# Sampling Report

**March 2001**

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

**Prepared for:**

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

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

**EPA Contract No. 68-W6-0063**

**Work Assignment No. 002BT065G**

13486

Prepared By

TechLaw, Inc.

HSWA LANL 04/1099/00

# 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-W6-0063**
**Work Assignment No. 002BT065G**

**March 2001**

# TABLE OF CONTENTS

**Section** **Page**

1.0 INTRODUCTION . . . . . 1
1.1 Objective . . . . . 1
1.2 Site Background . . . . . 1
1.2.1 Historical and Current Operations . . . . . 1
1.2.2 Geographical Setting . . . . . 2
1.2.3 Geology and Hydrology . . . . . 3

2.0 SITE INVESTIGATION ACTIVITIES . . . . . 5
2.1 Participants . . . . . 5
2.2 Effluent . . . . . 5
2.2.1 Effluent Sampling Procedure . . . . . 6
2.2.2 Deviations from the Field Sampling Plan . . . . . 6
2.3 Groundwater . . . . . 6
2.3.1 Groundwater Sampling Procedures . . . . . 7
2.3.2 Deviations from the Field Sampling Plan . . . . . 8
2.4 Springs and Surface Waters in the Pajarito Canyon Watershed . . . . . 8
2.4.1 Spring and Surface Water Sampling Procedures . . . . . 9
2.4.2 Deviations from the Field Sampling Plan . . . . . 10
2.5 Sediment . . . . . 10
2.5.1 Sediment Sampling Procedures . . . . . 10
2.5.2 Deviations From Field Sampling Plan . . . . . 11

3.0 LABORATORY RESULTS SUMMARY . . . . . 13
3.1 Effluent Sampling Results . . . . . 13
3.1.1 TA-50 Radioactive Waste Water Treatment Plant . . . . . 13
3.2 Groundwater Sampling Results . . . . . 13
3.2.1 Mortandad Canyon . . . . . 13
3.2.2 Drinking Water Production Wells . . . . . 14
3.2.3 Technical Area 3 (TA-3) . . . . . 15
3.2.4 Comparison of Groundwater Results . . . . . 16
3.3 Spring and Surface Water Sampling Results . . . . . 16
3.4 Sediment Sampling Results . . . . . 16
3.4.1 Acid Canyon . . . . . 16
3.4.2 Bayo Canyon . . . . . 17
3.4.3 Sandia Canyon . . . . . 18
3.4.4 Mortandad Canyon . . . . . 18
3.4.5 Cañada del Buey . . . . . 19
3.4.6 Pajarito Canyon . . . . . 19
3.4.7 Ancho Canyon . . . . . 20

4.0 QUALITY ASSURANCE SUMMARY . . . . . 21
4.1 Quality Assurance/Quality Control Samples . . . . . 21
4.2 Deviations from the Field Sampling Plan . . . . . 22
4.3 Laboratory and Analytical Methods . . . . . 23
4.4 Data Validation . . . . . 24

5.0 CONCLUSIONS . . . . . 25
5.1 Sampling Activities . . . . . 25
5.2 Analytical Results . . . . . 25
5.2.1 Effluent Samples . . . . . 25
5.2.2 Groundwater Samples . . . . . 26
5.2.3 Spring and Surface Water Samples . . . . . 27
5.2.4 Sediment Samples . . . . . 27
5.2.5 Drinking Water Production Wells . . . . . 28
5.2.6 Technical Area 3 Monitoring Well . . . . . 28

6.0 RECOMMENDATIONS . . . . . 31

7.0 REFERENCES . . . . . 33

## LIST OF TABLES

Table 1 Participants
Table 2 Well Location and Time Sampled
Table 3 Summary of Well Information
Table 4 Field Parameter Measurements
Table 5 Summary of Preliminary Analytical Results for Water Samples-Volatile Organic Compounds
Table 6 Summary of Preliminary Analytical Results for Water Samples-Total Metals
Table 7 Summary of Preliminary Analytical Results for Water Samples-Dissolved Cations
Table 8 Summary of Preliminary Analytical Results for Water Samples-General Chemistry
Table 9 Summary of Preliminary Analytical Results for Water Samples-Radionuclides
Table 10 Summary of Preliminary Analytical Results for Water Samples-Explosives
Table 11 Summary of Preliminary Analytical Results for Sediment Samples-Inorganics
Table 12 Summary of Preliminary Analytical Results for Sediment Samples-PCBs
Table 13 Summary of Preliminary Analytical Results for Sediment Samples-Radionuclides

## TABLE OF CONTENTS
## (continued)

### LIST OF FIGURES


| | |
|---|---|
| Figure 1 | Site Location Map |
| Figure 2 | Aerial View and Digital Elevation Model |
| Figure 3 | Aerial View/Sample Locations- Mortandad Canyon |
| Figure 4 | Aerial View/Sample Locations- Upper Pajarito Canyon |
| Figure 5 | Aerial View/Sample Locations- Middle Pajarito Canyon |
| Figure 6 | Aerial View/Sample Locations- Acid Canyon |
| Figure 7 | Aerial View/Sample Locations- Bayo Canyon |
| Figure 8 | Aerial View/Sample Locations- Mortandad/Sandia Canyons |
| Figure 9 | Aerial View/Sample Locations- Lower Pajarito/Cañada del Buey |
| Figure 10 | Aerial View/Sample Locations- Ancho Canyon |


### LIST OF APPENDICES


| | |
|---|---|
| APPENDIX A | Field Logbooks |
| APPENDIX B | Chronological Summary of Field Activities |
| APPENDIX C | Generalized Well Construction and Lithologic Descriptions |
| APPENDIX D | Comparative Standards Description |
| APPENDIX E | Comparison of Analytical Results |
| APPENDIX F | Analytical Data |
| APPENDIX G | Chain-of-Custody Forms |
| APPENDIX H | Photographs |
| APPENDIX I | Trend Analysis |

## 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 |
| MK | Morrison Knudson Corporation |
| $\mu m$ | 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-W6-0063, Work Assignment No. 002BT065G. 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 December 6, 1999 and December 17, 1999. 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 December 6 and December 17, 1999. Thanks are due to David Rogers of Los Alamos National Laboratory who provided the support and cooperation necessary to make the sampling event a success. The Los Alamos National Laboratory field support personnel, Max Maes and Consuelo Montoya, 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. TechLaw, Inc. would like to thank Aurora Technical Services and Program Management Company for their sampling support.

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, Bob Wingo, Chris Hanlon-Mayer, 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 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 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, and Cañada del Buey. 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 (Figure 1). 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 groundwaters 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.

THIS PAGE INTENTIONALLY LEFT BLANK

## 2.0 SITE INVESTIGATION ACTIVITIES

TechLaw sampling team members arrived at the LANL facility on the morning of December 6, 1999. All LANL training and administrative requirements were completed by team members by December 7, 1999.

Field activities began on December 6, 1999. TechLaw collected sediment samples from Acid Canyon, Bayo Canyon, Cañada del Buey, Mortandad Canyon, Pajarito Canyon, and Ancho Canyon. Groundwater was collected from shallow, canyon-bottom wells in Mortandad Canyon located west of Pueblo of San Ildefonso on LANL property and several main-aquifer production wells located on LANL property. Five springs were sampled in the Pajarito Canyon watershed. Effluent samples were collected at Gaging Station-1, located downstream of Technical Area 50 Radioactive Waste Water Treatment Plant, in Mortandad Canyon. New Mexico Environment Department DOE Oversight Bureau (NMED OB), and LANL personnel collected split samples at various sample locations during the field activities. Field activities ended on December 17, 1999. 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 completed during each day of field work.

### 2.1 Participants

During the two 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), NMED OB, TechLaw, Aurora Technical Services (ATS), and the Pueblo of San Ildefonso. 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 was completed to provide analytical 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 of sampling and is not meant to characterize the waste stream. The effluent sampling location was selected by EPA and NMED OB personnel.

One sample of effluent being discharged into Mortandad Canyon by the TA-50 Radioactive Waste Water Treatment Plant was collected at Gauging Station-1 in Mortandad Canyon during the first week of sampling. The sample was analyzed for anions, nitrate/nitrite as nitrogen, total phosphorous, ammonia, Total Kjedahl Nitrogen (TKN), total metals, perchlorate, strontium-90, tritium (low level), stable nitrogen isotopes, dissolved uranium isotopes, and dissolved cations.

### 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, then the facility repeats the treatment process until it is within the limits of the NPDES permit. 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 also has a third storage tank used as a backup to the two primary storage/treatment tanks.

One sample (GS-1) was collected at Gaging Station-1 in Mortandad Canyon while the TA-50 plant was discharging effluent into the canyon. This sample was 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 pump was used to collect the samples beginning with the non-filtered analyses containers and finishing with the filtered analyses containers. The filtered sample material was passed through a new in-line 0.45 micrometer ($\mu$m) 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 OB White Rock 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.

All waste generated during sampling activities were managed by LANL.

### 2.2.2 Deviations from the Field Sampling Plan

No deviations from the Field Sampling Plan occurred during the effluent sampling activities. All effluent samples were collected as prescribed in the Field Sampling Plan.

## 2.3 Groundwater

The collection and analysis of groundwater samples was completed to provide data to determine the presence or absence of contamination in groundwater at the different sample locations. Eight shallow groundwater monitoring wells, one main aquifer monitoring well, and four drinking water production wells were sampled during the groundwater sampling activities. Depending on

the well, groundwater monitoring wells were analyzed for anions, nitrate/nitrite as nitrogen, total phosphorous, ammonia, TKN, total metals, perchlorate, strontium-90, tritium (low level), stable nitrogen isotopes, VOCs, and dissolved cations. Depending on the well, drinking water production wells were analyzed for nitrate/nitrite, total phosphorous, ammonia, TKN, total arsenic, total uranium, perchlorate, strontium-90, VOCs, total barium, and explosives. The groundwater sampling locations were selected by EPA and NMED OB personnel.

Wells sampled during the groundwater sampling activities are located in Mortandad Canyon (8 wells sampled; see Figure 2), and drinking water production water wells are located on Pajarito Mesa (4 wells sampled). One shallow monitoring well, 03-MW-1, was sampled in TA-3 behind building SM-30. The well locations and the date and time each was sampled is presented in Table 2. Generalized well construction diagrams for each of the wells sampled is presented in Appendix C. Visual representations of the groundwater well locations can be viewed in Figures 3, 5, and 8.

### 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 verify 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 three.

Once these initial measurements and calculations were made, purging activities began. 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-8 and the drinking water production wells each contained a dedicated centrifugal pump. Samples from the main aquifer wells were collected from ports adjacent to the wellhead. 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 over the last three intervals measured. Although RCRA guidance recommends measuring dissolved oxygen in addition to the other water quality parameters mentioned above, it is believed that each well was purged adequately in order to facilitate the collection of a sample representative of the adjacent screened interval. 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. The final water quality parameter measurements for each well sampled is 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 $\mu$m 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 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 waste 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 occurred.

- Well MT-4 was sampled after the first well volume was purged, since the water quality parameters had stabilized.
- Well MCO-4B was not sampled as planned. Water was unable to be recovered from the well, so it was determined that the water was below the pump intake or the bladder pump was not functioning properly. Well MCO-5 was substituted for this well.
- Well MCO-2 was sampled after the first well volume was purged, since the water quality parameters had stabilized. This well had a slow recovery time.
- Well MCO-7 was sampled after one well volume was purged, since the water quality parameters had stabilized. This well had a slow recovery time.
- Well MCO-7.7B was sampled after one well volume was purged, since the water quality parameters had stabilized. This well had a slow recovery time.

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

The collection and analysis of spring and surface water samples was completed to provide analytical data to determine the presence or absence of contamination in groundwater discharging to the ground surface at the different sampling locations. The springs discharge from the Bandelier Tuff and the canyon-bottom alluvium. Nine springs and two spring-fed surface water streams were scheduled to be sampled during the spring and surface water sampling activities. Due to the lack of adequate flow, only five springs were actually sampled. The spring water was analyzed for anions, perchlorate, explosives, ammonia, nitrate/nitrite as nitrogen, total phosphorous, TKN, and dissolved cations. The spring sampling locations were selected by EPA and NMED personnel.

