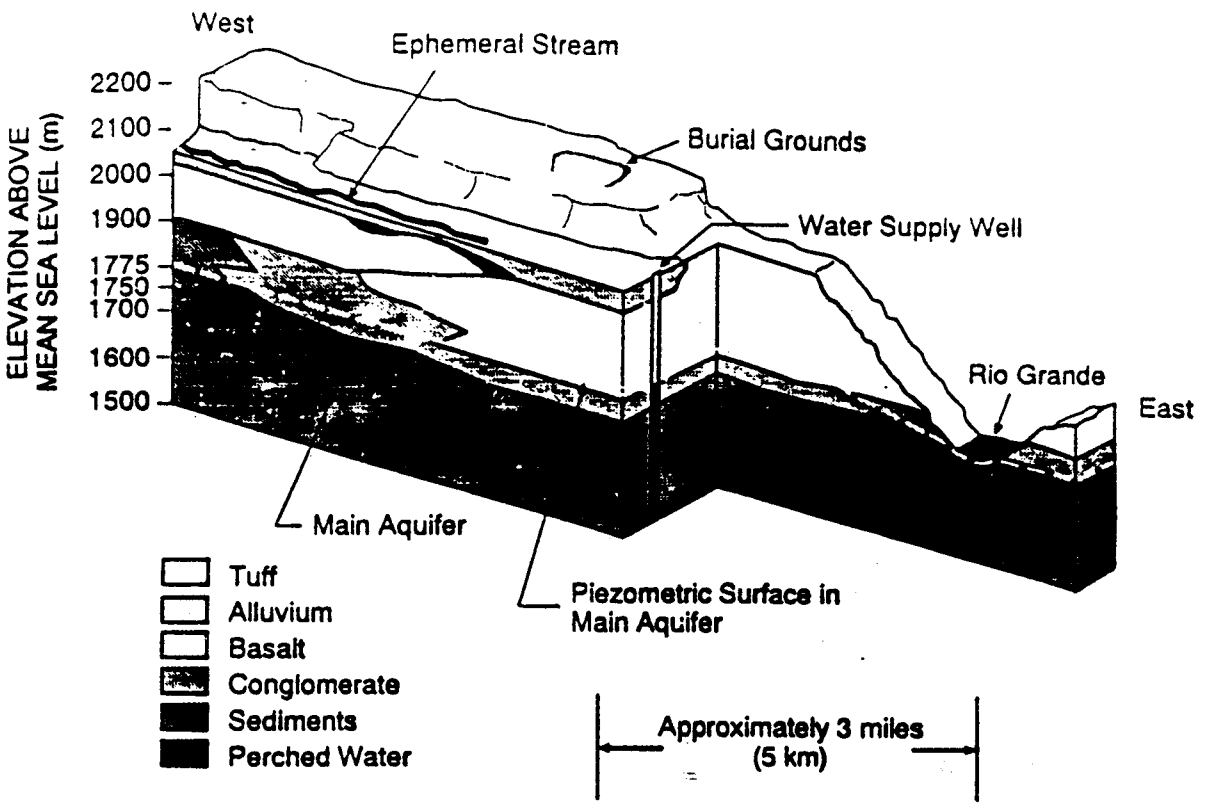
Fig. II-6. Conceptual illustration of geologic-hydrologic relationship in Los Alamos area.

(3 ft) to as much as 30 m (100 ft) in thickness. The alluvium is permeable, in contrast to the underlying volcanic tuff and sediments. Intermittent runoff in canyons infiltrates the alluvium until its downward movement is impeded by the less permeable tuff and volcanic sediment. This results in a shallow alluvial groundwater body that moves 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).

Perched water occurs in conglomerate and basalts beneath the alluvium in portions of Pueblo, Los Alamos, and Sandia Canyons. It has been encountered 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, mainly in basalts in Los Alamos Canyon at 61-76 m (200-250 ft) (Fig. II-6), and in Sandia Canyon near the eastern Laboratory boundary at a depth of about 137 m (450 ft). Perched water has one discharge point at Basalt Spring in Los Alamos Canyon.

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 aquifer ranges from 360 m (1,200 ft) along the western margin of the plateau to about 180 m (600 ft) at the eastern margin. The main aquifer is isolated from alluvial and perched waters by about 110 to 190 m (350 to 620 ft) of dry tuff and volcanic sediments. Thus, there is little hydrologic connection or potential for recharge to the main aquifer from alluvial or perched water.

