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April 5, 2002

RZ2-R06745.01-ID-028

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Reference: EPA Contract No. 68-W-99-017; EPA Work Assignment No. R06745; Los Alamos National Laboratory Sampling Activities; Deliverable for Task 06- Draft Sampling Report, Los Alamos National Laboratory, Los Alamos, NM.

Dear Mr. Mayer:

Enclosed please find one original and two copies of the Draft Sampling Report and all associated attachments which documents activities conducted by TechLaw at the Los Alamos National Laboratory in Los Alamos, New Mexico, from July 30 through November 2, 2001. Also, a copy of the report is included on the enclosed CD.

Please contact me or Steve Phillips, the TechLaw Work Assignment Manager, at 903/785-7636 if you have any questions.

Sincerely,

Debra Pandak
Regional Manager

cc: F. Greene, EPA RPO w/o attachments
W. Jordan, TL Central Files
S. Phillips, TL WAM
Dallas Files

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# Sampling Report

## April 2002

## Los Alamos National Laboratory
## Los Alamos, New Mexico

**Prepared for:**

**U. S. Environmental**
**Protection Agency**
**Region 6**

**EPA Contract No. 68-W-99-017**
**Work Assigment No. R06745**
**Techlaw, Inc.**

# DRAFT SAMPLING REPORT
# LOS ALAMOS NATIONAL LABORATORY
# LOS ALAMOS, NEW MEXICO

**Prepared for:**

**U.S. Environmental Protection Agency**
**Region 6**
**1445 Ross Avenue, Suite 1200**
**Dallas, Texas 75202**

**Prepared by:**

**TechLaw, Inc.**
**750 North St. Paul Street, Suite 600**
**Dallas, Texas 75201**

**EPA Contract No. 68-W-99-017**
**Work Assignment No. R06745**

**April 2002**

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## ABBREVIATIONS AND ACRONYMS LIST

| | |
|---|---|
| $\alpha$ | Gross Alpha |
| $\beta$ | Gross Beta |
| ATS | Aurora Technical Services |
| DOE | U.S. Department of Energy |
| DCG | Derived Concentration Guides |
| DQO | Data Quality Objective |
| EPA | U.S. Environmental Protection Agency |
| $H^3$ | Tritium |
| MCL | Maximum Contaminant Level |
| MSSL | Medium-Specific Screening Level |
| LANL | Los Alamos National Laboratory |
| $\mu g/\ell$ | microgram per liter |
| $\mu m$ | micrometer |
| NMED OB | New Mexico Environment Department Oversight Bureau |
| NMWQCC | New Mexico Water Quality Control Commission |
| NPDES | National Pollutant Discharge Elimination System |
| PMC | Program Management Company |
| PRG | Preliminary Remediation Goals |
| QC | Quality Control |
| SOW | Statement of Work |
| Sr-90 | Strontium-90 |
| TA | Technical Area |
| TDS | Total Dissolved Solids |
| TechLaw | TechLaw, Inc. |
| TKN | Total Kjedahl Nitrogen |
| TSS | Total Suspended Solids |
| U | Uranium |
| UC | University of California |
| USGS | United States Geological Survey |
| VOC | Volatile Organic Compound |
| WHL | Wildlife Habitat Limits |

## DISCLAIMER

This report was prepared for the U.S. Environmental Protection Agency (EPA) Region 6, by TechLaw, Inc. in fulfillment of Contract No. 68-W99-017, Work Assignment No. R06745. Any opinions, findings, and conclusions expressed herein are those of the contractor and not necessarily those of the EPA or cooperating agencies. Mention of any company or product names is not to be considered an endorsement by the EPA.

This report is intended to assist EPA personnel in documenting the collection of samples during sampling activities conducted at Los Alamos National Laboratories between July 30, 2001 and November 2, 2001. EPA personnel must exercise their technical judgement in using this report, as well as other relevant information, in determining what additional actions may be needed.

## ACKNOWLEDGMENTS

The data contained within this report was collected between July 30 and November 2, 2001. Thanks are due to Steve Rae and David Rogers of Los Alamos National Laboratory who provided their support and cooperation necessary to make the sampling event a success. The Los Alamos National Laboratory field support personnel, Max Maes and Bob Beers, should be recognized for their long hours and hard work under stressful conditions in providing support and equipment necessary for the successful completion of the field activities.

Special thanks are also due to the New Mexico Environment Department's DOE Oversight Bureau located in White Rock, New Mexico, for their assistance and support, especially Michael Dale, Kim Granzow, and Steve Yanicak.

# 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) requested that TechLaw, Inc. (TechLaw), provide support to the agency by collecting effluent, groundwater, spring, and sediment samples at Los Alamos National Laboratory, Los Alamos, New Mexico. The University of California (UC) operates Los Alamos National Laboratory (LANL) as a prime contractor to the U.S. Department of Energy (DOE), which owns LANL. The facility has been in operation since 1943 and was responsible for the development of the first atomic bomb. The facility is approximately 43 square miles in size and consists of mesa tops intersected by steep canyons. LANL is located approximately 35 miles northwest of Santa Fe, New Mexico (Figure 1).

LANL has been performing investigations/cleanups on former waste sites within the facility for the past fourteen years, as required by their hazardous waste permit issued in 1990. Several of the hazardous waste sites located on the mesa tops and in the canyons have released hazardous constituents and radionuclides to the environment. Some of the canyons impacted by the release of contaminants continue onward to the Pueblo of San Ildefonso.

## 1.1 Objective

The objective of this work assignment was to collect effluent, groundwater, spring, and soil/sediment samples from various locations at LANL. Groundwater samples were collected from one main/deep-aquifer monitoring well and several shallow alluvial wells located in Mortandad Canyon and drinking-water production wells located on LANL property at various locations. Spring samples were collected from areas of the Pajarito Canyon watershed. Effluent samples were collected from Gaging Station 1 located downstream of Technical Area 50 Radioactive Waste Water Treatment Plant in Mortandad Canyon. Sediment samples were collected in Acid, Bayo, Sandia, Mortandad, Pajarito and Ancho Canyons. The sampling locations and analytical suites per location were identified in the EPA Statement of Work (SOW).

## 1.2 Site Background

### 1.2.1 Historical and Current Operations

The facility began operations as Los Alamos Laboratory in March 1943 at the inception of Project Y of the Manhattan Project. The goal of this project was to develop the world's first nuclear weapon. When the first nuclear bomb was detonated at Trinity Site in southern New Mexico in 1945, more than 3,000 civilian and military personnel were working at Los Alamos Laboratory. In 1947, Los Alamos Laboratory became Los Alamos Scientific Laboratory, which in turn became Los Alamos National Laboratory in 1981.

LANL's original mission to design, develop, and test nuclear weapons has broadened and evolved as technologies, US priorities, and the world community have changed. LANL is now a

multiprogram laboratory with the central mission of reducing nuclear danger. The central mission at LANL has evolved beyond nuclear weapons testing and development to include five major elements to reduce nuclear danger:

- stockpile stewardship activities which ensure safe, secure, and reliable weapons;
- stockpile management projects which provide capabilities ranging from dismantlement to the recertification of existing nuclear weapons;
- nuclear materials management which ensures the availability or safe disposition of plutonium, highly enriched uranium, and tritium;
- effective nonproliferation and counterproliferation technologies to keep nuclear weapons, nuclear materials, and nuclear weapons knowledge out of the wrong hands; and
- environmental stewardship projects to provide for the remediation and reduction of wastes from the nuclear weapons complex.

LANL plans to continue its role in defense, particularly in nuclear weapons technology, and will increasingly use its multi-disciplinary capabilities to solve important civilian problems (including initiatives in areas of health, national infrastructure, energy, education, and the environment) and industrial collaborations.

### 1.2.2 Geographical Setting

LANL and the nearby communities of Los Alamos and White Rock are located in Los Alamos County, in north-central New Mexico, approximately 60 miles north-northeast of Albuquerque and 35 miles northwest of Santa Fe. The 43-square mile facility is situated on the Pajarito Plateau, which consists of a series of finger-like mesas separated by east-west oriented canyons cut by perennial and intermittent streams (Figures 2 and 3). Mesa tops range in elevation from approximately 7,800 feet on the flanks of the Jemez Mountains to about 6,200 feet at their eastern termination above White Rock Canyon and the Rio Grande River.

Most LANL and community developments are confined to mesa tops. The surrounding land is largely undeveloped, and large tracts of land north, west, and south of LANL are held by the Santa Fe National Forest, Bureau of Land Management, Bandelier National Monument, General Services Administration, and Los Alamos County. The Pueblo of San Ildefonso borders LANL to the northeast.

LANL is divided into Technical Areas (TAs) that are used for office building sites, experimental areas, and waste disposal locations. However, these uses account for only a small part of the total land area held by LANL. Most land provides buffer areas for security and safety and is held in reserve for future use.

### 1.2.3 Geology and Hydrology

Most of the finger-like mesas in the Los Alamos area are formed from Bandelier Tuff, which includes ash fall, ash fall pumice, rhyolitic tuff, and epiclastic fluvial deposits of the Cerro Toledo Interval. The tuff is more than 1,000 feet thick in the western part of the plateau and thins to approximately 260 feet eastward above the Rio Grande. It was deposited as a result of major eruptions in the Jemez Mountains' volcanic center approximately 1.2 to 1.6 million years ago.

On the western part of Pajarito Plateau, the Bandelier Tuff overlaps onto the Tschicoma Formation, which consists of older volcanics that form the Jemez Mountains. The tuff is underlain by the conglomerate of the Puye Formation in the central plateau and near the Rio Grande. Chino Mesa basalts interfinger with the conglomerate along the river. These formations overlie the sediments of the Santa Fe Group, which extend across the Rio Grande Valley and are more than 3,300 feet thick.

Surface water in the Los Alamos area occurs primarily as short-lived or intermittent reaches of streams. However, two perennial streams exist on LANL property and are supplied by springs which emanate from the Bandelier Tuff. Perennial springs on the flanks of the Jemez Mountains supply base flow into upper reaches of some canyons, but the volume is insufficient to maintain surface flows across the LANL facility before they are depleted by evaporation, transpiration, and infiltration.

Groundwater in the Los Alamos area occurs in four modes: (1) water in shallow alluvium in canyons; (2) perched water (a body of groundwater above a less permeable layer that is separated from the underlying main body of groundwater by an unsaturated zone); and (3) the main aquifer of the Los Alamos area. The fourth mode consists of water which exists in and above the Bandelier Tuff and discharges from the Bandelier Tuff via fractures and surge deposits.

The main aquifer of the Los Alamos area is considered the only aquifer in the area capable of serving as a municipal water supply; however, local surface waters and groundwater were used for drinking water purposes prior to 1949, and process water as recently as 1996. Water in the main aquifer is under slight artesian conditions under the eastern part of the Pajarito Plateau near the Rio Grande. The source of recharge to the aquifer is presently uncertain. Isotopic and chemical composition of some waters from wells near the Rio Grande suggest that the source of water underlying the eastern part of the Pajarito Plateau may be the Sangre de Cristo Mountains. In addition, recent hydrochemical data derived from deep boreholes drilled in the central and western parts of LANL suggest that some recharge to the main aquifer may be derived from canyon-bottom aquifers (i.e., man-made constituents detected). Groundwater flow along the Rio Grande rift from the north is another possible recharge source. The main aquifer discharges into the Rio Grande through seeps and springs in White Rock Canyon as well as by converging with the alluvial aquifers associated with the river. The 11.5-mile reach of the river in White Rock Canyon between Otowi Bridge and the mouth of the Rito de los Frijoles receives an estimated 4,300 to 5,500 acre feet annually from the aquifer.

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## 2.0 SITE INVESTIGATION ACTIVITIES

TechLaw sampling team members and alternates arrived at the LANL facility on the mornings of July 30, 2001 and October 29, 2001. All LANL-required training and administrative activities were completed by the afternoon of July 31, 2001, and morning of October 29, 2001.

Field activities at LANL consisted of two events. Field activities for the first event started on July 30, 2001, and the activities for the second event began on October 29, 2001. TechLaw sampled effluent, groundwater wells, and springs located in Mortandad Canyon and Pajarito Canyon. New Mexico Environmental Department (NMED) and LANL personnel collected samples at various locations during the field activities. Field activities for the first sampling event, that also included water level measurements (see Table 6), ended on August 17, 2001, and the second sampling event ended on November 2, 2001. Figure 4 is a visual representation of the locations of wells which were measured for depth to water. A copy of the field log books maintained during the field activities is included in Appendix A. Appendix B presents a summary of field activities in chronological order during each day of field work.

The July 30 through August 17, 2001, sampling is referred to as the August sampling event throughout the report. The October 29 through November 2, 2001, sampling event is referred to as the October sampling event.

### 2.1 Participants

During the four weeks of sample collection activities, numerous personnel from various agencies and companies participated or observed the sampling operations. These groups included EPA Region 6, New Mexico Environmental Department (NMED), University of California, TechLaw, Washington Group, IT Corporation, and SAIC. Table 1 presents a complete list of personnel that participated in and/or observed the sampling operations.

### 2.2 Effluent

The collection and analysis of effluent samples were completed to provide data on effluent being discharged into canyons located at the LANL facility. Effluent data only provides information on the effluent being discharged at the time the sample collection occurred and is not meant to provide total characterization of the waste stream. The effluent sampling locations were selected by EPA and NMED personnel.

Two samples were collected of effluent being discharged into Mortandad Canyon at the TA-50 Radioactive Waster Water Treatment Plant. Both samples were collected as the effluent was discharged into the canyon. The sample identified as GS-1A was collected during the first week, and the sample identified as GS-1B was collected during the second week. Each of these samples were analyzed for compounds identified in Table 5. The location of GS-1A and GS-1B may be found on Figure 6. Table 2 lists the date and time sampled for each location.

### 2.2.1 Effluent Sampling Procedure

TA-50 Radioactive Waste Water Treatment Plant

The TA-50 Radioactive Waste Water Treatment Plant operates two storage/treatment tanks, each with a capacity of approximately 25,000 gallons. Waste water at the plant is accumulated in one of the 25,000 gallon tanks until the tank is full. When the tank is full, the waste water is redirected to the second 25,000 gallon storage tank. The waste water in the full storage tank is batch treated and discharged into Mortandad Canyon. However, prior to discharging the treated waste water, TA-50 personnel test the effluent to make sure that the effluent does not exceed limits established in the plant's National Pollutant Discharge Elimination System (NPDES) permit. If the results indicate that the treated waste water is within the NPDES limits, then the treated waste water is discharged into Mortandad Canyon. If the treated waste water exceeds the limits of the NPDES permit, the facility then repeats the treatment process until it is within the limits. When the second storage tank is filled, the waste water is then redirected back to the first storage tank, and the process is repeated. The plant has an additional storage tank that is used as a backup to the two primary storage/treatment tanks.

Both samples (GS-1A and GS-1B) were collected at Gaging Station-1 in Mortandad Canyon while the TA-50 plant was discharging effluent into the canyon. These samples were collected by lowering the intake of a peristaltic pump directly into the stream channel of Mortandad Canyon while the TA-50 plant was discharging the waste water. The pump was used to collect the samples beginning with the non-filtered analyses containers and completing with the filtered analyses containers. The filtered sample material was passed through a new in-line 0.45 micrometer (μm) filter while filling the sample containers. All sample containers were filled slowly to avoid aeration. The sampling team transferred the samples to a sample cooler containing ice in order to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until arrival at the NMED Oversight Bureau (OB) office where they were transferred to a sample storage refrigerator. Samples were ultimately packaged in coolers with ice and shipped to the analytical laboratory for analysis. Field parameters were also collected during the time of the sample collection. Field parameters measurements are listed in Table 4.

All wastes generated during sampling activities were managed by LANL.

### 2.2.2 Deviations from the Field Sampling Plan

A deviation from the Field Sampling Plan occurred during the effluent sampling activities. A third sample at GS-1 was not collected due to the lack of waste water discharge into Mortandad Canyon and the time of discharge of waste water into Mortandad Canyon from TA-50.

## 2.3 Groundwater

The collection and analysis of groundwater samples were completed to provide data to determine the presence or absence of contamination in groundwater at different sample locations. The sampling locations included: Mortandad Canyon, production wells, TA-3, Pajarito Canyon, Ancho Canyon, Los Alamos Canyon, the Pueblo Canyon, and the Buckman Field. The groundwater sampling locations and analysis performed were selected by EPA and NMED OB personnel.

Groundwater sample locations are shown in Figures 2, 3, and 5 through 8. For each sampling location, Table 2 identifies the applicable figure number(s), sample date, and sample time. Table 3 lists the sample collection summary for the proposed sample locations, including the depth to water, calculated purge volume and actual purged volume. Table 5 lists the specific compounds and/or analytes that were analyzed according to the analytical methods requested by EPA and NMED. Field parameters were also collected during the sampling event. Final field parameters measurements are listed in Table 4.

Within Mortandad Canyon, five shallow monitoring wells with depths ranging between 6 to 60 feet bgs (MCO-3, MCO-5, MCO-6, MCO-7, and MCO-7.5B) and one test well (TW- 8) were sampled. MCO-7.5B is identified in the field logbook, chain of custodies, and raw laboratory analytical data as MCO-7.5. Samples collected from these wells were analyzed for compounds identified in Table 5.

Eight production wells were sampled and analyzed for compounds identified in Table 5. These wells included: O-1, O-4, PM-1, PM-2, PM-3, PM-4, PM-5, and G1-A.

One groundwater well located behind SM-30 at area TA-3 was sampled (identified as 03-MW-01). The sample was analyzed for compounds identified in Table 5.

Ten groundwater monitoring wells located in Pajarito Canyon were sampled. Samples (identified as: 18-BG-1, 18-MW-7, 18-MW-8, 18-MW-9, 18-MW-10, 18-MW-11, 18-MW-12, 18-MW-16, 18-MW-17, 18-MW-18) collected were analyzed for compounds identified in Table 5.

Three wells located in Ancho Canyon were sampled and analyzed for compounds identified in Table 5. These wells included DT-9, DT-5A, and DT-10.

Seven Buckman Wells (Buckman Wells 1, 2, 3, 4, 6, 7, and 8) developed into the main aquifer were sampled. Samples were analyzed for compounds identified in Table 5.

Four wells developed into the intermediate aquifer in Pueblo (POI-4) and Los Alamos (LADP-3 and LAOI(a)-1.1) Canyons were sampled and analyzed for compounds identified in Table 5. Three test wells developed into the main aquifer in Pueblo (TW-1 and TW-4) and Los Alamos (TW-3) Canyons and one test well (TW-2A) which was developed into the intermediate aquifer

in Pueblo Canyon were sampled. These samples were analyzed for compounds identified in Table 5.

### 2.3.1 Groundwater Sampling Procedures

The physical condition of the outside of each well was inspected upon arrival at each wellhead. The well casing diameter, static water level depth, and total well depth were measured in order to calculate the volume of water contained inside the well (one well volume). If the total depth of a well could not be measured because of a dedicated pump inside the well or the depth of the well was too great, the construction information for the well was used to determine the total depth of the well. A minimum purge volume (volume of groundwater to be removed before samples could be collected) was then calculated by multiplying the volume of water contained inside the well by a factor of three.

Once these initial measurements and calculations were made, purging activities commenced. The majority of shallow monitoring wells sampled contained dedicated bladder pumps that were used to purge and sample the wells. Shallow monitoring wells that did not contain dedicated bladder pumps were purged and sampled using a peristaltic pump. The main aquifer wells including TW-1, 3, 4, and 8; the intermediate aquifer well (TW-2A); the drinking water production wells (O-1, O-4, PM-1, PM-2, PM-3, PM-4, PM-5, and G1-A); Buckman Wells (Buckman Wells 1, 2, 3, 4, 6, 7, and 8); and the wells located in Ancho Canyon (DT-5A, DT-9, and DT-10) each contained a dedicated centrifugal pump. Samples from the main aquifer wells were collected from ports adjacent to the wellhead. The main aquifer wells and the wells located in Ancho Canyon were allowed to run for a set amount of time prior to sample collection. In general, a LANL representative and TechLaw representative would turn the pump on and allow water to discharge between four to twelve hours.

Groundwater in Pajarito Canyon was purged using a peristaltic pump. VOCs, SVOCs, and explosives were sampled from a stainless steel bailer. The remaining analytes were collected using the dedicated tubing associated with the peristaltic pump. In instances in which the stainless steel bailer could not be used (e.g.,18-MW-07) a disposable polyethylene bailer was used.

Water quality parameters consisting of pH, temperature, specific conductivity, and turbidity were measured during the purging activities. Samples were not collected until the measured water quality parameters remained consistent for three intervals. Table 3 presents well data including the water level measured in each well, the total depth of each well, the calculated purge volume for each well, and the actual volume purged before sampling activities commenced, if applicable. The final water quality parameter measurements for each well sampled are presented in Table 4.

After the well was purged, sample containers were filled beginning with the VOC containers, proceeding to the non-filtered analyses containers, and finishing with the filtered analyses containers. The filtered groundwater was passed through a new in-line 0.45 μm filter while filling the sample containers. All sample containers were filled slowly to avoid aeration. The

sample containers were placed in a sample cooler to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until reaching the NMED OB office where they were transferred to a sample storage refrigerator. The samples were packed in coolers containing ice and shipped to the analytical laboratory for analysis. All wastes generated during sampling activities were managed by LANL.

### 2.3.2 Deviations from the Field Sampling Plan

Deviations from the Field Sampling Plan occurred during the groundwater sampling activities. Following are the specific deviations that were required:

- Well TW-2A was sampled without purging the well. This well had a very slow recharge rate. The sample was collected on two consecutive days. VOCs and total cyanide parameters were not collected from this well due to insufficient water volume.
- Wells PCO-2, 18-BG-04, and PCO-3 were not sampled because the wells had insufficient groundwater.
- Wells MCO-2 and MCO-4B were not sampled because the wells did not contain any groundwater above the dedicated bladder pump in place.
- Well POI-4 was sampled after the first (approximate) well volume was purged and the water quality parameters had stabilized. Sampling was continued the following day due to health and safety concerns (thunderstorms).
- Wells MT-3, MT-4, MCWB-6.2C, MCWB-6.5E, and TSWB-6 were not sampled because the wells did not contain any groundwater.
- Wells MCO-7 and MCO-7.5B were sampled after the first well volume was purged and the water quality parameters had stabilized.
- Well PCO-1 was not sampled for health and safety reasons.
- Buckman Wells 1, 2, and 7 were resampled during the October sampling event. Buckman Wells 3, 4, 6, and 8 were added to the October sampling event.
- Wells MCWB 7.7B and MCWB 6.5A were not sampled due to insufficient time.
- Wells MCO-0.6, TW-1A, and TW-2 were not sampled.
- Well SHB-3 was not sampled due to an obstacle in the well.

## 2.4 Springs and Surface Waters in the Pajarito Canyon Watershed

The collection and analysis of spring samples were completed to provide data to determine the presence or absence of contamination in groundwater discharging to the ground surface at the different sampling locations. Six springs and two surface water locations were sampled during the sampling activities at LANL. Surface water (PA 10.6 and PA 6.7) and spring samples (Threemile Spring, TA-18 Spring and Springs 4, 4A, 4C, and 4AA) were analyzed for compounds identified in Table 5. The spring and surface water sampling locations and analysis were selected by EPA and NMED OB personnel. A visual representation of spring and surface water sampling locations are found in Figures 2, 6, and 8.

Table 4 lists the final field parameters collected during the sampling events.

### 2.4.1 Spring and Surface Water Sampling Procedures

PA 6.7 is a surface water sampling station located in middle Pajarito Canyon, just below its confluence with Twomile Canyon. This sample was collected using a peristaltic pump. The intake hose was placed in the water and pumped to the appropriate containers. For the filtered analytical parameters, the water was filtered using the peristaltic pump and a dedicated in-line 0.45 μm filter.

The TA-18 Spring and Threemile Spring are located just inside of the Technical Area 18 restricted area on the south-facing slope of Threemile Canyon (a south-connecting tributary to the middle portion of Pajarito Canyon). The samples were collected using a peristaltic pump. The intake for the peristaltic pump was placed directly in a small pool at the spring's point of origin. Spring water was pumped directly into the appropriate sample containers. For the filtered analytical parameters, the water was filtered using the peristaltic pump and a dedicated in-line 0.45 μm filter.

PA 10.6 is a surface water sampling station. This sample was collected approximately one hundred yards from the originally designated sampling point due to the increased flow rate of surface water caused by rains. The samples were collected using a peristaltic pump. The intake for the peristaltic pump was placed directly into the stream and pumped to the appropriate containers. For the filtered analytical parameters, the water was filtered using a peristaltic pump and a dedicated in-line 0.45 μm filter at the NMED OB office. Surface water was collected in new polyethylene non-preserved containers and allowed to settle prior to filtering the water.

Springs 4, 4C, 4A, and 4AA are located off of LANL property and are adjacent to the Rio Grande River. These samples were collected using a peristaltic pump. The intake for the peristaltic pump was placed directly in a small pool at the spring's point of origin. Spring water was pumped directly into the appropriate sample containers. For the filtered analytical parameters, the water was filtered using the peristaltic pump and a dedicated in-line 0.45 μm filter.

All spring sample containers were filled starting first with the non-filtered analyses containers

and finishing with the filtered analyses containers. All sample containers were filled slowly to avoid aeration. The sample containers were placed in a sample cooler which contained ice in order to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until reaching the NMED OB office where they were transferred to a sample storage refrigerator. The samples were packed in coolers containing ice and shipped to the analytical laboratory for analysis. All waste generated during sampling activities were managed by LANL.

### 2.4.2 Deviations from the Field Sampling Plan

Deviations from the field sampling plan occurred during the spring/surface water sampling activities. Following are the specific deviations that were required:

- Surface water PA 4.0 was not sampled. Threemile Spring and TA-18 Spring were added as alternative sample locations to surface water PA 4.0.

- Springs 4, 4C, 4A, and 4AA were additional springs sampled in response to perchlorate detection.

- Surface water for the filtered analysis at PA 10.6 was not filtered at the site due to the excessive turbid conditions at the sample location. Water was allowed to settle in the NMED OB office prior to filtering. In addition, the PA 10.6 surface water samples were not analyzed for VOCs due to the increased flow rate and turbid conditions.

## 2.5 Sediment

The collection and analysis of sediment samples were completed to provide data to determine the presence or absence of contamination in sediment and the potential for such contamination to be transported to different locations via surface-water runoff. Stream banks and beds were sampled in Southfork of Acid Canyon at five locations (PU-10283, PU-10284, PU-10285, PU-10286, and AC-01). PU- 10283 was collected by TL; however, the analysis was completed by NMED specified laboratory, as requested by NMED. These sample locations may be found in Figure 5. Analysis of the sediment completed by the laboratory is found in Table 5. Two samples were collected at the Sandia water shed in the vicinity of solid waste management unit (SWMU) 3-056(C). The analyses for these samples are listed in Table 5. The sediment sampling locations and analysis were selected by EPA and NMED personnel. The sampling locations (identified as 3-056 (C) and 3-056 (AA)) are shown in Figure 2 and 3.

### 2.5.1 Sediment Sampling Procedures

The sediment sampling areas were located where alluvial deposits were available for human contact and a potential for downstream transport exists. When the sampling area was located, a strata consisting of fine grained sediment was marked for collection. An area representative of the entire strata was removed using clean stainless-steel equipment such as chisels and trowels.

Once removed, the sample was homogenized in a stainless-steel bowl with a stainless-steel trowel. Sample collection equipment was decontaminated between sample stations.

The sample containers were placed in a sample cooler to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until reaching the NMED White Rock Office where they were transferred to a sample storage refrigerator. The samples were packed in coolers containing ice and shipped to the analytical laboratory for analysis. All wastes generated during sampling activities were managed by LANL.

### 2.5.2 Deviations From Field Sampling Plan

Deviations from the field sampling plan occurred during the sediment sampling activities. Following are the specific deviations that were required:

- Five samples were collected from Acid Canyon-Southfork. One sample (PU-10283) was collected by TechLaw for NMED OB.
- Two samples were collected in the Sandia water shed. These samples are identified as 3-056 (C), and 3-056 (AA).

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# 3.0 LABORATORY RESULTS SUMMARY

## 3.1 Effluent Sampling Results

### 3.1.1 TA-50 Radioactive Waste Water Treatment Plant

Two effluent samples (GS-1A and GS-1B) were collected from the TA-50 Radioactive Waste Water Treatment Plant approximately ¼-mile downstream of the plant's outfall at Gauging Station-1 located in Mortandad Canyon (Figure 6). The samples were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 12 and in Appendix E.

Inorganic results for total and dissolved metals and trace metals identified two analytes at concentrations greater than one of the reference limits noted in Table 9. Only one of these analytes (arsenic) was reported at a concentration greater than the EPA MCLs or MSSLs. Results of the metals and trace metals analyses are summarized in Tables 9 and 10 respectively.

The TA-50 samples were also analyzed for general water chemistry parameters. General chemistry results identified perchlorate in GS-1B at a concentration (23.3 ug/ℓ) greater than the EPA provisional MCL range of 4 to 18 ug/ℓ. Results of these analyses are summarized in Table 11.

The TA-50 samples were analyzed for radiochemistry as specified by EPA. Results of these analyses are summarized in Table 12. Only Strontium-90, in GS-1A, was detected above the EPA MCL. Americium-241 and Plutonium-238 were detected in both effluent samples above one of the reference limits noted in Table 12.

## 3.2 Groundwater Sampling Results

### 3.2.1 Mortandad Canyon

Five groundwater wells (MCO-3, MCO-5, MCO-6, MCO-7, and MCO-7.5B) completed in the shallow alluvial aquifer (water table at depths ranging from 6 to 60 feet bgs) located in Mortandad Canyon were sampled (Figure 6). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 12 and in Appendix E.

Volatile and semi-volatile organic and inorganic results did not identify any analytes at concentrations greater than any of the reference limits noted in Tables 7 and 8. Results of these analyses are summarized in Tables 7 and 8.

All of the Mortandad Canyon groundwater samples were analyzed for general water chemistry parameters as specified by EPA. Elevated nitrate/nitrite was found in one of the shallow alluvial monitoring wells (MCO-7.5B) at a concentration of 10.7 ug/ℓ. This exceeds the EPA and NMED

drinking water standard of 10 mg/ℓ. Perchlorate was detected in the shallow alluvial monitoring wells sampled, exceeding the EPA provisionary drinking water standard range of 4 to 18 ug/ℓ.

All of the Mortandad Canyon groundwater samples were analyzed for radiochemistry as specified by EPA. Elevated Sr-90 activity was detected above EPA and NMED drinking water standards for Sr-90 (8 pCi/ℓ) in monitoring wells MCO-3, MCO-5, and MCO-6, with the results ranging from 40.3 pCi/ℓ to 42.2 pCi/ℓ. The results of these analyses are summarized in Table 12.

### 3.2.2 Test Wells

The test wells (TW-1, 2A ,3, 4, and 8) were completed in the main aquifer (water table at approximately 600 to 1,000 feet bgs). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 12 and in Appendix E. Locations of the wells are shown on Figures 3, 5, 6, and 7.

The test well results did not identify any volatile organic compounds at concentrations greater than one of the reference limits noted in Table 7.

Inorganic results for the total and dissolved metals and trace metals identified eight analytes at concentrations greater than one of the reference limits noted in Tables 9 and 10. Four of the analytes, antimony, lead, thallium, and zinc, were detected at concentrations greater than either the EPA MCLs or MSSLs. Antimony was detected at a concentration of 25.5 µg/ℓ in TW-1. The EPA MSSL is 15 µg/ℓ. Lead was detected at a concentrations of 270 µg/ℓ, 32.4 µg/ℓ, and 31.7 µg/ℓ in TW-1, TW-2A, and TW-4 respectively. These concentrations exceeded the EPA and NMED drinking water standard of 15 µg/ℓ. Thallium concentrations were detected in TW-1 at 6.93 µg/ℓ and in TW-2A at 5.75 µg/ℓ, which exceeded the EPA and NMED drinking water standard of 2 µg/ℓ. Zinc was detected in TW-2A at a concentration of 12,200 µg/ℓ which exceeded the EPA MSSL of 11,000. Results of the metals and trace metals analyses are summarized in Table 9 and Table 10 respectively.

Perchlorate was also detected in wells TW-1 and TW-3, at 5.82 ug/ℓ and 2.49 ug/ℓ respectively, which are completed in the regional/deep drinking water aquifer. Results of these analyses are summarized in Table 11.

### 3.2.3 Drinking Water Production Wells

Eight production wells (PM 1, 2, 3, 4, and 5, O-1, O-4, and G-1A) were sampled (Figures 1, 6, 7, and 8). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 13 and in Appendix E.

The results for the production wells analyzed for volatile and semi-volatile organics did not identify any compounds at concentrations greater than any of the reference limits noted in Table 7 or Table 8, respectively.

There were two inorganic analytes detected at a concentration exceeding either the EPA MCLs or MSSLs. Arsenic was detected in wells O-1 and O-4 at 4.96 µg/ℓ and 2.73 µg/ℓ, respectively. The MSSL for arsenic is 0.045 µg/ℓ. Thallium was detected in well PM-3 at 7.84 µg/ℓ. The EPA and NMED MCL for Thallium is 2 µg/ℓ. Results of the metals and trace metals analyses are summarized in Table 9 and Table 10, respectively.

All of the production wells were analyzed for general water chemistry parameters as specified by EPA. The results did not identify any parameters at concentrations greater than reference limits noted in Table 11. Results of these analyses are summarized in Table 11.

All of the production wells were analyzed for radiochemistry as specified by EPA. Elevated U-238 activity was detected above DOE drinking water standards (24 pCi/ℓ) in wells O-4 at 194 pCi/ℓ and PM-1 at 157 pCi/ℓ. The results of these analyses are summarized in Table 12.

Five of the production wells were analyzed for explosives. The results did not identify any compounds at concentrations greater than the referenced EPA MSSLs. The results of these analyses are summarized in Table 13.

### 3.2.4 Technical Area 3 (TA-3)

One groundwater well (03-MW-1) located behind building SM-30 at area TA-3 was sampled (Figure 3). Samples collected from this well were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 13 and in Appendix E.

Volatile organic compound (VOC) concentrations found in the monitoring well exceeding the EPA drinking water standards include: 1,1-dichloroethylene at 23.9 µg/ℓ, methylene chloride at 124 µg/ℓ (though this is often a laboratory contaminant), trichloroethylene at 5.2 µg/ℓ, and 1,1,1-

trichloroethane at 1,150 µg/ℓ. Results of VOC analysis are presented in Table 7. No semi-volatile results exceeded any of the referenced levels on Table 8.

Inorganic results for total and dissolved metals and trace metals identified three analytes (aluminum, iron, and thallium) at concentrations greater than at least one of the reference limits noted in Tables 9 and 10. Thallium, detected at 3.72 µg/ℓ was above the EPA and NMED drinking water standard of 2 µg/ℓ. Results of the metals and trace metals analyses are summarized in Table 9 and Table 10, respectively.

The samples were analyzed for general water chemistry parameters as specified by EPA. None of the results was above any of the referenced levels noted in Table 11.

Results for the radiochemistry analyses indicated that lead-210 was detected at an activity of 260 pCi/ℓ in monitoring well 03-MW-1. This activity is above the DOE Derived Concentration Guides noted in Table 12.

### 3.2.5 Pajarito Canyon

Ten groundwater monitoring wells located in Pajarito Canyon were sampled (Figure 8). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 13 and in Appendix E.

The results for the monitoring wells analyzed for volatile organic compounds identified one compound (methylene chloride, a common laboratory contaminant) in one well (18-MW-7) at 6.3 µg/ℓ. The EPA MSSL for this analyte is 4.3 µg/ℓ. Results of these analyses are summarized in Table 7. The wells were also analyzed for semi-volatile organic compounds. The results identified one compound (Benzo(b) fluoranthene) in one well (18-MW-12) at 0.13 µg/ℓ. The EPA MSSL for this analyte is 0.092 µg/ℓ. Results of these analyses are summarized in Table 8.

Inorganic results for the total and dissolved metals and trace metals identified six analytes at concentrations greater than at least one of the reference limits noted in Tables 9 and 10. Three of the analytes, arsenic, iron, and thallium, were detected at concentrations greater than either the EPA MCLs or MSSLs. Arsenic was detected at concentrations of 3.18 µg/ℓ and 3.49 µg/ℓ in 18-TW-8 and 18-TW-17, respectively. The EPA MSSL for arsenic is 0.045 µg/ℓ. Iron was detected in wells 18-MW-16 and 18-MW-17 at 12,300 µg/ℓ and 11,200 µg/ℓ, respectively. The EPA MSSL for iron is 11,000 µg/ℓ. Thallium concentrations were detected ranging from below detection limit to 8.84 µg/ℓ. The EPA and NMED drinking water standard for thallium is 2 µg/ℓ. Results of the metals and trace metals analyses are summarized in Table 9 and Table 10, respectively.

All of the Pajarito Canyon groundwater samples were analyzed for general water chemistry parameters as specified by EPA. None of the results exceeded any of the referenced levels noted in Table 11.

The Pajarito Canyon groundwater samples were also analyzed for radiochemistry as specified by EPA. None of the results exceeded any of the referenced levels noted in Table 12.

Seven of the Pajarito Canyon wells were analyzed for explosives. The results identified one analyte in one well (RDX in 18-MW-7) at a concentrations (0.86 µg/ℓ) greater than the referenced EPA MSSL (0.61 µg/ℓ). The results of these analyses are summarized in Table 13.

### 3.2.6 Ancho Canyon

Three wells were sampled in Ancho Canyon (Figure 3). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results from these samples are presented in Tables 7 through 12 and in Appendix E.

From all the analyses, only three metals (antimony, arsenic, and thallium) were detected above the EPA MCL or MSSL. Antimony was detected at 7.54 µg/ℓ in well DT-5A versus an MCL of 6 µg/ℓ. Arsenic was detected in DT-10 at 2.71 µg/ℓ versus an MSSL of 0.045 µg/ℓ. Thallium was detected in wells DT-9 and DT-10 at 5.06 µg/ℓ and 9.7 µg/ℓ, respectively. The EPA and NMED MCL for thallium is 2 µg/ℓ. The results of the analyses are summarized in Table 9.

### 3.2.7 Buckman Wells

Seven of the drinking water production wells in the Buckman Well Field (Buckman wells) were sampled (Figure 3). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 12 and in Appendix E.

No volatile or semi-volatile compounds were detected above any of the referenced limits noted in Tables 7 or 8. Arsenic and thallium were the only metals exceeding the EPA or NMED MCLs or EPA MSSLs. Arsenic was detected in Buckman wells 1, 2, and 3 at concentrations ranging from 5.42 µg/ℓ to 19.9 µg/ℓ. The EPA MSSL for arsenic is 0.045 µg/ℓ. The results of the analyses are summarized in Table 9.

Only three radionuclides were detected above one of the referenced limits noted in Table 12. Uranium-238, Lead-210, and Uranium-235 were detected in Buckman 2 and Uranium-238 was detected in Buckman 3. The duplicate sample for Buckman 1 (Buckman 11) also had a concentration of Lead-210 above one of the referenced limits. The results of the analyses are summarized in Table 12.

### 3.2.8 Intermediate Aquifer Wells

Three wells were sampled that were completed in the intermediate aquifer. These were wells POI-4 (Figure 7) and LAOI(a)-1.1, and LADP-3 (Figure 6). Samples collected from these wells were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 12 and in Appendix E.

The only constituents that were detected above established EPA or NMED MCLs or EPA MSSLs were the metals arsenic, iron, lead, and thallium. Arsenic was detected in POI-4 at 4.05 µg/ℓ. The EPA MSSL for arsenic is 0.045 µg/ℓ. Iron was detected in LADP-3 at 14,500 µg/ℓ. The EPA MSSL for iron is 11,000 µg/ℓ. Lead was detected in LADP-3 at 18.5 µg/ℓ, above the EPA MCL and MSSL of 15 µg/ℓ,. Thallium was detected in samples LADD (duplicate of LAOI-1.1) at 5.5 µg/ℓ and in POI-4 at 5.54 µg/ℓ. The EPA and NMED MCLs for thallium are 2 µg/ℓ.

### 3.2.9 Comparison of Groundwater Results

Analytical results for groundwater samples collected during the sampling event are presented in Tables 7 through 13. Included on each table are various water quality standards, guidelines, and limits established by EPA, NMED, and DOE. These water quality standards, guidelines, and limits are included on each table to facilitate easy comparison with the analytical results; however, these water quality standards, guidelines, and limits may not apply to the locations sampled and are presented only as comparison data. A description of the EPA, NMED, and DOE water quality standards, guidelines, and limits used for comparison is included in Appendix D.

## 3.3 Spring and Surface Water Sampling Results

Four springs/spring fed surface water bodies throughout the Pajarito Canyon watershed and four off-site springs were sampled. The samples collected from the springs were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 7 through 13, and in Appendix E.

No volatile or semi-volatile compounds, general water chemistry parameters, radiochemistry, or explosives was detected at concentrations above the EPA MCLs or MSSLs, as noted in Tables 7, 8, 11, 12, and 13, in the samples collected from springs and surface water bodies.

Based on the analyses, only five metals (aluminum, arsenic, iron, lead, and thallium) were detected above the EPA MCL or MSSL. Aluminum was detected at 37,500 µg/ℓ in PA-10.6 versus an EPA MSSL of 37,000 µg/ℓ. Arsenic was detected in PA 10.6 and TA-18 at 4.24 µg/ℓ and 3.56 µg/ℓ respectively versus an EPA MSSL of 0.045 µg/ℓ. Iron was detected in PA 10.6 at 17,600 µg/ℓ versus a MSSL of 11,000 µg/ℓ. Lead was also detected in PA-10.6 at 25.6 µg/ℓ versus its MCL of 15 µg/ℓ. Total thallium was detected in Threemile Spring at 6.04 µg/ℓ, which exceeds the EPA and NMED MCL of 2 µg/ℓ. The results of the analyses are summarized in Table 9.

## 3.4 Sediment Sampling Results

### 3.4.1 Acid Canyon

Five sediment/soil samples were collected throughout Acid Canyon as presented in Figure 5. The samples were analyzed for compounds listed on Table 5. Analytical results obtained from these samples are presented in Tables 14 through 16 and in Appendix E.

PCB contamination was detected in sample PU-10284 in Acid Canyon in the form of Aroclor-1260 at a concentration of 237 µg/kg which exceeds EPA's residential MSSL of 220 µg/kg. Results of PCB analyses are presented in Table 14.

Inorganic analytical results for total metals identified seven analytes at concentrations greater than one of the reference limits as noted in Table 15. These analytes were arsenic, cadmium, chromium, lead, selenium, silver, thallium. However, only arsenic was detected at concentrations above EPA residential soil standards. Concentrations of arsenic ranged from 1.21 mg/kg to 2.7 mg/kg. The EPA MSSL of residential soils for arsenic is 0.39 mg/kg. Sample AC-O1 was collected to determine the background level for arsenic in the canyon. This sample indicated a background level of 2.7 mg/kg. Results of inorganic analyses are presented in Table 15.

Sediment samples collected in Acid Canyon were analyzed for radiochemistry as specified by EPA. All five of the samples had a least one radionuclide that exhibited activities above EPA Preliminary Remediation Goals (PRGs) or background values established by LANL. Four out of five samples exhibited Americium-241 activity above background values established by LANL (0.04 pCi/g) and two of the four were above both PRGs for commercial and residential settings. Americium-241 activities in these samples ranged from 0.885 pCi/g to 16.3 pCi/g. All five of the samples exhibited Plutonium-238 activity above background values established by LANL (0.006 pCi/g) . Plutonium-238 activities detected for these samples ranged from 0.053 pCi/g to 1.59 pCi/g. In addition, four of the samples exhibited plutonium-239/240 activity greater than the EPA PRGs for both commercial and residential settings. The activities ranged from 30.6 pCi/g to 351 pCi/g. Two of the five soil samples exhibited Cesium-137 activity above background values established by LANL (0.9 pCi/g). Cesium-137 activities in these samples were 1.08 pCi/g and 3.2 pCi/g. All five samples exhibited Potassium-40 activity greater than the EPA PRGs for both commercial and residential settings, but were below the established LANL background activity of 36.8 pCi/g. Results of these analyses are summarized in Table 16.

### 3.4.2 Sandia Canyon

Two sediment/soil samples, 3-056AA and 3-056(C), were collected in the Sandia Canyon watershed and are presented on Figure 3. The samples collected from the canyon were analyzed for total metals. Analytical results obtained from these samples are presented in Table 15 and in Appendix E.

Inorganic analytical results for total metals identified two analytes at concentrations greater than the referenced limits as noted in Table 15. One analyte (arsenic) was detected above the EPA MSSL for residential soils (0.39 mg/kg) at both locations ranging in concentrations from 2.63 mg/kg to 2.73 mg/kg. Results of inorganic analyses are presented in Table 15. The other analyte, thallium, was above the LANL background of 0.73 mg/kg at both locations.

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# 4.0 QUALITY ASSURANCE SUMMARY

## 4.1 Quality Assurance/Quality Control Samples

Data Quality Objectives (DQOs) for this work assignment required that certain quality control (QC) samples be collected during the sampling activities conducted at LANL. The types of QC samples collected included field duplicates, field blanks, matrix spike/matrix spike duplicate samples, equipment blanks, and trip blanks. Table 5 lists the specific groundwater or soil sample analysis requested by EPA and NMED at each sample location, including springs and surface water.

Field Duplicates

The purpose of collecting field duplicate samples is to verify laboratory analytical procedures and sampling techniques. Four field duplicate samples were collected of groundwater, one in Mortandad Canyon (MCO-5B), one at the Buckman 1 production well (designated as Buckman 11), one at Surface Water PA 6.7 (designated as PAD 6.7), and one at LAOI(a)-1.1 (designated as LADD). These samples were collected concurrently with samples MCO-5, Buckman 1, PA 6.7, and LAOI(a)-1.1, by alternating the filling of sample containers. The sample containers were filled slowly to avoid aeration. These samples were handled in an identical manner as the corresponding sample. The sample containers were placed in a sample cooler to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until reaching the NMED Oversight Bureau (OB) Office where they were transferred to a sample storage refrigerator. The samples were packed in coolers containing ice and shipped to the analytical laboratory for analysis.

Two field duplicates samples of sediment were collected. PRS-3D-056 was collected as a duplicate of PRS-3-056 and PU-110286 was collected as a duplicate of PU-10286. These samples were collected concurrently with the corresponding sample by alternating the filling of sample containers. The duplicate samples were handled in an identical manner as the corresponding sample. The sample containers were placed in a sample cooler which contained ice in order to maintain the samples at approximately 4°C. The samples were secured and stored inside the sample cooler until arrival at the NMED OB Office where they were transferred to a sample storage refrigerator. Samples were ultimately packaged in coolers with ice and shipped to the analytical laboratory for analysis.

Field Blank Samples

The purpose of collecting field blank samples is to check for contamination resulting from ambient conditions. One field blank sample (FB-01) was collected during the sampling operations conducted at the LANL facility. This sample was collected by pouring laboratory supplied reagent grade water into appropriate sample containers. The sample containers were filled slowly to avoid aeration. The sample containers were secured and stored inside the sample cooler until reaching the NMED OB Office where they were transferred to a sample storage

refrigerator. The sample containers were packed in coolers containing ice and shipped to the analytical laboratory for analysis.

Matrix Spike/Matrix Spike Duplicate Samples

The purpose of collecting matrix/matrix duplicate spike samples is to determine matrix effects to analytes recovery in both sample preparation and analysis. Three matrix spike/matrix spike duplicate samples were collected for groundwater and surface water during the sampling operations conducted at the LANL facility. These samples were collected by filling two extra sample containers for each analytical parameter. The locations where these samples were collected were DT-9, TA-18 Spring, and 18-MW-12. The samples were secured and stored inside the sample cooler until reaching the NMED OB Office where they were transferred to a sample storage refrigerator. The samples were packed in coolers containing ice and shipped to the analytical laboratory for analysis.

One matrix spike/matrix spike duplicate sample was collected for sediment during the sampling operations conducted at the LANL facility. This sample was collected by filling two extra sample containers for total metals analyses. The location where this sample was collected was PRS-3-056 AA. The sample containers were secured and stored inside the sample cooler until reaching the NMED OB Office where they were transferred to a sample storage refrigerator. This sample was packed in a cooler containing ice and shipped to the analytical laboratory for analysis.

Trip Blank Samples

The purpose of collecting trip blank samples is to detect the presence of contaminants that may have been introduced to samples during transport and storage. All trip blanks were pre-prepared by the analytical laboratory and shipped to the sampling team at the LANL facility. Five trip blank samples were submitted to the analytical laboratory. Each trip blank (TP-1, TP-2, TP-3, TP-4 and TP-5) sample was placed inside the sample cooler shipped to the laboratory which contained water sample(s) to be analyzed for VOCs.

Equipment Rinsate Blanks

The purpose of collecting equipment rinsate blanks is to measure the efficiency of the sample equipment decontamination process. One equipment rinsate blank was collected after sampling equipment (stainless steel bailer) was used and decontaminated. This sample was collected by using the rinsate (deionized water) to fill one extra container for VOCs, SVOCs, and explosives. The sample was labeled as EQ-1. The sample containers were filled slowly to avoid aeration. The sample containers were secured and stored inside a sample storage refrigerator at the NMED OB Office. The sample containers were packed in coolers containing ice and shipped to the analytical laboratory for analysis. EQ-1 was collected at the NMED OB office.

## 4.2 Deviations from the Field Sampling Plan

Deviations from the Field Sampling Plan occurred during the sampling activities. Following are the specific deviations that occurred:

- Only four field duplicate samples were collected for groundwater and surface water instead of the five samples required. The Field Sampling Plan required one field duplicate sample to be collected for every ten samples collected (10%).

- Only one field blank sample was collected instead of the five samples required. The Field Sampling Plan required one field blank sample to be collected for every ten samples collected (10%).

- Only three matrix spike/matrix spike duplicate samples were collected for groundwater instead of the five samples required. The Field Sampling Plan required one matrix spike/matrix spike duplicate sample to be collected for every ten samples collected (10%).

## 4.3 Laboratory and Analytical Methods

The analyses were performed by four separate laboratories: 1) General Engineering Laboratory (GEL) in Charleston, South Carolina; 2) University of Miami Tritium Laboratory in Miami, Florida; 3) Coastal Science Laboratories, Inc., in Austin, Texas; 4) and Acculab Inc., located in Golden, Colorado.

The following identifies the sample parameters, analytical methods used, and the corresponding laboratory performing the analyses:

| Parameter | Method Number | Laboratory |
|---|---|---|
| Bromide | EPA 300.0 | GEL-Charleston |
| Chloride | EPA 300.0 | GEL-Charleston |
| Fluoride | EPA 300.0 | GEL-Charleston |
| Sulfate | EPA 300.0 | GEL-Charleston |
| Bicarbonate Alkalinity | EPA 300.0 | GEL-Charleston |
| Hardness | EPA 130.2 | GEL-Charleston |
| Total Cyanide | SW-846 9012A | GEL-Charleston |
| Amendable Cyanide | SW-846 9012A | GEL-Charleston |
| Weak Dissociable Cyanide | ASTM D 2036 | GEL-Charleston |
| Total Dissolved Solids | EPA 160.1 | GEL-Charleston |
| Total Suspended Solids | EPA 160.2 | GEL-Charleston |
| Explosives | SW-846 8330 | GEL-Charleston |
| Metals (Total & Mercury) | SW-846 6010B/7470 | GEL-Charleston |
| Metal (Dissolved & Mercury) | SW-846 6010B/7470 | GEL-Charleston |
| Dissolved Trace Metals (B, Li, Mo, Si, Sr, Sn, Ti) | SW-846 6010B | GEL-Charleston |
| Ammonia | EPA 350.1 | GEL-Charleston |
| Nitrate/Nitrite Nitrogen | EPA 353.1 | GEL-Charleston |
| Total Kjedahl Nitrogen | EPA 351.2 | GEL-Charleston |
| Total Phosphorous | EPA 365.4 | GEL-Charleston |
| Volatile Organic Compounds | SW-846 8260B | GEL-Charleston |
| Semi Volatile Organic Compounds | SW-846 8270C | GEL-Charleston |
| Dissolved Organic Carbon | EPA 415.1 | GEL-Charleston |
| Total Organic Carbon | EPA 415.1 | GEL-Charleston |
| PCBs | SW-846 8082 | GEL-Charleston |
| Radiochemistry | Alpha/Gamma Spec | GEL-Charleston |
| Isotopic Plutonium | SW-846 6020 | GEL-Charleston |
| Strontium-90 | Gas Flow | GEL-Charleston |
| Tritium | Enrichment/Direct Count | University of Miami |
| Stable Nitrogen Isotopes | Isotopic Speciation | Coastal Laboratories |
| Perchlorate | EPA 314 | GEL-Charleston |
| Perchlorate | LCMSMS | Acculab-Golden |

### 4.4 Data Validation

All analytical results and corresponding data were provided by the analytical laboratories in Contract Laboratory Program (CLP)-like data packages. Upon receipt of these data packages, TechLaw staff performed a QC review to ensure that all of the elements required in a CLP-like data package were present. Elements of a CLP-like data package include, but are not limited to, case narratives, sample results, calibration data, instrument tuning data, instrument printouts, QC summary forms, raw data, and blank data.

Analytical data received by TechLaw will be transferred to EPA Region 6 for validation. The analytical data summarized in this report has not been validated and should be treated as such.

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# 5.0 CONCLUSIONS

## 5.1 Sampling Activities

TechLaw sampled effluent, groundwater monitoring and drinking water production wells, and springs and spring-fed surface water located on and off of LANL property in August 2001 and in October 2001. TechLaw also collected sediment samples in Acid Canyon and Sandia Canyon. NMED OB and LANL personnel collected split samples at various sample locations during the field activities.

During the sampling event, LANL provided equipment and personnel necessary for obtaining samples of effluent, groundwater, sediment, and springs. Equipment included electronic water level indicators, pumps, pump controllers, electrical battery, instruments used to measure field parameters, and sediment sieves. The LANL field team measured the depth to groundwater in each well using an electronic water level indicator. The LANL team measured the depth of groundwater to the top of the well casing. In general, sampling activities conformed with accepted EPA sampling procedures.

## 5.2 Analytical Results

Analytical results are presented in Table 7 through Table 16. The tables also include various water quality standards, guidelines, and limits established by EPA, NMED, and DOE. A description of the EPA, NMED, and DOE water quality standards, guidelines, and limits used for comparison is included in Appendix D.

### 5.2.1 Effluent Sampling Results

Analytical results from effluent samples collected at GS-1 indicate the effluent from the TA-50 Radioactive Wastewater Treatment Plant had a perchlorate concentration of 23.3 μg/ℓ. The provisionary EPA standard for drinking water is currently 4 μg/ℓ.

### 5.2.2 Groundwater Sampling Results

Analytical results from groundwater samples collected during the sampling event were compared to various water quality standards, guidelines, and limits established by EPA, NMED, and DOE. Trends in the groundwater quality within Mortandad Canyon, Pajarito Canyon, Ancho Canyon, production wells, the intermediate aquifer, Technical Area 3, and the Buckman wells were identified and are discussed below.

**Mortandad Canyon**

- Perchlorate was detected in all of the shallow alluvial monitoring wells sampled within Mortandad Canyon. The concentrations ranged from 106 µg/ℓ to 208 µg/ℓ. Though above the EPA provisionary drinking water standard range of 4 to18 µg/ℓ, the results are considerably less than the 1,100 µg/ℓ to 4,400 µg/ℓ detected during the 1999 EPA sampling event.

**Pajarito Canyon**

- Analysis of samples collected from one well, 18-MW-7, detected a volatile organic compound (methylene chloride, a common laboratory contaminant, at 6.3 µg/ℓ) slightly above the corresponding EPA MSSL of 4.3 µg/ℓ and analysis of samples from 18-MW-12 detected a semi-volatile organic compound (benzo(b)fluoranthene at an estimated 6.3 µg/ℓ) slightly above the corresponding EPA MSSL of 0.092 µg/ℓ.

- Analysis of samples collected from only two wells detected arsenic. Results from wells 18-MW-8 and 18-MW-18 indicated an arsenic concentration of 3.18 µg/ℓ and 3.49 µg/ℓ, respectively. Although these concentrations are below the EPA MCL for arsenic, they were above the corresponding EPA MSSL of 0.045 µg/ℓ.

- Elevated total thallium concentrations were detected in seven of the ten wells sampled ranging from 3.07 µg/ℓ to 8.84 µg/ℓ. Analytical results reveal that these concentrations are slightly above the corresponding EPA MCL of 2 µg/ℓ for thallium.

- The explosive compound RDX was detected in one Pajarito Canyon well. Analysis of samples collected from well 18-MW-7 indicated an RDX concentration of 0.86 µg/ℓ. This concentration is slightly above the corresponding EPA MSSL of 0.61 µg/ℓ. The explosive compound HDX was detected in only one well and at a concentration significantly (over an order of magnitude) lower than the corresponding EPA MSSL. Likewise, the explosive concentration of 1,2-Dinitrobenze was detected in all the wells sampled, but at least an order of magnitude below the corresponding EPA MSSL.

**Ancho Canyon**

- Elevated total thallium concentrations were detected in two wells (DT-9 and DT-10) at 5.06 µg/ℓ and 9.7 µg/ℓ, respectively. Analytical results reveal that the concentrations are above the corresponding EPA MCL of 2 µg/ℓ.

**Test Wells**

- Elevated total lead was identified in three of the monitoring wells sampled in the main aquifer. These concentrations (ranging from 31.7 µg/ℓ in TW-4 to 270 µg/ℓ in TW-1)

were above the EPA drinking water standard (15 µg/ℓ). Lead was below the EPA MCL during the 1999 EPA sampling event.

- Elevated total thallium concentrations were detected in two wells at 5.75 µg/ℓ and 6.93 µg/ℓ in TW-2A and TW-1 respectively. This is slightly higher than the highest concentration identified during the 1999 EPA sampling event of 5.4 µg/ℓ. Analytical results reveal that the concentrations are slightly above the EPA and NMED drinking water standard of 2µg/ℓ.

- Elevated perchlorate was detected in TW-1 at 5.82 µg/ℓ. Analytical results revealed that the concentration is above the corresponding EPA provisional MCL of 4-18 µg/ℓ.

**Drinking Water Production Wells**

- Elevated arsenic concentrations were detected in three wells (GA-1, O-1, and O-4) ranging from 2.73 µg/ℓ to 11.5 µg/ℓ. Analytical results reveal that the concentrations are above the corresponding EPA MSSL of 0.045 µg/ℓ but below the current EPA MCL of 50 µg/ℓ. In addition, analysis of samples collected from one well (PM-3) detected thallium at 7.84 µg/ℓ which is above the corresponding EPA MCL of 2 µg/ℓ.

**Intermediate Aquifer Wells**

- An elevated arsenic concentration was detected in one well (POI-4) at 4.05 µg/ℓ. Analytical results reveal that the concentration is above the corresponding EPA MSSL of 0.045 µg/ℓ but below the current EPA MCL of 50 µg/ℓ. In addition, analysis of samples collected from two wells (POI-4 and LADP-3) detected thallium at 5.5 µg/ℓ and 5.54 µg/ℓ which is above the corresponding EPA MCL of 2 µg/ℓ.

**Buckman Wells**

- Analysis of samples collected from six out of the seven Buckman wells revealed elevated levels of arsenic ranging from 3.87 µg/ℓ to 19.9 µg/ℓ. These concentrations are above the corresponding EPA MSSL of 0.045 µg/ℓ but below the current EPA MCL of 50 µg/ℓ. In addition, analysis of the samples from three wells detected thallium at levels ranging from 3.4 µg/ℓ and 4.4 µg/ℓ which is above the corresponding EPA MCL of 2 µg/ℓ.

**Technical Area 3, Building SM-30**

- Elevated levels above the EPA MCLs of three volatile organic compounds (1,1-dichloroethylene, trichloroethylene, and 1,1,1-trichloroethane) were detected in well 03-MW-1 and two additional compounds (chloroform and 1,2-dichloroethane) were above the corresponding EPA MSSL.

### 5.2.3 Spring and Surface Water Samples

Analytical results of spring samples collected from Pajarito Canyon revealed two analytes (lead and thallium) above the EPA or NMED drinking water standard of 15 µg/ℓ and 2 µg/ℓ, respectively. A lead concentration of 25.6 µg/ℓ was detected in PA 10.6. A thallium concentration of 6.04 µg/ℓ was detected in Threemile Spring. Aluminum, arsenic and iron were also detected in Pajarito Canyon springs at levels above their respective EPA MSSLs. None of the off-site springs detected elevated concentrations for any of the analytes.

### 5.2.4 Sediment Samples

Analytical results from the sediment samples collected from Acid Canyon contained arsenic at levels that exceeded EPA residential soil standards. However, none of the samples exceeded the background level for arsenic in AC-01 (2.7 µg/ℓ).

Acid Canyon contained radionuclides with levels above the EPA residential soil standards. These radionuclides include plutonium-238 (0.053 pCi/g to 1.59 pCi/g), plutonium-239/240 (30.6 pCi/g to 351 pCi/g), cesium-137 (0.281 pCi/g to 3.2 pCi/g), americium-241 (2.6 pCi/g to 16.3 pCi/g), lead-210 (1.15 pCi/g), and potassium-40 (27 pCi/g to 30.3 pCi/g). However, it should be noted that potassium-40 was detected at activities lower than the background concentration (36.8 pCi/g) established by LANL.

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## 6.0 RECOMMENDATIONS

*TO BE COMPLETED BY EPA.*

## 7.0 REFERENCES

Daniel B. Stevens & Associates, Inc. September 1998. Report on Alluvial Well Completions 1996-1998.

Los Alamos National Laboratory. June 1994. National Pollutant Discharge Elimination System Permit No. NM0028355.

Los Alamos National Laboratory. January 1995. Geologic and Hydrologic Records of Observation Wells, Test Holes, Test Wells, Supply Wells, Springs, and Surface Water Stations in the Los Alamos Area.

Los Alamos National Laboratory. September 1997. Environmental Surveillance and Compliance at Los Alamos during 1996.

New Mexico Environment Department. January 1995. New Mexico Environment Department Drinking Water Regulations.

New Mexico Water Quality Control Commission Regulations. January 1995. State of New Mexico Standards for Interstate and Intrastate Streams.

State of New Mexico. November 1996. New Mexico Water Quality Control Commission Regulations.

U.S. Department of Energy. January 7, 1993. DOE Order 5400.5 - Radiation Protection of the Public and the Environment.

U.S. Environmental Protection Agency, Region 6. July 1999. EPA Region 6, Human Health Media-Specific Screening Levels.

U.S. Environmental Protection Agency. April 13 1998. Risk Comparison for Radionuclides in Soil.

U.S. Environmental Protection Agency. 1986. Test Methods for Evaluating Solid Waste, Third Edition. SW-846. U.S. EPA, Washington, D.C. September 1986 (and updates in July 1992; September 1994; January 1995; June 1997).

U.S. Environmental Protection Agency. October 1996. Drinking Water Regulations and Health Advisories, EPA 822-B-96-002.

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# TABLES

## TABLE 1: Participants

| Representative/Associated Agency | Name |
|---|---|
| U.S. Environmental Protection Agency, Region 6 | Rich Mayer, Work Assignment Manager |
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## TABLE 2: Sample Location and Time Sampled

| Well No. | Located on Figure(s) | Location | Aquifer Monitored | Date Sampled | Time Sampled (hours) |
|---|---|---|---|---|---|
| MCO-3 | 4 and 6 | Mortandad Canyon | Alluvial Aquifer | 7/31/01 | 1355 |
| MCO-5 | 4 and 6 | Mortandad Canyon | Alluvial Aquifer | 8/2/01 | 1415 |
| MCO-6 | 4 and 6 | Mortandad Canyon | Alluvial Aquifer | 8/6/01 | 1430 |
| MCO-7 | 4 and 6 | Mortandad Canyon | Alluvial Aquifer | 8/7/01 | 0910 |
| MCO-7.5B | 4 and 6 | Mortandad Canyon | Alluvial Aquifer | 8/7/01 | 1800 |
| TW-1 | 7 | Pueblo Canyon | Main Aquifer | 7/31/01 | 1025 |
| TW-2A | 2 and 3 | Pueblo Canyon | Intermediate Aquifer | 7/30/01 | 1400 |
| TW-3 | 4 and 6 | Los Alamos Canyon | Main Aquifer | 7/30/01 | 1244 |
| TW-4 | 5 | Pueblo Canyon | Main Aquifer | 7/30/01 | 1100 |
| TW-8 | 4 and 6 | Mortandad Canyon | Main Aquifer | 7/30/01 | 1550 |
| POI-4 | 4 and 7 | Pueblo Canyon | Intermediate Aquifer | 8/1/01 | 1530 |
| LADP-3 | 2, 4, and 6 | Los Alamos Canyon | Intermediate Aquifer | 10/30/01 | 1020 |
| LAOI (a)-1.1 | 5 and 6 | Los Alamos Canyon | Intermediate Aquifer | 10/30/01 | 1557 |
| DT-9 | 2 | Ancho Canyon | Main Aquifer | 8/7/01 | 1300 |
| DT-5A | 2 | Ancho Canyon | Main Aquifer | 8/7/01 | 1435 |
| DT-10 | 2 | Ancho Canyon | Main Aquifer | 8/8/01 | 1045 |
| Buckman 1 | 2 | Buckman Field | Main Aquifer | 8/16/01 | 0940 |
| Buckman 1 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1223 |
| Buckman 2 | 2 | Buckman Field | Main Aquifer | 8/16/01 | 1140 |
| Buckman 2 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1420 |
| Buckman 3 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1112 |
| Buckman 4 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1030 |
| Buckman 6 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 0928 |
| Buckman 7 | 2 | Buckman Field | Main Aquifer | 8/16/01 | 1050 |
| Buckman 7 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1145 |
| Buckman 8 | 2 | Buckman Field | Main Aquifer | 10/31/01 | 1331 |

## TABLE 2: Sample Location and Time Sampled (Continued)

| Well No. | Located on Figure(s) | Location | Aquifer Monitored | Date Sampled | Time Sampled (hours) |
|---|---|---|---|---|---|
| O-4 | 6 | Los Alamos Canyon | Main Aquifer | 8/8/01 | 0545 |
| PM-1 | 7 | Mortandad Canyon | Main Aquifer | 8/8/01 | 0615 |
| PM-2 | 8 | Pajarito Canyon | Main Aquifer | 8/8/01 | 0740 |
| PM-3 | 6 | Mortandad Canyon | Main Aquifer | 8/8/01 | 0715 |
| PM-4 | 6 and 8 | Mortandad Canyon | Main Aquifer | 8/8/01 | 0820 |
| PM-5 | 6 | Mortandad Canyon | Main Aquifer | 8/8/01 | 0755 |
| O-1 | 7 | Pueblo Canyon | Main Aquifer | 8/8/01 | 0640 |
| G1-A | 2 and 3 | Guaje Canon | Main Aquifer | 8/8/01 | 1730 |
| 18-BG-1 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/13/01 | 1215 |
| 03-MW-01 | 4 and 8 | TA-3 | Alluvial Aquifer | 8/15/01 | 1620 |
| 18-MW-7 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/13/01 | 0950 |
| 18-MW-8 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/13/01 | 1410 |
| 18-MW-9 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/14/01 | 1340 |
| 18-MW-10 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/14/01 | 1710 |
| 18-MW-11 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/14/01 | 1610 |
| 18-MW-12 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/14/01 | 1255 |
| 18-MW-16 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/14/01 | 1020 |
| 18-MW-17 | 4 and 8 | Pajarito Canyon | Alluvial Aquifer | 8/15/01 | 1430 |
| 18-MW-18 | 2, 4, and 8 | Pajarito Canyon | Alluvial Aquifer | 8/15/01 | 1300 |
| 3-056 (C) | 2 and 3 | Sandia Watershed | NA (Sediment Sample) | 8/10/01 | 1500 |
| 3-056 (AA) | 2 and 3 | Sandia Watershed | NA (Sediment Sample) | 8/10/01 | 1515 |
| PU-10284 | 5 | Southfork of Acid Canyon | NA (Sediment Sample) | 11/2/01 | 1127 |
| PU-10285 | 5 | Southfork of Acid Canyon | NA (Sediment Sample) | 11/2/01 | 1146 |
| PU-10286 | 5 | Southfork of Acid Canyon | NA (Sediment Sample) | 11/2/01 | 1157 |
| AC-01 | 5 | Acid Canyon | NA (Sediment Sample) | 11/2/01 | 1255 |

## TABLE 2: Sample Location and Time Sampled (Continued)

| Well No. | Located on Figure(s) | Location | Aquifer Monitored | Date Sampled | Time Sampled (hours) |
|---|---|---|---|---|---|
| PA 6.7 | 6 | Pajarito Canyon | NA (Surface Water Sample) | 8/9/01 | 0845 |
| PA 10.6 | 2 and 3 | Canon de Valle | NA (Surface Water Sample) | 8/9/01 | 1610 |
| TA-18 Spring | 8 | Threemile Canyon | NA (Spring Sample) | 8/13/01 | 0745 |
| Threemile Spring | 8 | Threemile Canyon | NA (Spring Sample) | 8/13/01 | 0938 |
| Spring 4 | 2 and 3 | White Rock Canyon | NA (Spring Sample) | 11/1/01 | 0900 |
| Spring 4C | 2 and 3 | White Rock Canyon | NA (Spring Sample) | 11/1/01 | 0944 |
| Spring 4A | 2 and 3 | White Rock Canyon | NA (Spring Sample) | 11/1/01 | 1150 |
| Spring 4AA | 2 and 3 | White Rock Canyon | NA (Spring Sample) | 11/1/01 | 1230 |
| GS-1A | 6 | Mortandad Canyon | NA (Effluent) | 8/3/01 | 1100 |
| GS-1B | 6 | Mortandad Canyon | NA (Effluent) | 8/10/01 | 1005 |

## TABLE 3: Summary of Well Information
## Proposed Sample Locations

| Well No | Location | Date Sampled | Depth to Water (feet) | Total Well Depth (feet) | [1]Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| MCO-2 | Mortandad Canyon | NA | NA | 9 | NA | NA | NA | Not sampled |
| MCO-3 | Mortandad Canyon | 7/31/01 | 6.61 | 10.6 | 4.64 | 5.5 | Peristaltic Pump | Purged for 22 minutes at 0.25 gpm. |
| MCO-4B | Mortandad Canyon | 7/31/01 | NA | 23.5 | NC | NA | NA | Not sampled-water below screened interval |
| MCO-5 | Mortandad Canyon | 8/2/01 | 24.6 | 46.4 | 24.00 | 25 | Dedicated Bladder Pump | None |
| MCO-6 | Mortandad Canyon | 8/6/01 | 38.9 | 47.1 | 16.23 | 20 | Dedicated Bladder Pump | None |
| MCO-7 | Mortandad Canyon | 8/7/01 | 40.2 | 54.42 | 17.00 | 5.94 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MCO-7.5B | Mortandad Canyon | 8/7/01 | 45.95 | 58.15 | 23.95 | 10 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MCWB-6.2C | Mortandad Canyon | 8/6/01 | NA | 49.70 | NC | NA | NA | Not sampled - water below screened interval. |
| MCWB-6.5A | Mortandad Canyon | NA | NA | 53.00 | NC | NA | NA | Not sampled |
| MCWB-6.5E | Mortandad Canyon | 8/6/01 | NA | 52.84 | NC | NA | NA | Not sampled - water below screened interval. |
| MCWB-7.7B | Mortandad Canyon | NA | NA | 70.00 | NC | NA | NA | Not sampled |
| MT-3 | Mortandad Canyon | 8/2/01 | NA | 59.04 | NC | NA | NA | Not sampled-no groundwater |
| MT-4 | Mortandad Canyon | 8/2/01 | NA | 60.03 | NC | NA | NA | Not sampled- no groundwater |
| TSWB-6 | Mortandad Canyon | 8/6/01 | NA | 42.20 | NC | NA | NA | Not sampled - water below screened interval. |
| PCO-1 | Pajarito Canyon | 8/9/01 | 6.11 | NR | NC | NA | NA | Not sampled; health and safety concern |
| PCO-2 | Pajarito Canyon | 7/30/01 | 0.06 | 10.2 | NC | NA | NA | Not sampled-insufficient amount water |
| PCO-2 | Pajarito Canyon | 7/30/01 | 0.06 | 10.2 | NC | NA | NA | Not sampled-insufficient amount water |

## TABLE 3: Summary of Well Information
## Proposed Sample Locations
(Continued)

| Well No | Location | Date Sampled | Depth to Water (feet) | Total Well Depth (feet) | [1]Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| PCO-3 | Pajarito Canyon | 8/6/01 | 17.39 | 19.72 | NC | NA | NA | Not sampled-insufficient amount of water |
| PM-1 | Mortandad Canyon | 8/8/01 | NR | 2501 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| PM-2 | Pajarito Canyon | 8/8/01 | NR | 2600 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| PM-3 | Motandad Canyon | 8/8/01 | NR | 2552 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| PM-4 | Mortandad Canyon | 8/8/01 | NR | 2920 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| PM-5 | Mortandad Canyon | 8/8/01 | NR | 3110 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| O-1 | Pueblo Canyon | 8/8/01 | NR | 2609 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| O-4 | Los Alamos Canyon | 8/8/01 | NR | 2806 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| G-1A | Guaje Canon | 8/8/01 | NR | 2071 | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| DT-5A | Ancho Canyon | 8/7/01 | NR | 1821 | NC | Unknown | Dedicated Pump | Purged well overnight. |
| DT-9 | Ancho Canyon | 8/7/01 | NR | 1501 | NC | Unknown | Dedicated Pump | Purged well overnight. |
| DT-10 | Ancho Canyon | 8/8/01 | NR | 1409 | NC | Unknown | Dedicated Pump | Purged well overnight. |

## TABLE 3: Summary of Well Information
## Proposed Sample Locations
(Continued)

| Well No | Location | Date Sampled | Depth to Water (feet) | Total Well Depth (feet) | [1]Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| Buckman 1 | Buckman Field | 8/16/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 1 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Resampled; Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 2 | Buckman Field | 8/16/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 2 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Resampled: Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 3 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 4 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 6 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 7 | Buckman Field | 8/16/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approx. 5 minutes. |
| Buckman 7 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Resampled; Water was purged and sampled from spigot. Spigot was allowed to run approx 5 minutes. |
| Buckman 8 | Buckman Field | 10/31/01 | NR | NR | NC | Unknown | Dedicated Pump | Water was purged and sampled from spigot. Spigot was allowed to run approximately 5 minutes. |

## TABLE 3: Summary of Well Information
## Proposed Sample Locations
(Continued)

| Well No | Location | Date Sampled | Depth to Water (feet) | Total Well Depth (feet) | [1]Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| POI-4 | Pueblo Canyon | 8/1/01 | 162.74 | 179.00 | 57 | 15 | Dedicated Bladder Pump | Sampled after approx. 1 well volume was purged and parameters stable. Sampling continued following day. |
| TW-1 | Pueblo Canyon | 7/31/01 | NR | 642 | NC | Unknown | Dedicated Pump | Well was purged overnight. |
| TW-1A | Pueblo Canyon | NA | NA | 225 | NC | NA | NA | Not sampled; LANL verified water level prior to TL arrival. |
| TW-2 | Pueblo Canyon | NA | NA | 834 | NC | NA | NA | Not sampled; LANL verified water level prior to TL arrival. |
| TW-2A | Pueblo Canyon | 7/3/01; 7/31/01 | NR | 133 | NC | Unknown | Dedicated Pump | Well went dry during purging and sampling. |
| TW-3 | Los Alamos Canyon | 7/30/01 | 785 | 815 | 367.2 | 468 | Dedicated Pump | Well was purged for 3 hours 54 minutes at 2 litres every minute. |
| TW-4 | Pueblo Canyon | 7/30/01 | NR | 1205 | NC | 240 | Dedicated Pump | Well was purged for four (4) hours prior to sample collection at 1 liter every 1 minute. |
| TW-8 | Mortandad Canyon | 7/30/01 | 998 | 1065 | 524.8 | 940 | Dedicated Pump | Well was purged continuously for seven hours fifty minutes at 2 liters per minute. |
| MCO-0.6 | Mortandad Canyon | NA | NA | NR | NC | NA | NA | Not sampled; LANL verified water level prior to TL arrival. |
| LADP-3 | Los Alamos Canyon | 10/30/01 | 323.7 | 334.08 | 5.07 | 5 | Stainless Steel Bailer | None |
| LAOI(a)-1.1 | Los Alamos Canyon | 10/30/01 | NA | 310.2 | 49 | 35 | Dedicated Bladder Pump | Purge volume calculated by LANL prior to TL arrival. Well purged approximately one well volume every 2 hours 16 seconds. Samples were collected after two well volumes were purged and field parameters had stabilized. |
| SHB-3 | TA 16 | 10/31/01 | NA | 580 | NC | NA | NA | Not sampled; an obstacle was encountered at 580' bgs. |

## TABLE 3: Summary of Well Information
## Proposed Sample Locations
(Continued)

| Well No | Location | Date Sampled | Depth to Water (feet) | Total Well Depth (feet) | [1]Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| 03-MW-1 | TA 3 | 8/15/01 | 20.85 | 26.75 | 2.88 | 3 | Peristaltic pump, stainless steel bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-BG-1 | Pajarito Canyon | 8/13/01 | 17.45 | 31.75 | 7 | 7 | Peristaltic pump, stainless steel bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-BG-4 | Pajarito Canyon | 8/13/01 | 5.81 | 8.6 | 5.4 | 9 Litres | Peristaltic Pump | Not sampled; well went dry while purging, excessively slow recharge. |
| 18-MW-7 | Pajarito Canyon | 8/13/01 | 15.95 | 31.15 | 7.5 | 7.5 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-8 | Pajarito Canyon | 8/13/01 | 7.09 | 35.60 | 14 | 14 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-9 | Pajarito Canyon | 8/14/01 | 13.68 | 25.6 | 6 | 8 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-10 | Pajarito Canyon | 8/14/01 | 10.12 | 27.89 | 9 | 9 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-11 | Pajarito Canyon | 8/14/01 | 19.26 | 43.89 | 12 | 12 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-12 | Pajarito Canyon | 8/14/01 | 9.48 | 40.49 | 15 | 16 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-16 | Pajarito Canyon | 8/14/01 | 9.55 | 33.16 | 11.5 | 12 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-17 | Pajarito Canyon | 8/15/01 | 18.15 | 25.27 | 3.5 | 4 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |
| 18-MW-18 | Pajarito Canyon | 8/15/01 | 13.84 | 25.40 | 5.6 | 6 | Peristaltic Pump/ Stainless Steel Bailer | VOCs, SVOCs, and explosives collected by stainless steel bailer |

NA Information not available
NC Not Calculated
NR Not Recorded
[1] Calculated purge volume is three times the volume of standing water in the well.