### 2.4.1 Spring and Surface Water Sampling Procedures

TechLaw sample team members divided into two sampling teams. Team A sampled upper Pajarito springs and surface waters and was led by Mr. Bret Kendrick. Team B sampled middle and lower Pajarito springs and surface waters and was led by Mr. Jim Housley. The sampling locations are presented in Figures 4 and 5.

**Middle Pajarito Canyon Springs**

TA-18 Spring is 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 an in-line 0.45 $\mu$m filter.

PA-6.7 is a surface-water sampling station located in middle Pajarito Canyon, just below its confluence with Twomile Canyon. The samples were 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 an in-line 0.45 $\mu$m filter.

**Upper Pajarito Canyon Springs and Surface Waters**

Homestead Spring is located in upper 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 an in-line 0.45 $\mu$m filter.

Starmer's Spring is located in Starmer Gulch, an informally named southern tributary to upper 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 an in-line 0.45 $\mu$m filter.

Bulldog Spring and Kieling Spring are located in a small tributary to Pajarito Canyon informally named "Arroyo deLaDelfe" and "North Ancho East Basin." 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 an in-line 0.45 $\mu$m filter.

BU-0.01 is a surface-water sampling station located at the mouth of "Arroyo de LeDelfe," and was sampled 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 an in-line 0.45 $\mu$m filter.

PA-8.9 is another surface-water sampling station located in upper Pajarito Canyon, just below its confluence with Starmer Gulch, and was sampled using a peristaltic pump in the manner mentioned for BU-0.01 above.

All spring sample containers were filled beginning 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 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 waste generated during sampling activities were managed by LANL.

### 2.4.2 Deviations from the Field Sampling Plan

Two springs and one area of spring-fed surface water which were to be sampled were found to be either dry or to have such low flow that no sample was collected. They were: Threemile (B) Spring, Charlie's Spring, and Stream Area TM-0.4.

## 2.5 Sediment

The collection and analysis of sediment samples was 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 seven canyons to acquire a total of fifty samples. Depending on the canyon, sediment samples were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, gamma spectroscopy, isotopic uranium, and gross alpha/beta. The sediment sampling locations were selected by EPA and NMED personnel.

Ten sediment samples were to be collected from Acid Canyon; ten from Bayo Canyon; ten from Sandia Canyon; five from Mortandad Canyon; five from Cañada del Buey; five from Pajarito Canyon, and five from Ancho Canyon. The sediment sample locations can be viewed in Figures 6 through 10.

### 2.5.1 Sediment Sampling Procedures

The sediment sampling areas were located on stream banks 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. If there was an excess of gravel and rootlets in the sediment, the sample was sieved before containerizing. 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 waste generated during sampling activities were managed by LANL.

### 2.5.2 Deviations From Field Sampling Plan

The following deviations from the field sampling plan occurred:

- Six samples were collected from Sandia Canyon instead of the planned ten.
- Four samples were collected in Bayo Canyon instead of the planned ten.
- Six samples were collected in Mortandad Canyon instead of the planned five.
- Nine samples were collected from Cañada del Buey instead of the planned five.
- Four samples were collected from Pajarito Canyon instead of the planned five.

THIS PAGE INTENTIONALLY LEFT BLANK

# 3.0 LABORATORY RESULTS SUMMARY

## 3.1 Effluent Sampling Results

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

One effluent sample was 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 2). The sample was analyzed for total metals/mercury, dissolved cations, anions, ammonia, TKN, nitrate/nitrite, total phosphorous, perchlorate, strontium-90, low-level tritium, and stable nitrogen isotopes. Analytical results obtained from these samples are presented in Tables 6 through 9 and in Appendix F.

Inorganic results for total metals identified six analytes at concentrations greater than the detection limits and results for dissolved cations identified seven inorganic analytes at concentrations greater than detection limits. There were no concentrations of inorganic or dissolved cations detected which exceeded the EPA drinking water standards or MSSLs. Results of the total metals and dissolved cations analyses are summarized in Tables 6 and 7 respectively.

The TA-50 sample, GS-1, was analyzed for general chemistry parameters as specified by EPA. These parameters included ammonia, bicarbonate, carbonate, TKN, nitrate/nitrite, total phosphorous, inorganic chloride, fluoride, sulfate, perchlorate, and stable nitrogen isotope ratios. Results of these analyses are summarized in Table 8.

The TA-50 sample, GS-1, was analyzed for radiochemistry as specified by EPA. These radionuclides include Strontium-90 (Sr-90), and Tritium ($H^3$). Results of these analyses are summarized in Table 9.

## 3.2 Groundwater Sampling Results

### 3.2.1 Mortandad Canyon

Eight groundwater wells located in Mortandad Canyon were sampled (Figure 3). Seven of the eight were monitoring wells completed in the shallow aquifer (water table at depths ranging from 6 to 60 feet bgs) and one well (TW-8) was completed in the main aquifer (water table at approximately 1,000 feet bgs). Samples collected from these wells were analyzed for total metals, mercury, anions, ammonia, TKN, nitrate/nitrite, total phosphorous, perchlorate, low-level tritium, stable nitrogen isotopes, strontium-90, and dissolved cations. Analytical results obtained from these samples are presented in Tables 6 through 9 and in Appendix F.

Inorganic results for total metals identified twelve inorganic analytes at concentrations greater than the detection limits and results for dissolved metals identified nine inorganic analytes at concentrations greater than detection limits. Total arsenic was detected at concentrations of 3.3 $\mu g/\ell$ in MCO-1 to 13.4 $\mu g/\ell$ in MCO-2. The EPA drinking water standard is .05 $\mu g/\ell$. Total

cadmium was detected at a concentration of 7.6 $\mu$g/ℓ in MCO-7 which exceeded the EPA and NMED drinking water standard of 5 $\mu$g/ℓ. Total thallium concentrations were detected ranging from 2.4 $\mu$g/ℓ to 5.4 $\mu$g/ℓ in MCO-1, MCO-2, MCO-3, MCO-6, MCO-7, and MT-4, which exceeded the EPA and NMED drinking water standard of 2 $\mu$g/ℓ. Dissolved iron was detected in MCO-2 at a concentration of 12,400 $\mu$g/ℓ which exceeded the EPA MSSL of 11,000. Dissolved manganese was detected at a concentration of 1,730 $\mu$g/ℓ which exceeds the EPA MSSL of 1,700 $\mu$g/ℓ. Results of the total metals and dissolved metals analyses are summarized in Table 6 and Table 7 respectively.

All of the Mortandad Canyon groundwater samples were analyzed for general chemistry parameters as specified by EPA. These parameters included ammonia, bicarbonate, carbonate, TKN, nitrate/n nitrite, total phosphorous, inorganic chloride, fluoride, sulfate, perchlorate, and stable nitrogen isotope ratios. Elevated nitrate plus nitrite was found in 4 of the 7 shallow monitoring wells, with 3 wells (MCO-6, MCWB-7.7B, and MT-4) exceeding the EPA and NM drinking water standard of 10 mg/ℓ. Perchlorate was found in 6 of the 7 shallow monitoring wells, exceeding the EPA provisionary drinking water standard of 4-18 ug/ℓ. No perchlorate or nitrate plus nitrite was detected in well TW-8, which is completed in the regional/deep drinking water aquifer. Results of these analyses are summarized in Table 8.

NMED and LANL reported that the preliminary analytical results for perchlorate collected from monitoring wells completed in the shallow alluvial aquifer in Mortandad Canyon appear too high. As a result, a chemist on staff with TechLaw performed a cursory review of the analytical data for the perchlorate results in question. Based on the cursory review, he concluded that two scenarios are possible: 1) the results are correct or 2) the results are biased high based on resolution problems of the analytical instruments. In any case, these analytical results, and those results reported by NMED and LANL, support the presence of perchlorate in the shallow alluvial aquifer at concentrations exceeding the EPA provisionary drinking water standard.

All of the Mortandad Canyon groundwater samples were analyzed for radiochemistry as specified by EPA. These radionuclides include Strontium 90 (Sr-90), and Tritium ($H^3$). Elevated tritium above background levels was detected in all of the shallow monitoring wells (except MCO-2). One monitoring well, MT 4, at 20,004 pCi/ℓ, exceeded both the EPA and NMED drinking water standard (20,000 pCi/ℓ). Elevated Sr-90 was detected above background in 4 of the 7 shallow monitoring wells. Monitoring wells MCO-3, MCO-5, and MCO-6 exceeded the EPA and NMED drinking water standard for SR-90 (8 pCi/ℓ), with the results ranging from 44.6 pCi/ℓ to 84 pCi/ℓ. No elevated tritium or Sr-90 was found in monitoring well TW-8, which is completed in the regional drinking water aquifer. The results of these analyses are summarized in Table 9.

### 3.2.2 Drinking Water Production Wells

Four production wells were sampled. Two of the production wells, PM-2 and PM-5, in the regional aquifer were sampled for VOCs, total barium, perchlorate, and explosives.

Analysis of PM-2 detected three compounds with VOC concentrations above detection limits. 1,2-dichloroethene was detected at 6 $\mu$g/ℓ which is below the EPA drinking water standard of 7 $\mu$g/ℓ. Trichloroethene was detected at 4 $\mu$g/ℓ which is below the EPA drinking water standard of 5 $\mu$g/ℓ. 4-methyl-2-pentanone was detected at 26 $\mu$g/ℓ which is below the EPA MSSL of 160 $\mu$g/ℓ. There is no EPA drinking water standard associated with this compound. Results of VOC analysis are presented in Table 5.

There was one inorganic analyte from PM-2 which detected a concentration higher than the detection limit; however, no concentrations of inorganic analytes were above regulatory limits. The results for total metals are shown in Table 6.

Analysis of PM-5 detected VOC concentrations above the detection limits for three compounds. A concentration of 1,2-dichloroethene was detected at 5 $\mu$g/ℓ which is below the EPA drinking water standard of 7 $\mu$g/ℓ. Trichloroethene was detected at 3 $\mu$g/ℓ which is below the EPA drinking water standard of 5 $\mu$g/ℓ. 4-methyl-2-pentanone was detected at a concentration of 24 $\mu$g/ℓ which is below the EPA MSSL of 160 $\mu$g/ℓ. There is no EPA drinking water standard associated with this compound. Results of VOC analysis are presented in Table 5.

There was one inorganic analyte from PM-5 which detected a concentration higher than the detection limit; however, no concentrations of inorganic analytes were above regulatory limits. The results for total metals are shown in Table 6.

The last two production wells, O-4 and PM-1, were analyzed for nitrate/nitrite, total phosphorous, ammonia, TKN, total arsenic, total uranium, perchlorate, and strontium-90. None of these wells had constituents above EPA drinking water standards. The results of these analyses can be viewed in Tables 6 through 8.

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

One groundwater well located behind building SM-30 at TA-3 was sampled. The well, 03-MW-1, was sampled for VOCs, dissolved cations, anions, perchlorate, and low-level tritium. Analytical results obtained from these samples are presented in Tables 5 through 9 and in Appendix F.

VOC concentrations found in the well above the EPA drinking water standards include: 1,1-dichloroethene at 510 $\mu$g/ℓ, 1,1-dichloroethane at 340 $\mu$g/ℓ, 1,2-dichloroethene at 120 $\mu$g/ℓ, chloroform at 47 $\mu$g/ℓ, 1,1,1-trichloroethane at 22,000 $\mu$g/ℓ, 1,2-dichloroethane at 200 $\mu$g/ℓ, and trichloroethene at 310 $\mu$g/ℓ. Results of VOC analysis are presented in Table 5.