Water in the main aquifer is under artesian conditions in the eastern part and along the Rio Grande (Purtymun 1974b). Major recharge to the main aquifer is inferred to be from the west because of the slope of the piezometric surface. The main aquifer discharges into the Rio Grande through springs in White Rock



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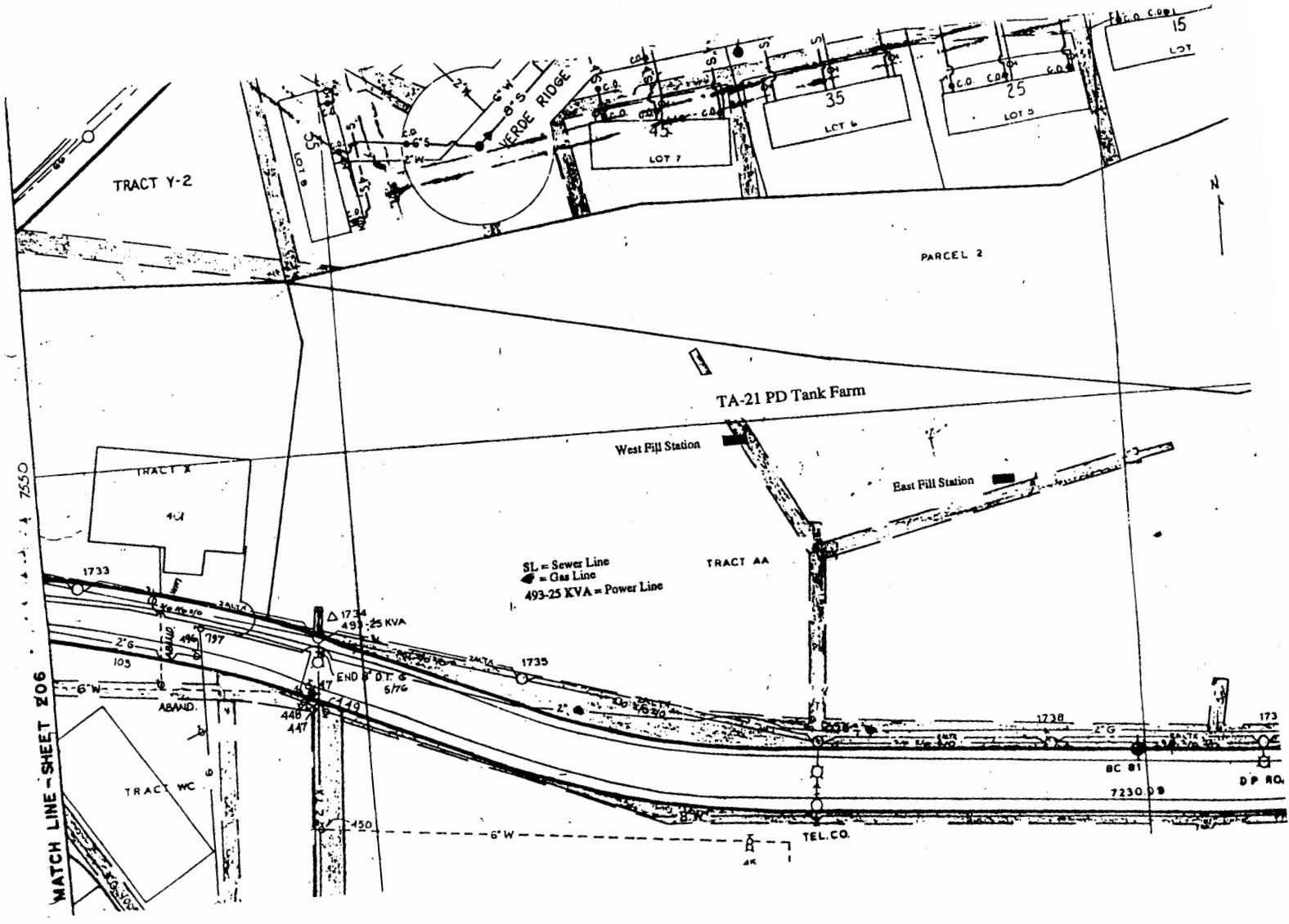
Surficial Geology - DP Tank Farm Site

According to the "Soil Survey of Los Alamos County, New Mexico" (LASL, LA-6779-MS), the surface soils found at the site are composed of the Hackroy sandy loam. The surface layer of this soil is typically described as follows: brown and moist; weak fine subangular blocky structure; hard and friable moist; common fine angular pores; mildly alkaline; and abrupt smooth boundary. ERM/Golder observed the surficial soils in the vicinity of the two fill station locations to be thin and poorly developed fine sand, silt and gravel overlaying the tuff bedrock. Soil thicknesses ranged from less than 1 foot at boring 21-3013 located near the east fill station to approximately 7.5 feet at boring 21-3004 located south of the former west fill station.