## TABLE 4: Final Field Parameter Measurements

| Well No. | Location | Water Quality Parameter | | | | |
|---|---|---|---|---|---|---|
| | | pH[a] | Temperature[b] | Dissolved Oxygen[c] | Specific Conductivity[d] | Turbidity[e] |
| MCO-3 | Mortandad Canyon | 7.44 | 15.1 | NR | 289 | 4.7 |
| MCO-5 | Mortandad Canyon | 7.37 | 8.4 | NR | 234 | 2.32 |
| MCO-6 | Mortandad Canyon | 7.35 | 11.8 | NR | 241 | 1.23 |
| MCO-7 | Mortandad Canyon | 8.18 | 11.0 | NR | 229 | 3.76 |
| MCO-7.5B | Mortandad Canyon | 7.16 | 11.08 | NR | 259 | 3.15 |
| TW-1 | Pueblo Canyon | 8.05 | 15.4 | NR | 195.8 | 4.7 |
| TW-2A | Pueblo Canyon | NR | NR | NR | NR | NR |
| TW-3 | Los Alamos Canyon | 7.64 | 21.9 | NR | 87.0 | 10.6 |
| TW-4 | Pueblo Canyon | 7.91 | 15.5 | NR | 67.7 | 15.5 |
| TW-8 | Mortandad Canyon | 7.93 | 20.9 | NR | 67.6 | 0.8 |
| POI-4 | Pueblo Canyon | 8.17 | 15.9 | NR | 250 | 4.1 |
| LADP-3 | Los Alamos Canyon | 6.71 | 11.1 | NR | 208 | Err |
| LAIO(a)-1.1 | Los Alamos Canyon | 6.60 | 10.2 | 8.92 | 0.142 | 107 |
| DT-9 | Ancho Canyon | 8.21 | 22.0 | NR | 58.1 | 0.33 |
| DT-5A | Ancho Canyon | 7.91 | 22.1 | NR | 58.1 | 0.85 |
| DT-10 | Ancho Canyon | 8.23 | 19.6 | NR | 65.3 | 2.16 |
| Buckman 1 | Buckman Field | 8.6 | 20.4 | NR | 177.4 | 0.79 |
| Buckman 1 | Buckman Field | 7.87 | 23.9 | 5.97 | 0.635 | 1 |
| Buckman 2 | Buckman Field | 7.3 | 28.5 | NR | 1130 | 0.51 |
| Buckman 2 | Buckman Field | 7.25 | 24.3 | 5.50 | 0.746-1.01 | 0 |
| Buckman 3 | Buckman Field | 7.07 | 24.0 | 5.72 | 0.894 | 0 |
| Buckman 4 | Buckman Field | 6.67 | 23 | 4.77 | 0.872-1.19 | 0 |
| Buclman 6 | Buckman Field | 6.73 | 22.8 | 5.74 | 0.964 | 1 |
| Buckman 7 | Buckman Field | 7.55 | 28.2 | NR | 498 | 0.38 |
| Buckman 7 | Buckman Field | 8.16 | 26.0 | 5.18 | 0.732 | 1 |
| Buckman 8 | Buckman Field | 7.66 | 25.6 | 6.03 | 0.615 | 1 |
| O-4 | Los Alamos Canyon | 7.17 | 11.8 | NR | 259 | 0.4 |
| PM-1 | Mortandad Canyon | Err | 11.2 | NR | 259 | 0.64 |
| PM-2 | Pajarito Canyon | Err | 22.3 | NR | 56.9 | 0.35 |

## TABLE 4: Final Field Parameter Measurements (continued)

| Well No. | Location | Water Quality Parameter | | | | |
|---|---|---|---|---|---|---|
| | | pH[a] | Temperature[b] | Dissolved Oxygen[c] | Specific Conductivity[d] | Turbidity[e] |
| PM-3 | Mortandad Canyon | Err | 22.3 | NR | 129.2 | 0.34 |
| PM-4 | Mortandad Canyon | Err | 25.7 | NR | 73.4 | 0.25 |
| PM-5 | Mortandad Canyon | Err | 24.3 | NR | 65.5 | 0.49 |
| O-1 | Pueblo Canyon | Err | 11.2 | NR | 259 | 0.46 |
| G1-A | Guaje Canon | 8.20 | 27.3 | NR | 93.2 | 4.22 |
| 18-BG-1 | Pajarito Canyon | 6.5 | 11.6 | NR | 89.4 | 5.47 |
| 03-MW-01 | TA 3 | 6.1 | 14.1 | NR | 177.4 | 40.7 |
| 18-MW-7 | Pajarito Canyon | 6.6 | 12.1 | NR | 89.0 | 19.1 |
| 18-MW-8 | Pajarito Canyon | 6.6 | 14.8 | NR | 100.6 | 4.48 |
| 18-MW-9 | Pajarito Canyon | 6.30 | 15.9 | NR | 233 | 1.17 |
| 18-MW-10 | Pajarito Canyon | 6.27 | 14.9 | NR | 228 | 6.27 |
| 18-MW-11 | Pajarito Canyon | 6.6 | 14.9 | NR | 207 | 2.65 |
| 18-MW-12 | Pajarito Canyon | 6.18 | 15.6 | NR | Err | 4.10 |
| 18-MW-16 | Pajarito Canyon | 6.55 | 15.1 | NR | 113.3 | 5.56 |
| 18-MW-18 | Pajarito Canyon | 6.7 | 15.3 | NR | 374 | 0.71 |
| 18-MW-17 | Pajarito Canyon | 6.5 | 16.0 | NR | 455 | 1.54 |
| PA 6.7 | Pajarito Canyon | 8.2 | 14.5 | NR | 103.6 | 45.0 |
| PA 10.6 | Canon de Valle | 7.65 | 13.8 | NR | 110.4 | NR |
| TA 18 Spring | Threemile Canyon | 5.77 | 13.8 | NR | 213 | NR |
| Threemile Spring | Threemile Canyon | 6.07 | 9.7 | NR | 188 | NR |
| Spring 4 | White Rock Canyon | 7.14 | 16.3 | NR | 208 | 103 |
| Spring 4C | White Rock Canyon | 7.28 | 17.1 | NR | 216 | 105 |
| Spring 4A | White Rock Canyon | 7.63 | 21.3 | NR | 193 | 94 |
| Spring 4AA | White Rock Canyon | 7.24 | 19.1 | NR | 211 | 103 |
| GS-1A | Mortanad Canyon | 7.65 | 21.9 | NR | 234 | NR |
| GS-1B | Mortandad Canyon | 7.7 | 16.7 | NR | 169.2 | 73.9 |

a pH measured in standard units.
b Temperature measured in degrees Celcius (°C).
c Dissolved oxygen measured in milligrams per liter (mg/ℓ)
d Specific conductivity measured in milli-Seimens per centimeter (mS/cm).
e Turbidity measured in Nephelometric turbidity units (NTUs)
NA Not available due to instrument limitations.
Err Parameter not measured due to an equipment error.
NR Not recorded

## TABLE 5: Sample Location and Analysis

| Sample Identification. | Location | Easting[1] | Northing[2] | Analysis[3] |
|---|---|---|---|---|
| MCO-3 | Mortandad Canyon | 383171.15 | 3969779.00 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Dissolved Radionuclide Suite<br>Tritium[4]<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Total Phospherous<br>TKN<br>NH3<br>Nitrogen Isotopes<br>SVOCs<br>DOC<br>TOC |
| MCO-5 | Mortandad Canyon | 384723.37 | 3969549.00 | |
| MCO-6[5] | Mortandad Canyon | 385067.34 | 3969378.25 | |
| MCO-7 | Mortandad Canyon | 385336.34 | 3969229.75 | |
| MCO-7.5B[5] | Mortandad Canyon | 385627.15 | 3969213.75 | |
| GS-1A | Mortandad Canyon | 382982.43 | 3969798.00 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Dissolved Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>NH3<br>Nitrogen Isotopes<br>VOCs<br>SVOCs<br>DOC<br>TOC<br>Total Phospherous<br>TKN |
| GS-1B | Mortandad Canyon | 382982.43 | 3969798.00 | |
| TW-1 | Pueblo Canyon | 390086.68 | 3970254.00 | Major Anions/Cayions<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Total Phospherous<br>TKN<br>NH3<br>Nitrogen Isotopes<br>VOCs[6]<br>DOC<br>TOC |
| TW-2A | Pueblo Canyon | 385274.84 | 3971903.75 | |
| TW-3 | Los Alamos Canyon | 386338.18 | 3970625.25 | |
| TW-4 | Pueblo Canyon | 382181.25 | 3972062.75 | |
| TW-8 | Mortandad Canyon | 384753.59 | 3969538.00 | |

## TABLE 5: Sample Location and Analysis
(Continued)

| Sample Identification. | Location | Easting[1] | Northing[2] | Analysis[3] |
|---|---|---|---|---|
| POI-4 | Pueblo Canyon | 388988.40 | 3970423.50 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Nitrogen Isotopes<br>VOCs<br>DOC<br>TOC |
| LADP-3 | Los Alamos Canyon | 384895.50 | 3970744.50 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Hardness<br>DOC<br>TOC |
| LAOI (a)-1.1 | Los Alamos Canyon | 383811.93 | 3970897.25 | |
| DT-9 | Ancho Canyon | 383592.53 | 3964063.25 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Nitrogen Isotopes<br>VOCs<br>DOC<br>TOC<br>Explosives |
| DT-5A[5] | Ancho Canyon | 382482.71 | 3965082.00 | |
| DT-10 | Ancho Canyon | 383602.21 | 3964964.00 | |

## TABLE 5: Sample Location and Analysis
(Continued)

| Sample Identification. | Location | Easting[1] | Northing[2] | Analysis[3] |
|---|---|---|---|---|
| Buckman 1 | Buckman Field | 395952.87 | 3966300.25 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NH3<br>NO2/NO3 as Nitrogen<br>Total Phospherous<br>TKN<br>SVOC[7]<br>VOC[8]<br>DOC<br>TOC<br>Radium[9] |
| Buckman 1 | Buckman Field | 395952.87 | 3966300.25 | |
| Buckman 2 | Buckman Field | 395513.90 | 3965608.25 | |
| Buckman 2 | Buckman Field | 395513.90 | 3965608.25 | |
| Buckman 3 | Buckman Field | 396157.53 | 3965351.75 | |
| Buckman 4 | Buckman Field | 396186.96 | 3964655.00 | |
| Buckman 6 | Buckman Field | 396739.68 | 3964488.50 | |
| Buckman 7 | Buckman Field | 395973.75 | 3966155.25 | |
| Buckman 7 | Buckman Field | 395973.75 | 3966155.25 | |
| Buckman 8 | Buckman Field | 394775.43 | 3966040.00 | |
| O-4[5] | Los Alamos | 386218.78 | 3970583.25 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Stronium-90<br>Alpha/Gamma Spec<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NO2/NO3 as Nitrogen<br>Explosives[10]<br>SVOC[11]<br>VOC<br>DOC<br>TOC |
| PM-1[5] | Mortandad Canyon | 389368.00 | 3969054.75 | |
| PM-2 | Pajarito Canyon | 385975.59 | 3966749.00 | |
| PM-3[5] | Mortandad Canyon | 387818.00 | 3969475.00 | |
| PM-4[5] | Mortandad Canyon | 385664.18 | 3968074.25 | |
| PM-5[5] | Mortandad Canyon | 384902.12 | 3969019.25 | |
| O-1 | Pueblo Canyon | 389890.50 | 3970303.75 | |
| G1-A[5] | Guaje Canon | 391718.81 | 3973974.50 | |
| 03-MW-01 | TA-3 | 379926.00 | 3970759.25 | Major Anions/Cations<br>TDS/TSS<br>23 TAL Metals (D/T)<br>Dissolved Trace Metals<br>Radionuclide Suite[12]<br>Tritium<br>Perchlorate<br>Total Cyanide<br>NH3<br>NO2/NO3 as Nitrogen<br>Total Phospherous<br>TKN<br>Explosives<br>SVOC<br>VOC<br>DOC<br>TOC |
| 18-BG-1 | Pajarito Canyon | 385415.75 | 3967221.00 | |
| 18-MW-7 | Pajarito Canyon | 385416.00 | 3967178.75 | |
| 18-MW-8 | Pajarito Canyon | 385371.37 | 3966834.00 | |
| 18-MW-9 | Pajarito Canyon | 385748.78 | 3966900.75 | |
| 18-MW-10 | Pajarito Canyon | 385645.96 | 3966954.00 | |
| 18-MW-11 | Pajarito Canyon | 385765.56 | 3966975.75 | |
| 18-MW-12 | Pajarito Canyon | 385805.59 | 3966813.00 | |
| 18-MW-16 | Pajarito Canyon | 385775.31 | 3966805.25 | |
| 18-MW-17 | Pajarito Canyon | 386300.09 | 3966539.50 | |
| 18-MW-18 | Pajarito Canyon | 386946.65 | 3966081.25 | |

## TABLE 5: Sample Location and Analysis
**(Continued)**

| Sample Identification. | Location | Easting[1] | Northing[2] | Analysis[3] |
|---|---|---|---|---|
| 3-056 (C) | Sandia Watershed | 380988.03 | 3970837.50 | TAL 23 Metals |
| 3-056 (AA) | Sandia Watershed | 380988.03 | 3970837.50 | |
| PU-10284 | Southfork of Acid Canyon | 382012.59 | 3972053.25 | Radionuclide Suite (Soil)<br>23 TAL Metals<br>PCB |
| PU-10285 | Southfork of Acid Canyon | 381999.50 | 3971827.00 | |
| PU-10286 | Southfork of Acid Canyon | 382013.53 | 3972124.25 | |
| AC-01 | Acid Canyon | 382172.96 | 3972171.00 | |
| PA 6.7[5] | Pajarito Canyon | 382941.28 | 3968521.50 | Major Anions/Cations<br>Hardness<br>TDS/TSS<br>TAL Metals (T/D)[13]<br>Dissolved Trace Metals<br>Radionuclide Suite[14]<br>Tritium<br>Perchlorate<br>Total Cyanide<br>Amendable Cyanide<br>NH3<br>NO2/NO3 as Nitrogen<br>Total Phospherous<br>TKN<br>Explosives<br>SVOC[14]<br>VOC<br>DOC<br>TOC |
| PA 10.6 | Canon de Valle | 377013.43 | 3968201.50 | |
| TA-18 Spring | Threemile Canyon | 385191.59 | 3966839.75 | |
| Threemile Spring | Threemile Canyon | 384524.18 | 3967121.25 | |
| Spring 4 | White Rock Canyon | 392240.75 | 3962977.00 | Nitrogen Isotopes<br>Tritium<br>Dissolved Major Anions/Cations<br>Dissolved Trace Metals<br>Anions<br>NO2/NO3<br>NH3<br>TKN<br>Total Phosphate<br>Perchlorate<br>VOC |
| Spring 4C | White Rock Canyon | 392191.25 | 3963002.75 | |
| Spring 4A | White Rock Canyon | 391828.31 | 3962914.50 | |
| Spring 4AA | White Rock Canyon | 391845.53 | 3963034.00 | |

# TABLE 5: Sample Location and Analysis (Continued)

[1]**False Easting**: 500000.000000
[2]**False Northing**: 0.000000

[3] **TAL Metals include:**

| | |
|---|---|
| aluminum | manganesium |
| antimony | manganese |
| arsenic | zinc |
| barium | nickel |
| berylium | potassium |
| cadmium | selenium |
| cadmium | silver |
| calcium | sodium |
| chromium | strontium |
| cobalt | thalium |
| copper | tin |
| iron | vanadium |
| lead | |

**Dissolved Trace Metals include:**

boron
lithium
molybdenum
silicon
tin
titanium

**Anions include:**

fluoride
carbonic acid
chlorine
sulfate
bromine

**Radionuclide Suite (Groundwater) include:**

90-Strontium

| (Alpha Spectrometry) | (Gamma Spectrometry) |
|---|---|
| Americium-241 | Americium-241 |
| Plutomium-238 | Cesium-137 |
| Plutonium-239/240 | Cobalt-60 |
| Uranium-233/234 | Lead-210 |
| Uranium-235/236 | Sodium-22 |
| Uranium-238 | Thallium-208 |
| | Thorium-230 |
| | Thorium-234 |
| | Tin-113 |
| | Uranium-235 |
| | Uranium-238 |

**Radiochemical Suite (Soil) include:**

90-Stronium

| (Alpha Spectrometry) | (Gamma Spectrometry) |
|---|---|
| Americium-241 | Actinium-228 |
| Plutomium-238 | Americium-241 |
| Plutonium-239/240 | Bismuth-212 |
| Uranium-233/234 | Bismuth-214 |
| Uranium-235/236 | Cesium-137 |
| Uranium-238 | Lead-210 |
| | Lead-212 |
| | Lead-214 |
| | Potassium-40 |
| | Radium-228 |
| | Thallium-208 |
| | Thorium-230 |
| | Thorium-234 |

4 Tritium collected at MCO-3, MCO-6, MCO-7, and MCO-7.5B only
5 Percent Uranium collected
6 VOCS collected at TW-1, TW-3, TW-4, and TW-8 only
7 SVOCs collected at Buckman Wells 1, 2, and 7 during first sampling event only
8 VOCs collected at Buckman 1,2,7 during the first sampling event only
9 Radium collected at Buckman Wells 1, 2, 3, 6, 7, and 8 during the second sampling event only
10 Explosives collected for PM-1, PM-2, PM-3, PM-4, PM-5, and 0-4 only
11 SVOCs collected for PM-1, PM-2, PM-3, PM-4, PM-5, 0-1, and 0-4 only
12 Radionuclide Suite collected for 18-MW-9, 18-MW-10, 18-MW-11, and 18-MW-12 only; remaining wells collected for dissolved radionuclide suite
13 PA 6.7 analyzed for Dissolved TAL Metals only
14 VOCs collected for PA 6.7, TA-18 Spring, and Threemile Spring only

Definitions:
TDS= Total Dissolved Solids
TSS= Total Suspended Solids
TAL= Target Analyte List
DOC= Dissolved Organic Carbon
TOC= Total Organic Carbon
D/T= Dissolvded/Total
TKN= Total Kjeldahl Nitrogen
VOC=Volatile Organic Compound
SVOC=Semi-Volatile Organic Compound
$NO_2/NO_3$ = Nitrate/Nitrite
$NH_3$= Ammonia
PCB=Poly Chlorinated Biphenol

## TABLE 6: Well Depth to Water and Location

| Well No. | Location | Depth to Water (feet below ground surface) |
|---|---|---|
| MCO-3 | Mortandad Canyon | 6.61 |
| MCO-5 | Mortandad Canyon | 24.6 |
| MCWB-5 | Mortandad Canyon | 29.48 |
| MCWB-5.5B | Mortandad Canyon | 35.36 |
| MCWB-5.5A | Mortandad Canyon | 35.06 |
| MCO-6B | Mortandad Canyon | 39.85 |
| MCO-6 | Mortandad Canyon | 38.9 |
| MCWB-6.2A | Mortandad Canyon | 41.2 |
| MCWB-6.5C | Mortandad Canyon | 43.8 |
| MCWB-7A | Mortandad Canyon | 41.51 |
| MCO-7 | Mortandad Canyon | 40.2 |
| MCWB-7.2 | Mortandad Canyon | 66.81 |
| MCWB-7.4A | Mortandad Canyon | 44.84 |
| MCWB-7.4B | Mortandad Canyon | 50.93 |
| MCO-7.5B | Mortandad Canyon | 45.95 |
| MCWB-7.7B | Mortandad Canyon | 60.15 |
| MT-1 | Mortandad Canyon | 46.21 |
| MT-2 | Mortandad Canyon | 66.1 |
| TW-1 | Pueblo Canyon | Unavailable, dedicated pump in well |
| TW-2A | Pueblo Canyon | Unavailable, dedicated pump in well |
| TW-3 | Los Alamos Canyon | 785 |
| TW-4 | Pueblo Canyon | Unavailable, dedicated pump in well |
| TW-8 | Mortandad Canyon | 998 |
| POI-4 | Pueblo Canyon | 162.74 |
| LADP-3 | Los Alamos Canyon | 323.7 |
| LAOI (a)-1.1 | Los Alamos Canyon | Unavailable, dedicated pump in well |
| DT-9 | Ancho Canyon | Unavailable, dedicated pump in well |
| DT-5A | Ancho Canyon | Unavailable, dedicated pump in well |
| DT-10 | Ancho Canyon | Unavailable, dedicated pump in well |
| Buckman 1 | Buckman Field | Unavailable, dedicated pump in well |
| Buckman 2 | Buckman Field | Unavailable, dedicated pump in well |
| Buckman 3 | Buckman Field | Unavailable, dedicated pump in well |

## TABLE 6: Well Depth to Water and Location
**(Continued)**

| Well No. | Location | Depth to Water |
|---|---|---|
| Buckman 4 | Buckman Field | Unavailable, dedicated pump in well |
| Buckman 6 | Buckman Field | Unavailable, dedicated pump in well |
| Buckman 7 | Buckman Field | Unavailable, dedicated pump in well |
| Buckman 8 | Buckman Field | Unavailable, dedicated pump in well |
| O-4 | Los Alamos Canyon | Unavailable, dedicated pump in well |
| PM-1 | Mortandad Canyon | Unavailable, dedicated pump in well |
| PM-2 | Pajarito Canyon | Unavailable, dedicated pump in well |
| PM-3 | Mortandad Canyon | Unavailable, dedicated pump in well |
| PM-4 | Mortandad Canyon | Unavailable, dedicated pump in well |
| PM-5 | Mortandad Canyon | Unavailable, dedicated pump in well |
| O-1 | Pueblo Canyon | Unavailable, dedicated pump in well |
| G1-A | Guaje Canon | Unavailable, dedicated pump in well |
| 18-BG-1 | Pajarito Canyon | 17.45 |
| 18-BG-4 | Pajarito Canyon | 5.81 |
| 03-MW-01 | TA-3 | 20.85 |
| 18-MW-1 | Pajarito Canyon | 16 |
| 18-MW-6 | Pajarito Canyon | 10.67 |
| 18-MW-7 | Pajarito Canyon | 15.95 |
| 18-MW-8 | Pajarito Canyon | 7.09 |
| 18-MW-9 | Pajarito Canyon | 13.68 |
| 18-MW-10 | Pajarito Canyon | 10.12 |
| 18-MW-11 | Pajarito Canyon | 19.26 |
| 18-MW-12 | Pajarito Canyon | 9.48 |
| 18-MW-13 | Pajarito Canyon | 10.68 |
| 18-MW-14 | Pajarito Canyon | 11.51 |
| 18-MW-15 | Pajarito Canyon | 9.29 |
| 18-MW-16 | Pajarito Canyon | 9.55 |
| 18-MW-17 | Pajarito Canyon | 18.15 |
| 18-MW-18 | Pajarito Canyon | 13.84 |
| PCO-1 | Pajarito Canyon | 6.11 |
| PCO-2 | Pajarito Canyon | 0.06 |
| PCO-3 | Pajarito Canyon | 17.39 |

**TABLE 7: Summary of Preliminary Analytical Results for Water Samples - Volatile Organic Compounds**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | TA-3 Building SM-30 | | Pajarito Canyon (TA-18) | | | | | | | | | | | Springs and Surface Water (Pajarito Canyon) | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | 03-MW-1 (8/15/01) DF 1 | 03-MW-1 (8/15/01) DF 50 | 18-BG-1 (8/13/01) | 18-MW-7 (8/13/01) | 18-MW-8 (8/13/01) | 18-MW-9 (8/14/01) | 18-MW-10 (8/14/01) | 18-MW-11 (8/14/01) | 18-MW-12 (8/14/01) | 18-MW-16 (8/14/01) | 18-MW-17 (8/15/01) | 18-MW-18 (8/15/01) | 18-MW-27[e] (8/15/01) | PA-6.7 (Dissolved) (8/9/01) | PAD-6.7A[f] (8/9/01) |
| Acetone | NE | 610 | NE | NE | BDL | BDL | 5.8 B | 5.8 B | 5.3 B | 5.6 B | 5.6 B | BDL | 5.9 B | 5.7 B | BDL | BDL | BDL | 6 B | 1.4 J |
| Bromofluorobenzene | NE | NE | NE | NE | 49.9 | 41.7 | 54.4 | 54.1 | 53.6 | 55.5 | 53.9 | 54.6 | 53.7 | 54.1 | 50.3 | 48.2 | 50.3 | 54.2 | 41.2 |
| Chloroform | NE | 0.16 | NE | 100 | **1.2** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Dibromofluoromethane | NE | NE | NE | NE | 49 | 45.6 | 48.5 | 48.3 | 47.8 | 47.6 | 48.2 | 48.5 | 47.5 | 47.8 | 49.1 | 49 | 48.6 | 47.9 | 41.8 |
| 1,4-Dichlorobenzene | 75 | 0.47 | NE | NE | BDL | BDL | 0.25 JB | 0.27 JB | 0.22 JB | 0.16 JB | 0.15 JB | 0.21 JB | 0.18 JB | 0.17 JB | BDL | BDL | BDL | BDL | BDL |
| 1,1-Dichloroethane | NE | 810 | NE | 25 | 15.5 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2-Dichloroethane | 5 | 0.12 | 5 | 10 | **1.9** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1-Dichloroethylene | 7 | 0.046 | 7 | 5 | **23.9** | **27 J** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Ethylbenzene | 700 | 1,300 | 700 | 750 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Isopropylbenzene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Methylene Chloride | NE | 4.3 | NE | 100 | BDL | **124 JB** | BDL | **6.3 B** | BDL | BDL | BDL | BDL | BDL | 0.68 JB | 0.83 J | 0.93 J | 1.6 J | BDL | 1 JB |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Toluene | 1,000 | 720 | 1,000 | 750 | BDL | BDL | 0.3 J | 0.34 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.57 J | 0.28 J | BDL | BDL |
| Toluene-d8 | NE | NE | NE | NE | 50.1 | 46 | 52.7 | 52.2 | 52.5 | 52.5 | 51.5 | 53.2 | 51.8 | 52.3 | 49.7 | 49.4 | 49.9 | 52.4 | 42.3 |
| Trichloroethylene | 5 | 1.6 | 5 | 100 | **5.2** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1,1-Trichloroethane | 200 | 790 | 200 | 60 | **900 E** | **1,150** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2,4-Trimethylbenzene | NE | 12 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Xylenes (total) | 10,000 | 1,400 | 10,000 | 620 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| m,p-Xylenes | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |

**TABLE 7: Summary of Preliminary Analytical Results for Water Samples - Volatile Organic Compounds**
**Los Alamos National Laboratory, New Mexico**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | Test Wells | | | | Ancho Canyon | | | TA-50 Radioactive Waste Water Treatment Plant | | Drinking Water Production Wells | | | | | | | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | TW-1 (7/31/01) | TW-3 (7/30/01) | TW-4 (7/30/01) | TW-8 (7/30/01) | DT-5A (Dissolved) (8/8/01) | DT-9 (8/7/01) | DT-10 (8/8/01) | GS1-A (8/3/01) | GS1-B (Dissolved) (8/10/01) | PM-1 (8/8/01) | PM-2 (8/8/01) | PM-3 (Dissolved) (8/8/01) | PM-4 (Dissolved) (8/8/01) | PM-5 (8/8/01) | O-1 (8/8/01) | O-4 (8/8/01) | G-1A (8/8/01) |
| Acetone | NE | 610 | NE | NE | BDL | BDL | BDL | BDL | 5.3 B | BDL | BDL | 3.1 J | 6.2 B | BDL | BDL | 5.2 B | 5.3 B | BDL | BDL | BDL | BDL |
| Bromofluorobenzene | NE | NE | NE | NE | 45.3 | 46.2 | 46.2 | 46.2 | 54.2 | 40.3 | 39.5 | 40.2 | 54.1 | 39.7 | 41.1 | 55.1 | 53.4 | 39.6 | 39.8 | 39.7 | 40.6 |
| Chloroform | NE | 0.16 | NE | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Dibromofluoromethane | NE | NE | NE | NE | 46.4 | 45.6 | 45.8 | 46.3 | 47.8 | 41.6 | 42.3 | 41.8 | 47.4 | 43.3 | 43.9 | 48.1 | 48.2 | 42.7 | 42.2 | 41.5 | 43.4 |
| 1,4-Dichlorobenzene | 75 | 0.47 | NE | NE | 0.18 JB | 0.22 JB | 0.21 JB | 0.2 JB | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1-Dichloroethane | NE | 810 | NE | 25 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2-Dichloroethane | 5 | 0.12 | 5 | 10 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1-Dichloroethylene | 7 | 0.046 | 7 | 5 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Ethylbenzene | 700 | 1,300 | 700 | 750 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Isopropylbenzene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.31 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Methylene Chloride | NE | 4.3 | NE | 100 | BDL | BDL | BDL | BDL | BDL | 1.4 JB | 1.7 JB | 1.7 JB | BDL | 1.1 JB | 2.3 JB | BDL | BDL | 1.3 JB | 1.4 JB | 0.98 JB | 0.83 JB |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.47 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Toluene | 1,000 | 720 | 1,000 | 750 | BDL | BDL | BDL | BDL | 0.23 J | BDL | BDL | BDL | 0.46 J | BDL | BDL | 0.26 J | 0.28 J | BDL | BDL | 0.25 J | BDL |
| Toluene-d8 | NE | NE | NE | NE | 48.2 | 47.6 | 49 | 48.3 | 53.2 | 42 | 40.9 | 41.2 | 51.9 | 41.5 | 42.7 | 52 | 51.6 | 41.8 | 41.8 | 41.4 | 42.1 |
| Trichloroethylene | 5 | 1.6 | 5 | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1,1-Trichloroethane | 200 | 790 | 200 | 60 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2,4-Trimethylbenzene | NE | 12 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.3 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Xylenes (total) | 10,000 | 1,400 | 10,000 | 620 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| m,p-Xylenes | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |

## TABLE 7: Summary of Preliminary Analytical Results for Water Samples - Volatile Organic Compounds
## Los Alamos National Laboratory, New Mexico
## (Continued)

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | Springs and Surface Water (Pajarito Canyon) | | Intermediate Aquifer Well | Buckman Wells | | | | QA/QC | | | | | | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | Three Mile Spring (8/13/01) | TA-18 Spring (8/13/01) | POI-4 (8/1/01) | Buckman 1 (8/16/01) | Buckman 2 (8/16/01) | Buckman 7 (8/16/01) | Buckman 11[g] (8/16/01) | EQ-1 (Equipment Rinsate) (8/16/01) | FB-01 (Field Blank) (8/15/01) | TP-1 (Trip Blank) (7/31/01) | TP-2 (Trip Blank) (7/30/01) | TP-3 (Trip Blank) (Dissolved) (7/30/01) | TP-4 (Trip Blank) (8/7/01) | TP-5 (Trip Blank) (8/7/01) |
| Acetone | NE | 610 | NE | NE | 5.7 B | 5.8 B | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 5.5 B | 5.6 B | BDL |
| Bromofluorobenzene | NE | NE | NE | NE | 54.9 | 56.6 | 40 | 50.4 | 49 | 50.4 | 49.5 | 50.5 | 50 | 47.8 | 40 | 53.8 | 55.4 | 51.2 |
| Chloroform | NE | 0.16 | NE | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Dibromofluoromethane | NE | NE | NE | NE | 48.6 | 49.4 | 42.7 | 49 | 48.7 | 48.6 | 48 | 48.4 | 49.3 | 47.4 | 43.5 | 47.6 | 48 | 49.9 |
| 1,4-Dichlorobenzene | 75 | 0.47 | NE | NE | 0.19 JB | 0.24 JB | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.14 JB | BDL | 0.19 JB | 0.2 JB | BDL |
| 1,1-Dichloroethane | NE | 810 | NE | 25 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2-Dichloroethane | 5 | 0.12 | 5 | 10 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1-Dichloroethylene | 7 | 0.046 | 7 | 5 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Ethylbenzene | 700 | 1,300 | 700 | 750 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.2 J | BDL | BDL | BDL | BDL |
| Isopropylbenzene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Methylene Chloride | NE | 4.3 | NE | 100 | BDL | BDL | 1.6 JB | 1.1 J | 1.8 J | 1.3 J | 2.8 J | 1.4 J | 1.8 J | BDL | 0.9 JB | BDL | BDL | 3.8 J |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Toluene | 1,000 | 720 | 1,000 | 750 | BDL | BDL | BDL | 0.25 J | 0.44 J | BDL | BDL | 0.26 J | 0.32 J | BDL | BDL | 0.5 J | BDL | 0.25 J |
| Toluene-d8 | NE | NE | NE | NE | 53.2 | 54.3 | 41.6 | 49.8 | 50.2 | 49.9 | 49.3 | 50.3 | 50.7 | 49.8 | 41.4 | 51.5 | 52.8 | 50.4 |
| Trichloroethylene | 5 | 1.6 | 5 | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,1,1-Trichloroethane | 200 | 790 | 200 | 60 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 1,2,4-Trimethylbenzene | NE | 12 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Xylenes (total) | 10,000 | 1,400 | 10,000 | 620 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.66 J | BDL | BDL | BDL | BDL |
| m,p-Xylenes | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.66 J | BDL | BDL | BDL | BDL |

* All results are reported in micrograms per liter (µg/l). All samples were analyzed for total VOCs, unless otherwise indicated. All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded.

a EPA Maximum Contaminant Levels (EPA MCL) for organic chemicals in the water supply.
b EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for chemicals in tap water (June 1999).
c New Mexico Maximum Contaminant Levels (NM MCL) for chemicals in community and non-transient, non-community water systems.
d New Mexico Water Quality Control Commission (NM WQCC) standards for groundwater of less than 10,000 mg/l total dissolved solids (TDS) concentration or less.
e Duplicate sample of 18-MW-17.
f Duplicate sample of PA-6.7. This sample was analyzed for total VOCs.
g Duplicate sample of Buckman 1.

BDL Below Detection Limit
NE Not Established

B The compound was detected in the associated blank as well as the sample.
E The reported value is estimated because the concentration exceeded the calibration range of the instrument.
J The reported value is estimated.

**TABLE 8: Summary of Preliminary Analytical Results for Water Samples - Semivolatile Organic Compounds**
**Los Alamos National Laboratory, New Mexico**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | Mortandad Canyon | | | | | | TA-50 Radioactive Waste Water Treatment Plant | | Drinking Water Production Wells | | | | | | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | MCO-3 (7/31/01) | MCO-5 (8/2/01) | MCO-5B[e] (8/2/01) | MCO-6 (8/6/01) | MCO-7 (8/7/01) | MCO-7.5B (Dissolved) (8/7/01) | GS-1A (8/3/01) | GS-1B (Dissolved) (8/10/01) | PM-1 (Dissolved) (8/8/01) | PM-2 (8/8/01) | PM-3 (Dissolved) (8/8/01) | PM-4 (Dissolved) (8/8/01) | PM-5 (Dissolved) (8/8/01) | O-1 (8/8/01) | O-4 (8/8/01) |
| Acenaphthene | NE | 370 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Acenaphthylene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Anthracene | NE | 1,800 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Benzo(b)fluoranthene | NE | 0.092 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| bis(2-ethylhexyl)phthalate | 6 | 4.8 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Chloronaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluoranthene | NE | 1,500 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluorene | NE | 240 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Fluorobiphenyl | NE | NE | NE | NE | 39 | 35.9 | 41.2 | 37 | 32.6 | 36.1 | 41.3 | 35.9 | 37.1 | 42.6 | 42.1 | 40.5 | 38.7 | 39.9 | 39.3 |
| 2-Fluorophenol | NE | NE | NE | NE | 33.1 | 34.3 | 38.6 | 45.5 | 39.4 | 40.7 | 35.1 | 38.7 | 43.7 | 47.3 | 46.8 | 47.8 | 41.2 | 45.9 | 46.6 |
| 2-Methylnaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Nitrobenzene-d5 | NE | NE | NE | NE | 34.9 | 32.3 | 37.4 | 37.5 | 33 | 34.8 | 36.4 | 34.7 | 37.2 | 41.8 | 42.8 | 40.5 | 38.4 | 39.6 | 39 |
| Phenanthrene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Phenol-d5 | NE | NE | NE | NE | 21.1 | 22.7 | 26.1 | 30.5 | 26.1 | 25.4 | 23.9 | 25.2 | 26.8 | 32.1 | 29.6 | 30.1 | 25.3 | 29.8 | 30.8 |
| p-Terphenyl-d14 | NE | NE | NE | NE | 42 | 39.3 | 42.8 | 44.1 | 34.6 | 42.1 | 45.4 | 43.6 | 44.4 | 43.8 | 50.8 | 43.2 | 45.7 | 46 | 46.2 |
| 2,4,6-Tribromophenol | NE | NE | NE | NE | 75.1 | 66.3 | 75.9 | 75 | 54.4 | 69.7 | 77.4 | 72.5 | 76.1 | 62.7 | 81.4 | 80.8 | 76.7 | 66 | 55.7 |

**TABLE 8: Summary of Preliminary Analytical Results for Water Samples - Semivolatile Organic Compounds**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | TA-3 Building SM-30 | Pajarito Canyon (TA-18) | | | | | | | | | | | Springs and Surface Water(Pajarito Canyon) | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | 03-MW-1 (8/15/01) | 18-BG-1 (8/13/01) | 18-MW-7 (8/13/01) | 18-MW-8 (8/13/01) | 18-MW-9 (Dissolved) (8/14/01) | 18-MW-10 (Dissolved) (8/14/01) | 18-MW-11 (Dissolved) (8/14/01) | 18-MW-12 (Dissolved) (8/14/01) | 18-MW-16 (8/14/01) | 18-MW-17 (8/15/01) | 18-MW-18 (8/15/01) | 18-MW-27[f] (8/15/01) | PA 6.7 (Dissolved) (8/9/01) | PAD 6.7A[g] (Dissolved) (8/9/01) |
| Acenaphthene | NE | 370 | NE | NE | BDL | BDL | BDL | 0.13 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Acenaphthylene | NE | NE | NE | NE | BDL | BDL | BDL | 0.11 J | BDL | BDL | BDL | 0.12 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Anthracene | NE | 1,800 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.15 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Benzo(b)fluoranthene | NE | 0.092 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **0.13 J** | BDL | BDL | BDL | BDL | BDL | BDL |
| bis(2-ethylhexyl)phthalate | 6 | 4.8 | 6 | NE | BDL | 0.44 JB | 0.55 JB | 0.65 JB | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Chloronaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.13 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluoranthene | NE | 1,500 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.15 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluorene | NE | 240 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.14 J | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Fluorobiphenyl | NE | NE | NE | NE | 25.9 | 34.5 | 27.8 | 30.4 | 34 | 15.6 | 18.2 | 24.2 | 39.4 | 26.9 | 36 | 38.4 | 34.1 | 35 |
| 2-Fluorophenol | NE | NE | NE | NE | 44.2 | 34.9 | 35.6 | 0.21 | 2.8 | 36.9 | 39.2 | 12.7 | 36.9 | 26.3 | 0.8 | 1.5 | 35.9 | 45.2 |
| 2-Methylnaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.15 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | 0.12 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Nitrobenzene-d5 | NE | NE | NE | NE | 32.1 | 38.3 | 33.2 | 35.4 | 36.5 | 22.8 | 27.2 | 31.5 | 41 | 33.1 | 39 | 40.8 | 33.4 | 35.7 |
| Phenanthrene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.18 J | BDL | BDL | BDL | BDL | BDL | BDL |
| Phenol-d5 | NE | NE | NE | NE | 29.6 | 24.2 | 26.7 | 1.5 | 7 | 26.4 | 28.4 | 10.6 | 24.1 | 18.7 | 2.3 | 3.7 | 23 | 29.5 |
| p-Terphenyl-d14 | NE | NE | NE | NE | 24.2 | 43.3 | 33.5 | 35.3 | 33.8 | 15.8 | 17.6 | 26.1 | 38.2 | 20.6 | 32.5 | 33.6 | 36.2 | 43.5 |
| 2,4,6-Tribromophenol | NE | NE | NE | NE | 53.7 | 80.1 | 62.4 | 0.44 | 3.7 | 30.8 | 41.6 | 1 | 73.7 | 49.8 | 2.2 | 2.5 | 65 | 67.6 |

**TABLE 8: Summary of Preliminary Analytical Results for Water Samples - Semivolatile Organic Compounds**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | Springs and Surface Water (Pajarito Canyon) | | | Buckman Wells | | | | QA/QC | |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | PA 10.6 (Dissolved) (8/9/01) | Threemile Spring (Dissolved) (8/13/01) | TA-18 Spring (8/13/01) | Buckman 1 (8/16/01) | Buckman 2 (8/16/01) | Buckman 7 (8/16/01) | Buckman 11[h] (8/16/01) | EQ-1 (Equipment Rinsate) (8/16/01) | FB-01 (Field Blank) (8/15/01) |
| Acenaphthene | NE | 370 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Acenaphthylene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Anthracene | NE | 1,800 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Benzo(b)fluoranthene | NE | 0.092 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| bis(2-ethylhexyl)phthalate | 6 | 4.8 | 6 | NE | BDL | BDL | 0.25 JB | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Chloronaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluoranthene | NE | 1,500 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Fluorene | NE | 240 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| 2-Fluorobiphenyl | NE | NE | NE | NE | 24.4 | 36.7 | 37.6 | 34.8 | 36.9 | 39.2 | 38.8 | 37.5 | 37.1 |
| 2-Fluorophenol | NE | NE | NE | NE | 44.8 | 36.9 | 44.5 | 40.2 | 42.5 | 43.9 | 43.6 | 46.2 | 45 |
| 2-Methylnaphthalene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Naphthalene | NE | 6.2 | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Nitrobenzene-d5 | NE | NE | NE | NE | 29.4 | 38 | 43.4 | 34.6 | 37.9 | 41.2 | 40.4 | 40 | 37.9 |
| Phenanthrene | NE | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Phenol-d5 | NE | NE | NE | NE | 33.4 | 23.7 | 29.5 | 26.2 | 27.2 | 28.1 | 28.2 | 30.8 | 30.1 |
| p-Terphenyl-d14 | NE | NE | NE | NE | 26.7 | 40.2 | 43.9 | 38.8 | 41 | 42.5 | 43.2 | 39.2 | 41.9 |
| 2,4,6-Tribromophenol | NE | NE | NE | NE | 50.7 | 76.3 | 83.6 | 71.1 | 80.5 | 79.7 | 79.6 | 77.2 | 75.4 |

* All results are reported in micrograms per liter (µg/ℓ). All samples were analyzed for total SVOCs, unless otherwise indicated. All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded.

a EPA Maximum Contaminant Levels (EPA MCL) for organic chemicals in the water supply.
b EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for chemicals in tap water (June 1999).
c New Mexico Maximum Contaminant Levels (NM MCL) for chemicals in community and non-transient, non-community water systems.
d New Mexico Water Quality Control Commission (NM WQCC) standards for groundwater of less than 10,000 mg/ℓ total dissolved solids (TDS) concentration or less.
e Duplicate sample of MCO-5.
f Duplicate sample of 18-MW-17.
g Duplicate sample of PA-6.7.
h Duplicate sample of Buckman 1.

BDL Below Detection Limit
NE Not Established

B The compound was detected in the associated blank as well as the sample.
J The reported value is estimated.

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | MCO-3 (7/31/01) | | MCO-5 (8/2/01) | | MCO-5B[f] (8/2/01) | | MCO-6 (8/6/01) | | MCO-7 (8/7/01) | | MCO-7.5B (8/7/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | 12.6 B | BDL | 20.1 B | 89.7 | 43.4 B | 22.1 B | BDL | 14.8 B | 226 | 227 | 66.6 | 91.7 |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **2.99 B** | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 36.5 | 37.1 | 99.4 | 95.1 | 94.9 | 98.3 | 94.4 | 93.6 | 171 | 169 | 159 | 161 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Calcium | NE | NE | NE | NE | NE | 48,100 | 49,200 | 33,900 | 33,500 | 33,100 | 33,400 | 34,600 | 34,000 | 18,900 | 18,900 | 20,300 | 20,400 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 1.97 B | 1.95 B | 0.663 B | 0.873 B | BDL | 0.844 B | 0.826 B | BDL | 0.632 B | 0.655 B | 0.862 B | 1.12 B |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | 33 | 33.8 | 3.65 B | 3.77 B | 3.77 B | 3.83 B | 4.24 B | 4.47 B | 2.51 B | 2.33 B | BDL | 1.36 B |
| Iron | NE | NE | 11,000 | NE | 1,000 | 13.5 B | BDL | 5.92 B | BDL | 14.9 B | BDL | 7.79 B | 3.52 B | 119 | 116 | 30.7 B | 48.9 B |
| Lead | 524 | 15 | 15 | NE | 50 | BDL | BDL | 2.87 B | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Magnesium | NE | NE | NE | NE | NE | 3,200 | 3,270 | 3,250 | 3,230 | 3,180 | 3,200 | 3,240 | 3,190 | 4,670 | 4,660 | 5,230 | 5,100 |
| Manganese | NE | NE | 1,700 | NE | 200 | 1.12 B | 0.451 B | BDL | BDL | BDL | BDL | 1.11 B | BDL | 2.28 B | 0.67 B | BDL | 1.56 B |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | 6.33 | 7.05 | 4.84 B | 4.63 B | 4.77 B | 4.85 B | 5 B | 5.07 | 5.05 | 4.8 B | 7.22 | 6.29 |
| Potassium | NE | NE | NE | NE | NE | 7,890 | 8,080 | 13,800 | 13,900 | 13,900 | 14,400 | 16,400 | 16,100 | 17,200 | 17,300 | 12,100 | 12,100 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | BDL | **5.2** | BDL | BDL | BDL | BDL | **5.59** | BDL | **5.84** | BDL |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Sodium | NE | NE | NE | NE | NE | 72,900 | 75,400 | 58,700 | 60,000 | 59,500 | 62,100 | 56,400 N | 55,800 N | 64,900 N | 65,100 N | 88,900 | 85,200 N |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Uranium | NE | NE | NE | NE | 5,000 | NA | NA | NA | NA | NA | NA | NA | 1.17 E | NA | 1.34 E | 1.4 | NA |
| Vanadium | 100 | NE | 260 | NE | NE | 1.59 B | 1.44 B | 0.723 B | 0.578 B | 0.525 B | 0.502 B | 1.26 B | 0.748 B | 2.73 B | 3.13 B | 1.79 B | 1.87 B |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 8.42 | 9 | 9.5 | 10 | 10.1 | 9.59 | 10.6 | 10.2 | 4.5 B | 4 B | 2.73 B | 2.8 B |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | TA-50 Radioactive Waste water Treatment Plant | | | | Test Wells | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | GS-1A (8/3/01) | | GS-1B (8/10/01) | | TW-1 (7/31/01) | | TW-2A (7/30/01) | | TW-3 (7/30/01) | | TW-4 (7/30/01) | | TW-8 (7/30/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | 242 | BDL | 1,470 | 12.7 B | BDL | BDL | 30.1 B | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | **25.5** | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | BDL | BDL | BDL | **3.34 B** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 55 | 45 | 49.9 | 34.7 | 79.8 | 78.8 | 57.9 | 53.7 | 31.3 | 27.3 | 54.8 | NA | 6.75 | 7 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | BDL | BDL | 0.55 B | BDL | BDL | BDL | 0.886 B | BDL | BDL | BDL | 0.793 B | NA | BDL | BDL |
| Calcium | NE | NE | NE | NE | NE | 53,000 | 57,900 | 37,100 | 35,200 | 51,600 | 50,000 | 40,500 | 39,500 | 16,500 | 16,800 | 10,200 | NA | 11,900 | 12,000 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 2.62 B | 2.15 B | 3.6 B | 1.99 B | BDL | BDL | BDL | BDL | 1.45 B | 1.21 B | 0.71 B | NA | 4.21 B | 3.72 B |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | 21.4 | 24.2 | 23.3 | 22.4 | BDL | BDL | 5.59 | BDL | 1.58 B | BDL | 11.9 | NA | BDL | BDL |
| Iron | NE | NE | 11,000 | NE | 1,000 | 492 | 59.3 | **1,350** | 92.4 | 465 | BDL | **2,570** | **1,650** | 652 | 150 | 284 | NA | 6.94 B | BDL |
| Lead | 524 | 15 | 15 | NE | 50 | BDL | BDL | 5.19 | BDL | **270** | **17.1** | **32.4** | 2.95 B | 3.4 B | BDL | **31.7** | NA | 3.4 B | 4.52 B |
| Magnesium | NE | NE | NE | NE | NE | 3,660 | 3,260 | 3,520 | 2,650 | 10,200 | 9,860 | 6,730 | 6,330 | 5,190 | 5,320 | 5,750 | NA | 4,170 | 4,190 |
| Manganese | NE | NE | 1,700 | NE | 200 | 144 | 44.8 | 165 | 50.2 | 16.8 | 15.3 | **390** | **375** | 49.7 | 44.1 | 67.4 | NA | 0.546 B | 0.545 B |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | 6.12 | 6.35 | 5.02 | 4.89 B | 3.34 B | 3.12 B | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Potassium | NE | NE | NE | NE | NE | 7,780 | 8,230 | 6,530 | 6,490 | 3,370 | 3,880 | 2,500 | 1,770 | 2,240 | 2,120 | 2,180 | NA | 1,560 | 1,590 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL |
| Sodium | NE | NE | NE | NE | NE | 68,100 | 74,000 | 45,800 | 57,900 | 19,900 | 20,500 | 17,600 | 17,200 | 12,600 | 12,000 | 10,000 | NA | 10,900 | 10,900 |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | BDL | BDL | **6.93 B** | BDL | BDL | **5.75 B** | BDL | BDL | BDL | NA | BDL | BDL |
| Uranium | NE | NE | NE | NE | 5,000 | NA | NA | NA | 1.02 | NA | NA | NA | NA | NA | 0.578 | NA | NA | NA | NA |
| Vanadium | 100 | NE | 260 | NE | NE | 2.84 B | 1.86 B | 4.69 B | 2.31 B | 2.31 B | 1.75 B | BDL | BDL | 7.95 | 8.61 | BDL | NA | 5.09 | 4.98 B |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 36.2 | 24.8 E | 83.7 | 39.9 | 591 | 419 E | **12,200** | **8,960 DF2** | 108 | 70.8 | 676 | NA | 296 | 295 |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | AnchoCanyon | | | | | | Intermediate Aquifer Wells | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | DT-5A (8/7//01) | | DT-9 (8/7/01) | | DT-10 (8/7/01) | | POI-4 (8/1/01) | | LAOI(a)-1.1 (10/30/01) | | LADD[g] (10/30/01) | | LADP-3 (10/30/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | 265 | BDL | BDL | NA | BDL | BDL | BDL | BDL | 2,210 N | 9.54 N | 1,460 | BDL | **6,180 N** | 214 N |
| Antimony | NE | 6 | 15 | 6 | NE | **7.54 B** | BDL | BDL | NA | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | BDL | BDL | BDL | NA | **2.71 B** | BDL | **3.58 B** | **4.05 B** | BDL | BDL | BDL | BDL | BDL | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 23.5 | 23.6 | 16.6 | NA | 7.38 | 7.54 | 95.9 | 82 | 21 | 7.76 | 17.8 | 7.8 | 102 | 16.8 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL | 0.711 B | BDL | 0.924 B | BDL | 1.34 B | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | 0.432 B | BDL | BDL | NA | BDL | 0.45 B | BDL | BDL | BDL | BDL | 0.517 B | BDL | BDL | BDL |
| Calcium | NE | NE | NE | NE | NE | 9,140 | 8,750 | 10,100 | NA | 11,700 | 11,800 | 43,600 | 37,500 | 7,270 | 6,180 | 7,230 | 6,130 | 11,300 | 10,700 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 2.02 B | 1.66 B | 1.7 B | NA | 2.23 B | 2.12 B | BDL | BDL | 1.25 B | BDL | BDL | BDL | **93.1** | 3.19 B |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | BDL | BDL | NA | BDL | BDL | 0.985 B | 3.57 B | BDL | BDL | BDL | BDL | 1.19 B | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | BDL | BDL | 1.25 B | NA | 1.14 B | 1.26 B | 3.18 B | 2.35 B | BDL | BDL | 1.35 B | BDL | 40.7 | 1.38 B |
| Iron | NE | NE | 11,000 | NE | 1,000 | 135 | 56.7 | BDL | NA | BDL | BDL | BDL | BDL | 830 | BDL | 585 | BDL | **14,500** | 365 |
| Lead | 524 | 15 | 15 | NE | 50 | 4.39 B | BDL | BDL | NA | BDL | BDL | 2.43 B | BDL | 6.33 | 2.74 B | 4.28 B | 3.28 B | **18.5** | BDL |
| Magnesium | NE | NE | NE | NE | NE | 2,950 | 2,560 | 2,810 | NA | 3,570 | 3,600 | 11,100 | 9,570 | 2,220 | 1,690 | 2,120 | 1,690 | 3,860 | 3,300 |
| Manganese | NE | NE | 1,700 | NE | 200 | 4.41 B | 4.23 B | BDL | NA | 0.637 B | 0.413 B | BDL | BDL | 9.37 B | 2.37 B | 8.55 B | 2 B | **213** | 61.9 |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | 1.4 B | 1.28 B | BDL | NA | BDL | BDL | 8.8 | 8.22 | BDL | BDL | BDL | BDL | 41.4 | 3.47 B |
| Potassium | NE | NE | NE | NE | NE | 1,810 | 1,760 | 962 | NA | 1,330 | 1,340 | 7,840 | 6,870 | 6,130 | 5,810 | 6,000 | 6,080 | 7,370 | 6,070 |
| Selenium | 5 | 50 | 180 | 50 | 50 | **7.38** | BDL | 3.77 B | NA | BDL | BDL | BDL | BDL | 3.66 B | BDL | BDL | BDL | BDL | 4.35 B |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Sodium | NE | NE | NE | NE | NE | 11,600 | 11,400 N | 11,200 N | NA | 11,500 N | 11,600 N | 43,900 | 37,800 | 9,560 | 9,640 | 9,580 | 9,540 | 24,500 | 24,900 |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | **5.06 B** | NA | **9.7 B** | **8.34 B** | **5.54 B** | BDL | BDL | BDL | BDL | **5.5 B** | BDL | BDL |
| Uranium | NE | NE | NE | NE | 5,000 | 0.364 | NA | NA | 0.471 E | NA | 0.612 E | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | 100 | NE | 260 | NE | NE | 8.71 | 8.12 | 5.88 | NA | 4.91 B | 4.54 B | 3.6 B | 2.78 B | 0.743 B | 0.515 B | 1.28 B | BDL | 7.51 | 1.87 B |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 248 | 253 | 107 | NA | 65.7 | 63 | 2.59 B | 1.76 B | 44.5 | 5 B | 15.5 | 4.67 B | 336 | 63.3 |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Drinking Water Production Wells | | | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e,f] | G-1A (8/8/01) | | O-1 (8/8/01) | | O-4 (8/8/01) | | PM-1 (8/8/01) | | PM-2 (8/8/01) | | PM-3 (8/8/01) | | PM-4 (8/8/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | **11.5** | **8.32** | BDL | **4.96 B** | BDL | **2.73 B** | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 37.1 | 36.6 | 31.6 | 31.4 | 45.2 | 46.4 | 77.5 | 78.4 | 25 | NA | 52.3 | 53.1 | 25.6 | 25 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Calcium | NE | NE | NE | NE | NE | 10,900 | 11,500 | 17,600 | 18,300 | 21,800 | 21,500 | 26,700 | 26,500 | 8,830 | NA | 24,400 | 24,200 | 11,500 | 11,500 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 6.55 | 6.76 | 3.23 B | 3.74 B | 4.03 B | 3.43 B | 2.68 B | 2.6 B | 3.3 B | NA | 3.29 B | 3.33 B | 4.99 B | 4.95 B |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | 12.8 | BDL | 1.74 B | 1.4 B | BDL | 1.08 B | 2.08 B | 2.8 B | 1.47 B | NA | BDL | 2.38 B | 1.85 B | 2 B |
| Iron | NE | NE | 11,000 | NE | 1,000 | BDL | BDL | 16.1 B | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | 2.24 | BDL |
| Lead | 524 | 15 | 15 | NE | 50 | 3.32 B | BDL | BDL | 2.44 B | 3.01 B | BDL | 3 B | BDL | BDL | NA | 2.58 B | BDL | BDL | BDL |
| Magnesium | NE | NE | NE | NE | NE | 533 | 538 | 2,810 | 2,990 | 8,830 | 8,570 | 6,870 | 6,700 | 2,820 | NA | 8,340 | 8,130 | 4,260 | 4,140 |
| Manganese | NE | NE | 1,700 | NE | 200 | BDL | BDL | 1.68 B | 0.896 B | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | BDL | BDL | BDL | 2.18 B | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Potassium | NE | NE | NE | NE | NE | 2,890 | 2,850 | 3,500 | 3,680 | 3,700 | 3,610 | 3,840 | 3,740 | 1,770 | NA | 3,730 | 3,630 | 2,430 | 2,480 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | 4.02 B | BDL | 3.91 B | BDL | BDL | BDL | BDL | NA | BDL | BDL | 4.16 B | BDL |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | BDL | BDL | BDL |
| Sodium | NE | NE | NE | NE | NE | 28,100 | 31,400 | 24,000 N | 23,900 | 21,600 | 20,300 N | 17,200 | 18,200 N | 10,500 N | NA | 18,700 | 17,900 N | 12,200 N | 12,300 |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL | **7.84 B** | BDL | BDL |
| Uranium | NE | NE | NE | NE | 5,000 | 0.593 | 0.5 | 1.64 | 1.54 | 0.819 | NA | 1.53 | NA | 0.507 | 0.348 | 1 | 1.02 E | 0.412 E | 0.378 |
| Vanadium | 100 | NE | 260 | NE | NE | 39.6 | 39.8 | 15.9 | 16.9 | 15.5 | 15.2 | 11 | 11.3 | 7.13 | NA | 15.2 | 15 | 11.3 | 11.6 |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 9.56 | 4.96 B | 12.6 | 3.67 B | 10.5 | 12.3 | 2.23 B | 2.79 B | 4.48 B | NA | 4.35 B | 8.93 | 6.05 | 9.24 |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Drinking Water Production Wells | | TA-3 Building SM-30 | | Pajarito Canyon (TA-18) | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | PM-5 (8/8/01) | | O3-MW-1 (8/15/01) | | 18-BG-1 (8/13/01) | | 18-MW-7 (8/13/01) | | 18-MW-8 (8/13/01) | | 18-MW-9 (8/14/01) | | 18-MW-10 (8/14/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | BDL | BDL | 10,900 | **2,960** | 3,640 | 316 | 2,970 | 59 | **5,500** | 21.9 | **8,630** | 47.4 B | 4,860 | 188 |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | 2.74 B | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **3.18 B** | BDL | BDL | BDL | BDL | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 28.5 | 28.7 | 68.7 | 39.8 | 89.9 | 70.2 | 93.8 | 73.5 | 103 | 66.6 | 141 | 96.2 | 113 | 95.3 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | 0.91 B | BDL | BDL | BDL | 0.22 B | BDL | 0.32 B | BDL | 0.66 B | BDL | 0.46 B | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | BDL | BDL | 0.52 B | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.41 B | 0.61 B | 0.4 B | 0.39 B |
| Calcium | NE | NE | NE | NE | NE | 97,000 | 9,590 | 10,200 | 8,950 | 13,000 | 12,700 | 14,100 | 13,200 | 16,800 | 16,000 | 18,200 | 18,100 | 17,600 | 17,400 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 5.6 | 4.83 B | 28.3 | 2.01 B | 3.04 B | BDL | 1.17 B | BDL | 2.22 B | BDL | 5.49 | BDL | 2.22 B | BDL |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | BDL | 1.77 B | 0.79 B | BDL | BDL | BDL | BDL | BDL | BDL | 1.54 B | BDL | 0.62 B | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | 1.8 B | 1.49 B | 10.1 | 2.49 B | BDL | BDL | BDL | BDL | BDL | BDL | 5.81 | 4.12 B | 4.61 B | 4 B |
| Iron | NE | NE | 11,000 | NE | 1,000 | BDL | BDL | **6,130** | **1,660** | **2,080** | 171 | **1,530** | 56.4 | **3,310** | 7.49 B | **4,770** | 27.3 B | **2,250** | 95.9 |
| Lead | 524 | 15 | 15 | NE | 50 | 3.84 B | BDL | 5.55 | BDL | 3.6 B | BDL | 3.16 B | BDL | 4.21 B | BDL | 4.27 B | BDL | BDL | BDL |
| Magnesium | NE | NE | NE | NE | NE | 3,610 | 3,540 | 3,310 | 2,270 | 4,680 | 4,180 | 4,950 | 4,250 | 5,390 | 4,450 | 6,350 | 5,710 | 6,460 | 5,970 |
| Manganese | NE | NE | 1,700 | NE | 200 | 0.596 B | BDL | 46 | 10.8 | 35.3 | 0.95 B | 20.4 | BDL | 49.1 | BDL | 96.7 | BDL | 26.2 | 0.71 B |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | BDL | BDL | 22.2 | 9.86 | 1.31 B | BDL | BDL | BDL | 2.35 B | BDL | 4.97 B | 2.33 B | 3 B | 1.84 B |
| Potassium | NE | NE | NE | NE | NE | 2,100 | 2,080 | 3,050 | 1,660 | 3,910 | 3,430 | 3,650 | 3,230 | 4,530 | 3,470 | 5,600 | 4,250 | 3,620 | 3,140 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Sodium | NE | NE | NE | NE | NE | 12,900 | 12,400 N | 21,900 N | 22,100 | 14,700 | 15,600 | 13,700 | 14,300 | 15,500 | 16,600 | 18,900 | 17,200 N | 19,600 | 18,500 N |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | **3.72 B** | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **8.84 B** | **11** | **5.25 B** | **6.7 B** |
| Uranium | NE | NE | NE | NE | 5,000 | 0.492 | 0.496 E | NA | 0.217 | NA | 0.015 B | NA | 0.043 B | NA | 0.044 B | NA | 0.283 | NA | 0.01 B |
| Vanadium | 100 | NE | 260 | NE | NE | 8.09 | 7.93 | 9.04 | 3.13 B | 3.96 B | 1.13 B | 2.37 B | 0.889 B | 5.22 | 0.649 B | 8.16 | 1.27 B | 3.83 B | 0.8 B |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 6.76 | 3.43 B | 60.4 | 11.2 | 6.96 | 1.16 B | 6.92 | BDL | 13.4 | 2.64 B | 15.3 | BDL | 9.77 | BDL |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Pajarito Canyon (TA-18) | | | | | | | | | | | | Springs and SurfaceWater (Pajarito Canyon) | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | 18-MW-11 (8/14/01) | | 18-MW-12 (8/14/01) | | 18-MW-16 (8/14/01) | | 18-MW-17 (8/15/01) | | 18-MW-18 (8/15/01) | | 18-MW-27[h] (8/15/01) | | PA 6.7 (8/9/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | **9,670** | 181 | **8,170** | 379 | **19,800** | 30.8 B | 902 | 28.1 B | **19,900** | 2,180 | 1,510 | BDL | NA | 2,410 |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **3.49 B** | BDL | BDL | BDL | NA | BDL |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 131 | 83.1 | 134 | 94.8 | 215 | 79.2 | 196 | 180 | 211 | 131 | 199 | 180 | NA | 103 |
| Beryllium | NE | 4 | 73 | 4 | NE | 0.63 B | BDL | 0.6 B | BDL | 1.64 B | BDL | 0.42 B | BDL | 1.45 B | BDL | 0.59 B | BDL | NA | BDL |
| Cadmium | 50 | 5 | 18 | 5 | 10 | 0.43 B | 0.44 B | 0.38 B | BDL | 0.53 B | BDL | BDL | BDL | 0.48 B | BDL | 0.4 B | BDL | NA | BDL |
| Calcium | NE | NE | NE | NE | NE | 17,500 | 16,600 | 19,400 | 18,800 | 22,800 | 18,900 | 49,200 | 44,500 | 27,700 | 24,400 | 48,000 | 44,600 | NA | 23,700 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | 6.12 | BDL | 3.28 B | BDL | 10.3 | BDL | BDL | BDL | 9.33 | BDL | BDL | BDL | NA | 0.728 B |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | 1.09 B | BDL | 0.83 B | BDL | 4.03 B | BDL | BDL | BDL | 2.81 B | BDL | BDL | BDL | NA | BDL |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | 5.79 | 3.58 B | 5.28 | 3.29 B | 11.5 | BDL | 4.32 B | 1.22 B | 9.77 | BDL | 4.12 B | BDL | NA | 2.65 B |
| Iron | NE | NE | 11,000 | NE | 1,000 | **4,680** | 88.1 | **3,640** | 186 | **12,300** | 14 B | 455 | 12 B | **11,200** | **1,300** | 737 | BDL | NA | **1,380** |
| Lead | 524 | 15 | 15 | NE | 50 | 2.84 B | BDL | 2.83 B | BDL | 12.1 | BDL | BDL | BDL | 8.97 | BDL | BDL | BDL | NA | 2.78 B |
| Magnesium | NE | NE | NE | NE | NE | 6,020 | 5,140 | 6,090 | 5,380 | 8,140 | 5,100 | 12,300 | 11,100 | 10,900 | 7,980 | 12,000 | 11,100 | NA | 5,640 |
| Manganese | NE | NE | 1,700 | NE | 200 | 44.7 | 0.76 B | 38 | 1.02 B | **278** | 0.453 B | 8.21 B | BDL | 146 | 14.3 | 11.7 | BDL | NA | 83.4 |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | 5.37 | 1.94 B | 5 B | 1.62 B | 9.2 | BDL | 2.53 B | BDL | 7.19 | BDL | 2.93 B | BDL | NA | 2.26 B |
| Potassium | NE | NE | NE | NE | NE | 5,060 | 3,890 | 5,410 | 4,250 | 9,030 | 4,290 | 8,040 | 7,270 | 7,970 | 4,970 | 7,960 | 7,270 | NA | 5,180 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | BDL |
| Sodium | NE | NE | NE | NE | NE | 17,500 | 16,000 N | 19,200 | 18,600 N | 16,800 N | 16,200 | 28,300 N | 27,600 | 36,100 N | 36,700 | 27,200 N | 27,600 | NA | 11,500 N |
| Thallium | NE | 2 | NE | 2 | NE | **5.6 B** | **4.41 B** | **4.01 B** | **3.58 B** | **2.7 B** | BDL | **4.04 B** | BDL | **4.39 B** | BDL | **3.07 B** | BDL | NA | **6.96 B** |
| Uranium | NE | NE | NE | NE | 5,000 | NA | BDL | NA | BDL | NA | 0.031 B | NA | 0.352 | NA | 0.183 B | NA | 0.339 | 0.382 | NA |
| Vanadium | 100 | NE | 260 | NE | NE | 7.61 | 1.36 B | 6.12 | 1.07 B | 19 | 0.556 B | 2.01 B | 1.62 B | 16.1 | 2.47 B | 2.8 B | 1.43 B | NA | 4.01 B |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 23.7 | 2.85 B | 11.3 | BDL | 44.9 | 1.18 B | BDL | 0.727 B | 70.8 | 5.04 | 36.7 | BDL | NA | 6.86 |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Springs and Surface Water (Pajarito Canyon) | | | | | | | | Springs and Surface Water( Off-Site Springs) | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | PAD 6.7A[1] (8/9/01) | | PA 10.6 (8/9/01) | | TA-18 Spring (8/13/01) | | Threemile Spring (8/13/01) | | SP4 (Spring 4) (11/01/01) | | SP4A (Spring 4A) (11/01/01) | | SP4AA (Spring 4AA) (11/01/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | 174 | **5,980** | **37,500** | 457 | 344 | 89.8 | 763 | 506 | NA | BDL | NA | BDL | NA | BDL |
| Antimony | NE | 6 | 15 | 6 | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | BDL | BDL | BDL | **4.24 B** | **3.56 B** | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 74.6 | 183 | 532 | 58.3 | 100 | 99.4 | 67.4 | 65.7 | NA | 42.3 | NA | 42.6 | NA | 39.8 |
| Beryllium | NE | 4 | 73 | 4 | NE | BDL | BDL | 1.17 B | BDL | BDL | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Cadmium | 50 | 5 | 18 | 5 | 10 | BDL | BDL | 0.521 B | BDL | BDL | BDL | 0.32 B | 0.33 B | NA | NA | NA | NA | NA | NA |
| Calcium | NE | NE | NE | NE | NE | 23,900 | 25,400 | 20,400 | 14,100 | 15,100 | 15,200 | 14,200 | 14,700 | NA | 23,200 | NA | 20,500 | NA | 22,400 |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | BDL | 2.53 B | 16.9 | BDL | BDL | BDL | 0.74 B | BDL | NA | NA | NA | NA | NA | NA |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | BDL | 0.798 B | 7.28 | BDL | 1.01 B | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | BDL | 5.55 | 19.3 | 1.3 B | BDL | BDL | 3.83 B | 4.13 B | NA | NA | NA | NA | NA | NA |
| Iron | NE | NE | 11,000 | NE | 1,000 | 103 | **3,590** | **17,600** | 284 | **2,620** | **2,030** | 359 | 241 | NA | BDL | NA | BDL | NA | BDL |
| Lead | 524 | 15 | 15 | NE | 50 | BDL | 6.45 | **25.6** | BDL | BDL | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Magnesium | NE | NE | NE | NE | NE | 5,570 | 6,260 | 6,490 | 2,900 | 4,570 | 4,570 | 4,620 | 4,770 | NA | 4,550 | NA | 4,690 | NA | 5,450 |
| Manganese | NE | NE | 1,700 | NE | 200 | 21.7 | **325** | **1,070** | 14.9 | 152 | 153 | 3.33 B | 2.18 B | NA | BDL | NA | BDL | NA | BDL |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | 1.44 B | 4.21 B | 13.2 | 2.51 B | BDL | 1.95 B | 2.2 B | 1.7 B | NA | NA | NA | NA | NA | NA |
| Potassium | NE | NE | NE | NE | NE | 4,930 | 6,200 | 10,900 | 5,880 | 4,290 | 4,300 | 3,230 | 3,330 | NA | 3,090 | NA | 2,500 | NA | 2,570 |
| Selenium | 5 | 50 | 180 | 50 | 50 | BDL | BDL | 4.55 B | BDL | 4.33 B | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Silver | NE | NE | 180 | NE | 50 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Sodium | NE | NE | NE | NE | NE | 11,300 | 11,800 N | 3,800 N | 1,980 | 16,900 | 16,900 | 15,300 | 14,500 N | NA | 13,800 | NA | 12,300 | NA | 12,600 |
| Thallium | NE | 2 | NE | 2 | NE | BDL | BDL | BDL | BDL | BDL | BDL | **6.04 B** | **3.85 B** | NA | NA | NA | NA | NA | NA |
| Uranium | NE | NE | NE | NE | 5,000 | 0.391 | NA | NA | 0.071 B | NA | 0.042 B | NA | 0.028 B | NA | NA | NA | NA | NA | NA |
| Vanadium | 100 | NE | 260 | NE | NE | 1.92 B | 7.66 | 37.1 | 3.11 B | 2.62 B | 1.13 B | 0.98 B | 1.08 B | NA | NA | NA | NA | NA | NA |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | 2.18 B | 19.6 | 69.6 | 1.68 B | 15.4 | 5.12 | 3.32 B | BDL | NA | NA | NA | NA | NA | NA |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Off-Site Springs | | Buckman Wells | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | SP4C (Spring 4C) (11/01/01) | | Buckman 1 (8/16/01) | | Buckman 1 (10/31/01) | | Buckman 2 (8/16/01) | | Buckman 2 (10/31/01) | | Buckman 3 (10/31/01) | | Buckman 4 (10/31/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | NA | BDL | BDL | BDL | 9.54 N | NA | BDL | BDL | 9.54 N | NA | 9.54 N | NA | 9.54 N | NA |
| Antimony | NE | 6 | 15 | 6 | NE | NA | NA | BDL | BDL | NA | NA | BDL | 5.39 B | NA | NA | NA | NA | NA | NA |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | NA | NA | **18.8** | **19.9** | **11.6** | NA | **4.81 B** | **7.48** | **7.29** | NA | **5.42** | NA | BDL | NA |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | NA | 44.4 | 21.5 | 19.8 | 34.4 | NA | 130 | 125 | 120 | NA | 115 | NA | 187 | NA |
| Beryllium | NE | 4 | 73 | 4 | NE | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Cadmium | 50 | 5 | 18 | 5 | 10 | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Calcium | NE | NE | NE | NE | NE | NA | 22,800 | 4,070 | 3,870 | 11,600 | NA | 45,700 | 43,600 | 45,700 | NA | 40,800 | NA | 87,100 | NA |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | NA | NA | 7.83 | 7.45 | NA | NA | 2.06 B | 1.51 B | NA | NA | NA | NA | NA | NA |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | NA | NA | 9.31 | BDL | NA | NA | 3.89 B | BDL | NA | NA | NA | NA | NA | NA |
| Iron | NE | NE | 11,000 | NE | 1,000 | NA | BDL | 63.8 | BDL | BDL | NA | 3.55 B | BDL | 42.8 B | NA | BDL | NA | 4.59 B | NA |
| Lead | 524 | 15 | 15 | NE | 50 | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Magnesium | NE | NE | NE | NE | NE | NA | 4,500 | 136 | 124 | 844 | NA | 7,120 | 6,800 | 7,760 | NA | 5,650 | NA | 12,300 | NA |
| Manganese | NE | NE | 1,700 | NE | 200 | NA | BDL | BDL | BDL | BDL | NA | BDL | BDL | 1.02 B | NA | 1.81 B | NA | 0.377 B | NA |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | NA | NA | 1.9 B | BDL | NA | NA | 1.48 B | BDL | NA | NA | NA | NA | NA | NA |
| Potassium | NE | NE | NE | NE | NE | NA | 3,070 | 1,860 | 1,490 | 2,580 | NA | 6,150 | 5,250 | 4,990 | NA | 5,340 | NA | 6,670 | NA |
| Selenium | 5 | 50 | 180 | 50 | 50 | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Silver | NE | NE | 180 | NE | 50 | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Sodium | NE | NE | NE | NE | NE | NA | 13,500 | 76,900 N | 77,700 | 106,000 | NA | 198,000 DF10 | 260,000 DF2 | 134,000 | NA | 114,000 | NA | 105,000 | NA |
| Thallium | NE | 2 | NE | 2 | NE | NA | NA | **4.12 B** | BDL | NA | NA | **4.4 B** | BDL | NA | NA | NA | NA | NA | NA |
| Uranium | NE | NE | NE | NE | 5,000 | NA | NA | 6.94 | 6.89 | 17.6 | NA | 238 | 237 | 22.8 | NA | 9.13 | NA | 9.73 | NA |
| Vanadium | 100 | NE | 260 | NE | NE | NA | NA | 49.1 | 47.2 | NA | NA | 26.8 | 25.6 | NA | NA | NA | NA | NA | NA |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | NA | NA | 12.3 | 2.5 B | NA | NA | BDL | 3.61 B | NA | NA | NA | NA | NA | NA |

**TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Buckman Wells | | | | | | | | | | QA/QC Samples | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | Buckman 6 (10/31/01) | | Buckman 7 (8/16/01) | | Buckman 7 (10/31/01) | | Buckman 8 (10/31/01) | | Buckman 11[f] (8/16/01) | | FB-01 (Field Blank) (8/15/01) | | LADP-EB (Equipment Blank) (10/30/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Aluminum | 5,000 | NE | 37,000 | NE | 5,000 | 9.54 N | NA | BDL | BDL | 9.54 N | NA | 9.54 N | NA | BDL | BDL | BDL | 17.4 B | 367 N | NA |
| Antimony | NE | 6 | 15 | 6 | NE | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | BDL | NA |
| Arsenic | 368 | 50 * | 0.045 | 50 | 100 | **6.97** | NA | **3.87 B** | **4.21 B** | BDL | NA | **6.35** | NA | **17.5** | **18.6** | BDL | **3.35 B** | BDL | NA |
| Barium | NE | 2,000 | 2,600 | 2,000 | 1,000 | 210 | NA | 109 | 104 | 135 | NA | 51.6 | NA | 21.5 | 18.9 | 19.1 | 17 | 19.7 | NA |
| Beryllium | NE | 4 | 73 | 4 | NE | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | 0.56 B | BDL | BDL | NA |
| Cadmium | 50 | 5 | 18 | 5 | 10 | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | BDL | NA |
| Calcium | NE | NE | NE | NE | NE | 65,900 | NA | 35,900 | 33,400 | 34,400 | NA | 14,100 | NA | 4,070 | 3,750 | 20,200 | 18,200 | 16,600 | NA |
| Chromium | 2,680 | 100 | 55,000 | 100 | 50 | NA | NA | 7.61 | 6.73 | NA | NA | NA | NA | 8.6 | 7.24 | BDL | BDL | 3.81 B | NA |
| Cobalt | 1,000 | NE | 2,200 | NE | 50 | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | BDL | NA |
| Copper | 1,,393 | 1,300 | 1,400 | NE | 1,000 | NA | NA | 5.22 | 1.82 B | NA | NA | NA | NA | 4.97 B | 1.19 B | 3.03 B | BDL | 3.05 B | NA |
| Iron | NE | NE | 11,000 | NE | 1,000 | BDL | NA | BDL | BDL | BDL | NA | BDL | NA | 11.2 B | BDL | 3.94 B | BDL | 772 | NA |
| Lead | 524 | 15 | 15 | NE | 50 | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | 3.54 B | NA |
| Magnesium | NE | NE | NE | NE | NE | 8,850 | NA | 5,130 | 4,810 | 4,940 | NA | 2,140 | NA | 138 | 124 | 2,570 | 2,360 | 2,760 | NA |
| Manganese | NE | NE | 1,700 | NE | 200 | BDL | NA | BDL | BDL | BDL | NA | BDL | NA | BDL | BDL | 0.46 B | BDL | 17.3 | NA |
| Mercury | 0.77 | 2 | 11 | 2 | 2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NE | NE | 730 | 100 | 200 | NA | NA | BDL | BDL | NA | NA | NA | NA | 2.16 B | BDL | 2.04 B | BDL | 2.7 B | NA |
| Potassium | NE | NE | NE | NE | NE | 5,170 | NA | 5,030 | 4,580 | 4,570 | NA | 2,480 | NA | 1,850 | 1,470 | 3,720 | 3,130 | 3,830 | NA |
| Selenium | 5 | 50 | 180 | 50 | 50 | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | BDL | NA |
| Silver | NE | NE | 180 | NE | 50 | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | BDL | BDL | BDL | NA |
| Sodium | NE | NE | NE | NE | NE | 87,000 | NA | 72,200 N | 75,000 | 84,400 | NA | 97,100 | NA | 70,500 DF2 N | 75,300 | 18,700 N | 19,900 | 24,700 | NA |
| Thallium | NE | 2 | NE | 2 | NE | NA | NA | **3.4 B** | BDL | NA | NA | NA | NA | **3.49 B** | BDL | BDL | BDL | BDL | NA |
| Uranium | NE | NE | NE | NE | 5,000 | 5.96 | NA | 5.59 | 5.45 | 5.95 | NA | 14.2 | NA | 7.25 | 7.49 | NA | BDL | NA | NA |
| Vanadium | 100 | NE | 260 | NE | NE | NA | NA | 16.5 | 15.2 | NA | NA | NA | NA | 49.5 | 45.6 | BDL | 0.76 B | 0.913 B | NA |
| Zinc | 8,750 | NE | 11,000 | NE | 10,000 | NA | NA | BDL | 1.49 B | NA | NA | NA | NA | BDL | BDL | 14.5 | BDL | 187 | NA |

## TABLE 9: Summary of Preliminary Analytical Results for Water Samples - TAL Metals
## Los Alamos National Laboratory, New Mexico
## (Continued)

All results reported in micrograms per liter (µg/ℓ). All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded. Some samples were analyzed for uranium, in addition to Target Analyte List metals.

a National Pollutant Discharge Elimination System (NPDES) permit limits for discharges from the TA-50 Radioactive Liquid Waste Treatment Facility (NPDES Outfall 051).
b EPA Maximum Contaminant Levels (EPA MCL) for inorganic chemicals in the water supply (includes Action Levels for copper and lead).
c EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for inorganic chemicals in tap water (July 1999).
d New Mexico Maximum Contaminant Levels (NM MCL) for inorganic chemicals in community and non-transient, non-community water systems.
e New Mexico Water Quality Control Commission (NM WQCC) standards for groundwater of less than 10,000 mg/ℓ total dissolved solids (TDS) concentration or less.
f MCO-5B is a duplicate sample of MCO-5.
g LADD is a duplicate sample of LAOI(a)-1.1.
h 18-MW-27 is a duplicate sample of 18-MW-17.
i PAD-6.7A is a duplicate sample of PA-6.7.
j Buckman 11 is a duplicate sample of Buckman 1 (collected on 8/16/01).