Results for dissolved cations revealed nine analytes with concentrations above detection limits; however, there were no detections which exceeded the established EPA MSSLs for these analytes. Results of the dissolved cations analysis are presented in Table 7.

The samples were analyzed for general chemistry parameters as specified by EPA. These parameters included bicarbonate, carbonate, inorganic chloride, fluoride, sulfate, and perchlorate. Results of these analyses are summarized in Table 8.

Tritium was detected at a concentration of 1,804 pCi/ℓ in monitoring well 03-MW-1, which is elevated above background levels (see Table 9), but does not exceed the EPA drinking water standard of 20,000 pCi/l.

### 3.2.4 Comparison of Groundwater Results

Analytical results for groundwater samples collected during the sampling event are presented in Tables 5 through 10. 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

Five springs and three spring fed surface water bodies were sampled throughout the Pajarito Canyon watershed. The samples collected from the springs were analyzed for anions, ammonia, TKN, nitrate/nitrite, total phosphorous, perchlorate, explosives, and dissolved cations. Analytical results obtained from these samples are presented in Tables 7, 8, and 10, and in Appendix F.

No explosives were detected at concentrations above detection limits in the samples collected from springs and surface water bodies.

Inorganic results for dissolved cations concentrations identified nine inorganic analytes at concentrations greater than detection limits; however, there were no concentrations of dissolved cations that exceeded established regulatory limits. Results of dissolved cation analyses are presented in Table 7.

## 3.4 Sediment Sampling Results

### 3.4.1 Acid Canyon

Ten sediment samples were collected throughout Acid Canyon as presented in Figure 6. The samples were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, and gamma spec. Analytical results obtained from these samples are presented in Tables 11 through 13.

PCB contamination was detected in Acid Canyon in the form of Aroclor-1254 in concentrations ranging from 37 $\mu g/\ell$ to 635 $\mu g/\ell$; however, there were no detections exceeding EPA Region 6 residential soil standards. Detection limits of the Aroclors ranged from 34 to 44 $\mu g/\ell$. Results of PCB analyses are presented in Table 12.

Inorganic analytical results for total metals identified fifteen analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the Acid Canyon sediment samples were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, strontium-90, cesium-137, actinium-228, americium-241, lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. Seven out of the 11 samples collected for plutonium-239/240 analysis exhibited concentrations above EPA residential soil standards (2.5 pCi/g), ranging from 27.5 pCi/g to 184 p/g. Nine out of eleven samples taken were above background values established by LANL. Four out of eleven samples collected for cesium-137 analysis exhibited concentrations above background values established by LANL (.9 pCi/g) and were also above the EPA residential soil standard. Cesium-137 concentrations for these samples ranged from .93 pCi/g to 7.10 pCi/g. Six of the eleven samples collected for americium-241 analysis exhibited concentrations above EPA residential soil standards (1.9 pCi/g). Americium-241 concentrations detected for these samples ranged from 3.35 pCi/g to 29.3 pCi/g. One (20.7 pCi/l) out of eleven soil samples analyzed for Strontium 90 exceeded EPA residential soil standards (14 pCi/l). All of the samples collected for potassium-40 analysis exhibited concentrations above EPA soil standards, however, the established natural background concentration in soils at LANL for Potassium 40 is 38.6 pCi/g, which is above the EPA residential soil standard. Results of these analyses are summarized in Table 13. A comparison of preliminary analytical results of radionuclides collected by EPA, NMED, and LANL is presented in Appendix E.

### 3.4.2 Bayo Canyon

Four sediment samples were collected throughout Bayo Canyon and are presented in Figure 7. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, isotopic uranium gross alpha/beta, and gamma spec. Analytical results obtained from these samples are presented in Tables 11 through 13.

Depending on the specific Aroclor, detection limits ranged from 32 to 34 $\mu g/\ell$. Sediment sample BC-2 detected Aroclor-1260 at 39 $\mu g/\ell$. No other PCBs were detected above the detection limits in the samples collected from Bayo Canyon. Results of these analyses are presented in Table 12.

Inorganic analytical results for total metals identified twelve analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the Bayo Canyon sediment samples were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, uranium-234, uranium-

235, uranium-238, strontium-90, gross alpha/beta, cesium-137, actinium-228, americium-241, lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. All samples collected for cesium-137 and potassium-40 analysis exhibited concentrations above EPA residential soil standards; however, all of the detected concentrations were below the background values established by LANL. Results of these analyses are summarized in Table 13.

### 3.4.3 Sandia Canyon

Six sediment samples were collected throughout Sandia Canyon and are illustrated in Figure 8. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium, isotopic uranium, and gross alpha/beta. Analytical results of these samples are presented in Tables 11 through 13.

PCB contamination in the form of Aroclor1260 was detected in Sandia Canyon. The concentrations ranged from 48 $\mu g/\ell$ to 140 $\mu g/\ell$ with detection limits ranging from 33 to 35 $\mu g/\ell$. No other PCBs were detected above the detection limits in the samples collected from Sandia Canyon. Results of PCB analyses are presented in Table 12.

Inorganic analytical results for total metals identified twelve analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the Sandia Canyon sediment samples were analyzed for radiochemistry as specified by EPA. These radionuclides include Uranium-234, Uranium-235, Uranium-238, and Gross Alpha/Beta. None of the samples collected exceeded the background values established by LANL. Results of these analyses are summarized in Table 13.

### 3.4.4 Mortandad Canyon

Six sediment samples were collected throughout Mortandad Canyon and are presented in Figure 8. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, isotopic uranium, gamma spec., and gross alpha/beta. Analytical results obtained from these samples are presented in Tables 11 through 13.

There were no PCBs above detection limits in the samples collected from Mortandad Canyon. The detection limits for samples from Mortandad Canyon ranged from 31 to 34 $\mu g/\ell$. Results of PCB analysis are presented in Table 12.

Inorganic analytical results for total metals identified eleven analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the Mortandad Canyon sediment samples were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, uranium-234, uranium-235, uranium-238, strontium-90, gross alpha/beta, cesium-137, actinium-228, americium-241,

lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. Two samples collected for plutonium-239/240 analysis exhibited concentrations above EPA residential soil standards and background values established by LANL. Plutonium-239/240 concentrations detected for these samples ranged from 67 pCi/g to 106 pCi/g. However, EPA believes that these two results were mistakenly switched by the analytical lab (contracted by Tech Law) with the two soil samples (ACS-12-1 and ACS-12-2) collected from Acid Canyon. Therefore, EPA believes that the plutonium-239/240 is not present in samples MC-5A & MC-5B at concentrations above EPA residential soil standards and background values established by LANL. Three samples collected for cesium-137 analysis exhibited concentrations above EPA residential soil standards. However, none of these samples collected for cesium-137 analysis exhibited concentrations above the background values established by LANL. Cesium-137 concentrations detected in these samples ranged from 0.124 pCi/g to 0.44 pCi/g. All of the samples collected for potassium-40 analysis exhibited concentrations above EPA residential soil standards; however, all of the detected concentrations were below the background values established by LANL. Results of these analyses are summarized in Table 13.

### 3.4.5 Cañada del Buey

Nine sediment samples were collected throughout Cañada del Buey and are illustrated in Figure 9. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, isotopic uranium, gamma spec., and gross alpha/beta. Analytical results obtained from these samples are presented in Tables 11 through 13.

There were no PCBs above detection limits in the samples collected from Cañada del Buey. The detection limits for samples collected from Cañada del Buey ranged from 35 to 41 $\mu g/\ell$. Results of PCB analysis are presented in Table 12.

Inorganic analytical results for total metals identified thirteen analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the sediment samples at Cañada del Buey were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, uranium-234, uranium-235, uranium-238, strontium-90, gross alpha/beta, cesium-137, actinium-228, americium-241, lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. Four samples collected for cesium-137 analysis and nine samples collected for potassium-40 analysis exhibited concentrations above EPA residential soil standards; however, all of the detected concentrations were below the background values established by LANL. Results of these analyses are summarized in Table 13.

### 3.4.6 Pajarito Canyon

Four sediment samples were collected throughout Pajarito Canyon and are shown in Figure 9. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium,

strontium-90, isotopic plutonium, isotopic uranium, gamma spec., and gross alpha/beta. Analytical results obtained from these samples are presented in Tables 11 through 13.

There were no PCBs above detection limits in the samples collected from Pajarito Canyon. The detection limits for samples collected from Pajarito Canyon ranged from 32 to 38 $\mu g/\ell$. Results of PCB analysis are presented in Table 12.

Inorganic analytical results for total metals identified fifteen analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the sediment samples at Pajarito Canyon were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, uranium-234, uranium-235, uranium-238, strontium-90, gross alpha/beta, cesium-137, actinium-228, americium-241, lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. Three samples collected for cesium-137 analysis and four samples collected for potassium-40 analysis exhibited concentrations above EPA residential soil standards; however, all of the detected concentrations were below the background values established by LANL. Results of these analyses are summarized in Table 13.

### 3.4.7 Ancho Canyon

Five sediment samples were collected throughout Ancho Canyon and are illustrated in Figure 10. The samples collected from the canyon were analyzed for PCBs, total metals, total uranium, strontium-90, isotopic plutonium, isotopic uranium, gamma spec., and gross alpha/beta. Analytical results obtained from these samples are presented in Tables 11 through 13.

There were no PCBs above detection limits in the samples collected from Ancho Canyon. The detection limits for samples collected from Ancho Canyon ranged from 31 to 34 $\mu g/\ell$. Results of PCB analysis are presented in Table 12.

Inorganic analytical results for total metals identified fifteen analytes at concentrations greater than the detection limits; however, none of the analytes were detected at concentrations above EPA residential soil standards. Results of inorganic analyses are presented in Table 11.

All of the sediment samples at Ancho Canyon were analyzed for radiochemistry as specified by EPA. These radionuclides include plutonium-238, plutonium-239/240, uranium-234, uranium-235, uranium-238, strontium-90, gross alpha/beta, cesium-137, actinium-228, americium-241, lead-210, lead-212, lead-214, potassium-40, thallium-208, and thorium-234. Five samples collected for cesium-137 analysis and five samples collected for potassium-40 analysis exhibited concentrations above EPA residential soil standards; however, all of the detected concentrations were below the background values established by LANL. Results of these analyses are summarized in Table 13.

# 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 for this work assignment. The types of QC samples collected included field duplicate samples, field blank samples, matrix spike/matrix spike duplicate samples, equipment blanks, and trip blanks. Dependent on the location sampled, QC samples were analyzed for VOCs, total metals, dissolved metals, general chemistry, dissolved uranium isotopes, dissolved strontium-90, gross alpha, gross beta, stable nitrogen isotopes, and tritium.

Field Duplicate Samples

The purpose of the field duplicate samples is to verify laboratory analytical procedures and sampling techniques. Two field duplicate samples were collected of groundwater, one in Mortandad Canyon (MCO-1) and one (SD-30) in TA-3 behind building SM-30 at 03-MW-1. These samples were collected concurrently with samples MCO-3 and SM-30 by alternating the filling 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 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.

Four field duplicates samples were collected of sediment. ACS-18-3 was collected as a duplicate of ACS-18-1, BC-5 was collected as a duplicate of BC-2, CC-9 was collected as a duplicate of CC-2, and PC-5 was collected as a duplicate of PC-2. These samples were collected concurrently with its corresponding sample by alternating the filling sample containers. These 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 shipped to the analytical laboratory for analysis.

Field Blank Samples

The purpose of the field blank samples was to check for contamination resulting from ambient conditions. Two field blank samples (MCO-FB and FB-6.7) were collected during the sampling operations conducted at the LANL facility. These samples were collected by pouring reagent grade water into appropriate sample containers. The sample containers were filled slowly to avoid aeration. 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.

Matrix Spike/Matrix Spike Duplicate Samples

These samples were collected to ensure that the laboratory had sufficient volume of sample material to conduct matrix spike and matrix spike duplicate sample analysis for QC purposes. 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 one extra sample container for each analytical parameter. The locations where these samples were collected were MCO-5, TA-18, and SM-30. 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.