In all areas of the site, the soils overlay Unit 3 of the Tshirege Member of the Bandelier Tuff. This unit is typically described as a grey, nonwelded to moderately welded tuff containing pumice fragments up to 3 cm in diameter with up to 15 percent crystals and lithic fragments embedded in the matrix. Horizontal to high-angle fractures are common. Many of the fractures were lined with carbonate materials or clays. Much of the core recovered was completely disaggregated, making accurate lithologic descriptions and fracture characterization difficult to impossible.

ENCLOSURE 7

ENGINEERING DRAWING OF UTILITY LINES SOUTH OF THE FORMER TA-21 DP TANK FARM

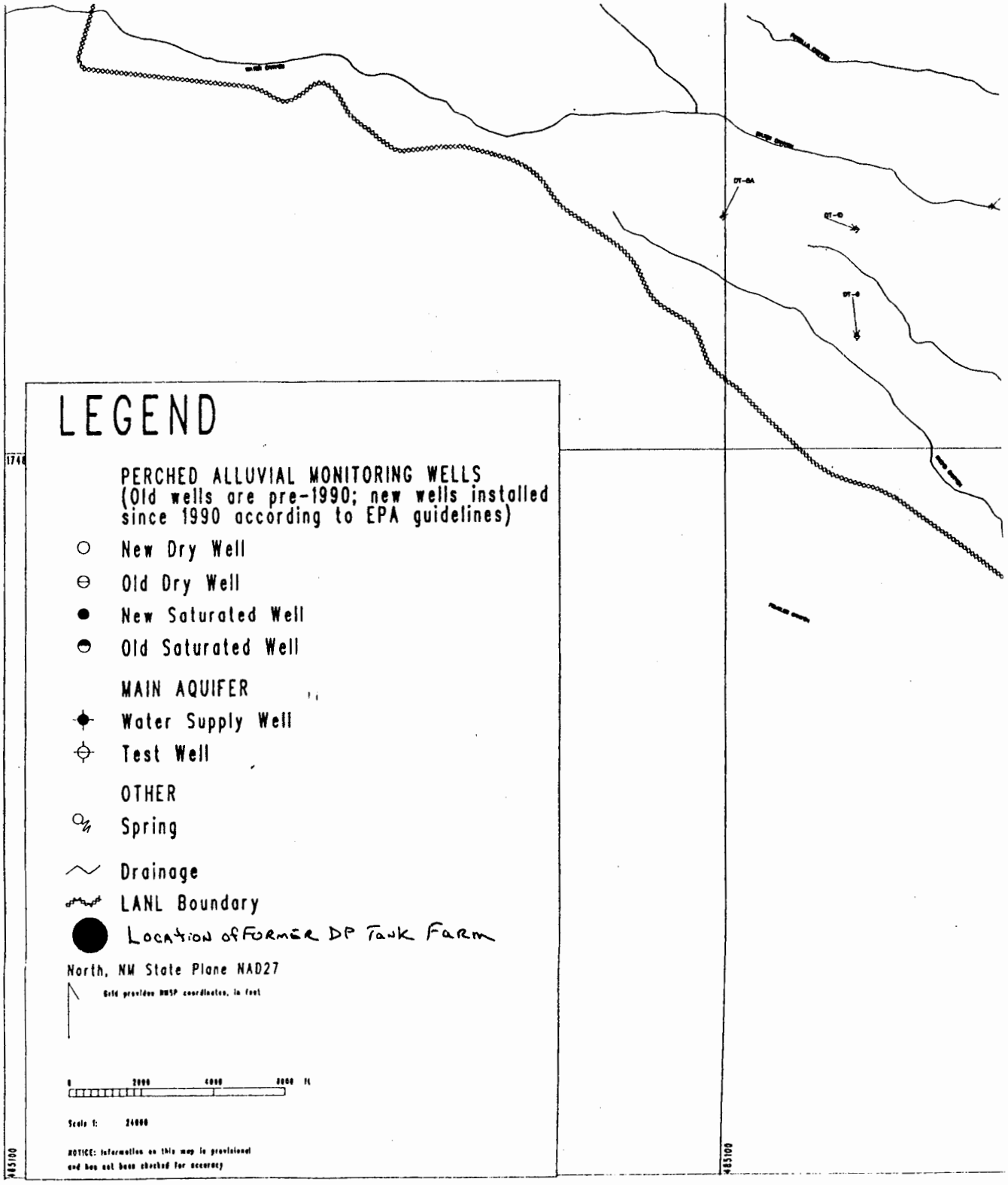

TRACT Y-2
VERDE RIDGE
LOT 7
LOT 6
LOT 5
PARCEL 2
TA-21 PD Tank Farm
West Fill Station
East Fill Station
TRACT X
TRACT AA
TRACT WC
SL = Sewer Line
= Gas Line
493-25 KVA = Power Line
1733
1734
1735
1738
ABAND.
TEL.CO.
MATCH LINE - SHEET Z06
N

ENCLOSURE 8

GROUNDWATER WELLS

AND OTHER PENETRATIONS AND DRAINAGES

Note: The nearest municipal water well from the former TA-21 PD Tank Farm is PM-3. PM-3 is approximately 15,000 feet, east south-east from the site.


DT-9A
DT-10
DT-9
1740
1740
LEGEND
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
MAIN AQUIFER
Water Supply Well
Test Well
OTHER
Spring
Drainage
LANL Boundary
Location of Former DP Tank Farm
North, NM State Plane NAD27
Grid provides NMSP coordinates, in feet
0
2000
4000
8000 ft
Scale 1: 24000