BDL Below Detection Limit.
NA Not Analyzed.
NE Not Established.

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
E The reported value is estimated because of the presence of interference.
N The laboratory-spiked sample recovery for this analyte is not within control limits.

* Although the current EPA MCL for arsenic is 50 µg/ℓ, on January 22, 2001, EPA enacted a revised standard of 10 µg/ℓ. However, the revised arsenic standard of 10 µg/ℓ is not enforceable until January 2006.

**TABLE 10 Summary of Preliminary Analytical Results for Water Samples - Trace Metals**
**Los Alamos National Laboratory, New Mexico**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | MCO-3 (7/31/01) | | MCO-5 (8/2/01) | | MCO-5B[f] (8/2/01) | | MCO-6 (8/6/01) | | MCO-7 (8/7/01) | | MCO-7.5B (8/7/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 57.5 | NA | NA | NA | 59.8 | NA | 65 | NA | 74.2 | NA | 65.2 |
| Lithium | NE | NE | 730 | NE | NE | NA | 35.5 | NA | NA | NA | 16.8 | NA | 16.4 E | NA | 6.13 BE | NA | 3.2 B |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | 56.1 | NA | NA | NA | 74.4 | NA | 93.6 | NA | 111 | NA | 93.6 |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 24,200 | NA | NA | NA | 17,200 | NA | 15,800 | NA | 17,100 | NA | 15,700 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 102 | NA | NA | NA | 143 | NA | 141 | NA | 126 | NA | 132 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | NA | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | NA | NA | BDL | NA | BDL | NA | BDL | NA | BDL |

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | TA-50 Radioactive Waste Water Treatment Plant | | | | Test Wells | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | GS-1A (8/3/01) | | GS-1B (8/10/01) | | TW-1 (7/31/01) | | TW-2A (7/30/01) | | TW-3 (7/30/01) | | TW-4 (7/30/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 57.6 | NA | 52.2 | NA | 75.3 | NA | 77.5 | NA | 16.5 B | NA | 5.3 B |
| Lithium | NE | NE | 730 | NE | NE | NA | 28.7 | NA | 20.8 | NA | 34.9 | NA | 28 | NA | 25.3 | NA | 24.6 |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | 70.9 | NA | 68.6 | NA | BDL | NA | BDL | NA | 1.54 B | NA | BDL |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 21,500 | NA | 18,700 | NA | 22,900 | NA | 3,570 | NA | 12,000 | NA | 15,800 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 104 | NA | 77.9 | NA | 285 | NA | 221 | NA | 73 | NA | 48.8 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |

**TABLE 10: Summary of Preliminary Analytical Results for Water Samples - Trace Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Test Wells | | Ancho Canyon | | | | | | Intermediate Aquifer Wells | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | TW-8 (7/30/01) | | DT-5A (8/7//01) | | DT-9 (8/7/01) | | DT-10 (8/7/01) | | POI-4 (8/1/01) | | LAOI(a)-1.1 (10/30/01) | | LADD[g] (10/30/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | 177 | NA | BDL | NA | BDL |
| Lithium | NE | NE | 730 | NE | NE | NA | 22.9 | NA | 19.5 | NA | 20.5 E | NA | 23.1 E | NA | 7.93 B | NA | 5.87 B | NA | 5.8 B |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | BDL | NA | 4.65 B | NA | 3.35 B | NA | 2.77 B | NA | 1.98 B | NA | 1.32 B | NA | 1.81 B |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 71,100 | NA | 71,300 |
| Silicon | NE | NE | NE | NE | NE | NA | 34,200 | NA | 31,900 | NA | 31,300 | NA | 29,300 | NA | 22,700 | NA | 33,500 | NA | 33,600 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 54.1 | NA | 45.4 | NA | 48.6 | NA | 48.3 | NA | 190 | NA | 52.2 | NA | 52.2 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | 3.35 B | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL DF5 | NA | BDL DF5 |

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Intermediate Aquifer Wells | | Drinking Water Production Wells | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | LADP-3 (10/30/01) | | G-1A (8/8/01) | | O-1 (8/8/01) | | O-4 (8/8/01) | | PM-1 (8/8/01) | | PM-2 (8/8/01) | | PM-3 (8/8/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 8.56 B | NA | 15.4 B | NA | 18.2 B | NA | 30.6 B | NA | 31.7 B | NA | BDL | NA | 28 B |
| Lithium | NE | NE | 730 | NE | NE | NA | 7.61 B | NA | 19.7 | NA | 20.5 | NA | 36.8 | NA | 29.4 | NA | 20.3 | NA | 35.1 |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | 3.53 B | NA | 5.1 B | NA | 2.49 B | NA | 1.23 B | NA | 1.31 B | NA | 1.88 B | NA | BDL |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | 60,500 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 28,500 | NA | 32,400 | NA | 29,200 N | NA | 41,600 N | NA | 34,100 N | NA | 36,300 | NA | 39,200 N |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 78.9 | NA | 79.2 | NA | 110 | NA | 116 | NA | 148 | NA | 41 | NA | 127 |
| Tin | NE | NE | 22,000 | NE | NE | NA | 2.72 B | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |

**TABLE 10: Summary of Preliminary Analytical Results for Water Samples - Trace Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Drinking Water Production Wells | | | | TA-3 Building SM-30 | | Pajarito Canyon (TA-18) | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | PM-4 (8/8/01) | | PM-5 (8/8/01) | | O3-MW-1 (8/15/01) | | 18-BG-1 (8/13/01) | | 18-MW-7 (8/13/01) | | 18-MW-8 (8/13/01) | | 18-MW-9 (8/14/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | BDL | NA | BDL | NA | 20.8 B | NA | 10.2 B | NA | 6.59 B | NA | 20.5 B | NA | 27.7 B |
| Lithium | NE | NE | 730 | NE | NE | NA | 23.6 | NA | 22.4 | NA | 3.08 B | NA | 0.889 B | NA | 1.16 B | NA | 2.34 B | NA | 1.46 BE |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | 1.57 B | NA | 1.29 B | NA | 2.29 B | NA | BDL | NA | BDL | NA | 2.15 B | NA | BDL |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 41,200 | NA | 40,000 | NA | 10,800 | NA | 15,500 | NA | 15,400 | NA | 17,200 | NA | 16,300 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 53.6 | NA | 43.8 | NA | 49.3 | NA | 93.5 | NA | 100 | NA | 103 | NA | 123 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | BDL | NA | 4.37 B | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | BDL | NA | 47.1 | NA | BDL | NA | BDL | NA | BDL | NA | 1.29 B |

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Pajarito Canyon (TA-18) | | | | | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | 18-MW-10 (8/14/01) | | 18-MW-11 (8/14/01) | | 18-MW-12 (8/14/01) | | 18-MW-16 (8/14/01) | | 18-MW-17 (8/15/01) | | 18-MW-18 (8/15/01) | | 18-MW-27[h] (8/15/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 22.7 B | NA | 21.1 B | NA | 29.7 B | NA | 23.1 B | NA | 50.9 | NA | 23.1 B | NA | 50.2 |
| Lithium | NE | NE | 730 | NE | NE | NA | 1.88 BE | NA | 1.35 BE | NA | 2.53 BE | NA | 2.12 B | NA | 2.36 B | NA | 0.919 B | NA | 2.22 B |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | 1.4 B | NA | BDL | NA | BDL |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 16,500 | NA | 15,400 | NA | 16,800 | NA | 16,900 | NA | 17,200 | NA | 21,200 | NA | 17,100 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 124 | NA | 116 | NA | 126 | NA | 120 | NA | 280 | NA | 165 | NA | 281 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | 3.21 B | NA | 3.21 B | NA | 7.31 | NA | BDL | NA | BDL | NA | 27 | NA | BDL |

**TABLE 10: Summary of Preliminary Analytical Results for Water Samples - Trace Metals**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Springs and Surface Water (Pajarito Canyon) | | | | | | | | | | Springs and Surface Water (Off-Site Springs) | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | PA 6.7 (8/9/01) | | PAD 6.7A[1] (8/9/01) | | PA 10.6 (8/9/01) | | TA-18 Spring (8/13/01) | | Threemile Spring (8/13/01) | | SP4 (Spring 4) (11/01/01) | | SP4A (Spring 4A) (11/01/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 13.5 B | NA | 13.4 B | NA | 15.1 B | NA | 18.2 B | NA | 13.3 B | NA | 5.22 B | NA | 4.02 B |
| Lithium | NE | NE | 730 | NE | NE | NA | 2 B | NA | 2 B | NA | 1.18 B | NA | 3.1 B | NA | 1 BE | NA | 21.8 E | NA | 25.9 E |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | 1.92 B | NA | 2.46 B | NA | BDL | NA | 2.87 B | NA | BDL | NA | NA | NA | NA |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 15,000 | NA | 14,900 | NA | 7,120 | NA | 15,900 | NA | 16,200 | NA | 27,000 | NA | 34,800 |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 154 | NA | 152 | NA | 95.5 | NA | 101 | NA | 102 | NA | 139 | NA | 104 |
| Tin | NE | NE | 22,000 | NE | NE | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | BDL | NA | NA | NA | NA |
| Titanium | NE | NE | NE | NE | NE | NA | BDL | NA | BDL | NA | 8.13 | NA | BDL | NA | 8.32 | NA | NA | NA | NA |

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Springs and Surface Water (Off-Site Springs) | | | | Buckman Wells | | | | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | SP4AA (Spring 4AA) (11/01/01) | | SP4C (Spring 4C) (11/01/01) | | Buckman 1 (8/16/01) | | Buckman 1 (10/31/01) | | Buckman 2 (8/16/01) | | Buckman 2 (10/31/01) | | Buckman 3 (10/31/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | NA | 4.17 B | NA | 3.67 B | 81.4 | 73.6 | 95.3 | NA | 477 | 467 | 108 | NA | 108 | NA |
| Lithium | NE | NE | 730 | NE | NE | NA | 25.6 E | NA | 21.6 E | 45.1 | 44.3 | 75.9 DF5 | NA | 195 | 177 | 162 DF10 | NA | 129 DF10 | NA |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | NA | NA | NA | BDL | 3.13 B | NA | NA | BDL | 4.85 B | NA | NA | NA | NA |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | NA | 33,400 | NA | 26,700 | 21,400 | 21,200 | 18,700 | NA | 20,100 | 20,100 | 19,500 | NA | 17,100 | NA |
| Strontium | NE | NE | 22,000 | NE | NE | NA | 108 | NA | 134 | 88.9 | 85.8 | 238 | NA | 1,160 | 1,140 | 1,240 | NA | 945 | NA |
| Tin | NE | NE | 22,000 | NE | NE | NA | NA | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA |
| Titanium | NE | NE | NE | NE | NE | NA | NA | NA | NA | BDL | BDL | NA | NA | BDL | BDL | NA | NA | NA | NA |

## TABLE 10: Summary of Preliminary Analytical Results for Water Samples - Trace Metals
## Los Alamos National Laboratory, New Mexico
## (Continued)

| Analyte | Sample Location and Date Collected | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Buckman Wells | | | | | | | | | | | | QA/QC | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | Buckman 4 (10/31/01) | | Buckman 6 (10/31/01) | | Buckman 7 (8/16/01) | | Buckman 7 (10/31/01) | | Buckman 8 (10/31/01) | | Buckman 11[j] (8/16/01) | | FB-01 (Field Blank) (8/15/01) | |
| | | | | | | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved | Total | Dissolved |
| Boron | 5,000 | NE | 3,300 | NE | 750 | 79 | NA | 77.4 | NA | 80.4 | 77.8 | 74 | NA | 70.2 | NA | 82.4 | 74.5 | NA | 44.1 B |
| Lithium | NE | NE | 730 | NE | NE | 119 DF10 | NA | 86.1 | NA | 87.2 | 79.5 | 92.2 DF5 | NA | 81.9 | NA | 46.2 | 45 | NA | 4.72 B |
| Molybdenum | NE | NE | 180 | NE | 1,000 | NA | NA | NA | NA | BDL | 5.88 B | NA | NA | NA | NA | BDL | 3.57 B | NA | BDL |
| Silica (silicon dioxide) | NE | NE | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Silicon | NE | NE | NE | NE | NE | 19,200 | NA | 18,300 | NA | 15,800 | 15,600 | 16,000 | NA | 18,700 | NA | 21,300 | 20,800 | NA | 2,970 |
| Strontium | NE | NE | 22,000 | NE | NE | 1,990 | NA | 1,420 | NA | 799 | 772 | 817 | NA | 354 | NA | 87.8 | 82.3 | NA | 50.8 |
| Tin | NE | NE | 22,000 | NE | NE | NA | NA | NA | NA | BDL | BDL | NA | NA | NA | NA | BDL | BDL | NA | BDL |
| Titanium | NE | NE | NE | NE | NE | NA | NA | NA | NA | 0.26 B | BDL | NA | NA | NA | NA | BDL | BDL | NA | BDL |

* All results reported in micrograms per liter (µg/l). All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded. TechLaw filtered water samples in the field prior to submitting samples for dissolved analysis (total fraction was not field-filtrered).

a National Pollutant Discharge Elimination System (NPDES) permit limits for discharges from the TA-50 Radioactive Liquid Waste Treatment Facility (NPDES Outfall 051).
b EPA Maximum Contaminant Levels (EPA MCL) for inorganic chemicals in the water supply.
c EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for inorganic chemicals in tap water (July 1999).
d New Mexico Maximum Contaminant Levels (NM MCL) for inorganic chemicals in community and non-transient, non-community water systems.
e New Mexico Water Quality Control Commission (NM WQCC) standards for groundwater of less than 10,000 mg/l total dissolved solids (TDS) concentration or less.
f MCO-5B is a duplicate sample of MCO-5.
g LADD is a duplicate sample of LAOI(a)-1.1.
h 18-MW-27 is a duplicate sample of 18-MW-17.
i PAD-6.7A is a duplicate sample of PA-6.7.
j Buckman 11 is a duplicate sample of Buckman 1 (collected on 8/16/01).

BDL Below Detection Limit.
NA Not Analyzed.
NE Not Established.

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
E The reported value is estimated because of the presence of interference.
N The laboratory-spiked sample recovery for this analyte is not within control limits.

**TABLE 11: Summary of Preliminary Analytical Results for Water Samples - General Water Chemistry**
**Los Alamos National Laboratory, New Mexico**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | | | | Mortandad Canyon (Effluent Gauging Station 1) | | Test Wells | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | MCO-3 (7/31/01) | MCO-5 (8/2/01) | MCO-5B[d] (8/2/01) | MCO-6 (8/6/01) | MCO-7 (8/7/01) | MCO-7.5B (8/7/01) | GS-1A (8/3/01) | GS-1B (8/10/01) | TW-1 (7/31/01) | TW-2A (7/30/01) | TW-3 (7/30/01) | TW-4 (7/30/01) | TW-8 (7/30/01) |
| Bromide (mg/ℓ) | NE | NE | NE | 0.268 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.227 | BDL | BDL | BDL |
| Chloride (mg/ℓ) | NE | NE | 250 | 18.3 | 27.2 (DF 2) | 26.4 (DF 2) | 25.6 (DF 2) | 17.8 | 13.3 | 12.6 | 15.2 | 35.2 (DF 2) | 74 (DF 5) | 2.75 | 1.75 | 1.88 |
| Cyanide, Total (µg/ℓ) | 200 | 200 | 200 | 3.01 J | BDL | BDL | BDL | BDL | BDL | 3.8 J | BDL | 4.61 J | NA | BDL | BDL | BDL |
| Cyanide, Amenable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cyanide, Weak Acid Dissociable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | 0.501 | NA | NA | NA | NA | NA | NA |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | 0.523 | 0.85 | 0.956 | 1.06 | 1.11 | 1.21 | NA | 0.323 | 0.314 | 0.178 | 0.333 | 0.142 | 0.124 |
| Hardness (as $CaCO_3$) (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | 67 | NA | NA | NA | NA | NA | NA | NA |
| Nitrogen, Ammonia (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | 3.6 (DF 5) | 1.24 | NA | NA | NA | NA | NA |
| Nitrogen, Nitrate/Nitrite (mg/ℓ) | NE | 10 | NE | 3.84 (DF 3) | 3.81 (DF 3) | 3.84 (DF 3) | 4.05 (DF 3) | 5.64 (DF 3) | **10.7 (DF 5)** | 4.11 (DF 3) | 4 (DF 5) | 5.88 (DF 3) | 0.03 J | 0.6 | 0.02 J | 0.25 |
| Nitrogen, Total Kjeldahl (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | 2.91 (DF 3) | 0.48 | NA | NA | NA | NA | NA |
| Dissolved Organic Carbon (mg/ℓ) | NE | NE | NE | 5.02 | 4.29 | 4.1 | 4.36 | 3.47 | 2.55 | 7.24 | 8.01 | 1.23 | 1.79 | 0.779 | 0.992 | 0.644 |
| Total Organic Carbon (mg/ℓ) | NE | NE | NE | 4.75 | 3.91 | 3.96 | 3.96 | NA | 2.33 | 7.2 | 7.64 | 0.884 | 2.47 | 0.38 | 0.7 | 0.326 |
| Perchlorate (µg/ℓ) | 4* | NE | NE | **106 (DF2)** | **161 (DF 2)** | **164 (DF 2)** | **170 (DF 5)** | **162 (DF 5)** | **208 (DF 5)** | NA | **23.3** | **5.82** | BDL | 2.49 J | BDL | BDL |
| Phosphorus (as $PO_4$), Total (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | 0.02 J | 0.15 | NA | NA | NA | NA | NA |
| Sulfate (mg/ℓ) | NE | NE | 600 | 90.8 (DF 5) | 35.3 | 36.5 | 38.1 | 29.3 | 32.4 | 101 (DF 5) | 26.6 | 24 | 0.264 | 2.88 | BDL | 2.03 |
| Total Dissolved Solids (mg/ℓ) | NE | NE | 1,000 | 440 | 324 | 334 | 333 | 318 | 372 | NA | 268 | 315 | 289 | 185 | 114 | 157 |
| Total Suspended Solids (mg/ℓ) | NE | NE | NE | BDL | BDL | BDL | 0.8 J | 2.2 J | 2.6 J | NA | 103 | 2 J | 4.4 J | BDL | 1.6 J | BDL |
| $\delta^{15}N_{air}$ of $NH_3$ (no units) | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | 8.9, 9.2 | BDL | NA | 11.8 | NA | NA | NA |
| $\delta^{15}N_{air}$ of $NO_3$ (no units) | NE | NE | NE | -12.3, -12.1 | -16.3 | -16.4 | -10.8 | -10.5 | -6.1, -6.9 | 9.3, 9.8 | 12.3 | NA | BDL | NA | NA | NA |

**TABLE 11: Summary of Preliminary Analytical Results for Water Samples - General Water Chemistry**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Ancho Canyon | | | Intermediate Aquifer Wells | | | | Drinking Water Production Wells | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | DT-5A (8/7//01) | DT-9 (8/7/01) | DT-10 (8/7/01) | POI-4 (8/1/01) | LAOI(a)-1.1 (10/30/01) | LADD* (10/30/01) | LADP-3 (10/30/01) | G-1A (8/8/01) | O-1 (8/8/01) | O-4 (8/8/01) | PM-1 (8/8/01) | PM-2 (8/8/01) | PM-3 (8/8/01) |
| Bromide (mg/ℓ) | NE | NE | NE | BDL | BDL | BDL | 1.81 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Chloride (mg/ℓ) | NE | NE | 250 | 1.41 | 1.66 | 1.38 | 41.8 (DF 2) | 1.23 | 1.07 | 9 | 3.24 | 4.97 | 7.06 | 5.17 | 1.51 | 5.77 |
| Cyanide, Total (µg/ℓ) | 200 | 200 | 200 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 3.03 J | BDL | BDL | BDL | BDL | BDL |
| Cyanide, Amenable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cyanide, Weak Acid Dissociable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | BDL | 0.265 | 0.123 | 0.24 | BDL | BDL | 0.341 | 0.508 | 0.226 | 0.195 | 0.124 | 0.101 | 0.21 |
| Hardness (as $CaCO_3$) (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | 218 | 58.6 | 183 | NA | NA | NA | NA | NA | NA |
| Nitrogen, Ammonia (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nitrogen, Nitrate/Nitrite (mg/ℓ) | NE | 10 | NE | 0.33 | 0.41 | 0.25 | 2.94 (DF 3) | 0.24 | 0.26 | 0.2 | 0.44 | 1.22 | 0.34 | 0.45 | 0.34 | 0.38 |
| Nitrogen, Total Kjeldahl (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Dissolved Organic Carbon (mg/ℓ) | NE | NE | NE | 0.749 | 0.999 | 1.22 | 1.92 | 1.19 | 0.734 | 2.76 | 1.43 | 2.32 | 2.43 | 2.27 | 1.89 | 2.78 |
| Total Organic Carbon (mg/ℓ) | NE | NE | NE | 0.3 | 0.298 | 0.357 | 1.83 | 0.639 | 0.591 | NA | NA | 0.362 | 0.425 | 0.43 | 0.298 | BDL |
| Perchlorate (µg/ℓ) | 4* | NE | NE | BDL | 1.46 J | 1.22 J | 2.82 J | BDL | BDL | BDL | 1.65 J | 3.65 J | BDL | 2.46 J | 1.33 J | BDL |
| Phosphorus (as $PO_4$), Total (mg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Sulfate (mg/ℓ) | NE | NE | 600 | 1.33 | 1.59 | 1.21 | 20.2 | 2.38 | 2.71 | 39.6 | 4.29 | 5.81 | 5.15 | 4.59 | 1.52 | 4.71 |
| Total Dissolved Solids (mg/ℓ) | NE | NE | 1,000 | 120 | 136 | 152 | 333 | 146 | 152 | 177 | 189 | 193 | 239 | NA | 161 | 238 |
| Total Suspended Solids (mg/ℓ) | NE | NE | NE | BDL | BDL | BDL | 0.8 J | 94.5 | 111 | 99.1 | BDL | BDL | BDL | BDL | BDL | BDL |
| $\delta^{15}N_{air}$ of $NH_3$ (no units) | NE | NE | NE | NA | NA | NA | BDL | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| $\delta^{15}N_{air}$ of $NO_3$ (no units) | NE | NE | NE | NA | NA | NA | 27.4, 26.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA |

**TABLE 11: Summary of Preliminary Analytical Results for Water Samples - General Water Chemistry**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Drinking Water Production Wells | | TA-3 Building SM-30 | Pajarito Canyon (TA-18) | | | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | PM-4 (8/8/01) | PM-5 (8/8/01) | O3-MW-1 (8/15/01) | 18-BG-1 (8/13/01) | 18-MW-7 (8/13/01) | 18-MW-8 (8/13/01) | 18-MW-9 (8/14/01) | 18-MW-10 (8/14/01) | 18-MW-11 (8/14/01) | 18-MW-12 (8/14/01) | 18-MW-16 (8/14/01) | 18-MW-17 (8/15/01) | 18-MW-18 (8/15/01) |
| Bromide (mg/l) | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Chloride (mg/l) | NE | NE | 250 | 2.05 | 1.74 | 25.2 | 14.6 | 15 | 16.7 | 22.9 | 18.5 | 16.5 | 17.1 | 15.2 | 27.2 (DF 2) | 53.4 (DF 5) |
| Cyanide, Total (µg/l) | 200 | 200 | 200 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 4.67 J | BDL |
| Cyanide, Amenable (µg/l) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cyanide, Weak Acid Dissociable (µg/l) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Fluoride (mg/l) | 4 | 4 | 1.6 | 0.165 | 0.145 | BDL | BDL | BDL | 0.089 | 0.147 | 0.185 | 0.124 | 0.236 | 0.149 | 0.1 | 0.068 |
| Hardness (as $CaCO_3$) (mg/l) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Nitrogen, Ammonia (mg/l) | NE | NE | NE | NA | NA | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Nitrogen, Nitrate/Nitrite (mg/l) | NE | 10 | NE | 0.33 | 0.24 | 0.1 | 0.38 | 0.91 | 0.33 | 2.09 | 1.41 | 0.94 | 0.11 | 1.12 | 1.07 | 1.07 |
| Nitrogen, Total Kjeldahl (mg/l) | NE | NE | NE | NA | NA | 0.12 | 0.16 | 0.16 | 0.2 | 0.14 | 0.16 | 0.13 | 0.17 | 0.14 | 0.43 | 0.17 |
| Dissolved Organic Carbon (mg/l) | NE | NE | NE | 2.3 | 2.11 | 4.33 | 2.63 | 2.02 | 3.99 | 2.64 | 3.24 | 2.85 | 3.7 | 3.3 | 7.59 | 3.15 |
| Total Organic Carbon (mg/l) | NE | NE | NE | BDL | 0.26 | 4.11 | 2.49 | 1.93 | 2.84 | 2.02 | 2.88 | 2.44 | 3.04 | 2.82 | 7.1 | 2.51 |
| Perchlorate (µg/l) | 4* | NE | NE | 1.99 | 2.06 J | BDL | BDL | 1.31 J | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| Phosphorus (as $PO_4$), Total (mg/l) | NE | NE | NE | NA | NA | BDL | 0.02 J | BDL | BDL | 0.05 | BDL | BDL | BDL | BDL | BDL | 0.06 |
| Sulfate (mg/l) | NE | NE | 600 | 2.13 | 1.96 | 3.62 | 12.2 | 10 | 17.1 | 16.7 | 19.9 | 15.8 | 22.3 | 16.4 | 25.4 | 14.4 |
| Total Dissolved Solids (mg/l) | NE | NE | 1,000 | 182 | 178 | 201 | 166 | 146 | 158 | 357 | 283 | 278 | 363 | 213 | 322 | 365 |
| Total Suspended Solids (mg/l) | NE | NE | NE | BDL | BDL | 89.6 | 179 | 41.3 | 80.7 | 643 | 843 | 82.2 | 790 | 134 | 13.4 | 60.5 |
| $\delta^{15}N_{air}$ of $NH_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| $\delta^{15}N_{air}$ of $NO_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

**TABLE 11: Summary of Preliminary Analytical Results for Water Samples - General Water Chemistry**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Pajarito Canyon (TA-18) | Springs and Surface Water (Pajarito Canyon) | | | | | Springs and Surface Water (Off-Site Springs) | | | | Buckman Wells | |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | 18-MW-27[f] (8/15/01) | PA-6.7 (8/9/01) | PAD-6.7A[g] (8/9/01) | PA-10.6 (8/9/01) | TA-18 Spring (8/13/01) | Three Mile Spring (8/13/01) | SP4 (Spring 4) (11/01/01) | SP4A (Spring 4A) (11/01/01) | SP4AA (Spring 4AA) (11/01/01) | SP4C (Spring 4C) (11/01/01) | Buckman 1 (8/16/01) | Buckman 1 (10/31/01) |
| Bromide (mg/l) | NE | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.275 | BDL | 0.111 | BDL | BDL |
| Chloride (mg/l) | NE | NE | 250 | 30.3 (DF 2) | 5.86 | 5.78 | 0.833 | 14.7 | 8.96 | 5.26 | 3.79 | 4.5 | 5.18 | 2.84 | 3.06 |
| Cyanide, Total (µg/l) | 200 | 200 | 200 | 3.07 J | BDL | 3.66 J | 3.9 J | BDL | BDL | NA | NA | NA | NA | BDL | NA |
| Cyanide, Amenable (µg/l) | NE | NE | NE | NA | BDL | BDL | BDL | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Cyanide, Weak Acid Dissociable (µg/l) | NE | NE | NE | NA | BDL | BDL | 3.94 J | BDL | BDL | NA | NA | NA | NA | NA | NA |
| Fluoride (mg/l) | 4 | 4 | 1.6 | 0.095 | BDL | 0.066 | BDL | 0.093 | 0.042 J | 0.096 J | 0.264 | 0.11 | 0.118 | 0.616 | 0.174 |
| Hardness (as $CaCO_3$) (mg/l) | NE | NE | NE | NA | 72.9 | 73.9 | 28.6 | 60.1 | 49.3 | 89 | 93.7 | 94.1 | 91.3 | NA | 232 |
| Nitrogen, Ammonia (mg/l) | NE | NE | NE | BDL | 0.03 J | BDL | 0.13 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | NA |
| Nitrogen, Nitrate/Nitrite (mg/l) | NE | 10 | NE | 1.06 | 0.45 | 0.18 | 1.43 | 0.01 J | 0.24 | 1.26 | 0.87 | 1.06 | 1.36 | 1.19 | 1.15 |
| Nitrogen, Total Kjeldahl (mg/l) | NE | NE | NE | 0.38 | 0.52 | 0.2 | 2.33 | 0.18 | 0.14 | 0.37 | 0.13 | 0.11 | 0.16 | 0.06 J | NA |
| Dissolved Organic Carbon (mg/l) | NE | NE | NE | 7.67 | 6.37 | 7 | 13.4 | 4.61 | 3.83 | NA | NA | NA | NA | 0.991 | NA |
| Total Organic Carbon (mg/l) | NE | NE | NE | 7.03 | 5.73 | 5.7 | 13.5 | 4.56 | 2.97 | NA | NA | NA | NA | 0.534 | NA |
| Perchlorate (µg/l) | 4* | NE | NE | BDL | BDL | BDL | BDL | BDL | BDL | 0.58 | 0.4 | 0.53 | 0.64 | BDL | BDL |
| Phosphorus (as $PO_4$), Total (mg/l) | NE | NE | NE | 0.04 J | 0.14 | 0.23 | 0.74 | BDL | BDL | BDL | 0.03 J | BDL | BDL | BDL | NA |
| Sulfate (mg/l) | NE | NE | 600 | 26.2 | 4.95 | 4.81 | 2.9 | 12 | 10.4 | 8.07 | 9.22 | 5.6 | 8.1 | 11.2 | 13.2 |
| Total Dissolved Solids (mg/l) | NE | NE | 1,000 | 325 | 175 | 173 | 197 | 148 | 144 | NA | NA | NA | NA | 254 | NA |
| Total Suspended Solids (mg/l) | NE | NE | NE | 51.1 | 38.6 | 60 | 1,080 | 6.6 | BDL | NA | NA | NA | NA | BDL | NA |
| $\delta^{15}N_{air}$ of $NH_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | BDL | BDL | BDL | BDL | NA | NA |
| $\delta^{15}N_{air}$ of $NO_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | 4 | 4 | 4.5 | 4, 3 | NA | NA |

**TABLE 11: Summary of Preliminary Analytical Results for Water Samples - General Water Chemistry**
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Buckman Wells | | | | | | | | | QA/QC |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | Buckman 2 (8/16/01) | Buckman 2 (10/31/01) | Buckman 3 (10/31/01) | Buckman 4 (10/31/01) | Buckman 6 (10/31/01) | Buckman 7 (8/16/01) | Buckman 7 (10/31/01) | Buckman 8 (10/31/01) | Buckman 11[h] (8/16/01) | FB-01 (Field Blank) (8/15/01) |
| Bromide (mg/ℓ) | NE | NE | NE | BDL | BDL | BDL | 0.103 | 0.392 | BDL | 0.191 | BDL | BDL | BDL |
| Chloride (mg/ℓ) | NE | NE | 250 | 9.76 | 3.13 | 3.3 | 3.72 | 3.39 | 3.15 | 3.29 | 1.9 | 2.67 | 23.9 |
| Cyanide, Total (µg/ℓ) | 200 | 200 | 200 | BDL | NA | NA | NA | NA | BDL | NA | NA | BDL | 4.12 J |
| Cyanide, Amenable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cyanide, Weak Acid Dissociable (µg/ℓ) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | 0.286 | BDL | 0.042 J | 0.066 J | 0.338 | 0.299 | 0.238 | 0.116 | 0.539 | 0.613 |
| Hardness (as $CaCO_3$) (mg/ℓ) | NE | NE | NE | NA | 349 | 305 | 418 | 326 | NA | 264 | 222 | NA | NA |
| Nitrogen, Ammonia (mg/ℓ) | NE | NE | NE | BDL | NA | NA | NA | NA | BDL | NA | NA | BDL | 0.17 |
| Nitrogen, Nitrate/Nitrite (mg/ℓ) | NE | 10 | NE | 0.79 | 1.23 | 1.67 | 1.45 | 1.52 | 1.39 | 1.47 | 0.61 | 1.23 | 0.92 |
| Nitrogen, Total Kjeldahl (mg/ℓ) | NE | NE | NE | 0.06 J | NA | NA | NA | NA | BDL | NA | NA | 0.07 J | 0.17 |
| Dissolved Organic Carbon (mg/ℓ) | NE | NE | NE | 0.951 | NA | NA | NA | NA | 1.65 | NA | NA | 0.966 | 0.829 |
| Total Organic Carbon (mg/ℓ) | NE | NE | NE | 1.62 | NA | NA | NA | NA | 0.704 | NA | NA | 0.481 | 0.502 |
| Perchlorate (µg/ℓ) | 4* | NE | NE | BDL | BDL | BDL | 2.04 J | BDL | 1.01 J | BDL | BDL | BDL | BDL |
| Phosphorus (as $PO_4$), Total (mg/ℓ) | NE | NE | NE | BDL | NA | NA | NA | NA | BDL | NA | NA | BDL | 0.27 |
| Sulfate (mg/ℓ) | NE | NE | 600 | 26.2 | 19.9 | 28.1 | 16.5 | 20.7 | 21.6 | 26.6 | 7.86 | 10.6 | 31.5 |
| Total Dissolved Solids (mg/ℓ) | NE | NE | 1,000 | 773 | NA | NA | NA | NA | 334 | NA | NA | 252 | 143 |
| Total Suspended Solids (mg/ℓ) | NE | NE | NE | BDL | NA | NA | NA | NA | 2.4 J | NA | NA | BDL | BDL |
| $\delta^{15}N_{air}$ of $NH_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| $\delta^{15}N_{air}$ of $NO_3$ (no units) | NE | NE | NE | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded. Double values for stable nitrogen isotope ratios represent two separate analyses.

| | |
|---|---|
| a | EPA Maximum Contaminant Levels (EPA MCL) for inorganic chemicals in the water supply. |
| b | New Mexico Maximum Contaminant Levels (NM MCL) for inorganic chemicals in community and non-transient, non-community water systems. |
| c | New Mexico Water Quality Control Commission (NM WQCC) standards for groundwater of less than 10,000 mg/ℓ total dissolved solids (TDS) concentration or less. |
| d | MCO-5B is a duplicate of sample MCO-5. |
| e | LADD is a duplicate of sample LAOI(a)-1.1. |
| f | 18-MW-27 is a duplicate of sample 18-MW-17. |
| g | PAD-6.7A is a duplicate of sample PA-6.7. |
| h | Buckman 11 is a duplicate of sample Buckman 1 (collected on 8/16/01). |

| | |
|---|---|
| BDL | Below Detection Limit. |
| $\delta^{15}N_{air}$ of $NH_3$ | Stable nitrogen isotope ratio found in the ammonia fraction of the sample. |
| $\delta^{15}N_{air}$ of $NO_3$ | Stable nitrogen isotope ratio found in the nitrate fraction of the sample. |
| NA | Not Analyzed. |
| NE | Not Established |
| J | The reported value is estimated. |

* 4 µg/ℓ is a provisional standard established in 1999 by the EPA Unregulated Contaminant Monitoring Rule.

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**

| Parameter | Reference | | | | | Sample Location and Date Collected: Mortandad Canyon | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | MCO-3 (7/31/01) (dissolved)[k] | | MCO-5 (8/2/01) (dissolved)[k] | | MCO-5B[f] (8/2/01) (dissolved)[k] | | MCO-6 (8/6/01) (dissolved)[k] | | MCO-7 (8/7/01) (dissolved)[k] | | MCO-7.5B (8/7/01) (dissolved)[k] | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | 41.6 | 1.96 | 40.3 | 1.94 | 36.5 | 1.8 | 42.2 | 2.21 | 1.35 | 0.595 | BDL | -- |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 4,923.606 | 51 | NA | -- | 6,861.757 | 71 | 7,778.148 | 81 | 9,349.104 | 97 | 11,861.995 | 123 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | 1.06 | 0.206 | 0.133 | 0.0657 | 0.206 | 0.0925 | 0.198 | 0.135 | 0.161 | 0.109 | 0.405 | 0.269 |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | 0.144 | 0.0981 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | 0.882 | 0.253 | 1.12 | 0.281 | 1.06 | 0.29 | 0.982 | 0.261 | BDL | -- | 0.863 | 0.37 |
| Uranium-235/236 | NE | NE | NE | NE | NE | 0.104 | 0.082 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | BDL | -- | NA | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 0.4 | 0.16 | 0.348 | 0.143 | 0.47 | 0.183 | 0.432 | 0.163 | 0.431 | 0.268 | 0.369 | 0.238 |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | 11.8 | 4.22 | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | TA-50 Radioactive Waste Water Treatment Plant | | | | Test Wells | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | GS-1A (8/3/01) (dissolved)[k] | | GS-1B (8/10/01) (dissolved)[k] | | TW-1 (7/31/01) | | TW-2A (7/30/01) | | TW-3 (7/30/01) | | TW-4 (7/30/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | **14.4** | 1.58 | 7.13 | 0.772 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 3,592.125 | 37 | 1,794.466 | 19 | 169.229 | 4 | 1,171.831 | 12 | 0.15965 | 0.09 | 0.479 | 0.09 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | **4.03** | 0.543 | **8.4** | 0.975 | BDL | -- | BDL | -- | BDL | -- | 0.0436 | 0.0293 |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | **5.3** | 0.623 | **2.63** | 0.703 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | 1.79 | 0.256 | 0.859 | 0.366 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | 1.84 | 0.357 | BDL | -- | 1.87 | 0.359 | BDL | -- | 0.358 | 0.133 | 0.122 | 0.0802 |
| Uranium-235/236 | NE | NE | NE | NE | NE | 0.108 | 0.0717 | BDL | -- | 0.0736 | 0.0592 | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 1.25 | 0.277 | 0.451 | 0.36 | 1.06 | 0.25 | BDL | -- | 0.177 | 0.0921 | BDL | -- |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | 35.3 | 6.73 | 26.3 | 5.51 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Test Wells | | Ancho Canyon | | | | | | Intermediate Aquifer Wells | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | TW-8 (7/30/01) | | DT-5A (8/7/01) | | DT-9 (8/7/01) | | DT-10 (8/8/01) | | POI-4 (8/1/01) | | LAOI(a)-1.1 (10/30/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[f] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 2.714 | 0.09 | -0.25544 | 0.09 | 0.064 | 0.09 | 0.445 | 0.09 | 38.316 | 3 | 0.479 | 0.09 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | 0.0237 | 0.0275 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | 0.442 | 0.158 | 0.335 | 0.227 | 0.182 | 0.107 | 0.299 | 0.129 | 1.47 | 0.351 | BDL | -- |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 0.176 | 0.112 | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | BDL | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 0.191 | 0.102 | BDL | -- | BDL | -- | 0.228 | 0.105 | 0.691 | 0.222 | 0.257 | 0.19 |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | **104** | 76.9 | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | 6.29 | 5.62 | BDL | -- | 5.78 | 7.53 | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Intermediate Aquifer Wells | | | | Drinking Water Production Wells | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | LADD[g] (10/30/01) | | LADP-3 (10/30/01) | | G-1A (8/8/01) | | O-1 (8/8/01) | | O-4 (8/8/01) | | PM-1 (8/8/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[f] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | NA | -- | 290.563 | 4 | 0.351 | 0.09 | 30.014 | 0.3 | -0.16 | 0.09 | 0.926 | 0.09 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | 0.0304 | 0.0306 | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | 0.0133 | 0.0155 | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | BDL | -- | 0.913 | 0.346 | 0.556 | 0.3 | 0.942 | 0.236 | 0.971 | 0.436 | 1.37 | 0.445 |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | BDL | -- | NA | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 0.426 | 0.262 | 0.832 | 0.323 | 0.203 | 0.175 | 0.446 | 0.155 | 0.418 | 0.284 | 0.551 | 0.279 |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 194 | 151 | 157 | 208 |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 194 | 151 | 157 | 208 |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Drinking Water Production Wells | | | | | | | | TA-3 Building SM-30 | | Pajarito Canyon (TA-18) | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | PM-2 (8/8/01) | | PM-3 (8/8/01) | | PM-4 (8/8/01) | | PM-5 (8/8/01) | | O3-MW-1 (8/15/01) (dissolved)[k] | | 18-BG-1 (8/13/01) (dissolved)[k] | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | -0.032 | 0.09 | 0.128 | 0.09 | -0.128 | 0.09 | -0.16 | 0.09 | 437.441 | 5 | 114.948 | 4 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | 0.0377 | 0.0379 | 0.164 | 0.148 | BDL | -- | BDL | -- | BDL | -- | 0.0561 | 0.0505 |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | 0.239 | 0.12 | 0.654 | 0.335 | 0.47 | 0.262 | 0.483 | 0.256 | BDL | -- | BDL | -- |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | 0.326 | 0.221 | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | BDL | -- | 34.3% | -- | BDL | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 0.177 | 0.102 | 0.283 | 0.216 | BDL | -- | 0.273 | 0.19 | BDL | -- | BDL | -- |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | **260** | 450 | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 2.14 | 3.17 |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 5.44 | 7.62 |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 2.69 | 3.48 |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Pajarito Canyon (TA-18) | | | | | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | 18-MW-7 (8/13/01)(dissolved)[k] | | 18-MW-8 (8/13/01) (dissolved)[k] | | 18-MW-9 (8/14/01) | | 18-MW-10 (8/14/01) | | 18-MW-11 (8/14/01) | | 18-MW-12 (8/14/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | 1.05 | 0.429 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 83.018 | 4 | 121.334 | 4 | 134.106 | 4 | 114.948 | 4 | 111.755 | 4 | 114.948 | 4 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | 0.338 | 0.0392 | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | 0.0308 | 0.0357 | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | **116** | 33.8 | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | 32 | 6.16 | BDL | -- | BDL | -- | 8.07 | 4.28 |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | 38.7 | 9.26 | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | 160 | 153 | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | **160** | 153 | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Pajarito Canyon (TA-18) | | | | | | | | Springs and Surface Water (Pajarito Canyon) | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | 18-MW-16 (8/14/01) (dissolved)[k] | | 18-MW-17 (8/15/01) (dissolved)[k] | | 18-MW-18 (8/15/01) (dissolved)[k] | | 18-MW-27[h] (8/14/01) (dissolved)[k] | | PA 6.7 (8/9/01) | | PAD 6.7A[i] (8/9/01) (dissolved)[k] | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 0.906 | 0.465 |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 121.334 | 4 | 111.755 | 4 | 102.176 | 4 | 105.369 | 4 | 73.439 | 4 | 79.825 | 4 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | BDL | -- | 0.463 | 0.284 | BDL | -- | 0.448 | 0.287 | 0.302 | 0.217 | 0.4 | 0.271 |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 0.213 | 0.175 | BDL | -- |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | 3.34 | 2.78 | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | 8.29 | 5.7 | 12.5 | 8.03 | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Springs and Surface Water (Pajarito Canyon) | | | | | | Springs and Surface Water (Off-Site Springs) | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCGI[d] | DOE DCGE[e] | PA 10.6 (8/9/01) (dissolved)[k] | | TA-18 Spring (8/13/01) | | Threemile Spring (8/13/01) | | SP4 (Spring 4) (11/01/01) | | SP4A (Spring 4A) (11/01/01) | | SP4AA (Spring 4AA) (11/01/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | 1.59 | 0.674 | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Tritium ($H^3$)[j] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 98.983 | 4 | 137.299 | 4 | 108.562 | 4 | 6.386 | 2 | 12.772 | 2 | -22.351 | 3 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | 0.0371 | 0.0373 | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | 0.0334 | 0.0387 | NA | -- | NA | -- | NA | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | BDL | -- | 0.855 | 0.586 | BDL | -- | NA | -- | NA | -- | NA | -- |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | NA | -- | NA | -- | NA | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Springs and Surface Water (Off-Site Springs) | | Buckman Wells | | | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | SP4C (Spring 4C) (11/01/01) | | Buckman 1 (8/16/01) | | Buckman 1 (10/31/01) | | Buckman 2 (8/16/01) | | Buckman 2 (10/31/01) | | Buckman 3 (10/31/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[f] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 3.193 | 3 | -0.12772 | 0.09 | 0 | 2 | 0.128 | 0.09 | 6.386 | 2 | 3.193 | 2 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | NA | -- | BDL | -- | NA | -- | BDL | -- | BDL | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | NA | -- | 3.92 | 0.86 | 8.73 | 1.39 | 85.1 | 11.3 | 13.9 | 2.17 | 6.73 | 1.15 |
| Uranium-235/236 | NE | NE | NE | NE | NE | NA | -- | 0.135 | 0.136 | 0.504 | 0.248 | 3.11 | 0.847 | 0.859 | 0.381 | 0.466 | 0.239 |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | NA | -- | 2.29 | 0.616 | 5.54 | 1 | 68 | 9.17 | 7.37 | 1.35 | 2.69 | 0.627 |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | NA | -- | BDL | -- | BDL | -- | 516 | 485 | BDL | -- | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | NA | -- | BDL | -- | BDL | -- | 30.4 | 20.5 | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | NA | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 98.7 | 117 |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Buckman Wells | | | | | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | Buckman 4 (10/31/01) | | Buckman 6 (10/31/01) | | Buckman 7 (8/16/01) | | Buckman 7 (10/31/01) | | Buckman 8 (10/31/01) | | Buckman 11[f] (8/16/01) | |
| | | | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tritium ($H^3$)[g] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | -15.965 | 3 | 3.193 | 2 | -0.192 | 0.09 | -3.193 | 2 | -6.386 | 2 | -0.3193 | 0.1 |
| **Alpha Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- | 1.06 | 0.518 | NA | -- | BDL | -- | 0.606 | 0.398 | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | 10.7 | 1.62 | 7.22 | 1.19 | 5.04 | 1 | 5.71 | 1..03 | 6.5 | 1.11 | 3.24 | 0.727 |
| Uranium-235/236 | NE | NE | NE | NE | NE | 0.636 | 0.284 | BDL | -- | BDL | -- | 0.395 | 0.216 | 0.277 | 0.178 | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | 2.63 | 0.622 | 1.41 | 0.424 | 1.41 | 0.461 | 1.46 | 0.437 | 4.22 | 0.827 | 1.84 | 0.516 |
| **Gamma Spectrometry** | | | | | | | | | | | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | 82 | 80.4 |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | BDL | -- | BDL | -- | 8.69 | 5.67 | BDL | -- | BDL | -- | BDL | -- |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- | BDL | -- |

**TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**
**(Continued)**

| Parameter | Sample Location and Date Collected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Reference | | | | | QA/QC | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | FB-01 (Field Blank) (8/15/01) (dissolved)[k] | |
| | | | | | | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | |
| Strontium-90 | NE | 8 | 8 | 1,000 | 40 | BDL | -- |
| Tritium ($H^3$)[f] | NE | 20,000 | 20,000 | 2,000,000 | 80,000 | 169.229 | 4 |
| **Alpha Spectrometry** | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- |
| Plutonium-238 | NE | NE | NE | 40 | 1.6 | BDL | -- |
| Plutonium-239/240 | NE | NE | NE | NE | NE | BDL | -- |
| Radium-226 | NE | NE | NE | 100 | NE | NA | -- |
| Uranium-233/234 | NE | NE | NE | NE | NE | BDL | -- |
| Uranium-235/236 | NE | NE | NE | NE | NE | BDL | -- |
| Percent Uranium-235 | NE | NE | NE | NE | NE | NA | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- |
| **Gamma Spectrometry** | | | | | | | |
| Americium-241 | NE | NE | NE | 30 | 1.2 | BDL | -- |
| Cesium-137 | NE | NE | NE | 3,000 | 120 | BDL | -- |
| Cobalt-60 | NE | NE | NE | 5,000 | 200 | BDL | -- |
| Lead-210 | NE | NE | NE | 30 | NE | BDL | -- |
| Sodium-22 | NE | NE | NE | 10,000 | NE | BDL | -- |
| Thallium-208 | NE | NE | NE | NE | NE | BDL | -- |
| Thorium-230 | NE | NE | NE | 300 | NE | 3.86 | 6.32 |
| Thorium-234 | NE | NE | NE | 10,000 | NE | BDL | -- |
| Tin-113 | NE | NE | NE | 50,000 | NE | BDL | -- |
| Uranium-235 | NE | NE | NE | 600 | 24 | BDL | -- |
| Uranium-238 | NE | NE | NE | 600 | 24 | BDL | -- |

## TABLE 12: Summary of Preliminary Analytical Results for Water Samples - Radionuclides*
## Los Alamos National Laboratory, New Mexico
## (Continued)

* All results are reported in pico Curies per liter (pCi/l) except Percent Uranium-235 (which is reported as a percentage). All samples were analyzed for total radionuclides, unless otherwise indicated. All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed state or federal reference concentrations are marked in bold and shaded. Negative tritium values are, in principle, the difference between the count rate of the sample and that of a tritium-free sample (background count or blank sample). If the user is not performing statistical evaluation of the tritium data, negative values may be considered to be 0 (zero).

a EPA proposed Maximum Contaminant Levels (EPA MCLs) for radionuclides in the water supply (EPA has not established MCLs for individual radioactive isotopes).
b New Mexico Maximum Contaminant Levels (NM MCLs) for Beta Particle and Photon Radioactivity from man-made radionuclides in community water systems. There are no established NM MCLs for individual radioactive isotopes (other than strontium-90).
c New Mexico Standards for Interstate and Intrastate Streams for Wildlife Habitat Limits (NM WHLs). There are no established NM WHLs for for individual radioactive isotopes (other than strontium-90).
d Department of Energy Derived Concentration Guides for water ingestion in uncontrolled areas. Concentration of a specific radionuclide in water that could be continuously consumed at average annual rates and not exceed an effective dose equivalent of 100 millirems (mrem) per year.
e Department of Energy Derived Concentration Guides for drinking water systems. Concentration of a specific radionuclide in water that would produce an effective dose equivalent of 4 mrem/year if consumed at average annual rates.
f MCO-5B is a duplicate sample of MCO-5.
g LADD is a duplicate sample of LAOI(a)-1.1.
h 18-MW-27 is a duplicate sample of 18-MW-17.
i PAD-6.7A is a duplicate sample of PA-6.7.
j Buckman 11 is a duplicate sample of Buckman 1 (collected on 8/16/01).
k Dissolved samples were field filtered.
l TechLaw collected the samples for Tritium in dedicated containers and did not field filter them.

-- No Uncertainty Data
BDL Below Detection Limit.
NA Not Analyzed.
NE Not Established.

**TABLE 13: Summary of Preliminary Analytical Results for Water Samples - Explosives**
**Los Alamos National Laboratory, New Mexico**

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | Ancho Canyon | | | Drinking Water Production Wells | | | | | TA-3 Building SM-30 | Pajarito Canyon (TA-18) | | | | | | |
| | EPA MSSL[a] | DT-5A (8/8/01) | DT-9 (8/7/01) | DT-10 (8/8/01) | PM-1 (8/8/01) | PM-2 (8/8/01) | PM-3 (8/8/01) | PM-4 (8/8/01) | PM-5 (8/8/01) | 03-MW-1 (8/15/01) | 18-BG-1 (8/13/01) | 18-MW-7 (8/13/01) | 18-MW-8 (8/13/01) | 18-MW-9 (8/14/01) | 18-MW-10 (8/14/01) | 18-MW-11 (8/14/01) | 18-MW-12 (8/14/01) |
| Cyclonite (RDX) | 0.61 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | **0.86** | BDL | BDL | BDL | BDL | BDL |
| 1,2-Dinitrobenzene | 15 | 0.43 | BDL | BDL | 0.47 | 0.44 | 0.93 | 0.41 | 0.46 | 0.39 | 0.42 | 0.44 | 0.45 | 0.82 | 0.51 | 0.68 | 0.45 |
| Octahydro-1357-tetranitro-1357-tetrazocine (HMX) | 1,800 | BDL | 0.46 | 0.94 | BDL | BDL | BDL | BDL | BDL | BDL | BDL | 0.69 | BDL | BDL | BDL | BDL | BDL |

| Compound | Sample Location, Result, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | Pajarito Canyon (TA-18) | | | | Springs and Surface Water( Pajarito Canyon) | | | | | QA/QC | |
| | EPA MSSL[a] | 18-MW-16 (8/14/01) | 18-MW-17 (8/15/01) | 18-MW-18 (8/15/01) | 18-MW-27[b] (8/15/01) | PA 6.7 (8/9/01) | PAD 6.7A[c] (8/9/01) | PA 10.6 (8/9/01) | Threemile Spring (8/13/01) | TA-18 Spring (8/13/01) | EQ-1 (Equipment Rinsate) (8/16/01) | FB-01 (Field Blank) (8/15/01) |
| Cyclonite (RDX) | 0.61 | BDL | BDL | BDL | BDL | 0.3 | 0.3 | BDL | BDL | BDL | BDL | BDL |
| 1,2-Dinitrobenzene | 15 | 0.46 | 0.5 | 0.44 | 0.46 | 0.45 | 0.46 | 0.39 | 0.45 | 0.48 | 0.48 | 0.48 |
| Octahydro-1357-tetranitro-1357-tetrazocine (HMX) | 1,800 | BDL | BDL | BDL | BDL | 0.57 | 0.57 | BDL | 0.49 | 0.21 | BDL | BDL |

* All results are reported in micrograms per liter (µg/l). All samples were analyzed for total explosives, unless otherwise indicated. All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed federal reference concentrations are marked in bold and shaded. No EPA Maximum Contaminant Levels (MCL), New Mexico MCLs, or New Mexico Water Quality Control Commission standards have been established for the detected compounds.

a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for chemicals in tap water (June 1999).
b Duplicate of 18-MW-17.
c Duplicate of PA-6.7.

BDL Below Detection Limit

## TABLE 14: Summary of Preliminary Analytical Results for Sediment/Soil Samples - Polychlorinated Biphenyls
## Los Alamos National Laboratory, New Mexico

| Compound | Sample Location, Result, and Date Collected | | | | | | |
|---|---|---|---|---|---|---|---|
| | Reference | | Acid Canyon | | | | |
| | EPA MSSL[a] | | | | | | |
| | Industrial | Residential | PU-10284 (11/02/01) | PU-10285 (11/02/01) | PU-10286 (11/02/01) | PU-110286[b] (11/02/01) | AC-01[c] (11/02/01) |
| Araclor-1242 | 930 | 220 | 124 (DF 20) | BDL | BDL | BDL | BDL |
| Araclor-1254 | 13,000 | 1,100 | 600 (DF 20) | 168 (DF 20) | 114 (DF 20) | 93.4 (DF 20) | BDL |
| Araclor-1260 | 930 | 220 | **237 (DF 20)** | 57.2 J (DF 20) | BDL | BDL | BDL |
| 4cmx | NE | NE | 7.6 P (DF 20) | 5.3 (DF 20) | 6 (DF 20) | 6 (DF 20) | 5.3 (DF 10) |
| Decachlorobiphenyl | NE | NE | 5.5 (DF 20) | 4.9 (DF 20) | 5.4 (DF 20) | 5.3 (DF 20) | 5.5 (DF 10) |

* All results are reported in micrograms per kilogram (µg/kg). All samples were collected 1 to 3 inches below ground surface. Results that exceed state or federal reference concentrations are marked in bold and shaded.

a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for soil (ingestion, inhalation, and dermal exposure routes) - outdoor industrial worker and residential scenarios.
b PU-110286 is a duplicate sample of PU-10286.
c AC-01 was collected to determine background conditions in Acid Canyon.

BDL Below Detection Limit
DF Dilution Factor
NE Not Established

J The reported value is estimated.
P Greater than 25% difference between the two GC columns.

**TABLE 15: Summary of Preliminary Analytical Results for Sediment/Soil Samples - TAL Metals**
**Los Alamos National Laboratory, New Mexico**

| Analyte | Sample Location and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | EPA MSSL[a] | | LANL Background[b] | Acid Canyon | | | | | Sandia Canyon | | |
| | Industrial | Residential | | PU-10284 (11/02/01) | PU-10285 (11/02/01) | PU-10286 (11/02/01) | PU-110286[c] (11/02/01) | AC-01[d] (11/02/01) | 3-056AA (8/10/01) | 3-056(C) (8/10/01) | 3D-056(C)[e] (8/10/01) |
| Aluminum | 100,000 | 76,000 | 15,400 | 3,270 | 3,020 | 4,180 | 4,220 | 7,590 | 4,890 | 5,300 | 6,470 |
| Antimony | 510 | 31 | 0.83 | 0.505 N | 0.537 N | 0.546 N | 0.54 N | 0.522 N | BDL | BDL | BDL |
| Arsenic | 2 | 0.39 | 3.98 | **1.29** | **1.21** | **2.37** | **1.54** | **2.7** | **2.73** | **2.63** | **2.93** |
| Barium | 83,000 | 5,400 | 127 | 19.2 N | 26.1 N | 42.4 N | 52.5 N | 90.7 N | 34.8 | 29.8 | 25.1 |
| Beryllium | 2,400 | 150 | 1.31 | 0.386 B | 0.328 B | 0.466 B | 0.362 B | 0.583 | 0.48 B | 0.38 B | 0.37 B |
| Cadmium | 630 | 39 | 0.4 | **0.689** | **0.65** | **0.404 B** | 0.395 B | BDL | BDL | BDL | BDL |
| Calcium | NE | NE | 4,420 | 961 N | 1,510 N | 2,040 N | 2,280 N | 1,610 N | 2,210 | 1,340 | 1,320 |
| Chromium | 560 | 210 | 10.5 | **13 N** | 10.2 N | 5.87 N | 6.06 N | 5.85 N | 5.91 | 4.74 | 4.77 |
| Cobalt | 30,000 | 3,400 | 4.73 | 1.37 | 1.46 | 2.1 | 2.75 | 3.61 | 1.82 | 1.9 | 1.81 |
| Copper | 47,000 | 2,900 | 11.2 | **13.9 N** | 7.11 | **14.1 N** | 5.94 N | 4.57 N | 5.25 | 3.61 | 3.41 |
| Iron | 100,000 | 23,000 | 13,800 | 6,360 | 5,170 | 7,830 | 7,320 | 10,000 | 8,510 | 9,890 | 10,700 |
| Lead | 2,000 | 400 | 19.7 | **71.2 N** | **28.2 N** | **30.3 N** | **21.2 N** | 15.5 N | 16.9 | 11.4 | 11.6 |
| Magnesium | NE | NE | 2,370 | 721 N | 645 N | 802 N | 1,310 N | 1,180 N | 985 N | 1,000 N | 1,050 N |
| Manganese | 40,000 | 3,200 | 543 | 120 | 201 | 239 | 225 | 379 | 148 | 115 | 92.2 |
| Mercury | 380 | 23 | 0.1 | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | 26,000 | 1,600 | 9.38 | 5.51 | 4.03 | 4.28 | 6.36 | 4.78 | 4.02 | 3.64 | 3.88 |
| Potassium | NE | NE | 2,690 | 469 N | 414 N | 524 N | 506 N | 1,150 N | 816 EN | 819 EN | 834 EN |
| Selenium | 6,400 | 390 | 0.3 | BDL | BDL | **0.403 B** | BDL | BDL | BDL | BDL | BDL |
| Silver | 6,400 | 390 | 1 | **5.6** | 0.639 | 0.534 B | 0.425 B | BDL | 0.39 | BDL | BDL |
| Sodium | NE | NE | 1,470 | 79.3 E | 76.2 E | 92.6 E | 89.6 E | 74.8 E | 112 | 117 | 123 |
| Thallium | NE | NE | 0.73 | BDL | BDL | BDL | BDL | BDL | **1.7** | **1.15** | **0.92 B** |
| Vanadium | 8,900 | 550 | 19.7 | 8.78 | 6.19 | 10.1 | 11.2 | 14.8 | 7.27 | 8.4 | 9.21 |
| Zinc | 100,000 | 23,000 | 60.2 | 59.1 N | 46.4 N | 44.9 N | 38.3 N | 30.7 N | 45.2 | 43.2 | 43.1 |

## TABLE 15: Summary of Preliminary Analytical Results for Sediment/Soil Samples - TAL Metals
## Los Alamos National Laboratory, New Mexico

All results reported in milligrams per kilogram (mg/kg). All samples have a dilution factor of 2. All samples were collected from 1 to 3 inches below ground surface. Results that exceed LANL background or federal reference concentrations are marked in bold and shaded.

a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for soil (ingestion, inhalation, and dermal exposure routes) - outdoor industrial worker and residential scenarios.
b Los Alamos National Laboratory background concentrations.
c PU-110286 is a duplicate sample of PU-10286.
d AC-01 was collected to determine background conditions in Acid Canyon.
e 3D-056(C) is a duplicate sample of 3-056(C).

NA Not Analyzed.
NE Not Established.
BDL Below Detection Limit.

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
E The reported value is estimated because of the presence of interference.
N The laboratory-spiked sample recovery for this particular analyte is not within control limits.

**TABLE 16: Summary of Preliminary Analytical Results for Sediment/Soil Samples - Radionuclides***
**Los Alamos National Laboratory, New Mexico**

| Parameter | References | | | Acid Canyon | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EPA PRG Commercial | EPA PRG Residential | LANL Background* | PU-10284 (11//2/01) | | PU-10285 (11//2/01) | | PU-10286 (11//2/01) | | PU-110286[b] (11//2/01) | | AC-01[a] (11//2/01) | |
| | | | | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty | Result | Uncertainty |
| **Gas Proportional Counting** | | | | | | | | | | | | | |
| Strontium-90 | 57 | 14 | 1.04 | 0.64 | 0.284 | 0.525 | 0.232 | BDL | -- | BDL | -- | BDL | -- |
| **Alpha Spectrometry** | | | | | | | | | | | | | |
| Americium-241 | 7.5 | 1.9 | 0.04 | **16.3** | 2.31 | 14.4 | 2.25 | **2.6** | 0.666 | **1.64** | 0.544 | BDL | -- |
| Plutonium-238 | 11 | 2.7 | 0.006 | **1.59** | 0.295 | **1.22** | 0.264 | **0.284** | 0.141 | **0.196** | 0.199 | **0.053** | 0.0533 |
| Plutonium-239/240 | 10 | 2.5 | NE | 351 | 36.2 | 325 | 34.1 | 43.6 | 5.23 | 30.6 | 5.28 | 0.783 | 0.228 |
| Plutonium-244 | | | NE | 0.48 | 0.147 | 0.169 | 0.104 | BDL | -- | BDL | -- | 0.119 | 0.0805 |
| Uranium-233/234 | | | NE | 1.85 | 0.329 | 2.89 | 0.437 | 1.76 | 0.341 | 1.22 | 0.266 | 1.23 | 0.268 |
| Uranium-235/236 | | | NE | 0.119 | 0.0801 | 0.0826 | 0.0621 | BDL | -- | BDL | -- | BDL | -- |
| Uranium-238 | 73 | 18 | 2.29 | 1.14 | 0.243 | 1.47 | 0.279 | 1.15 | 0.261 | 0.874 | 0.221 | 1.13 | 0.256 |
| **Gamma Spectrometry** | | | | | | | | | | | | | |
| Actinium-228 | | | NE | 0.989 | 0.25 | 1.05 | 0.227 | 1.54 | 0.411 | 1.22 | 0.336 | 1.22 | 0.298 |
| Americium-241 | 7.5 | 19 | 0.04 | **7.9** | 0.865 | **5.12** | 0.854 | **1.04** | 0.147 | **0.885** | 0.136 | BDL | -- |
| Bismuth-212 | | | NE | 0.534 | 0.321 | 0.894 | 0.348 | 1.31 | 0.504 | 0.993 | 0.529 | 1.39 | 0.522 |
| Bismuth-214 | | | NE | 0.757 | 0.168 | 0.857 | 0.136 | 1.08 | 0.208 | 1.22 | 0.24 | 1.13 | 0.197 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **3.2** | 0.416 | **1.08** | 0.124 | **0.655** | 0.121 | **0.29** | 0.0878 | **0.281** | 0.0713 |
| Lead-210 | 3.2 | 0.78 | NE | BDL | -- | BDL | -- | 1.15 | 1.13 | BDL | -- | BDL | -- |
| Lead-212 | | | NE | 1.03 | 0.147 | 1.19 | 0.147 | 1.25 | 0.19 | 1.39 | 0.205 | 1.58 | 0.195 |
| Lead-214 | | | NE | 0.889 | 0.153 | 0.961 | 0.148 | 1.05 | 0.221 | 1.17 | 0.215 | 1.31 | 0.209 |
| Potassium-40 | 0.25 | 0.068 | 36.8 | 27 | 2.94 | 27.9 | 3.46 | 28 | 3.38 | **28.4** | 3.38 | 30.3 | 3.6 |
| Radium-228 | 13 | 3.2 | 2.33 | 0.989 | 0.25 | 1.05 | 0.227 | 1.54 | 0.411 | 1.22 | 0.336 | 1.22 | 0.298 |
| Thallium-208 | | | NE | 0.347 | 0.0712 | 0.354 | 0.0629 | 0.369 | 0.101 | 0.442 | 0.0912 | 0.471 | 0.0918 |
| Thorium-230 | | | 2.29 | 0.757 | 0.168 | 0.857 | 0.136 | 1.08 | 0.208 | 1.22 | 0.24 | 1.13 | 0.197 |
| Thorium-234 | | | 2.59 | 1.7 | 0.725 | BDL | -- | 1.34 | 0.975 | 1.84 | 0.849 | 1.41 | 1.42 |
| Uranium-238 | 73 | 18 | 2.29 | 1.7 | 0.725 | BDL | -- | 1.34 | 0.975 | 1.84 | 0.849 | 1.41 | 1.42 |

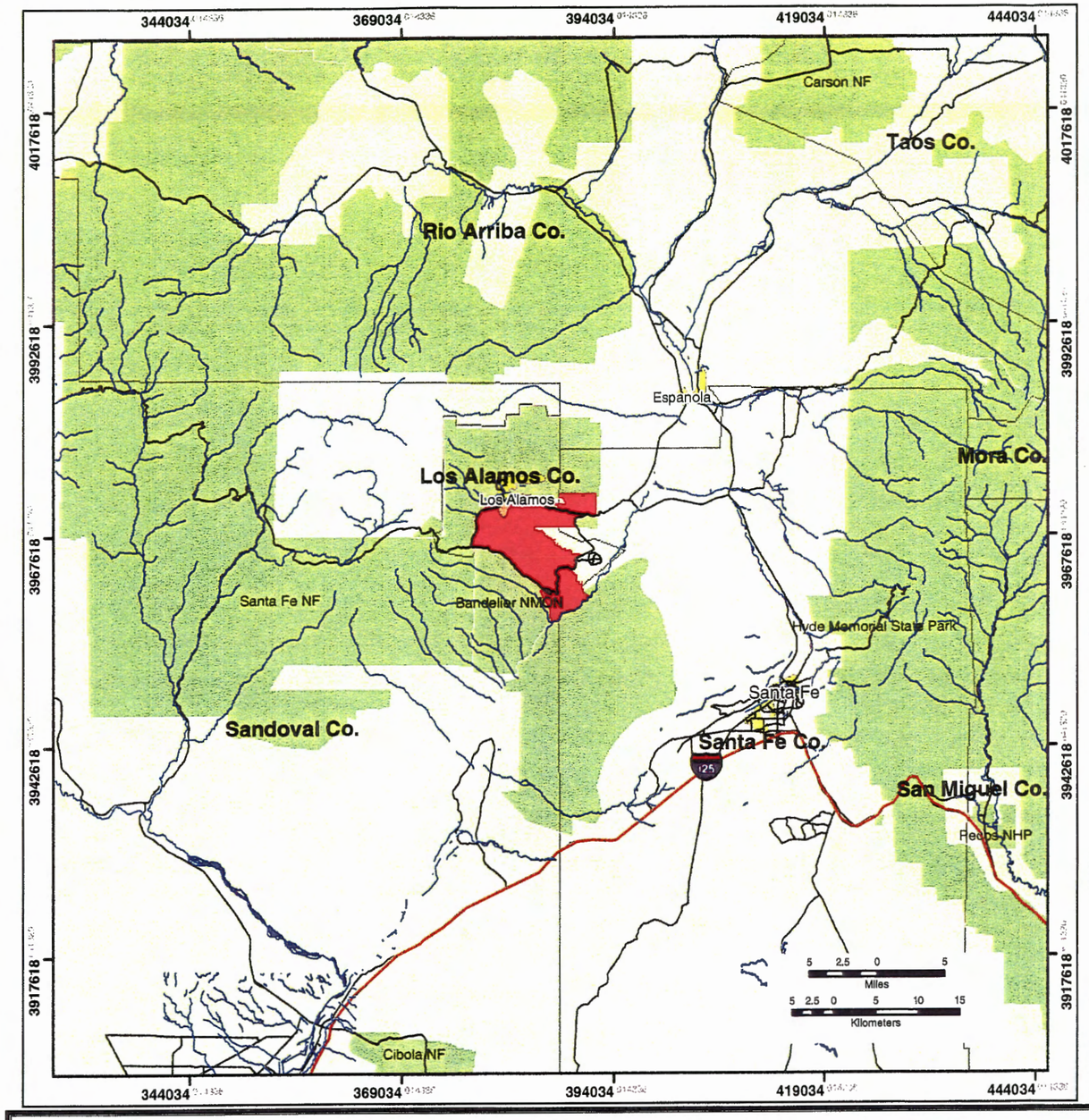
**TABLE 16: Summary of Preliminary Analytical Results for Sediment/Soil Samples - Radionuclides***
**Los Alamos National laboratory, New Mexico**
**(Continued)**

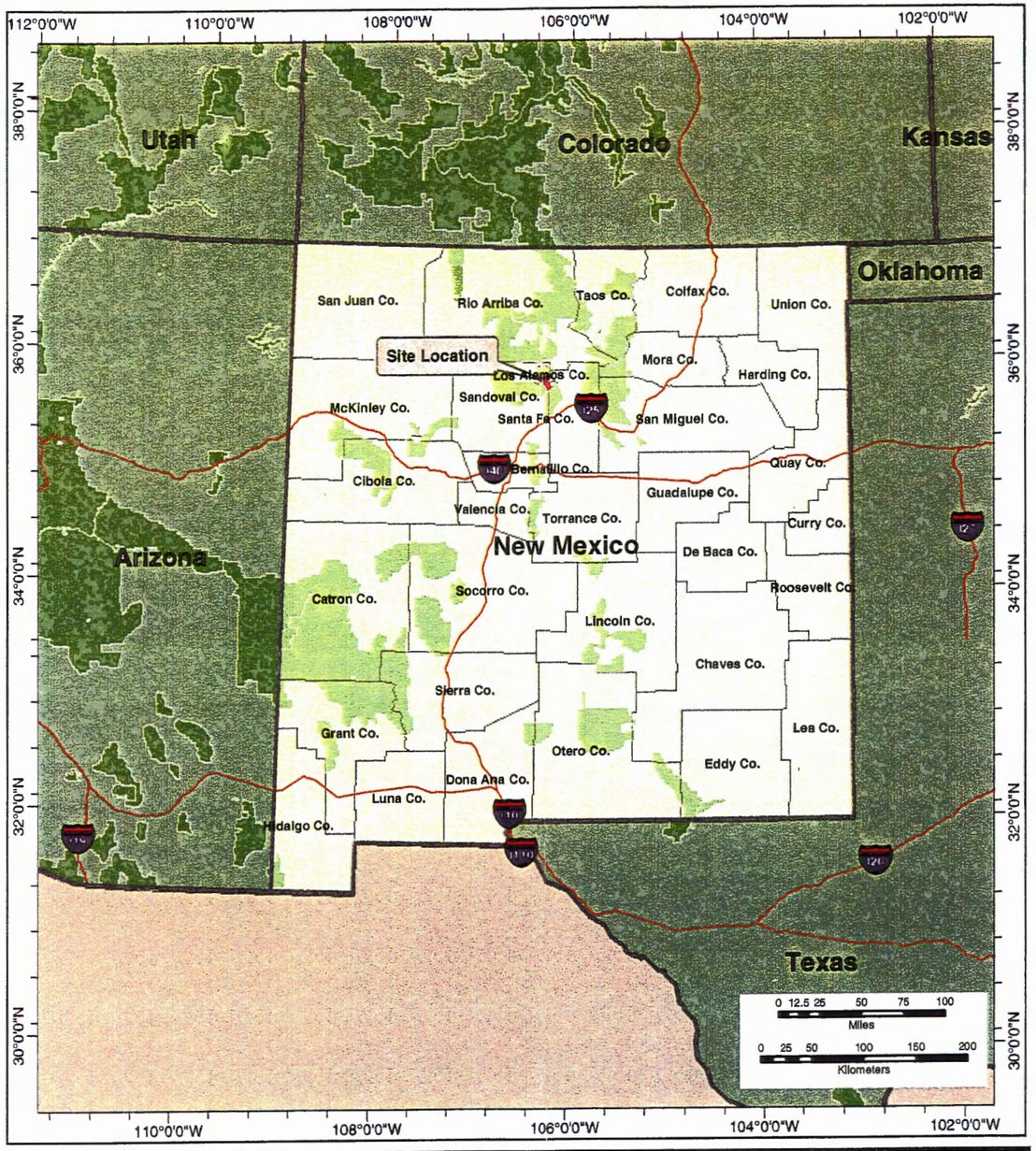
* All results are reported in pico Curies per gram (pCi/gram). All samples were analyzed for total radionuclides, unless otherwise indicated. All samples have a dilution factor (DF) of 1, unless otherwise indicated. Results that exceed LANL background reference concentrations are marked in bold and shaded.

a No state or federal reference values for radionuclides in sediment or soil.
b PU-110286 is a duplicate sample of PU-10286.
c AC-01 was collected to determine background conditions in Acid Canyon.

BDL Below Detection Limit.
NE Not Established.

# FIGURES



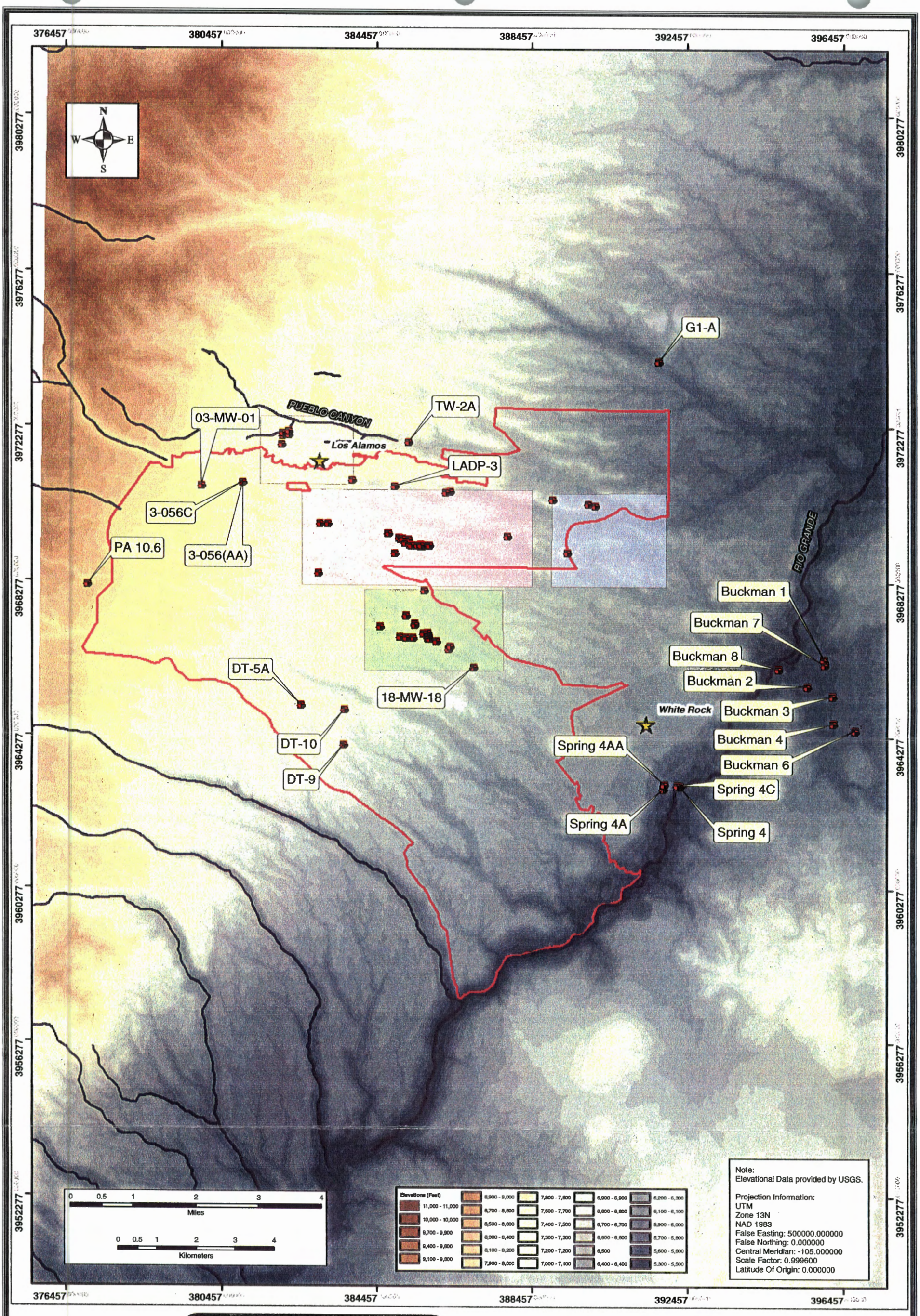




- Los Alamos National Laboratory
- Urban Areas
- Counties
- National Park or Forest
- Interstate Highways
- Roads
- Rivers

Figure 1
Site Location
2001 Sample Locations
Los Alamos National Laboratory

N
W E
S

Prepared By:
TechLaw, Inc.