Four matrix spike/matrix spike duplicate samples were collected for sediment during the sampling operations conducted at the LANL facility. These samples were collected by filling one extra sample container for total metals and PCB analyses. The locations where these samples were collected were ACS-48, SC-6, CC-4, and AC-5. 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.

Trip Blank Samples

The purpose of the trip blank samples was 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. One trip blank sample was submitted to the analytical laboratory. The trip blank sample was placed inside the sample cooler shipped to the laboratory which contained sample(s) to be analyzed for VOCs.

Equipment Rinsate Blanks

The purpose of the equipment rinsate blank is to measure the efficiency of the decontamination process. Three equipment rinsate blanks were collected after sampling equipment was used and decontaminated. These samples were collected by using the rinsate to fill one extra container for each analytical parameter. The samples were labeled as ACS-EB, CC-EB, and AC-EB.

## 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 two field duplicate samples were collected for groundwater instead of the three samples required because of dry and low yielding groundwater wells and slow recovery rates. The Field Sampling Plan required one field duplicate sample to be collected for every ten samples collected (10%).

- Only four field duplicate samples were collected for sediment 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 two field blank samples were collected instead of the seven samples required because of a lack of reagent grade water. The Field Sampling Plan required one field blank sample to be collected for every ten samples collected (10%).

- Only four matrix spike/matrix spike duplicate samples were collected for sediment 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: Quanterra Laboratory in Earth City, Missouri, Southwest Laboratories in Oklahoma, Coastal Science Laboratories, Inc. in Austin, Texas, and American Analytical and Technical Services, Inc. located in Baton Rouge, Louisiana.

The following identifies the analyses, analytical methods used, and the corresponding laboratory performing the analyses.

| Parameter | Method Number | Laboratory |
|---|---|---|
| Chloride | EPA 300.0 | Southwest-Oklahoma |
| Fluoride | EPA 300.0 | Southwest-Oklahoma |
| Sulfate | EPA 300.0 | Southwest-Oklahoma |
| Bicarbonate Alkalinity | EPA 300.0 | Southwest-Oklahoma |
| Metals (Total & Mercury) | SW-846 6010B/7470 | Southwest-Oklahoma |
| Ammonia Nitrogen | EPA 350.3 | Southwest-Oklahoma |
| Nitrate/Nitrite Nitrogen | EPA 353.2 | Southwest-Oklahoma |
| Total Kjedahl Nitrogen | EPA 351.3 | Southwest-Oklahoma |
| Total Phosphorous | EPA 365.2 | Southwest-Oklahoma |
| Volatile Organic Compounds | SW-846 8260B | Southwest-Oklahoma |
| PCBs | SW-846 8082A | Southwest-Oklahoma |
| Gamma Spec. | EPA 901.1 | Quanterra-Earth City |
| Gross Alpha/Beta | EPA 900.0 | Quanterra-Earth City |
| Isotopic Plutonium | EPA 908.0 | Quanterra-Earth City |
| Isotopic Uranium | EPA 908.0 | Quanterra-Earth City |
| Strontium-90 | ASTM 05811-95 | Quanterra-Earth City |
| Tritium | EPA 906.0 | Quanterra-Earth City |
| Stable Nitrogen Isotopes | Isotopic Speciation | Coastal Laboratories |
| Perchlorate | EPA 300 | American Analytical |

## 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 quality control check 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 reported in this report has not been validated and should be treated as such.

# 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 from December 6 to December 17, 1999. TechLaw also collected sediment samples in Acid Canyon, Sandia Canyon, Bayo Canyon, Mortandad Canyon, Cañada del Buey, Pajarito Canyon, and Ancho 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 5 through Table 13. Tables comparing analytical results from split samples collected during the field activities are presented in Appendix E. These tables compare the analytical results of split samples collected by NMED and LANL personnel to the EPA results. 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 Samples

Analytical results from effluent samples collected at GS-1 indicate the effluent from the TA-50 Radioactive Wastewater Treatment Plant had a strontium-90 concentration of 11pCi/ℓ which exceeds the 8 pCi/ℓ limit established by EPA for drinking water. However, radionuclides identified under the Atomic Energy Act, are currently excluded from EPA regulation. However, the newly issued EPA discharge permit does require LANL to sample for tritium.

Also, perchlorate was found in the effluent sample at 1,500 $\mu$g/ℓ. The provisionary EPA standard for drinking water is currently 4-18 $\mu$g/ℓ. Perchlorate was not analyzed by EPA in the 1998 effluent samples. In addition, it should be pointed out that the EPA perchlorate samples contained higher concentrations than the sample results obtained by LANL and NMED, which generally range from 25-500 $\mu$g/ℓ. However, perchlorate still exists in the discharged effluent at concentrations above the EPA provisionary drinking water standard. EPA intends to collect additional effluent samples in 2001.

### 5.2.2 Groundwater Samples

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, and Pajarito Canyon were identified and are discussed below.

- Elevated nitrate/nitrite as nitrogen concentrations (11.4 mg/ℓ to 24.5 mg/ℓ) within the alluvial aquifer of Mortandad Canyon were identified. These elevated concentrations are above the New Mexico Maximum Contaminant Level (10 mg/ℓ) and are attributable to past effluent discharges from the TA-50 Radioactive Wastewater Treatment Plant (WWTP).

- Elevated total cadmium was identified in one of the seven of the monitoring wells sampled from the alluvial aquifer in Mortandad Canyon. This concentration (7.6$\mu$g/ℓ) was slightly above the EPA and NMED drinking water standard (5ug//l). Cadmium was not analyzed in the 1998 EPA sampling event.

- Elevated total thallium concentrations (2.4 $\mu$g/ℓ to 5.4 $\mu$g/ℓ) within the alluvial aquifer of Mortandad Canyon were identified. Analytical results reveal that the concentrations are slightly above the EPA and NMED drinking water standard of 2$\mu$g/ℓ. Thallium was not analyzed in the 1998 EPA sampling event.

- Elevated tritium concentrations were detected in monitoring well MT-4 which exceeded the EPA and NMED drinking water standard (20,000 pCi/l). Adjacent wells also contain elevated tritium levels above background which can be attributed to the TA-50 wastewater releases.

- Elevated strontium-90 concentrations (44.6 pCi/ℓ to 84 pCi/ℓ) within the alluvial aquifer of Mortandad Canyon were identified in 3 of the 7 monitoring wells. These concentrations were above the EPA and NMED drinking water standard (8 pCi/l), as well as the DOE standard for drinking water systems (40 pCi/l). These elevated concentrations are a result of the TA-50 effluent discharges.

- Perchlorate was found in all of the alluvial monitoring wells (except MCO-2, which is hydraulically upgradient of the effluent discharge) in Mortandad Canyon. The concentrations ranged from 1,100 $\mu$g/ℓ to 4,400 $\mu$g/ℓ. The EPA provisionary drinking water standard is 4-18 $\mu$g/ℓ. As was the case with the effluent result, it appears that the EPA analytical results may be high in comparison to the results obtained by NMED and LANL. LANL and NMED perchlorate results over the past year have generally ranged from 50 $\mu$g/ℓ to 450 $\mu$g/ℓ in the alluvial monitoring wells, which exceeds the EPA provisionary drinking water standard.

### 5.2.3 Spring and Surface Water Samples

Analytical results of spring samples collected from Pajarito Canyon revealed no elevated contaminant levels of any analytes above regulatory limits.

### 5.2.4 Sediment Samples

Analytical results from sediment samples collected from Acid Canyon, Sandia Canyon, Bayo Canyon, Mortandad Canyon, Cañada del Buey, Pajarito Canyon, and Ancho Canyon contained radionuclides which exceeded EPA residential soil standards. However, only Acid Canyon had radionuclides exceedances which can be attributed to LANL operations. The radionuclides found in the other canyons are found naturally in the soils surrounding LANL and are within the established background concentrations for those radionuclides.

- Acid Canyon contained radionuclides with levels above the EPA residential soil standards. These radionuclides include plutonium-239/240 (27.5 pCi/g to 184 pCi/g), cesium-137 (0.079 pCi/g to 7.10 pCi/g), americium-241 (3.30 pCi/g to 29.3 pCi/g), lead-210 (1.55 pCi/g to 2.4 pCi/g), and potassium-40 (26.0 pCi/g to 32.7 pCi/g). However, it should be noted that lead-210 and potassium-40 are radionuclides found in nature with the concentrations being lower than established background concentrations.

- Sandia Canyon contained one radionuclide, uranium-235, which was above the EPA residential soil standard at a concentration of 0.16 pCi/g; however, the concentration found was below the LANL established background concentration of 0.2 pCi/g.

- Bayo Canyon contained three radionuclides which exceeded the EPA residential soil standards. These radionuclides include cesium-137 (0.06 pCi/g to 0.83 pCi/g), lead-210 (1.9 pCi/g to 4.0 pCi/g), and potassium-40 (26.8 pCi/g to 32.6 pCi/g; however, the concentrations found were below the LANL established background concentrations for those radionuclides.

- Mortandad Canyon contained four radionuclides which exceeded the EPA residential soil standards. These radionuclides include plutonium 239/240 (67 pCi/g to 106 pCi/g), cesium-137 (0.124 pCi/g to 0.44 pCi/g), lead-210 (1.5 pCi/g to 3.7 pCi/g), and potassium-40 (26.9 pCi/g to 32.8 pCi/g). In regard to the plutonium exceedances, after carefully reviewing the results from Acid Canyon and Mortandad Canyon and comparing the results with samples collected by NMED and LANL, EPA believes that the plutonium results were mistakenly switched (by the analytical laboratory) with the two plutonium results collected from Acid Canyon, samples ASC-12-1 and ASC-12-2. In addition, NMED OB personnel re-sampled Station MC-5A on December 29, 2000. Results from this re-sampling indicate that concentrations of plutonium-239/240, plutonium-238, cesium-137, strontium-90, and americium-241 are at or below the LANL established background concentrations.

- Cañada del Buey contained three radionuclides which were above the EPA residential soil standards. These radionuclides include cesium-137 (0.10 pCi/g to 0.21 pCi/g), lead-210 (1.5 pCi/g to 3.8 pCi/g), and potassium-40 (21.0 pCi/g to 35.7 pCi/g). However, for cesium-137 and potassium-40 the results were below the established background concentrations at LANL for those radionuclides.

- Pajarito Canyon contained three radionuclides which were above the EPA residential soil standard. These radionuclides include cesium-137 (0.052 pCi/g to 0.41 pCi/g), lead-210 (2.5 pCi/g to 3.4 pCi/g), and potassium-40 (20.1 pCi/g to 25.3 pCi/g). However, for cesium-137 and potassium-40 the results are below the established background concentrations at LANL for those constituents.

- Ancho Canyon contained three radionuclides which were above the EPA residential soil standards. These radionuclides include cesium-137 (0.16 pCi/g to 0.39 pCi/g), lead-210 (2.9 pCi/g to 4.2 pCi/g), and potassium-40 (22.2 pCi/g to 29.9 pCi/g). However, the cesium-137 and potassium-40 results are within the LANL established background concentrations for those radionuclides.

### 5.2.5 Drinking Water Production Wells

Four production/drinking water wells were sampled: PM-1, PM-2, PM-5 and O-4. None of the wells contained radionuclides or hazardous constituents above EPA drinking water standards. However, two wells had organic constituents detected slightly below the EPA drinking water standards.

- Production well PM-2 had three volatile organics detected above the analytical detection limit but below EPA drinking water standards. They are: 1,2-dichloroethane at 6 $\mu$g/ℓ with a EPA drinking water standard of 7 $\mu$g/ℓ; trichloroethene at 4 $\mu$g/ℓ with a EPA drinking water standard of 5 $\mu$g/ℓ; 4-methyl-2-pentanone at 26 $\mu$g/ℓ, there is currently no EPA drinking water standard for this constituent, but there is a EPA media specific screening level number of 160 $\mu$g/ℓ.