NOTICE: Information on this map is provisional and has not been checked for accuracy
405100
405100

ENCLOSURE 9

SOIL SAMPLE RESULTS

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3002 May 25, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) (2) Acetone	MEK (3)	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0121-95-0(	3.9	4.4	0.0	U (4)	U	U	U	U	U	U	U	U
0009	8.8	9.4	0.1	U	U	U	U	U	U	U	U	U
0010	13.9	14.5	0.0	U	U	0.52	0.24	U	U	U	0.76	U
0011	19.2	19.8	0.0	U	U	0.59	0.27	U	U	U	0.87	U
0012	22.5	23.0	0.0	U	U	0.61	0.28	U	U	U	0.89	U
0139	29.0	29.5	NA (6)	U	U	0.61	0.27	U	U	U	0.87	U
0140	32.0	32.5	NA	U	U	0.56	0.26	U	U	U	0.82	U

Borehole 21-3003 (Angled at 45 degrees) May 30, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0015	4.0	4.6	0.0	U	U	U	U	U	U	U	U	U
0016	8.7	9.3	0.0	U	U	U	U	U	U	U	U	U
0017	13.5	14.3	165	U	U	U	U	U	U	U	U	>600 J
0018	18.5	19.2	181	U	U	U	U	U	U	U	U	>670 J
0019	23.8	24.5	13	U	U	U	U	U	U	U	U	U
0020	28.4	29.0	0.0	U	U	U	U	U	U	U	U	U
0021	34.0	34.7	0.0	U	U	U	U	U	U	U	U	U
0022	38.7	39.2	NA	U	U	U	U	U	U	U	U	U
0141	44.0	44.5	NA	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3004 — May 30-31, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0023	3.1	3.7	0.0	U	U	U	U	U	U	U	U	U
0024	9.1	9.6	0.0	U	U	U	U	U	U	U	U	U
0025	13.8	14.3	0.0	U	U	U	U	U	U	U	U	U
0026	17.0	17.5	0.0	U	U	U	U	U	U	U	U	U
0027	23.5	24.2	0.0	U	U	U	U	U	U	U	U	U
0028	28.7	29.3	0.3	U	U	U	U	U	U	U	U	U
0029	33.9	34.4	0.0	U	U	U	U	U	U	U	U	U
0030	38.5	39.0	NA	U	U	U	U	U	U	U	U	U
0031	42.5	43.0	NA	U	U	U	U	U	U	U	U	U