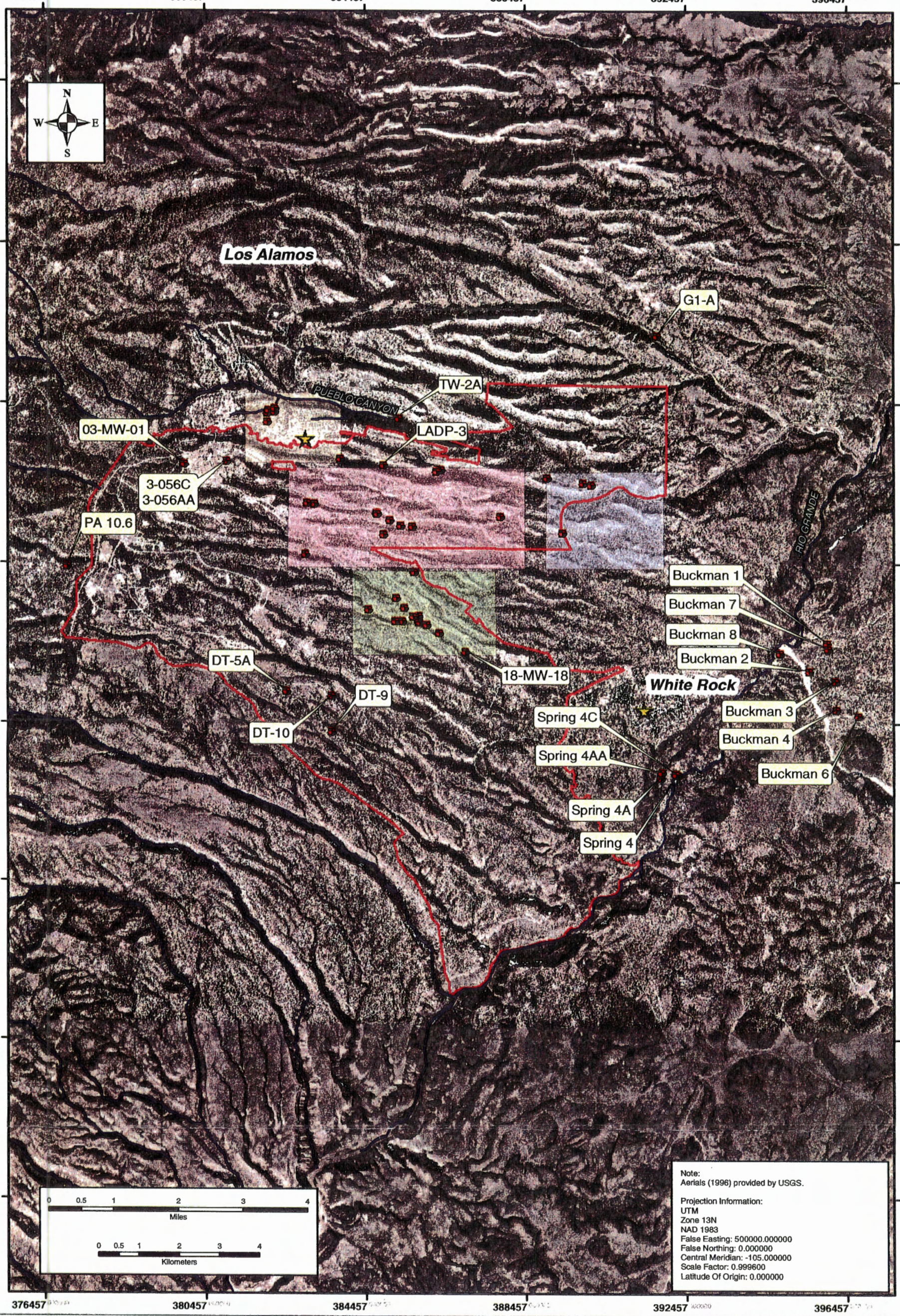



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Figure 2
Elevational Information
2001 Sample Locations
Los Alamos National Laboratory

Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities
See Figure 5
See Figure 6
See Figure 7
See Figure 8

Prepared By:
TechLaw, Inc.

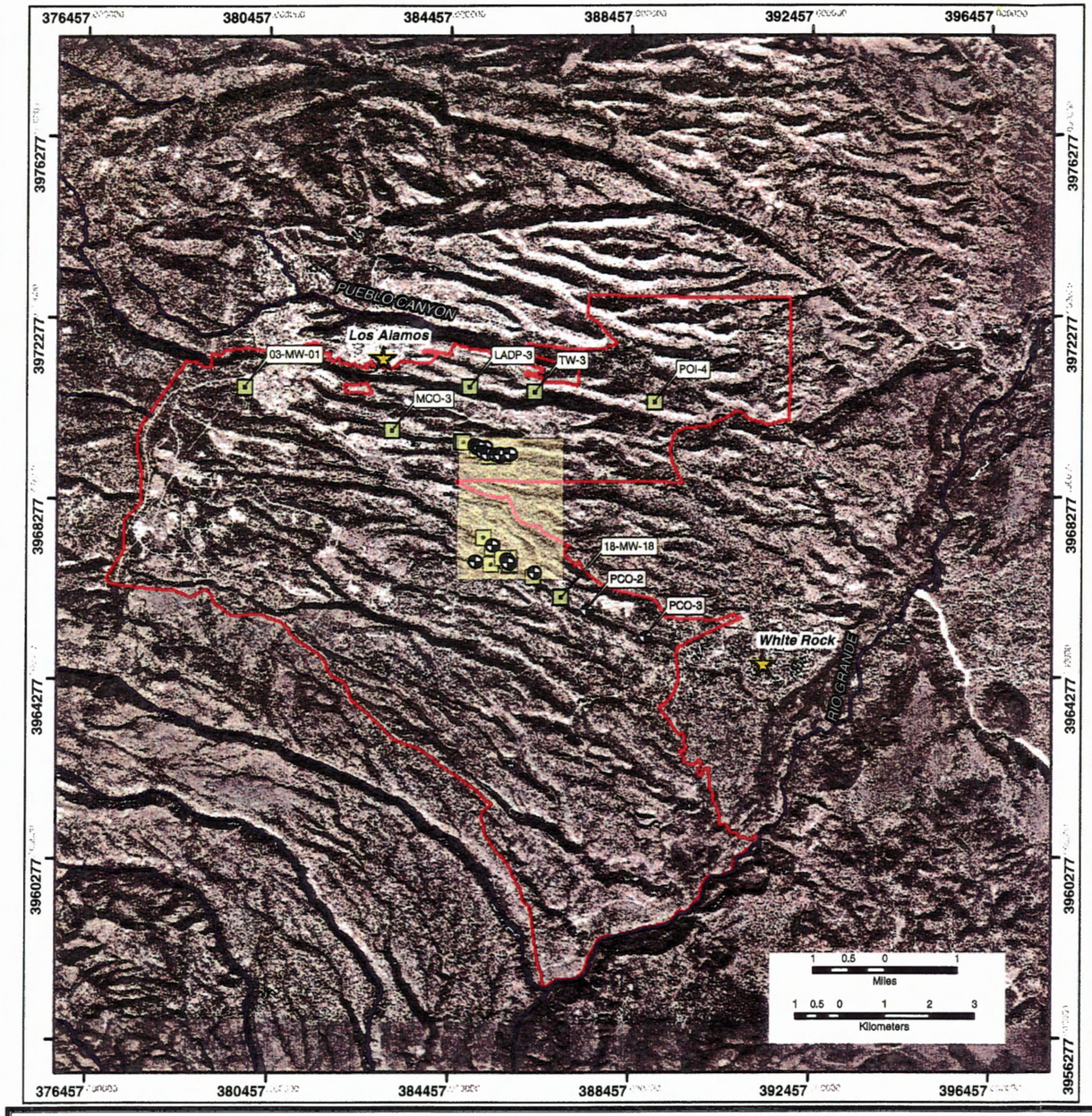


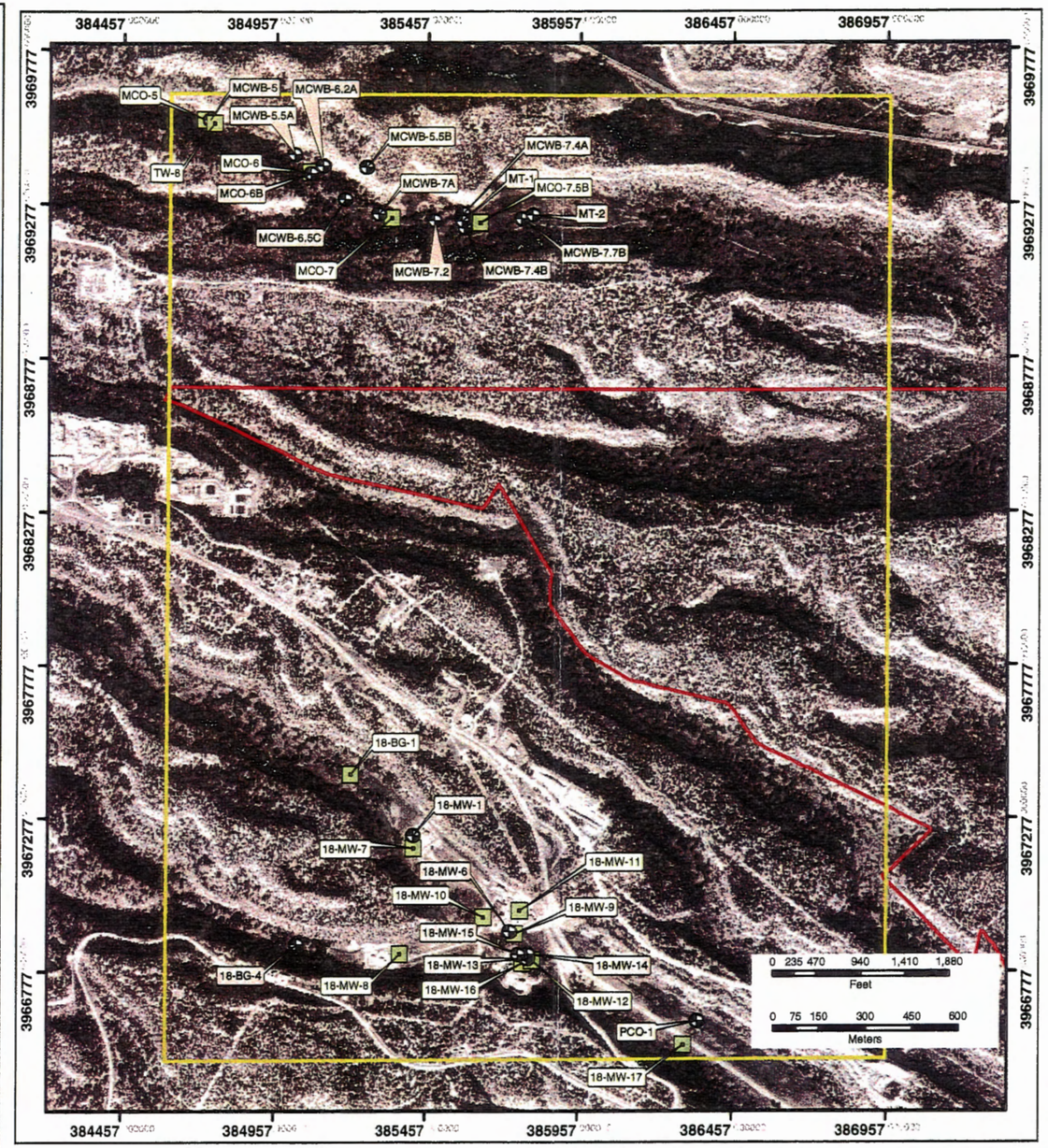

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Aerial View
Figure 3
2001 Sample Locations
Los Alamos National Laboratory

Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities
See Figure 5
See Figure 6
See Figure 7
See Figure 8

Prepared By:
TechLaw, Inc.




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

N W E S

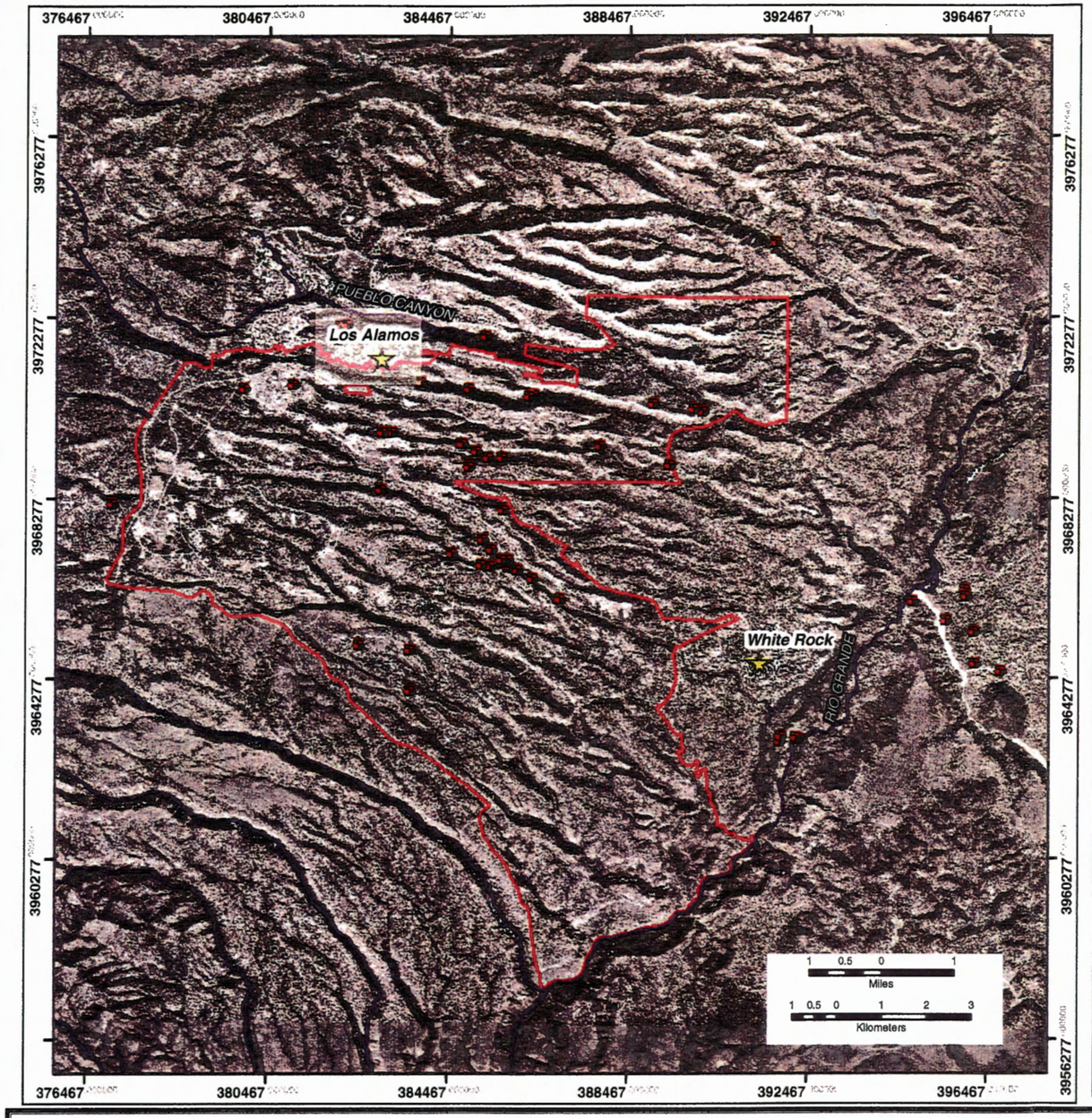
Aerial View
Figure 4
2001 Water Level Measurement
Los Alamos National Laboratory

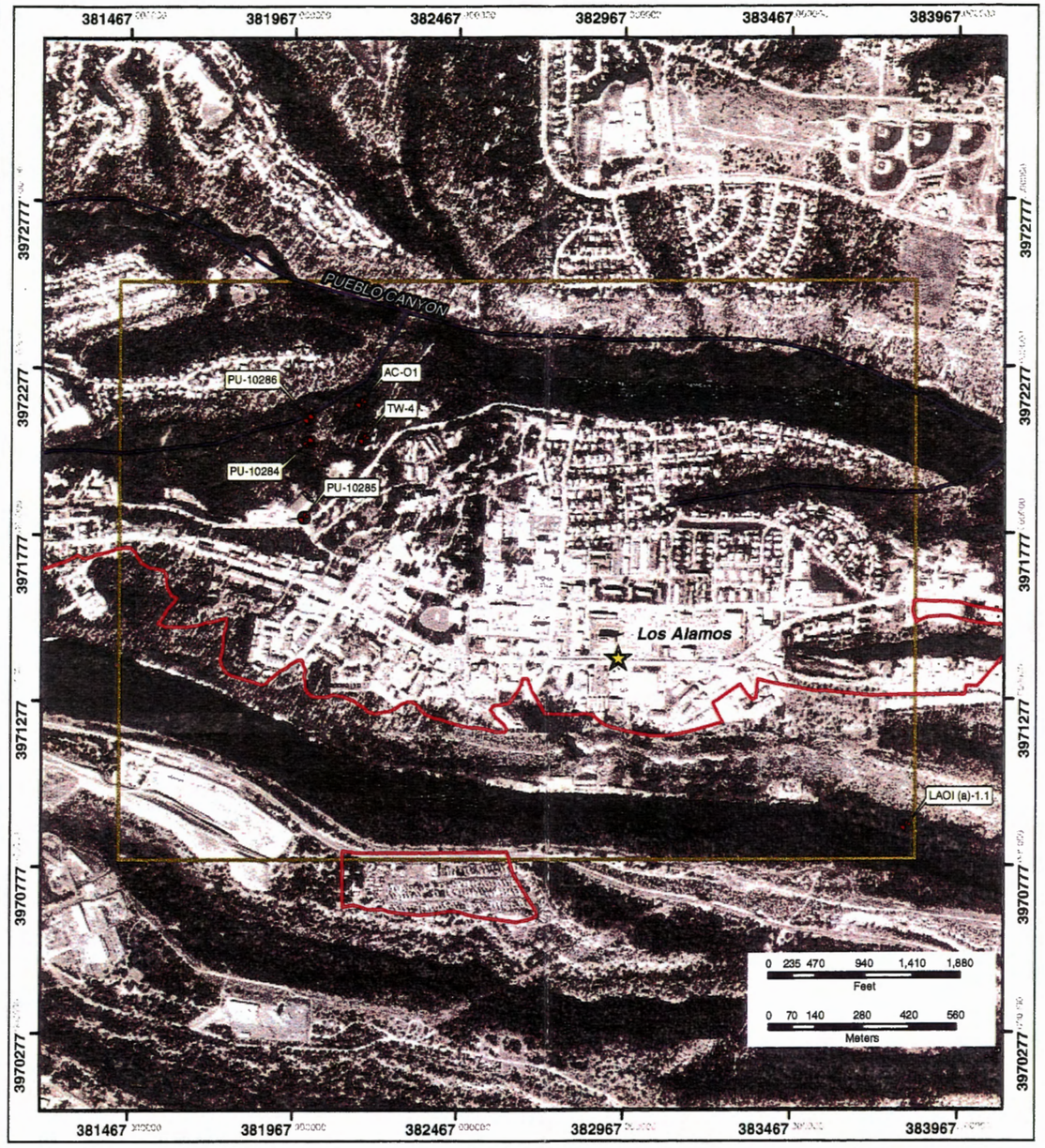
Los Alamos National Laboratory
**Sampled Aug./Oct. 2001**
Sample/Water Levels
Water Levels
Rivers
Cities

Note:
Aerials (1996) provided by USGS.

Projection Information:
UTM
Zone 13N
NAD 1983
False Easting: 500000.000000
False Northing: 0.000000
Central Meridian: -105.000000
Scale Factor: 0.999600
Latitude Of Origin: 0.000000

Prepared By:
TechLaw, Inc.




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

N W E S

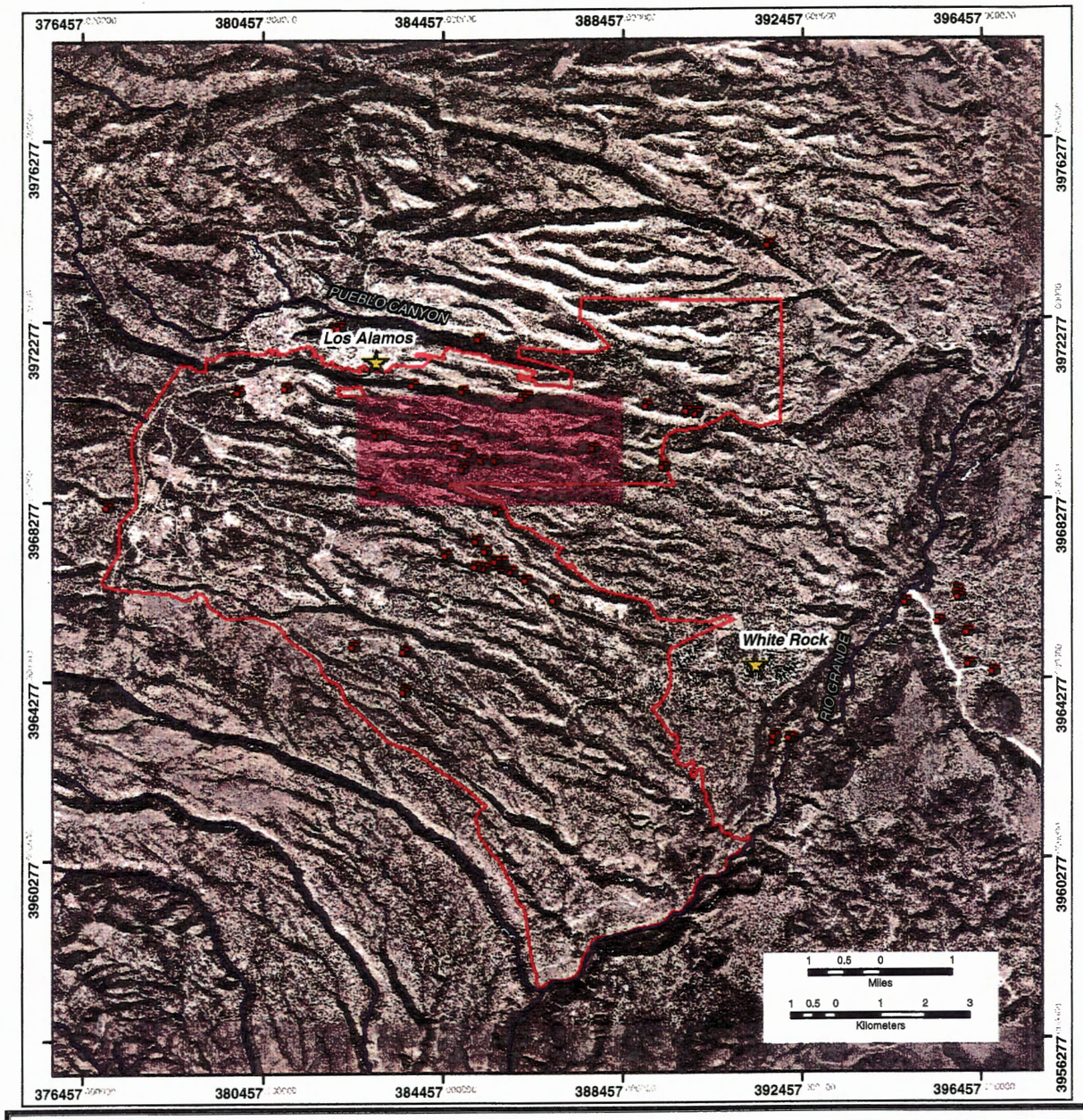
Aerial View
Figure 5
2001 Sample Locations
Los Alamos National Laboratory

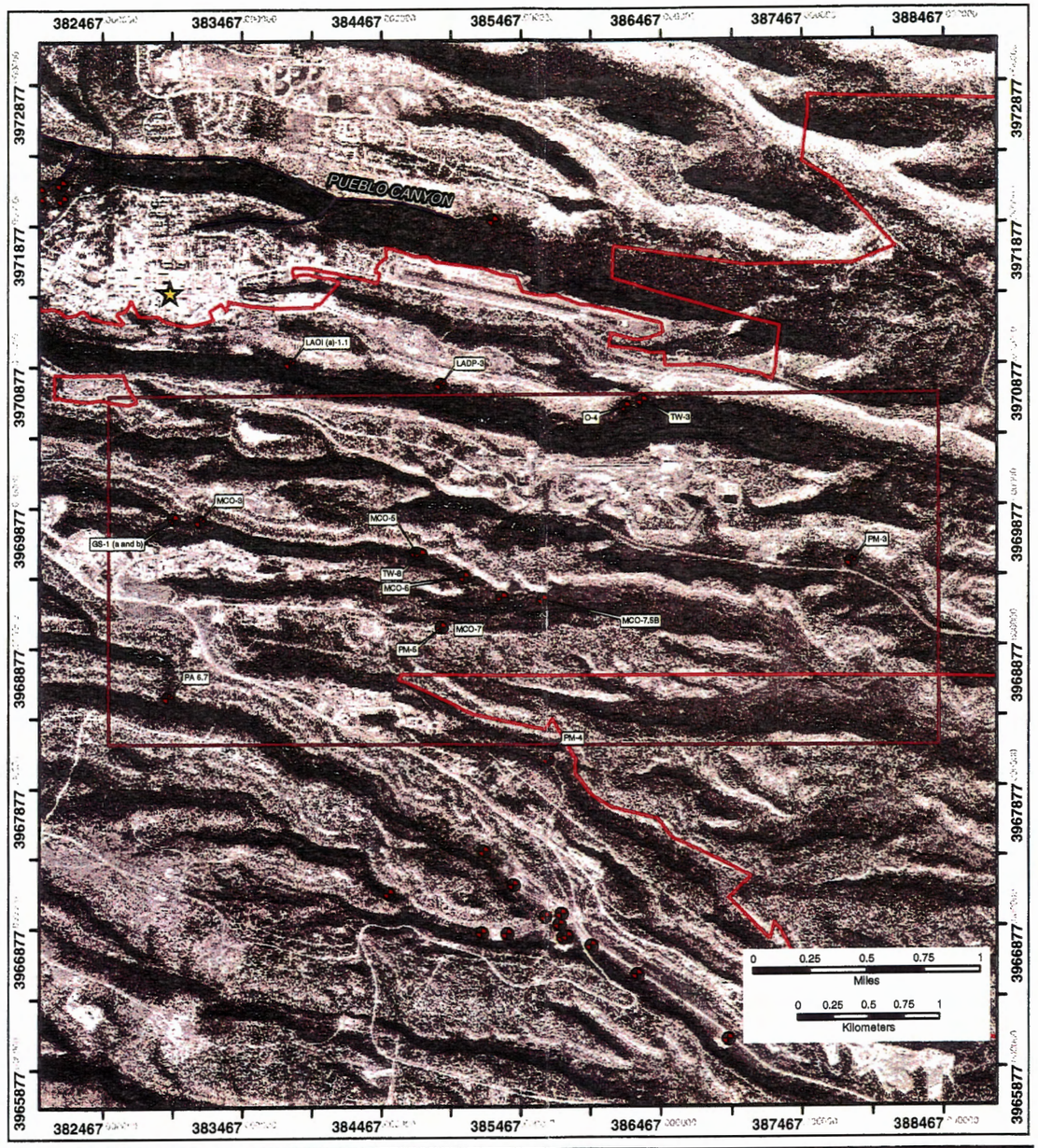
Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities

Note:
Aerials (1996) provided by USGS.

Projection Information:
UTM
Zone 13N
NAD 1983
False Easting: 500000.000000
False Northing: 0.000000
Central Meridian: -105.000000
Scale Factor: 0.999600
Latitude Of Origin: 0.000000

Prepared By:
TechLaw, Inc.



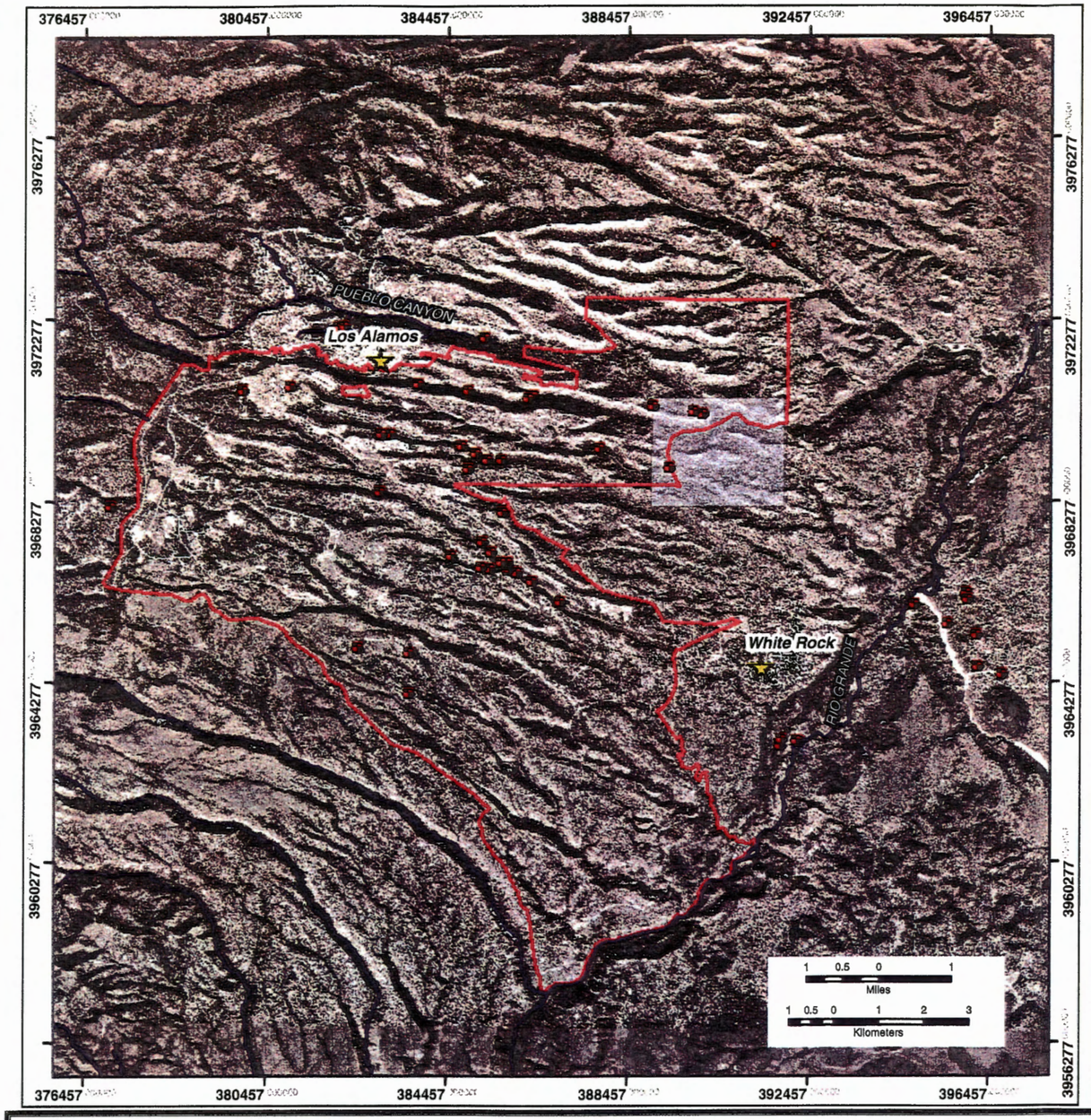

Aerial View
Figure 6
2001 Sample Locations
Los Alamos National Laboratory

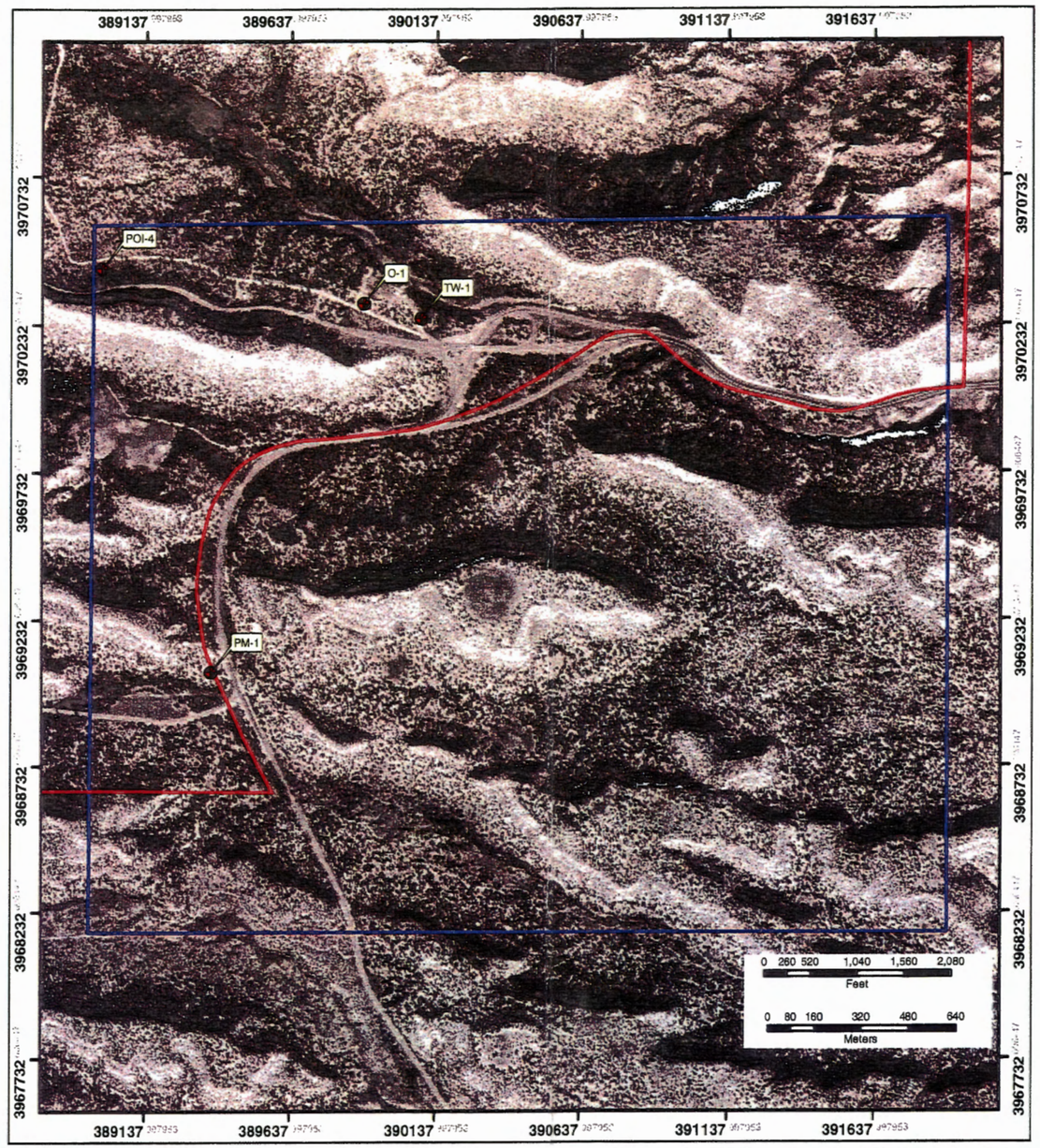
Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities

Note:
Aerials (1996) provided by USGS.

Projection Information:
UTM
Zone 13N
NAD 1983
False Easting: 500000.000000
False Northing: 0.000000
Central Meridian: -105.000000
Scale Factor: 0.999600
Latitude Of Origin: 0.000000

Prepared By:
TechLaw, Inc.



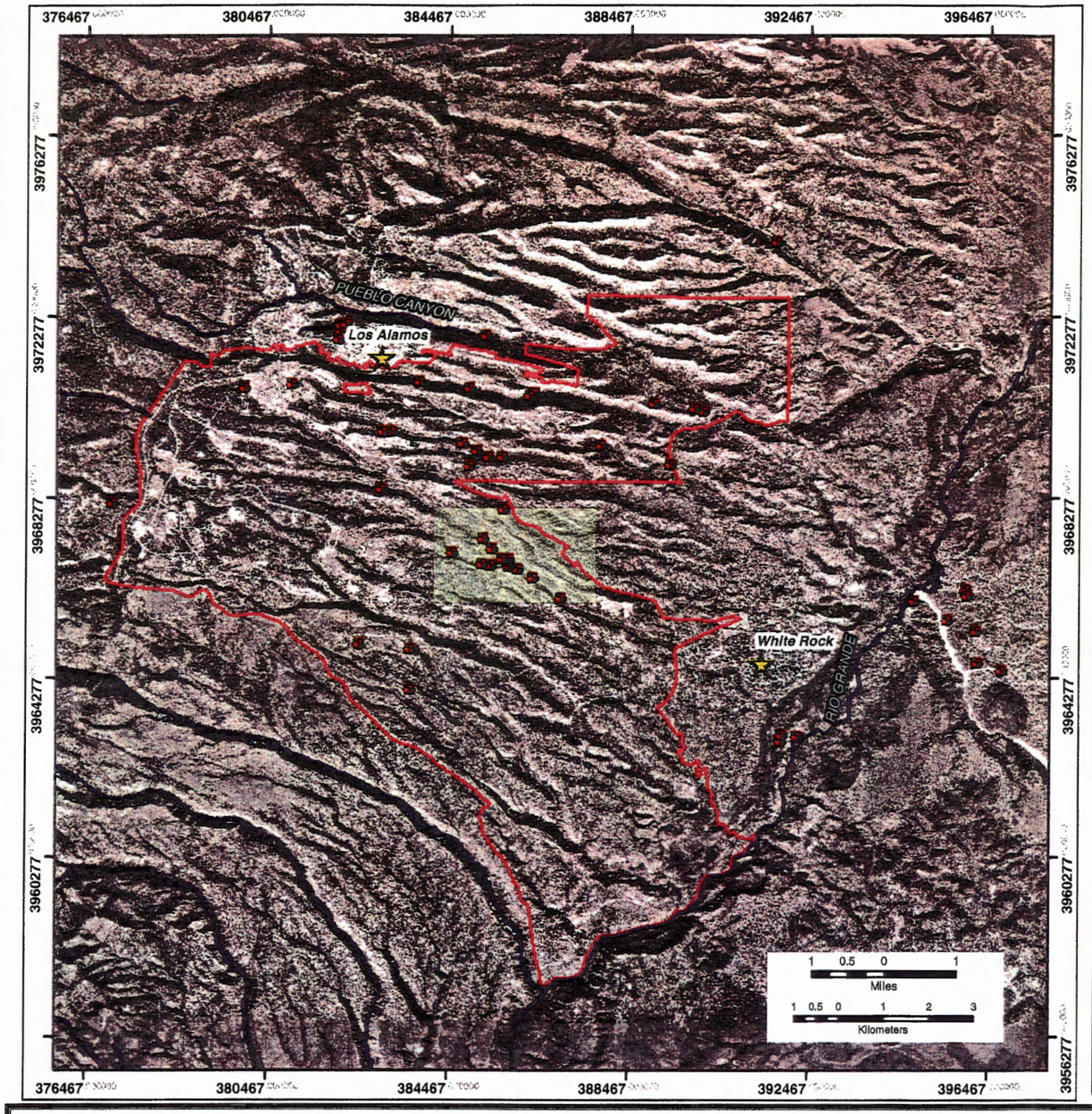

Aerial View
Figure 7
2001 Sample Locations
Los Alamos National Laboratory

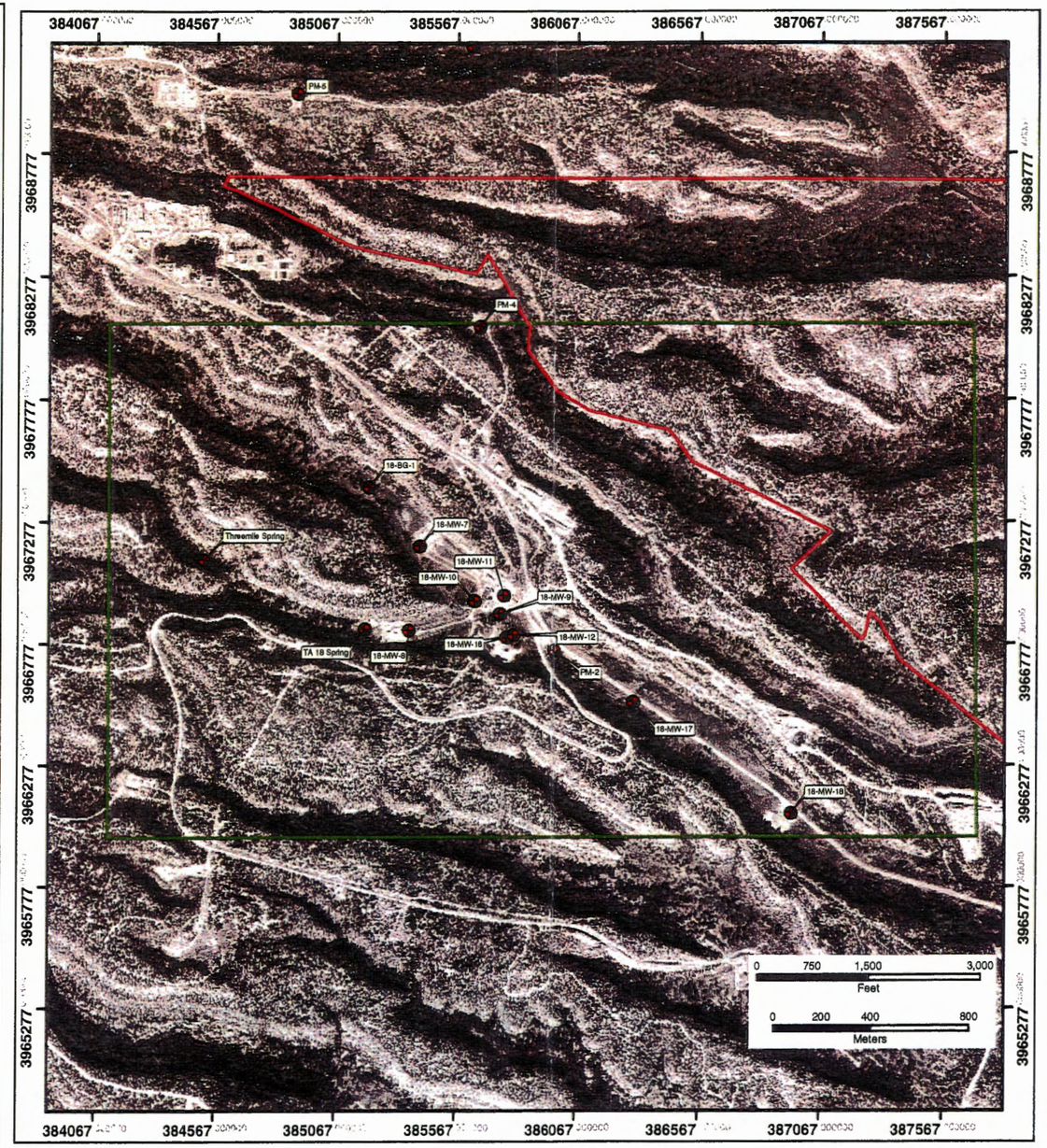
Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities

Note:
Aerials (1996) provided by USGS.

Projection Information:
UTM
Zone 13N
NAD 1983
False Easting: 500000.000000
False Northing: 0.000000
Central Meridian: -105.000000
Scale Factor: 0.999600
Latitude Of Origin: 0.000000

Prepared By:
TechLaw, Inc.




Aerial View
Figure 8
2001 Sample Locations
Los Alamos National Laboratory

Los Alamos National Laboratory
Sampled Aug./Oct. 2001
Rivers
Cities

Note:
Aerials (1996) provided by USGS.

Projection Information:
UTM
Zone 13N
NAD 1983
False Easting: 500000.000000
False Northing: 0.000000
Central Meridian: -105.000000
Scale Factor: 0.999600
Latitude Of Origin: 0.000000

Prepared By:
TechLaw, Inc.

Wally O'Rear 7/30/01

LANL
Los Alamos, NM

WA# R067X5
7/30/01

1058 Arrived @ TW-4

Temperature 80°F
Partly Cloudy, 0-3 mph wind

Sampling Team members included Kim Granzow, NMED
Wally O'Rear and Tami Engle,
Torch Lake, Inc. Max Maes
Nicholas Martinez, ESH 18

Flow Rate is 1 gallon per minutes

Sampling Time 11:00

Purging began @ 07:00 and was purged for 4 hours until 1100.
Turbity 15.5 mtu
Conductivity 67.7
PH 7.91
Temperature 15.5°C

Wally O'Rear 7/30/01

LANL
Los Alamos, NW

WA# R067X5
7/30/01

0

1058 Arrived @ TW-4

Temperature 80°F
Partly Cloudy, 0-3 mph wind

Sampling Team members included Kim Granzow, NMED
Wally O'Rear and Tami Engle, Torch Law, Inc. Max Maes
Nicholas Martinez, ESH 18

Flow Rate is 1 gallon per minutes

Sampling Time 11:00

Purging began @ 07:00 and was purged for 4 hours until 1100.
Turbity 15.5 mtu
Conductivity 67.7
PH 7.91
Temperature 15.5°C

[illegible] 7/30/01



LANL WA# R06745

Los Alamos, NM 7/30/01

Samples consisted of:
Major Anions, TDS, TSS, 23 TAL Metals, DNT, Dissolved trace metals, Total Radio nuclides, Tritium perchlorate, Total CN, $NO_23$, VOC, DOC, TOC

Sampling began @ 11:05

GPS is 30° 53 min 08 sec N
106° 18 min 19 sec W

NMED collected parameters
pH 7.54 @ 16.2°C
Sp Cond. 138.5 ms/cm

Photo 1, Film Roll #1 Photo by T. Engle
Direction N Witness W. O'Rear
11:27 AM
Photo of Well Test Well 4 showing pipe of discharge and sampling bottles.

Dissolved metals & TAL metals & D[illegible] filtered

06

7/30/01

LANL WA*R067 0

Los Alamos, NM 7/30/01

Water was Clear.

1158 completed sampling

1207 Left TW-4

1228 arrived at TW-3

Wind 10-20 mph

Partly Cloudy

Temp 80°F

10" well depth of well is 815' water level 785'

Sampling Team included:

Wally O'Rear, Tami Engle,

Techlaw, Inc. and

Max Mares & Nicholas Martinez,

ESH18

Started purging @0850

2 gallon per minute Flow rate

1242 Turbidity 10.6 NTU

PH 7.642

Conductance 87.0 ms/L

Temp. ~~22.6~~ °C 21.9°C

GPS 35° 52' 23.8" N

106° 15' 32.6" W

7/30/01



LANL WA# R06745
Los Alamos, NM 7/30/01

Sample time is 1242
Sample No. TW-3

Sample for Major Anions, TDS, TSS, 23 TAL Metals, DNT, Dissolved Trace metals, Total Radionuclides, Tritium, perchlorate, Total CN, $NO_{23}$, VOC, DOC, TOC.

The samples for dissolved metals, TAL metals & DOC ~~other~~ were filtered.

Completed sampling @ 1305 for TW-3

Photo 2 Film ~~SITE~~ 1 July 30, 2001
W 1303 Photo by T. Engle
Witness: W. O'Rear

View of TW-3 showing water draining from pipe.

Depart Tw-3 at 1312.

7/30/01



LANL
Los Alamos

WA# R06745
7/30/01

1339 Arrived @ TW-2A

1342 Photo #3 Roll #1
Looking NE
Photo of test well #2A

The well was not purged due to inadequate level of water and the recharge rate is very slow.

Well depth is
Water level is

GPS reading N 35°53 min 05.3 sec.
W 106°16 min 15.6 sec

Sampling Time: 1400

Sampling for Major Anions, TDS, TSS, 23 TAL Metals DNT, Dissolved trace metals, Total Radio Nuclides, Tritium, perch' ter,

7/30/01



LANL WA# R06745
Los Alamos, NM 7/30/01
Total CN, $NO_3$, UOC, DOC, TOC
Nitrogen Isotopes
Sampling Started @ 1355

The well went dry and the team waited for 30 minutes and collected more. The well went dry again.

The concrete pad is in poor condition.

1450 Tried again to collect samples. It was dry.

The decision was to collect the sample from TW-8 then ~~compa~~ come back to TW-2A and finish the sample

1510 left TW-2A
1545 arrived @ TW-8

7/30/01



LANL WA# R06743
Los Alamos, Nm 7/30/01

1345 Photo 4 Roll #1
N - Looking
Photo of Well TW-8

Depth of Well ~~998'~~ 1065'
Water Level 998
2 gallons per minute purge rate
Started purging @ 0800
8" well

1550 Sample time

Sampling Team members
are Wally O'Rear of Tami
Engle Technology and
Max Maes & Nicholas Martinez
ESH18

GPS N 35° 51 min 47.8 inches
W 106° 16 min 35.3 inches

1555 Conductivity 67.6 Temp 20.9°C
Tribidity 0.8
pH 7.93

7/30/01



LANL WA#R06745
Los Alamos, NM 6/30/01
Started sampling @ 1600
Completed Sampling @ 1610

Sampled for Major Anion, TDS, TSS, 23 TAL Metals, DNT, Dissolved Trace metals, Total Radio Nuclides, Tritium perchlorate, Total CN, $NO_2$, VOC, DOC, TOC

Left TW-8 @ 1615

Arrived @ PC-01 1652

1653 Photo 5 Roll #1
Looking West
Photo of PC-01 Following the removal of the cap from the mw

Water Level 6'11"
4 inch ~~well~~ @ Well
15'9" Total depth of Well
Left Well @ 1700

7/30/01



LANL WA# R06745
Los Alamos 7/30/01

1705 Arrived @ PC-02

Well depth
10'2" Maybe 6 inches of
water!
4 inch well

at FM81
GPS 35° 49 min 48 inch N
106° 14 min 44 sec. W

Left well @ 1715

1735 Arrived back TW-2A to
complete sampling
It is raining.
Temperature 70°F

1745 starting sampling could not
collect enough again.
Wes doesn't think it will be
any better tomorrow.

Tomorrow morning we will

1 ANL WA# R06745

Los Alamos, NM 7/30/01

Sampling TW-1 and then talk to Steve Phillips, Technical for further direction on TW-02A. We still need VOC's & $NO_3$

1800 Left TW-2A

1815 arrived @ TW-1

1817 began pumping water

The well is 8" in diameter
The well water 505'
total depth 642'

1820 water began a
Water is slightly brown

2 gallons a minute water flow
time 1823 Initial Reading.
Turbidity -58.9 EC pH 8.074
Conductivity 195.8 Temp 2 2°C

7/30/01

7/30/01



LANL WA# R06745
Los Alamos 7/30/01
GPS reading
N 35°52 min 13.5 sec
W 106°13 min 03.4 sec.

Well need 8.7 hours to
Complete purging

Left well @ 1827

7/30/01

LANL WATER06745
Los Alamos, NM 7/31/01
0900 Arrive @ TW-2A
Attempting to complete the
Sampling
Clear skies
Temp 70°F
Wind 3-5 mph

Sampling Team members
include Wally O'Rear, Technician, Kim
Granzow, NMED, Max Maes,
and Nicholas Martinez
Color of water light brown
0908 Attempted to
complete the sampling @
TW2A. Still not enough water
Notified Debra Pandak about water problem
0945 Left TW-2A
1002 Arrived @ TW-1

Samples will be for Major
Anions, TDS, TSS, 23 TAL Metals,
DNT, Dissolved Trace Metals,
Total Radionuclides, Tritium, TOC
perchlorate, Total CN, $NO_{2,3}$ VOC+DOC,

Jan A Gad
7/31/01

7/31/01



LANL WA#R067415

Los Alamos, NM 7/31/01

Sampling Team consists of Wally O'Rear, TechLaw, Kim Granzow, NMED, Max Maes, and Nicholas Martinez, ESH18

Partly Cloudy
80°F

1012 Photo of Test Well #1
Photo #6 Roll #1
Looking NE

Parameters are
Turbidity @ ~~5.2~~ 4.7 Temp 15.4°C
Conductivity 195.8
pH ~~8.~~ @ 8.05

Sampling Time is 1025
~~Started~~ Sampling 1023
Completed Sampling @ 1038

1100 left facility

1237 arrived @ MC-02

LANL WA# R06745
Los Alamos, NM 7/31/01
CPS 35° 51 min 54.1 sec N
106° 17 min 56.1 sec W

depth to Water
Well depth

The water level is below
the pump.
MC 046 may be dry as well

The protocol is not to sample

1247 Photo 7 Roll #1
Looking North
Picture of MC-02 well.

1250 left MC-02 going to
MC-03

1315 arrived @ MC03
Water depth 6.61"
Depth of Well @ ~~6.61~~ 10.6
4½ gallons for 3 well bores
Began purging @ 1328

7/31/01



LANL WA# R06745

Los Alamos, NM 7/31/01

Purging rate 1 gallon = 4 min .25 gpm

MCO3 reading

GPS reading N 35° 51 min 55.0 sec

W 106° 17 min 38.5 sec

Conductivity 287.0 pH 7.67

Turbidity 4.7 Temp 15.7°C

1335 1st Parameters

1341 Conductivity 287.0 pH 7.67 pH

Turbidity 6.0 Temp 14.9 °C

1346 Conductivity 289 pH 7.57 pH

Turbidity 1.8 Temp 14.9 °C

1350 Ended purging

1351 Began sampling

1355 Sampling Time

Sampled for Tritium (direct count only) DOC; SVOC, Total CN, TOC, Nitrogen Isotopes, dissolved Radionuclides, dissolved trace metals, 23 TAL metals, TSS, TDS; major anions, and perchlorate.

7/31/01



LANL WA#R06745
Los Alamos, NM 7/31/01
1430 Completed sampling

1434 Perameters - Final
Turbidity 4.7 pH 7.44
Conductivity 289 15.1 °C

1445 Back backed the samples out of the canyon. Ice down samples

1500 left well

1523 Arrive within 100 yards of MCO-4B. Team must walk to site due to obstacles in route.

1527 Water Level is being measured by LANL personnel Max Maes
Well depth is approximately ~~25 ft~~ 7/31/01 23.5 feet to top of bladder pump no water is detected.
GPS: 35° 51' 49.9" N / 106° 16' 41.8"
Sample will not be taken at this location due to lack of water. Water below top of pump

7/31/01

7/31/01



LANL WA# R06745

Los Alamos, NM 7/31/01

Photo # Roll 1 1527 7/31/01

E By T. Engle

Witness ~~H. M.~~ W. Oliver

Photo of Well MLO-4B showing water level measurement

1545 Depart MLO-4B, Arrive MLO 4A

GPS: 35° 51' 49.0" N

106° 16' 42.1" W

Photo not taken, Sample not requested, Water level not able to be measured b/c lock on well is not accessible to LANL personnel at this time

1548 Depart MLO-4A. TechLaw and LANL personnel begin to look for MLO-4B to gather water measurement level data.

1609 Search for MLO-4B is aborted. Well not found. NMED M. Dale previously said he knew the location. TechLaw will approach M. Dale for assistance

1613 TechLaw returns for NMED White Rock office to prepare for shipping.

7/31/01

7/31/01



LANL

WA# R06745

Los Alamos, New Mexico

7/31/01

1736 Well (Test Well 2A) was not with sufficient water volume to collect VOA or Total Cyanide on July 30, 2001 or July 31, 2001.

7/31/01

8/1/01



LANL WA# R06745
Los Alamos 8/1/01
0845 arrived @ POI-4

Sunny day
75°F Temperature
3-5 mph wind

Sampling Team members include
Wally O'Rear and Tami Engle, Tetra Tech,
Max Maes and Nicholas Martinez
ESH 18, and Jennifer Kofoed, ER

0900 left to get wrenches for air equipment

0931 Returned to POI-4.

GPS Reading
N 35° 52 min 18.5 sec
W 106° 13 min 10.4 sec

0945 Depth to Water 162.74
Depth of Well 176.50 approximately
19 gallons 1 well Volume
0950 Photo 9 Roll #1

LANL WA# R06745
Los Alamos, NM 8/1/01
Looking SW
Photo of well POI-4

0953 Began Pumping water through the Air compressor

1000 The hose for the well is leaking and we have to go get more tubing. pumping stopped

1045 Returned

The air pressure is set @ 100 psi and into the regulator

1050 Began pumping
1055 Flow rate
1 liter every ~~1.20~~. 1 minute + 20 sec

1100 Parameters
Conductivity 250 pH 8.19
Turbidity 1.3 Temp 16.5 °C

1158 Completed 5 gallons purge

LANL WA# R06745

Los Alamos, NM 8/31/01

2nd parameter readings

1205 Conductivity 250 pH 8.283

Turbidity 1.7 Temp 16.7°C

We will be sampling for major anions, TDS, TSS, 23 TAL metals, (dissolved/Total), dissolved trace metals, total radionuclides, ~~Isotopic~~ Tritium (enrichment), perchlorate, CN total, Nitrate/Nitrite, VOCs, DOC, Nitrogen isotopes, Direct Count tritium, and TOC

1210 After conferring with Steve Phillips It was decided that after obtaining 3 field parameters that if the readings have stabilized to within 10% that it would be advisible to sample at that time. The field parameters would be taken after purging 5 gallons of well water.

1311 Completed purging the 2nd 5 gallons

Dan Abeyta 8/31/01

LANL WA# R06745

Los Alamos, NM 8/1/01

3rd Set of Parameters

1315 Conductivity 250 pH 8.281

Turbidity 1.8 Temp 17.5 °C

1400 Left well to meet with Dave Rogers

1420 Wally O'Rear talked with Dave Rogers about sampling well # POI-4 when the parameters stabilized. He agreed that we should sample when they stabilized.

Purging continued while Mr. O'Rear was gone from site

1330 4th Set of Parameters

Conductivity 250 pH 8.255

Turbidity 2.4 Temp 17.7 °C

1344 5th Set of Parameters

Conductivity 250 pH 8.19

Turbidity 2.9 Temp 16.3

1358 6th Set

Conductivity 250 pH 8.186

Turbidity 2.8 Temp 15 °

8/1/01

[illegible]

[illegible]

[illegible]

8/1/01



LANL WA# R06745

Los Alamos 8/1/01

1412 7th Set

Conductivity 250 pH 8.21

Turbidity 3.1 Temp 17.5

1422 8th Set

Conduct. 250 pH 8.22

Turbidity 1.2 Temp 16.6

1432 Purge 3rd 5 gallons of purge water

1440 9th Set

Conduct 250 pH 8.13

Turbidity 1.3 Temp 17.0

1457 10th Set

Conduct 250 pH 8.18

Turbidity 3.6 Temp 15.8

1508 11th Set

Conduct 250 pH 8.17

Turbidity 4.1 Temp 15.9

1509 Air Tank empty

1510 Mr. O'Rear Returned

1515 Changed Tanks

LANL WA# R06745
Los Alamos, NM 8/1/01

Sampling Time 1530
Began Sampling @ 1528

Cloudy
Wind is 15 to 25 mph
1540 Started raining lightly

1750 discontinued sampling
due to heavy rain and
wind
will return in the morning
to complete sampling

1758 left facility

8/1/01

8/2/01



LANL WA# R06745
Los Alamos 8/2/01
0840 Arrived @ POI-4
Will continue sampling

0855 Continued sampling

Partly cloudy
75°F Temp

Sampling Team members are Wally O'Rear + Tami Engle, Techlaw, Inc. Max Maes, + Nicholas Martinez, ESH 18.

1015 Completed Sampling DOC and TAL 23 metals, and Dissolved Trace metals were filtered.

1030 left well POI-4
1205 arrive @ MC-05

1207 Photo 10 Roll 1
Looking North photo of MC 05

LANL WA# R06745

Los Alamos, NM 8/2/01

GPS Reading

N 35° 51 min 48.2 sec

W 106° 16 min 36.5 sec

Cloudy, Overcast day Temp 80°F

1258 Water level: 24'6"

Depth of Well: 46'4"

3" casing

1306 1st Parameters

Conductivity 250 pH 7.16

Turbidity 12.8 Temp 10.9°C

The Turbidity meter quit working and Max got another one from the ER division. It was calibrated on 7/27/01.

1300 37 sec to get a liter of water

Pump Rate: ~~2.48 gallons per minute~~ 2.28 minutes per gallon

Started ~~pumping~~ (purging)

8.064 gallons for 1 well volume

24.192 gallons for 3 well volumes

1319 1st 5 gallons purged

Jason A. [illegible] 8/2/01

LANL WA# R067C3
Los Alamos, NM 8/2/01

1315 2nd Parameter reading
EC 250 pH 8.074
Turbidity 588 Temp 10.9°C

1325 3rd Parameter:
EC: 250
Turbidity: 6.41
pH: 7.437
Temp: 9.9°C

1331 4th Parameter:
EC: 250 mg/L
Turbidity: 4.98
pH: 7.51
Temp: 10.3°C

1334 5 gallons ~~dire~~ 8/2/01 purged, total of 10 gallons

1336 5th Parameter:
EC: 236 mg/L
Turbidity: 9.92 NTU
pH: 7.53
Temp: 8.9°C

8/2/01

LAM WA# R06745

Los Alamos, New Mexico 8/2/01

1341 6th Parameter:

EC: 235 mg/L

Turbidity: 3.82

pH: 7.449

Temp: 8.8°C

1347 7th Parameter:

EC: 236

Turbidity: 4.94

pH: ~~7.75~~ 7.52

Temp 9.0°C

1346 3rd 5 gallons purged (total 15 gallons)

Sampling Team members are Wally O'Rear and Tami Engle, Techlaw with Max Mees and Nicholas Martinez ESH 18

Sampling for Total CN, Major Anion, TDS, TSS, 23 TAL Metals, dissolved total trace metals, dissolved radionuclides, Tritium (direct Count) perchlorate, SVOCs, TOC, DOC, N isotopes

Tami Engle 8/2/01

LANL
Los Alamos, NM

WA# R06745
8/2/1

1352 8th Parameter
EC: 237
Turbidity: 3.98
pH: 7.456
Temp: 8.3°C

1358 9th Parameter
EC: 236
Turbidity 3.29
pH 7.35
Temp. 8.5 °C

1401 Purged another 5 gallons
(total 20 gallons)

1404 10th Parameter
Turbidity: 3.83
EC: 236
pH 7.41
Temp 8.6°C

8/2/4

8/2/01



LANL WAP R06745
Los Alamos, New Mexico 8/2/01

This well will be duped
The sample ID is MC-05
for the regular sample and
The dupe sample ID is
MCDP-05B

1412 11th Parameter
EC: 234
Turbidity: 2.32
pH 7.375
Temp 8.4°C

1414 purged the 5th 5 gallons.
(total 25 gallons)

Sample time 1415 for MC-05
Sample Time for MCDP-05B is
1500
Began sampling @ 1416

1525 Began Collecting filtering
Samples.
1610 left MC-05

LANL WA#R06745

Los Alamos, NM 8/2/01

1620 MT-3 arrived @

GPS Reading

N 35 51 39.6

W 106 15 53.9

59.04 Depth of Well

(Dry) the well is dry

1625 Photo 11 Roll #1 Photo by T. Engle

Looking NE

Photo of well MT-3

Team members

Tami Engle & Wally O'Rear Technicians

Max Mares & Nicholas Martinez

1628 Left MT-3

2" inch well

1630 Arrive @ MT-4

The pad (concrete is broken)

1631 Photo 12 Roll #1

Looking SW

Photo of well MT-4. Note:

Concrete pad is broken.

2 inch well

8/2/01

LANL WA#RC6745
Los Alamos, NM 8/2/01
GPS
N 35° 51 39.3
W 106° 15 46.9

60.03 feet depth of
well is Dry (MT-4)

MT-2 is a 2 in well
MT-1 is a 2 inch well
1652 Left site

8/3/01



LANL WATERSHEDS
Los Alamos, NM 8/3/01

0900 The team met with
Steven RAE, David Rogers
Max Maes, Nicholas Martinez and
Neil Tapia

At the meet we discussed the schedule
and how best to work out
notifying each other about changes
in schedule.

1050 Arrived @ GS-1

Sampling Team members include
Wally O'Rear + Tami Englos, Technicians
+ Max Maes and Nicholas Martinez
EHS18

Sunny Day with little to no
wind

1101 Photo Roll
Looking Down at the gauging
station at GS-1
GPS N 35° 51 55.6
W 106° 17 46.

LANL WA#RD175
Los Alamos, NM 8/3/07
Sampling Time 1100

Started pairing @ 1107

Started Sampling @ 1120
Started Dissolved @ 1125
1130 Parameter
EC 234
21.9 °C Temp
7.65 pH

Ending Sampling @ 1128

1132 Photo
Looking N @ sample GS-1A
Sample Container

1145 Left GS-1
@ GS-1A was sampled for
SVOC, VOC, DOC, Total CN,

8/3/07

8/3/01

LANL WA# R0076B

Los Alamos, NM 8/3/01

After leaving GS-1A we had to go to RCT our ~~feet~~ and hand after going into the canyon.

1215 We recieved a flood warning not to go into the canyon

1420 arrived @ MC-06

Photo Roll #1

Looking NE

Photo of well MC-06

Depth to water 38.76'

to top of casing 0'

Depth of well ~~46.91~~ 47.05

4 inch well

GPS Reading N 35° 51 min 42.8

W 106° 16 22.7

Pump rate 1 gallon every 4 minutes

1440 Another Flood Warning

LANL WA#1460148

Los Alamos, NM 8/3/61

Cam. We have to get out of the Canyon, due to Flood warning.

LANL WA# A06745

Los Alamos, New Mex 8/6/01

0700 Met with Harvey Decker to discuss access to Pajarito Canyon & DX area

0845 arrived @ PC-03 to take water level measurements

Photo Roll #1
Looking North
Photo of well PC-03

Water level 17.39'
19.22 well depth
1" well

GPS N 35° 49 min 29.4 sec
W 106° 13 min 51.4 sec

0850 left well PC-03
@ The Partly Cloudy Temperature is approximately 70°F, wind 0-5 mph. Water standing on the ground in low areas
Team members include

8/6/01



LANL WA# R06746
Los Alamos, NM 8/6/01
Wally O'Rear & Tami Engle, TechLaw
Max Mares & Nicholas Martinez,
and Harvey Decker, ESH18 LANL.
at PC-03
There was a heavy rain on Sunday
1032 Arrived @ DT-9

We will set up the generator
to start purging the well.

Photo Roll #
Looking SW
Photo of Well # DT-9
Photo by Tami Engle,
Witness Wally O'Rear

GPS Reading: N 35° 48 min 49.9"
W 106° 17 min 18.9"

We will be using a Horiba
analyzer. It was setup
on 8/5/01. It was rented by
TechLaw

LANL WA# RO6745
Los Alamos, NM 8/6/01
Temp 75° Partly Cloudy

Started the pump to purge
will take a while before
water starts.

1045 left DT-9 and
are going to DT-5A.

1054 arrived @ DT-5A

The total depth is 1821'
water level is

GPS Reading
35° 49 22.2 N
106° 18 3.7 W
Start Purging 1058
PH 8.2
Condu. 11.7
Turbidity
Temp 11.8 °C

Pump Rate 3 gallons a minute

LANL WA# R00746
Los Alamos, NM 8/6/01

Max Parameters
pH 8.4
Temp 16.9
Conductivity 53.2
Turbidity

1110 Left DT-5A

1115 arrived @ DT-9
to take parameters

I run the setup calibration program an got an error on Turbidity.

Parameters will be taken later after repair to Turbidity meter

1340 ~~Arri~~ @ ~~Left~~ DT-9.

1311 Arrived @ MC-06

LANL WA# R06745
Los Alamos, NM 8/6/01

1315 Depth to Water 38.9
Depth of Well 47.1
4 inch well
1320 Started pump

Pump rate: 1 minute per litre
4 minutes per gallon.

1st parameter
1324 Conductivity 239
Turbidity 2.2
pH 7.54
Temp 16.6°C

1328 2nd parameter
Conductivity 240
Turbidity 1.0
pH 7.14
Temp 11.3°C

16.23 gallons to be purged
for 3 well bores

8/6/01

8/6/01

LANL WA # R06285

Los Alamos 8/6/01

1335 3rd Parameter

Conductivity 246

Turbidity 1.64

pH 7.09

Temp 10.8°C

No concrete pad observed

1340 1st 5 gallons purged

1341 3rd Parameter

(P) ~~#3~~ Conductivity 242

Turbidity 1.35

pH 7.52

Temp 11.6°C

1349 4th Parameter

Conductivity 239

Turbidity 1.24

pH 6.53

Temp 12.0

1352 Water level 38.95

Measurement

8/6/01

8/6/01

8/6/01



LANL

WA # R10745

Los Alamos

8/6/01

5th Parameter

1355 Conductivity 239

Turbidity 1.0

pH 7.238

Temp 11.8°C

1357 2nd 5 gallons (total 10 gallons)

1401 6th Parameter

Conductivity : 238

Turbidity : 1.57

pH : 7.31

Temp : 11.9°C

1415 7th Parameter

Conductivity 240

Turbidity 1.34

pH 7.25

Temp 14.1°C

1421 3rd 5 gallons (Total 15 gallons purged)

8/6/01

8/6/01



LANL
Los Alamos, NM

WA # R06745
8/6/01

1422 8th Parameter
Conductivity: 239
Turbidity: 1.05
pH: 7.18
Temp: 11.8

Sampling Time 1430
Started Sampling @ 1431

Sampling for DOC, SVOC, Dissolved Radiochem, Total CN, Nitrogen Isotopes, Tritium (direct count only), Dissolved 23 TAL metals

1522 Completed sampling

1528 8th Parameter
Conductivity 241
Turbidity 1.23
pH 7.35
Temp 11.8
1535 Left MC-06

8/6/01



LANL WA# R06745
Los Alamos, NM 8/6/01
1540 arrived @ MCWB-6.2A

1543 GPS Reading
N 35° 51 43.5
W 106° 16 21.0

1545 Photo #1 Roll #2
Looking ~~NW~~ SW
Photo Well # MCWB-6.2A
1546 Water Level 41.2'
Total Depth 49.63'

1547 Left MCWB-6.2A
1548 Arrived @ MCWB 6.2B

GPS Reading
W 35° 51m 41.8 sec
W 106 16min 21.8 sec

1549 Photo #2 Roll #2
Looking NW
Photo of Well # MCWB 6.2B

1550 Well is dry Total Depth 44.0'

8/6/01



LANL WA#R0G745
Los Alamos, NM 8/6/01
1551 Left Well MCWB-6.2B
1551 Arrived @ MCWB-6.2C

1552 GPS Reading
N 35 51 41.9
W 106° 16 min 21.9

1554 32.35' top of Casing
Well is dry
Total Depth 32.35

1556 Photo #3 Roll #2
Looking NE
Photo of MCWB-6.2C

Left MCWD-6.2C 1605
Arrived MCWB-6.5E 1610

1610 GPS Reading
N 35 51 39.3
W 106 16 20.0

1611 Well is dry
52.84' Top of Casing

LANL WA# R0076G
Los Alamos, NM 8/6/01

1613 @ ~~Left~~ Photo #4 Roll #2
Looking SE
Photo of MCWB 6.5E

1614 Left MCWB 6.5E

1615 arrived @ MCWB 6.5D
1616 Photo #5 Roll #1
Looking SE
Photo of MCWB 6.5D
Photo by T. Engle

GPS Reading
N 35 51 38.3
W 106 16 19.4

1618 Water Level "Dry"
Total Depth 45.23'
Top of casing

1620 Left MCWB 6.5D

1624 Arrived @ TSWB @ B-6

8/6/01



LANL WAHROG7
Los Alamos, NM 8/6/01

1627 Photo # 6 Roll # 2
Looking NE
Photo of TSWB-6
GPS Reading
N 35° 51' 37.9
W 106° 16' 25.4

1629 42.20 Top of Casing
The well is dry

1635 Left TSWB-6

8/6/01

# Logbook 2

BLUELINE

# RECYCLED ACCOUNT BOOKS

Green Paper
8¼" x 5⅝"
209 mm x 143 mm

Subject: LANL SAMPLING
LOS ALAMOS, NM
From: 7/30/01 To: 8/11/01

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*The Blueline Team*

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| **A 1750-52** | Journal |
| **A 1750-53** | Cash |
| **A 1750-54** | Double Entry Ledger |

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Field Log Book

For

Los Alamos National Laboratory

Los Alamos, New Mexico

BOOK 2 OF 3

provided to

US EPA, Region 6
1445 Ross Avenue, Ste 1200
Dallas, TX 75202-2733

by

TechLaw, Inc
750 N. St Paul Ave Ste 600
Dallas, TX 75201

Work Assignment No.: R06745
Contract No.: 68-W-99-017

8/7/01



LANL
Los Alamos, NM

WA# ROC745
8/7/01

0745 arrived @ MC-07

0752 Photo #7 Roll #2
Looking ~~NW~~ NE
Photo of Well MC-07

Partly Cloudy
Temperature 65°F
Wind 1-5 mph

Sampling Team members include Wally O'Rear, Tami Engle, Techlaw and Max Maes, EHS 18

GPS Reading
N 35° 51 38.1
W 106° 16 11.9

Samples are analyzed for Major Anions, TDS, TSS, 23 TAL metals, dissolved Trace Metals, dissolved radionuclides ~~Isotopic U~~ (U) Tritium (direct Count Only)

LANL WA# R06745
Los Alamos, NM 8/7/01
perchlorate, CN (Total), NO3/3,
SVOC, TOC, DOC, Nitrogen
Isotopes.

0801 Water level 40.20
Well Depth for MC-07 – 54.42
Top of Casing

14.22 feet of Water
5.4 per well boring
17.00 gallons for 3 well
borings
Started pumping @ 0810
Pump rate 2 minutes + 5 second
per liter
0813 Parameters
Conductivity 241
Turbidity 3.10
PH 7.95
Temp 12.4

8/7/01

8/7/01

LANL WA# R06745

Los Alamos, NM 8/7/01

| | pH | Temp | Conductivity | Turbidity |
|---|---|---|---|---|
| 0817 | 8.02 | 10.9°C | 228 | 3.53 |
| 0830 | 7.97 | 10.8°C | 231 | 3.67 |
| 0840 | 8.01 | 10.8°C | 229 | 3.17 |
| 0845 | 8.05 | 10.8°C | 230 | 3.09 |
| 0900 | 8.18 | 11.0°C | 229 | 3.76 |

The parameters have stabilized and due to impending rain that we would go ahead and sample 6 gallons have been purged
Sampling time is 0900
Sampling began @ 0910

1005. Samples that require field filtering are beginning at this time.

1038 Completed Sampling
Overcast Skies
65°F
Wind 1-5 mph

1050 left mc-07

8/7/01

8/7/01



LANL WA#R06745
Los Alamos 8/7/1
1245 arrived @ DT-9

1252 Parameters
Conductivity 58.1
Turbidity 0.33
pH 8.21
Temp 22.0°C

1300 Sampling Time
1255 Began Sampling

Sampled for: DOC, Explosives
23 TAL Metals, VOC, Major Ations
Total Metals, Radiochem,

1325 Started Filtering samples
1347 Completed Sampling

Sampling Team members are
Wally O'Rear, Tami Engle, Techlaw
and Max Maes, ESH18
Partly Cloudy 79°F Temp
Wind 10-15

8/7/01



LANL WA#R06745
Los Alamos, 8/7/01

1410 Left DT-9

1421 Arrived @ DT-5A
Photo #8 Roll #2
Looking N
Picture of well DT-5A

1425 Parameters
Conductivity 58.1
Turbidity 0.85
pH 7.91
Temp 22.1 °C

Sampling Time 1435
Start Sampling @ 1430

Sampling Team Members
include Wally O'Rear, Tami
Engle, Tech Law, and
Max Maes Esi+18

1440 Wally O'Rear and Max Maes
left to set up DT-10
pump and check Parameter

8/7/01



LANL WA# R06745

Los Alamos, NM 8/7/01

1455 DT-10 Started pump
Rate of Flow 5 gallons per minute.

1500 Parameters (Initial) DT-10 well
Conductivity: 68.7
Turbidity: ~~29.6~~ @ 19.7
pH: 8.46
Temp: 15.5°C

1510 left DT-10

1515 arrived @ DT-5A

1535 Completed sampling @ DT-5A

Samples for: DOC, Major Anions,

8/7/01

LANL WAH 806745

Los Alamos, New Mexico 8/7/01

1545 Left DT-5A

1611 Arrive MLD-7.5 to conduct water level measurement, parameters, and sampling activities

MLD-7.5 is a ~~three~~ Four-inch casing

Water level measurement: 45.95 feet

Top of Casing: 58.15 feet

Total Feet of Water is 12.2 feet

1623 Began pump

1 liter every 6 min + 50 seconds

Parameters:

| | Conductivity | Turbidity | pH | Temp |
|---|---|---|---|---|
| 1641 | 281 mg/L | 7.40 NTU | 7.28 | 18.5°C |
| 1652 | 260 | @ ~~8.33~~ 5.19 | 7.20 | 14.0°C |
| 1713 | 264 | 5.09 | 6.98 | 12.4°C |

1709 5 gallons purged from well.

1715 We tried DI water in the Turbidity meter to make sure of the readings. 0.40 Reading for DI water

| | Conductivity | Turbidity | pH | Temp |
|---|---|---|---|---|
| 1725 | 263 | 4.73 | 7.10 | [illegible] |

Jon A. Ewal 8/7/01

8/7/01



LANL WA#R06745

Los Alamos, NM 8/7/01

1650 GPS Reading

N 35 51 36.8

W 106 16 00.4

Sample Team Includes:

Wally O'Rear + Tami Engle, Techlaw

and Max Maes, ESH18

Partly Cloudy 85°F Wind 1-5 mph

Parameters

| | Conductivity | Turbidity | pH | Temp |
|---|---|---|---|---|
| 1739 | 258 | 5.12 | 7.05 | 12.5°C |
| 1743 | 261 | 3.71 | 7.16 | 12.9°C |
| 1745 | Turb Only | 3.25 | | |
| 1751 | ~~Turb Only~~ 259 | 3.15 | 7.16 | 11.08 |

1745 10 gallons purged

Sampling Time 1800

12 gallons purged prior to sampling

1758 Began Sampling

1905 Started Filtering Sample

1934 Completed Sampling

Sample MCO-7.5 is

LANL WA#R06745
Los Alamos, NM 8/7/01
Sampled MCO-7.5 for
DOC, SVOC, Major Anions,

Looking SW
1949 Photo 9 Roll #2 Well #MCO-7.5
Left 1950

8/7/01

8/7/01

LANL WAT-R06745
Los Alamos, NM 8/8/01
0538 arrived @ 0-4

TechLaw Team members include
Wally O'Rear & Tami Engle
Consuelo Montoia, Bob Beers ESH-18
Pete ~~B~~ Padilla, LA County

GPS Reading 20.9
N 35 52 ~~23.5~~
W 106 15 ~~37.9~~ 38.0
Well inside building
Sampling Began @ 0545
Sampling Time 0545

0548 Parameter
Conductivity 259
Turbidity 0.40
pH 7.173
Temp 11.8°C

0549 Completed Sampling

0555 Photo 10 Roll #2
Looking North

8/8/01

LANL WA#R06745
Los Alamos 8/8/01
0600 Left Well # O-4

0611 arrived @ Well # PM-1
0615 Sampling Time
0615 Sampling Started
0615 Parameters
Conductivity 259
Turbidity 0.64
pH
Temp 11.2°C

PH meter is not working

0624 Sampling Ended.

Temp 60°F
Partly Cloudy
Well inside building

0625 Photo # 11 Roll #2
Looking West
Photo of
GPS Reading
N 35 51 33.9 W 106° 13-31.5

Jan. A Gal
8/8/01

LANL WA# R06745
Los Alamos, NM 8/8/91
0630 Left Well

0635 arrived at O-1
0636 Photo #12 Roll #2
Looking NW
Photo of well O-1

Sample Time 0640
Started Sampling @ 0636

0639 Parameters
Conductivity 259
Turbidity 0.46
pH NA
Temp 11.2°C

GPS Reading
N 35° 52 14.6
W. 106° 13 10.9

0645 Completed Sampling

0655 Left Well # O-1

8/8/91

LANL WA# R06745
Los Alamos, NM 8/8/01

0707 Arrived @ PM-3

0709 Photo # 13 Roll #2
Looking SW
Photo of PM-3

Sampling Time 0715
Started Sampling 0710

0712 Parameters:
Conductivity ~~259~~ 129.2
Turbidity 0.34
pH NA
~~0712~~ @ Temp @ ~~11.2°C~~ 26.1°C

GPS Reading
N 35 51 48.3
W 106 14 33.8

0715 Completed Sampling

0720 Left well PM-3
0730 Arrived @ PM-2

8/8/01

0735 Photo 14 Roll #3
Looking NW
Photo of well # PM-2

Sampling Time 0740
Sampling Began @ 0736

0737 Parameter
Conductivity 56.9
Turbidity 0.35
pH NA
Temp 22.3 °C

GPS Reading
N 35 50 18.8
W 106 15 45.7

0741 Completed Sampling
0745 Left Well PM-3

0753 Arrived @ PM-5
0754 Sampling Time 0755
Photo # 15 Roll #2
Looking West

8/8/01

8/8/01



Started Sampling @ 755

0757 Parameters
Conductivity 65.5
Turbidity 0.49
pH NA
Temp 24.3°c

0801 Completed Sampling

GPS Reading
N 35 51 30.8
W 106 16 40.5

805 Left PM-5

0815 Arrived PM-4

0817 Photo #16 Roll #2
~~N~~ Looking SW
Looking @ PM-4 well

Sampling Time 0820
Started 0818

LANL WA# R06745
Los Alamos, NM 8/8/01

0820 Parameters
Conductivity 73.4
Turbidity 0.25
pH
Temp 25.7°C

GPS Reading
N 35 51 00.7
W 106 15 59.0

0824 Completed Sampling
0830 Left Well

1040 Arrived @ DT-10

1042 Photo 17 Roll #2
Looking SW photo by W. O'Rear
Looking @ DT-10

Sampling Time 1045
Started Sampling @ 1045

Completed Sampling @ 1101
1121 Left Well DT-10

8/8/01



LANL WA # R06745

Los Alamos, NM 8/8/01

1140 returned to well DT-10
to complete Parameters

1150 Parameters
Conductivity 65.3
Turbidity 2.16
pH 8.231
Temp 19.6 °C

GPS Readings
N 35° 49 min 19.1
W 106° 17 18.8

1155 Left DT-10

1730 Arrived @ G1-A
1730 Sample Time
1731 Started sampling
1733 Parameters
Conductivity 93.2
Turbidity 4.22
pH 8.208
Temp 27.3 °C
1742 Ended Sampling

LANL
Los Alamos, NM
GPS Springs
N 35° 54' 14.7"
W 106° 11' 59.8"

WA# R06745
8/8/01

1745 Photo #18 Roll # 2
looking down
Photo of G1-A

1748 Left Well

8/8/01

8/8/01

8/9/01



LANL WA# R06745
Los Alamos, NM 8/9/01
0755 TechLaw Team met with
NMED + ESH18 personnel to
discuss sampling schedule

0825 PA6.7 arrived

0840 Photo #19 Roll #2
Looking SW
Photo of PA6.7
0845 Sampling Time
Overcast Day

0845 Parameters
Conductivity 103.6
Turbidity 45.0
pH 8.2
Temp 14.5 °C

0745 Dupe PAD 6.7A of PA6.7
Sampling Time 0745
0746 Sampling began @

GPS Readings N 35 51 14.1
W 106 17 47.0

8/9/01



LANL WA# R06745
Los Alamos, NM 8/9/01
Sampling Team Members include Wally O'Rear, Tami Engle, TechLaw, Michael Dale & Mark Coffman, NMED Harvey Decker, ESH18

0940 Sampling Ended

0955 @ En. Left PA6.7

1140 Arrived @ PC-01
Sampling Team includes Wally O'Rear, TechLaw & Max Mares & Nicholas Martinez

There was a huge rattlesnake near the well. The snake was the largest I have ~~ever seen such a big sn~~ ever seen @

8/9/01

LANL WAHR06745
Los Alamos, New Mexico 8/9/01

1526 Depart NMED office for PA 10.6 for sampling of spring.

1608 Arrive site of ~~the~~ 8/9/01 PA 10.6. Sample will be taken approximately 100 yard from usual designated point due to high flow rate of water

1608 8/9/01 Photo 20 Roll 2 NE
Photo of PA 10.6 sampling point
By T. Engle
Witness: R. Mayer

1610 Sampling began

GPS: 35° 51' 01.1" N
106° 21' 43.10" W

1615 Parameters for this site:
pH 7.56 @ 13.8°C / 7.64 @ 13.8°C
Conductivity 110.4 @ 14°C
TDS: 54 @ 14°C
Parameter meter was previously calibrated by New Mexico Dept of Environment personnel earlier in day.