- Production well PM-5 had three volatile organics detected above the analytical detection limit but below EPA drinking water standards. They are: 1,2-dichloroethane at 5 $\mu$g/ℓ with a EPA drinking water standard of 7 $\mu$g/ℓ; trichloroethene at 3 $\mu$g/ℓ with a EPA drinking water standard of 5 $\mu$g/ℓ; 4-methyl-2-pentanone at 24 $\mu$g/ℓ, there is currently no EPA drinking water standard for this constituent, but there is a EPA media specific screening level number of 160 $\mu$g/ℓ.

### 5.2.6 Technical Area 3 Monitoring Well

One groundwater well (03-MW-1) located behind building SM-30 in TA-3 was sampled. The well contained hazardous constituents above the EPA drinking water standards and had elevated tritium above background levels.

- The following volatile organics were detected above EPA drinking water standards: 1,1-dichloroethene at 510 $\mu$g/ℓ with an EPA drinking water standard of 7 $\mu$g/ℓ; 1,2-dichloroethene at 120 $\mu$g/ℓ with an EPA media specific screening level of 61 $\mu$g/ℓ;trichloroethane at 22,000 $\mu$g/ℓ with an EPA drinking water standard of 200 $\mu$g/ℓ; 1,2-dichloroethane at 200 $\mu$g/ℓ with an EPA drinking water standard of 5 $\mu$g/ℓ; and, trichloroethene at 300 $\mu$g/ℓ with an EPA drinking water standard of 5 $\mu$g/ℓ. Also, 1,1-dichloroethane was found at 340 $\mu$g/ℓ, which is below the EPA media specific screening level of 810 $\mu$g/ℓ.

- Tritium was detected at 1,804 pCi/ℓ which is below the EPA drinking water standard but above background levels.

THIS PAGE INTENTIONALLY LEFT BLANK

## 6.0 RECOMMENDATIONS

In general, the alluvial groundwater in Mortandad Canyon exceeded the EPA drinking water standards (known as MCL's) for strontium-90, nitrates, and perchlorate. Perchlorate was not analyzed in the 1998 sampling event conducted by EPA (TechLaw); however, it is likely that the contaminant has been present for several years. The major source of the contamination is the TA-50 Radioactive Wastewater Treatment Plant, which as been in operation since the mid 1960's. Currently, the groundwater from the alluvial aquifer is not being used for drinking water and therefore no human exposure is occurring. However, there is evidence suggesting that groundwater in the alluvial aquifer is migrating downward towards intermediate perched aquifers and potentially to the main aquifer. Recent laboratory data from LANL found perchlorate in well R-15 in a perched zone (646 ft bgs) at 12 $\mu$g/ℓ. The monitoring well TW-8, which is screened in the main aquifer, did not detect radionuclide or chemical contamination above EPA drinking water standards; however, NMED and LANL low-level tritium results (elevated levels, but well below EPA's standard of 20,000 pCi/ℓ) for TW-8 do suggest that tritium-contaminated shallow groundwater communicates (or is in communication) with the regional aquifer.

The shallow groundwater near building SM-30 in TA-3 exceeded the EPA drinking water standards for several chlorinated volatile organic constituents. The constituents are: 1,1-dichloroethene, 1,2 dichloroethene, chloroform, trichloroethane, 1,2-dichloroethane, and trichloroethene. The vertical and horizontal extent of the groundwater contamination in this area has not been determined.

Four production/drinking water wells were sampled and none of the wells contained radionuclides or hazardous constituents above EPA drinking water standards. However, two wells (PM-2 & PM-5) had chlorinated volatile organic constituents detected slightly below the EPA drinking water standards.

The springs and surface water bodies sampled in Pajarito watershed contained no chemical constituents above EPA drinking water standards.

The south fork of Acid Canyon contained three radionuclides with levels above the EPA residential soil standards. These radionuclides include: plutonium-239/240, cesium-137, and americium-241. The source of this contamination was a former LANL outfall that released untreated radioactive waste in the late 1940's. This area was partially excavated by DOE in 1960's and 1970's. Acid Canyon is currently owned by Los Alamos County.

The following are EPA recommendations pertaining to the sampling performed at LANL in December of 1999:

- LANL should minimize the amount of perchlorate waste being sent to the TA-50 Wastewater Treatment Plant and continue the minimization of radioactive waste. Perchlorate is very persistent and mobile in water and is similar to tritium in migration characteristics and is very difficult to remove. The current treatment technology at TA-

50, which is reverse osmosis, still contains perchlorate in the effluent at 24 $\mu g/\ell$ or greater. If LANL cannot reduce the concentration of perchlorate being released, then it may be necessary to add an additional treatment unit to the existing system. The EPA web site for perchlorate is www.epa.gov/ogwdw/ccl/perchlor/.html.

- LANL should perform "hot spot" removals of soils/sediments in the south fork of Acid Canyon. Removals should be based on cumulative radionuclide risk per "hot spot" using a drainage hiker scenario. At a minimum, the remaining risk levels in the soil should be no greater than $10^{-4}$ to $10^{-5}$ risk per "hot spot" location. Furthermore, consultation with NMED, Los Alamos County and the general public on the amount of soil removed and the radionuclide concentration left in place at the "hot spots" is recommended.

- The vertical and horizontal extent of soil and groundwater contamination behind building SM-30 at TA-3 needs to be addressed. Even though there was a removal of contaminated soil in the mid-1990's, monitoring well 03-MW-1 still has significant VOC contamination and there are uncertainties regarding groundwater flow and the extent of soil/groundwater contamination in this area.

- Continued characterization (lateral & vertical extent of groundwater) and monitoring of the aquifers in Mortandad Canyon is needed to understand the flow regimes and interconnection of the alluvial system with the intermediate and main aquifers. Also, LANL should work closely with NMED on groundwater models being developed at the lab.

- Periodic monitoring of the drinking water wells for chlorinated volatile organics should be continued. Low levels were detected in wells PM-2 and PM-5. Additional monitoring should verify whether the contaminants detected by EPA sampling are actually present.

## 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. 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.

THIS PAGE INTENTIONALLY LEFT BLANK

# TABLES

## TABLE 1: Participants

| Representative/Associated Agency | Name |
|---|---|
| U.S. Environmental Protection Agency, Region 6 | Rich Mayer, Work Assignment Manager |
| Los Alamos National Laboratory | David Rogers |
| | Max Maes |
| | Consuelo Montoya |
| | Danny Katzman |
| | Steve Reneau |
| | Bill Turney |
| | Harvey Decker |
| New Mexico Environment Department | Steve Yanicak, Oversight Bureau |
| | Michael Dale, Oversight Bureau |
| | Bob Wingo, Oversight Bureau |
| | Chris Hanlon-Meyer |
| | Bruce Wedgeworth |
| San Ildefonso Pueblo Department of Environmental and Cultural Preservation | Naomi Archuleta, Pueblo water quality |
| | Noah Kaniatobe, Pueblo GIS tech |
| TechLaw, Inc. | Bret Kendrick, Project Manager |
| | Jim Housley |
| Program Management Company (PMC) | Steve Calhoun |
| | Deborah Steven |
| Aurora Technical Service (ATS) | Jenny Harris |

## TABLE 2: Well Location and Time Sampled

| Well No. | Location | Aquifer Monitored | Date Sampled | Time Sampled (hours) |
|---|---|---|---|---|
| MCO-2 | Mortandad Canyon | Alluvial Aquifer | 12/07/99 | 1530 |
| MCO-3 | Mortandad Canyon | Alluvial Aquifer | 12/07/99 | 1400 |
| MCO-5 | Mortandad Canyon | Alluvial Aquifer | 12/08/99 | 1045 |
| MCO-6 | Mortandad Canyon | Alluvial Aquifer | 12/08/99 | 1200 |
| MCO-7 | Mortandad Canyon | Alluvial Aquifer | 12/08/99 | 1350 |
| MCWB-7.7B | Mortandad Canyon | Alluvial Aquifer | 12/08/99 | 1510 |
| MT-4 | Mortandad Canyon | Alluvial Aquifer | 12/07/99 | 1105 |
| TW-8 | Mortandad Canyon | Regional Aquifer | 12/08/99 | 1545 |
| PM-1 | Pajarito Mesa | Regional Aquifer | 12/13/99 | 2011 |
| PM-2 | Pajarito Mesa | Regional Aquifer | 12/13/99 | 1850 |
| PM-5 | Pajarito Mesa | Regional Aquifer | 12/13/99 | 1810 |
| O-4 | Pajarito Mesa | Regional Aquifer | 12/13/99 | 2040 |
| SM-30 | Technical Area-3 | Perched Aquifer | 12/17/99 | 1210 |

## TABLE 3: Summary of Well Information

| Well No | Location | Date Sampled | Water Level (feet) | Total Well Depth (feet) | Calculated Purge Volume (gallons) | Volume Purged (gallons) | Purge/Sample Method | Comments |
|---|---|---|---|---|---|---|---|---|
| MCO-2 | Mortandad Canyon | 12/07/99 | 6.35 | 9.25 | 0.45 | 3.94 | Peristaltic Pump | None |
| MCO-3 | Mortandad Canyon | 12/07/99 | 5.95 | 10.83 | 7 | 7.91 | Peristaltic Pump | None |
| MCO-5 | Mortandad Canyon | 12/08/99 | 26.20 | 46.00 | 22.50 | 9.94 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MCO-6 | Mortandad Canyon | 12/08/99 | 39.00 | 47.00 | 13.86 | 9.92 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MCO-7 | Mortandad Canyon | 12/08/99 | 41.73 | 69.00 | 10.36 | 14.05 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MCWB-7.7B | Mortandad Canyon | 12/08/99 | 60.08 | 70.00 | 3.76 | 9.46 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| MT-4 | Mortandad Canyon | 12/07/99 | 59.64 | 75.34 | 2.34 | 10.69 | Dedicated Bladder Pump | Sampled after first well volume purged and parameters stable. |
| TW-8 | Mortandad Canyon | 12/08/99 | NA | 1065 | NC | 530 | Dedicated Pump | Well was purged continuously for 7 hours and 6 minutes at 1 liter every 6 seconds. |
| SM-30 | Technical Area-3 | 12/17/99 | 22.27 | NA | NC | 6.74 | Peristaltic Pump | Well was developed on 12/13/99. |

NA Information not available
NC Not Calculated

## TABLE 4: Field Parameter Measurements

| Well No. | Location | Water Quality Parameter | | | | |
|---|---|---|---|---|---|---|
| | | pH[a] | Temperature[b] | Dissolved Oxygen[c] | Specific Conductivity[d] | Turbidity[e] |
| MCO-2 | Mortandad Canyon | 7.66 | 8.2 | 0.20 | 0.242 | 15 |
| MCO-3 | Mortandad Canyon | 6.17 | 4.2 | NA | 563 | NA |
| MCO-5 | Mortandad Canyon | 6.97 | 7.3 | NA | 0.400 | 1 |
| MCO-6 | Mortandad Canyon | 7.06 | 7.8 | NA | 0.413 | 1 |
| MCO-7 | Mortandad Canyon | 6.92 | 8.5 | NA | 0.509 | 5.10 |
| MCWB-7.7B | Mortandad Canyon | 6.94 | 9.0 | NA | 0.509 | 0 |
| MT-4 | Mortandad Canyon | 6.34 | 10.4 | NA | 560 | NA |
| TW-8 | Mortandad Canyon | 7.70 | 17.0 | NA | 0.112 | 1 |
| SM-30 | Technical Area-3 | 5.89 | 13.3 | 2.21 | 0.149 | 4 |

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 national turbidity units (NTUs)
NA Not available due to instrument limitations.