Borehole 21-3005 — May 26, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0032	3.8	4.3	0.0	U	U	0.53	0.19	U	U	U	0.72	U
0033	8.4	9.2	0.1	U	U	0.61	0.22	U	U	U	0.83	U
0034	13.6	14.1	0.0	U	U	0.65	0.23	U	U	U	0.89	U
0035	18.9	19.3	0.0	U	U	0.65	0.24	U	U	U	0.89	U
0036	22.0	23.0	0.1	U	U	0.70	0.26	U	U	U	0.96	U
0037	22.0	23.0	0.1	U	U	0.70	0.26	U	U	U	0.97	U
0038	29.0	29.5	NA	U	U	0.61	0.23	U	U	U	0.84	U
0039	34.0	34.5	NA	U	U	0.67	0.26	U	U	U	0.93	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3006 May 17-19, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0041	4.0	4.8	0.0	U	U	U	U	U	U	U	U	U
0042	9.3	9.8	8400	U	U	18.4 J	158.9 J	72.6 J	300.4 J	124 J	674.3 J	8239
0043	14.0	14.5	331	U	U	6.3	61.2	27.9	147	66.8	309.2	7008
0044	19.0	19.5	NA	U	U	6.9	117.9	63	272.3	131	591.1	>2901
0045	24.0	24.5	702	U	U	U	37.8 J	15.3 J	108.4 J	54.1 J	215.6 J	2049
0046	29.3	29.5	98	U	U	0.053	U	U	U	U	0.053	U
0047	34.0	34.5	395	U	U	0.062	U	U	U	U	0.062	2365
0048	39.0	39.5	219	U	U	0.065	U	U	U	U	0.065	213
0121	43.4	43.9	133	U	U	U	U	U	U	U	U	114
0122	49.0	49.5	2.7	U	U	U	U	U	U	U	U	U
0123	54.1	54.5	4.0	U	U	U	U	U	U	U	U	U
0124	57.0	57.3	0.0	U	U	U	U	U	U	U	U	U
0125	59.4	59.7	0.0	U	U	U	U	U	U	U	U	U
0126	64.2	64.5	0.0	U	U	U	U	U	U	U	U	U

Borehole 21-3007 May 19, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0049	4.0	4.8	0.0	U	U	U	U	U	U	U	U	U
0050	9.0	9.8	0.0	U	U	U	U	U	U	U	U	U
0051	14.3	14.8	0.0	U	U	U	U	U	U	U	U	U
0052	19.0	19.5	0.0	U	U	U	U	U	U	U	U	U
0053	24.0	24.8	0.0	U	U	U	U	U	U	U	U	U
0054	29.2	29.7	155	U	U	U	U	U	U	U	U	U
0055	34.2	34.6	206	U	U	U	U	U	U	U	U	U
0056	39.2	39.6	1.2	U	U	U	U	U	U	U	U	U
0127	44.0	44.7	0.0	U	U	U	U	U	U	U	U	U
0129	48.7	49.1	0.0	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3008 (Angled at 45 degrees) May 22-23, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0057	3.0	3.5	53	UJ (7)	U	UJ	UJ	UJ	UJ	UJ	UJ	U
0130	6.2	6.8	1452	UJ	U	UJ	0.45 J	0.13 J	2.6 J	2.7 J	5.88 J	>1500 J
0058	8.8	9.4	1853	U	U	U	U	U	3.40	2.90	6.30	>900 J
0059	13.8	14.2	NA	UJ	U	18.6 J	115 J	75 J	218 J	123 J	549.6 J	>2000 J
0060	18.5	19.1	NA	UJ	U	12.8 J	55 J	34.7 J	101 J	56.2 J	259.7 J	>1200 J
0131	18.5	19.1	NA	UJ	U	9.4 J	52.4 J	31.5 J	91.9 J	52.1 J	237.3 J	>3300 J
0061	24.0	24.5	NA	U	U	6.80	65.20	48.40	161.00	87.30	368.70	>1200 J
0062	29.0	29.5	NA	UJ	U	U	0.71 J	U	2.6 J	1.4 J	4.71 J	U
0063	34.0	34.5	517	U	U	U	U	U	U	U	U	390 J
0064	38.4	39.0	47	U	U	U	U	U	U	U	U	U
0132	43.8	44.2	4.9	U	U	U	U	U	U	U	U	U
0133	49.1	49.6	13	U	U	U	U	U	U	U	U	U

Borehole 21-3009 May 24, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0065	4.3	4.9	290	U	U	U	U	U	U	U	U	1461
0066	8.8	9.3	1098	U	U	U	U	U	U	U	U	1678
0067	14.3	14.6	NA	U	U	U	0.03 J	0.21 J	0.60 J	0.83 J	1.67	2393