8/9/01

LAM 8/9/01

Los Alamos, New Mexico WA # R06745

1720 Depart site of PA 10.6 for NMED office to conduct shipment activities

1410 Late Entry: Dissolved samples were not filtered in field as flow from stream/spring was such that sediment would have hindered filtering process. Two Gallons were collected in field and brought to NMED office for settling purposes. These will be filtered 8/10/01 and placed into preprserved containers. Suggestion/recommendation was by NMED Michael Dale.

1730 Arrive NMED for shipment activities.

1748 EPA Man Richard Mayer decided that VOCs for this site were not necessary and the analysis was not to be performed. Tetlaw disposed of them accordingly.

8/9/01

LANL WA# R06245
Los Alamos, NM 8/10/01
0945 Arrived @ GS-1
Sample ID GS-1B
Sample Time 1005

Sampling Team Members
include: Wally O'Rear &
Tammi Engle, TechLaw and
Michael Dale & Steve Yanick, NMED

Sample for SVOC, DOC, VOC,
Nitrogen Isotopes, TAL Metals,
Radiochem, Dissolved 23 TAL Metals
Dissolved Trace Metals, Dissolved Rads

1029 Parameters
Conductivity 169.2
Turbidity 73.9
pH 7.7
Temp 16.7°C

1035 Started Sampling

1040 Finished Sampling
Left GS-1

8/10/01

8/10/01



8/10/01

1450 arrived @ Sandia
Water shed - 3-056(c) SWMU
~~Sample #~~ is location id
is 03-14361.

Gabriella Lopez Escobedo, ER
Sample Team Wally O'Brien &
Tom Engle
Dupe # is 3D-056(c)

Sample # 3-056(c) is for TAL metals
Time is 1500

Time for Dupe 3D-056(c)
is 1530

Sample Started @ 1504
1515 Sample Completed
1505 Photo #21 Roll #2
Looking SE
Photo of sample 3-056(c)

1506 Photo #22 Roll #2
Looking SW Photo Sample
3-056. AA

LANL WA R06745
Los Alamos, NM 8/10/04
GPS
N 35 52 28.4
W 106 19 06.1

The second sample 3056AA
is 3ft 7inches North of

Sample Time for 3-056AA
is 1515.

Sta
1533 Photo 23 Roll #2
Looking SE
≈ 100 yards from Building #223

1535 Left Building Area #223

8/10/04

8/13/01



LANL
Los Alamos, NM

WA RO 6745
8/13/01

0545: Young and Engle arrive at NMED offices. Two stainless steel bailers are decontaminated using an alconox/DI water wash and a DI water rinse. After air drying, the bailers are wrapped in stainless steel.

0653: Engle departs NMED office for TA 18.

0707: Engle arrives TA 18. Awaits search and clearance procedures of vehicle and person to enter into TA 18.

0820. Young arrives at TA 18 from the badging process to TA-18.

0847. Young, Engle, Catherine Goerke (SAIC, LANL contractor w/ the environmental Restoration group) and Dave Baggett (NMED) arrive at 18-MW-7.

8/13/01

LANL
Los Alamos

WAH ROCKPILE
8/13/01

0902: Top of inter casing to water: 15.95 feet
Top of casing (depth of well): 31.15 feet

FIGURE OUT PURGE VOLUME:

$$\begin{array}{r} 31.15 \\ -15.95 \\ \hline 15.20 \end{array}$$

15.20 x .163 = 2.5 GALS
(2 INCH WELL)

2.5 GALS x 3 = 7.5 GALS

0915: START PUMPING WELL - TUBING SET AT APPROXIMATELY 24' BGS.
WATER IS INITIALLY SOMEWHAT CLOUDY.
FIELD PARAMETERS UPON INITIATION OF PUMPING.

pH: 7.5
COND: 95.1 mS/L
TEMP: 14.0°C
TURB: 71.1 NTUs

8/13/01

LANL
Los Alamos, New Mexico

WA Roberts
8/13/01

0928: Field Parameters upon completion of 1 (one) well boring (2.5 gallons)

Temp: 13.0°C
pH: 7.1
Conductivity: 94.8
Turbidity: 53.5

0941 Field Parameters upon completion of 2 (two) well borings (5.0 gallons)

Temp: 12.3°C
pH: 6.6
Conductivity: 90.3
Turbidity: 65.8

0949 FIELD PARAMETERS UPON COMPLETION OF 3 WELL VOLUMES (~7.5 GALS)

temp: 12.1°C
pH: 6.6
COND: 89.0
TURBIDITY: 19.1

0950 Sample collection of MW-1B-7 begun

8/13/01

8/13/01



LANL WA RO 6745

Los Alamos 8/13/01

STAINLESS STEEL BAILER WOULD NOT WORK (GOT STUCK) IN 2" PVC WELL AT 18-MW-7. THEREFORE, A DISPOSABLE POLYETHYLENE BAILER WAS USED TO COLLECT VOCs, SVOCs AND HIGH EXPLOSIVES.

1110: TAKE A WATER/BATHROOM BREAK.

NMED TAKES WATER LEVEL MEASUREMENTS AT WELLS THAT WILL NOT BE SAMPLED.

RM 8/13/01

1139: Arrive at ~~18-MW-8G-1~~ 18-BG-1

1140: Water Level Measurement Taken

Top of Water : 17.45 Feet

TOC : 31.75 Feet

Calculation:

$$\begin{array}{r} 31.75 \\ -\ 17.45 \\ \hline 14.30 \end{array}$$

casing = 2 inches in diameter.

14.30 x 0.163 = 2.3 gallons

3 well volumes = 7 gallons

8/13/01

LANL
LOS ALAMOS

WA R06745
8/13/01

1150: START PURGING AT ~~18-MW-B6~~ + 18-B6-01 PM 8/13/01

INITIAL FIELD PARAMETERS MEASURED AS FOLLOWS:

TEMP: 14.7 °C
CONDUCTIVITY 88.2 mS/L
pH: 6.3
TURBIDITY: 26.4 NTU

INITIAL WATER IS SOMEWHAT CLEAR, WITH LITTLE SEDIMENTATION.

AFTER 1 WELL-VOLUME (2.5 GALLONS), FIELD PARAMETERS ARE:

TEMP: 12.0 °C
CONDUCTIVITY: 89.4
pH: 6.4
TURBIDITY: 26.4

AFTER 2 WELL VOLUMES (5 GALLONS) FIELD PARAMS ARE:

TEMP: 11.6 °C
CONDUCTIVITY: 89.6
pH: 6.5
TURBIDITY: 26.4

LANL : WA ROBERT

LOS ALAMOS 8/13/01

AFTER 3 WELL VOLUMES (7 GALLONS)

FIELD MEASUREMENTS ARE:

TEMP: 11.6

CONDUCTIVITY: 89.4

pH: 6.5

TURBIDITY: 5.47

STABILIZED AFTER 3 WELL VOLUMES.

18-BG-01 SAMPLES COLLECTED AT 1215. ~~USED~~ By 8/13/01. AFTER PURGING USING A PERISTALTIC PUMP, COLLECTED VOCs, SVOCs AND HIGH EXPLOSIVES USING A STAINLESS STEEL BAILER.

AFTER FILLING BOTTLES, USE PERISTALTIC PUMP TO FILL REMAINING PARAMETERS.

1245: FINALIZE SAMPLING AT 18-BG-01

1300: MOVE TO 18-BG-04

ACCORDING TO WHEP, ABOUT 8.5 LITERS WERE PURGED, BUT THE WELL WASN'T DRY.

8/13/

LANL WA R06745
LOS ALAMOS 8/13/01

ACCORDING TO NMED:

TOTAL DEPTH = 8.6
DEPTH TO WATER = 5.81

1305: 18-BG-04 IS DRY. NMED WOULD LIKE TECHLAND TO TARGET THE FOLLOWING ANALYSIS:
- HE EXPLOSIVES
- DISSOLVED METALS
- VOCS
- ANIONS (2 LITER/ NON-FILTERED NON-ACIDIFIED)
- TRITIUM (IF POSSIBLE)

1330: SINCE 18-BG-04 IS DRY, MOVE TO 18-MW-08 FOR SAMPLING.

1331 Depth to water: 7.09 feet
TOC : 35.60 feet

Two inch CASING:
Calculations: 35.60 − 7.09 = 28.51 feet standing water.

28.51 X 0.163 = 4.65 gallons X 3 = 14 gallon TO BE purged

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WA R06745

8/13/01

1340: BEGIN PURGING 18-MW-08. INITIAL FIELD PARAMETERS ARE:

TEMP: 17.2
CONDUCTIVITY: 100.1
pH: 6.6
TURBIDITY: 63.8 NTU

WATER IS SLIGHTLY CLOUDY

AFTER 1 WELL VOLUME (~4.7 GALS) FIELD PARAMS ARE:
TEMP: 14.8
CONDUCTIVITY: 100.7
pH: 6.5
TURBIDITY: 63.8 NTU

AFTER 2 WELL VOLUMES (~9.4 GALS)
TEMP: 14.6
CONDUCTIVITY: 100.6
pH: 6.5
TURBIDITY: 4.36

8/13/01

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LOS ALAMOS 8/13/01
AFTER 3 WELL VOLUMES AT
18-MW-08, (~14 GALS) FIELD PARAMS ARE:
TEMP: 14.8
CONDUCTIVITY: 100.6
pH: 6.6
TURBIDITY: 4.48

PARAMETERS HAVE STABILIZED AFTER
3 WELL VOLUMES.

1410: COLLECT SAMPLES FROM 18-MW-08.
COLLECT VOCS, SVOCS, AND HE EXPLOSIVES
FIRST USING A POLYETHYLENE BAILER.
THE STAINLESS STEEL BAILER GOT
HUNG IN THE WELL AT ABOUT 8' BGS,
SO A SAMPLE COULD NOT BE COLLECTED
USING STAINLESS STEEL.

AFTER COLLECTION OF VOCS, SVOCS AND
HE EXPLOSIVES, COLLECT REMAINING
PARAMETERS USING A PERISTALTIC PUMP,
WITH ABOUT 18-20' BGS.

1455: FINISH SAMPLING AT 18-MW-0
8/13/01

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1520: RETURN TO 18-BG-04 TO DETERMINE IF WATER IS AVAILABLE FOR SAMPLING

WATER LEVEL IS 8.20. (TOTAL DEPTH TAKEN EARLIER IS 8.6' BELOW TOC. THEREFORE, ONLY 0.4' OF WATER IS IN WELL. TECHLAW DECIDES NOT TO SAMPLE. WILL TALK TO EPA ABOUT THE NEED TO SAMPLE THIS WELL LATER

TOMORROW MW-12, MW-16 AND MW-9 ARE POSSIBLE. ALSO, WILL TRY TO COLLECT ONE ADD'L WELL IN ADMINISTRATIVE AREA. TALKED TO CATHERINE GOETZ OF SAIC ABOUT THIS PROPOSED SAMPLING STRATEGY.

1600: CHECK OUT OF AREA 18 SERVICE LOCATION. GO TO NMED OFFICE.

8/13/01

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Los Alamos, New Mexico 8/14/01

0721: Engle departs NMED office for TA-18 sampling with NMED Yanicak.

0727: Engle and Yanicak arrive TA-18 for sampling activities. At this time security has decided to search vehicle.

0816 Arrive at 18-MW-16 and 18-MW-12.

0833: Water level measurement taken for 18-MW-16

Depth to water: 9.55'

TOC (inner casing): 33.16'

~~FD~~ Casing diameter: 2 inch

Calculations:

$$\begin{array}{r} 33.16 \\ -\ 09.55 \\ \hline 23.61 \end{array}$$

23.61 x 0.163 = 3.85 gallons X 3 = 11.5 gallons to be purged from 18-MW-16.

Due to NMED's presence, 18-MW-12 will be simultaneously measured for water level and both wells purged at same time. 18-MW-16 & 18-MW-12

LANL WA # 306745

Los Alamos, New Mexico 8/14/01

are located approximately 75 feet from one another. As both wells are purged, parameters for 18-MW-11 will be recorded by Engle, and parameters for 18-MW-12 will be recorded by Yanicoh. Yanicoh's notes will be recorded in EPA Logbook as well.

0849: Water well measurement for 18-MW-12:

Depth to water: 9.48 feet

TOC (inner casing): 40.49 feet

Diameter of casing: 2 inch

Calculations:

```
  40.49
- 09.48
  31.01 feet
```

31.01 x 0.163 = 5.05 x 3 = 15 gallons to be purged for 18-MW-12

0928: Well 18-MW-11 pump started.

Initial Parameters:

Temp: 14.9°C

pH: 6.42

Conductivity: 112.2 mg/L

Turb: 20.3

8/14/01

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0943: Parameters at approx. 4 gallons purged:

pH: 6.57

Temp: 15.8°C

Conductivity: 112.4

Turb: 7.49

0957: Parameters at approximately 8 gallons purged:

pH: 6.57

Temp: 16.1°C

Conductivity: 113.2

Turb: 6.39

1004: Parameters at approximately 10 gallons purged:

pH: 6.55

Temp: 15.6°C

Conductivity: 112.6

Turb: 5.84

1010: Parameters (final) prior to sampling well:

pH: 6.55

Temp: 15.1°C

Conductivity: 113.3

Turb: 5.56 NTU

LANL

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WAH ROCK745

01/14/01

1020: Sampling Time for 18-MW-12.

1145: NMED CONTINUES TO PURGE WELLS AHEAD OF TECHLAW SAMPLING TEAM.

1255: TECHLAW COLLECTS 18-MW-12. VOCs, SVOCs AND EXPLOSIVES ARE COLLECTED USING A STAINLESS STEEL BAILER. REMAINING ANALYTES COLLECTED USING A PERISTALTIC PUMP.
TECHLAW COLLECTS TRIPLE VOLUME AT 18-MW-12 FOR AN MS/MSD.

1325: TECHLAW DECONTAMINATES TWO STAINLESS STEEL BAILERS USING AN ALCONOX/DI WATER WASH AND A TRIPLE DI WATER RINSE. DECON WATER WILL BE POURED ON THE GROUND AFTER SAMPLING AT 18-MW-9.

8/14/01



LANL

Los Alamos, New Mexico

WA # RCL745
8/14/01

1340: TECH LAN COLLECTS SAMPLES FROM 18-MW-9. NOTE THAT NMED REPRESENTATIVES PURGED THIS WELL PRIOR TO SAMPLING, AND PARAMETERS STABILIZED.

VOCs, SVOCs AND EXPLOSIVES ARE SAMPLED FIRST USING A STAINLESS STEEL BAILER, AND SUBSEQUENT PARAMETERS ARE COLLECTED USING A PERISTALTIC PUMP.

1410: ~~TEAM LEAVES THE SITE TO PICK UP SUPPLIES.~~ 8/14/01 SAMPLING TEAM TAKES A BREAK. WAITS FOR NMED TO PROVIDE MORE BOTTLES AND TUBING FOR PERISTALTIC PUMP

1500: MEASURE WATER LEVELS AT 18-MW-11

TOTAL DEPTH WELL - 43.89

DEPTH TO WATER - 19.26

Calculations: 43.89 - 19.26 = 24.63 feet x 0.163 = 4.01 X 3 = 12 gal

8/14/01

LANL

WA# R06745

Los Alamos, New Mexico

8/14/01

520: START PURGING 18-MW-11, USE APPROXIMATELY 38' OF TUBING TO PURGE WELL. IT IS A 2" FLUSH MOUNT WELL.

UPON INITIATION OF TUBING, FIELD PARAMETERS ARE AS FOLLOWS

pH - 6.8

CONDUCTIVITY - 208 mg/L

TEMPERATURE - 16.6°C

TURBIDITY - 12.5

AFTER ABOUT 1 GALLON, THE WATER IS RUNNING RELATIVELY CLEAR

AFTER 4 GALLONS (1 PURGE VOLUME) PARAMETERS ARE:

pH - 6.6

COND - 207 mg/L

TEMP - 14.8°C

TURBIDITY - 2.60 NTU

WATER IS STILL RELATIVELY CLEAR AFTER 1 PURGE VOLUME

8/14/01

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WA#R0674S

8/14/01

AFTER 8 GALLONS ARE PURGED AT 18-MW-11, FIELD PARAMETERS ARE:

pH: 6.7

COND: 207 uS/cm

TEMP: 15.3°C

TURBIDITY: 2.32 NTU

AFTER 12 GALLONS ARE PURGED AT 18-MW-11, FIELD PARAMETERS ARE:

pH: 6.6

COND: 207 uS/cm

TEMP: 14.9°C

TURBIDITY: 2.65 NTU

WELL IS STABILIZED AND READY TO SAMPLE.

1610: TECHLAW SAMPLES 18-MW-11 VOCS, SVOCS AND EXPLOSIVES COLLECTED USING A STAINLESS STEEL BAILER, WHILE REMAINING PARAMETERS ARE COLLECTED USING A PERISTALTIC PUMP.

8/14/01

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WAHR010745

8/14/01

1645: FINISH SAMPLING 18-MW-11. NMED PURGED 18-MW-10. TECHLAW MOVES TO 18-MW-10 FOR SAMPLING.

NMED PURGED 9 GALLONS FROM 18-MW-10 NMED HAS FIELD NOTES WITH SPECS ON 18-MW-10. TECHLAW WILL OBTAIN THOSE NOTES.

1710: TECHLAW COLLECTS GROUNDWATER SAMPLE FROM 18-MW-10 VOCS, SVOCS AND EXPLOSIVES COLLECTED USING A STAINLESS STEEL BAILER AND REMAINING PARAMETERS ARE COLLECTED USING A PERISTALTIC PUMP.

1740: TECHLAW LEAVES SEWARD SITE WITH NMED AND SAIC ESCORTS.

8/14/01

LANL
Los Alamos, NM

LOA: R06745
8/15/01

0700: YOUNG AND ENGLE PARTIALE SAMPLES AT NMED OFFICE

1230: TECHLAW ARRIVES AT 18-MW-18 CONDUCT WATER LEVEL MEASUREMENTS:

TOTAL DEPTH = 25.40
DEPTH TO WATER TOC = 13.84
11.56 feet

11.56 X 0.163 = 1.88 X 3 = 5.6 gallons to be purged.

1240: START PURGING AT 1240: UPON INITIATION OF PURGING, FIELD PARAMETERS ARE:
pH = 6.9
CONDUCTIVITY: 374 µS/cm
TEMP: 16.7°C
TURBIDITY: 7.76

8/15/01

~~After 2 Gallons (1 well volume)~~
~~Field~~ RY 8/15/01 RY 8/15/01

RY 8/15/01



LANL WA#R06745
Los Alamos, New Mexico 8/15/01

After 2 Gallons (1 well volume),
Field parameters are:
pH: 6.7
Cond: ~~15~~ 8/15/01 373 us/cm
Temp: 15.1
Turbidity: 2.32 NTU

After 4 Gallons (2 well volumes)
Field parameters are:
pH: 6.7
Cond: 373 us/cm
Temp: 15.1
Turbidity. 1.03

Water in well is very clear. The tubing is placed at about 18' BGS. The well is PVC, 2". No locking cap, about a 2' stick-up, with locking outer casing.

RY 8/15/01

LANL WA# R0L745

Los Alamos, New Mexico 8/15/01

After 6 Gallons (3 purge volumes)
Field parameters are:
pH: 6.7
Cond: 374 us/cm
Temp: 15.3
Turbidity: 0.71 NTU
Parameters have stabilized.

1300: Collect sample 18-MW-18. VOCs, SVOCs, Explosives are collected using a stainless steel bailer and remaining parameters using a peristaltic pump.

GPS coordinates for 18-MW-18 are: 35°49'56.6" N
106°15'06.1" W

| Photo # | Date | Time | Dir | Description |
|---|---|---|---|---|
| Roll 2 #~~23~~ 24 | 8/15/01 8/15/01 | 1330 | SE | View of well 18-MW-18 Photo by: Tammy Enkle Witness: Rob Young |

8/15/01

LANL WA#B04745

Los Alamos, New Mexico 8/15/01

1345: TL SAMPLING TEAM MOVES TO 18-MW. BEFORE SAMPLING, A FIELD BLANK IS COLLECTED NEAR 18-MW 17. THE WELL IS ABOUT 1/4 MILE DOWNWIND OF THE TA-18 AREA (1/4 MILE EAST).

FIELD BLANK IS FB-01, AND ALL PARAMETERS ARE COLLECTED BY POURING DI WATER DIRECTLY INTO SAMPLE CONTAINERS. THE DISSOLVED SAMPLES ARE COLLECTED USING CLEAN TUBING AND THE PERISTALTIC PUMP WITH A CLEAN FILTER. FB-01 COLLECTED AT 1400

CATHY GROTZ (SAIC) INDICATES THAT 18-MW-17 AND 18-MW-13 ARE "TEMPORARY WELLS" W/ NO FILTER PACKS AND BENTONITE ANNULAR SEALS.

8/15/01

LANL WATHROUTHS
Los Alamos, New Mexico 8/15/01

1 WATER LEVELS AT 18-MW-17 ARE AS FOLLOWS:

TOTAL DEPTH: 25.27'
DEPTH TO WATER (TOC) 18.15
7.12'

7.12 x 0.163 = 1.16 x 3 BORE VOLS = 3.5 GALS

THEREFORE, TOTAL PURGE VOLUME FOR 18-MW-17 IS 3.5 GALS.

UPON INITIATION OF PURGING, FIELD PARAMETERS ARE:
pH: 6.7
COND: 468 µS/cm
TEMP: 18.2°C
TURBIDITY: 121 NTU

18-MW-17 IS A 2" PVC WELL WITH ABOUT A 3.5' STICK-UP. WATER UPON PURGING IS FAIRLY CLOUDY, WITH A BROWN COLOR.

8/15/01

8/15/01



LANL
Los Alamos, New Mexico

WA # RO6715
8/15/01

AFTER 1 WELL VOLUME AT 18-MW-17,
FIELD PARAMETERS ARE:
pH: 6.6
COND: 465 uS/cm
TEMP: 16.2°C
TURBIDITY: 4.26 NTU

AFTER 2 WELL VOLUMES (~2.5 GALS)
FIELD PARAMS ARE:
pH: 6.5
COND: 461 uS/cm
TEMP: ~~16.2°C~~ ~~MS~~ 8/15/01 15.9°C
TURBIDITY: ~~4.26 MS~~ 8/15/01 2.09 NTU

AFTER 3 WELL VOLUMES (~4 GALS)
FIELD PARAMS ARE:
pH: 6.5
COND: 455 uS/cm
TEMP: 16.0°C
TURBIDITY: 1.54 NTU

WELL IS STABILIZED AFTER 3 WELL VOLUMES GO TO NEXT LOGBOOK

8/15/01

# Logbook 3

BLUELINE

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Field Log Book

For

Los Alamos National Laboratory

Los Alamos, New Mexico

Book 3 of 3

provided to

US EPA, Region 6
1445 Ross Avenue, Ste. 1200
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by

TechLaw, Inc.
750 N. St. Paul Ste 600
Dallas, TX 75201

work assignment No.: R06745
Contract No.: 68-W-99-017

LANL WA R06745
Los Alamos, NM 8/15/01

1430: COLLECT SAMPLE 18-MW-17. ALSO, A DUPLICATE IS COLLECTED AT THIS LOCATION, FOR ALL PARAMETERS. THE DUPLICATE IS DESIGNATED 18-MW-27, AND IS GIVEN A FICTICIOUS COLLECTION TIME OF 1445. THE DUP WAS ACTUALLY COLLECTED AT THE EXACT TIME, USING THE EXACT METHODS AS 18-MW-17.

VOCs, SVOCs AND EXPLOSIVES ARE AN COLLECTED USING A STAINLESS STEEL BAILER, WHILE ALL OTHER PARAMETERS ARE COLLECTED USING A PERISTALTIC PUMP.

GPS COORDINATES AT 18-MW-17.
35° 50' 11.2" N
106° 15' 32.1" W

8/15/01

LANL
LOS ALAMOS, NM

WA R06 475
8/15/01

| PHOTO # | DATE | TIME | DIR | DESCRIPTION |
|---|---|---|---|---|
| ROLL # 2 PHOTO ~~24~~ 35 | 8/15/01 | 1540 | SE | VIEW OF 18-MW-17. PHOTO BY: TAMI ENGLE WITNESS: ROB YOUNG |

150 1300 8/15/01: MOVE TO O3-MW-01, ON THE WEST SIDE OF BUILDING SM-30.

O3 MW-01 is a flush mount stainless steel well.

Depth to water: 20.85 feet
TOC : 26.75 feet
Casing size: 2 inches

Calculations:
$$\begin{array}{r} 26.75 \\ -\ 20.85 \\ \hline 5.90 \end{array}$$
feet of standing water.

5.90 x 0.163 = 0.96 x 3 = 2.88 gallons to be purged.

8/15/01

LANL

LOS ALAMOS, NM

WA 00647 P7

8/15/01

AFTER INITIATION OF PURGING, FIELD PARAMETERS ARE:

pH: 6.6

COND: 238 us/cm

TEMP: 16.9 °C

TURBIDITY: 19.5 NTU

AFTER 1 WELL VOLUME (~1 GALLON), FIELD PARAMETERS ARE:

pH: 6.3

COND: 194 us/cm

TEMP: 14.4 °C

TURBIDITY: 35.0 NTU

WATER AT 1 WELL VOLUME IS SLIGHTLY CLOUDY, WITH A BROWN HUGH.

AFTER 2 WELL VOLUMES (~2 GALLONS) FIELD PARAMETERS ARE:

pH: 6.1

COND: 183 us/cm

TEMP: 14.0 °C

TURBIDITY: 40.5 NTU

8/15/01

8/15/01

LANL
LOS ALAMOS, NM

W. R0647509
8/15/01

AFTER 3 WELL VOLUMES (~3 GALLONS)
FIELD PARAMS ARE:
pH: 6.1
COND: 177.4
TEMP: 14.1°C
TURBIDITY: 40.7 NTU

AFTER 3 WELL VOLUMES, PARAMETERS ARE STABILIZED.

| PHOTO # | DATE | TIME | DIR | DESCRIPTION |
|---|---|---|---|---|
| ROLL #3 PHOTO #1 | 8/15/01 | 1615 | N/E | PURGING WELL USING PERISTALTIC PUMP AT 03-MW-01. NOTE FIELD PARAMETER METERS ON LEFT. PHOTO BY: TAMI ENG WITNESS: ROB YOUNG |

1620: COLLECT SAMPLE AT 03-MW-01, VOCs, SVOCs AND EXPLOSIVES SAMPLES ARE COLLECTED USING A STAINLESS STEEL BAILER. ALL OTHER PARAMETERS COLLECTED USING A PERISTALTIC PUMP.

8/15/01

LANL WA ROCATS
LOS ALAMOS 8/15/01
GPS READINGS AT 03-MW-01 ARE:

35° 52' 25.4" N
106° 19' 48.4" W

1730: FINALIZE SAMPLING AT 03-MW-01.
LEAVE SITE.

8/15/01

8/16/01



LANL WA R06475
LOS ALAMOS 8/16/01

0700 ARRIVE AT OFFICE -- PACK COOLERS.

0715: YUNK COLLECTS EQUIPMENT BLANK FROM THE STAINLESS STEEL BAILER. SAMPLE COLLECTED BY POURING DEIONIZED WATER INTO A PREVIOUSLY DECONTAMINATED BAILER. SAMPLES COLLECTED FROM BAILER FOR THE FOLLOWING ANALYSES: VOCs, SVOCs AND EXPLOSIVES. THESE WERE THE ANALYSES COLLECTED IN THE FIELD USING THE BAILER. SAMPLE IS DESIGNATED EQ-1.

0930: ARRIVE AT BUCKMAN WELL #1. PUMP IS SET AS ABOUT 860' BGS. THE WELL RUNS ALL THE TIME DURING DRY PERIODS. DURING RAINY PERIODS, THE WELL IS SHUT DOWN. THIS WELL WAS OFF-LINE 2 DAYS PRIOR TO SAMPLING AND BEGAN PUMPING EARLIER THIS MORNING.

8/16/01

LANL WA R06475
LOS ALAMOS, NM 8/16/01

0940: SAMPLE BUCKMAN WELL #1 NEAR THE RIO GRANDE RIVER. WELL IS SAMPLED FROM A SPIGOT IN AN ~10' LINE. ALLOWED TO RUN FOR ABOUT 3 MINUTES PRIOR TO SAMPLING.

FIELD PARAMETERS ARE AS FOLLOWS (BEFORE SAMPLING)
pH: 8.6
COND: 177.4 µS/cm
TEMP: 20.4°C
TURBIDITY: 0.79 NTU

| PHOTO # | DATE | TIME | DIR | DESCRIPTION |
|---|---|---|---|---|
| ROLL #3 PHOTO #2 | 8/16/01 | 1010 | NE | VIEW OF SAMPLING SPIGOT (L-SHAPED BRASS TUBING (~1/2 INCH) |

PHOTOGRAPHER: TAMMI SPRUILL
WITNESS: LOB YOUNG AT BUCKMAN WELL #1

ALL BOTTLES AT BUCMAN 1 ARE FILLED DIRECTLY FROM SPIGOT SHOWN IN PHOTO 3-2.

8/16/01

8/16/01



LANL WA R06475
LOS ALAMOS, NM 8/16/01

A FIELD DUPLICATE IS COLLECTED AT BUCKMAN WELL 1. IT IS DESIGNATED "BUCKMAN 11" AND GIVEN A SAMPLING TIME OF 0950 (TO HIDE IT AS A DUP FROM THE LAB). ALL PARAMETERS ARE DUPLICATED USING THE SAME SAMPLING PROCEDURES AS BUCKMAN 1.

DISSOLVED SAMPLES ARE COLLECTED USING A FILTER ATTACHED TO A PERISTALTIC PUMP.

GPS READING AT BUCKMAN 1:
35° 50' 06.3" N
106° 09' 32.6" W

1035: MOVE TO BUCKMAN WELL #~~8~~ 7 AT AN HRS, TECH LAW ACCOMPANIED BY GERALD GEORGE OF THE CITY OF SANTA FE.

8/16/01

8/16/01



LANL WA R06 478

Los Alamos, NM 8/16/01

According to Mr. George, the well pump is 750 feet deep.

1050 Collect samples from Buckman 7. (At 1050) Before sampling, field parameter readings are:

pH: 7.5

COND: 498 µS/cm

TEMP: 28.2°

TURBIDITY: 0.38

~~Also~~, 14 8/16/01 samples are collected directly from a spigot.

GPS Coordinates at Buckman Site 7:
35° 50' 02.3" N
106° 09' 06.1 W

| Photo # | Date | Time | Dir | Description |
|---|---|---|---|---|
| Roll #3 Frame #3 | 8/16/01 | 1113 | E | View of sampling spigot (Faucet type dispenser, made of brass) at Buckman 7 PHOTO BY: TAMI ENGLE WITNESS: Rob Young |

8/16/01

8/16/01



LANL WA R06475
Los Alamos, NM 8/16/01
According to Mr. George, Buckman well 8 is located closer to the Rio Grande River; however it is offline for repairs. Buckman wells 1 and 7 are equally distanced from the Rio Grande River.

1124: TechLaw arrive at well (Buckman) #2.

1140: TechLaw samples Buckman #2
Prior to sampling, parameters are as follows:
pH: 7.3
Cond: 1,130 us/cm
Temp: 28.5°C
Turbidity: 0.51

According to Mr. George, Buckman well nos. 1, 2 and 7 are pumping at about 700 GPM.

GPS Coordinates at Buckman 2 well:
35° 49' 45.1" N
106° 09' 23.5" W

8/16/01

8/16/01



LANL WA R06475
LOS ALAMOS, NM 8/16/01

BUCKMAN 2 WAS COLLECTED FROM A BRASS SPIGOT IN THE DISCHARGE LINE TO THE WATER SYSTEM.

| PHOTO # | DATE | TIME | DIR | DESCRIPTION |
|---|---|---|---|---|
| ROLL #3 PHOTO #4 | 8/16/01 | 1155 | W | VIEW OF SPIGOT (BRASS) USED TO COLLECT BUCKMAN 2 SAMPLE. PHOTO BY: TAMI ENGLE WITNESS: ROB YOUNG |

1200: FINISH SAMPLING BUCKMAN WELLS. TEAM DRIVES BACK TO NMED OFFICE.

1330: PACKAGE SAMPLES FOR FED EX SHIPMENTS ON FRIDAY.

1930: LEAVE NMED OFFICE.

8/16/01

8/16/01



LANL
LOS ALAMOS, NM 8/17/01

0945: CONDUCT WATER LINES IN MORTANDAD CANYON WITH DAVID ROGERS AND BETSY CATA.

1055: ARRIVE AT MCWB-4. THERE ARE TWO BLACK WIDOW SPIDERS AT THE WELL, SO IT IS NOT GAUGED. GPS READINGS ARE:
35°51'50.5" N
106° 16' 45.2 W

1015 MOVE TO MCWB-5.
DEPTH TO WATER = 29.48
GPS: 35°51'48.2" N
: 106° 16' 35.8" W

LOOKED FOR, BUT COULD NOT FIND MCO-5.1A.

8/17/01

LANL

Los Alamos, New Mexico

WA # RO-715
8/17/01

1030: MOVE TO MCWB-5.5B.

Depth to Water: 35.36 Feet

GPS: 35° 51' 43.4" N
106° 16' 25.3" W

Well is a conducer, concrete pad, appears to be in good condition. Wood on side is pulling from concrete.

1037: Move to MCWB-5.5A

Depth to water: 35.06 Feet

GPS: 35° 51' 44.7" N
106° 16' 24.7" W

Well is a conducer, concrete pad, appears to be in a good condition

1046 Move to MCWB-6A

GPS: 35° 51' 42.7" N
106° 16' 22.6" W

Key for locks is not on site (within Mortandad Canyon) Water depth not taken at this time

LANL WA#B06HS
Los Alamos, New Mexico 8/17/01

1051: Move to MLO-6B
Depth to Water: 39.85 Feet
GPS: 35° 51' 42.7" N
106° 16' 22.5" W
Well has bladder pump, is a stick mount, concrete pad is ~~broken~~ cracked into three pieces

Attempts were made to locate MLO-6.5A, with no success. Techlaw identified grout markings on ground, LANL state that approx 100 wells were removed ~~for FTE~~ from Mortandad Canyon due to the fire of 2000

1110: Move to MLWB-6.5C
Depth to water: 43.80 feet
GPS Coordinates: 35° 51' 40.4" N
106° 16' 18.0" W
Well is a conducer, with bladder pump, situated on a concrete pad.

8/17/01

LANL WA # R06745

Los Alamos, New Mexico 8/17/01

1121: Move to MCWB-6.6

Depth to Water: N/A

GPS Coordinates: 35° 51' 38.6" N

106° 16' 17.7" W

Well is a conducer, ~~with a bladder pump~~, situated on a concrete pad. This well is not equipped with a pump, but a cap is in place. Diameter of casing is 4 inches.

Depth of well that is dry: 50.30 feet

Sediment was full at bottom.

The concrete pad appears to be in good condition.

MCO 6.6B was attempted to locate; however it is believed to be filled in with grout upon removal.

1135: Move to MCWB-7B

Depth to water was not taken due to a Black Widow spider presence.

GPS Conducer: 35° 51' 37.7" N

106° 16' 13.8" N

Well is a transducer, situated on a concrete pad which appears to be in good condition.

8/17/01

LANL

Los Alamos, New Mexico

WAB ROLETT
8/17/01

1142: Move to MCWB-7A

Depth to Water: 41.51 Feet

GPS Coordinates: 35° 51' 38.5" N
106° 16' 13.6" W

Well is a transducer, situated on a concrete pad, equipped with a bladder pump.

1154: Move to MCO-7A

Depth to Water: N/A

GPS Coordinates: 35° 51' 38.0" N
106° 16' 12.0" W

Well is stick mount, equipped with a bladder pump

Depth to obstruction, which is likely to be the top of the bladder pump is: 37.90 Feet

Concrete pad which well sits on is 8/18/01 Appears to be in good condition.

1202: Move to MCWB 7.2

Depth to Water: 66.81 Feet

GPS Coordinates: 35° 51' 37.9" N
106° 16' 06.2" W

Well is transducer, equipped with a bladder pump situated on a concrete pad.

J A Engl 8/17/01

LANL WA # R016745

Los Alamos, New Mexico 8/17/01

~~1309 Move to MA~~ TE 8/17/01

Attempts were made to locate MCO 7.1 and MCO 7.1A, however they were not located. LANL representative stated that approx 100 wells were removed following the Fire of 2000.

1421 Move to ~~MCO~~ TE 8/17/01 MCNB-7.4B following

Depth to Water: ~~MCO~~ 8/24 50.93 feet

GPS Coordinates: 35° 51' 37.2" N

106° 16' 02.3" W

Well is transducer, equipped with bladder pump and situated on concrete pad.

1427 Move to MT-1

Depth to water from Top of PVC casing: 44.21 feet

GPS Coordinates: 35° 51' 37.9" N

106° 16' 02.6" W

Well is stick mounted located on small concrete pad

PVC is two inches in diameter.

8/17/01

LANL WA#R0745

Los Alamos, New Mexico 8/17/01

1431 Move to MCWB 7.4A

Depth to water: 44.84 feet

GPS Coordinates: 35° 51' 38.7" N

106° 16' 02.5" W

Well is a transducer equipped with a bladder pump situated on a concrete pad which appears to be in good condition.

1445 Move to MCO 7.5B

Depth to water: 45.96 feet

GPS Coordinates: 35° 51' 37.7" N

106° 16' 00.3" W

Well is stick stand equipped with bladder pump and situated on concrete poured into ground.

1456 Move to MCWB 7.7B

Depth to water: 60.15

GPS Coordinates: 35° 51' 38.2" N

106° 15' 54.8" W

Well is transducer, situated on concrete pad which appears to be in good condition, and is equipped with a bladder pump.

8/17/01

8/17/01



LANL WAH RO675

Los Alamos New Mexico 8/17/01

1504: Move to MCWB 7.7A

Depth to Water: N/A

GPS Coordinates: 35° 51' 40.2" N

106° 15' 54.9" W

Well is transducer, equipped with bladder pump and situated on concrete pad.

TOC: 71.7 feet to top of bladder pump with no water encountered.

1313 Move to MT-2

Depth to water: 166.1 feet

GPS Coordinates: 35° 51' 38.6" N

106° 15' 53.4" W

Well is stick stand type, ~~equipped with TE~~ situated on concrete that has been poured around well and is presently cracking ~~to TE~~ 8/17/01 from well. Measurement is from two inch diameter PVC piping.

There is approximately 1 (one) inch of sediment / mud on bottom at the 166.1 foot mark.

8/17/01

LANL WA# R4.745

Los Alamos, New Mexico 8/17/14

MCOSA was located; however it was abandoned and grout was found at the surface

MCO-8 was located; however it was abandoned and grout was found at the surface

GPS: 35° 51' 38.2" N
106° 15' 53.3" ~~N~~ W TE 8/17/14

1432 Move to MCWB 8.1C

Depth to water: N/A

GPS: 35° 51' 38.4" N
106° 15' 46.8" W

Well is transducer, ~~equipped with bladder~~ TE 8/17/14

situated on concrete pad that appears to be in good condition.

Well is dry, TOC (water) is 82.80 feet

1439 Move to MCWB 8.1B

GPS: 35° 51' 39.3" N
106° 15' ~~44~~ TE 46.9" W

Well is transducer. Well is dry TOC: 74.90 feet

Concrete pad appears in good condition, no bladder pump

TNF

LANL WA # PQ-745

Los Alamos NM 8/17/01

1444 ~~1344~~ TE 8/17/01 Move to MCWB 8.1A

GPS: 35° 51' 40.1" N

106° 15' 46.9" W

Due to Black widow presence, water depth was not taken for health And Safety Reasons.

1548 ~~1348~~ TE Move to MCO-8.2

GPS: 35° 51' 39.5" N

106° 15' 45.1" W

Well is two inch PVC pipe that is Filled with grout. No Longer in use

1556 MCO-9 is no longer in place, It has been removed.

GPS coordinates: 35° 51' 38.9" N

106° 15' 36.5" W

~~According to NMED Workplan Canyon well locations map provided to TechLaw, wells: MCO~~ TE 8/17/01

Emil Ewan 8/17/01

LANL 806745
Los Alamos, New Mexico 8/17/01

1613 A second location for MLO-9 is located
MLO-9
GPS: 35° 51' 36.8" N
106° 15' 28.7" W
Depth to water: N/A
TOC: 57.70 feet. Well is dry, situated on
concrete pad. No bladder pump provided

1621 Move to MCWB-9B
GPS: 35° 51' 38.0" N
106° 15' 28.5" W
Depth to water: N/A Well is dry
TOC: 860.30 feet
Well is transducer, no pump, situated on concrete
pad that appears to be in good condition

1629 Move to MCWB-9A
GPS: 35° 51' 39.2" N
106° 15' 27.8" W
Well is dry TOC: 75.00 feet. Well is still stand,
No pump, situated on concrete pad that appears is
good position. Casing size is 2 inch pvc.

8/17/01

LANL WAF# R 86745
Los Alamos, New Mexico 8/17/01

1635 Move to MLO 9S
Well is plugged with grout
GPS Coordinates: 35° 51' 37.9" N
106° 15' 25.1" W

1646 Move to MLO 12
GPS: 35° 51' 35.1" N
106° 15' 01.0" W
Well is two inch PVC pipe that is sticking out of ground. There is no concrete pad or pump
TOC: 97.80 feet.
Well is dry.

1659 Move to MLO 13
GPS: 35° 51' 28.1" N
106° 14' 50.7" W
Well is stick stand with small concrete pad, no info tag provided for well.
TOC: 109.20 feet Well is dry.
measurement is taken from outer casing.

1710 Return to NMED.

Jane A. Hagle 8/17/01

8/18/01



LANL R06475

Los Alamos, NM 8/18/01

0830 ARRIVE AT NMED OFFICES TO PACK COOLERS AND CLEAN-UP.

ROB YANKY PACKS THREE COOLERS. TWO ARE SENT TO THE UNIVERSITY OF MIAMI TRITIUM LAB. BOTH COOLERS HAVE CUSTODY SEALS DATED 8/18/01, AND WILL BE PICKED UP BY FED EX ON 8/21/01 FOR 8/22/01 DELIVERY. THE COOLERS ARE KEPT IN THE SECURED NMED OFFICE WITH CUSTODY SEALS INTACT, FOR FED EX PICKUP ON 8/20 (MONDAY). AIRBILL #S ARE 809305848050 AND 809305848054.

THE THIRD COOLER, WITH AIRBILL # 809305848028, IS SENT TO COASTAL SCIENCE LABS. CUSTODY SEALS ARE PLACED ON COOLER, AND IT IS ALSO KEPT IN SECURED AREA FOR FED EX PICKUP ON 8/20/01.

8/18

# Logbook 4

Field Log Book

For

LANL

Los Alamos, NM

Contract No: 68-
Work Assignment No: R06745

LANL 10/29/01
Los Alamos, NM WA# R06745

0730 arrived at TA-59 for meeting with all

0800 The team met with
Stephen Rae, Dave Rogers, LANL
Mikael Dale, NMED, Max Maze
Patrick Longmire, Lorenzon Martinez, LANL
Steve Yanazak, Kim Grunzow NMED
Mark Kaufman, NMED
Sena LANL, Bob Beers, LANL
Andy Crowder, Alethea Baner, LANL
Discussion included schedules for sampling. Purge water for SHB-3.

There is a concern about Health & Safety and whose umbrella the Techlaw Team will be under.
Tami will meet with Beth Gray + Bob Beers on Wednesday to sample Buckman Wells @ 7:30 at NMED

Wally Ram 10/29/01

Wally Dalton 10/29/01

LANL 10/29/01 (15)

Los Alamos, NM WA# R06745

Lorenzo Martinez will be the LANL personnel to accompany TechLaw to ESH-18

LANL personnel will accompany TechLaw personnel at the Springs 4, 4A, 4AA and 4C Snakes, poison ivy + trip fall are issues for H+S

0850 Meeting ended

1000 Received badges

1010 After discussions with Michael Dale, NMED + Steve Phillips, TechLaw it was decided that GS-1 would have to be missed. According to Dave Rogers, LANL today would be the only day that they would be releasing. We had a three hour window to get sample

Wally O'Rear 10/29/01



LANL 10/29/01
Los Alamos NM WA#R06745

1142 arrived @ the LAPD-3 Stream prior to well the well is approximately 50 feet. The stream has eroded some of the road

1150 arrived @ LAPD-3 approximately 70°F Partly Cloudy

Team Members include Lorenzo Martinez + Joseph Sena, Max Maze LANL, Wally O'Rear + Tami Engle, TechLaw, Michael Dale, Kim Granzow, Mark Kaufman, NMED.

Martinez + Sena will be using a pulling rig to bring up the groundwater

Wally O'Rourke 10/29/01



LANL 10/29/01

Los Alamos, NM WA# REG745

The well is a 2 inch well
PVC
1200 began measuring for
water depth

1203 Water level 323.42' Top of Well
1205 Total Well Depth 334.8'
A total of 11.4' of water
approximately 2 gallons
of water per hour well.
Total of 6 gallons to
purge well

1230 Started lowering the
Stainless Steel Bailer

1238 Photo of Well LAPD-3
with the pulling winch
Looking NW Photo By W. O'Rourke
T. Engle witness

1247 Collected 1st Bailer
1249 Sent Bailer Back down

Wally Olsen
10/29/01



LANL 10/29/01
Los Alamos, NM WA#R06745

1250 Field Parameters
pH: 7.27
Temp: 11.6 °C
Conductivity: 215
Turb: 22.1

1252 got to bottom of well
started bringing up
1254 Collected second liter

1255 started bailer down well
1257 at bottom
1259 collected 3rd liter

1259 started bailer down well
1303 Collected 4th liter
did not get but 1/3 liter
water appeared light brown
in color

1305 Started water level
measurement
1307 323.45' Water level Top of Well
1309 333.58' Total Depth of Well

LANL 10/29/01
Los Alamos, NM WA# R06745

1311 Started bailer down
1314 reached ~~end~~ bottom
1316 Collected 5th Liter

1316 Started down
1318 2nd P
Turb: ~~215~~ 183
Conduct: ~~215~~ 215
Temp 11.9 °C
pH 7.18

1320 Started bringing bailer up
1321 Collected 6th liter

1321 Started bailer
1324 Reach Bottom
1325 Bringing up

Water ~~was~~ seemed not to be recharging fast enough.
1345 collected 7th liter
1346 bailer started down

Water O'Brien
10/29/01

Wally Olson 10/29/01



LANL 10/29/01
Los Alamos WA#R06745

1346 Field Parameters
EC 215
Temp 11.2
pH 6.8
Turb. 211

1349 Collected 8th Liter of Water
only 100mL

1354 Collected 9th liter
Only 100mL this
time

1357 Changed bailers - to fix water volume

1359 Started bailer down well

1405 Brought up 10th Bailer
No water was in the bailer
It was decided to run one
more try. Wait 15 min. Michael
Dale suggested.

1406 Started bailer down well

1424 Started bringing the
bailer up

1425 bailer had 1 liter

Wally O'Dell 10/31/01



LANL 10/29/01

Los Alamos, NM WA#R06745

1425 Starting sampling LAPD-3

1425 Sample time for LAPD-3

Analyze for Anions, TSS/TDS perchlorate, Tritium, $NO_2/NO_3$, TOC Total CN, TAL Metal, Total Rad, DOC

Due to poor water flow it was decided not to sample for organics.

1428 Water level 323.40'

1431 Water level 323.40'

1434 Started bailer down the well

1439 The bailer was empty

We tried to pour water (DI) in the bailer to see if the bail was seeding. It didn't seem to be seeding. We cleaned it went down the hole

Wally Dyer 10/29/01



LANL 10/29/01
Los Alamos, NM WA#R06745

1445 No water
1446 checked value ball and it seemed to be drained
1458 Tried again
1503 The bailer was dry

1505 John McCann, LANL ER was not comfortable with responsibility and wanted to get everything straight before we could continue
There was the issue of purge water
There was not a successful effort to collect the samples through a bailer.

1520 Left Site

Sample water collected was approximately 500 ml for TSS/TDS, perchlorate + anions container and about ½ liter of water for tritium.

LANL 10/29/01
Los Alamos, NM WA#R06745

Steve Phillips suggested plugging the Bailer and letting the water come in @ the top. And that we should not sample for organics.

I purchased galvanized metal plugs for the bailers and used teflon tape to make a good seal. The plugs were deconed and placed on the bailers. They were wrapped in alumium foil.

10/29/01
Wally O'Rourke

Wally O'Rear 10/30/01



LANL 10/30/01
Los Alamos, NM WA# R06745

0700 Talked with Steve Phillips, Techlaw to let him know that we purchased the galvanized plugs for the bailers and informed him that sampling was back on after talking with John McCann, LANL ER

0730 Meeting with Andy Crowder, Alethea Baner, Kim Granzow, LANL Tami Engle, Michael Dale, NMED John McCann, James Jordan

Discussed the sampling activities. John McCann will make sure that we can get into SHB-3

0745 left meeting

0850 arrived @ ~~LAPD-3~~ LADP-3

team members include: Wally O'Rear

10/30/01



LANL 10/30/01
Los Alamos, NM WA# R06745
Michael Dale, NMED,
James Jordan, David B Stephens & Lawrenson
Martinez, LANL Alethea
Beaver, Washington Group

0905 Started measuring
water level.
Depth to Water 323.7
to top of casing.
Decided to start over on sampling
0913 Started Down; Bailer
0915 Started Bringing up
0917 1st Bailer full
Will have new sampling time & Date
0919 Started Bailer down well

0920 Field Parameters
Temp 10.9
pH 7.0
Conduct. ~~275~~ 236
TDS 115

0921 Bringing Bailer up
0922 2nd Bailer full

Walt O'Rourke
10/30/01



LANL 10/30/01
Los Alamos, NM WA # R06745

0928 3rd Bailer full

0929 Bailer going down well
0934 4th Bailer full

0934 Collected water for field Parameters

0935 Started Bailer down well
0936 Field Parameters
Conductivities 214
Temp 10.6
TDS 104
pH 6.75

0937 Dave Rogers came to well
0939 5th Bailer full

0944 Collected 6th Bailer full

0947 Collected 7th Bailer full
0954 Collected 8th Bailer

Walt O'Rourke

Wally Dean
10/30/01



LANL 10/30/01
Los Alamos, NM WAHR06745

0955 Field Parameter
Temp 10.4
pH 6.60
Conduct. 211
TDS 103

1000 9th Bailer full

1005 10th Bailer full
1010 11th Bailer full
1015 12th Bailer full
have collected 5 gallons
of purge water

1016 Field Parameters
Conductance: 208
Temp 11.1
TDS 108
pH 6.71

~~Continued~~
1020 ~~Began~~ Sampling Began
Sampling Time 1020, 1025-LADP-EB
1115 Completed Sampling
1130 left LADP-3

Wally O'Rear 10/31/01



LANL 10/31/01
Los Alamos, NM WA #R06746

0905 arrived @ TA-16
SHB-3
Team members include
Wally O'Rear, TechLaw, Joe
Sena, LANL, Lorenzo Martinez,
LANL, Kevin Reid, ~~LANL~~ @ IT Corp
Elmer Alcon IT corp. John Kaufman,
NMED
0930 completed Safety Meeting
0936 Arrived @ SHB-3 and
opened well casing

0947 Started to measure
well water level
The well is a 3" pvc pipe
0955 The water level
measurement got hung up
@ 580'

1005 We tested the water
level indicator to make
sure it was working

LANL 10/31/01
Los Alamos, NM WA# R06745

1010 Temp 50°F
Wind 15-20 mph
Cloudy

1011 568' The water level indicator is hung up. No water level
566' The indicator is hung up. Tried different ways to break through. No Luck.

1030 I talked with Steve Phillips and he stated that the way that it is hitting on whatever is stopping the indicator, that we will not be able to sample this well.

1047 I talked with Michael Dale and told him about the indicator and he said that their was nothing else to do.

LANL 10/31/01
Los Alamos, Nm WA#R06745
1115 Picked up equipment
1130 left facility

1300 I talked with Michael Dale, NMED and he said that a transducer was pulled approximately 10-12 days ago at a depth of 630'. They (LANL) pulled it with a hand winch. The transducer was wet.

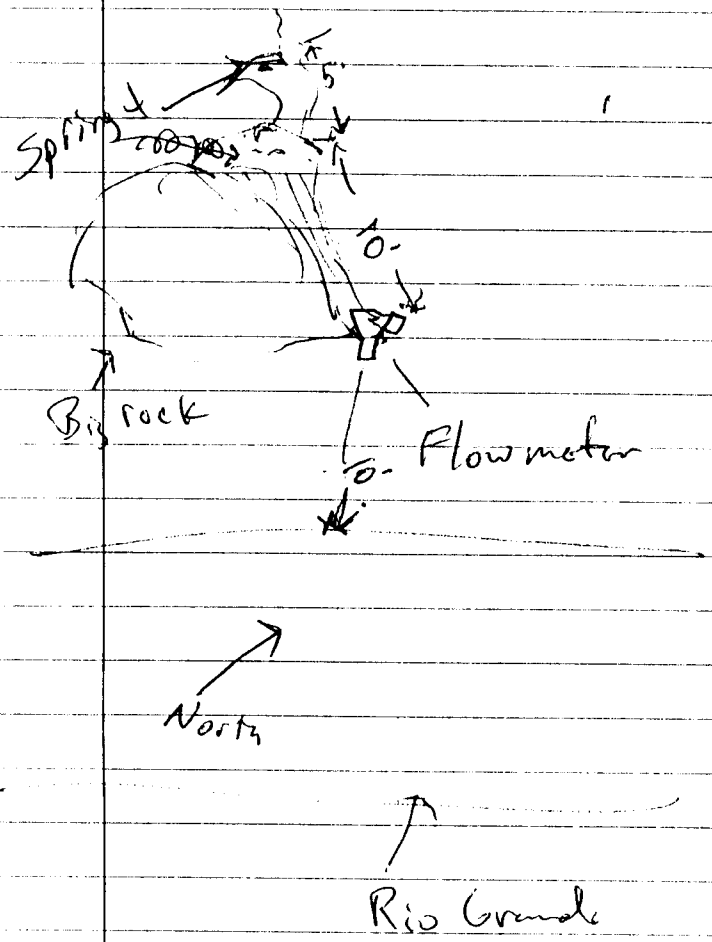
LANL 11/1/01
Los Alamos, NM WAA R00745

0735 arrived @ Trail head
Dave Rogers, Ryan Ramoro,
LANL, Wally O'Rear &
Tami Engle, Techlaw
Kim Corenzow, Steve Yanazake,
Michael Dale, Mark Goffman,
Dave Baggett, NMED

Partly Cloudy, 45°F
light wind <5 mph

0845 arrived @ Spring 4C

Michael Dale NMED
and Wally O'Rear are
setting up equipment for
0850 Spring 4C to go to Spring 4C
Left Spring 4C
0853 Arrived @ Spring 4
Tami Engle, Techlaw and
Wally O'Rear, Techlaw, Dave
Rogers, LANL will be
sampling. Dave Rogers
will ~~split~~ sample his own.






LANL 11/1/01
Los Alamos WA#R06745

0855 Ryan Ramarro LANL is setting up a water flow meter down stream approximately 10 feet from spring
Will use peristolic pump
0900 Began Sampling for SP-4
Water appeared clear
0909 Completed Sampling SP-4
0900 Sample Time for Spring #4
0910 Water Flow 0.09 cfs from Ryan Ramero, LANL

0915 Began taking field parameters.
All springs will be sampled for
Analytes are perchlorate, Low-level tritium, dissolved cation, anions, non-metallic inorganics (nitrate as N, ammonia, TKN, phosphate) and nitrogen isotopes.
0911
7.14 pH
16.3 Temp °C
From LANL Conductivity 208
Turb 103 NTU
7.09 pH Temp 16.7

Walt Gilson 11/1/01



LANL 11/1/01
Los Alamos, NM WA# R06745

0920 Completed sampling and field activities @ Spring #4

0923 left Spring #4

0937 arrived @ Spring #4C

0940 David Rogers began sampling. He placed the sampling containers in the water to collect his sampling.

0942 David Rogers completed sampling

0944 Tech Law Team began sampling for Sample SP-4C

0944 Sample time for SP-4C
GPS N 35° 48' 18.7"
W 106° 11' 35.7"
Battery is Low for the GPS unit

1002 Completed sampling

LANL 11/1/01
Los Alamos, NM WAtt R06785

1005 Started Field Parameters for Spring #4C

Conduct 216 mc/cm
Temp 17.2 °C
pH 7.28 @ 17.1 °C
Turb 105 ppm

1010 Roll 1 Photo #10
Photo of Spring #4C looking SW. Wally O'Rear photo.
T. Engle Witness

1011 left Spring #4C

1022 David Rogers LANL stopped @ 4B spring. He is taking some samples

1034 Rogers completed sampling

1035 Steve Yanazak will take field parameters and take a VOC sample.

11/1/01
Wally Dale



LANL 11/1/01
Los Alamos, NM WBS# R06745

1037 Field Parameters for 4B Spring
pH: 7.26 @ 17.4°C
Temp: 17.5°C
Conductivity: 236 mc/cm
Turbidity: 115 ppm

Overcast skies
1041 Completed Field Parameters

1045 left Spring 4B

1128 Arrived @ Spring 4A
1126 David Rogers began sampling
1129 David Rogers Completed sampling

1134 Qx 345 cfs Water flow rate. Taken by Ryan Ramirez He stated that it was approximately 80% of the actual flow rate

LANL 11/1/01
Los Alamos, NM WA# R067ES

1146 Field Parameters for 4A
pH ~~6.83~~ 7.63
Temp 21.3°C
Conductivity: 193
Turbidity 94 ppm
Partly Cloudy Temp 68°F
1150 Began Sampling @
SP-4A, Sampling Time 1150
for SP-4A
1202 Completed Sampling 4A

1207 Roll #1 Photo #11
Photo of Spring 4A
Looking SW Photo by W. O'Rourke
Witness: Tami Eng6

1210 Left Spring #4A

1220 Arrived @ Spring #4AA
1225 David Rogers is collecting
his samples.
1229 David Roger Completed
Samples

LANL 11/1/01
Los Alamos, NM WA# R06745

1230 Started sampling SP4AA
1238 completed sampling 4AA
Sample # SP-4AA
1240 Field Parameters
pH 7.24
Temp 19.1 °C
Conductivity: 211
Turbidity 103ppm

1241 0.025 cfs Water flow
measurement

1250 left Spring # 4AA
1251 Came back to shoot
photo

1252 Roll #1 Photo #12
looking North
Photo of Spring 4AA
photo by: W. O'Rer
witness: T. Engle

1253 left Spring 4AA
1340 arrived @ cars

LANL 11/2/01
Los Alamos, NM WA# R06745

Techlaw will be sampling soil in South Fork - Acid Canyon

1023 arrived @ acid Canyon

1031 had a H+S meeting

1100 arrived @ upper cleanup area

1110 selected areas to sample. One sample will be for John Young, NMED. We will not analyze for that sample
PU-10283 will be John Young's sample

Sample Team include Tami Boyle, Wally O'Rear, TechLaw, @ Steve Reneau, LANL (ER), + Steve Yanazak

LANL 11/2/01

Los Alamos WA#R06745

1117 Sampling Began @ PU-10283

1120 GPS location

35 : 52 47.5 N

106 18 14.4 W

1123 Completed sampling for PU-10283. This will be for John Young

Sample is location 187 meter from the road

1125 Roll #1 Photo #13

Photo of sample PU-10283

Looking South photo by W. O'R.

Witness by: T. Eagle

1126 Arrived @ Sample location PU-10284

Will analyze for TAL Metals, PCB,

Will collect for MS/MSD

1127 Started Sampling for PU-10284

LANL 11/2/01
Los Alamos, NM WA# R06745

1133 GPS
35 53 08.3 N
106 18 25.9 W

The sample is located
between PU-10274 & PU10275
① 133 meters from upstream pouch
1138 Completed Sampling

1143 arrived at sample
location PU-10285
This location will also be

1144 went back to take
a photo of sample location
PU-10284
1145 Roll #1 Photo 14
Photo of PU-10284 sample
location looking south
Photo by W. O'Rea
Witness by T. Engle

1146 Sampling began ②
PU-10285

LANL 11/2/01
Los Alamos, NM RWA# RU6745

1149 GPS 35 30. 0.95 N
106 18 26.3 W

1150 Completed Sampling
@ PU-10285

1152 Photo 15 Roll #1
Photo of sample location
PU-10285. Looking South
Photo by: W. O'Rear
Witness: T. Engle

1154 left PU-10285

1156 arrived @ PU-10286
we will pull a duplicate
sample @ this location
It will be PU-110286 @ 12:05
1157 Began sampling for PU-10286
1158 GPS 35 53 10.6 N
106 18 25.9 W
1200 Completed sampling
1203 Roll #1 Photo #16
Photo of sample location

LANL 11/2/01

Los Alamos, NM WA#R06145

PU-10286 Looking South

Photo by: W. Orr

Witness: T. Engla

1210 left acid canyon stream bed.

We were checked - RTC's personnel out of exclusion zone.

1215 Signout @ Trailer

1238 left remediated area

1250 Arrived @ Acid Canyon approximately 200 yards SW of Canyon Road where new apartment construction is currently on going.

The soil is on the north bank 8 feet North of a marked tree. The

LANL 11/02/01
Los Alamos, NM WA#R06745

Tree is marked with orange fluorescent paint

1255 started sampling for sample AC-01. NMED will split.
Sample time is 1255
The sample location is where 2 tributaries meet.
Approximately 140' NW of main Acid Canyon

1304 Completed Sampling

1305 Roll #1 Photo #~~18~~ 17
Photo of Sample location for AC-01. Looking East
Photo by: W. O'Rourke
Witnessed by: T. Eng

1307 Roll #1 Photo #18
Photo of Sample location AC-01 looking NE

LANL 11/2/01
Los Alamos, NM WAT R06745
Photo by: W. O'Rear
Witness: T. Eagle

1333 left Acid Canyon

1320 Recieved notes on locations for samples PU-10285 + PU-10286.

At PU-10285 @ 179 meters from upstream reach

At PU-10286 @ 205 meter from the upstream reach

# Logbook 5

Blueline®

# Columnar Book

| Subject | Los Alamos National Laboratory Sampling Points | | |
|---|---|---|---|
| From | 10/30/01 | To | |

Green Paper

8 1/4" x 5 5/8"

210 mm x 143 mm

**SERIES A 1750**

| | |
|---|---|
| **A 1750.50** | Record |
| **A 1750.51** | Single Entry Ledger |
| **A 1750.52** | Journal |
| **A 1750.53** | Cash |
| **A 1750.54** | Double Entry ledger |

**100** Numbered Pages

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# Field LogBook

for

Los Alamos National Laboratory
Los Alamos, New Mexico

provided to

U S EPA, Region 6
1445 Ross Avenue, Ste 1200
Dallas, Texas 75202-2733

by

TechLaw, Inc
750 N. St. Paul Ave Ste 600
Dallas, Texas 75201

Work Assignment No.: R06745
Contract No.: 68 W-99-017

LAN

WA # RU2745

Los Alamos, NM

10/30/01

0845 T. Engle, Technician, K. Grazow, NMED OB, Andy Crowder, Washington Group (ER Contractor) depart LAPP-3 for LADF(A) 1.1. W. O'Reon, Technician M. Drake, NMED, Jim Jordan Daniel B. Stephens (ER Contractor), Lorenzo Martinez, LANL ER Group will sample from LADP-3 while the other group samples from LADF(A) 1.1.

0900 Team B (T. Engle, K. Grazow, A. Crowder) Arrive at LADF(A) 1.1. to begin setup procedures.

During the ER (Environmental Restoration) Group Health & Safety Concerns, A. Crowder will be conducting all direct contact with the WUI, and including sampling completion.

A health and safety meeting was held earlier at the Washington Group Office; however, a tailgate briefing will be conducted at site.

Temperature is approximately 70° F, clear skies, no rain in forecast, no breeze felt.

Jim Jordan 10/30/01

LANL WAH R0.745
Los Alamos, NM 10/30/01

Purge water for this location will be collected into A 55-gallon drum. Washington Group will be responsible for collected purge water.

An MS/MSD And duplicate sample will be collected at this location.

This well will be purged by bladder pump.
Samples collected at this location will be collected from bladder pump

0915 Nitrogen cylinders And applicable hoses were turned on at 0915. Adjustments to the pump control box are being made by A Crowder.

Database for this well stated that Total depth is 310.2 ft.

Water depth is not DATE known As water level is not taken. Bladder pump in place will not allow for measurement

05

10/30/01

LAN WA# R01745
Los Alamos, NM 10-30-01
4 inch diameter of casing at LADI(a) b.l.

A. Crowder stated that 49 gallons will be purged from this well.

0939 Water Quality Meter, Horiba, calibrated by Field Team members.

0942 Readjustment to the bladder pump occured.

Data from previous sampling event at this location was used to determine the amount of water purged.

Calibration information
pH - 3.99
Conductivity - 4.51 mS/cm
Turbidity - 0 NTU
DO - 10.75 mg/l
Temp - 13.6 °C
Salinity - 0.23%

We will not collect DO however, as Horiba will measure ambient air at site for calibration purposes

LANL WA B R0674S
Los Alamos, NM 10-30-01

1000 Adjustments are being made to the bladder pump valves. Air is being leaked from the connection to the well cap valve.

1002 View of LADT(a) 1.1 including nitrogen cylinders, bladder pump box, purge drum.
Direction: N. By: T. Engle
Roll 1 Frame 2. Witness: K. Granzow

1101 Following readjustment of the pump control and connection to the well cap valve, no water has been purged although the pump has been turned on for approximately 2 1/2 hours.

1105 The amount of air being ran to the well was readjusted to 175 psi.

1105 Purge began.

Donald Engle
10-30-01

LANL WAA RW0745

Los Alamos, NM 10-30-01

1112 Initial Field Parameters

pH ~~7.57~~ TE 10/30/01 : 8.12

Conductivity : 0.159 mS/cm

Turbidity : ~~0~~ TE 10/30/01 1.6 NTU

Temp : 12.1 °C

Salinity : 0.0 %

DO : 9.82 mg/L

Pat Longmire (LANL) calculated the well purge volume

At each cycle, the well purges 500 mL.

Pump cycle is every 53 seconds; 0.5 L every minute or 1 Liter every 2 minutes. Approximately 2 hours 11 minutes for every well boring.

1126 cycle time was readjusted to make it shorter.

1127 Cycle time was readjusted to previous cycle

10-30-01



LAM WA # R96707
LOS ALAMOS, NM 10-30-01
time as the volume purged was less.

LATE ENTRY 0915
Max Moses, EHS-18 joins field team
At LADI(a) 1.1

1130 W. O'Rear, Techlaw, A. Bonar, Washington Group
H. Dale, NMED,
J. Sena, LANL ESH-18,
L. Martinez, LANL ER.
join the LADI(a) 1.1 field team sampling
group.

1157 pH 9.30
conductivity 0.308 mS/cm
Turbidity 0.98 NTU
Temp 9:TE 10/30/01 10.80 C
Salinity 0.01 %
DO 9.30 mg/L

LATE ENTRY 1145
5 1/2 gallons of purge water was dumped into the
55-gallon drum

10-30-01



LANL WA # RA-707

Los Alamos, NM 10-30-01

Field Parameters will be collected every six gallons (approximately).

NMED also collected field parameters at ~~1255~~ 1155 ~~SITE~~ 10/30/01.

pH 9.31

Temp 12.2 °C

Cond: 1.91 µS/cm

TDS: 93 ppm

1220 Second 16-gallon bucket dumped into 55-gallon drum. This bucket was approximately ~~10.5 SITE~~ 10/30/01 5.5 gallons.

1234 Field Parameters

pH 8.53

conductivity 0.220 mS/cm

Turbidity 108 NTU

Temp 10.6 °C

Salinity 0.00 %

DO 10.17 mg/L

10-30-01

LANL WA #RAL743

Los Alamos, NM 10-30-01

NMED Field Parameters

1230 pH 7.39 @ 12.1°C

sp Cond 142 µS/cm @ 11.7°C

TDS 70ppm

1249 Nitrogen cylinders are being changed out.

1255 Purging recommenced.

1300 Field Parameters are conducted

pH 7.04 su

conductivity 0.176 mS/cm

Turbidity 115 NTU

Temp 10.3°C

Salinity 0.00%

DO 10.88 mg/L

NMED Field parameters

pH 7.08 @ 11.1°C.

Conductivity 120µS/cm @ 11.9°C

TDS: 58 ppm

10-30-01



LANL WA # R0L74S
Los Alamos, NM 10-30-01

1331 Third bucket of purge water dumped into 55-gallon drum. Bucket was Approximately full of 5 1/2 gallons.

Field Parameters conducted:
pH 6.73su
conductivity 0.158 mS/cm
turbidity 134 NTU
temp ~~8.72~~ 10/30/01 10.5°C
Salinity 0.00 %
DO 8.84 mg/l

Andy Crowder just informed Field Team Members that MW04 is dry

WMED Field parameters
pH 6.75 @ 11.8°C
sp Cond 109 µS/cm @ 12.2°C
TDS: 53 ppm

1414 Field Parameters
pH 6.63su
Conductivity 0.150 mS/cm
turbidity: 131 NTU

LANL WA#RO0743

Los Alamos, NM 10-30-01

DO: 10.89 mg/L

Temp: 10.5°C

Salinity: 0.00 %

NMED Field Parameters

pH 6.68 su 11.5°C

Conductivity 104 µS/cm @ 11.1°C

TDS 51 ppm

1429 Fourth bucket of purged water dumped into 55-gallon drum. Bucket was approximately 5 1/2 gallons full.

1435 Field parameters conducted

pH: 6.57 su

Conductivity: 0.145 mS/cm

turbidity: 119 NTU

DO: ~~10.TE~~ 12/3/01 10.98 mg/L

Temp: 10.3°C

Salinity: 0.0%

GPS unit:

35° 52' 31.6" N

106° 17' 13.7" W

LANL WA # RC-745

Los Alamos, NM 10-30-01

NMED Field Parameters

pH 6.66 su @ 11.1°C

cond 104 µS/cm @ 11.6°C

TDS 49 ppm

LATE Entry: 1420

John McCann, LANL and

Steve Pierson, LANL Arrived on site.

Fifth bucket of purge water dumped into

55 gallon drum. bucket was approximately

3/2 gallons full.

1510 Field Parameters Collected:

pH: 6.57 su

Conductivity: 0.142 mS/cm

turbidity: 109 ~~10.9~~ NTU 10/30/01

DO: 11.37 mg/l

Temp: 10.2°C

Salinity: 0.0 %

NMED Field Measurements

pH: 6.60 su @ 10.6°C

Conductivity: 101 µS/cm @ 11.3°C

TDS: 49 p.

LANL WA#R06745

Los Alamos, NM 10-30-01

1539 1330TE 10/30/01 Field Parameters collected:

pH: 6.60 su

Conductivity 0.142 mS/cm

Turb: 107 NTU

DO: 8.92 mg/L

Temp: 10.2 °C

Salinity: 0.0%

1545 1345TE 10/30/01 Cylinder is changed At LAOI(a)1.1

LADD will be the duplicate sample At LAOI(a)-1.1.

1547 1349TE 10/30/01 Nitrogen is reentered into system.

Approximately 35-gallons have been purged at this well. Due to time / health & safety constraints, sampling will commence. The well is approximately into into TE 10/30/01 the third well bowing.

1557 Sampling At LAOI(a)-1.1 begins.

Duplicate sample TE 10/30/01 LADD is 1615 sample time

10-30-01



LANL WA#PCL7PS
Los Alamos, NM 10-30-01

Filtered Samples were filtered using 0.45 micron filter.
Analytes included: Dissolved TRACE METALS Are 23 TAL Metals + DOC.

1727 Sampling Complete

1729 Pump Shut down

Unfiltered Samples include: Major Anions (F, ALO3, SO4, Cl, Br), TDS, TSS, 23 TAL metals (TOTAL), Total Radionuclides (238/239/240 Pu, 90Sr, 241Am, isotopic U, gamma spec) tritium (U. of Miami enrichment), perchlorate, CN (TOTAL), NO2/3, + DOC.
VOCs were not collected at this location due to historically no organic problem and depth to water.

1815 10/30/01 Arrive at NMED to begin packing & shipping procedures.
Complete of day. 10/30/01

10-31-01



LANL WA # RAFFES

Los Alamos, NM 10-31-01

0730 T. Engle departs NMED office with Beth Gray, of LANL EHS-18 to meet Bob Beers, LANL EHS-18, to sample Buckman Wells 1, 2, 3, 4, 6, 7, 8.

Temperature is approximately 60°C Rain is forecasted; however skies appear relatively clear.

On 10-30-01 David Rogers phoned T. Engle to inform T. Engle of potential Health and Safety Concerns. There has been rodent excrement in the well houses of the Buckman wells and due to its presence, David Rogers has notified Bob Beers to not sample at those locations due to Hanta Virus concern. T. Engle informed Rich Mayer, USEPA via voicemail message.

LANL WA# BUL74S

Los Alamos, NM 10-31-01

The following parameters will be analyzed at the Buckman wells: Major Anions (F, HCO3, SO4, Cl, Br, Flaride), cations (Ca, Mg, K, NA, Si, Li, Mn, Fe, Al, B, Ba, Sr, Arsenic), tritium, low detection perchlorate (Accutabs at wells 1, 2, 7), perchlorate (wells 3, 6, 4, 8) Total Radionuclides & 90Sr, Isotopic Uranium, Alpha Spec, Total Uranium ICP-MS, U-235/U-238 ICPMS, Radium, Nitrate/Nitrite.

0820 Bob Beers, EHS-18 and Bruce Gallagher, EHS-18 arrive at meeting location. Field team awaits the city contact for sample collection.

0845 IVA of City of Santa Fe arrive, Depart for Buckmanh

0913 Arrive at Buckmanh
35° 49' 08.8" N
106° 08 35.1" W

Jamie Linder 10-31-01

LANL WA#R0067495
Los Alamos, NM 10-31-01

Quarter inch tap

0921 Tap turned on for purge
Estimated Pump rate 850 gallons/minute

0924 Roll 1 Frame 3 N T. Engle
View of Buckman 6 well while purging.

0928 Sample Began

0931 Field Parameters collected:
pH 4.73
Cond 0.964 mS/cm
Turb 1 NTU
DO 5.74 mg/L
Temp 22.8°C
Salinity 0.03%

0955 Sample Complete

1000 Depart for Buckman 4

1006 Arrive At Buckman 4
35°49' 14.0" N (GPS Units)
106° 08' 57.2" W

10-31-01

10-3-01



LANL WA # RA-74J

Los Alamos, NM 10-3-01

1016 Field Parameters collected

pH ~~7.73 SU~~ TE 10/3/01 6.67 SU

cond 0.872 – 1.19 mS/cm (fluctuating)

turb 0 NTU

DO 4.77 mg/l

Temp 23.0°C

Salinity 0.04 %

Pump rate is 425 gallons/minute

Faucet was turned on ~~ATE~~ 10/3/01 upon arrival by Ira Allemon

1020 Roll 1 Frame 4 SW T. Engle View of Buckman Well 4 while purging

1030 Sample begun

1033 Sampling complete, prepare to depart

1043 Depart for Buckman Well 3

1048 Arrive Buckman Well 3
35° 49' 36.6" N
106° 08' 58.7" W

10-31-01



LANL WA # R0C745

Los Alamos, NM 10-31-01

1055 Roll 1 Frame 5 E T. Engle

View of Buckman well 3 while purging.

Pump was turned on by IRA Aikman upon Arrival 330 gallons/minute

1057 Field Parameters collected:

pH: ~~7.89 SU~~ 10/31/01 7.07 SU

Cond: 0.894 mS/cm

Turb: 0 NTU

DO: 5.72 mg/L

Temp: 24.0°C

Salinity: 0.03%

1112 Sample Began

1115 Sample Complete

1118 Depart for Buckman 2 10/31/01 TE 7

1128 Arrive at Buckman 2 10/31/01 TE 7

35° 50' 02.6" N

106° 09' 06.4" W

LANL WA# RO67HS

Los Alamos, NM 10-31-01

Roll 1 Frank SE T. Graf

1133 Visual of Buckman WELL 7 sampling activities

Faucet was turned on by City of Santa Fe, IRA personnel upon arrival.