## TABLE 5: 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 | | | | Regional Aquifer (Production Wells) | | TA-3 Building SM-30 | | QA/QC |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | PM-2 (12/13/99) | PM-5 (12/13/99) | SM-30 (12/17/99) | SD-30[e] (12/17/99) | Trip Blank |
| Chloromethane | | 1.5 | | | <5 | <5 | <100 | <100 | <5 |
| Vinyl Chloride | 2 | 0.02 | 2 | 1 | <5 | <5 | <100 | <100 | <5 |
| Bromomethane | | 8.7 | | | <5 | <5 | <100 | <100 | <5 |
| Chloroethane | | | | | <5 | <5 | <100 | <100 | <5 |
| 1,1-Dichloroethene | 7 | 0.046 | 7 | 5 | <5 | <5 | **510** | <100 | <5 |
| Acetone | | 610 | | | <5 | <5 | <100 | <100 | <5 |
| Carbon Disulfide | | 1000 | | | <5 | <5 | <100 | <100 | <5 |
| Methylene Chloride | | 4.3 | | 100 | <5 | <5 | <100 | <100 | <5 |
| 1,1-Dichloroethane | | 810 | | 25 | <5 | <5 | **340** | <100 | <5 |
| 1,2-Dichloroethene | 7 | 61 | | | 6 | 5 | **120** | **110** | <5 |
| 2-Butanone | | 1900 | | | <5 | <5 | <100 | <100 | <5 |
| Chloroform | | 0.16 | | 100 | <5 | <5 | **47 J** | <100 | <5 |
| 1,1,1-Trichloroethane | 200 | 790 | 200 | 60 | <5 | <5 | **22000 E** | **1200** | <5 |
| Carbon Tetrachloride | 5 | 0.17 | 5 | 10 | <5 | <5 | <100 | <100 | <5 |
| Benzene | 5 | 0.42 | 5 | 10 | <5 | <5 | <100 | <100 | <5 |
| 1,2-Dichloroethane | 5 | 0.12 | 5 | 10 | <5 | <5 | **200** | <100 | <5 |
| Trichloroethene | 5 | 1.6 | 5 | 100 | **4 J** | **3 J** | **310** | **82 J** | <5 |
| 1,2-Dichloropropane | 5 | 0.16 | 5 | | <5 | <5 | <100 | <100 | <5 |
| Bromodichloromethane | | 0.18 | | | <5 | <5 | <100 | <100 | <5 |
| cis-1,3-Dichloropropene | | 0.081 | | | <5 | <5 | <100 | <100 | <5 |
| 4-Methyl-2-Pentanone | | 160 | | | 26 B | 24 B | <100 | **93000 BE** | <5 |
| Toluene | 1000 | 720 | 1000 | 750 | <5 | <5 | <100 | <100 | <5 |
| trans-1,3-Dichloropropene | | 0.081 | | | <5 | <5 | <100 | <100 | <5 |
| 1,1,2-Trichoroethane | 5 | 0.2 | 5 | 10 | <5 | <5 | <100 | <100 | <5 |
| Tetrachloroethene | 5 | 1.1 | 5 | 20 | 1 J | **3 J** | **50 J** | <100 | <5 |

# TABLE 5
# (continued)

| Compound | Sample Location, Result, and Date Collected | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | Regional Aquifer (Production Wells) | | TA-3 Building SM-30 | | QA/QC |
| | EPA MCL[a] | EPA MSSL[b] | NM MCL[c] | NM WQCC[d] | PM-2 (12/13/99) | PM-5 (12/13/99) | SM-30 (12/17/99) | SD-30[e] (12/17/99) | Trip Blank |
| 2-Hexanone | | | | | <5 | <5 | <100 | <100 | <5 |
| Dibromochloromethane | | 0.13 | | | <5 | <5 | <100 | <100 | <5 |
| Chlorobenzene | 100 | 39 | | | <5 | <5 | <100 | <100 | <5 |
| Ethylbenzene | 700 | 1300 | 700 | 750 | <5 | <5 | <100 | <100 | <5 |
| Xylene (total) | 10000 | 1400 | 10000 | 620 | <5 | <5 | <100 | <100 | <5 |
| Styrene | 100 | 1600 | 100 | | <5 | <5 | <100 | **480** | <5 |
| Bromoform | | 8.5 | | | <5 | <5 | <100 | <100 | <5 |
| 1,1,2,2-Tetrachloroethane | | 0.055 | | 10 | <5 | <5 | <100 | <100 | <5 |

* All results are reported in micrograms per liter ($\mu g/\ell$).
a EPA Maximum Contaminant Levels (EPA MCL) for inorganic 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 nontransient, 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 SM-30.

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 6: Summary of Preliminary Analytical Results for Water Samples - Total Metals*
## Los Alamos National Laboratory, New Mexico

| Analyte | Sample Location, Result, and Date | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | |
| | NPDES Limits[a] | EPA MCL[b] | EPA MSSL[c] | NM MCL[d] | NM WQCC[e] | MCO-1[f] (12/7/99) | MCO-2 (12/7/99) | MCO-3 (12/7/99) | MCO-5 (12/8/99) | MCO-6 (12/8/99) | MCO-7 (12/8/99) | MCWB-7.7B (12/8/99) |
| Antimony | | 6 | 15 | | | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 |
| Arsenic | 40 | 50 | 0.045 | 50 | 100 | **3.3 B** | **13.4** | <3.3 | <3.3 | <3.3 | <3.3 | <3.3 |
| Barium | | 2000 | 2600 | | 1000 | 48.6 | 121 | 49.5 | 92.4 | 87.0 | 237 | 149 |
| Beryllium | | 4 | 73 | 4 | | <0.30 | 0.68 B | <0.30 | <0.30 | <0.30 | <0.30 | <0.30 |
| Cadmium | 200 | 5 | 18 | 5 | 10 | 0.54 B | <0.30 | 0.85 B | 0.46 B | 0.92 B | **7.6** | <0.30 |
| Cobalt | 1000 | | 2200 | | 50 | <1.7 | 2.2 B | <1.7 | <1.7 | <1.7 | <1.7 | <1.7 |
| Copper | 1600 | 1300 | 1400 | | 1000 | 10.2 B | 6.0 B | 10.0 B | 2.4 B | 2.7 B | 1.2 B | <1.0 |
| Lead | 400 | 15 | 15 | | 50 | <2.1 | <2.1 | <2.1 | <2.1 | 2.4 B | <2.1 | <2.1 |
| Mercury | 10 | 2 | 11 | 2 | 2 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Nickel | | | 730 | 100 | 200 | 10 B | 8.0 B | 10.3 B | 8.2 B | 9.3 B | 7.8 B | 5.2 |
| Selenium | 50 | 50 | 180 | 50 | 50 | <2.9 | <2.9 | <2.9 | <2.9 | <2.9 | <2.9 | <2.9 |
| Silver | | | 180 | | 50 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Thallium | | 2 | | 2 | | **3.0 B** | **2.6 B** | **5.4 B** | <2.3 | **2.4 B** | **2.7 B** | <2.3 |
| Uranium | | | | | 5000 | 19.2 B | 21.2 B | 16.7 B | <10.5 | 21.2 B | 20.0 B | NA |
| Vanadium | 100 | | 260 | | | <0.90 | 2.8 B | <0.90 | <0.90 | <0.90 | 2.4 B | 1.3 B |
| Zinc | 95400 | | 11000 | | 10000 | 15.5 B | 14.5 B | 16.9 B | 4.7 B | 11.9 B | 7.8 B | 5.3 BE |

# TABLE 6
## (continued)

| Analyte | Sample Location, Result, and Date | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | Regional Aquifer (Production Wells) | | | |
| | NPDES Limit | EPA MCL | EPA MSSL | NM MCL | NM WQCC | MT-4 (12/7/99) | TW-8 (12/8/99) | GS-1 (12/9/99) | PM-1 (12/13/99) | PM-2 (12/13/99) | PM-5 (12/13/99) | O-4 (12/13/99) |
| Antimony | | 6 | | | | <5.0 | <5.0 | <5.0 | NA | NA | NA | NA |
| Arsenic | 40 | 50 | 0.045 | 50 | 100 | <3.3 | <3.3 | <3.3 | <3.3 | NA | NA | <3.3 |
| Barium | | 2000 | 2600 | | 1000 | 139 | 6.9 B | 28.0 | NA | 24.0 B | 29.0 | NA |
| Beryllium | | 4 | 73 | 4 | | <0.30 | <0.30 | <0.30 | NA | NA | NA | NA |
| Cadmium | 200 | 5 | 18 | 5 | 10 | 0.92 B | <0.30 | 0.90 B | NA | NA | NA | NA |
| Cobalt | 1000 | | 2200 | | 50 | <1.7 | <1.7 | <1.7 | NA | NA | NA | NA |
| Copper | 1600 | 1300 | 1400 | | 1000 | 2.5 B | <1.0 | 19.0 B | NA | NA | NA | NA |
| Lead | 400 | 15 | 15 | | 50 | <2.1 | 4.4 | <2.1 | NA | NA | NA | NA |
| Mercury | 10 | 2 | 11 | 2 | 2 | <0.10 | <0.10 | <0.10 | NA | NA | NA | NA |
| Nickel | | | 730 | 100 | 200 | 6.1 B | <0.80 | 34.0 | NA | NA | NA | NA |
| Selenium | 50 | 50 | 180 | 50 | 50 | <2.9 | <2.9 | <2.9 | NA | NA | NA | NA |
| Silver | | | 180 | | 50 | <2.0 | <2.0 | <2.0 | NA | NA | NA | NA |
| Thallium | | 2 | | 2 | | **3.1 B** | <2.3 | <2.3 | NA | NA | NA | NA |
| Uranium | | | | | 5000 | 27.4 B | NA | NA | <10.5 | NA | NA | <10.5 |
| Vanadium | 100 | | 260 | | | 1.2 B | 5.5 B | 2.5 B | NA | NA | NA | NA |
| Zinc | 95400 | | 11000 | | 10000 | 6.9 B | 468 E | 273 E | NA | NA | NA | NA |

# TABLE 6
# (continued)

| Analyte | Sample Location, Result, and Date | | | | | |
|---|---|---|---|---|---|---|
| | Reference | | | | | QA/QC Samples |
| | NPDES Limit | EPA MCL | EPA MSSL | NM MCL | NM WQCC | MCO-FB (12/09/99) |
| Antimony | | 6 | | | | <5.0 |
| Arsenic | 40 | 50 | 0.045 | 50 | 100 | <3.3 |
| Barium | | 2000 | 2600 | | 1000 | <0.40 |
| Beryllium | | 4 | 73 | 4 | | <0.30 |
| Cadmium | 200 | 5 | 18 | 5 | 10 | <0.30 |
| Cobalt | 1000 | | 2200 | | 50 | <1.7 |
| Copper | 1600 | 1300 | 1400 | | 1000 | <1.0 |
| Lead | 400 | 15 | 15 | | 50 | <2.1 |
| Mercury | 10 | 2 | 11 | 2 | 2 | <0.10 |
| Nickel | | | 730 | 100 | 200 | <0.80 |
| Selenium | 50 | 50 | 180 | 50 | 50 | <2.9 |
| Silver | | | 180 | | 50 | <2.0 |
| Thallium | | 2 | | 2 | | <2.3 |
| Vanadium | 100 | | 260 | | | <0.90 |
| Zinc | 95400 | | 11000 | | 10000 | 8.1 BE |

* All results reported in micrograms per liter ($\mu g/\ell$).
a National Pollutant Discharge Elimination System (NPDES) permit limits for discharges from the TA-50 Radioactive Wastewater Treatment Plant.
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 nontransient, 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-1 is a duplicate sample of MCO-3.

NA Not Analyzed.
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.