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3010 — May 22, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0074	4.0	4.7	0.6	U	U	U	U	U	U	U	U	U
0075	9.0	9.5	1.9	U	U	U	U	U	U	U	U	U
0076	13.5	14.0	0.6	U	U	U	U	U	U	U	U	U
0077	19.0	19.4	0.3	U	U	U	U	U	U	U	U	U
0078	23.7	24.4	0.3	U	U	U	U	U	U	U	U	U
0079	26.8	27.6	0.3	U	U	U	U	U	U	U	U	U
0080	33.5	34.0	0.0	U	U	U	U	U	U	U	U	U

Borehole 21-3011 — May 23, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0082	3.2	3.7	91	U	U	U	U	U	U	U	U	U
0083	8.4	8.9	210	U	U	U	U	U	U	U	U	U
0084	13.1	13.6	57	U	U	U	U	U	0.12	0.14	0.26	U
0085	19.0	19.3	665	U	U	U	U	U	1.30	1.40	2.70	>2000 J
0086	23.6	24.4	560	U	U	U	U	0.03	0.29	0.34	0.66	>1500 J
0087	29.0	29.4	227	U	U	U	U	U	U	U	U	U
0088	33.5	34.4	121	U	U	U	U	U	U	U	U	U
0089	33.5	34.4	121	U	U	U	U	U	U	U	U	U
0135	39.0	39.5	NA	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3012 May 24, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0090	3.2	3.6	0.1	U	U	U	U	U	U	U	U	U
0091	8.6	9.2	0.0	U	U	U	U	U	U	U	U	U
0092	14.0	14.7	0.0	U	U	U	U	U	U	U	U	U
0093	16.7	17.3	0.0	U	U	U	U	U	U	U	U	U
0094	23.8	24.6	0.0	U	U	U	U	U	U	U	U	U
0095	26.3	26.8	0.0	U	U	U	U	U	U	U	U	U
0096	33.9	34.7	0.0	U	U	U	U	U	U	U	U	U
0097	38.9	39.4	0.0	U	U	U	U	U	U	U	U	U
0136	43.0	43.5	0.0	U	U	U	U	U	U	U	U	U
0137	49.0	49.5	NA	U	U	U	U	U	U	U	U	U
0138	54.0	54.5	NA	U	U	U	U	U	U	U	U	U

Borehole 21-3013 May 25, 1994

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0098	3.5	4.2	0.0	U	U	U	U	U	U	U	U	U
0099	8.4	9.1	0.1	U	U	U	U	U	U	U	U	U
0100	14.0	14.5	0.0	U	U	U	U	U	U	U	U	U
0101	18.8	19.4	0.0	U	U	U	U	U	U	U	U	U
0102	24.0	24.5	0.1	U	U	U	U	U	U	U	U	U
0104	29.0	29.5	NA	U	U	U	U	U	U	U	U	U
0105	32.7	33.2	NA	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3014 — May 31, 1995

Sample Number	Sample Interval (ft) From	Sample Interval (ft) To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0160	3.8	4.5	0.0	U	U	U	U	U	U	U	U	U
0161	8.4	9.0	0.0	U	U	U	U	U	U	U	U	U
0162	13.7	14.4	0.0	U	U	U	U	U	U	U	U	U
0163	18.5	19.2	0.0	U	U	U	U	U	U	U	U	U
0164	18.5	19.2	0.0	U	U	U	U	U	U	U	U	U
0165	21.4	22.0	0.0	U	U	U	U	U	U	U	U	U
0168	29.0	29.5	NA	U	U	U	U	U	U	U	U	U
0169	31.5	32.0	NA	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Borehole 21-3015

Shallow Borehole Approximately 10 Feet North of Hydrocarbon Seep — June 1, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0171	3.0	3.5	NA	U	U	U	U	U	U	U	U	131
0172	4.5	5.0	NA	U	U	U	U	U	U	U	U	82
0173	7.0	7.5	NA	U	U	U	U	U	U	U	U	51
0174	8.5	9.0	NA	U	U	U	U	U	U	U	U	U

Borehole 21-3018

Shallow Borehole Approximately 20 Feet North of Hydrocarbon Seep — June 8, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0218	1.5	2.5	NA	U	U	U	U	U	U	U	U	296
0219	4.0	4.5	NA	U	U	U	U	U	U	U	U	U
0220	6.0	7.0	NA	U	U	U	U	U	U	U	U	U
0221	8.0	9.0	NA	U	U	U	U	U	U	U	U	U