1141 Field Parameters collected:

pH 8.16 su

DO ~~0.732 mS/cm TE~~ 5.18 mg/L

Conductivity: ~~1 NTU~~ TE 0.732 mS/cm

~~turbidity 0.732 mS/cm TE~~ 1 NTU

Temp: 26.0°C

Salinity: 0.03 %

1145 Sample began.

1152 Sample complete

Flow rate is 770 gallons per minute at this location.

1200 Depart for Buckman 1

1208 Arrive At Buckman 1

Tom Graf 10-31-01

LANL WA # RCL741
Los Alamos, NM 10-31-01
GPS Coordinates: 35° 50' 07.3" N
106° 09' 32.3" W

1212 Roll 1 Frame 7 NE T. Engle
View of Buckman Well 1 while pumping

Flow rate at this well is
Approximately 550 gallons/minute.

1214 Field Parameters collected:
pH 7.87 SU
Cond: 0.635 mS/cm
turb: 1 NTU
DO: 5.97 mg/L
Temp: 23.9°C
Salinity: 0.02 %

IPA Alkman turned faucet on upon
Arrival at Buckman Well 1. He stated
that this well had a history of pumping
Air. And that the city officials were not
sure why, or where it was coming from.

1223 Sampling began

LANL Los Alamos, NM WA # R016745
~~Buckman~~ TE 10/31/01 10-31-01

1230 Sampling complete

1240 Depart site for Buckman

1314 ~~1314~~ Arrive At Buckman well 8
35°49' 58.4" N
106° 09' 54.1" W

This well has been ~~running~~ TE 10/31/01 operating continuously.

1316 Roll 1 Frame 8 E T. Engh
View of Buckman well 8 while ~~pumping~~ TE 10/31/01 sampling.

This well pumps flow rate is approximately 550 gallons / minute

1317 Field Parameters collected
pH 7.66 su
cond 0.615 mS/cm
turb 1 NTU
DO 6.03 mg/L
temp 25.6°C
salinity 0.02 %

Dan Alert
10-31-01

LANL
Los Alamos NM

WAB RC-749
10-31-01

1331 Sample begun

1339 Sample complete

1350 Depart for Buckman Well 2

1359 Arrive At Buckman Well 2
GPS coordinates:
35° 49' 44.9" N
106° 09' 23.9" W

1402 Roll 1 Frame 9 W T. Engle
View of Buckman Well 2 being sampled

1401 Field Parameters collected
pH 7.25 su
Conductivity: 0.746 - 1.01 mS/cm (fluctuating)
turbidity: 0 NTU
DO: 5.50 mg/L
temp: 24.3°C
Salinity: 0.03%

10-31-01

LANL WA# R2674S
Los Alamos NM 10-31-01

Flow rate at this well is Approximately 300 gallons per minute.

1420 Sample began

1425 Sample Collection complete

This well does not usually run. It began to be purged at 1030 10-31-01. Pump at this well failed about 1 wk ago. Used to pump App 600-800 gal/min.

1430 Depart site for NMED.

1540 Arrive NMED to begin sample shipment preparation.

End / Completion of day sampling Activities.

10-31-01

LANL WAHROL795

Los Alamos, NM 11-1-01

0730 Wohrer, T. Eash depart NMED with M. Dale, K. Grazzow, M. Kaufman, D. Baggett, and S. Yanicski to arrive at trailhead to sample springs 4A, 4AA, 4C, and 4.
This field team will split into separate teams to sample all. This field team will meet with D. Rogers, LANL.

The current temperature is 41°C, clear skies, however, snow is forcasted. Slight breeze. Watching of snakes, fallen trees caused by fire.

These springs are located off of LANL property and are on County land.

0732 Arrive at trailhead
met with David Rogers, ESA-18, LANL
Ryan Romero EHS-18, LANL

0740 Depart for site
T. Eash, Tech Law, S. Yanicski, NMED,
M. Kaufman, NMED and a LANL guide

Chris 11-1-01

11-1-01



LANL WA B ROLE 745

Los Alamos, NM 11-1-01

Will be on one team.

That plan was aborted. The people mentioned previously stayed on one team.

11-1-01

# NMED Field Notes

August 13, 2001
0545 - Arrive @ office

0555: pH Calibration #F slope = 98.6
Standards 4, 7 & 10 #C slope = 98.5

0700 - Arrive @ TA-18
0735 - Arrive @ TA-18 Spring

0745: ID: TA-18 Spring (duplicate, MSD's original samples)
Date: 8-13-01
Time: 0745 Flow: 2.3 gpm [Flow extends 10m down stream]
Sample #1:

*Organics for all three samples Collected at the same time
Start: 0745
End: 0810

Inorganics NF/NA (All samples)
Start: 0815
End: 0819

Inorganics NF/$H_2SO_4$ (all samples #1, 2 & 3)
Start: 0822
End: 0830

Inorganics NF/NaOH (CN)
Start: 0833
End: 0842

Inorganics NF/nitric
Start: 0836
End: 0905

TA-18 Spring Field Parameters
#F pH: 5.77 S.U. @ 13.8°C Collected @ 0830
Sp Cond: 213 µS/cm TDS: 103 ppm @ 14.0°C

Inorganics F/nitric
Start: 0906
End: 0916

Dissolved Organic Carbon F/NA
Start: 0850
End: 0854
} need to preserve w/ $H_2SO_4$ @ shop
*rinsed bottles twice w/ filtered water.

0918 - Overal Sampling.

0935 - Arrive Threemile Spr

ID: Threemile spring (20m downstream from source; low flow @ source)
Date: 8-13-01
Time: 0938 start; end 1005
pH: 6.07 S.U. @ 9.7°C
Sp Cond: 183 µS/cm @ 9.8°C; TDS: 91 ppm } Field data @ 1005
Flow: ≈10 gpm Flow extends ≥ 100m

Sampling Times for Threemile Spr.

Organics NF/NA + 1L NF/$H_2SO_4$
Start: 0938
Finish: 0944

Inorganics NF/NA
Start: 0950
Finish: 0952

Inorganics NF/$H_2SO_4$
Start: 0953
Finish: 0955

Inorganics NF/NaOH (CN)
Start: 0956
Finish: 0958

DOC F/$H_2SO_4$
Start: 0959
Finish: 1000

Dissolved Metals/Rad F/nitric
Start: 1001
Finish: 1004

1005 - End Sampling Threemile Spring

ID: MW-3
Date: 8-13-01
Time: 1110
DTW: 16.65' North Casing (GTOC)
TD: 23.2'

ID: MW-2
Date: 8-13-01
Time: 1113
DTW: 16.79' North Casing (GTOC)

ID: MW-1
Date: 8-13-01
Time: 1117 North
DTW: 16' (BTOC)
TD: 27.13'

ID: MW-4 (Unable to locate well; well probably covered w/ debris, sediment, etc.)
Date: 8-13-01
Time: 1119

1155 – Arrive @ BG-4

ID: BG-4
Date: 8-13-01
Time: Begin purge @ 1211 (see next page)
pH: see next page
Sp. Cond: see next page.
DTW: 5.81 (North BTOC)
TD: 8.6'

∴ Purge Calculation 4"

$$\begin{array}{r} 8.60 \\ -\ 5.81 \\ \hline 2.79' \end{array} \text{ of } H_2O \qquad \begin{array}{r} 4\ 2 \\ .653 \\ 2.8 \\ \hline 5224 \\ 2306 \\ \hline 1.8284 \end{array}$$

$0.653 \times 2.79'' =$ 1.8 per bore

$$\begin{array}{r} 2.8 \\ .653 \\ \hline \end{array}$$

3

5.4 gal/this well

4" diameter Purge Volumes BG-4

| | TIME | Vol. (L) | pH | Temp | Sp Cond |
|---|---|---|---|---|---|
| 1 Liter | 1201 | | 6.53 | 17 | 351 |
| | 1206 | 9 Liters | 6.05 | 15.7 | 331 |
| | 1211 | | 5.96 | 15.9 | 327 |
| | 1212 well dry 12:22. | | | | |
| | 1215 | (9 Liters purge from 1211 to 1222) | | | |
| | 1217 | | | | |

after 1st L flow rate increased to 0.75 L per minute
well went dry 12:22
started again 12:28
1300 – no sampling @ BG-4; EPA will try after they sample MW-8 or will try on wednesday the 15th; exit site (no SY) at 1340, arrive @ Calsite Rock @ 1400;

no lunch
1500 – exit office and log; rain from 2100–1200 0.4" @ home
(SB4 from 5-8) (9.5 hrs worked; flex @ 6.5 hrs)

August 14, 2001
0900 – Arrived office

(current Flow @ 150 gpm)
100: ID: Pueblo @ SR 502, no samples, sampler set @ sampler tubing bized.
1015 – exit Pueblo @ SR 502

8/14/01 Well Sampling w/ Tech Law

pH calibration: 4, 7, 10 solutions
meter F; time: 0640
slope: 98.4 @ 23.8
recheck w/ 7: ~~98.4~~ @ ~~23.8~~ °C
: 7.03 @ 23.6 °C

date: 8-14-01
well MW12
TD (TOC): 40.49'
DTW: 9.48 at pipe mark

well vol 40.49 - 9.48 = 31.01
2" diam correlator (0.163) ← from table ER
1 purge → 5.05
3 x → 15.16 gal
~ 15 gal total

Purge # 1 ~ 5 gallons in plastic bucket
initial pH: 6.24 @ 14.2 °C
cond: 240 µS/cm @ 14.3 °C
turb: 21.5 NTU
start time: 0926
at # gallons: 1
time @ 1 bore end: 10:00

we MW-12 date: 8-14-01
Purge # 2 ~ 5 gallons in bucket
pH: 6.06 @ 15.6
cond: 235 @ 16.1 °C
turb: 4.04 NTU
time: 10:00
at # gal: 7
time at 1 bore end:

Purge # 3 ~ 5 gallons in bucket
initial pH: 6.02 @ 15.9 °C
cond: 239 @ 16.3 °C
turb: 4.09 NTU
time: 10:20
at # gal: 10
time at 1 bore end:

well: MW-12 cont'd
Purge # 3

| | |
|---|---|
| pH: 6.18 @ 15.6 °C | pH: 6.16 @ 15.4 °C |
| cond: 241 @ 16.1 °C | cond: 240 @ 16.2 °C |
| turb: 4.14 NTU | turb: 4.53 NTU |
| time: 10:28 | time: 1035 |
| at gallons: 13 | at gallons: 14 |

pH: 6.18 @ 15.6 °C
cond: meter out
turb: 4.10 NTU
time: 1045 end purge at: 1047
@ gallons: 16 end log: SY

date : 8-14-01
well : MW-13
TD(TOC) : 40.47'
DTW : 10.68' at pipe mark

well vol
2" diam conv factor
end log : SY

date : 8-14-01
well : MW-14
TD(TOC) : 43.19'
DTW : 11.51 at pipe mark

well vol
2" diam
end log : SY

date : 8-14-01
well : MW-15
TD(TOC) : 34.20'
DTW : 9.29' at pipe mark

well vol
2" diam
end log : SY

date : 8-14-01
well : MW-9 → well not marked
TD(TOC) : 25.16'
DTW : 13.68' top of tube

well vol → 25.16' − 13.68' = 11.48'
2" diam conv factor (0.163) from Table ER
1 purge → 1.87 gal
3 x → 5.6 gal
~ 6 gal total

8-14-01 (date)
purge 1 → 3 well: MW-9
initial pH: 6.27 @ 16.4
★ cond: 231uS/cm @ 16.0 °C
turb: 10.4 NTU
start time: 12:05
at # gall: 2 gal

pH: 6.31 @ 15.8 °C
★ cond: 231uS/cm @ 16.0 °C
turb: 4.84 NTU
time: 12:20
at # gal: 3

pH: 6.31 @ 16.4 °C
★ cond: 231uS/cm @ 16.0 °C
turb: 1.45 NTU dup → 1.97 NTU
time: 1228
at # gal: 4

pH: 6.43 @ 16.0 °C
★ cond: 233uS/cm @ 15.2
turb: 1.45 NTU
time: 1232
at # gal: 6

★ used LANG HACH cond meter
NMED cond meter OUT

well: MW-9 date: 8-14-01
pH: 6.30 @ 15.9 °C
★ cond: 233uS/cm @ 15.8 °C
turb: 1.17 NTU
time: 1245
at # gall: 8

end purge at: 1248 SY
end log

date: 8-14-01 time: 1342
well: MW-6 → Flush mount in flowpath in E of log cabin
TD(TOC): 24.99' water in hole
DTW: 10.67' around well
end log: SY

well: MW-11 → Flush mount
TD(TOC): 43.89'
DTW: 19.26'

well vol → 43.89' − 19.26' = 24.63
2" diam corr factor (0.163) from EA Table
1 purge → 4.014
3 x → 12.00
~ 12 total

end log: SY

date: 14-01 time: 1342
well: MW-10
TD (toc): 27.89
DTW: 10.12'

well vol → 27.89' − 10.12' = 17.77'
2" diam conv factor (0.163)
1 purge → 2.89
3 X → 8.68
total ~ 9 gal

8-14-01
purge MW-10 # 1 → 3
initial pH: 6.04 @ 16.8 °C
* cond: 234 uS/cm @ 16.6 °C
turb: 13.5 NTU
start time: 1618
at gall: 1

pH: 6.00 @ 16.1 °C
cond: 228 uS/cm @ 15.7 °C
time: 1625
at gal: 3
turb: 8.66 NTU

8-1-01 well: MW-10

pH: 5.96 @ 15.8 °C
* cond: 227 uS/cm @ 15.7 °C
turb: 7.22 NTU
time: 1640
at gal: 5

pH: 5.96 @ 15.6 °C
* cond: 228 uS/cm @ 15.3 °C
turb: 6.78 NTU
time: 1649
at gal: 7

pH: 5.89 @ 15.0 °C
* cond: 228 uS/cm @ 15.1 °C
turb: 6.26 NTU
time: 1656
at gall: 8

pH: 5.88 @ 14.9 °C
* cond: 228 uS/cm @ 14.9 °C
turb: 6.27 NTU
time: 1700
at gall: 9

8-14 21
end-of-day pH calibration: 4, 7, 10
meter F > time: 1734
slope: 97.1 @ 28.5 °C
recheck w/ 7: 6.99 @ 28.4 °C

end log: SY
time: 1740

# APPENDIX A

## Field Logbooks

# Logbook 1

BLUELINE

# RECYCLED ACCOUNT BOOKS

Green Paper
8¼" x 5⅝"
209 mm x 143 mm

Subject: LANL SAMPLING
LOS ALAMOS, NM
From: 7/30/01 To: 8/17/01

*"In order to better serve you, Dominion Blueline has decided to increase the spacing between the lines of its accounting books. This decision was based on numerous suggestions from many of our loyal customers.*

*We at Blueline are committed to total customer satisfaction and trust that this modification will meet with your approval."*

*The Blueline Team*

**A 1750 SERIES**

| | |
|---|---|
| **A 1750-50** | Record |
| **A 1750-51** | Single Entry Ledger |
| **A 1750-52** | Journal |
| **A 1750-53** | Cash |
| **A 1750-54** | Double Entry Ledger |

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# Field Log Book

For

LANL
Los Alamos, NM

Book 1 of 3

provided to
US EPA, Region 6
1445 Ross Avenue, Ste 1200
Dallas, TX 75202-2733

by

Tetra Tech, Inc
750 N. St. Paul Ave, Ste 600
Dallas, TX 75201

WA Assignment No.: B06745
Contract No.: 68-W-99-017

# APPENDIX B

## Chronological Summary of Field Activities

# Chronological Summary
# 2001 Sampling Mission
# Los Alamos National Laboratory

This section provides a brief summary of all sampling activities that were conducted by TechLaw (TL) staff from July 30 through August 18, 2001, and from October 29 through November 2, 2001, at the Los Alamos National Laboratory (LANL) located in Los Alamos, New Mexico. This summary is based upon TL's daily logbooks and does not include all recorded details. Copies of the logbook are included in Appendix A. The analyses completed for each well may be found in Table 5.

## July 30, 2001 (Monday)

**Weather:** Temperature approximately 80° Fahrenheit, clear.
**Proposed Work:** Begin groundwater sampling at the Test Wells located on LANL property.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; K. Granzow, NMED; M. Maes, LANL (ESH-18); and N. Martinez, LANL (ESH-18).

**Activities:** Wally O'Rear, TL field team leader and Tami Engle, TL team member, arrived at the ESH-18 building at 0800 hours to meet with David Rogers, LANL, to discuss health and safety concerns and sampling logistics prior to starting the sampling activities. It was decided the TL team would follow the schedule established by Max Maes, LANL, and Nicholas Martinez, LANL student intern. At 1058 hours, the field team arrived at Test Well (TW) -4. This area was within a fenced area that was slightly wooded.

At 0700 hours, prior to the TL teams' arrival, Max Maes and Nicholas Martinez began purging at TW-4. Sampling commenced at 1100 hours; therefore, four (4) hours of purging had taken place prior to sample collection. One set of field parameters had been collected by LANL immediately prior to the sampling. At 1105 hours, NMED also collected field parameters. At 1150 hours, the sampling was complete and the field teams departed the site.

At 1228 hours, the field teams arrived at TW-3. Kim Granzow was not in attendance for this well sampling. Before the TL team arrived, Max Maes and Nicholas Martinez had begun purging this well at 0850 hours. TW-3 was purged and sampled at a flow rate of approximately two gallons per minute (gpm). At 1242 hours, field parameter measurements were collected using the LANL water quality meter data. Following this data collection, the well was sampled. Sample collection at TW-3 was complete at 1303 hours. The field teams departed the site at 1312 hours.

The next test well to be sampled was TW-2A. This well was not purged due to the inadequate amount of water in the well and slow recharge rate. The well depth and water level were not recorded at this well. Sampling time at TW-2A was 1400 hours. The concrete pad was noted in the TL field logbook as being in poor condition. During the collection of samples at TW-2A, the well became dry and the field teams waited approximately thirty minutes for groundwater recharge in order to resume sample collection. At 1450 hours the field teams attempted to resume sample collection; however, the well was still "dry." The field teams decided to begin the sample collection process at TW-8, and return to TW-2A within 24 hours to complete the sample suite at this location.

The field teams arrived at TW-8 at 1545 hours. Max Maes and Nicholas Martinez had begun the purging process at 0800 hours. TW-8 was purged and sampled at a flow rate of approximately two gpm. Sampling at TW-8 started at 1550 hours. The sampling team departed at approximately 1615 hours.

Following the sample collection at TW-8, the sampling teams conducted depth-to-water measurements at PCO-1 at 1653 hours and PCO-2 at 1705 hours. The sampling teams then returned to TW-2A to complete the sampling activities at 1735 hours. At 1745 hours, the field sampling team was unable to obtain a complete set of sample parameters. Max Maes indicated that TW-2A had a history of very slow recharge; therefore, Steve Phillips, the TL Work Assignment Manager (WAM), was notified about the lack of recharge from TW-2A. At Steve Phillips' direction, sampling was scheduled to resume the following day. TL collected samples for the following analyses: Dissolved Organic Carbon (DOC), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), perchlorate, anions, and Total Metals and Radiochemistry. TL did not have enough sample volume to collect samples for Volatile Organic Carbon (VOCs) and nitrate/nitrite (N02/NO3). Under ordinary circumstances, VOCs are collected first; however, due to the high flow rate of the water from the well, they were not.

At 1800 hours, the sampling teams departed TW-2A for TW-1. The sampling team began to purge this well at 1820 hours. Purging at TW-1 was conducted at a flow rate of approximately two gpm. Field parameters were collected at 1823 hours. However, TW-1 was required to purge overnight and the field sampling teams departed the sample location for the day. The estimated time needed to purge the well was 8.7 hours. The TL field team departed TW-1 at 1827 hours for the NMED Oversight Bureau office to begin sample shipment preparation.

**July 31, 2001 (Tuesday)**

**Weather:** Clear skies, temperature approximately 70° Fahrenheit, wind estimated three to five miles per hour.
**Proposed Work:** Complete sampling of TW-2A, begin sampling of TW-1, MCO-2, MCO-3, and obtain water lever measurements for MCO-4B, MCO-4A, and MCO-4.9.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member;

K. Granzow, NMED; M. Maes, LANL (ESH-18); and N. Martinez, LANL (ESH-18).

**Activities:** TL team members arrived at TW-2A and attempted to complete the sample collection at 0900 hours. The well had not recharged and there was not sufficient volume to collect the samples. At 0945 hours, the field teams departed the TW-2A sample location and moved to TW-1. Field parameters were collected at approximately 1012 hours and the sample collection began at 1023 hours. At 1100 hours, TL field team departed the location of TW-1.

The field team members arrived at MCO-2 at 1237 hours to commence sampling activities. While attempting to obtain the water level measurement, the water level was below the pump. A sample could not be collected at this site, nor could the depth-to-water measurement. LANL protocol was not to sample, as that would entail removing the bladder pump and possibly contaminating it. The field team then departed the location.

At 1315 hours, the TL field team members arrived at MCO-3. TL took well water measurements and determined that the depth to water was 6.61' below TOC and the total depth of well was 10'6" below TOC. Based on these measurements, LT estimated that three well volumes equals 4.5 gallons. At 1328 hours, purging began using a peristaltic pump. Field parameters were measured at 1335 hours, 1341 hours, and 1346 hours. There appeared to be no draw-down of the well and the water quality measurements were stable. A peristaltic pump was used to sample the well at 1351 hours. Final field parameters were measured at 1434 hours prior to departing the site. At 1445 hours, the samples were packed and iced down in the coolers for preservation.

At 1523 hours, the field team members arrived at MCO-4B to conduct depth to water measurements and collect groundwater samples. Although the bladder pump was encountered at 23.5' below TOC, no water was detected. Since no water was detected, no sample was collected, and the sampling teams departed the location at 1545 hours and arrived at the location of MCO-4A. The TL field team was not able to gain entry into the well for water level measurements at the time because the lock was inaccessible to LANL personnel. According to Max Maes, the well belongs to a group other than ESH-18, and the group uses different locks. The field teams began to look for MCO-4.9, which could not be located. The TL team believed that perhaps NMED had knowledge of this well's location and would therefore wait for NMED's assistance in locating the well. At 1613 hours, the TL team departed the site for the NMED Oversight Bureau (OB) office to prepare the samples for shipment.

**August 1, 2001 (Wednesday)**

**Weather:** Clear skies, approximately 75° Fahrenheit, wind three to five mph.
**Proposed Work:** Purge and sample Well POI-4.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Maes, LANL (ESH-18); N. Martinez, LANL (ESH-18); and J. Kofoed ER, Washington Group.

**Activities:** At 0845 hours, TL team members met with Max Maes and Nicholas Martinez, ESH-18 and Jenny Kofoed, Washington Group, contractor to LANL's Environmental Restoration group, at the location of Monitoring Well POI-4. The water depth was measured at 0945 hours and found to be 162.74' below TOC. Purging activities began at 0953 hours. However, difficulties were experienced as the hose of the bladder pump was leaking. The pumping was stopped and more tubing was acquired. At 1050 hours, purging of the well was restarted. Field parameters were collected at 1100 hours, 1205 hours, 1315 hours, 1330 hours, 1344 hours, 1358 hours, 1412 hours, 1422 hours, 1440 hours, 1457 hours, and 1508 hours. It was decided that following stabilization of three field parameters, sampling could begin without having to purge three well volumes. Sample collection began at 1530 hours. However, sampling was discontinued before all parameters could be collected due to heavy rain at 1750 hours. TL team members departed the site for the NMED OB office to prepare the samples for shipment at 1758 hours.

**August 2, 2001 (Thursday)**

**Weather:** Partly cloudy, approximately 75° Fahrenheit.
**Proposed Work:** To continue sampling POI-4 and to sample MCO-5, MT-3, MT-4.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Maes, LANL (ESH-18); and N. Martinez, LANL (ESH-18).

**Activities:** TL team members met with Max Maes, and Nicholas Martinez, LANL ESH-18, at well POI-4 at 0840 hours to continue sampling. At 1015 hours sample collection was complete and the teams departed at 1030 hours. At 1205 hours the team members arrived at well MCO-5. The depth to water was measured at 1258 hours and found to be 24.60 feet below TOC. The casing is three inches in diameter and the depth of the well was 46.4 feet. Field parameters were collected at 1306 hours, 1315 hours, 1325 hours, 1331 hours, 1336 hours, 1341 hours, 1347 hours, 1352 hours, 1358 hours, 1404 hours, and1412 hours. The sample at this well was duplicated for Quality Assurance/Quality Control (QA/QC) purposes and the duplicate sample was identified as MCO-5B. The sample time for MCO-5B was 1500 hours.

At 1610 hours the field teams departed for MT-3. At 1620 hours, MT-3 was found to be dry. The location was departed at 1628 hours and at 1630 hours, the field teams arrived at MT-4. The team noted that the concrete pad was broken. This well has a two-inch casing. This well was also found to be dry. At 1652 hours, the TL team members departed the location for the NMED OB offices to begin sample shipment preparation.

**August 3, 2001 (Friday)**

**Weather:** Clear skies, approximately 80° Fahrenheit, no wind observed.
**Proposed Work:** Sample Gaging Station (GS)-1 and Well MCO-6.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Maes, LANL (ESH-18); and N. Martinez, LANL (ESH-18).

**Activities:** At 0900 hours, TL team members met with Steven Rae, ESH-18; David Rogers, ESH-18; Max Maes, ESH-18; Nicholas Martinez, ESH-18, and Neil Tapia, ESH-18 to discuss health and safety concerns as well as schedule conflicts and possible modifications.

At 1050 hours, the sample teams arrived at GS-1 to collect the effluent sample (GS-1A). The sample time was 1100 hours. Field parameters were collected at 1130 hours. The sample was collected using a peristaltic pump with tygon tubing placed in the outfall area. All parameters were collected in this manner at GS-1. At 1145 hours, the field teams departed the location for the Radioactive Control Technician (RCT) building. This was completed in conjunction with LANL's health and safety protocol of radioactive materials.

A flood warning was given to all LANL personnel at 1215 hours to not complete any activities within the canyons. At 1420 hours, TL team members and ESH-18 field team members arrived at MCO-6, which is located in Mortandad Canyon. The depth to water was measured and found to be 38.76' below TOC. The purging of this well began after the depth to water was measured. However, at 1440 hours, a second flood warning was issued and the field team members departed the canyon for the NMED OB office.

**August 6, 2001 (Monday)**

**Weather:** Partly cloudy, approximately 70° Fahrenheit, wind is zero to five mph.
**Proposed Work:** Purge and sample Well PCO-3 and Well MCO-6; to begin purging DT-9, DT-5A; and determine water levels at MCWB 6.2A, MCWB 6.2B, MCWB 6.2C, MCWB- 6.2E, MCWB- 6.2D, and TSWB-6.
**In Attendance (sampling):** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Maes, LANL (ESH-18); and N. Martinez, LANL (ESH-18).

**Activities:** TL team members met with Harvey Decker, ESH-18; Max Maes, ESH-18, and Nicholas Martinez, ESH-18 at 0700 hours to discuss access into Pajarito Canyon and the DT areas for sampling activities.

At 0845 hours, the TL team members arrived at PCO-3 to take water level measurements. The depth to water was measured and found to be 17.39 feet below TOC. At 1032 hours, the team members arrived at DT-9, and purging began shortly after arrival. At 1045 hours, the field team members departed DT-9 for DT-5A. At 1058 hours the field team started purging DT-5A and

field parameters were collected. Both DT-9 and DT-5A had to be purged for a long period of time due to the high purge volume required to meet applicable guidelines.

At 1311 hours, the field teams arrived at MCO-6. The depth to water was measured at 1315 hours and found to be 38.9' below TOC. Subsequently, purging of the well was started at 1320 hours. Field parameters were collected at 1324 hours, 1328 hours, 1335 hours, 1341 hours, 1349 hours, 1355 hours, 1401 hours, 1415 hours, and 1422 hours. The sample from this well was collected at 1430 hours. A final field parameter was collected at 1528 hours. At 1535 hours, the field teams departed the site of MCO-6 to begin water level measurements at MCWB-6.2A, MCWB-6.2B, MCWB-6.2C, MCWB- 6.2E, MCWB- 6.2D, and TSWB-6.

At 1540 hours, TL team members arrived at MCWB-6.2A. The depth to water was measured at 1546 hours and found to be 41.2' TOC. TL team members and LANL team members departed for MCWB-6.2B at 1547 hours. At 1550 hours, it was noted that MCWB-6.2B was dry. The total depth of the well was 44.9 feet. At 1551 hours, the TL team members arrived at MCWB-6.2C. The well was noted as being dry at 1554 hours. The total depth of the well was 32.35 feet. At 1610 hours, the field team members arrived at MCWB-6.5E. At 1611 hours, the well was noted as being dry and was not sampled. The total depth of the well was 52.84' TOC. TL members arrived at MCWB-6.5D at 1615 hours. This well was noted as being dry. The total depth of the well was 45.23' TOC. At 1626 hours the field teams arrived at TSWB-6. This well had a total depth of 42.20' TOC, was noted as being dry, and was not sampled. At 1635 hours, TL team members departed the site for the NMED OB office to begin sample shipment preparation.

**August 7, 2001 (Tuesday)**

**Weather:** Partly Cloudy, approximately 65° Fahrenheit, one to five mph wind.
**Proposed Work:** Sample MCO-7, DT-9, DT-5A, MCO-7.5B, and to begin purging DT-10.
**In Attendance:** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; and M. Maes, LANL (ESH-18).

**Activities:** TL team members arrived at MCO-7 to begin sampling activities at 0745 hours. The water level was measured at 0801 hours and found be at a depth of 40.20' below TOC. Purging began at 0810 hours. Field parameters were collected at 0813 hours, 0817 hours, 0830 hours, 0840 hours, 0845 hours, and 0900 hours. Due to impending rain, the MCO-7 was sampled after one well volume was purged and the parameters had stabilized at 0910 hours. Field team members departed MCO-7 at 1050 hours.

The field teams arrived at DT-9 at 1252 hours to collect field parameters and samples. DT-9 was purged overnight and sampled using a dedicated pump. The samples were collected at 1300 hours. TL completed sampling activities at 1347 hours.

At 1421 hours, the field teams arrived at DT-5A, which was purged overnight. Field parameters were collected at 1425 hours and samples were collected at 1435 hours. At 1440 hours, Wally O' Rear and Max Maes departed DT-5A for DT-10 to begin preliminary sampling procedures. At 1500 hours, field parameters were collected and at 1510 hours, Wally O'Rear and Max Maes departed DT-10 for DT-5A. DT-10 had to be purged for a long period of time due to the high purge volume required to meet applicable guidelines. At 1535 hours, sampling was completed and the field teams departed the location. At 1611 hours, TL team members arrived at MCO-7.5B to conduct water level measurements, field parameters, and sampling activities. The water level was measured and found to be 45.95' TOC. Field parameters were measured at 1641 hours,1652 hours,1713 hours,1725 hours,1739 hours,1743 hours,1745 hours, and 1751 hours. The sampling of MCO-7.5B began at 1800 hours. Sampling was completed at 1934 hours and TL team members departed the site for NMED OB office to begin sample shipment preparation.

**August 8, 2001 (Wednesday)**

**Weather:** Approximately 60° Fahrenheit.
**Proposed Work:** Sample PM-1, PM-2, PM-3, PM-4, PM-5, O-1, O-4, G-1A, and DT-10
**In Attendance:** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; C. Montoia, LANL (ESH-18); and B. Beers, LANL (ESH-18).

**Activities:** PM-1, PM-2, PM-3, PM-4, PM-5, O-1, O-4, and G-1A are production wells and, due to their active use, do not require a three well volume purge. These wells are located within an enclosed building and were observed to be locked upon arrival. TL and LANL representatives turned the spigot on and allowed water to run through the pipes for approximately 5 minutes prior to the sample collection. TL team members arrived at O-4 to begin sampling at 0538 hours. Field parameters were collected at 0548 hours, and sampling was complete at 0549 hours. At 0611 hours, TL Team members arrived at PM-1, sampling field parameters were collected at 0615 hours, and sampling was completed at 0624 hours. TL team members arrived at O-1 at 0635 hours, field parameters were collected at 0639 hours, and samples were collected at 0640 hours. At 0645 hours, the sampling was completed and the field teams departed at 0655 hours. At 0707 hours, TL team members arrived at PM-3, field parameters were collected at 0712 hours, sampling began at 0715 hours. Sample collection was completed shortly after. At 0730 hours, TL team members arrived at PM-2. Field parameters were collected at 0737 hours, and the sample collection began at 0740 hours and was completed at 0741 hours. At 0753 hours, TL team members arrived at PM-5. Samples were collected at 0754 hours, field parameters were collected at 0757 hours, and sampling was completed at 0801 hours. At 0815 hours, TL team members arrived at PM-4. Sampling and field parameters were collected at 0820 hours. Sampling was complete at 0824 hours, and at 0830 hours, the field team members departed the location.

TL team members arrived at DT-10 and met with Max Maes, ESH-18, to complete sampling activities. DT-10 was purged overnight and the samples were collected at 1045 hours. At 1150

hours, field parameters were collected and, at 1155 hours, TL team departed Well DT-10.

TL team members and LANL ESH-18 personnel Bob Beers and Consuelo Montoia arrived at Production Well G1-A at 1730 hours. G1-A was sampled at 1730 hours, field parameters were collected at 1733 hours, and sampling activities were completed at 1742 hours. At 1748 hours, TL team members departed the site for the NMED OB office to begin sample shipment preparation.

**August 9, 2001 (Thursday)**

**Weather:** Overcast skies, approximately 75° Fahrenheit.
**Proposed Work:** Sample Surface Waters PA 6.7, PA 10.6, and Well PCO-1.
**In Attendance:** R. Mayer, EPA WAM; W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Dale, NMED; M. Kaufman, NMED; H. Decker, LANL (ESH-18).

**Activities:** At 0755 hours, TL team members met with LANL and NMED personnel to discuss the sampling strategy and schedule for the day. At 0825 hours, the sampling teams arrived at Surface Water PA 6.7. Field parameters were collected at 0845 hours. Sample activities began at 0845 hours and completed at 0940 hours. VOCs, SVOCs, Total Organic Carbon (TOC), and explosives were collected by placing the lip of the container into the water body and allowing water to run in. The remaining analytes were collected by using a peristaltic pump and pumping the water into the appropriate sample container.

TL team member Wally O' Rear, Max Maes, ESH-18, and Nicholas Martinez, ESH-18, then moved to PCO-1 to complete sampling activities. However, due to the presence of a large rattle snake, which posed a health and safety concern, the sample was not collected.

TL team member Tami Engle, Richard Mayer, EPA WAM; Mark Kaufman, NMED, departed for Surface Water PA 10.6 at 1526 hours. The sample was collected approximately 100 yards from the historical designated sampling point due to the high flow rate in the stream. The sample collection began at 1610 hours. Field parameters were collected at 1615 hours. NMED instruments were used to collect the field measurements at this location. Parameters that are ordinarily filtered using a 0.45 micron filter were not filtered due to the high flow rate. The sediment within the water at the observed flow rate would have hindered the filtering process. It was suggested by Michael Dale NMED, to collect extra volume and filter the samples in the NMED OB office following the settling process. At 1720 hours, the field team departed site for the NMED OB office. The surface water was filtered for dissolved analysis at the NMED OB office the following day using a peristaltic pump and 0.45 micron filter.

**August 10, 2001 (Friday)**

**Weather:** Approximately 75° Fahrenheit.
**Proposed Work:** Sample effluent GS-1 and two soil samples, 03-056(C) and 03-056 (AA).
**In Attendance:** W. O'Rear, TL Field Team Leader; T. Engle, TL Team Member; M. Dale, NMED; S. Yanicak, NMED; and G. Lopez Escobedo, LANL ER.

**Activities:** TL team members and NMED personnel arrived at the sampling location at 0945 hours to collect an effluent sample from GS-1. The sample collected was identified as GS-1B, as it is the second grab sample from the gaging station. Field parameters were collected 1029 hours and the sample was collected at 1035 hours. The methods used to collect the sample were completed in the same manner as the previous sample collection effort at GS-1. The field teams departed the GS-1 sampling location at 1040 hours for the RCT building to be screened. Following the screening, TL field team members departed for NMED OB office to begin sample shipment preparation.

TL team members arrived at the Sandia Water Shed to meet with Gabriella Lopez Escobedo, LANL ER at 1450 hours. Two split samples and one QA/QC (duplicate sample) were collected at this location for Target Analyte List (TAL) 23 Metals. Sample 03-056(C) was collected at 1500 hours; the duplicate sample 3D-056(C) at 1530 hours; and the third sample, 03-056AA at 1515 hours. The third sample was collected approximately three feet, seven inches north of the first sample. All samples were collected by removing the organic debris from the surface of the soil. An area of soil large enough to fill all sample containers was extracted and placed into a stainless steel bowl and mixed into a homogeneous sample by using a stainless steel trowel. All sampling equipment was dedicated to the specific location, and therefore did not require decontamination. Split samples were collected at these locations by alternating the jars that were collected.

Following the collection of soil samples, the TL team members departed the site for the White Rock NMED office to continue sample shipment preparation at 1535 hours.

**August 13, 2001 (Monday)**

**Weather:** Clear skies, approximately 75° Fahrenheit.
**Proposed Work:** Purge and sample wells within the Technical Area (TA) 18
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member; D. Baggett, NMED; S. Yanicak, NMED; M. Dale, NMED; and C. Goertz, SAIC.

**Activities:** TL team members arrived at the NMED White Rock office at 0545 hours to prepare for the sample activities. Two stainless steel bailers were decontaminated using Alconox/water wash and DI water rinse. Afterwards, they were then wrapped in aluminum foil to secure the decontamination. TL team member Tami Engle departed site for TA18 to meet with Cathy

Goertz at 0653 hours. TA 18 was a secure area that required a high level of security before entering. At 0707 hours, Tami Engle awaited search and clearance procedures of vehicle and person prior to entering site with NMED representatives Steve Yanicak and Michael Dale. Following entrance, Steve Yanicak and Michael Dale departed to sample TA-18 Spring and Threemile Spring.

At 0820 hours, Rob Young arrived at site from the LANL badge office and at 0847 hours, Cathy Goertz, Rob Young, Tami Engle, and Dave Baggett arrived at well 18-MW-7. The depth to water was measured and found to be 15.95' below TOC at 0902 hours. Field parameters were collected at 0915 hours (initial purge time), 0928 hours, 0941 hours, and 0949 hours. The sample was collected at 0950 hours. Because the stainless steel bailer became stuck in the well, TL used a poly bailer instead to collect the VOCs, SVOCs, and high explosives at this location. The well was purged by using a peristaltic pump with dedicated tygon tubing. Following the VOCs, SVOCs, and high explosives, the dedicated tygon tubing and pump were then used to collect the remaining samples.

At 1139 hours, the field teams arrived at 18-BG-1. The water level was measured and found to be 17.45' below TOC at 1140 hours. Field parameters were collected at 1150 hours when purging activities began and then periodically thereafter. Samples were collected at 1215 hours after the well was purged of three well volumes. A stainless steel bailer was used to collect VOCs, SVOCs, and high explosives. The remaining parameters were collected using the peristaltic pump and dedicated tygon tubing. Sample collection was completed at 1245 hours and, at 1300 hours, the field team members arrived at 18-BG-4. NMED representatives had previously begun to purge 18-BG-4 at 1211 hours. Upon the arrival of TL, approximately 8.5 liters had been purged and the well had gone dry. NMED suggested that, upon the recharge of the well, the TL team members should target the following analyses for sampling (in the following order): high explosives, dissolved metals, VOCs, total anions, and tritium. At 1330 hours, the well was still dry, and TL team members moved to 18-MW-18.

At 1331 hours, the depth to water at 18-MW-18 was measured and found to be 7.09' below TOC. Field parameters were collected upon initiation of purging at 1340 hours and periodically thereafter. The well was purged by using a peristaltic pump and dedicated tygon tubing. A stainless steel bailer was used to collect the high explosives, VOCs, and SVOCs at 1410 hours. The remaining analyses were collected by using the dedicated tubing and peristaltic pump.

At 1520 hours, the TL team arrived back at 18-BG-4 to determine if water was available for sampling. The water level was 8.20' below TOC. Previously, the depth of the water was 8.6' below TOC. The TL team members decided not to sample this well due to insufficient water (only 0.4' of water in the well). The following day's schedule was discussed and at 1600 hours the TL team members checked out of TA18 and departed for the NMED OB office.

**August 14, 2001 (Tuesday)**

**Weather:** Clear skies, approximately 75° Fahrenheit.
**Proposed Work:** Purge and sample groundwater monitoring wells in TA 18
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member; S. Yanicak, NMED; and C. Goertz, SAIC LANL ER.

**Activities:** At 0721 hours, TL team member, Tami Engle departed the NMED OB office with Steve Yanicak for TA18. At 0727 hours, the TL sampling vehicle was inspected prior to entering TA18, due to security reasons. At 0816 hours, Tami Engle, Steve Yanicak, and Cathy Goertz arrived at wells 18-MW-16 and 18-MW-12. These wells are located approximately 75 feet apart. Due to the high security and clearance associated with this site, NMED was responsible for taking the water level measurements and TL was responsible for sampling. At 0833 hours, the water level was measured at 18-MW-16 and found to be 9.55' below TOC. At 0849 hours, the water level measurement was taken at 18-MW-12 and found to be 9.48' below TOC.

Field parameters were collected at 0928 hours and purging activities began at 18-MW-16. Field parameters were also collected at 0943 hours, 0957 hours, 1006 hours, and 1010 hours. Samples for 18-MW-16 were collected at 1020 hours. NMED had previously begun to purge 18-MW-12 at 0926 hours and consistently collected field parameters as well. Rob Young arrived on site from a LANL mandatory training session at 1015 hours. 18-MW-12 was sampled at 1255 hours. Both wells (18-MW-16 and 18-MW-12) were purged by using a peristaltic pump with dedicated tygon tubing. The VOCs, SVOCs, and high explosives were collected using stainless steel bailers that had been previously decontaminated.

After completing the sampling at 18-MW-16 and 18-MW-12, the TL team arrived at 18-MW-9 to collect samples. The well had previously been purged by NMED representative Steve Yanicak at 1205 hours, who recorded all field parameters. The VOCs, SVOCs, and high explosives were collected by using a previously decontaminated stainless steel bailer. The remaining analyses were collected by using the dedicated tygon tubing and peristaltic pump.

After completing sample collection at 18-MW-9, TL team members arrived at 18-MW-11. Depth to water was 43.89' below TOC at 1500 hours. Field parameters were measured at 1520 hours upon the initiation of purging and periodically thereafter. The well was purged by using a peristaltic pump and dedicated tygon tubing. The tubing was then set aside and a stainless steel bailer was used to collect VOCs, SVOCs, and high explosives. The tubing and pump were then used to collect the remaining samples. As the TL team sampled well 18-MW-11, NMED representatives began to purge and collect field parameters for 18-MW-10. At 1645 hours, the TL team arrived at 18-MW-10 to collect samples. At 1710 hours, the well was purged and sampled following the previously described procedures.

At 1740 hours, TL team members were escorted out of TA18 by NMED and SAIC personnel. The TL team members then departed for NMED OB office to begin sample shipment preparation.

**August 15, 2001 (Wednesday)**

**Weather:** Clear skies, approximately 75° Fahrenheit.
**Proposed Work:** Purge and sample groundwater monitoring wells within TA18 and well 03-MW-01.
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member; and C. Goertz, SAIC LANL ER.

**Activities:** TL team members packaged samples in the morning until approximately 1230 hours when they arrived at Well 18-MW-18 to meet with Cathy Goertz. The depth to water was measured and at 13.84' below TOC upon arrival. Field parameters were collected periodically after the initiation of purging. Samples were collected following the removal of three well volumes of purge water. Sampling procedures were conducted using the same procedures as described in the August 13 and 14 sampling activities.

After completion of sampling at 18-MW-18, TL team members and Cathy Goertz arrived at Well 18-MW-17, at 1345 hours. This well was approximately one quarter mile downwind (east) from the TA18 area. QA/QC (field blank and duplicate) samples were collected for all the same analytical parameters as 18-MW-17. The water level was measured and found to be 18.15' below TOC. Field parameters were collected upon initiation of purging and periodically thereafter. The sample was collected at 1430 hours. The samples were collected following the same procedures as described in the August 13 and 14 sampling activities.

At 1500 hours, after the completion of sampling at 18-MW-17, TL team members and Cathy Goertz arrived at well 03-MW-01, which was located on the west side of building SM-30. This well was a flush mount stainless steel well. The depth to water was measured and found to be 20.85' below TOC. After purging the well, the field parameters were periodically collected. Three well volumes were purged and at 1620 hours, the sample was collected. The samples were collected following the same procedures as described in the August 13 and 14 sampling activities. At 1730 hours, the TL team members departed the site for the NMED OB office to prepare samples for shipment.

**August 16, 2001 (Thursday)**

**Weather:** Clear skies, approximately 75° Fahrenheit.
**Proposed Work:** Purge and collect groundwater samples from Buckman Field.
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member; B. Beers, LANL ESH-18; and G. George, City of Sante Fe.

**Activities:** Rob Young collected a QA/QC (Equipment Rinsate) sample from a previously decontaminated stainless steel bailer at 0715 hours for VOCs, SVOCs, and high explosives. This sample was identified as EQ-1.

The TL team members arrived at Buckman Well 1 at 0930 hours and met with Bob Beers, ESH-18 and Gerald George, City of Sante Fe. This well had been offline two days prior to sampling and had begun pumping earlier that morning. Buckman Well 1 pumps approximately 700 gpm when operational. This well is located near the Rio Grande River. The sample was collected at 0940 hours from a spigot in a ten-inch line. The well was allowed to purge for approximately three minutes prior to sampling. Field parameters were collected upon the initiation of sampling. All bottles, with the exclusion of the dissolved parameters, were filled directly from the spigot. A QA/QC (duplicate) sample was collected at this well and identified as Buckman 11.

At 1035 hours, the sampling teams arrived at Buckman Well 7. According to Gerald George, this well is set at approximately 750 feet below ground surface (bgs). The pump rate was approximately 700 gpm. Field parameters were collected immediately before the analyses were sampled from the spigot, as described in Buckman Well 1. Buckman Well 7 was sampled at 1050 hours. The spigot appeared to be constructed of brass and resembled a faucet. Gerald George stated that Buckman Wells 1 and 7 are estimated as being equally distanced from the Rio Grande River. Buckman Well 8 was located closest to the river. However, Buckman Well 8 was offline for repairs at the time of sampling, and therefore could not be sampled

The TL team members arrived at Buckman Well 2 at 1124 hours. Field parameters were collected prior to sampling at 1140 hours. Samples were collected from what appeared to be a brass spigot in the discharge line to the water system. This well was pumping at a rate of approximately 700 gpm. Sample collection was completed at 1200 hours, at which time the TL team members departed for the NMED OB office to complete sample shipment preparation.

**August 17, 2001 (Friday)**

**Weather:** Clear skies, approximately 75° Fahrenheit.
**Proposed Activities:** Conduct water level measurements within Mortandad Canyon.
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member; D. Rogers, LANL (ESH-18); B. Cata, LANL (ESH-18); and N. Tapia, LANL (ESH-18).

**Activities:** The TL team members arrived at the ESH-18 building to meet with David Rogers, ESH-18 and Betsy Cata, ESH-18 at 0945 hours. At 0955 hours, the field teams arrived at MCWB-4 to conduct water level measurements. Due to health and safety concerns, the water level measurement was not completed. There were black widow spiders habituating at this well area. At 1015 hours, MCWB-5 was located and the water level was measured at 29.48' below TOC. MCO-5.1A was not found and therefore could not be gauged.

MCWB-5.5B was found at 1030 hours and the water level was measured at 35.36' below TOC. This well included a transducer with a concrete pad that appeared to be in good condition. At 1037 hours, MCWB-5.5A was found and the water level was measured at 35.06' below TOC. This well also contained a transducer with a concrete pad that appeared to be in good condition. At 1046 hours, the field team members arrived at MCO-6A. Water levels in this well could not be measured as the key to this well was not on site. MCO-6B was located at 1051 hours and the water level was measured at 39.85' below TOC. This well was equipped with a bladder pump on a concrete pad which was cracked into three pieces.

The field teams attempted to locate MCO-6.5A. However, it was not found and the water level could, therefore, not be measured. The TL team members were able to identify grout markings on the ground in the approximate area of MCO-6.5A; however, it could not be confirmed that they belonged to this well. David Rogers stated that approximately 100 wells were removed from Mortandad Canyon due to the fire that occurred in 2000. MCWB-6.5C was found and depth to water was measured at 1110 hours. The depth to water was 43.80' below TOC. This well contained a transducer with a bladder pump which was situated on a concrete pad that appeared to be in good condition. At 1121 hours, the depth to water was measured at well MCWB-6.6; however, the well was dry, as sediment was felt at the bottom with the water level indicator. The total depth of the well was 50.30 feet below TOC. This well contained a transducer situated on a concrete pad. It was not equipped with a pump; however, it did have a cap in place. The concrete pad, on which the well was situated, appeared to be in good condition. Attempts to locate MCO6.6B were made; however, they were unsuccessful and, therefore, the water depth could not be measured.

Well MCWB-7B was located at 1135 hours. A depth to water measurement could not be collected due to the presence of a black widow spider, which caused a health and safety concern. This well contained a transducer situated on a concrete pad which appeared to be in good condition. At 1142 hours the depth to water at for MCWB-7A was measured and found to be 41.51' below TOC. This well contained a transducer situated on a concrete pad which appeared to be in good condition. MCWB-7A was also equipped with a dedicated bladder pump.

At 1154 hours, MCO-7A was located and the field team attempted to collect a depth to water measurement. However, there appeared to be an obstruction at 37.9', which may be have been the top of the bladder pump. This well is situated on a concrete pad which appeared in good condition. The depth to water at MCWB-7.2 was measured at 1202 hours and found to be 66.81' below TOC. The well contained a transducer equipped with a dedicated bladder pump situated

on a concrete pad which appeared in good condition. Attempts were made by the field teams to locate MCO-7.1 and MCO -7.1A; however, they were not found. These wells may have been removed following the fire that occurred in 2000.

Well MCWB-7.4B was measured for water depth at 1421 hours and water was found at 50.93' below TOC. This well contained a transducer and a bladder pump, and was situated on a concrete pad. MT-1 was measured for the depth to water at 1427 hours and found to have water 44.21' below TOC. This well was located on a concrete pad. Well MCWB-7.4A was located at 1431 hours. The water level was measured and found to be at 44.84' below TOC. This well contained a transducer and a dedicated bladder pump, and was situated on a concrete pad which appeared to be in good condition. MCO-7.5B was gauged for water at 1445 hours and found to be 45.96' below TOC. The well was equipped with a bladder pump and was situated on a concrete pad.

The depth to water at MCWB-7.7B was measured at 1456 hours and found to be 60.15' below TOC. This well contained a transducer and was situated on a concrete pad which appeared to be in good condition. It was also equipped with a dedicated bladder pump. At 1313 hours, well MT-2 was gauged for water depth. It was found to have water at 66.1' below TOC. This well had an associated concrete pad that had been poured around it. At the time of gauging, the concrete was cracking around the well. MCO-8A and MCO-8 were located by the field team members. However, they were abandoned wells and grout was found at the surface. Therefore, water level measurements were not collected at MCO-8A and MCO-8.

At 1432 hours, well MCWB-8.1C was located and measured for water depth. The well was found to be dry. The total depth of MCWB-8.1C was 82.80' below TOC. The well contained a transducer and was situated on a concrete pad that appeared in good condition. Well MCWB-8.1B was also found to be dry. The total depth of Well MCWB-8 was 74.90' below TOC. This also contained a transducer and the concrete pad that it is situated on appeared to be in good condition. At 1444 hours, MCWB-8.1A was located. However, due to the presence of a black widow spider, which caused a health and safety concern, the water level was not gauged. Well MCO-8.2 was located at 1548 hours. The water level could not be gauged since the well was apparently grouted to the land surface. At 1613 hours, MCO-9 was located but the well was found to be dry. The total depth of MCO-9 was 57.7' below TOC. MCWB-9B was located at 1621 hours and was also found to be dry. The total depth of MCWB-9B was 86.30' below TOC. This well was equipped with a transducer and was situated on a concrete pad that appeared to be in good condition. A pump was not observed at this location. Well MCWB-9A was located at 1629 hours. This well was noted as being dry and had a total depth of 75.0' below TOC. MCWB-9A contained an in-place pump and was situated on a concrete pad that appeared to be in good condition. At 1635 hours, it was noted that Well MCO-9.5 was plugged and filled with grout. MCO-12 was located at 1646 hours. This well had a two-inch PVC pipe that is sticking out of the ground without a concrete pad or pump in place. The total depth of MCO-12 was noted as 97.8' and the well was dry. At 1659 hours, MCO-13 was located. A total depth measurement was collected from the outer casing, and was as noted being 109.2 feet below the

outer casing. The well was dry and situated on a concrete pad. There was no inner cap at MCO-13.

At 1710 hours, the TL field team departed this site for the NMED OB office to continue sample shipment preparation.

**August 18, 2001 (Saturday)**

**Weather:** Not Applicable
**Proposed Work:** Complete sample shipment duties
**In Attendance:** R. Young, TL Field Team Leader; T. Engle, TL Team Member.

TL team members arrived at the NMED OB office to complete sample shipment activities. These activities included placing custody seals on the containers, completing chain of custody forms, and packing samples into coolers. These coolers were dropped off at a FedEx location in Albuquerque, New Mexico, for transport to the appropriate laboratories. Following all shipment activities, the TL team members departed for their home offices.

**October 29, 2001 (Monday)**

**Weather:** Partly cloudy skies, temperature approximately, 70° Fahrenheit.
**Proposed Work:** Purge and sample Well LAPD-3.
**In Attendance (sampling):** W. O'Rear, TL field team leader; T. Engle, TL team member; M. Dale, NMED, K. Granzow, NMED, M. Kaufman, NMED; M. Maes, LANL (ESH-18); L. Martinez, LANL; and J. Sena, LANL.

Wally O'Rear, TL field team leader and Tami Engle, TL team member, arrived at TA59 at 0730 hours for a logistics meeting with Stephen Rae, Dave Rogers, Michael Dale, Max Maes, Patrick Longmire, Larenzo Martinez, Steve Yanicak, Kim Granzow, Mark Kaufman, Joseph Zena, Bob Beers, Andy Crowder, and Alethea Banar. Topics included sample schedule, purge water issues, and health and safety concerns such as which divisions or agency the TL team would follow in regards to the site specific health and safety plans. It was decided that the TL team members would follow the site-specific health and safety plans presently in place by LANL or LANL contractors. The meeting was adjourned at 0850 hours and TL team members received their badges at 1000 hours from the LANL badge office. The sample that was to be collected at Gaging Station-1 (GS-1) could not be collected due to the limited number of times the effluent was discharged and the restricted time frame for sample collection activities.

TL team members arrived at well LADP-3 at 1150 hours. This well was a two-inch diameter PVC well with a water level of 323.42' below TOC and a total depth of 334.8' below TOC. Lorenzo Martinez and Joseph Zena used the down rigger to pull the stainless steel bailer of water

from the well depth. Field parameters were collected at 1250 hours, 1318 hours, and 1346 hours. At 15:05, John McCann, LANL Environmental Restoration, arrived and observed the sample operation. John McCann was not comfortable with the purging/sampling operation and requested that TL cease activities to correct the health and safety and purge water issues. At 1520 hours, TL team members departed site.

**October 30, 2001 (Tuesday)**

**Weather:** Partly cloudy skies, temperature approximately, 70° Fahrenheit.

**Proposed Work:** Complete sampling of Well LAPD-3; and purge and sample Well LAOI(a)-1.1.
**In Attendance (sampling):** W. O'Rear, TL field team leader; T. Engle, TL team member; M. Dale, NMED; K. Granzow, NMED; Andy Crowder, Washington Group; Alethea Banar Washington Group; L. Martinez, LANL; and J. Zena, LANL.

TL field team members, Andy Crowder, Alethea Banar, Kim Granzow, Michael Dale, John McCann, and James Jordan met at 0730 hours at the Washington Group (LANL contractor) facility to discuss field activities of the week and the health and safety issues involved. The meeting was adjourned at 0745 hours. TL field team members divided into two teams to complete the sampling tasks. Wally O'Rear, Michael Dale, James Jordan, Lorenzo Martinez, and Alethea Banar arrived at LADP-3 to complete sampling of the well. The depth to water was remeasured and found to be 323.7' below TOC. Field parameters were collected at 0920 hours, 0936 hours, and 1016 hours. Sample collection began at 1020 hours and was completed at 1115 hours. Field team members departed the site at 1130 hours to begin sample shipment preparation. It was decided that samples collected from Well LADP-3 on October 29, 2001, could not be submitted to the laboratory for analysis. The samples collected on October 30, 2001 would be sent to the laboratory instead.

TL team member Tami Engle, NMED representative Kim Granzow, and Washington Group representative Andy Crowder, arrived at well LAOI(a)-1.1 to begin well purging procedures. Purge water from this location was collected into a 55-gallon drum and disposed of by the LANL contractor, the Washington Group. This well was purged and sampled by using a dedicated bladder pump. An NMED database identified LAOI(a)-1.1 as 310.2' deep . An actual depth to water measurement could not be taken due to the bladder pump. Field parameters were collected at 1112 hours, 1157 hours, 1234 hours, 1306 hours, 1331 hours, 1414 hours, 1435 hours, 1510 hours, and 1539 hours. A QA/QC (duplicate) sample, identified as LADD, was collected at this location as well. Sample collection began at 1557 hours and completed at 1727 hours. The field team was joined by Wally O'Rear, Michael Dale, Joseph Zena, Lorenzo Martinez, John McCann, and Steve Pierson. After completion of sampling, TL team members drove to the NMED OB office at 1815 hours to prepare the samples for shipment to the laboratory.

**October 31, 2001 (Wednesday)**

**Weather:** Clear skies; however, rain was forecasted, temperature approximately, 60° Fahrenheit.
**Proposed Work:** Sample Buckman Wells, 1, 2, 3, 4, 6, 7,and 8; to sample Well SHB-3.
**In Attendance (sampling):** W. O'Rear, TL field team leader; T. Engle, TL team member; B. Beers, LANL (ESH-18); B. Gallagher, LANL (ESH-18); B. Grey LANL (ESH-18); K. Reid (LANL Contractor); E. Alcon (LANL Contractor); M. Kaufman, NMED; L. Martinez, LANL; and J. Zena, LANL.

The TL team members split into two groups to ensure that proposed sampling activities were completed. Tami Engle departed the NMED office at 0730 hours with Beth Grey to meet Bob Beers to sample the Buckman field wells. At 0913 hours, Bob Beers, Bruce Gallagher, Beth Grey, Tami Engle, and Ira (City of Sante Fe employee) arrived at Buckman Well 6. The sample was collected at 0928 hours, and field parameters were collected at 0931 hours. At 1000 hours the field teams departed for Buckman Well 4 and arrived at the well at 1006 hours. Field parameters were collected at 1016 hours and the sample was collected at 1030 hours. The field teams departed for Buckman Well 3 at 1043 hours and arrived at the well at 1048 hours. Field parameters were collected at 1057 hours and the sample at 1112 hours. The field teams departed for Buckman Well 7 at 1118 hours and arrived at the well at 1128 hours. Field parameters were collected at 1141 hours and the samples were collected at 1145 hours. The field team members departed for Buckman Well 1 at 1200 hours and arrived at the well at 1208 hours. Field parameters were collected at 1214 hours and sample collection began at 1223 hours. At 1314 hours, the field teams arrived at Buckman Well 8. Field parameters were collected at 1317 hours and sample collection began at 1331 hours. The field team members then departed for Buckman Well 2 at 1350 hours and arrived at the well at 1359 hours. Field parameters were collected at 1401 hours and Buckman Well 2 was sampled at 1420 hours. At 1430 hours, the field teams departed the site and TL team member Tami Engle drove to the NMED OB office to begin sample shipment preparation. Samples collected at all Buckman well locations were completed by turning the spigot/faucet on and placing the collection jar directly beneath the outlet. All field parameters were collected in the same manner. The wells were allowed to run for approximately five minutes prior to sample collection.

Wally O'Rear, Kevin Reid, Elmer Alcon, and Mark Kaufman arrived at Well SHB-3 at 0936 hours. At 0955 hours, the water level indicator became obstructed within the well and would not go deeper than 580' below TOC. The water level indicator was tested to ensure it was working properly. At 1011 hours, a second attempt was made to collect depth to water measurements. However, the indicator became obstructed once again and attempts to sample from Well SHB-3 were aborted. At 1130 hours, the field team members departed the site.

**November 1, 2001 (Thursday)**

**Weather:** Partly cloudy skies, temperature approximately 45° Fahrenheit, light wind less than five mph.
**Proposed Work:** Sample Springs 4C, 4A, 4, and 4AA.
**In Attendance (sampling):** W. O'Rear, TL field team leader; T. Engle, TL team member; D. Rogers, LANL (ESH-18); Ryan Romero, LANL (ESH-18); M. Kaufman, NMED; K. Granzow, NMED; M. Dale, NMED, S. Yanicak NMED, and D. Baggett NMED.

The TL team members arrived at the trail head at 0735 hours to meet with NMED and LANL personnel to conduct a health and safety meeting and to discuss the sampling agenda. David Rogers collected split samples at all locations on behalf of LANL. At 0853 hours, the field teams arrived at Spring 4. Sample collection began at 0900 hours, field parameters were collected at 0915 hours. At 0923 hours, the field teams departed for Spring 4C and arrived at 0937 hours. The sample at Spring 4C was collected at 0944 hours and field parameters were collected at 1005 hours. The field team members then departed for Spring 4B. Both LANL and NMED collected samples at this location; however, per the direction of EPA and NMED, the TL team members did not collect samples. Field parameters were collected at 1037 hours by NMED. At 1045 hours, the field teams departed for Spring 4A and arrived at 1125 hours. Field parameters were collected from Spring 4A at 1146 hours and samples were collected at 1150 hours. The field team members departed at 1210 hours for Spring 4AA and arrived at 1220 hours. Samples were collected from Spring 4AA at 1230 hours and field parameters were collected at 1240 hours. The field teams departed the Spring site at 1253 hours and arrived at the trail head at 1340 hours. TL team members then departed to prepare the samples for shipment.

**November 2, 2001 (Friday)**

**Weather:** Partly cloudy skies, temperature approximately 60° Fahrenheit.
**Proposed Work:** Collect soil samples in the Southfork of Acid Canyon.
**In Attendance (sampling):** W. O'Rear, TL field team leader; T. Engle, TL team member; S. Reneau, LANL (ER); and S. Yanicak (NMED).

At 1023 hours, TL team members and Steve Yanicak arrived at Acid Canyon to select sample locations and conduct a health and safety meeting. Following the selection of the sampling locations, PU-10283 was collected at 1120 hours. All samples were collected by clearing ground debris from the surface and placing soil into a stainless steel bowl. There were no split samples collected during the event at Southfork of Acid Canyon, nor were VOCs collected. Sample PU-10283 was not analyzed by TL contracted laboratory. Rather, the sample was collected for transfer to John Young, NMED. Sample PU-10284 was collected at 1127 hours. PU-10284 was located approximately 133 meters from the upstream portion of the creek bed. At 1143 hours, the TL team members arrived at location PU-10285. The sample was collected at 1146 hours. TL team members arrived at sample location PU-10286. A sample as well as a QA/QC

(duplicate) sample identified as PU-110286 was collected. At 1238 hours, the TL team members departed the Southfork of Acid Canyon remediation area for a background location which was located approximately 200 yards southwest of Canyon Road. New apartment construction was occurring in the area where the background sample was collected. The sample was collected on the north bank of a stream bed, approximately eight feet north of a marked tree (flourescent paint) and approximately 140 feet northwest of the main part of Acid Canyon. This sample is designated as AC-01 and the sample was split with NMED. The sample was collected at 1255 hours. This sample is located where two tributaries meet. TL and NMED departed Acid Canyon at 1333 hours for the NMED OB office to prepare the samples for shipment.

# APPENDIX C

## Generalized Shallow and Deep Well Construction

# Generalized Well Construction and Lithologic Description

**Well Designation:** TW-8

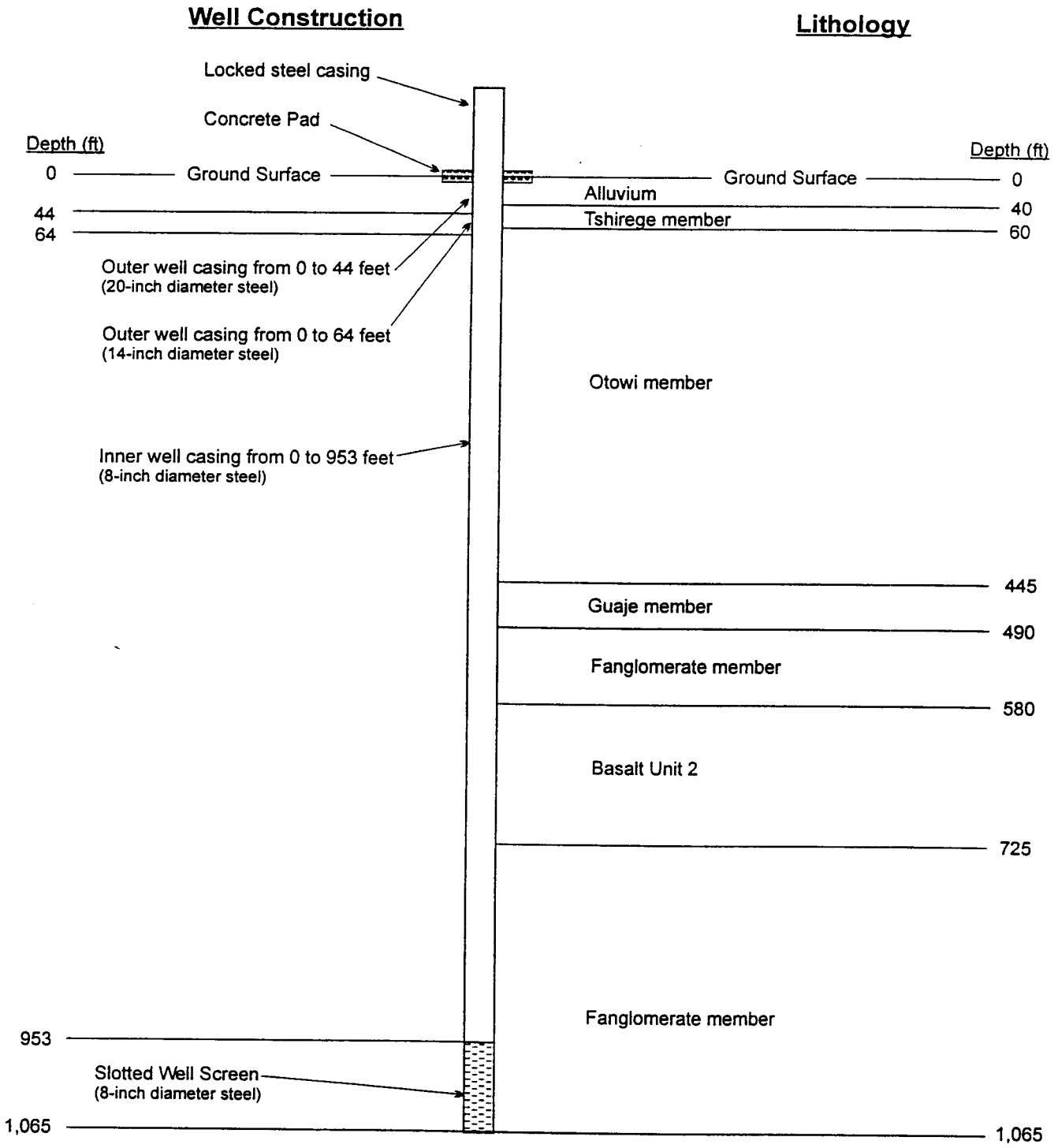
**Date Completed:** December 1960

**Location:** Mortandad Canyon

**Well Diameter:** 8 inches

**Length of Well Screen:** Not Available

**Total Depth of Well:** 1,065 feet



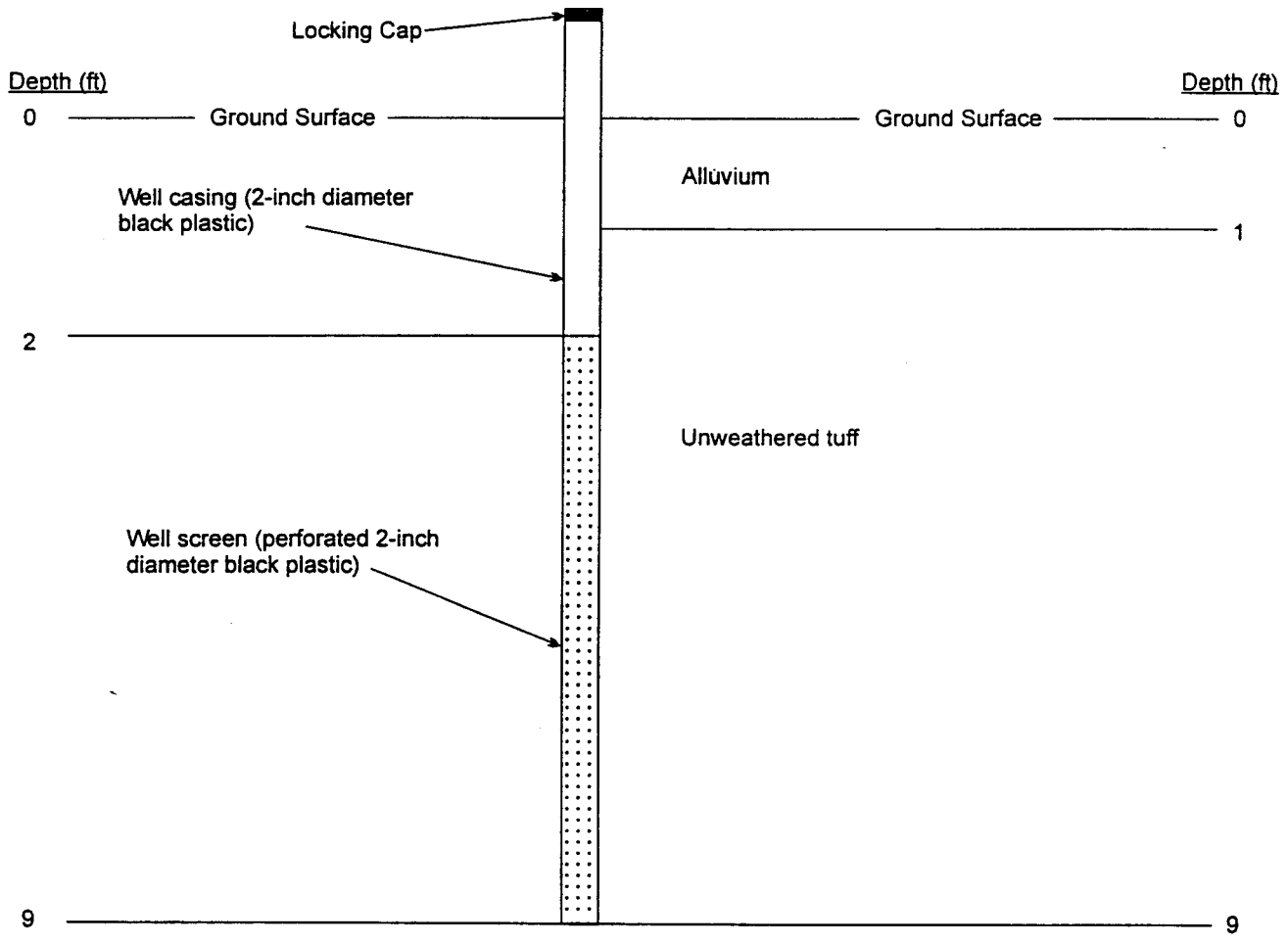

TECHLAW, INC.

Regional Oversight Contract
No. 68-W6-0063

# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-2
**Date Completed:** November 1960
**Location:** Mortandad Canyon

**Well Diameter:** 2 inches
**Length of Well Screen:** 7 feet
**Total Depth of Well:** 9 feet



# APPENDIX D

## Comparative Standards Description

## COMPARATIVE STANDARDS DESCRIPTION

The following is a description of the U.S. Environmental Protection Agency (EPA), New Mexico Environment Department (NMED), and U.S. Department of Energy (DOE) water quality standards, guidelines, and limits used for comparison in Tables 7 through16, and Appendix E of this report. These standards, guidelines, and limits do not necessarily apply to the analytical results for samples collected during the sampling event, but have been included as a point of reference for the reader.

*EPA Maximum Contaminant Levels (EPA MCL)*

EPA MCLs are defined as the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. A public water system means a system which has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year.

EPA MCLs also include secondary maximum contaminant levels which apply to public water systems. These secondary MCLs are defined as the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of public water system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

Finally, there are action levels for lead and copper contained in the EPA MCLs. The action levels are defined as the concentration of lead or copper in water in a public water system which requires treatment specified in Subpart I of 40 CFR 141 prior to distribution to users.

*EPA Region 6 Human Health Medium-Specific Screening Levels (EPA SL)*

EPA SL values are chemical concentrations that correspond to fixed levels of risk (i.e., either a one-in-one million [$10^{-6}$] cancer risk or a noncarcinogenic hazard quotient of one, whichever occurs at a lower concentration). The EPA SL values used for comparison to the analytical results are based on use of the water as residential tap water.

*National Pollutant Discharge Elimination System (NPDES) Permit Limits*

NPDES permits are a means to regulate and limit elements and compounds regularly discharged from outfalls associated with facility processes. These permits are issued by State and/or Federal regulatory agencies. The NPDES permit establishes limits and monitoring and reporting requirements for facilities with regulated outfalls.

*New Mexico Maximum Contaminant Levels (NM MCL)*

Except for arsenic, fluoride, gross alpha particle radioactivity, strontium-90, and tritium, the NM MCLs apply to community water systems and non-transient, non-community water systems. NM MCLs only apply to community water systems for arsenic, fluoride, gross alpha particle radioactivity, strontium-90, and tritium. A community water system is defined as any water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. A non-transient, non-community water system is defined as a public water supply system that is not a "community water system" and that regularly serves at least 25 of the same persons for more than six months per year, including but limited to schools and factories.

*New Mexico Water Quality Control Commission (NM WQCC) Standards*

The NM WQCC standards referred to in this report apply to groundwater of 10,000 milligrams per liter (mg/L) total dissolved solids (TDS) concentration or less. The standards apply to the dissolved portion of the contaminants except for mercury, organic compounds, and non-aqueous phase liquids.

*New Mexico Standards for Interstate and Intrastate Streams for Wildlife Habitat Limits (NM NWL)*

Wildlife habitat water is defined as water of the State used by plants and animals. This water is not considered pathogenic to humans or domesticated livestock and plants. The NM NWLs applies to all discharges to the surface.

*DOE Derived Concentration Guides (DOE DCG)*

DOE DCG values are divided into two categories: 1) water ingestion in uncontrolled areas and 2) water ingestion from drinking water systems. The DCG values for water ingestion in uncontrolled areas are based on a committed effective dose equivalent of 100 mrem per year for each individual radionuclide. The DOE DCG values do not take into account the additive effects of radionuclides. Water ingestion in uncontrolled areas refers to drinking water sources other than public drinking water systems.

The DOE DCG values for water ingestion from drinking water systems apply to public water systems which have at least fifteen service connections or regularly serve an average of at least twenty-five individuals daily at least 60 days out of the year. The DOE DCG values for water ingestion from drinking water systems is calculated by taking 4 percent of the DCG values for water ingestion in uncontrolled areas. The DCG values for water ingestion from drinking water systems are based on a committed effective dose equivalent of 4 mrem per year for each individual radionuclide.

# APPENDIX F

## Chain-of-Custody Forms

47029%
47033% -dissolved

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: Tech Law, Inc.
W. O'Rear / W. O'Rear  T. Engle / Idaho Alpha

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS, TDS, Alkalinity, Chloride, Sulfate | NO3/NO2 | 23 TAL Metals Dissolved | Dissolved Trace Metals | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | P | F/P | |
| TW-8 | 7/30/01 | 1550 | X | | | X | 4 | X | X | X | X | 23 TAL Metals Dissolved And Dissolved Trace Metals are ~~Filtered and Preserved~~ |
| TW-3 | 7/30/01 | 1244 | X | | | X | 2 | X | X | | | |
| TW-4 | 7/30/01 | 1100 | X | | | X | 2 | X | X | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| [illegible] | 7/31/01 | 1700 | Patricia Dover | 8/1/01 | 10:00 | [illegible] |

Return Ice Bottles

White = sample collector  Yellow = file  Pink = with report

47025% 47026% - dissolved

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Eck / W. O'Rear / W. O'Rear / TechLaw, Inc.

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | DO (F/P) | Total Cyanide (P) | 23 TAL Total (P) | 23 TAL Dissolved (F/P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-3 | 7/30/01 | 1244 | X | | | X | 4 | X | X | X | X | 23 TAL Metals and Dissolved Trace Metals are Filtered and Preserved. |
| TW-4 | 7/30/01 | 1100 | X | | | X | 4 | X | X | X | X | |
| TW-8 | 7/30/01 | 1550 | X | | | X | 2 | X | X | | | |
| | | | X | | | X | FTE | 7/30/01 | | | | |

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| [signature] | 7/31/01 | 1700 | Palmira Dawes | 8/1/01 | 10:00 | Send Report to Steve Phillips at TechLaw (N 455) |

Return Ice Bottles Please

White = sample collector Yellow = file Pink = with report

ENVIRONMENTAL PROTECTION AGENCY

# OFFICIAL CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME |
|---|---|
| [illegible] | Los Alamos Sampling [illegible] |

SAMPLERS: (Signature) [illegible]

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | [illegible] | [illegible] | [illegible] | [illegible] | VOC | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | ~~47161~~ 47163 47165 |
| TW 2A | 1/30/01 | 1400 | | X | LANL | | X | X | X | X | | 2 | Dissolved Trace Metal [illegible] |
| TW-1 | 1/30/01 | [illegible] | | X | LANL 1 | | | | | | X | 3 | B.L., No.S., Sc., Sn.T. |
| TW-4 | 1/30/01 | 1100 | | X | LANL | | | | | | X | 3 | |
| TW 8 | 1/30/01 | [illegible] | | X | LANL | | | | | | X | 3 | |
| TW 3 | 1/30/01 | 1642 | | X | LANL | | | | | | X | 3 | |
| TP-1 | 1/31/01 | 1700 | | X | NMED | | | | | | X | 3 | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [illegible] | [illegible] 1700 | Patricia Dauer | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) Patricia Dauer | Date / Time [illegible]/01 [illegible]30 | Remarks [illegible] | |
| Shipped by: [illegible] | | Airbill Number: [illegible] | | | |

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA [illegible]0-53 (11/46)

6- 07151

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Date 470599. Disc. 470599.