## TABLE 7: Summary of Preliminary Analytical Results for Water Samples - Dissolved Cations*
## Los Alamos National Laboratory, New Mexico

| Parameter | Sample Location, Result, and Date | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Mortandad Canyon | | | | | | |
| | EPA MSSL[a] | NM WQCC[b] | MCO-1[c] (12/7/99) | MCO-2 (12/7/99) | MCO-3 (12/7/99) | MCO-5 (12/8/99) | MCO-6 (12/8/99) | MCO-7 (12/8/99) | MCWB-7.7B (12/8/99) |
| Aluminum | 37000 | 5000 | <32.1 | 100 B | <32.1 | <32.1 | <32.1 | 48.0 B | <32.1 |
| Calcium | | | 77800 | 21700 | 79400 | 32100 | 31900 | 28000 | 22700 |
| Iron | 11000 | 1000 | <24.2 | **12400** | <24.2 | <24.2 | <24.2 | <24.2 | <24.2 |
| Magnesium | | | 4560 | 5490 | 4740 | 3230 | 3130 | 6720 | 5750 |
| Manganese | 1700 | 200 | <1.2 | **1730** | <1.2 | <1.2 | <1.2 | <1.2 | <1.2 E |
| Potassium | | | 9400 E | 3530 E | 9900 E | 18300 E | 18300 E | 23700 E | 7640 |
| Sodium | | | 44600 E | 31500 E | 45600 E | 63400 E | 65800 E | 80800 E | 87900 |
| Silicon | | | 21800 | 38500 | 22300 | 17700 | 17600 | 18600 | 17100 |
| Strontium | 22000 | | 143 | 121 | 147 | 136 | 135 | 185 | 156 |

## TABLE 7
## (continued)

| Parameter | Sample Location, Result, and Date | | | | | | |
|---|---|---|---|---|---|---|---|
| | Reference | | Mortandad Canyon | | | TA-3, Building SM-30 | |
| | EPA MSSL[a] | NM WQCC[b] | MT-4 (12/7/99) | TW-8 (12/8/99) | GS-1 (12/9/99) | SM-30 (12/17/99) | SD-30[d] (12/17/99) |
| Aluminum | 37000 | 5000 | 38.3 B | <32.1 | <32.1 | 494 N | 928 N |
| Calcium | | | 24000 | 11700 | 83100 | 9260 | 9350 |
| Iron | 11000 | 1000 | <24.2 | <24.2 | <24.2 | 277 N | 457 N |
| Magnesium | | | 5830 | 4180 | 3440 | 2280 E | 2400 E |
| Manganese | 1700 | 200 | <1.2 | 1.7 BE | 11.1 E | 4.6 B | 5.2 B |
| Potassium | | | 6950 E | 1740 B | 6110 | 1500 B | 1560 B |
| Sodium | | | 94900 E | 12600 | 45700 | 26900 | 26700 |
| Silicon | | | 18500 | 32600 | 22400 | 6800 | 7680 |
| Strontium | 22000 | | 154 | 53.3 | 85.9 | 54.7 | 54.9 |

# TABLE 7
# (continued)

| Parameter | Sample Location, Result, and Date | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Upper and Middle Pajarito Canyon Springs and Surface Water | | | | | | | |
| | EPA MSSL[a] | NM WQCC[b] | Homestead (12/10/99) | Starmer (12/10/99) | Bulldog (12/10/99) | Kieling (12/10/99) | BU-0.01 (12/10/99) | PA-8.9 (12/10/99) | TA-18 (12/10/99) | PA-6.7 (12/10/99) |
| Aluminum | 37000 | 5000 | 196 B | 121 B | 70.9 B | 44.8 B | 47.3 B | 139 B | 251 | 121 B |
| Calcium | | | 7910 | 10300 | 21700 | 20900 | 21000 | 10800 | 11800 | 12900 |
| Iron | 11000 | 1000 | 123 | 63.7 B | 29.9 B | <24.2 | <24.2 | 75.1 B | 461 | 79.8 B |
| Magnesium | | | 2820 | 3570 | 5950 | 6110 | 6010 | 3560 | 3710 | 4140 |
| Manganese | 1700 | 200 | 4.0 B | 1.5 B | 1.5 B | <2.4 | 1.7 B | 6.2 B | 128 E | 2.0 B |
| Potassium | | | 2190 B | 2380 B | 3620 | 3390 | 3460 | 2490 B | 3080 | 2470 B |
| Sodium | | | 8160 | 10600 | 28300 | 23800 | 26500 | 11900 | 16800 | 15800 |
| Silicon | | | 16900 | 16900 | 23800 | 18000 | 20700 | 18000 | 19800 | 13800 |
| Strontium | 22000 | | 62.3 | 78.6 | 133 | 141 | 131 | 77.4 | 80.0 | 90.2 |

## TABLE 7
## (continued)

| Parameter | Sample Location, Result, and Date | | |
|---|---|---|---|
| | Reference | | QA/QC Samples |
| | EPA MSSL[a] | NM WQCC[b] | MCO-FB (Dissolved) (12/09/99) |
| Aluminum | 37000 | 5000 | <32.1 |
| Calcium | | | 537 B |
| Iron | 11000 | 1000 | <24.2 |
| Magnesium | | | 72.9 B |
| Manganese | 1700 | 200 | <1.2 E |
| Potassium | | | <353 |
| Sodium | | | 2300 |
| Silicon | | | <89.0 |
| Strontium | 22000 | | 1.6 |

* All results reported in micrograms per liter ($\mu g/\ell$).
a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for inorganic chemicals in tap water (July 1999).
b 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.
c MCO-1 is a duplicate sample of MCO-3.
d SD-30 is a duplicate sample of SM-30.

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 Spike recovery not within control limits.

## TABLE 8: Summary of Preliminary Analytical Results for Water Samples - General Chemistry
## Los Alamos National Laboratory, New Mexico

| Parameter | Sample Location, Result, and Date | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WQCC[c] | MCO-1[d] (12/7/99) | MCO-2 (12/7/99) | MCO-3 (12/7/99) | MCO-5 (12/8/99) | MCO-6 (12/8/99) | MCO-7 (12/8/99) | MCWB-7.7B (12/8/99) |
| Ammonia (mg/ℓ) | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Bicarbonate (mg/ℓ) | | | | 98.0 | 160 | 98.0 | 172 | 182 | 194 | 176 |
| Carbonate (mg/ℓ) | | | | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 |
| TKN (mg/ℓ) | | | | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Nitrate-Nitrite (mg/ℓ) | | 10 | | 1.5 | <0.10 | 0.72 | 9.6 | **11.4** | 1.8 | **24.5** |
| Total Phosphorus (mg/ℓ) | | | | 0.11 | 0.48 | 0.11 | <0.10 | 0.25 | 0.24 | <0.10 |
| Inorganic Chloride (mg/ℓ) | 250 | | 250 | 12.8 | 6.0 | 12.9 | 12.5 | 13.1 | 21.0 | 21.3 |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | 0.53 | 0.82 | 0.53 | 1.2 | 1.3 | 1.3 | 1.1 |
| Sulfate (mg/ℓ) | 500 | | 600 | 167 | 1.5 | 173 | 34.0 | 31.0 | 28.9 | 22.9 |
| Perchlorate (mg/ℓ) | 4-18* | | | 3.0 | <0.5 | **4.4** | 1.1 | 1.1 | 1.8 | 1.7 |
| $\delta^{15}N_{air}$ - $NO_3/NO_2$ (no units) | | | | NA | NA | 3.3 | -3.4 | NA | -2.1 | NA |

# TABLE 8
## (continued)

| Parameter | Sample Location, Result, and Date | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | Regional Aquifer (Production Wells) | | | | TA-3, Building SM-30 | |
| | EPA MCL | NM MCL | NM WQCC | MT-4 (12/7/99) | TW-8 (12/8/99) | GS-1 (12/9/99) | PM-1 (12/13/99) | PM-2 (12/13/99) | PM-5 (12/13/99) | O-4 (12/13/99) | SM-30 (12/17/99) | SD-30[e] (12/17/99) |
| Ammonia (mg/ℓ) | | | | <0.10 | <0.10 | 1.1 | <0.10 | NA | NA | <0.10 | NA | NA |
| Bicarbonate (mg/ℓ) | | | | 180 | 104 | 100 | NA | NA | NA | NA | 40.0 | 54.0 |
| Carbonate (mg/ℓ) | | | | <20.0 | <20.0 | <20.0 | NA | NA | NA | NA | <20.0 | <20.0 |
| TKN (mg/ℓ) | | | | <1.0 | <1.0 | 3.1 | 6.4 | NA | NA | 7.0 | NA | NA |
| Nitrate-Nitrite (mg/ℓ) | | 10 | | **12.6** | <0.10 | 1.1 | 0.45 | NA | NA | 0.35 | NA | NA |
| Total Phosphorus (mg/ℓ) | | | | <0.10 | 0.10 | 0.32 | <0.10 | NA | NA | <0.10 | NA | NA |
| Inorganic Chloride (mg/ℓ) | 250 | | 250 | 21.8 | 1.7 | 33.1 | NA | NA | NA | NA | 22.4 | 22.2 |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | 1.1 | 0.16 | 0.61 | NA | NA | NA | NA | <0.10 | <0.10 |
| Sulfate (mg/ℓ) | 500 | | 600 | 23.3 | 2.1 | 161 | NA | NA | NA | NA | 5.6 | 5.6 |
| Perchlorate (mg/ℓ) | 4-18* | | | 1.4 | <0.5 | 1.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| $\delta^{15}N_{air}$ - $NO_3/NO_2$ (no units) | | | | -4.8 | 0.7 | NA | NA | NA | NA | NA | NA | NA |

# TABLE 8
# (continued)

| Parameter | Sample Location, Result, and Date | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Upper and Middle Pajarito Canyon Springs and Surface Water | | | | | | | |
| | EPA MCL | NM MCL | NM WQCC | Homestead (12/10/99) | Starmer (12/10/99) | Bulldog (12/10/99) | Kieling (12/10/99) | BU-0.01 (12/10/99) | PA-8.9 (12/10/99) | TA-18 (12/10/99) | PA-6.7 (12/10/99) |
| Ammonia (mg/ℓ) | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Bicarbonate (mg/ℓ) | | | | 36.0 | 42.0 | 82.0 | 82.0 | 74.0 | 46.0 | 46.0 | 52.0 |
| Carbonate (mg/ℓ) | | | | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 | <20.0 |
| TKN (mg/ℓ) | | | | <1.0 | <1.0 | 2.5 | <1.0 | 1.7 | 4.8 | <1.0 | <1.0 |
| Nitrate-Nitrite (mg/ℓ) | | 10 | | <0.10 | 1.1 | 0.20 | 0.59 | 0.18 | <0.10 | <0.10 | <0.10 |
| Total Phosphorus (mg/ℓ) | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.10 | <0.10 | <0.10 |
| Inorganic Chloride (mg/ℓ) | 250 | | 250 | 3.6 | 7.4 | 19.5 | 22.7 | 20.8 | 7.2 | 16.0 | 13.2 |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | <0.10 | <0.10 | 0.29 | 0.16 | 0.22 | <0.10 | 0.10 | 0.13 |
| Sulfate (mg/ℓ) | 500 | | 600 | 2.7 | 5.1 | 13.5 | 12.3 | 13.0 | 4.9 | 7.1 | 7.9 |
| Perchlorate (mg/ℓ) | 4-18* | | | 0.6 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.6 |
| $\delta^{15}N_{air}$ - $NO_3/NO_2$ (no units) | | | | NA | NA | NA | NA | NA | NA | NA | NA |

# TABLE 8
## (continued)

| Parameter | Sample Location, Result, and Date | | | | |
|---|---|---|---|---|---|
| | Reference | | | QA/QC Samples | |
| | EPA MCL | NM MCL | NM WQCC | MCO-FB (12/09/99) | FB-6.7 (12/10/99) |
| Ammonia (mg/ℓ) | | | | <0.10 | <0.10 |
| Bicarbonate (mg/ℓ) | | | | <20.0 | <20.0 |
| Carbonate (mg/ℓ) | | | | <20.0 | <20.0 |
| TKN (mg/ℓ) | | | | <1.0 | <1.0 |
| Nitrate-Nitrite (mg/ℓ) | | 10 | | <0.10 | <0.10 |
| Total Phosphorus (mg/ℓ) | | | | <0.10 | <0.10 |
| Inorganic Chloride (mg/ℓ) | 250 | | 250 | <0.20 | <0.20 |
| Fluoride (mg/ℓ) | 4 | 4 | 1.6 | <0.10 | <0.10 |
| Sulfate (mg/ℓ) | 500 | | 600 | <0.20 | <0.20 |
| Perchlorate (mg/ℓ) | 4-18* | | | <0.5 | <0.5 |

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 nontransient, 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-1 is a duplicate sample of MCO-3
e SD-30 is a duplicate sample of SM-30.