Borehole 21-3019

Shallow Borehole Approximately 5 Feet South of Hydrocarbon Seep — June 8, 1995

Sample Number	Sample Interval (ft) From	To	Headspace (ppm)	EPA Method 8020 (ppm) Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	EPA Method 8015 TPH (ppm)
0223	1.5	2.5	NA	U	U	U	U	U	U	U	U	U
0224	4.0	5.0	NA	U	U	U	U	U	U	U	U	U
0225	6.0	7.0	NA	U	U	U	U	U	U	U	U	U
0226	8.0	9.0	NA	U	U	U	U	U	U	U	U	U

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Surface Soil/Tuff Samples

June 14, 1995

Sample Number	Approximate Sample Location (relative to seep)	Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
			Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0185	250' downstream	NA	U	U	U	U	U	U	U	U	U
0186	250' downstream	NA	U	U	U	U	U	U	U	U	U
-	At Seep (see sample sites 21-3020 at 21-3021 below)										
0187	100' upstream	NA	U	U	U	U	U	U	U	U	U

Surface Sample Site 21-3020

Sample collected from stream bed at seep just above waterline. South bank.

June 14, 1995

Sample Number	Sample Interval (ft)		Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
	From	To		Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0228	0.0	0.4	NA	U	U	U	U	U	U	U	U	>1382
0229	0.0	0.4	NA	U	U	U	U	U	U	U	U	>1796

Surface Sample Site 21-3021

Sample collected from stream bed at seep just above waterline. North bank.

June 14, 1995

Sample Number	Sample Interval (ft)		Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
	From	To		Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0233	0.0	0.4	NA	U	U	U	U	U	U	U	U	>1042
0234	0.0	0.4	NA	U	U	U	U	U	U	U	U	>569

SOIL SAMPLE RESULTS (1)
DP TANK FARM
May 1995

Surface Water Samples June 1, 1995

Sample Number	Approximate Sample Location (relative to seep)	Headspace (ppm)	EPA Method 8020 (ppm)								EPA Method 8015 TPH (ppm)
			Acetone	MEK	Benzene	Toluene	Ethylbenzene	M,P-Xylene	O-Xylene	Total BTEX	
0243	250' downstream	NA	U	U	U	U	U	U	U	U	U
0244	At Seep	NA	U	U	U	U	U	U	U	U	U
0245	100' upstream	NA	U	U	U	U	U	U	U	U	U
0247*	At Seep	NA	U	U	U	U	U	U	U	U	U

* Sample 0247 (collected 6/8/95) was collected downgradient of the hydrocarbon seep just after intentionally disturbing the hydrocarbon seep to produce a visible sheen on the water.

Notes:

(1) All data is validated.
(2) ppm - parts per million
(3) MEK - Methyl Ethyl Ketone
(4) U - Not detected above the MCAL detection limit.
(5) J-Estimated quantities
(6) NA - Not analyzed
(7) UJ-Not detected, but qualified as an estimate.

Note 1 - MCAL detection limits are as follows:
Acetone: 0.2 ppm
MEK: 0.2 ppm
Benzene: 0.05 ppm
Toluene: 0.05 ppm
Ethylbenzene: 0.05 ppm
Xylenes: 0.05 ppm
TPH: 50 ppm

Note 2 - For investigation purposes, the UST action level for total BTEX is 100 ppm. For remediation purposes, UST action levels are 50 ppm for total BTEX and 10 ppm for benzene, or 100 ppm for TPH. These remediation action levels are used at sites contaminated with "highly contaminated" or saturated soils that are 50 feet or less above the seasonal high groundwater level.

ATTACHMENT B CORRESPONDENCE

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: May 19, 1995
In Reply Refer To: ESH-18/WQ&H:95-0252
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Jim Piatt, Chief
Surface Water Quality Bureau
New Mexico Environment Department
1190, St. Francis Drive
Santa Fe, NM 87502

SUBJECT: RELEASE OF DIESEL FUEL AT TA-21

Dear Mr. Piatt:

The enclosed data package contains additional information associated with a release of diesel fuel discovered at Solid Waste Management Unit (SWMU) 21-029 located at TA-21. The release was verbally reported to your office on May 10, 1995, pursuant to Section 1-203.A of the New Mexico Water Quality Control Commission Regulations.