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle / T. Engle, W.O'Rear / W.O'Rear, Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | DOC (F/P) | Total CN (P) | NO2/3 (P) | TOC (P) | TSS | TDS | Perchlorate | Anions | 23 TAL Dissolved (F/P) | Dissolved Trace Metals (F/P) | Total 23 TAL (F) | Total Radionuclides (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-1 | 7/31/01 | 1025 | X | | | X | 6 | X | X | X | X | X | X | X | X | X | X | X | X | Anions, include: F, $HCO_3$, $SO_4$, Cl, Br (For both wells) |
| TW-2A | 7/30/01 | 1400 | X | | | X | 3 | X | | X | | X | X | X | X | | | X | X | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti (For all wells) |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | Total Radionuclides: 238 Plutonium, 239/240 Plutonium, 90Sr, 241Am, Isotopic U, Gamma Spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/1/01 | 1700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dover | 8/2/01 | 0930 | |

White = sample collector  Yellow = file  Pink = with report

SVOC 46.819%
dissolved 47.046%

# CHAIN OF CUSTODY RECORD

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Charleston, South Carolina 29407
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(843) 556-8171

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle / G. Engle, W. O'Rear, W.O. and Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOC | NO2/3 | TPC | DOC | Total Cyanide | TSS | TDS | Perchlorate | Anions (F, NO3, SO4, Cl, Br) | Dissolved Radionuclides | Dissolved 23 TAL Metals | Dissolved Total Metals | Total TAL 23 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | F | P | F/P | P | | | | | F/P | F/P | F/P | P | |
| MCO-3 | 7/31/01 | 1355 | X | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | Dissolved Radionuclides include: 238 Plutonium, 239/240 Plutonium, 90Sr, 241AM, isotopic U. Gamma Spec |
| | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/1/01 | 1700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dauer | 8/2/01 | 0930 | Please Return Ice Bottles to NMED |

White = sample collector Yellow = file Pink = with report

2

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

(1) 47032% 46849%

Client Name/Facility Name: CH/ LANL

Collected by/Company: T. Engle / W. O'Rear / W. O'Ram / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Gamma Isotopes | SVOC | DOC | Total Cyanide | TSS | TDS | Perchlorate | Anions | Total Metals | Dissolved Radiochem | Dissolved 23TA Metals | NO2/3 | TOC | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 MC-05 | 8/2/01 | 1415 | X | | | X | 8 | | F | F | X | X | X | X | X | X | X | X | X | F | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals include: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | Dissolved Radiochemistry: 238 Plutonium, 239/240 Pu, 90Sr, 241AM, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Tom Nel | 08/07 | 9/3/01 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Gustav Kunde | 8/4/01 | 0930 | PLEASE Return To Bottles to [illegible] |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

46880 47068 Dissolved

EPA

Client Name/Facility Name: LANL

Collected by/Company: W. O'Rear/W. O'Rear - TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOC | Total CN | DOC | Dissolved Trace Metals | Dissolved Radiochem | 23 TAL Metals | NH3 | NO2/3 | F-, Cl-, SO4 | TOC | PHOS | TKN | Anions | Dissolved 23 TAL Metals | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | P | F | F | F | P | P | | F | F | F | P | F | P | | | | |
| 009 CS-1A | 8/3/01 | 1100 | | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Dissolved Trace Metals include: B, Li, Mo, Si, Sr, Sn, Ti. Dissolved Radiochem include: 238 Plutonium, 239/240 Pu, 90 Sr, 241 Am, Isotopic U, Gamma Spec. Anions include: F, HCO3, SO4, Cl, Br |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/3/01 | 1500 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Gustavo Lamela | 8/4/01 | 0930 | Please Return Bottles to NMED |

Thanks TB

White = sample collector Yellow = file Pink = with report

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Page 1 of 1

47021% Dissolved
46877%

# CHAIN OF CUSTODY RECORD

~~46875% (DM)~~ ~~46874%~~ 46876%

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engle (T. Engle) W. O'Rear W. O'Rear / TechLaw

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| | SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS | TDS | Alkalinity | Anions | Total Cyanide | DOC | TAL 23 Dissolved Metals | Dissolved Tine Metals | TAL 23 Total | Total Radiochem | NO2 | NO3 | TOC | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | P | F P | F P | F | P | P | F | F | F | | | | | | |
| 001 | PO I-4 | 8/1/01 | 1530 | X | | | X | 6 | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | Anions include: F, HCO3, SO4, Cl, Br) |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Tl Alk Metals include: B, Li, MO, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | Total Radionuclides include: 238 Plutonium, 239/240Pu, 90Sr, 241 Am, isotopic U, gamma spec) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/3/01 | 0745 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/4/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

46881% 47036% - dissolved

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Erpk (LANL) W. O'Rear/W. O'Rear (Tech LANL)

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO3 N | NO2 N | PO4 P | SO4 S | PO4 P | Cerchlorate | Halides | Total Phenolics | COD | Diss. Rads | Dissolved Trace Metals | Dissolved Rare Earth Metals | Total Trace Metals | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 003 004 MLO-05B | 08/02/01 | 1500 | X | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Dissolved Rads include: 238Pu, 239/240Pu, 90Sr, 241Am, isotopic U, gamma spec |
| | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Total Trace Metals include: B, Li, Mo, Si, Sr, Sn, and Ti. |
| | | | | | | | | | | | | | | | | | | | | | | | | Major Anions include: F, HCO3, SO4, Cl, Br |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wallace O'Rear | 8/3/01 | 1700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | / | | Gustavo Sanchez | 8/4/01 | 0930 | Please Return Ice Bottles to NMED. |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of ____

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engler / W. O'Rourke / W. Dinkar / Tech[redacted]

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Tritium Enrichment | Tritium (Direct Count) | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TW-1 | 7/31/01 | 1025 | x | | | x | 2 | [redacted] | X | | For Tritium Direct |
| TW-2A | 7/30/01 | 1400 | X | | | x | 1 | | X | | Count - No Enrichment |
| MC-03 | 7/31/01 | 1355 | x | | | x | 1 | | X | | only Direct Count. |
| MC-06 | 8/6/01 | 1430 | x | | | x | 1 | | X | | |
| TW-8 | 7/30/01 | 1550 | x | | | x | 1 | X | | | |
| PUI-4 | 8/1/01 | 1530 | x | | | x | 2 | X | X | | |
| TW-3 | 7/30/01 | 1244 | x | | | x | 2 | X | X | | |
| MC-02 | 8/2/01 | 1415 | x | | | x | 1 | | X | | |
| MCD-05B | 8/2/01 | 1500 | x | | | x | 1 | | X | | |
| TW-4 | 7/30/0 | 1100 | x | | | x | 1 | X | | | |
| D[redacted] | 8/8/01 | 0815 | x | | | x | 1 | X | | | |
| Dup | 8/8/01 | 0815 | x | | | x | 1 | X | | | |
| | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 8/8/01 | [illegible] | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | R. Brescher | 01/08/03 | 10:00 | Please Return Ice Bottles to NMED: 134 [illegible] |

White - sample collector  Yellow = file  Pink = with report

47217%
47221% Dissolved

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engle of W.O. Rear/W.O. Rear/TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total 23 Tal Metals (P) | Total Radioxium (P) | SVOC | Total Cyanide (P) | TSS | TDS | Radionuclide | Anions (P) | Total Uranium (P) | NO2 (P) | NO3 (P) | TOC (P) | Explosives (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM-2 | 8/8/01 | 0740 | X | | | X | 7 | X | X | X | X | X | X | X | X | X | X | X | X | X | Total Radnuclides include: 90Sr, isotopic U |
| | | | | | | | | | | | | | | | | | | | | | Anions include: F, HCO3, SO4, Cl, Br |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/8/01 | 1230 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/9/01 | 0930 | Please Return Ice Bottles to NMED |

[signature] 8/9/01 0930

White = sample collector  Yellow = file  Pink = with report

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Charleston, South Carolina 29417
(843) 556-8171

# CHAIN OF CUSTODY RECORD

Page ____ of ____

Client Name/Facility Name: EPA LANL

Collected by/Company: T. Engle Ld. Engr. W. O'Rear / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Sample Matrix (Soil, Water, Tissue, etc.) | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| MLO-7 | 8/2/01 | 0910 | X | | | X | 3 | X | |
| MLO-5 | 8/2/01 | 1415 | X | | | X | 3 | X | |
| MLO-5B | 8/2/01 | 1560 | X | | | X | 3 | X | |
| MLO-10 | 8/6/01 | 1430 | X | | | X | 3 | X | |
| ~~DT-9~~ | ~~8/7/01~~ | TE | 8/8/01 | | | | | | |
| MLO-3 | 7/31/01 | 1355 | X | | | X | 3 | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/8/01 | 1103 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: Please Return Ice Bottle to NMED: 1341 State Rd 4, Ste A White Rock NM | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA ILAW

Collected by/Company: T. Engle / W. O'Rear / W. O'Rear / TechLaw

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS | TDS | Anions | Archive | TPH 8015 | Total Uranium | Total Radi | NO2 | NO3 | TOC | SVOC | Total Cyanide | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | F | F | F | F | P | P | P | P | P | P | | P | |
| O-1 | 8/8/01 | 0040 | X | | | X | 6 | X | X | X | X | X | X | X | X | X | X | X | X | Anions include: |
| O-4 | 8/8/01 | 0545 | X | | | X | 3 | X | X | X | X | | | | | | | X | | F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | Total Radiochem: |
| | | | | | | | | | | | | | | | | | | | | 90 Sr, isotopic U |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/8/01 | 1430 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Kaiser | 8/9/01 | 0730 | PLEASE Return Ice Bottles to NMED |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

2 coolers total

Client Name/Facility Name: EPA / LANL

Collected by/Company: W. O'Rear / W. O'Rear / TechLaw — T. Engle

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Radionuclides (P) | Total Metals (P) | Perchlorate (K) | Major Anions (K) | TSS | TDS | Explosives | NO3/NO3 (P) | TOC (P) | Dissolved Trace Metals (P F) | DOC (P F) | Total CN (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT-9 | 8/7/01 | 1300 | X | | | | 21 | X | X | X | X | X | X | X | X | X | X | X | X | MS/MSD |
| | | | | | | | | | | | | | | | | | | | | radionuclides include: (238, 239/240 pu, 90 sr, 241 Am, istopic U, gamma spec) |
| | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals (B, Li, Mo, Si, Sr, Sn, and Ti) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/8/01 | 1430 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: Mike Gaulon | Date: 8/9/01 | Time: 0950 | Remarks: Return Ice Bottles to NMED | |

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engel / W. O'Rear / W. O'Rear / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO3/NO2 (P) | TOC (P) | TSS | TDS | Perchlorate | Anions | Total Metals (P) | Total Radiation (P) | Total CN (P) | DOC (P) | Explosives (F) | Dissolved Trace metals (F) | Dissolved TAL metals (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT-10 | 8/8/01 | 1045 | x | | | | 7 | X | X | X | X | X | X | X | X | X | X | X | X | X | Radionuclides include (238, 239/240 Pu, 90Sr, 241Am, isotopic U, gamma spec) Dissolved Trace Metals Include: (B, Li, Mo, Si, Sr, Sn, and Total) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/8/01 | 1430 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Kessler | 8/9/01 | 0930 | Return Ice Bottles to NMED |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle (for W. O'Rear) / W. O'Rear / TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO2 (P) | NO3 (P) | SVOC | TSS | TDS | Perchlorate | Anions | TAL Total Metals | DOC (P) | Total Cyanide (P) | Dissolved TAL Metals (P) | Dissolved Rad (P) | Dissolved Rad Metals (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-7 | 0910 | 8/7/01 | | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | Dissolved Radchem: 238 Plutonium, 239/240 Pu, 90Sr, 241 Am, isotopic U, gamma spec |
| | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/8/01 | 1430 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: Mike Kenlow | Date: 8/9/01 | Time: 0930 | Remarks: Return Ice ~~Bottom~~ Containers to NMED | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: W. O'Rourke - W.O'Rourke / T. Eagle & Tech LAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | DOC | TSS | TDS | Perchlorate | Anions | Total Cyanide | Total 23TAL Metals | Dissolved 23TAL METALS | Dissolved Radioisotopes | Dissolved Trace Metals | NO2 | NO3 | TOC | SVOC | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | F | P | | | | | P | P | F P | F P | F P | P | P | P | | | | |
| MCO-6 | 8/6/01 | 1430 | X | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radionuclides: 238 Pu, 239/240 Pu, 90Sr, 241 Am, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/7/01 | 0630 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/9/01 | 0950 | Please return ice bottles to LANL. Thanks. |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: TECHLAW/INC. ENGLE/O'REAR

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | VOC | MS | MSD | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAD 6.7A | 8/9/01 | 0745 | X | | | X | 3 | X | | | |
| DT-9 | 8/7/01 | 1300 | X | | | X | 3 | | | X | |
| DT-9 | 8/7/01 | 1300 | X | | | X | 3 | | X | | |
| DT-9 | 8/7/01 | 1300 | X | | | X | 3 | X | | | |
| O-4 | 8/8/01 | 0545 | X | | | X | 3 | X | | | |
| O-1 | 8/8/01 | 0640 | X | | | X | 3 | X | | | |
| DT-10 | 8/8/01 | 1045 | X | | | X | 3 | X | | | |
| PM-2 | 8/8/01 | 0740 | X | | | X | 3 | X | | | |
| PIO-4 | 8/1/01 | 1530 | X | | | X | 3 | X | | | |
| G5-1A | 8/3/01 | 1100 | | | | X | 3 | X | | | |
| PM-5 | 8/8/01 | 0755 | X | | | X | 3 | X | | | |
| PM-1 | 8/8/01 | 0615 | X | | | X | 3 | X | | | |
| G-1A | 8/8/01 | 1730 | X | | | X | 3 | X | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/9/01 | 1327 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/13/01 | 1000 | |

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Diss. 4/4/97.

Client Name/Facility Name: EPA ILAN

Collected by/Company: T. Enck Tech Law, N. O'Rear, W. O'Rear / Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | DOC (P) | Total Cyanide (P) | SVOA | NO2 (P) | NO3 (P) | TOC (P) | TSS | TDS | Perchlorate | Anions | Dissolved Total Metals (F P) | Dissolved Trace Metals (F P) | Bicarbonate | Total Rads (P) | Total 238 Metals (P) | Total Uranium (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G-1A | 8/8/01 | 1730 | X | | | X | 8 | X | X | X | X | X | X | X | 1 | 1 | X | X | X | | X | X | X | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | Total Rads: 90Sr, isotopic U |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/9/01 | 1112 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/13/01 | 1000 | |

White = sample collector  Yellow = file  Pink = with report

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474217.

# CHAIN OF CUSTODY RECORD

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Page 1 of 1

Client Name/Facility Name: EP/LANL

Collected by/Company: T. Engle & W. Orem / MechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | P TOC | P DISSOLVED INSTALLATION | P DISSOLVED TRACE METALS | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D-4 | 8/8/01 | 0545 | X | | | X | 2 | X | X | X | Dissolved Trace Metals: B, Li, Mo, Sr, Sn, Ti |
| PM-3 | 8/8/01 | 0715 | X | | | X | 2 | X | X | X | |
| D-1 | 8/8/01 | 0640 | X | | | X | 2 | X | X | X | |
| PM-1 | 8/8/01 | 0615 | X | | | X | 2 | X | X | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/9/01 | 1250 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/13/01 | 1000 | |

White mple collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: TECHLAW, INC. ENGLE/O'REAR Trash WO Run

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | P | VOC | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| TP-2 | 7/30/01 | 1430 | X | | | X | 3 | | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 1327 | 8/9/01 | | | | | |

| Relinquished by: | Date: | Time: | Received for lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Lambert | 8/13/01 | 1000 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle & W. O'Reilly / W. D'Ram Tech Law

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Explosives | NH3 | NO2 | NO3 | Total P | TKN | TOC | Total CN | Weak CN | Dissolved CN | Amenable CN | TAL Metals | SVOC | DOC | Dissolved TAL Zinc | Dissolved TAL Metals | Trace Metals | Dissolved Radiochem | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | I | P | P | P | P | P | P | P | P | P | P | P | I | P P | F P | F P | P | F P | |
| PAD6.7A | 8/9/01 | 0745 | X | | | X | 10 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radiochem: 90 Sr, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/9/01 | 1221 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | | | | |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: W. O'Rear / W O'Rear, T. Engle & Ken / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | P Hardness | TSS | TDS | Perchlorate | Anions | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAD6.7A | 8/9/01 | 0745 | | | | X | 10 | X | X | X | X | X | Anions include: F, HCO3, SO4, Cl, Br |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/11/01 | 0750 | |

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA LANL

Collected by/Company: T. Engle & N. O'Rear/Waller, TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Cyanide | Total 23 Metals | Total Radis | Total Uranium | TSS | TDS | Perchlorate | Anions | SVOC | NO2 | NO3 | TOC | Explosives | DOC | Dissolved Metals | Dissolved Trace Metals | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | TE | TE | TE | TE | | | | | | | | | |
| | | | | | | | | P | P | P | P | P | P | P | P | | | P | P | P | | P P | P P | |
| PM-S | 8/8/01 | 0755 | X | | | X | 9 | Y | + | + | + | X | X | X | X | X | X | X | X | + | + | X | X | Total Rads include: 90 Sr, isotopic U |
| | | | | | | | | | | | | | | | | | | | | | | | | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Sr, Sn, Ti |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/9/01 | 1129 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: J. Engle / W. O'Rear / WO'Rear Tech LHW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | VOCs | SVOC | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| BS-1B | 8/10/01 | 1005 | | | | X | 5 | X | X | |
| PA 6.7 | 8/9/01 | 0845 | | | | X | 5 | X | X | |
| PM-3 | 8/8/01 | 0715 | | | | X | 3 | X | | |
| DT-5A | 8/8/01 | 1435 | | | | X | 3 | X | | |
| PM-4 | 8/8/01 | 0820 | | | | X | 3 | X | | |
| TP3 | 7/30/01 | 1430 | | | | X | 3 | X | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/10/01 | 1252 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/11/01 | 0930 | Please Return Ice Bottles to NMED |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Englert / W. O'Rear / W. O'Rear / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Metals | Total Metals | Total CN | DOC | Metals Trace | NO2/NO3 | TOC | TSS | Perchlorate | Major Anions | Explosives | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-4 | 8/8/01 | 0545 | | | | X | 5 | X | X | X | | | X | X | | | | | |
| PM-2 | 8/8/01 | 0740 | | | | X | 2 | | | | X | X | | | | | | | |
| PM-1 | 8/8/01 | 0615 | | | | X | 4 | X | X | X | | | X | X | X | X | X | X | Major Anions: (F, HCO3, SO4, Cl, Br) |
| | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: (B, Li, Mo, Si, Sr, Sn, and Ti) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/10/01 | 1700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [illegible] | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA/LANL

Collected by/Company: Engle dp — W. O. Rex/WDR Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Tritium Enrichment | - | Tritium Direct Count | Gamma Spec | | | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-1A | 1100 | 8/3/01 | | | | X | 1 | | | X | | | | | | | | | | | | | | | | |
| PM-1 | 0820 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| -0-1 | 0610 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| G-1A | 1730 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| GS-1B | 1005 | 8/10/01 | | | | X | 1 | | | X | | | | | | | | | | | | | | | | |
| PA 10.6 | 1610 | 8/9/01 | | | | | 1 | | | X | | | | | | | | | | | | | | | | |
| PA 6.7 | 0845 | 8/9/01 | | | | X | 1 | | | X | | | | | | | | | | | | | | | | |
| MA 7.5 | 1800 | 8/7/01 | X | | | X | 1 | | | X | | | | | | | | | | | | | | | | |
| MA 0.7 | 0910 | 8/7/01 | X | | | X | 1 | | | X | | | | | | | | | | | | | | | | |
| PM-3 | 0715 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| PM-2 | 0740 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| DT-10 | 1045 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |
| PM-5 | 0755 | 8/8/01 | X | | | X | 1 | X | | | | | | | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Alan Kligh | 8/10/01 | 1619 | R Breschen | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | | 010814 | 1097 15 | |

White = sample collector  Yellow = file  Pink = with report

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA ILANL

Collected by/Company: W.O. Rear/Weston/TechLAN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Tritium Enrichment | | Tritium Direct Count | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT-5A | 1435 | 8/7/01 | X | | | X | 1 | X | | | | |
| PADG7A | 0745 | 8/9/01 | X | | | X | 1 | | | X | | |
| DT-9 | 1300 | 8/7/01 | X | | | X | 1 | X | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 8/10/01 | 1619 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | R Bussler | 010815 | 10a | |

White = sample collector  Yellow = file  Pink = with report

473779 Diso 473789

# CHAIN OF CUSTODY RECORD

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2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
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Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. English / W. O'Reer / W. O'Reer / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOC | Total CN | TSS | TDS | Perchlorate | Major Anions | TAL metals | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM-1 | 8/8/01 | 0615 | X | | | x | 2 | X | | | | | | | |
| PA 10.6 | 8/9/01 | 1610 | | | | X | 2 | X | | | | | | | |
| PM-4 | 8/8/01 | 0820 | | | | x | 4 | X | X | X | X | X | X | | Major Anions: (F, HCO3, SO4, Cl, Br) |
| PM-3 | 8/8/01 | 0715 | | | | x | 3 | X | X | | | | | | |
| PA10.6 | 8/9/01 | 1610 | | | | x | 1 | | | | | | | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Reer | 8/10/01 | 1500 | | | | | |

| Relinquished by: | Date: | Time: | Received by Lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Bowsler | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

2

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle / W. O'Rear / W. O'Rear TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS | TDS | Perchlorate | Anions | Total Cyanide | Dissolved Total Metals | Dissolved Trace Metals | Total Trace Metals | Total Rad Chem | DOC | NO2 | NO3 | TOC | Explosives | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT-5A | 8/7/01 | 1435 | X | | | X | 7 | X | X | X | X | X | X | X | + | + | X | X | X | X | X | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | Total Rads include: 238 Plutonium, 239/240 Pu, 90Sr, 241Am, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Jan Singh | 8/10/01 | 0810 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Kimber | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA ILAW

Collected by/Company: W. O'Rear/W. O'Rear/T. Engle/Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOC | NO2 | NO3 | TOC | TSS | TDS | Perchlorate | Anions | Total CN | DOC | Total 123 Total Metals | Dissolved Metals | Dissolved Trace Metals | Dissolved Radiochem | Hardness | Weak CN | Dissociable CN | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | P | P | P | | | | | P | P | P | P | P | F | F | P | P | P |
| MLO 75 | ~~8/10/01~~ 8/7/01 | 1800 | X | | | X | 8 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | Anions include: F, NO3, SO4, Cl, Br |
| PA 10.16 | 8/9/01 | 1610 | | | | X | 2 | | | | | | | | | X | | | | | | | X | X | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radiochem: 238 Plutonium, 239/240 Pu, 90Sr, 241 Am, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/10/01 | 0910 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

12

# OFFICIAL
# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME |
|---|---|
| R06745 | Los Alamos Sampling Activities |

SAMPLERS: (Signature) T. Engle, R. Young, TechLaw, Inc.

| | STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | VOCs | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bucks 012 | ~~Buckmann~~ MW-11 | 8/16/01 | 0950 | | X | LANL | 3 | X | | | | | | |
| 013 | EQ-1 | 8/16/01 | 0715 | | X | LANL | 3 | X | | | | | | |
| 014 | 18-MW-17 | 8/15/01 | 1430 | | X | LANL | 3 | X | | | | | | |
| 015 | Buckmann 2 | 8/16/01 | 1140 | | X | LANL | 3 | X | | | | | | |
| 016 | 18-MW-27 | 8/15/01 | 1445 | | X | LANL | 3 | X | | | | | | |
| | ~~18-MW-15E~~ | | | | | | | | | | | | | TE 8/16/0 |
| 017 | 18-MW-18 | 8/15/01 | 1300 | | X | LANL | 3 | X | | | | | | |
| 018 | 03-MW-1 | 8/15/01 | 1620 | | X | LANL | 3 | X | | | | | | |
| 019 | Buckman 1 | 8/16/01 | 0940 | | X | LANL | 3 | X | | | | | | |
| 020 | FB-01 | 8/15/01 | 1400 | | X | LANL | 3 | X | | | | | | |
| 021 | Buckman 7 | 8/16/01 | 1050 | | X | LANL | 3 | X | | | | | | |
| 022 | TP-5 | 8/7/01 | 1615 | | X | LANL | 3 | X | | | | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/17/01 0910 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) [signature] | Date / Time 8/18/01 0900 | Remarks | |
| Shipped by: FED EX | | Airbill Number: 8079058455221 | | | |

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 100-53 (1-86)

6- 11667

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P.O. Box 30712
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(843) 556-8171

# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engler / W. O'Rear / W. Dixon / TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Amoxicillin | | | | | | | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MLO 7.5 | 8/7/01 | 1800 | | | | | | | | | | | | | | | | | | | | | | | |
| PA 10.6 | 8/9/01 | 1610 | | | | X | | X | | | | | | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 8/10/01 | 0910 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [illegible] | 8/11/01 | 0930 | |

White = sample collector  Yellow = file  Pink = with report

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(843) 556-8171

# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA ILANL

Collected by/Company: T. Enck & W. O'Reay / W.O. & Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS | TDS | Perchlorate | Major Anions | NO3/NO3 | Total Phos. | TKN | TOC | NH3 | Explosives | Hardness | TAL Metals | DOC | SVOC | Total Trace Metals | Total Radionuclides | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | P | P | P | P | P | | P | P | F P | | F P | F P | |
| PA10.6 | 8/9/01 | 1610 | | | | X | 3 | X | X | X | X | X | X | X | X | X | X | X | | | | | | |
| PA6.7 | 8/9/01 | 0945 | | | | X | 7 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Dissolved Trace metals: (B, Li, Mo, Si, Sr, Sn, + Ti) |
| | | | | | | | | | | | | | | | | | | | | | | | | Total Radionuclides Dissolved: (90Sr, isotopic U, gamma spec) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/10/01 | 1430 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engle / W. O'Rear / W. O'Rear / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total CN (w/ Chlorine) P | Amenable CN P | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| PA6.7 | 8/9/01 | 0845 | | | | X | 1 | X | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 8/10/01 | 1430 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [illegible] | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engle of WORRAP / TechLaw

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Explosives | NO3 (F) | NO2 (F) | TOC (P) | TSS | TDS | Perchlorate | Anions | Total 23 TAL Metals (P) | Total Radiochem (P) | Total Uranium (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM-3 | 8/8/01 | 0715 | X | | | X | 4 | X | X | X | X | X | X | X | X | X | X | X | Anions include: F, HCO3, SO4, Cl, Br |
| PM-4 | 8/8/01 | 0820 | X | | | X | 3 | X | + | + | + | | | | | X | X | X | |
| | | | | | | | | | | | | | | | | | | | Total Radchem: 90Sr, isotopic U |
| | | | | | | | | | | | | | | | | | | | Total Uranium: use ICPMS (detection limit to 5-10 ppb range) |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Tom A Engle | 8/10/01 | 1352 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Jute Gaslow | 8/11/01 | 0930 | |

White = sample collector Yellow = file Pink = with report

Airbill # 8093058487 05

Total 475639

# CHAIN OF CUSTODY RECORD

Page 1 of 2

475679

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Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Erickson / R. Young

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Explosives | DOC | Total Alkalinity | TSS | TDS | Perchlorate | Anions | Total Cyanide | Total Phenols | Dissolved Metals | Dissolved Trace Metals | Dissolved Radchem | SVOC | NO2/NO3 | TOC | TOP | TKN | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18-MW-08 | 8/13/01 | 1410 | X | | | X | 9 | | | | | | | | | | | | | | | | | | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metal: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radchem: 90Sr, isotopic U, gamma spec |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/14/01 | 0700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dover | 8/15/01 | 09:00 | |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: EPA ILANL

Collected by/Company: T. Engle / T. Engl
R. Young / Tech Law

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NH3 | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 18MW-08 | 8/13/01 | 1410 | X | | | X | | X | |

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 8/14/01 | 0700 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Davis | 8/15/01 | 09:00 | |

White = sample collector  Yellow = file  Pink = with report

Air bill # 809305848212

# CHAIN OF CUSTODY RECORD

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(843) 556-8171

Page 1 of 1

Client Name/Facility Name: EPA/LANL

Collected by/Company: T. Engle & Engle / TechLAW
R. Young

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Cyanide (P) | DOC (F P) | TSS (P) | TDS (P) | Perchlorate (P) | Anions (P) | NH3 (P) | NO2 (P) | NO3 (P) | Total P (P) | TKN (P) | Total 23 Metals (P) | Total Hg (P) | Dissolved 23 Metals (P) | Dissolved Trace Metals (P) | Dissolved Radchem (P) | TOC (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-1B | 8/10/01 | 1005 | | | | X | 6 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Anions: F, NO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radchem: 238 Plutonium, 239/240 Pu, 90 Sr, 241 Am, isotopic U, gamma spec. |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Lani Aiken | 8/14/01 | 0900 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: Patricia Dauer | Date: 8/16/01 | Time: 09:00 | Remarks: | |

White = sample collector  Yellow = file  Pink = with report

Airbill # 809305848186

# CHAIN OF CUSTODY RECORD



General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA/LALNL LANL

Collected by/Company: T. Engle of Engl
R. Young EPA / Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TSS | TDS | Petroleum H | Anions | Total 23 Metals | BOD | Dissolved 23 Metals | Dissolved Trace Metals | Dissolved Rad Isotopes | NO2 | NO3 | TOC | Phos Ortho | TKN | NH3 | SVOC | Explosives | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | P | | | P | P | P | P | | | |
| 18-BG-1 | 8/13/01 | 1215 | X | | | X | 9 | X | X | X | X | X | X | X | X | X | X | Y | Y | Y | Y | Y | X | X | Anions include: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Rad: 90Sr, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/14/01 | 0800 | [signature] | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dover | 8/15/01 | 09:00 | |

White = sample collector  Yellow = file  Pink = with report

Air bill # 809305848186

# CHAIN OF CUSTODY RECORD



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Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: FFR / LANL

Collected by/Company: T. Engle & R. Young / Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | P | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 18-BG-1 | 8/13/01 | 1215 | X | | | X | | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/14/01 | 0800 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dauer | 8/15/01 | 09:00 | |

White = sample collector Yellow = file Pink = with report

Airbill # 8093058487 1le

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171



Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Eagle / R. Youngblood / TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | EDB/DBCP/NC | TOTAL METALS | Total Cyanide | DOC | TSS | TDS | Perchlorate | Anions | Dissolved Metals | Dissolved Trace Metals | Dissolved Radiochem | SVOC | NO2 | NO3 | TOC | Total P | TKN | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | P | P | P | | | | | F | P | F P | P | | | | | | |
| 18-MW-7 | 8/13/01 | 0950 | X | | | X | 9 | X | X | Y | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Anions: F, NO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radiochem: 90 Sr, isotopic U, gamma spec |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/14/01 | 0730 | [signature] | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dennis | 8/15/01 | 09:00 | |

White = sample collector  Yellow = file  Pink = with report

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA / LANL

Collected by/Company: T. Engle & R. Young / TechLaw

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NH3 (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 18-MW-7 | 8/13/01 | 0950 | X | | | X | | X | |

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/14/01 | 0730 | [signature] | | | | |

| Relinquished by: | Date: | Time: | Received by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| [signature] | | | [signature] | 8/15/01 | 09:00 | |

White = sample collector  Yellow = file  Pink = with report

AIRBILL # 8091305848175

# CHAIN OF CUSTODY RECORD

Page 1 of 1

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA/LANL

Collected by/Company: W.O. Rear / T. Engelhardt / Techlaw / R. Young

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMB | GRAB | # OF CONTAINERS | F/P Dissolved 93 Tritium | F/P Dissolved Trace Metals | F/P Dissolved Radium | F/P DOC | | TRPH 13 Metals | | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PA 10.6 | 8/9/01 | 11610 | | | | X | 2 | X | X | X | X | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti |
| PM-4 | 8/8/01 | 0820 | X | | | X | 2 | X | X | | X | | | | | | | | | | | | | |
| PRS-3-056AA | 8/10/01 | 1515 | | X | | X | 1 | | | | | | X | | | | | | | | | | | Dissolved Radchem: 90 Sr, isotopic U, gamma spec |
| PRS-3-056AA MS | 8/10/01 | 1515 | | X | | X | 1 | | | | | | X | | | | | | | | | | | |
| PRS-3-056AA MSD | 8/10/01 | 1515 | | X | | X | 1 | | | | | | X | | | | | | | | | | | |
| PRS-3-056(C) | 8/10/01 | 1500 | | X | | X | 2 | | | | | | X | | | | | | | | | | | |
| PRS-3D-056 | 8/10/01 | 1530 | | X | | X | 2 | | | | | | X | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Robert Young | 8/14/01 | 0715 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Patricia Dawn | 8/16/01 | 09:00 | |

White = sample collector Yellow = file Pink = with report

ARBIU II 8[illegible]0048554

# CHAIN OF CUSTODY RECORD

~~SOUTHWEST LABORATORY OF OKLAHOMA, INC.~~ ECH

1700 W. Albany • Broken Arrow, Oklahoma 74012-1421 8/16/01
Office: 918-251-2858 • Fax 918-251-2599

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| ECH LAW | N/A | 214/953-0045 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| N/A | EPA/LANL |

SAMPLER: (Signature) R. Lowe T. Engle

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | SVOCs | Explosives | TSS/TDS | Formaldehyde | Anions | NO2/NO3 | TDC | Total P | TKN/NH3 | Total CN | Total Metals | Total Metals | Diss. Metals | Diss. Metals | Rad Chem | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buckman 1 | 8/16/01 | 0940 | | X | Buckman 1 | GW | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | PRESERVED? |
| | | | | | | | | | | | | | | | | | | | | X | X | X | FILTERED? |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|---|---|---|---|
| [signature] | 8/17/01 | 7:55 | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|---|---|---|---|
| | | | | | | | [signature] 8/18/01 0900 |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

REMARKS: ANIONS: F, HCO3, SO4, Cl, Br
DISSOLVED TRACE METALS: B, Li, Mo, Si, Sr, Sn, Ti
RAD CHEM: 40 Sr, ISOTOPIC U, GAMMA SPEC!

Total U
Total F
Total Hg
Please use Ic Pms (5-10ppb marginal detect limit)

[illegible]2-1192-03]

AIR BILL # [illegible]

# CHAIN OF CUSTODY RECORD

~~SOUTHWEST LABORATORY OF OKLAHOMA, INC.~~
1700 W. Albany • Broken Arrow, Oklahoma 74012-1421
Office: 918-251-2858 • Fax 918-251-2599

8/16/01

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TECH LAW | N/A | 214/953-0045 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| N/A | EPA/LANL |

SAMPLER: (Signature) T. ENGLE

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | SVOCs | HALOSVOCs | TSS/TDS | PERCHLORATE | ANIONS | NO2/NO3 | TOC | TOTAL P | TKN/NH3 | TOTAL CN | TOTAL TRACE METALS | TOTAL URANIUM | TOTAL TRACE METALS | DISS. TOTAL METALS | DISS. TRACE METALS | DISS. RAD CHEM (total) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BUCKMAN 2 | 8/16/01 | 1140 | | X | BUCKMAN 2 | GW | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | PRESERVED? |
| | | | | | | | | | | | | | | | | | | | | X | X | X | X | FILTERED? |

RELINQUISHED BY: (Signature) | DATE: 8/17/01 | TIME: 0740 | RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) 8/18/01 0900

RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature)

Total 3

REMARKS: ANIONS: F, $ALO_3$, $SO_4$, Cl, Br
DISSOLVED TRACE METALS: B, Li, Mo, Si, Sr, Sn, Ti
DISSOLVED RAD CHEM: 40Sr, ISOTOPIC U, GAMMA SPECTE

Total Uranium: Please use ICPMS method (5-10 ppb range detect limit)

Test

# OFFICIAL CHAIN OF CUSTODY RECORD

F = FILTERED

| PROJ. NO. | PROJECT NAME |
|---|---|
| R06745 | EPA/LANL |

SAMPLERS: (Signature) R Young KRA T. Engle

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | SVOCs | Sulfides | TSS/FDS | Radionuclides | Anions | NO2/NO3 | TOC/TOTAL P | NH3/NH4 | TOTAL CN | TOTAL TRACE METALS P | TOTAL URANIUM P | TOTAL TRACE METALS P | DISSOLVED TRACE METALS FP | DIS-TRACE METALS F | TOTAL RAD CHEM P | DOC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BUCKMAN 7 | 8/16/01 | 1050 | | X | BUCKMAN 7 | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/17/01 0840 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) [signature] | Date / Time [illegible] | Remarks | ANIONS: F, HCO3, SO4, Cl, Br TOTAL AND DISSOLVED TRACE METALS: Ba, Li, Mo, Si, Sr, Sn, Ti TOTAL RAD CHEM: [illegible] |
| Shipped by: FED EX | | Airbill Number: 809305 848500 | | | |

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA [illegible]00-53 (11/96)

6- 11622

TOTAL URANIUM - PLEASE USE ICPMS METHOD (5-10 ppb range detection limit

AIKBILL # 8[illegible]

# CHAIN OF CUSTODY RECORD

~~SOUTHWEST LABORATORY OF OKLAHOMA, INC.~~ Pat X 8/16/01
1700 W. ALBANY • BROKEN ARROW, OKLAHOMA 74012-1421
Office: 918-251-2858 • FAX 918-251-2599

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TECHLAW | N/A | 214 953-0045 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| N/A | EPA/LANL |

SAMPLER: (Signature) R. YOUNG T. ENGLE

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | SVOCs | EXPLOSIVES | TSS/TDS | PERCHLORATE | ANIONS | NO2/NO3 | TOC | TOTAL P | TKN/NH3 | TOTAL CN | TOTAL METALS | TOTAL URANIUM | TOTAL DISSOLVED METALS | DISSOLVED METALS | DISSOLVED RADIONUCLIDES | DO | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 BUCKMAN 11 | 8/16/01 | 0950 | | X | BUCKMAN 11 | GW | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | PRESERVED? |
| 001 | | | | | | | | | | | | | | | | | | | | X | X | X | X | FILTERED? (.1) |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|---|---|---|---|
| [signature] | 8/16/01 | 0750 | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|---|---|---|---|
| | | | | | | | [signature] 8/16/01 0900 |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

Total 3

REMARKS: ANIONS: F, $HCO_3$, $SO_4$, Cl, Br
DISSOLVED TRACE METALS: B, Li, Mo, Si, Sr, Sn, Ti
DISSOLVED RADIONUCLIDES: 90Sr, ISOTOPIC U, ~~GAMMA~~ 8/16/01

Total Uranium! Please use ICPMS (5-10ppb detection limit) Total

2-1192-03 REC'D 8/16/01

ARBIL # 809305848510

# CHAIN OF CUSTODY RECORD

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Page 1 of 1

Client Name/Facility Name: EPA / LANL

Collected by/Company: R. Young / Tech Law

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOC | Explosives | TSS/TDS | Perchlorate | Alkalinity | NO2/NO3 | TOC | Total P | TKN/NH3 | Total CN | Total Metals | Dissolved Trace Metals | Dissolved Trace Metals | Dissolved Radioactivity | DOC | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 003 Q3-MW-1 | 8/15/01 | 1620 | X | | | X | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | Anions: F, HCO3, SO4, Cl, Br |
| 005 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals B, Li, Mo, S, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | Dissolved Radiochem 90Sr, Isotopic U, Gamma Spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/17/01 | 0905 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/17/01 | 0900 | |

White = sample collector Yellow = file Pink = with report

ARBIU # 809305848554

# CHAIN OF CUSTODY RECORD

Page 1 of 1

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: EPA / LANL

Collected by/Company: R. Young, T. Spence (TETRA TECH)

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| | SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | SVOCs | Explosives | TSS/TDS | Perchlorate | Anions | NO2 (P) | NO3 (P) | TOC (P) | TOTAL P (P) | TKN (P) | NH3 (P) | TOTAL CYAN, OE (P) | TOTAL TRACE METALS (P) | DISSOLVED TRACE METALS (F/P) | DISSOLVED TRACE METALS (F/P) | GRS-RAD CHEM (F/P) | DOC (F/P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 006 | 18-MW-16 | 8/14/01 | 1020 | X | | | X | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 006 | | | | | | | | | | | | | | | | | | | | | | | | | | ANIONS: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | | | | | | | DISSOLVED TRACE METALS B, Li, Mo, Si, Sr, Sn, Ti |
| | | | | | | | | | | | | | | | | | | | | | | | | | | DISSOLVED RAD CHEM 90 Sr, ISOTOPIC U, GAMMA SPEC |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 8/17/01 | 0730 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 8/18/01 | 0700 | |

White = sample collector  Yellow = file  Pink = with report

# OFFICIAL CHAIN OF CUSTODY RECORD

F = Filtered

PROJ. NO.: N/A

PROJECT NAME: EPA / LANL

SAMPLERS: (Signature) R Young, [illegible]

| | STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | SVOC | Explosives | TSS/TDS | Perchlorate | Anions | NO2/NO3 | TOC | Total P | TKN/NH3 | Total CN | Total TAL Metals | Dissolved TAL Metals | Dissolved Trace metals | Dissolved Radium | DOC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | P | P | P | P | P | P | F/P | F/P |
| 007 | 18 MW 17 | 8/15/01 | 1430 | ~~X~~ TE | X | 18 MW-17 | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 007 | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/17/01 0700 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) [signature] | Date / Time 8/18/01 0900 | | |
| Shipped by: FedEx | | Airbill Number: 809305848565 | | | |

Remarks: Anions: F, HCO3, SO4, Cl, Br
Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, Ti
Dissolved Radium: 90 Sr, Isotopic U, Gamma Spec

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EP/ 00-53 (11/96)

6- 1166(

ENVIRONMENTAL PROTECTION AGENCY

# OFFICIAL CHAIN OF CUSTODY RECORD

P = Preserved
F = Filtered

PROJ. NO.

PROJECT NAME: EPA/LANI

SAMPLERS: (Signature) R. Young T. England/Tech Law

| | STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | SVOC | Explosives | TSS/TDS | Cyanide | Anions | NO2/NO3 | TOC | Total P | TKN/NH3 | Total Chemical | Total Trace Metals | Dissolved Trace Metals | Dissolved Trace Metals | Dissolved Radiochem | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | P | P | P | P | P | P | F/P | F/P | F/P |
| 008 | 18 MW18 | 8/15/01 | 1300 | X | | 18-MW-18 | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 008 | | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/17/01 1720 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) [signature] | Date / Time 8/18/01 0900 | Remarks | |
| Shipped by: FED EX | | Airbill Number: 809305 8532 | | | |

Remarks: Anions: F, HCO3, SO4, Cl, P
Dissolved Trace Chem: B, Li, Mo, Si, Sr, Sn, Ti
Dissolved Rad Chem: Ra, Sr Isotopic

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with ...

EPA 7500-53

AIRBILL # 804 505 8485 16

# CHAIN OF CUSTODY RECORD

~~Southwest~~ Laboratory of Oklahoma, Inc. IE 8/16
1700 W. Albany • Broken Arrow, Oklahoma 74012-1421
Office: 918-251-2858 • Fax 918-251-2599

TM

SAMPLING FIRM: TechLaw
CLIENT CONTACT: N/A
PHONE NUMBER: 214/953-0045
P.O. or PROPOSAL NUMBER: N/A
PROJECT NAME: EPA/LANL ~~LOS Alamos Sampling Activities~~ IE
SAMPLER: (Signature) R Young X T. Erickson (Engl) / TechLaw

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | SVOC | Explosives | TSS/TDS | Perchlorate | Anions | ND2/ND3 | TOC | Total P | TKN/NH3 | Total Cyanide | Total TAL Metals | Dissolved TAL Metals | Total Trace Metals | Dissolved Trace Metals | DOC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 MW-27 | 8/15/01 | 1445 | | X | 18-MW-27 | GW | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | Preserved? |
| | | | | | | | | | | | | | | | | | | | X | X | X | X | Filtered? |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| [signature] | 8/17/01 | 0715 | |
| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
| | | | |
| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |
| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
| | | | [signature] 8/18/01 0900 |

REMARKS: Anions: F, NO3, SO4, Cl, Br
Dissolved ~~Barium~~ B, Li, Mo, Si, Sr, Sn, Ti (TAL Metals) ~~Chem~~ IE
~~Dissolved Radiochem~~ 90Sr, Isotopic U, Gamma Spec

[S 1192-03]

2

MKBIU II 8093058 48602

# CHAIN OF CUSTODY RECORD

~~SOUTHWEST LABORATORY OF OKLAHOMA, INC.~~ TE
1700 W. Albany • Broken Arrow, Oklahoma 74012-1421
Office: 918-251-2858 • Fax 918-251-2599

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLAW | N/A | 21419 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| N/A | EPA ILANL |

SAMPLER: (Signature) R. Young R. [illegible] ITE. [illegible]

ANALYTICAL TESTS REQUESTED

| | SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | EPA VOC | EXPLOSIVES | TSS/TDS | PESTICIDES | AMMONIA | NO3/NO2 | TOC | Total P | TKN/NH3 | Total CN | Total Metals | Dissolved Metals | Dissolved Metals | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 010 | FB-1 | 8/15/01 | 1400 | | X | FB-1 | water | 9 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | .2 |
| 011 | EQ-1 | 8/16/01 | 0715 | | X | EQ-1 | water | 3 | X | X | | | | | | | | | | | | | .B |
| | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | Preserved? | |
| | | | | | | | | | | | | | | | | | | X | X | X | X | Filtered? | .2 |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| [signature] | 8/17/01 | 0710 | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|
| | | | [signature] 8/18/01 0800 |

REMARKS: Anions: F, HCO3, SO4, Cl, Br
Dissolved Trace Metals: Bi, Li, Mo, Si, Sr, Sn, Ti
Dissolved Kel/Chem: Al, Sr, I Sulphide, Gamma Spec

2-1192-03]

# OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO.: R06745

PROJECT NAME: EPA/LANL

SAMPLERS: (Signature) R Yuma

T. Gnuechtel TECHLAW

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | TRITIUM - DIRECT COUNT | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TA-18 SPRING | 8/13/01 | 0745 | | X | TA-18 SPRING | 1 | X | | | | | | |
| 18-BG-1 | 8/13/01 | 1215 | | X | 18-BG-1 | 1 | X | | | | | | |
| 18-MW-03 | 8/13/01 | 1410 | | X | 18-MW-03 | 1 | X | | | | | | |
| 18 MW-11 | 8/14/01 | 1610 | | X | 18-MW-11 | 1 | X | | | | | | |
| 3-MILE SPRING | 8/13/01 | 0938 | | X | 3-MILE SPRING | 1 | X | | | | | | |
| 18-MW-16 | 8/14/01 | 1020 | | X | 18-MW-16 | 1 | X | | | | | | |
| 18 MW-12 | 8/14/01 | 1255 | | X | 18-MW-12 | 1 | X | | | | | | |
| 18 MW-9 | 8/14/01 | 1340 | | X | 18-MW-9 | 1 | X | | | | | | |
| FB-01 | 8/15/01 | 1400 | | X | FB-01 | 1 | X | | | | | | |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/18/01 1020 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | 8/21 7:00 | [signature] | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time | Remarks | |

Shipped by: FED EX

Airbill Number: 809305848 050

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA [illegible]00-53 (11/96)

6- 11669

# OFFICIAL
# CHAIN OF CUSTODY RECORD

PROJ. NO.: R06745
PROJECT NAME: EPA/LANL
SAMPLERS: (Signature) P Young T. Angle

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | TRITIUM ENRICHMENT | TRITIUM DIRECT COUNT | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buckman 11 | 8/16/01 | 0950 | | X | BUCKMAN 11 | 1 | X | | | | | | |
| Buckman 2 | 8/16/01 | 1140 | | X | BUCKMAN 2 | 1 | X | | | | | | |
| Buckman 1 | 8/16/01 | 0940 | | X | BUCKMAN 1 | 1 | X | | | | | | |
| Buckman 7 | 8/16/01 | 1050 | | X | BUCKMAN 7 | 1 | X | | | | | | |
| 03-MW-1 | 8/15/01 | 1620 | | X | 03-MW-1 | 1 | | X | | | | | |
| 18-MW-18 | 8/13/01 | 1300 | | X | 18-MW-18 | 1 | | X | | | | | |
| 18-MW-27 | 8/15/01 | 1445 | | X | 18-MW-27 | 1 | | X | | | | | |
| 18-MW-7 | 8/13/01 | 0950 | | X | 18-MW-7 | 1 | | X | | | | | |
| 18-MW-10 | 8/14/01 | 1710 | | X | 18-MW-10 | 1 | | X | | | | | |
| 18-MW-17 | 8/15/01 | 1430 | | X | 18-MW-17 | 1 | | X | | | | | |
| ~~18-MW-16~~ | ~~8/14/01~~ | ~~1020~~ | | ~~X~~ | ~~18-MW-16~~ | ~~1~~ | | ~~X~~ | | | | | FEDEX 8/18/01 |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/18/01 1000 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | 8/21 10[illegible] | R Buscher | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time | Remarks | |

Shipped by: FedEx
Airbill Number: [illegible]

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA [illegible]00-53 (11/96)

6- 11665

ENVIRONMENTAL PROTECTION

# OFFICIAL CHAIN OF CUSTODY RECORD

PROJ. NO.: R06745

PROJECT NAME: EPA / LANL

SAMPLERS: (Signature) R. Young, T. Enwale, Patrick Perkins

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | NITROGEN ISOTOPES | | | | | | | REMARKS PRESERVATIVES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GS-1A | 8/3/01 | 1100 | | X | GS-1A | 3 | X | | | | | | | $H_2SO_4$ |
| GS-1B | 8/10/01 | 1005 | | X | GS-1B | 3 | X | | | | | | | $H_2SO_4$ |
| TW-2A | 7/30/01 | 1400 | | X | TW-2A | 3 | X | | | | | | | $H_2SO_4$ |
| POI-4 | 8/1/01 | 1530 | | X | POI-4 | 3 | X | | | | | | | $H_2SO_4$ |
| MCO-7.5 | 8/1/01 | 1800 | | X | MCO-7.5 | 3 | X | | | | | | | $H_2SO_4$ |

| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 8/18/01 1105 | | | | |
| Relinquished by: (Signature) | Date / Time | Received by: (Signature) | Relinquished by: (Signature) | Date / Time | Received by: (Signature) |
| | | | | | |
| Relinquished by: (Signature) | Date / Time | Received for Laboratory by: (Signature) | Date / Time | Remarks: ANALYZE FOR STABLE NITROGEN ISOTOPES | |

Shipped by: FED EX

Airbill Number: 809305898028

Distribution: White Accompanies Shipment, Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53

6- 07135

TECHLAW, INC.

# Chain of Custody Record

№ 20362

| Project Code | Samples Shipped To | Samplers Names | 1) Sample description (Enter in column A) | 2) Preservatives (Enter in column B) |
|---|---|---|---|---|
| R06745 | GEL (General Engineering Laboratories) | T. Eagle J. Engl W. O'Rear | 1. Surface Water<br>2. Ground Water<br>3. Leachate<br>4. Rinsate<br>5. Soil/Sediment<br>6. Oil<br>7. Waste<br>8. Other (specify) | 1. HCl<br>2. $HNO_3$<br>3. Na $HSO_4$<br>4. $H_2SO_4$<br>5. Na OH<br>6. Other (specify)<br>7. Ice only<br>N. Not preserved |
| Project (site) Name: LANL | | | | |
| City, State, Zip Code: Los Alamos, NM | Carrier: FedEX | Samplers Signatures: Dan Alhad, Wally O'Rear | | |
| Date Shipped | Air Bill Number: 824168791079 | | | |

51203% Dissolved
51204%

| Sample Identification Numbers | A. Matrix enter from Box 1 | B. Preser. enter from Box 2 | Grab or Comp | Number of Sample Containers | MM/DD/YY Time sample collection | DOC | TAL Metals | Total Radionuclides | NO2/NO3 | TOC | Dissolved Metals | Dissolved Metals | Total Cyanide | TSS | TDS | Remarks/ Tag Numbers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LADD | 2 | 4 | G | 2 | 10-30-01 1615 | X | | | X | X | | | | | | Total Radionuclides: |
| LADD | 2 | 2 | G | 3 | 10-30-01 1615 | | X | X | | | X | X | | | | 238 1239 1240 Pu, |
| LADD | 2 | 5 | G | 1 | 10-30-01 1615 | | | | | | | | X | | | 90Sr, 241 Am, |
| LADD | 8 | 7 | G | 1 | 10-30-01 1615 | | | | | | | | | X | X | isotopic U, |
| | | | | | | | | | | | | | | | | gamma spec |
| | | | | | | | | | | | | | | | | Dissolved TAL Metals: |
| | | | | | | | | | | | | | | | | B, Li, Mo, Si, Sr, |
| | | | | | | | | | | | | | | | | Sn, and Ti |
| | | | | | | | | | | | | | | | | Anions: |
| | | | | | | | | | | | | | | | | F, HCO3, SO4, |
| | | | | | | | | | | | | | | | | Cl, Br |

| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wally O'Rear | 1700 | 10/31/01 | [signature] | 0700 | 11/1/01 | | | | | | |
| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
| | | | | | | | | | | | |

Remarks: Return ice bottles to NMED

Split Samples — Accepted — Declined (Signature)

Distribution: Original — TECHLAW, INC.
Carbon copies — Laboratory, work assignment manager, client (as appropriate)

TECHLAW, INC.

# Chain of Custody Record

No. 20363

| | | | |
|---|---|---|---|
| Project Code: RO6745 | Samples Shipped To: GEL General Engineering Laboratories | Samplers Names: T. Engle, W. O'Rear | 1) Sample description (Enter in column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil/Sediment, 6. Oil, 7. Waste, 8. Other (specify) |
| Project (site) Name: LANL | | | 2) Preservatives (Enter in column B): 1. HCl, 2. $HNO_3$, 3. $Na\,HSO_4$, 4. $H_2SO_4$, 5. NaOH, 6. Other (specify), 7. Ice only, N. Not preserved |
| City, State, Zip Code: Los Alamos, NM | Carrier: Fed EX | Samplers Signatures: T. Engle, Wally O'Rear | |
| Date Shipped: | Air Bill Number: 824168791079 | | |

| Sample Identification Numbers | A. Matrix enter from Box 1 | B. Preser. enter from Box 2 | Grab or Comp | Number of Sample Containers | MM/DD/YY Time sample collection | Analysis: Perchlorate | Analysis: Anions | Remarks/ Tag Numbers |
|---|---|---|---|---|---|---|---|---|
| 51203 LADD | 2 | 7 | G | | 10-30-01 1615 | X | X | |

| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wally O'Rear | 1700 | 10/31/01 | [signature] | 0905 | 11/01/01 | | | | | | |
| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
| | | | | | | | | | | | |

Remarks

Split Samples — Accepted — Declined (Signature)

Distribution: Original — TECHLAW, INC.
Carbon copies — Laboratory, work assignment manager, client (as appropriate)

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

# CHAIN OF CUSTODY RECORD

Page 1 of 1

51324

Client Name/Facility Name: TechLAN LANL

Collected by/Company: T. Erickson / TechLAN

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| | SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO2 (P) | NO3 (P) | Total Radionuclides (P) | Radium (P) | CATIONS (P) | Arsenic (P) | Anions (P) | Fluoride (P) | Ferrocyanide (P) | Cl | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 006- | Buckman Le | 10-31-01 | 0928 | X | | | X | 4 | X | X | X | X | X | X | X | X | X | | Total Radionuclides: 90Sr, Isotopic Uranium, Alpha Spec, Total Uranium, ~~(USE ICP-MS) U-235/U-238~~ (USE ICP-MS) Radium |
| 007- | Buckman 8 | 10-31-01 | 1331 | X | | | X | 4 | X | X | X | X | X | X | X | X | X | | |
| | | | | | | | | | | | | | | | | | | | CATIONS: (in TAL Metal Contains) Ca, Mg, K, Na, Si, Li, Mn, Fe, Al, B, Ba, Sr, Arsenic |
| | | | | | | | | | | | | | | | | | | | ANIONS: F, HCO3, SO4, Cl, Br, Fluoride |
| | | | | | | | | | | | | | | | | | | | Fluoride w/Anion Bottle |
| | | | | | | | | | | | | | | | | | | | Note: TSS + TDS NOT Requested. |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Walter Rae | 11/1/01 | 1200 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: Pamela [illegible] | Date: 11/02/01 | Time: 0930 | Remarks: Please return ice containers to NO | |

White = sample collector Yellow = file Pink = with report

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

# CHAIN OF CUSTODY RECORD

Page 1 of 1

51304%

Client Name/Facility Name: TechLaw/LANL

Collected by/Company/: TechLaw

W. O'Rear/W. O'Rear T. Engle

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TOC (P) | Perchlorate | DOC (F P) | NO2/NO3 (P) | TSS | TSD | Anions | Total Cyanide (P) | TAL Metals (P) | Dissolved Trace Metals (F P) | Dissolved TAL Metals (F P) | Total Radionuclides (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00B-LAOI(a)-1.1 | 10/30/01 | 1557 | X | | | X | 7 | X | X | X | X | X | X | X | X | X | X | X | X | Anions: F, HCO3, SO4, Cl, Br |
| | | | | | | | | | | | | | | | | | | | | Total Radionuclides: 238, 239/240 Pu, 90Sr, 241 Am, Isotopic U, gamma Spec |
| | | | | | | | | | | | | | | | | | | | | Dissolved Trace Metals: B, Li, Mo, Si, Sr, Sn, and Ti |

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [illegible] | 11-1-01 | 1905 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: [illegible] | Date: 11/02/01 | Time: 0930 | Remarks: Please return ice containers to NMED | |

White = sample collector Yellow = file Pink = with report

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

# CHAIN OF CUSTODY RECORD

51324%

Page 1 of 1

Client Name/Facility Name: TechLaw / LANL

Collected by/Company: W. O'Rear / W. O'Rear T. English / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO3/NO3 (P) | TOC (P) | TSS | TDS | Perchlorate | Anions | DOC (F) | TAL Metals (P) | MS/MSD | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LA01(a)-1.1 | 10/30/01 | 1557 | X | | | X | 8 | X | X | X | X | X | X | X | X | | Anions: F, HCO3, SO4, Cl, Br |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 11-1-01 | 0709 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: [signature] | Date: 11/02/01 | Time: 0930 | Remarks: Please return ice containers to NMF | |

White = sample collector  Yellow = file  Pink = with report

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

# CHAIN OF CUSTODY RECORD

Page 1 of 1

51324%

Client Name/Facility Name: TechLaw / LANL

Collected by/Company: W. O'Rear / W. O'Rear, T. Engle / TechLaw

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| | SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Dissolved TAL Metals (F P) | Dissolved Trace Metals (F P) | Total Radionuclides (P) | Total Cyanide (P) | MS/MSD Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009- | LAOL(a)-1.1 | 10/30/01 | 1557 | X | | | X | 6 | X | X | X | X | Dissolved Trace metals: B, Li, Mo, Si, Sr, Sn, and Ti |
| | | | | | | | | | | | | | Total Radionuclides: 238,239/240 Pu, 90Sr, 241 Am, isotopic U, gamma spec |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 11-1-01 | 0717 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | [signature] | 11/02/01 | 0930 | Please Return Ice Containers to NMED |

White = sample collector Yellow = file Pink = with report

TECHLAW, INC.

# Chain of Custody Record

№ 20365

| | | | |
|---|---|---|---|
| Project Code: R06745 | Samples Shipped To: GEL (General Engineering Laboratories) | Samplers Names: W. O'Reer, T. Engle | 1) Sample description (Enter in column A): 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil/Sediment, 6. Oil, 7. Waste, 8. Other (specify) |
| Project (site) Name: LANL | | | 2) Preservatives (Enter in column B): 1. HCl, 2. $HNO_3$, 3. Na $HSO_4$, 4. $H_2SO_4$, 5. Na OH, 6. Other (specify), 7. Ice only, N. Not preserved |
| City, State, Zip Code: Los Alamos, NM | Carrier: Fed EX | Samplers Signatures: W. O'Reer, T. Engle | |
| Date Shipped: 11-1-01 | Air Bill Number: 8241168717 1105 | | |

| Sample Identification Numbers (513266%) | A. Matrix enter from Box 1 | B. Preser. enter from Box 2 | Grab or Comp | Number of Sample Containers | MM/DD/YY Time sample collection | Analysis: Dissolved Trace Metals | Dissolved TAL metals | | | | | | | | Remarks/ Tag Numbers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LADP-3 | 2 | 2 | G | 1 | 10/30/01 1020 | X | X | | | | | | | | Dissolved Trace Metals B, Li, Mo, Si, Sr, Sn, & Ti |

| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | 1400 | 11-1-01 | [illegible] | 0930 | 11/2/01 | | | | | | |
| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
| | | | | | | | | | | | |

Remarks: Please return ice Bottle to NMED

Split Samples — Accepted — Declined (Signature)

Distribution: Original — TECHLAW, INC.
Carbon copies — Laboratory, work assignment manager, client (as appropriate)

TECHLAW, INC.

# Chain of Custody Record

NO 20364

| Project Code | Samples Shipped To | Samplers Names | 1) Sample description (Enter in column A) | 2) Preservatives (Enter in column B) |
|---|---|---|---|---|
| R06745 | GEL (General Engineering Laboratories) | W. O'Rear, T. Engle | 1. Surface Water<br>2. Ground Water<br>3. Leachate<br>4. Rinsate<br>5. Soil/Sediment<br>6. Oil<br>7. Waste<br>8. Other (specify) | 1. HCl<br>2. $HNO_3$<br>3. Na $HSO_4$<br>4. $H_2SO_4$<br>5. Na OH<br>6. Other (specify)<br>7. Ice only<br>N. Not preserved |
| **Project (site) Name** | | | | |
| LANL | | | | |
| **City, State, Zip Code** | **Carrier** | **Samplers Signatures** | | |
| Los Alamos, NM | Fed EX | W. O'Rear, T. Engle | | |
| **Date Shipped** | **Air Bill Number** | | | |
| 11-1-01 | 8241162871105 | | | |

51324%

| | Sample Identification Numbers | A. Matrix enter from Box 1 | B. Preser. enter from Box 2 | Grab or Comp | Number of Sample Containers | MM/DD/YY Time sample collection | Analysis: TSS | TDS | Perchlorate | Anions | TAL Metals | Total Radionuclides | Total Cyanide | NO2/NO3 | DOC | Remarks/ Tag Numbers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 009-4 | LADP-3 | 2 | 7 | G | 1 | 10/30/01 1020 | X | X | X | X | | | | | | Total Radionuclides: |
| | LADP-3 | 2 | 2 | G | 2 | 10/30/01 1020 | | | | | X | X | | | | 238/239/240Pu, |
| | LADP-3 | 2 | 5 | G | 1 | 10/30/01 1020 | | | | | | | X | | | 90Sr, 241Am, |
| | LADP-3 | 2 | 4 | G | ~~2~~ 1 | 10/30/01 1020 | | | | | | | | ~~2~~ X | | isotopic U, gamma |
| 010-5 | LADP-EB | 4 | ~~2~~ 2 | G | 1 | 10/30/01 1020 ~~10/30/01~~ 11/1/01 | | | | X | | | | | | spec |
| | LADP-3 | 2 | 2 | G | 1 | 10/30/01 1020 | | | | | | | X | | | |
| | | | | | | | | | | | | | | | | Anions: |
| | | | | | | | | | | | | | | | | ~~X~~ F, HCO3, SO4, |
| | | | | | | | | | | | | | | | | Cl, Br |

| Relinquished By | Time | Date | Received By | Time | Date | Received By | Time | Date | Received By | Time | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [signature] | 0440 | 11-1-01 | [signature] | 0930 | 11/02/01 | | | | | | |
| **Relinquished By** | **Time** | **Date** | **Received By** | **Time** | **Date** | **Received By** | **Time** | **Date** | **Received By** | **Time** | **Date** |
| | | | | | | | | | | | |

Remarks: Please Return Bottles (Ice) to NMED

Split Samples — Accepted — Declined (Signature)

Distribution: Original — TECHLAW, INC.
Carbon copies — Laboratory, work assignment manager, client (as appropriate)

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Charleston, South Carolina 29417
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# CHAIN OF CUSTODY RECORD

Page 1 of 1

51324

Client Name/Facility Name: TechLAW / LANL

Collected by/Company: T. Engle / Ed. Engle TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| | SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO2 | NO3 | TOTAL | Radionuclides | Radions | CATIONS | ARSENIC | ANIONS | Fluoride | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002 | Buckman 1 | 10-31-01 | 1223 | X | | | X | 11 | X | X | X | X | X | X | X | X | X | Total Rads: 90Sr, Isotopic Uranium, Alpha Spec, Total Uranium ~~(Use ICP MS), U235/U238~~ (Use ICP-MS) Radion |
| 003 | Buckman 2 | 10-31-01 | 1420 | X | | | X | 11 | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | | | CATIONS: (in TAL Metals Cations) CA, Mg, K, Na, Si, Li, Mn, Fe, Al, B, Ba, Sr, Arsenic |
| | | | | | | | | | | | | | | | | | | Anions: F, ALCB, SO4 Cl, Br; Flouride |
| | | | | | | | | | | | | | | | | | | Flouride w/in Anion Bottle |
| | | | | | | | | | | | | | | | | | | Note: TSS, TDS, Perchlorate Not requested At this time |
| | | | | | | | | | | | | | | | | | | Buckman Cations in Trace Metal Container |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 11/1/01 | 1200 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Paulette Wendell | 11/02/01 | 0930 | Please Return Ice Bottles to NMT |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



5/3 24%

Client Name/Facility Name: LechLaw / LANL

Collected by/Company: T. Enyle / C. Engl TechLAW

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO2 | NO3 | Total Metals (Tot Metals) | Radium | Radiochem | Cations | Arsenic | Anions | Fluoride | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001- Bulkman 7 | 10-31-01 | | X | | | X | 4 | X | X | | | X | X | X | X | X | Total Rads: 90Sr, Isotopic Uranium, Alpha Spec, Total Uranium (use ICP-MS) U-235/U-238 (use ICP-MS) Radium |
| | | | | | | | | | | | | | | | | | CATIONS: Lin TAL Metals (total) Ca, Mg, K, Na, S, Li, Mn, Fe, Al, B, Be, Sr, Arsenic |
| | | | | | | | | | | | | | | | | | ANIONS: F, Alk, SO4, Cl, Br, Flouride |
| | | | | | | | | | | | | | | | | | Flouride w/in 48 hrs Bottle |
| | | | | | | | | | | | | | | | | | NOTE: TSS, TDS, Perchlorate Not requested at this time. |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Brian A. Engl | 11/1/01 | (1052) | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Paulette Mendoza | 11/02/01 | 0530 | Please return Ice Bottles to NLED |

White – sample collector  Yellow = file  Pink = with report

513739

# CHAIN OF CUSTODY RECORD

Page 1 of 1

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Client Name/Facility Name: TetraTech / LANL

Collected by/Company: T. Engle / Tetra Tech / W. O'Rear / W. O'Rear

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Radionuclides | 23 Total metals | Total Cyanide | PCB | Extra Volume for AK analysis | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PU-10284 | 11-2-01 | 1127 | | X | | X | 15 | X | X | X | X | X | Total Radionuclides: Isotopic Americium, Isotopic Plutonium, Isotopic Uranium, Sr-90, Gamma Spec |
| | | | | | | | | | | | | | * PCBs as Arochlores |
| | | | | | | | | | | | | | Samples chilled >4°C |
| | | | | | | | | | | | | | Volume for PU-10284 includes MS/MSD |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 11/3/01 | 1400 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Barlow | 11/5/01 | 0830 | PLEASE Return Ice Bottles to LANL Thank You |

White = sample collector  Yellow = file  Pink = with report

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# CHAIN OF CUSTODY RECORD



TF 11/3/01

Client Name/Facility Name: TechLaw/ LANL

Collected by/Company: TechLaw

T. Engle / W. O'Rear

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | TAL Metals | Total Cyanide | Total Radionuclides | PCB | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PU-10285 | 11/2/01 | 1146 | | x | | x | 4* | X | X | X | X | Total Radionuclides: Istopic Americium, |
| AC-01 | 11/2/01 | 1255 | | x | | x | 4* | X | X | X | X | Istopic Plutonium, Isotopic Uranium, |
| | | | | | | | | | | | | Sr 90, Gamma Spec |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | * PCBs as Arochlors |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | * Extra containers |
| | | | | | | | | | | | | are for any analysis |
| | | | | | | | | | | | | requiring additional |
| | | | | | | | | | | | | volume |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Walter O'Rear | 11/3/01 | 1400 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Sanchez | 11/5/01 | 0830 | Please return ice container to NM. |

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: TechLAW / LANL

Collected by/Company: TechLAW

T. Engle / W O'Rear

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Total Radionuclides | 237Am, Pu, Cs | Total Gamma Spec | PCB | Extra Volume for All Analysis | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10286 PU-~~108246~~ | 11-2-01 | 1157 | | X | | X | 5 | X | X | X | X | X | Total Radionuclides Isotopic Americium Isotopic Plutonium Isotopic Uranium Sr90, Gamma Spec |
| 110286 PU-~~108246~~ | 11-2-01 | 1205 | | X | | X | 5 | X | X | X | X | X | |
| | | | | | | | | | | | | | * PCBs as Arochlores |
| | | | | | | | | | | | | | Samples chilled >4°C |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Wally O'Rear | 11/3/01 | 1400 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Kaplan | 11/5/01 | 0830 | Heavy Return Ice Bottles to NME Thank YE |

6

White = sample collector  Yellow = file  Pink = with report

F8733 Rev. C

# Acculabs Inc.

[ ] 1046 Olive Drive Davis CA 95616 — 530-757-0920 Fax 753-6091
[ ] 75 Suttle St. Durango CO 81301 — 970-247-4220 Fax 247-4227
[X] 4663 Table Mountain Dr. Golden CO 80403 — 303-277-9514 Fax 277-9512
[ ] 992 Spice Islands Dr. Sparks NV 89431 — 775-355-0202 Fax 355-0817

Lab Number: G01110060
Report Due Date:

| | | | |
|---|---|---|---|
| Client: Echelon Incorporated | | Fax Results Y N | Page of |
| Address: 730 North Saint Paul Ave Ste 600 | | [redacted] | |
| City, State & Zip: Dallas TX 75201 | | System Name | |
| Contact: Steve Phillips | | PWS No. | Report to State/EPA Y N |
| Phone: 903/785-7636 | Collector's Name: Tim Eagle | POE No. | DWR No. |
| Fax: 903/785-7636 | Project Name: Samples Annulus | Collection Point | |
| P.O. Number | Project Number: 20745 | City | County |

**SAMPLE TYPE CODES**

DW = drinking water, TB = travel blank, WW = waste water, SD = solid, MW = monitoring well, SO = soil, HW = hazardous waste, SL = sludge

Compliance Monitoring: Y N

**TURNAROUND TIME REQUESTED**

Standard / RUSH / Special — Lab Manager Approval

| CLIENT'S SAMPLE ID/LOCATION | Date | Time | Sample Type | Containers | Analyses Requested: Perchlorate | Spl. No. |
|---|---|---|---|---|---|---|
| SP - 4A | 11-1-01 | 1230 | SP | 1 | X | |
| SP - 4C | 11-1-01 | 0940 | SP | 1 | X | |
| SP - 4B | 11-1-01 | 1150 | SP | | X | |
| SP - L | 11-1-01 | 1000 | SP | 1 | X | |
| Buckman 2 | 10-31-01 | 430 | DW | 1 | X | |
| Buckman 1 | 10-31-01 | 1033 | DW | 1 | X | |
| Buckman 7 | 10-31-01 | 1145 | DW | 3 | X | Volume for MS/MSD |

Instructions/Comments/Special Requirements: SP = Spring water
Low detection Perchlorate method please

| SAMPLE RECEIPT | | | Date | Time | Samples Relinquished By | Samples Received By |
|---|---|---|---|---|---|---|
| Received Cold | Y | N | 11-3-01 | | Tim Eagle | |
| Custody Seals | Y | N | 11/5/01 | 1000 | FedEx | [signature] |
| Seals Intact | Y | N | | | | |
| No. of Containers | | | | | | |

**Acculabs, Inc.'s Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.**

To the maximum extent permitted by law, the Client agrees to limit the liability of Acculabs, Inc. for the Client's damages to the total compensation received unless other arrangements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted.

* Please return Ice Bottles to NMED. Thanks TE

000005 301.2E

FedEx 8279 0829 1920

# CHAIN OF CUSTODY RECORD

513718

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Page 1 of 1

Client Name/Facility Name: Techlaw / LANL

Collected by/Company: W. O'Rear — Techlaw T. Engle

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Dissolved Cations (F) | Anions (P) | NO2 (P) | NO3 (P) | Ammonia (P) | TKN (P) | Phosphate (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP4 | 11-01-01 | 0900 | | | | X | 3 | X | X | X | X | X | X | X | Dissolved cations: Ca, Mg, K, Na, Si, Li, Mn, Fe, Al, B, Ba, Sr |
| SP4C | 11-1-01 | 0944 | | | | X | 3 | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | | | | Anions include: F, HCO3, Cl, Br |
| | | | | | | | | | | | | | | | *Perchlorate not requested at this time. |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Eric Engle | 11-30-01 | 1115 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Mike Kessler | 11/5/01 | 0830 | Please return ice containers to NMC |

White = sample collector  Yellow = file  Pink = with report

FedEx 8279 0829 2309

# CHAIN OF CUSTODY RECORD

5137/18

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Charleston, South Carolina 29417
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Page 1 of 1

Client Name/Facility Name: TechLAW / LANL

Collected by/Company: W. O'Rear / TechLAW T. Engle

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Dissolved Cations (F) | Anions (P) | NO2/NO3 (P) | Ammonia (P) | TKN (P) | Phosphate (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP4A | 11-1-01 | 1150 | | | | X | 3 | X | X | X | X | X | X | Dissolved Cations: Ca, Mg, K, Na, Si, Li, Mn, Fe, Al, B, Ba, Sr |
| SP4AA | 11-1-01 | 1230 | | | | X | 3 | X | X | X | X | X | X | Anions include: F, HCO3, Cl, Br |
| | | | | | | | | | | | | | | *Perchlorate not requested at this time |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Tom Alnach | 11-2-01 | 1125 | | | | | |
| Relinquished by: | Date: | Time: | Received by lab by: Mike Barlow | Date: 11/5/01 | Time: 0830 | Remarks: Please return ice bottles to LANL | |

Thanks

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name/Facility Name: Tetra Tech EPA LAN

Collected by/Company: T. Engle A. Engel / TetraTech

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | NO2 (P) | NO3 (P) | Total Radionuclides (P) | Radionuclides (P) | Total Metals (P) | Cations (P) | Anions (P) | Fluoride (P) | Perchlorate (P) | Arsenic (P) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 004 Buckman 3 | 10-31-01 | 1112 | X | | | X | 4 | X | X | X | X | X | X | X | X | X | X | Total Radionuclides: 90Sr, Isotopic Uranium, Alpha Spec, Total Uranium (use ICP-MS) U-235/U-238 (use ICP-MS), Radium |
| 005 Buckman 4 | 10-31-01 | 1030 | X | | | X | 4 | X | X | X | X | X | X | X | X | X | X | |
| | | | | | | | | | | | | | | | | | | CATIONS (in TAL Metal contains) include: Ca, Mg, K, Na, Si, Li, Mn, Fe, Al, B, Ba, Sr, Arsenic. |
| | | | | | | | | | | | | | | | | | | Anions include: F, HCO3, SO4, Cl, Br, Flouride |
| | | | | | | | | | | | | | | | | | | Flouride with Anion bottle * |
| | | | | | | | | | | | | | | | | | | Note: TSS + TDS NOT requested. |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Dri Nhal | 11-7-01 | 1634 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | Pauletta Mendell | 11/07/01 | 0930 | Return Ice Containers to NMEP please |

5

White = sample collector Yellow = file Pink = with report

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# CHAIN OF CUSTODY RECORD



Client Name/Facility Name: TechLAW / LANL

Collected by/Company: T Engle / Final / TechLAW / NDRea

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Tritium | Environment | | Tritium | Direct Count | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buckman 3 | 10-31-01 | 1112 | X | | | X | 1 | | | | X | X | |
| LADP-3 | 10-29-01 | 1425 | X | | | X | 1 | | | | X | X | |
| Buckman 7 | 10-31-01 | 1145 | X | | | X | 1 | | | | X | X | |
| LADT(a) 1.1 | 10-30-01 | 1557 | X | | | X | 1 | X | X | | | | |
| Buckman 4 | 10-31-01 | 1030 | X | | | X | 1 | | | | X | X | |
| Buckman 8 | 10-31-01 | 1331 | X | | | X | 1 | | | | X | X | |
| Buckman 6 | 10-31-01 | 0928 | X | | | X | 1 | | | | X | X | |
| Buckman 2 | 10-31-01 | 1420 | X | | | X | 1 | | | | X | X | |
| Buckman 1 | 10-31-01 | 1223 | X | | | X | 1 | | | | X | X | |
| SP 4C | 11-1-01 | 0944 | | | | X | 1 | | | | X | X | |
| SP 4AA | 11-1-01 | 1230 | | | | X | 1 | | | | X | X | |
| SP-4 | 11-1-01 | 0900 | | | | X | 1 | | | | X | X | |
| SP-4A | 11-1-01 | 1150 | | | | X | 1 | | | | X | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| Glenn A Engle | 11-3-01 | 1153 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | | | | |

White = sample collector  Yellow = file  Pink = with report

FedEX Air bill # 809305846275

# CHAIN OF CUSTODY RECORD

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Charleston, South Carolina 29417
(843) 556-8171

Page 1 of 1

Client Name/Facility Name: TechLaw / LANL

Collected by/Company: TechLaw

T. Ernst & Ind / W. O'Rear W. O'Rear

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

| SAMPLE ID | DATE | TIME | WELL | SOIL | COMP | GRAB | # OF CONTAINERS | Barium | Nitrate | Fluoride | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SP 4 | 11-1-01 | 0900 | | | | X | 1 | X | X | X | |
| SP 4C | 11-1-01 | 0944 | | | | X | 1 | X | X | X | |
| SP 4A | 11-1-01 | 1150 | | | | X | 1 | X | X | X | |
| SP 4AA | 11-1-01 | 1230 | | | | X | 1 | X | X | X | |

| Relinquished by: | Date: | Time: | Received by: | Relinquished by: | Date: | Time: | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 11-30-01 | 0854 | | | | | |

| Relinquished by: | Date: | Time: | Received by lab by: | Date: | Time: | Remarks: |
|---|---|---|---|---|---|---|
| | | | | | | pH < 2. Preserved with HC |

White = sample collector Yellow = file Pink = with report

# APPENDIX G

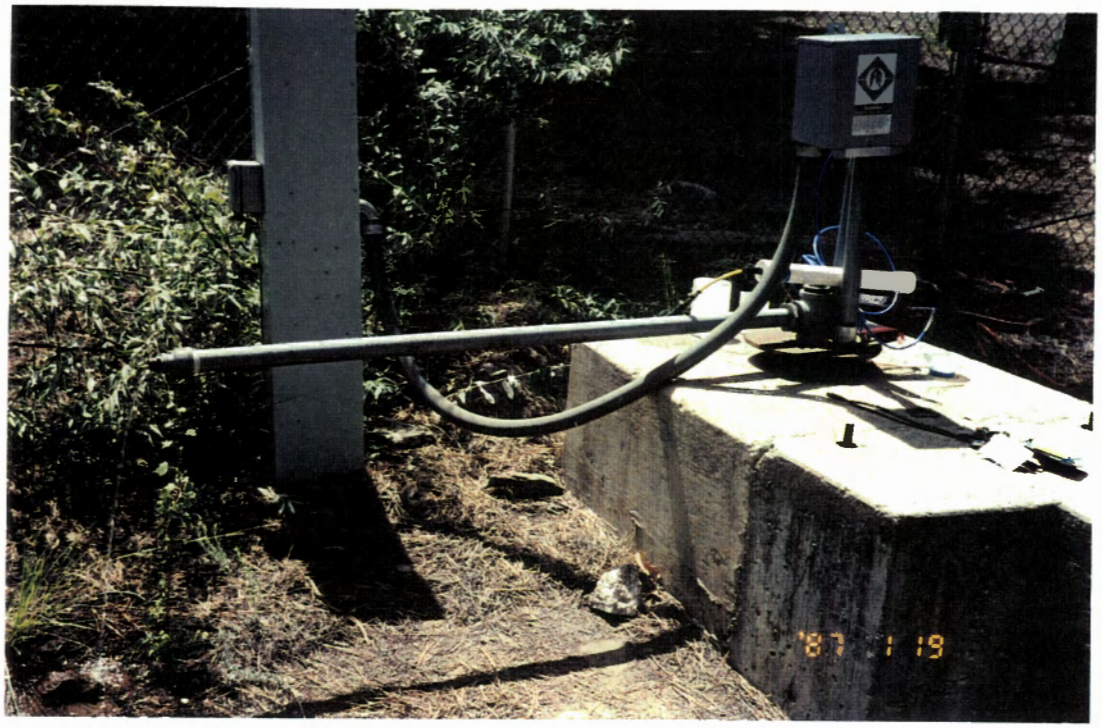
## Photographs

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 2, 2001 | **Time:** | 1625 |
| **Photo By:** | T. Engle | **Direction:** | Northeast |

**Description:** View of Monitoring Well MT-3. This well was dry during the sampling activities at LANL. This well was equipped with a dedicated bladder pump.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 2, 2001 | **Time:** | 1631 |
| **Photo By:** | T. Engle | **Direction:** | Southwest |
| **Description:** | View of Monitoring Well MT-4. Note the broken concrete pad surrounding the well. This well was dry during the LANL sampling activities. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 3, 2001 | **Time:** | 1101 |
| **Photo By:** | W. O'Rear | **Direction:** | Down |
| **Description:** | View of location from which effluent samples at the Gauging Station were collected. | | |



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| **Photograph No.:** | 1-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 30, 2001 | **Time:** | 1127 |
| **Photo By:** | T. Engle | **Direction:** | North |

**Description:** Photo of Test Well 4 showing discharge pipe with water purging directly onto the ground. LANL began to purge this well at approximately 0700, four hours prior to sample collection.