This site is currently being investigated pursuant to Module VIII of the Laboratory's Resource Conservation and Recovery Act Permit. Additionally, the Water Quality & Hydrology Group (ESH-18) will collect water samples from the ephemeral watercourse adjacent to SWMU 21-029 to determine if contaminants have migrated from the release site.

If you have any questions associated with the attached information regarding SWMU 21-029, please contact me at 665-1859 or Alex Puglisi at 667-4882.

Sincerely,

Steve Rae
Acting Group Leader
Water Quality and Hydrology Group

AP:SR/em

Enclosures: a/s

Cy: G. Saums, NMED, Surface Water Quality Bureau, w/enc.
H. Decker, AIP Bureau, w/enc.. MS J993
S. Yanicek, AIP Bureau, w/enc., MS J993
D. McInroy, EM/ER, w/enc., MS M992
M. Leavitt, NMED, Ground Water Protection and Remediation Bureau, w/enc.
B. Koch, DOE/LAAO, w/enc., MS A316
T. Taylor, DOE/LAAO, w/enc., MS A316
WQ&H File, MS K497
CRM-4, MS A150

Release Notification
DP Tank Farm
TA-21, SWMU 21-029

Description of Release: A site investigation at the former DP Tank Farm located at TA-21 has indicated that contaminants may have migrated to DP Canyon by flow through fractures in the tuff. Due to the position of a hydrocarbon seep in the DP Canyon drainage, contaminants migrating to the surface may be impacting water quality in this ephemeral watercourse. (See attached Technical Memorandum for further information).

Los Alamos National Laboratory
NPDES Permit No. NM0028355
Release Notification Form

Responsible Facility/User Group LANL/ER Program Contact Person Alex Puglisi / James Alarid

Phone # 667-4882 / 665-9736 Pager # 699-1947

Discharge Location: TA-21, SWMU-21-029

Discharge Occurred: Ongoing (date / time) Discharge Discovered: See Attached Technical Report (date / time)

Discharge Stopped: Ongoing (date / time) Method: _____

Corrective Actions: See Attached Technical Memorandum.

Nearest watercourse and/or canyon affected: None _____ Describe: DP Canyon

Source and cause of discharge: Underground storage tanks and spillage of petroleum products at former fueling area.

Materials Spilled: Diesel, gasoline and other fuel products

Estimate Amount: Unknown

Cleanup Started: Yes _____ No X Date _____ Time _____

Cleanup Finished: Yes _____ No X Date _____ Time _____

Weather Conditions: N/A

*24 Hr. Notification:

EPA	Person:	N/A	NMED	Person:	N. Wells
	Time:			Time:	1520 hr.
	Date:			Date:	5/10/95
ESH-7	Person:	N/A	DOE	Person:	B. Koch
	Time:			Time:	0730 hr.
	Date:			Date:	5/11/95

Written follow-up within 7 days: Date: 5/17/95
Corrective action report within 15 days: Date: 5/17/95
NMED/EPA Approval on file: Date: Pending

Comments: Soil / substrate samples from seep area in DP Canyon indicate the presence of diesel. Further sampling will be performed on the watercourse.

Release Notification Form Completed By: Alex Puglisi / James Alarid, Water Quality & Hydrology Group (ESH-18)

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DEPUTY SECRETARY

June 28, 1995

Beverly Martin
LANL ER Program MS/E525
Los Alamos, NM 87545

Re: Response to TA-21 site visit concerning TPH/DIESEL contamination of the stream course in DP Canyon.

Ms. Martin:

On May 31, 1995, per your request, AIP personnel accompanied LANL staff on a site visit to TA-21, former underground storage tank farm. The purpose of this visit was to help answer any questions that LANL staff may have concerning the possibility that hydrocarbons may be discharging along the tuff/channel stream course in DP canyon. After viewing the area of concern, and reviewing existing data a discussion was held concerning this project with NMED Surface Water Quality Bureau staff. SWQB concurred with AIP suggestions that ER staff take several water and soil/rock samples. Sample locations agreed upon were upstream of the seep, at the seep and downstream in order to assess the possible contamination impact on the stream below the release area. Other interested bureaus within the NMED may respond to this separately.

If you have any questions please call me at 672-0459.

Sincerely,

Harvey L. Decker
Environmental Specialist C
NMED\SWQB\AIP

cc: Steve Rae, ES&H 18
Alex Puglisi, ES&H 18
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