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| **Photograph No.:** | 1-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 30, 2001 | **Time:** | 1303 |
| **Photo By:** | T. Engle | **Direction:** | West |

**Description:** View of Test Well 3 showing water draining from discharge pipe. TW- 3 has an approximate two gallons per minute (gpm) flow rate.

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| **Photograph No.:** | 1-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 30, 2001 | **Time:** | 1342 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |

**Description:** Photo of Test Well 2A. This well was not purged prior to sample collection due to inadequate recharge. Samples for VOCs and Total Cyanide analyses could not be collected during this sampling event.

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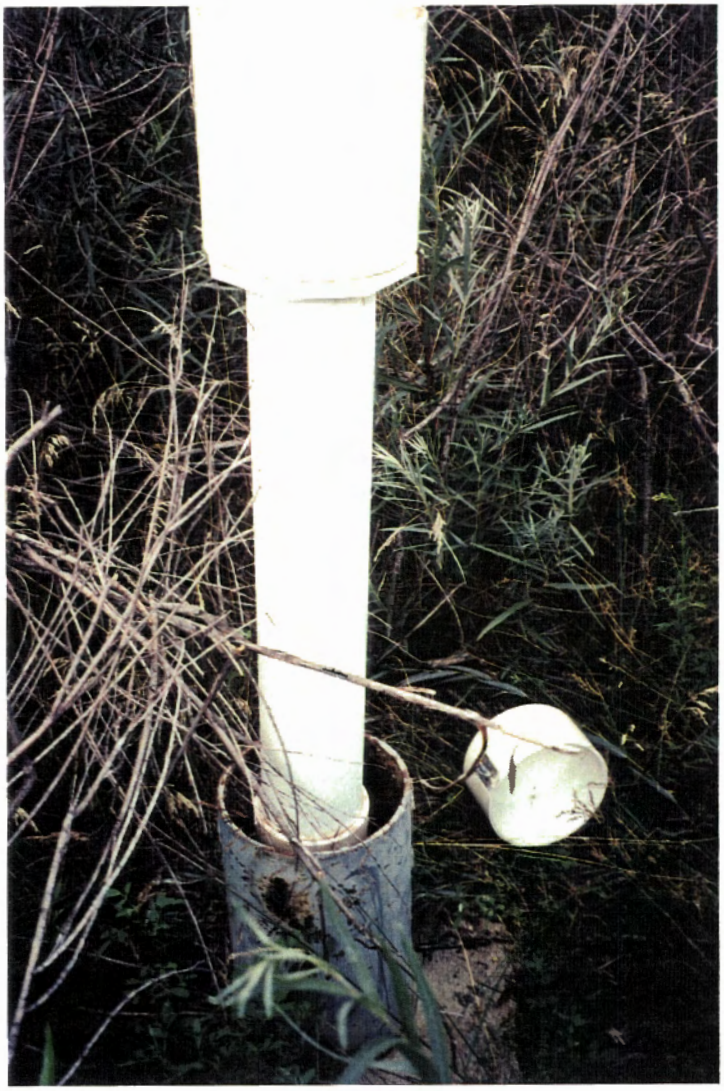
| **Photograph No.:** | 1-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 30, 2001 | **Time:** | 1545 |
| **Photo By:** | W. O'Rear | **Direction:** | North |

**Description:** View of Test Well 8. This well is located within a fenced enclosure. The total depth of this well is 1,065 feet below top of casing (TOC), and the water level is 998 feet below TOC.



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| **Photograph No.:** | 1-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 30, 2001 | **Time:** | 1653 |
| **Photo By:** | W. O'Rear | **Direction:** | West |
| **Description:** | Photo of Monitoring Well PC-01 following the removal of the well cap. The total depth of the well is 15.9 feet below TOC and the water level is 6.11 feet below TOC. | | |

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| **Photograph No.:** | 1-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 31, 2001 | **Time:** | 1012 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |
| **Description:** | Photo of Test Well 1 showing a LANL intern setting up field parameter equipment for water quality measurements. | | |

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| **Photograph No.:** | 1-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 31, 2001 | **Time:** | 1247 |
| **Photo By:** | W. O'Rear | **Direction:** | North |

**Description:** Photo of Monitoring Well MCO-2. This well was not sampled due to water being below the pump during the time of the sampling events. MCO-2 is located in upper Mortandad Canyon.

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| **Photograph No.:** | 1-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | July 31, 2001 | **Time:** | 1527 |
| **Photo By:** | T. Engle | **Direction:** | East |

**Description:** Photo of Monitoring Well MCO-4B. A water level indicator was placed into the well to determine depth to water by LANL personnel. This well was not sampled. MCO-4B is located in lower Mortandad Canyon.

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| **Photograph No.:** | 1-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 1, 2001 | **Time:** | 0950 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |

**Description:** Photo of Monitoring Well POI-4. This well is equipped with a transducer and dedicated bladder pump. It is situated on a concrete pad.

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| **Photograph No.:** | 1-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 2, 2001 | **Time:** | 1207 |
| **Photo By:** | W. O'Rear | **Direction:** | North |

**Description:** Photo of Monitoring Well MCO-5. This well is located in the lower Mortandad Canyon. This well had an approximate pump rate of two gpm.

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| **Photograph No.:** | 1-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 3, 2001 | **Time:** | 1132 |
| **Photo By:** | W. O'Rear | **Direction:** | North |
| **Description:** | View of sample at Gauging Station-1A. Samples were collected from this general location for two consecutive weeks. | | |

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| **Photograph No.:** | 1-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 3, 2001 | **Time:** | 0900 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |
| **Description:** | Photo of Monitoring Well MCO-6. This well, located in lower Mortandad Canyon, is not constructed with a concrete pad. | | |

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| **Photograph No.:** | 1-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 0845 |
| **Photo By:** | W. O'Rear | **Direction:** | North |
| **Description:** | Photo of Monitoring Well PCO-3. This well is located in Pajarito Canyon and was not sampled during the 2001 sampling events at LANL. | | |

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| **Photograph No.:** | 1-17 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1032 |
| **Photo By:** | T. Engle | **Direction:** | Southwest |
| **Description:** | View of Test Well DT-9. This well is behind a fenced enclosure and was allowed to purge for approximately one hour before the samples were collected. | | |

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| **Photograph No.:** | 2-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1545 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |

**Description:** View of Monitoring Well MCWB-6.2A which is equipped with a transducer. The depth to water was found to be 41.2 feet below TOC by LANL personnel. The total depth of this well is 49.63 feet below TOC.

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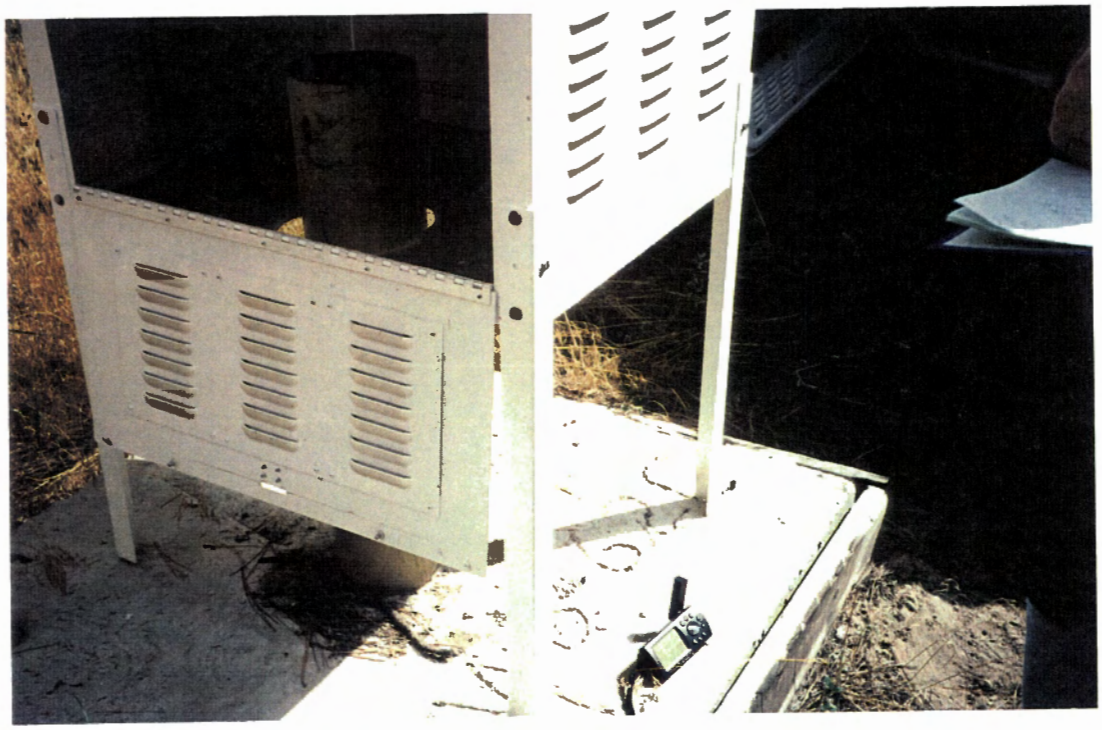
| **Photograph No.:** | 2-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1505 |
| **Photo By:** | W. O'Rear | **Direction:** | Northwest |

**Description:** Photo of Monitoring Well MCWB-6.2B. This well is equipped with a transducer and was found to be dry by LANL personnel. The total depth of well is 44. 9 feet below TOC.



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| **Photograph No.:** | 2-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1556 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |
| **Description:** | View Monitoring Well MCWB-6.2C, which is equipped with a transducer. This well was found to be dry. It has a total well depth of 52.84 feet below TOC. This well was not sampled during LANL sampling activities. | | |

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| **Photograph No.:** | 2-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1613 |
| **Photo By:** | W. O'Rear | **Direction:** | Southeast |
| **Description:** | View of Monitoring Well MCWB-6.5E. This well is equipped with a transducer and dedicated bladder pump. It was found to be dry with a total well depth of 45.23 feet below TOC. | | |

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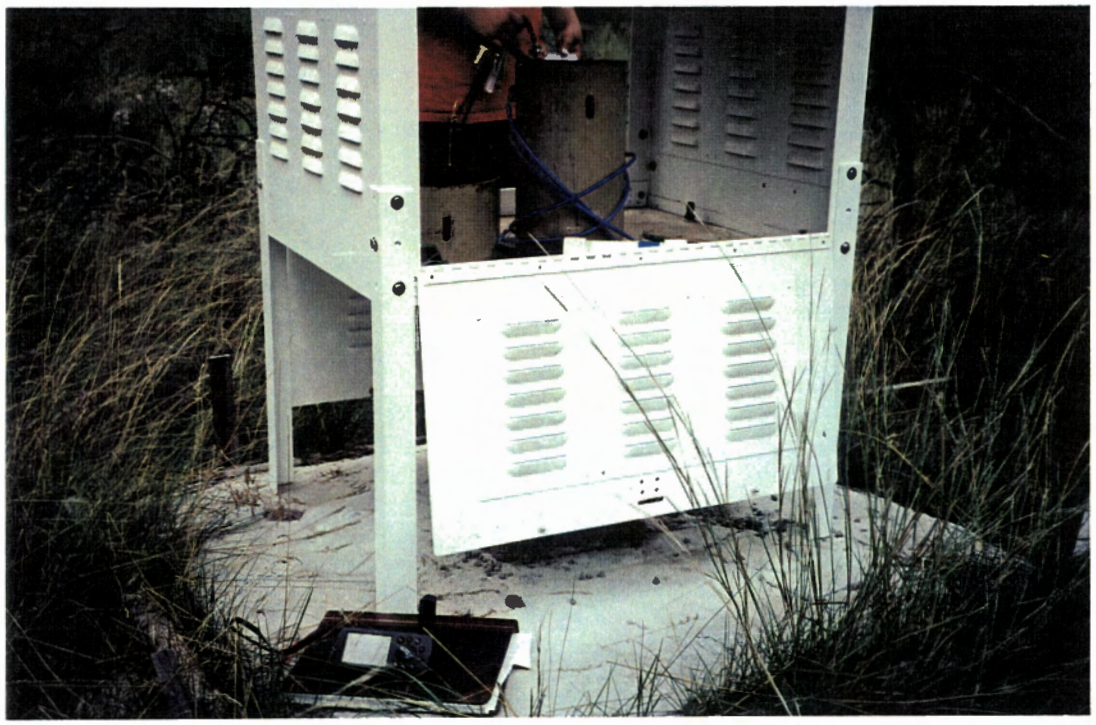
| **Photograph No.:** | 2-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1616 |
| **Photo By:** | T. Engle | **Direction:** | Southeast |

**Description:** View of Monitoring Well MCWB-6.5D. Notice that this well is equipped with a locked padlock and transducer. Many monitoring wells encountered in LANL were found to be locked. Also notice the Garmin handheld Global Positioning System (GPS) situated on the concrete pad. GPS coordinates were obtained using this instrument.



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| **Photograph No.:** | 2-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 6, 2001 | **Time:** | 1627 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |

**Description:** View of Monitoring Well TSWB-6. This well, equipped with a transducer, was found dry with a total depth of 42.2 feet below TOC.

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| **Photograph No.:** | 2-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 7, 2001 | **Time:** | 0725 |
| **Photo By:** | W. O'Rear | **Direction:** | Northeast |
| **Description:** | View of Monitoring Well MCO-7. This well, located in lower Mortandad Canyon, is situated on a fragmented concrete pad. | | |

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| **Photograph No.:** | 2-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 7, 2001 | **Time:** | 1421 |
| **Photo By:** | W. O'Rear | **Direction:** | North |

**Description:** View of water discharge pipe at Test Well DT-5A. This well is located inside a sheltered building. This well was allowed to purge for approximately 15 hours prior to sample collection. Samples were collected from this discharge pipe.

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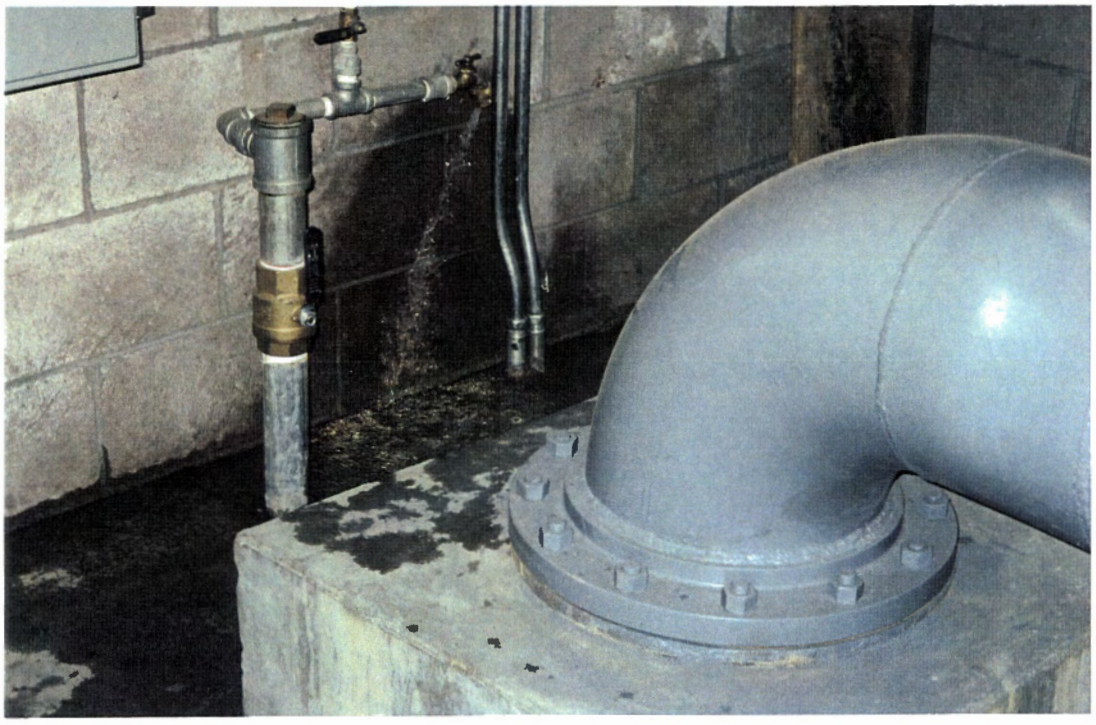
| **Photograph No.:** | 2-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 7, 2001 | **Time:** | 1949 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |
| **Description:** | View of Monitoring Well MCO-7.5B. Approximately 10 gallons were purged prior to sample collection. | | |



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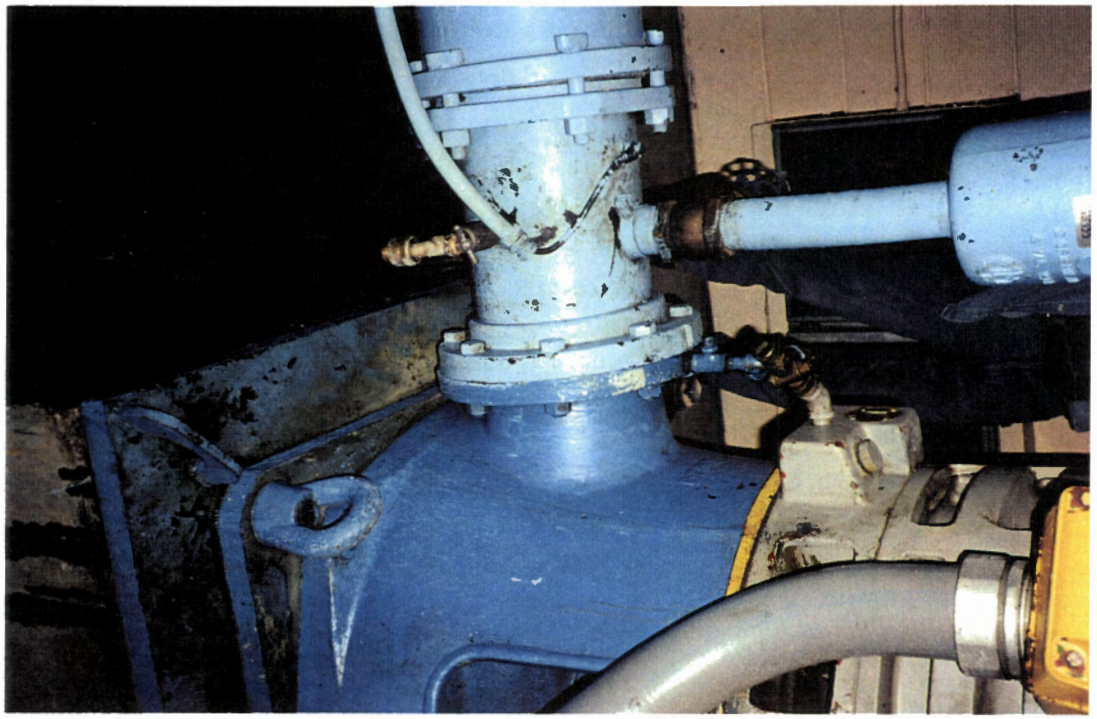
| **Photograph No.:** | 2-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0555 |
| **Photo By:** | W. O'Rear | **Direction:** | North |
| **Description:** | View of Production Well O-4. This well is located within a sheltered building. The sample was collected from the faucet which was running when the photo was taken. | | |



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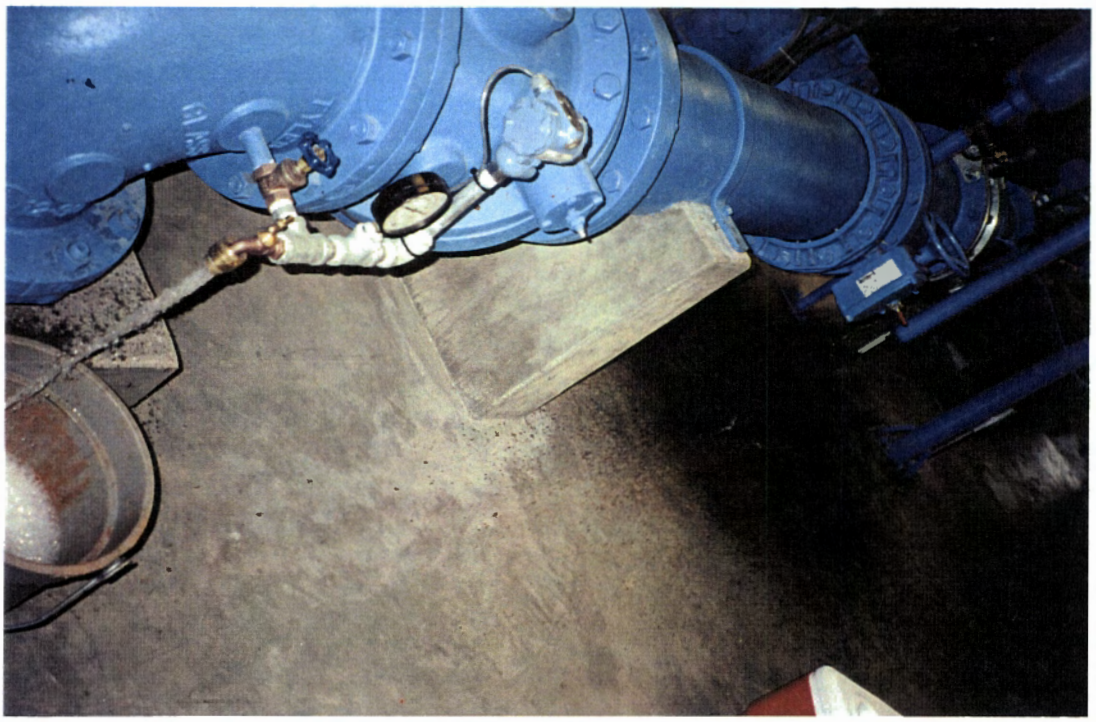
| **Photograph No.:** | 2-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0625 |
| **Photo By:** | W. O'Rear | **Direction:** | West |

**Description:** View of Production Well PM-1. This well is enclosed in a building. The sample was collected from the faucet on the left side of the photo.



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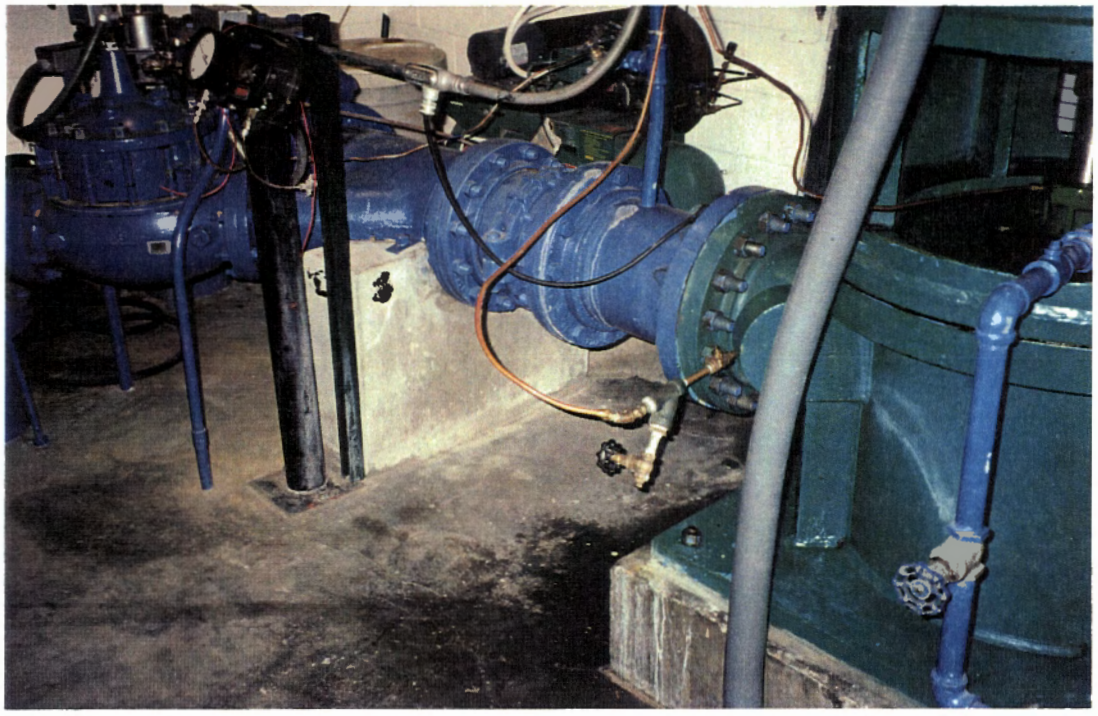
| **Photograph No.:** | 2-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0636 |
| **Photo By:** | W. O'Rear | **Direction:** | Northwest |

**Description:** View of Production Well O-1. This well is located inside a shelter. The sample was collected from the faucet which was running when the photo was taken. A bucket was used to collect excess water prior to dumping it into the drain.



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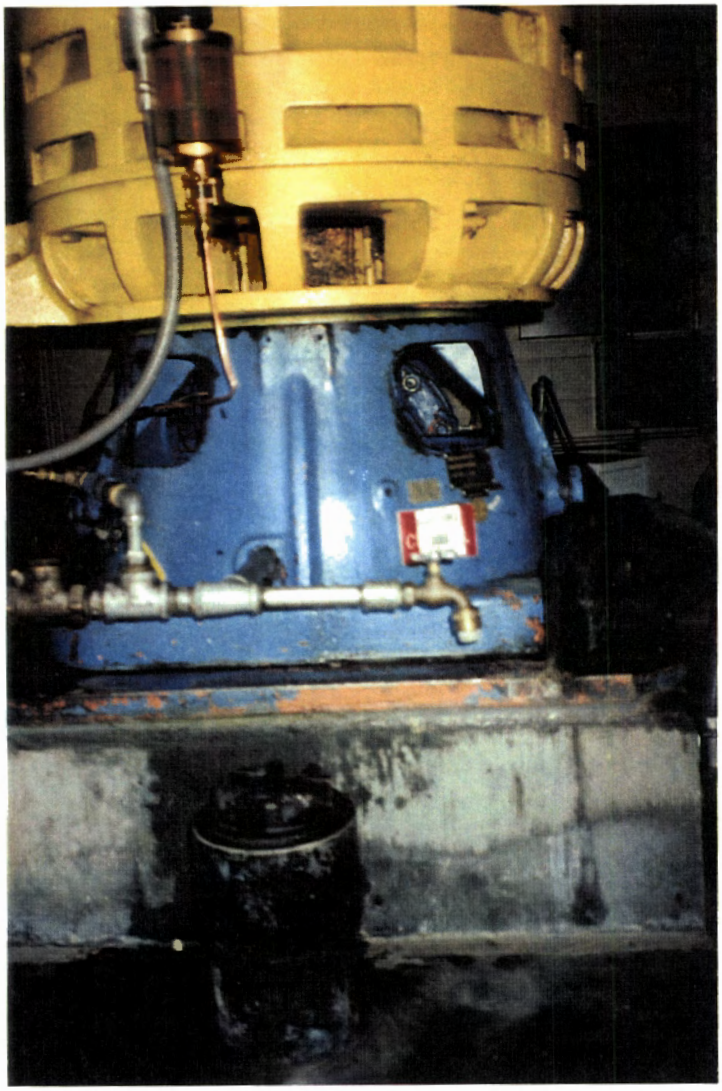
| **Photograph No.:** | 2-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0709 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |
| **Description:** | View of Production Well PM-3. The sample was collected from the faucet located at the bottom of the metal pipe. | | |



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| **Photograph No.:** | 2-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0735 |
| **Photo By:** | W. O'Rear | **Direction:** | Northwest |

**Description:** Photo of Production Well PM-2. This well is located inside an enclosed building. The sample was collected from the faucet located on the southeast side of the well.

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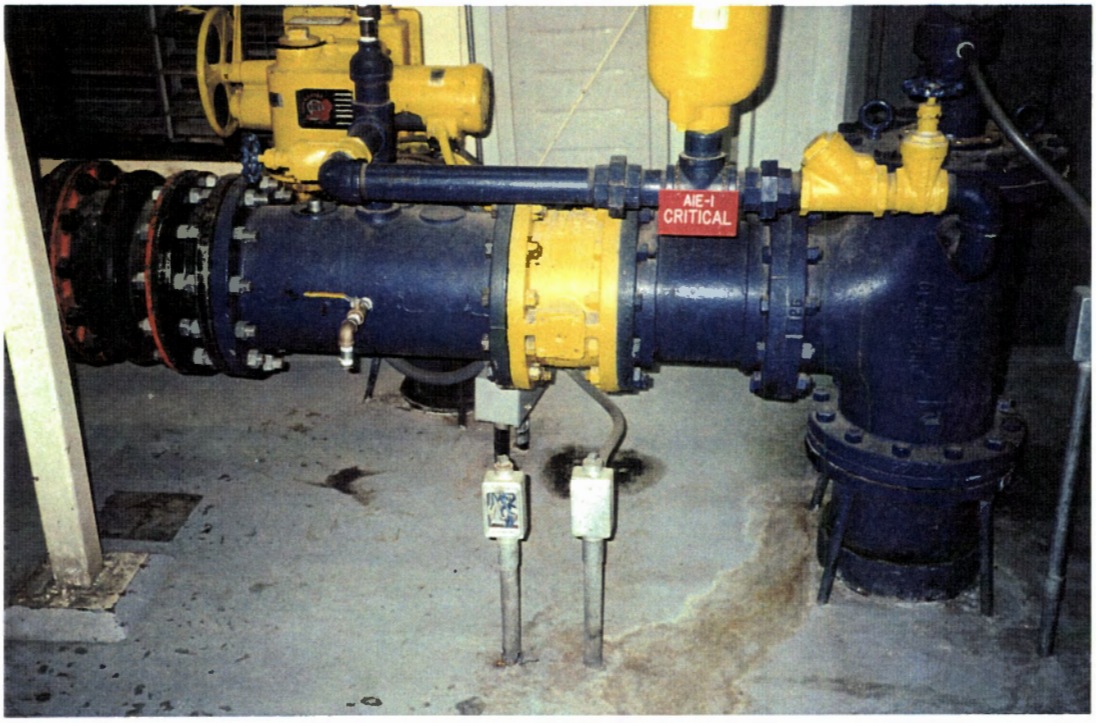
| **Photograph No.:** | 2-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0754 |
| **Photo By:** | W. O'Rear | **Direction:** | West |
| **Description:** | Photo of Production Well PM-5. The sample was collected from the faucet located at the bottom of the well on the east side. | | |

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| **Photograph No.:** | 2-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0817 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |
| **Description:** | View of Production Well PM-4. The sample was collected from the faucet located on the northeast side of the well. Photo was taken prior to turning the well on for minimal purge and sample collection. | | |

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| **Photograph No.:** | 2-17 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 1042 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |
| **Description:** | View of Monitoring Well DT-10. The sample was collected from the white discharge PVC pipe. DT-10 was allowed to purge for approximately 20 hours prior to sample collection. | | |

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| **Photograph No.:** | 2-18 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 1745 |
| **Photo By:** | W. O'Rear | **Direction:** | Down |
| **Description:** | Photo of Production Well G1-A, which is located within an enclosed building. The sample was collected from the faucet located at the far end of the pipe. | | |

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| **Photograph No.:** | 2-19 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 0840 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |
| **Description:** | View of Sample Location PA 6.7. The sample was collected from the area just above the waterfall. | | |

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| **Photograph No.:** | 2-20 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 8, 2001 | **Time:** | 1608 |
| **Photo By:** | T. Engle | **Direction:** | Northeast |
| **Description:** | Photo of Sample Location PA 10.6. Extra volume was collected to allow for sediment caused by heavy rain event to settle prior to filtering surface water for dissolved parameters. VOCs were not analyzed at this site due to the rapid flow rate of the stream. | | |

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| **Photograph No.:** | 2-21 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 10, 2001 | **Time:** | 1505 |
| **Photo By:** | W. O'Rear | **Direction:** | South |

**Description:** Photo of Sample 3-056(C). The soil sample was collected by brushing away ground litter and collecting an amount for the split and primary samples. QA/QC samples were collected at this location as well.

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| **Photograph No.:** | 2-22 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 10, 2001 | **Time:** | 1506 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |

**Description:** Photo of Sample 3-056(AA) which was collected approximately three feet, seven inches north of the previous soil sample. The soil sample was collected by brushing away ground litter and collecting an amount for the split and primary samples.

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| **Photograph No.:** | 2-23 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 10, 2001 | **Time:** | 1533 |
| **Photo By:** | W. O'Rear | **Direction:** | Southeast |

**Description:** Photo of drainage pathway from location of site where soil samples were collected. This view represents the path in which water may drain downhill. This location is approximately 100 yards from Building 223.

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| **Photograph No.:** | 2-24 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 15, 2001 | **Time:** | 1330 |
| **Photo By:** | T. Engle | **Direction:** | Southeast |

**Description:** View of Monitoring Well 18-MW-18, which is located outside of the high security area within Technical Area 18. A stainless steel bailer was used to collect VOCs, SVOCs, and explosives; a peristaltic pump was used to purge the well and collect the remaining parameters.

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| **Photograph No.:** | 2-25 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 15, 2001 | **Time:** | 1540 |
| **Photo By:** | T. Engle | **Direction:** | Southeast |

**Description:** View of monitoring well 18-MW-17, which is located outside of the high security area within Technical Area 18. A stainless steel bailer was used to collect VOCs, SVOCs, and explosives; a peristaltic pump was used to purge the well and collect the remaining parameters. This well and 18-MW-18 were identified as being temporary wells with no filter pack and bentonite in place.

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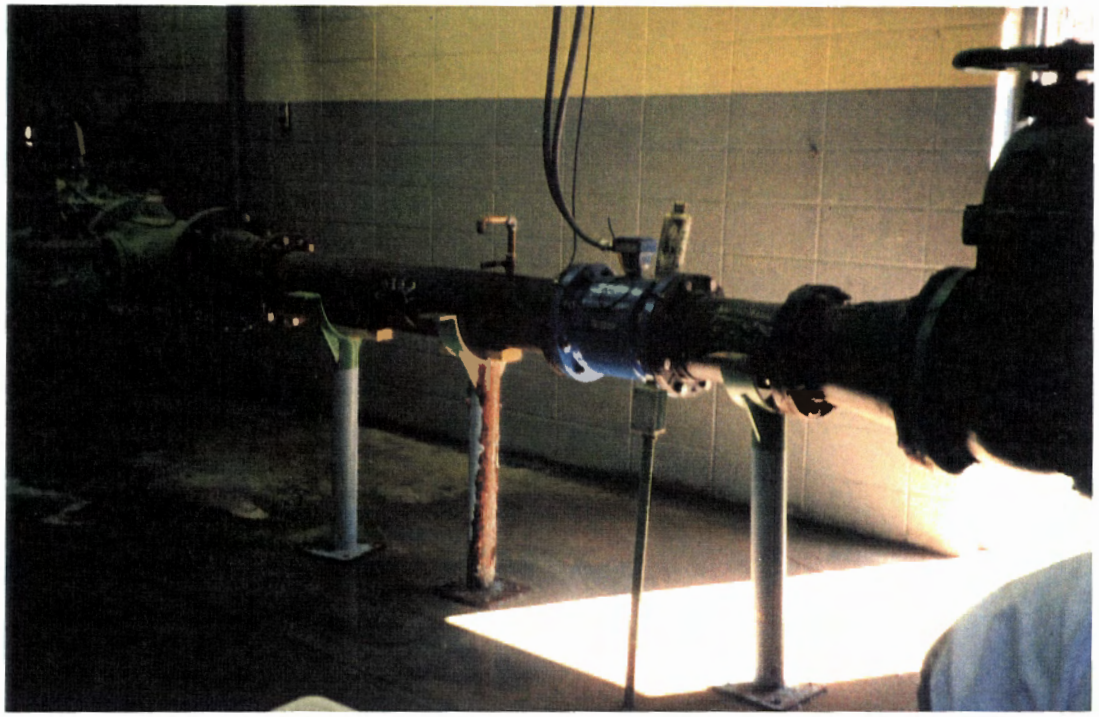
| **Photograph No.:** | 3-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 15, 2001 | **Time:** | 1615 |
| **Photo By:** | T. Engle | **Direction:** | Northeast |

**Description:** Photo of Monitoring Well 03-MW-01 as the well is being purged by a peristaltic pump. Note field parameter meters are on left and the peristaltic pump on the right.



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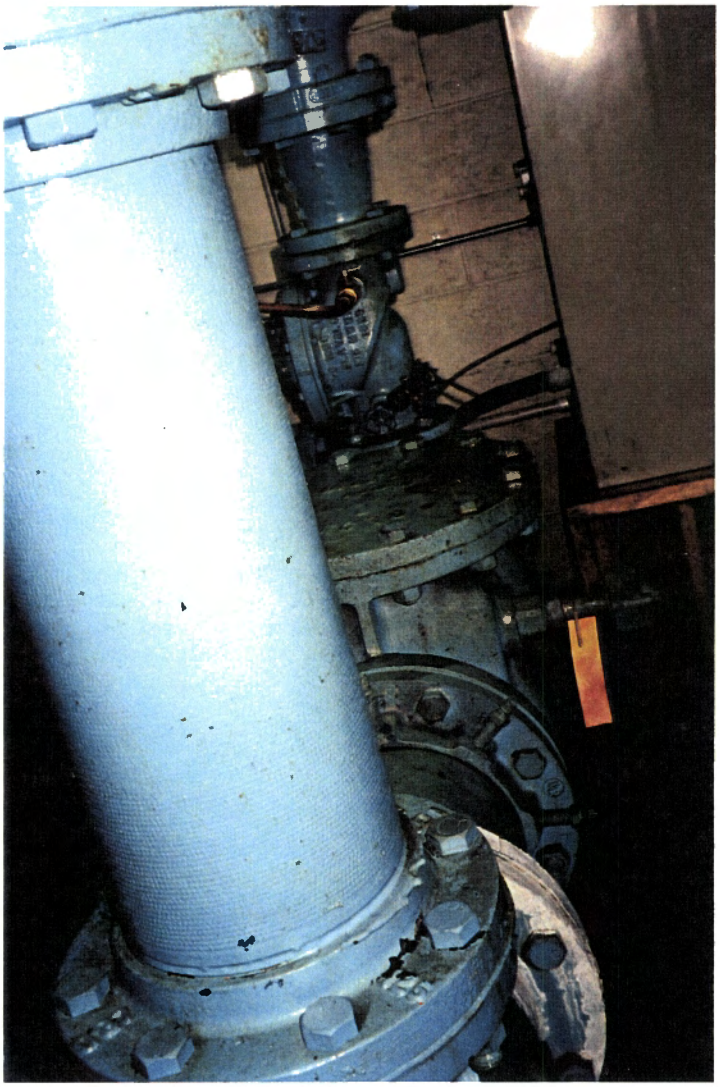
| **Photograph No.:** | 3-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 16, 2001 | **Time:** | 1010 |
| **Photo By:** | T. Engle | **Direction:** | Northeast |
| **Description:** | View of sampling spigot (L-shaped brass pipe, approximately one-half inch long) at Buckman Well 1. | | |



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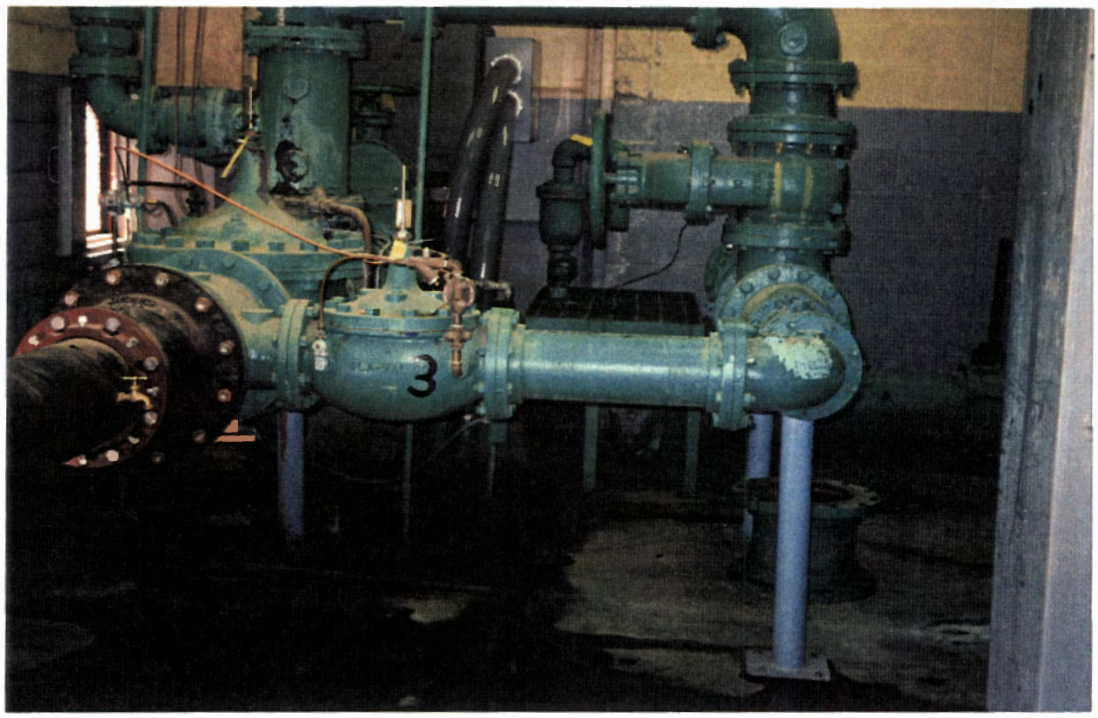
| **Photograph No.:** | 3-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 16, 2001 | **Time:** | 1113 |
| **Photo By:** | T. Engle | **Direction:** | East |
| **Description:** | View of sampling spigot (faucet type dispenser, made of brass) at Buckman Well 7. | | |

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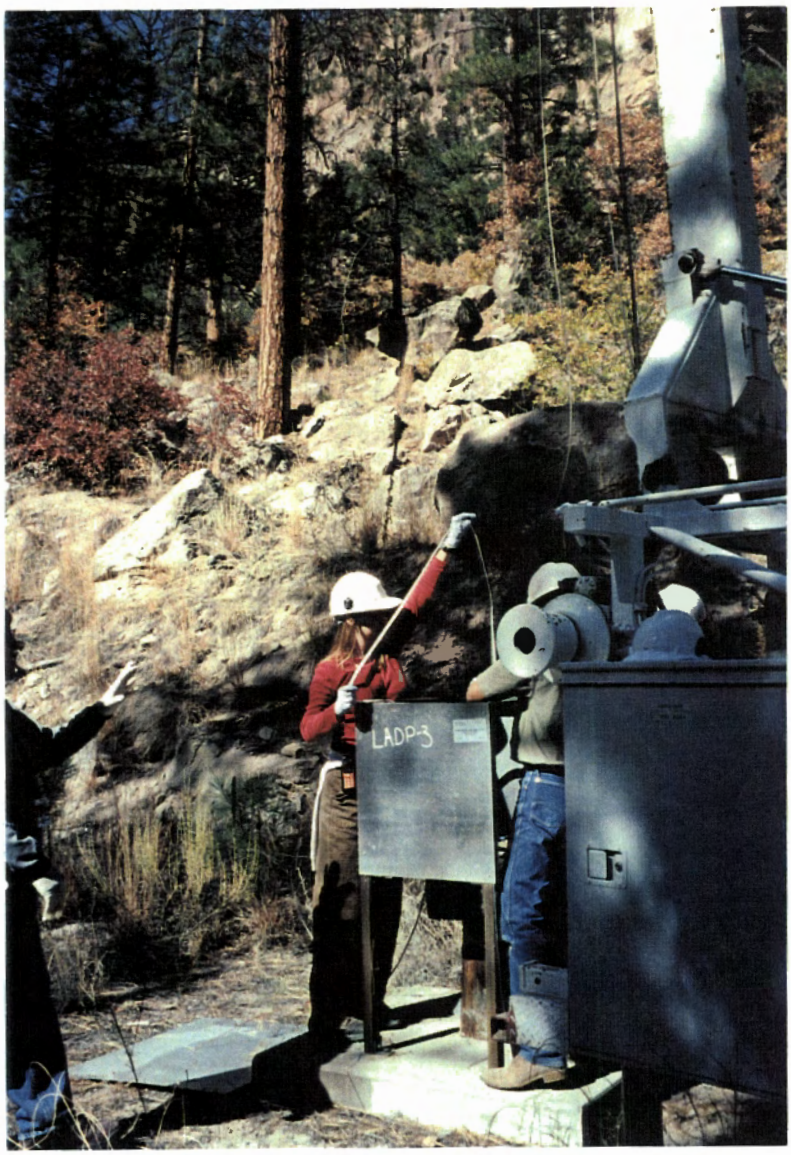
| **Photograph No.:** | 3-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | August 16, 2001 | **Time:** | 1155 |
| **Photo By:** | T. Engle | **Direction:** | West |
| **Description:** | View of spigot (brass) used to collect Buckman Well 2 sample. | | |

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| **Photograph No.:** | 1-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 29, 2001 | **Time:** | 1228 |
| **Photo By:** | W. O'Rear | **Direction:** | Northwest |

**Description:** Photo of Monitoring Well LADP-3 showing the pulling winch used to draw the stainless steel bailer. A stainless steel bailer was used to purge and collect samples.

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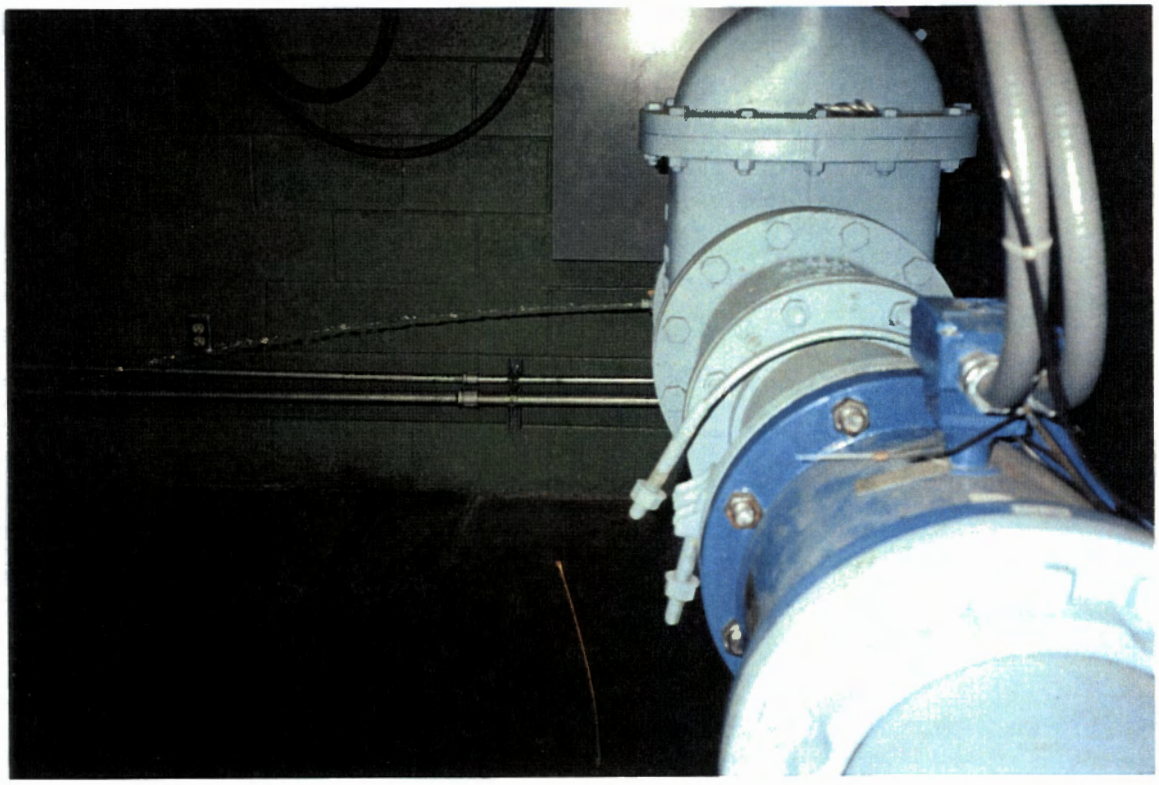
| **Photograph No.:** | 1-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 30, 2001 | **Time:** | 1002 |
| **Photo By:** | T. Engle | **Direction:** | North |

**Description:** View of Monitoring Well LAOI(a)-1.1, including nitrogen cylinders, bladder pump control box, and a 55-gallon drum used to dispose of the purge water.



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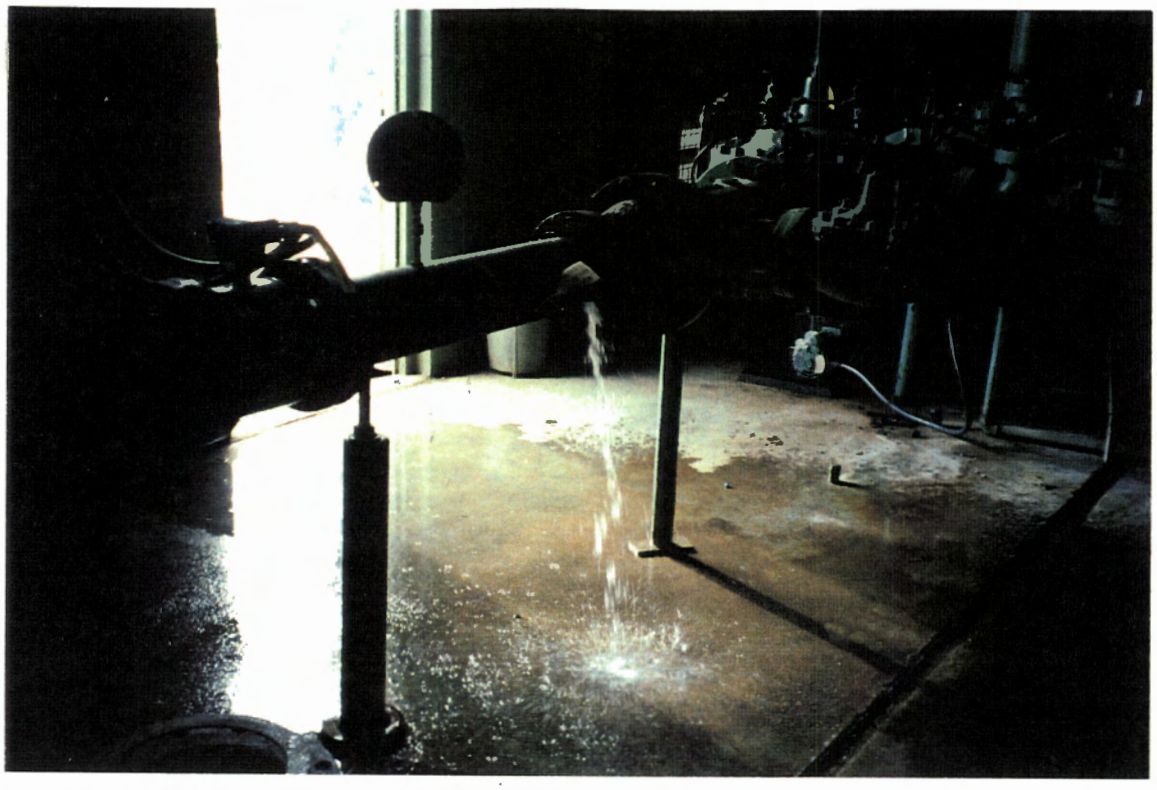
|---|---|---|---|
| **Photograph No.:** | 1-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 0924 |
| **Photo By:** | T. Engle | **Direction:** | North |

**Description:** View of Buckman Well 6 while being purged. The purge water was contained within the pump house which is equipped with a drain to dispose of the water.



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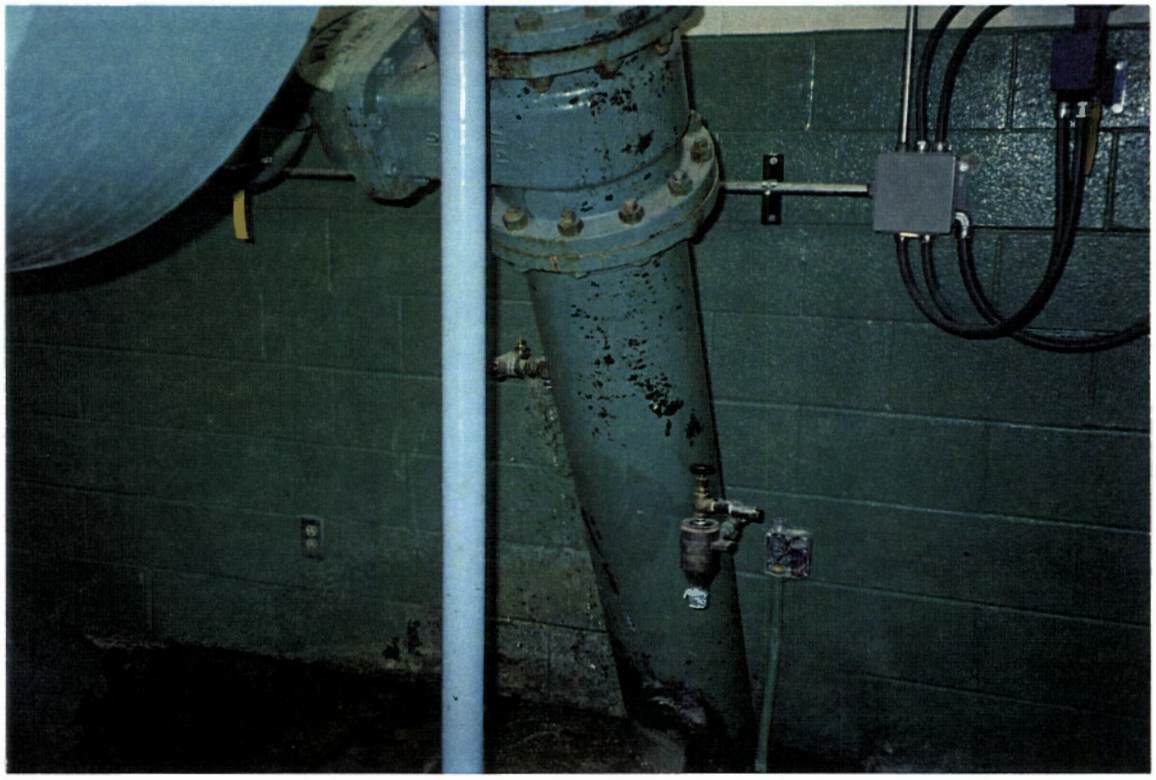
| **Photograph No.:** | 1-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 1020 |
| **Photo By:** | T. Engle | **Direction:** | Southwest |

**Description:** View of Buckman Well 4 as it is purging. Buckman field wells were allowed to run water onto the floor for approximately three to seven minutes prior to collecting the samples.



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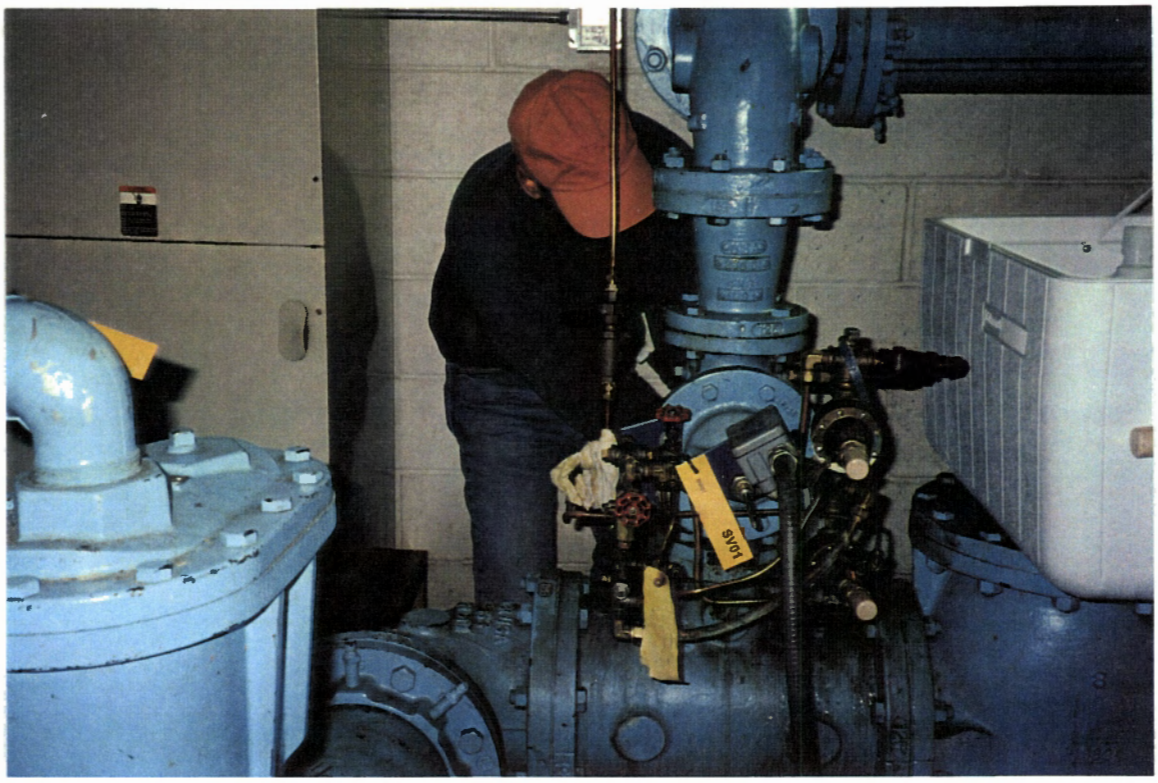
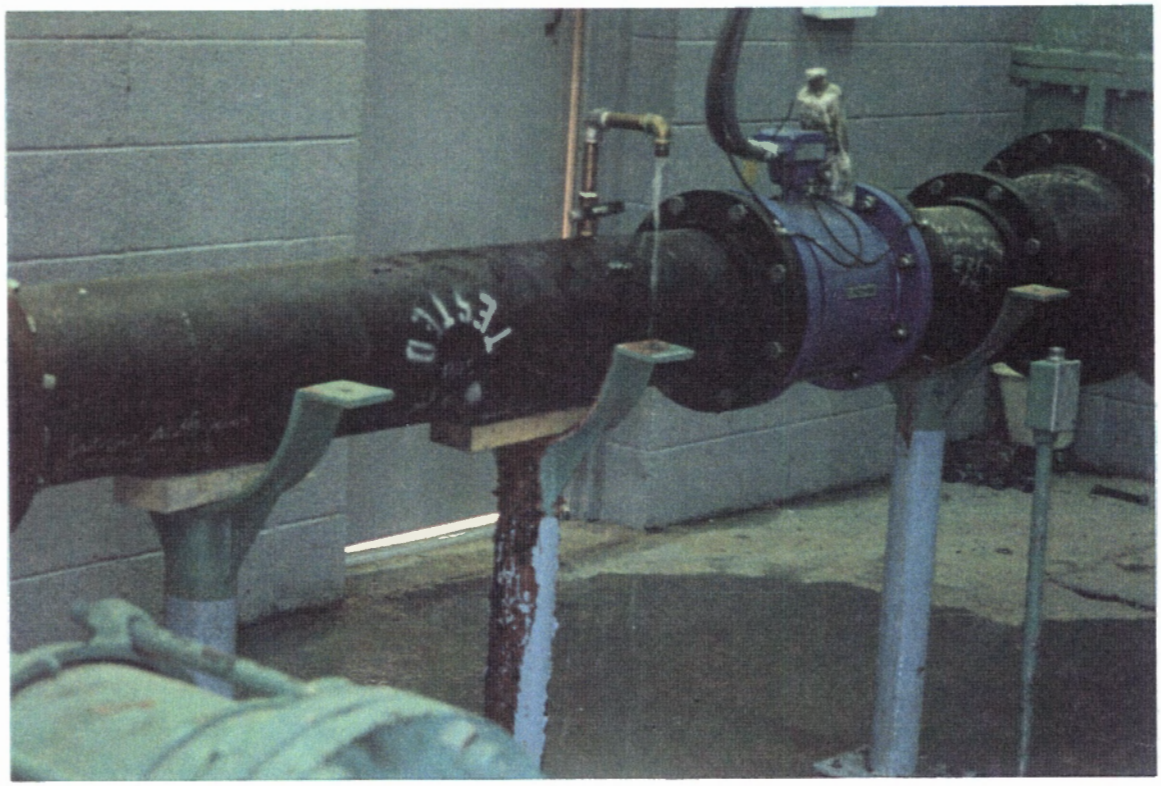
| **Photograph No.:** | 1-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 1055 |
| **Photo By:** | T. Engle | **Direction:** | East |

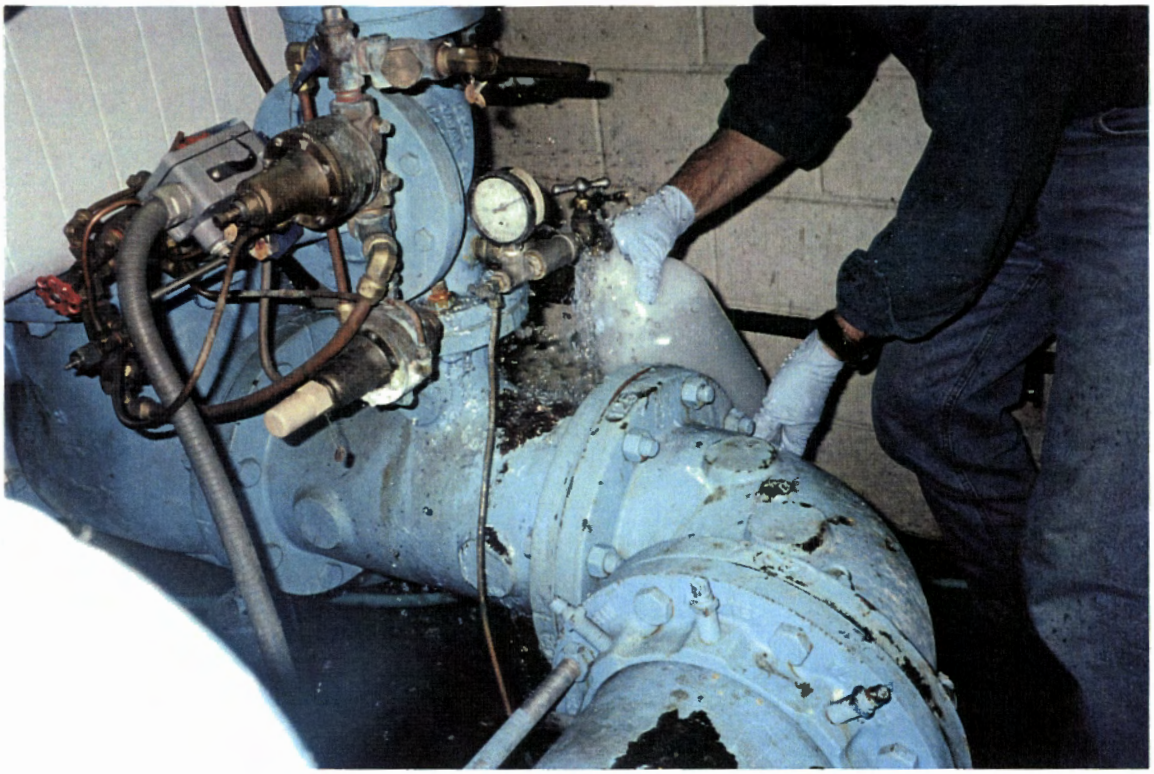
**Description:** View of Buckman Well 3 as the well is purging water from the spigot onto the containment floor prior to sampling.



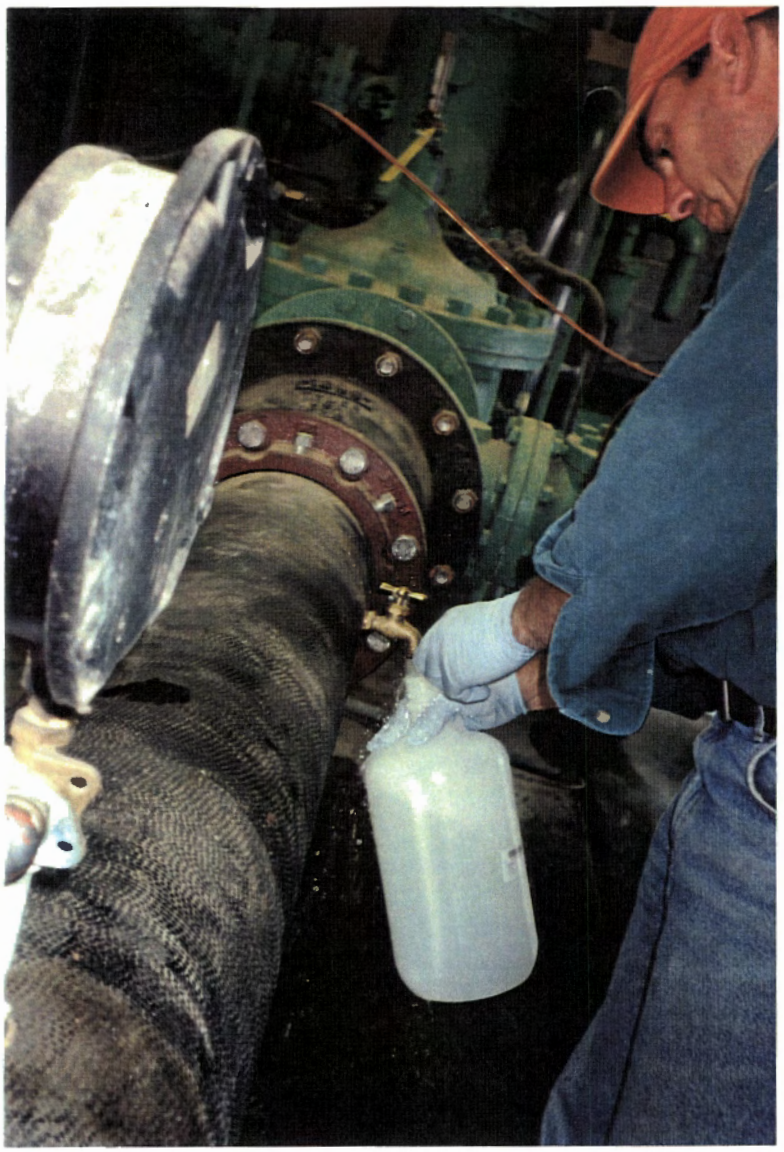
| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 1133 |
| **Photo By:** | T. Engle | **Direction:** | Southeast |
| **Description:** | View of Buckman Well 7 while a LANL employee is completing split sampling activities. | | |



| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 1212 |
| **Photo By:** | T. Engle | **Direction:** | Northeast |
| **Description:** | View of Buckman Well 1 during purging process. The flow from the spigot was adjusted for sample collection purposes. | | |



**Photograph No.:** 1-8
**Date:** October 31, 2001
**Photo By:** T. Engle
**Facility:** Los Alamos National Laboratory
**Time:** 1316
**Direction:** East
**Description:** View of Buckman Well 8. LANL personnel are completing split sampling activities at this well. Buckman Well 8 pumps at a rate of approximately 550 gpm.



| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | October 31, 2001 | **Time:** | 1402 |
| **Photo By:** | T. Engle | **Direction:** | West |
| **Description:** | View of Buckman Well 2 as LANL personnel collects a sample. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 1, 2001 | **Time:** | 1010 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |

**Description:** Photo of Spring 4C. Samples were collected by using a peristaltic pump to draw the water into the collection bottles.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 1, 2001 | **Time:** | 1207 |
| **Photo By:** | W. O'Rear | **Direction:** | Southwest |

**Description:** Photo of Spring 4A. This spring had an approximate flow rate of 0.345 cubic feet per second (cfs), as measured by LANL personnel.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 1, 2001 | **Time:** | 1252 |
| **Photo By:** | W. O'Rear | **Direction:** | North |

**Description:** Photo of Spring 4AA, which has an approximate flow rate of 0.025 cfs. Split samples were collected by LANL personnel at all sample points. The yellow pole is the approximate location of the area in which the TechLaw field team sampled.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1125 |
| **Photo By:** | W. O'Rear | **Direction:** | South |

**Description:** View of Sample Location PU-10283, which is located in South Fork Acid Canyon, in the remedial area. The flourescent painted stick is the location of where the sample was collected. PU-10283 was collected by TL and analyzed by NMED Laboratory.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1145 |
| **Photo By:** | W. O'Rear | **Direction:** | South |

**Description:** Photo of sample location PU-10284, located in South Fork Acid Canyon. This sample is located between Samples PU-10274 and PU-10275, which were collected previous to TechLaw's sampling activity at LANL.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1125 |
| **Photo By:** | W. O'Rear | **Direction:** | South |

**Description:** View of Sample Location PU-10283, which is located in the Southfork of Acid Canyon.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1202 |
| **Photo By:** | W. O'Rear | **Direction:** | South |

**Description:** View of Sample Location PU-10286. A duplicate sample was collected from this location and identified as PU-110286.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-17 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1305 |
| **Photo By:** | W. O'Rear | **Direction:** | East |

**Description:** View of background Sample Location AC-01. This area is located approximately 200 yards southwest of Canyon Road, which is where a new apartment complex is being constructed. The soil was collected from an area directly north of the fluorescent painted tree.

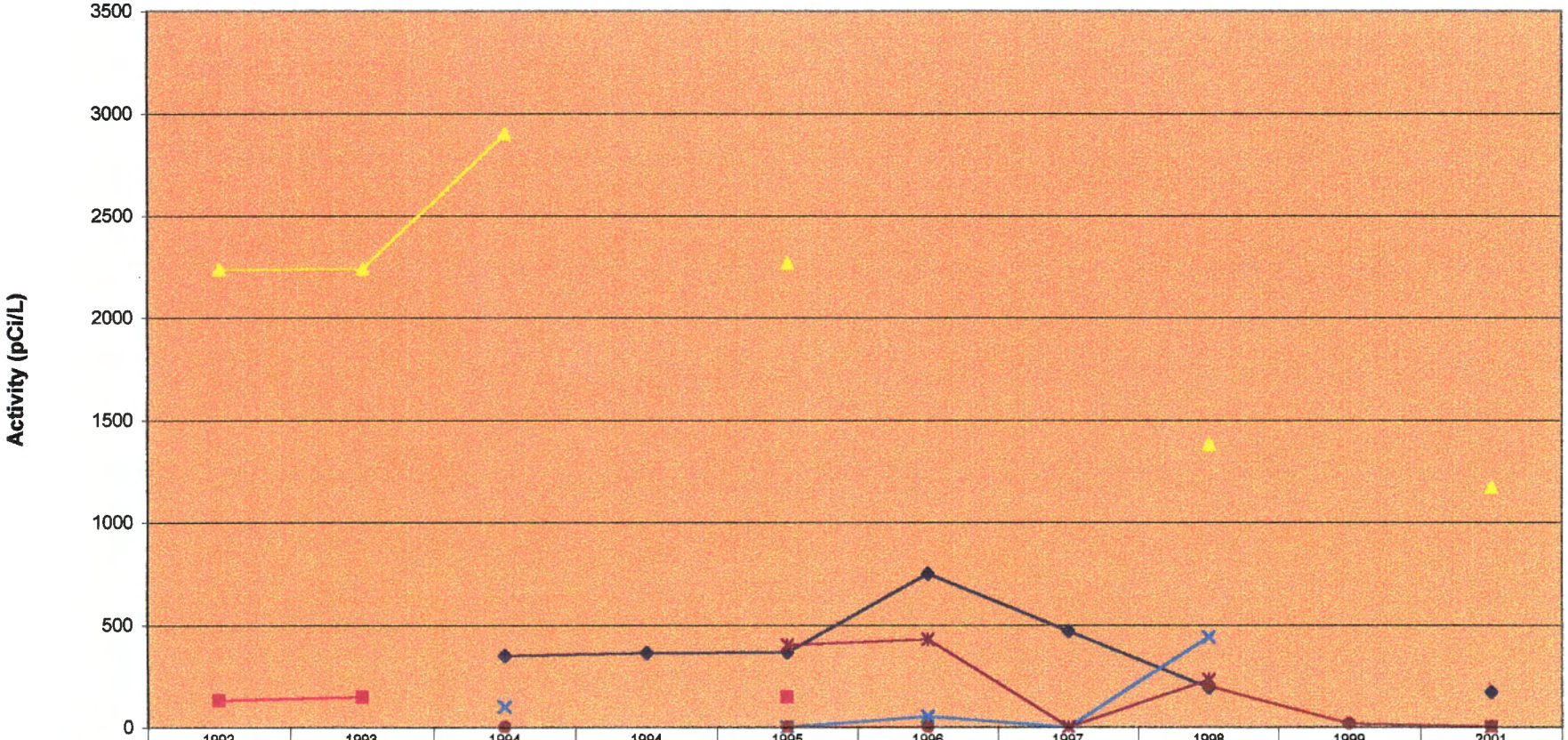
| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-18 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | November 2, 2001 | **Time:** | 1307 |
| **Photo By:** | W. O'Rear | **Direction:** | East |

**Description:** View of background sample location AC-01. This area is located approximately eight feet north of the tree with the flourescent paint mark. This general location is an area in which two tributaries meet, approximately 140 feet northwest of Acid Canyon.

# APPENDIX H

## Trend Analysis for Tritium

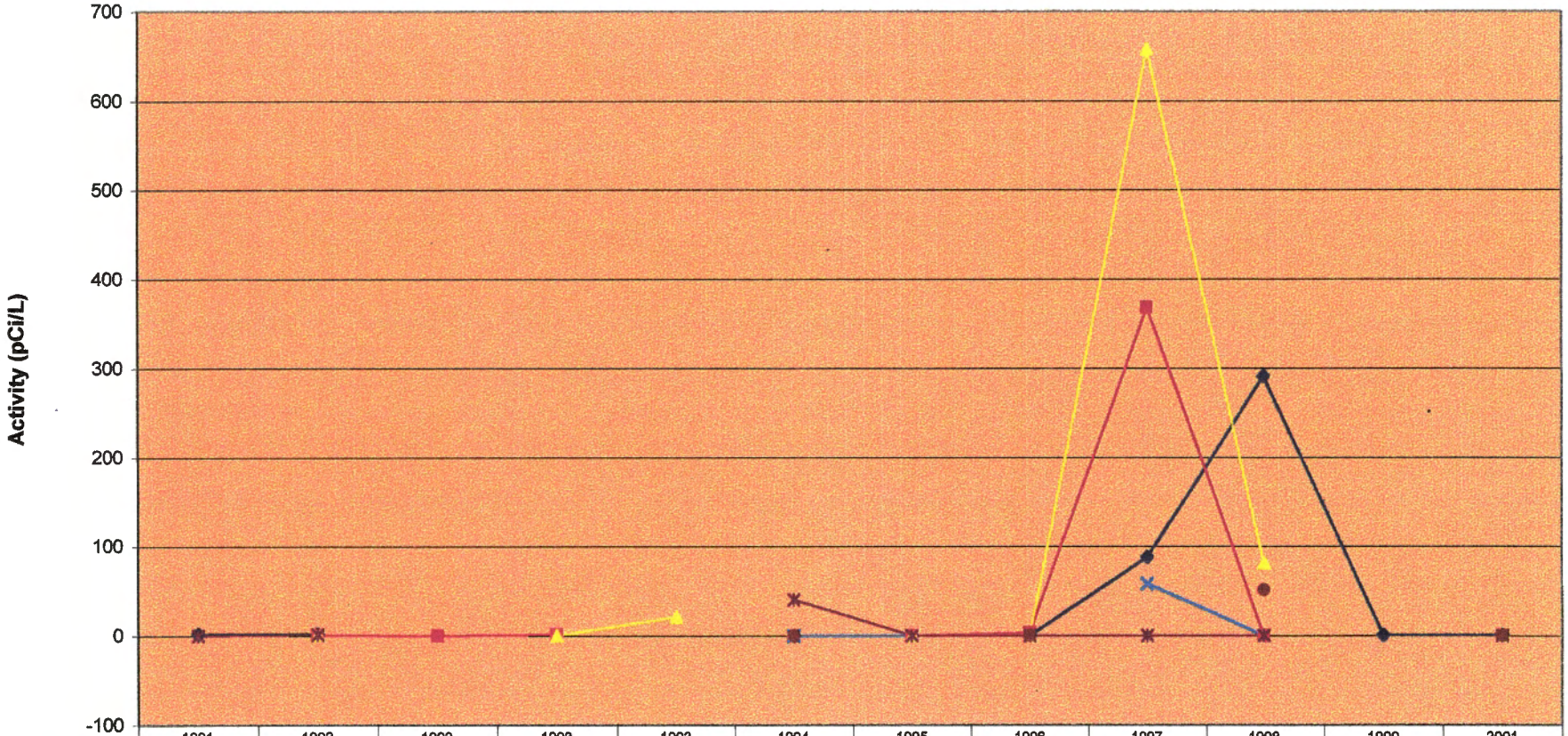
## Tritium Activity in TW Series Wells




| | 1992 | 1993 | 1994 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|
| TW-1 | | | 349 | 362 | 366 | 749 | 468 | 191 | | 169 |
| TW-1A | 132 | 147 | | | 148 | | | | | |
| TW-2A | 2234 | 2237 | 2900 | | 2265 | | | 1380 | | 1171 |
| TW-3 | | | 100 | | 0 | 52 | 0 | 441 | | 0.16 |
| TW-4 | | | | | 400 | 430 | 0 | 231 | | 0.48 |
| TW-8 | | | 0 | | 0 | 0 | | 201 | 16 | 2.71 |

Year Sampled

## Tritium Activity in Water Supply Wells




| | 1991 | 1992 | 1992 | 1993 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM-1 | 1.6 | 2.2 | | | | 0 | 0 | 0 | 88 | 291 | 0.33 | 0.926 |
| PM-2 | | 0.48 | 0.13 | 1.57 | | 0 | 0 | 3 | 368 | 0 | | -0.032 |
| PM-3 | | 1.2 | | 0.19 | 21.3 | | 0 | 0 | 658 | 81 | | 0.128 |
| PM-4 | | | | | | 0 | 0 | | 58 | 0 | | -0.128 |
| PM-5 | 0.288 | 1.2 | | | | 40 | 0 | 0 | 0 | 0 | | -0.16 |
| O-4 | | | | | | 0 | | 0 | | 51 | | -0.16 |

Year Sampled