$\delta^{15}N_{air}$ - $NO_3/NO_2$ Stable nitrogen isotope ratio found in the nitrate/nitrite fraction of the sample.
NA Not Analyzed.
* 4-18 ppb is a provisional standard established by EPA.

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

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | | | |
| | EPA MCL[a] | NM MCL[b] | NM WHL[c] | DOE DCG1[d] | DOE DCG2[e] | MCO-1[g] (12/7/99) | | | MCO-2 (12/7/99) | | | MCO-3 (12/7/99 | | |
| | | | | | | Result | Sigma Error | MDC[f] | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Strontium-90 | 8 | 8 | | 1000 | 40 | **84** | 17 | 3 | 0.33 | 0.53 | 0.90 | NR | NR | NR |
| Tritium ($H^3$) | 20000 | 20000 | 20000 | 2000000 | 80000 | 4311 | 144 | -- | 83 | 10 | -- | 4298 | 144 | -- |

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | | | |
| | EPA MCL | NM MCL | NM WHL | DOE DCG1 | DOE DCG2 | MCO-5 (12/8/99) | | | MCO-6 (12/8/99) | | | MCO-7 (12/8/99) | | |
| | | | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Strontium-90 | 8 | 8 | | 1000 | 40 | **45.6** | 9.0 | 0.8 | **44.6** | 8.9 | 0.7 | 1.86 J | 0.77 | 1.0 |
| Tritium ($H^3$) | 20000 | 20000 | 20000 | 2000000 | 80000 | 9959 | 329 | -- | 10016 | 332 | -- | 17325 | 572 | -- |

# TABLE 9
## (continued)

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | | | | | | |
| | | | | | | MCWB-7.7B (12/8/99) | | | MT-4 (12/7/99) | | | TW-8 (12/8/99) | | |
| | EPA MCL | NM MCL | NM WHL | DOE DCG1 | DOE DCG2 | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Strontium-90 | 8 | 8 | | 1000 | 40 | 0.09 | 0.45 | 0.78 | -0.01 | 0.37 | 0.64 | 0.19 | 0.40 | 0.67 |
| Tritium ($H^3$) | 20000 | 20000 | 20000 | 2000000 | 80000 | 19717 | 651 | -- | **20004** | 661 | -- | 16 | 6 | -- |

| Parameter | Sample Location and Date Collected | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | Mortandad Canyon | | | Regional Aquifer (Production Wells) | | | | | |
| | | | | | | GS-1 (12/9/99) | | | PM-1 (12/13/99) | | | O-4 (12/13/99) | | |
| | EPA MCL | NM MCL | NM WHL | DOE DCG1 | DOE DCG2 | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Strontium-90 | 8 | 8 | | 1000 | 40 | **11.0** | 2.3 | 0.8 | 0.33 | 0.39 | 0.65 | 0.44 | 0.43 | 0.70 |
| Tritium ($H^3$) | 20000 | 20000 | 20000 | 2000000 | 80000 | 3115 | 102 | -- | NA | NA | NA | NA | NA | NA |

# TABLE 9
# (continued)

| Parameter | Sample Location and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | | | TA-3, Building SM-30 | | | | | |
| | | | | | | SM-30 (12/17/99) | | | SD-30[h] (12/17/99) | | |
| | EPA MCL | NM MCL | NM WHL | DOE DCG1 | DOE DCG2 | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Strontium-90 | 8 | 8 | | 1000 | 40 | NA | NA | NA | NA | NA | NA |
| Tritium ($H^3$) | 20000 | 20000 | 20000 | 2000000 | 80000 | 1804 | 60.7 | -- | 1810 | 60.7 | -- |

* All results are reported in pico Curies per liter (pCi/ℓ).
a EPA proposed Maximum Contaminant Levels (EPA MCLs) for Radiochemicals in the water supply.
b New Mexico Maximum Contaminant Levels (NM MCLs) for Beta Particle and Photon Radioactivity from manmade radionuclides in community water systems.
c New Mexico Standards for Interstate and Intrastate Streams for Wildlife Habitat Limits (NM WHLs).
d Department of Energy Derived Concentration Guides for water ingestion in uncontrolled areas.
e Department of Energy Derived Concentration Guides for drinking water systems.
f Minimum Detected Count.
g MCO-1 is a duplicate sample of MCO-3.
h SD-30 is a duplicate sample of SM-30.

NA Not Analyzed
NR Not Reported due to the recovery for the tracer was not within QC limits. The sample could not be re-analyzed due to insufficient sample volume.
– Value not available.

## TABLE 10: Summary of Preliminary Analytical Results for Water Samples - Explosives*
## Los Alamos National Laboratory, New Mexico

| Parameter | Sample Location, Result, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | Regional Aquifer (Production Wells) | | Upper and Middle Pajarito Canyon Springs and Surface Water | | | | | | | | |
| | EPA MSSL[a] | PM-2 (12/13/99) | PM-5 (12/13/99) | Homestead (12/10/99) | Starmer (12/10/99) | Bulldog (12/10/99) | Kieling (12/10/99) | BU-0.01 (12/10/99) | PA-8.9 (12/10/99) | TA-18 (12/10/99) | PA-6.7 (12/10/99) | FB-6.7 (12/10/99) |
| HMX | 1800 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 | <13.0 |
| RDX | 0.61 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 | <14.0 |
| TNB | | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 | <7.30 |
| DNB | | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 | <4.00 |
| TETRYL | | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 | <10.0 |
| NB | | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 |
| TNT | | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 | <6.40 |
| 4ADNT | | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 | <7.00 |
| 2ADNT | | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 |
| 26DNT | | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 | <9.40 |
| 24DNT | | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 | <5.70 |
| 2NT | | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 | <12.0 |
| 4NT | | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 | <7.90 |
| 3NT | | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 | <8.00 |

* All results reported in micrograms per liter ($\mu g/\ell$).

a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for inorganic chemicals in tap water (July 1999).

## TABLE 11: Summary of Preliminary Analytical Results for Sediment Samples - Inorganics
## Los Alamos National Laboratory, New Mexico

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | |
| | EPA MSSL[a] Industrial | EPA MSSL Residential | LANL Bkground | ACS-18-1 0-26 cm (12/6/99) | ACS-18-2 26-46 cm (12/6/99) | ACS-18-3[b] 0-26 cm (12/6/99) | ACS-35-0 2-10 cm (12/6/99) | ACS-12-1 0-30 cm (12/6/99) | ACS-12-2 30-62 cm (12/6/99) | ACS-48-0 0-12 cm (12/6/99) | ACS-3-1 0-28 cm (12/6/99) |
| Antimony | 31 | 31 | 0.83 | <0.32 N | <0.35 N | <0.31 N | <0.32 N | <0.27 N | <0.31 N | <0.31 N | <0.29 N |
| Arsenic | 360 | 22 | 3.98 | 2.2 | 3.1 | 2.3 | 1.8 | 2.0 | 2.8 | 1.9 | 2.3 |
| Barium | 100000 | 5400 | 127 | 36.2 | 43.3 | 51.9 | 27.4 | 40.2 | 51.4 | 36.5 | 41.9 |
| Beryllium | 2200 | 150 | 1.31 | 0.60 | 0.67 | 0.63 | 0.45 B | 0.61 | 0.73 | 0.48 B | 0.62 |
| Cadmium | 1000 | 39 | 0.4 | 1.1 | 2.2 | 1.2 | 0.39 | 2.5 | 3.2 | 0.55 | 0.61 |
| Cobalt | 29000 | 3400 | 4.73 | 1.4 B | 1.9 B | 1.7 B | 0.98 B | 1.7 B | 2.2 B | 1.4 B | 1.5 B |
| Copper | 76000 | 2900 | 11.2 | 8.0 | 10.4 | 9.7 | 29.6 | 11.6 | 28.1 | 4.9 B | 4.9 B |
| Lead | 2000 | 400 | 19.7 | 37.1 | 48.1 | 50.0 | 38.4 | 57.7 | 66.0 | 25.3 | 19.4 |
| Mercury | 610 | 23 | 0.1 | 0.48 | 0.58 | 0.57 | 0.03 B | 0.67 | 1.2 | 0.31 | 0.19 |
| Nickel | 41000 | 1600 | 9.38 | 8.3 | 8.0 | 8.0 | 3.8 | 7.4 | 13.8 | 3.1 | 3.9 |
| Selenium | 10000 | 390 | 0.3 | 0.48 B | 0.55 B | 0.45 B | 0.57 B | 0.36 B | 0.70 | 0.41 B | 0.53 B |
| Silver | 10000 | 390 | 1 | 0.18 BE | 1.3 E | 0.61 BE | <0.14 E | 0.80 BE | 3.9 E | 0.22 BE | <0.13 E |
| Thallium | 180 | 7 | 0.73 | <0.40 | <0.44 | <0.39 | <0.40 | <0.34 | 0.62 B | <0.39 | <0.37 |
| Uranium | | | | 3.0 B | <1.3 | 3.8 B | <1.2 | 2.2 B | 6.4 | <1.6 B | 1.0 B |
| Vanadium | 14000 | 550 | 19.7 | 6.9 | 9.4 | 8.0 | 5.2 | 6.7 | 10.9 | 6.1 | 6.0 |
| Zinc | 100000 | 23000 | 60.2 | 49.5 | 46.7 | 52.7 | 64.8 | 51.6 | 53.6 | 38.1 | 39.3 |

**TABLE 11**
**(continued)**

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | Sandia Canyon | | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | LANL Bkground | ACS-3-2 37-62 cm (12/6/99) | ACS-3-3 62-89 cm (12/6/99) | ACS-3-4 89-104 cm (12/6/99) | SC-1 0-17 cm (12/13/99) | SC-2 0-3 cm (12/13/99) | SC-3 8-19 cm (12/13/99) | SC-4 2-12 cm (12/13/99) | SC-5 0-18 cm (12/13/99) |
| Antimony | 31 | 31 | 0.83 | <0.28 N | <0.29 N | <0.31 N | <0.28 N | <0.29 N | <0.27 N | <0.28 N | <0.28 N |
| Arsenic | 360 | 22 | 3.98 | 2.0 | 2.5 | 3.0 | 2.4 | 1.8 | 1.6 | 1.8 | 2.4 |
| Barium | 100000 | 5400 | 127 | 49.5 | 56.9 | 56.4 | 83.0 | 57.8 | 47.3 | 54.2 | 65.8 |
| Beryllium | 2200 | 150 | 1.31 | 0.56 | 0.84 | 2.3 | 0.73 | 0.66 | 0.48 B | 0.55 | 0.73 |
| Cadmium | 1000 | 39 | 0.4 | 0.41 | 2.5 | 10.5 | <0.03 | 0.41 | 0.07 B | 0.08 B | 0.11 B |
| Cobalt | 29000 | 3400 | 4.73 | 1.5 B | 3.2 | 5.3 | 2.7 | 2.0 B | 1.5 B | 2.6 | 2.3 B |
| Copper | 76000 | 2900 | 11.2 | 2.6 B | 31.6 | 81.0 | 5.3 | 4.7 B | 6.4 | 6.1 | 8.9 |
| Lead | 2000 | 400 | 19.7 | 9.0 | 98.2 | 42.3 | 9.7 | 10.5 | 16.0 | 19.9 | 17.4 |
| Mercury | 610 | 23 | 0.1 | 0.03 B | 0.81 | 2.2 | 0.00 B | 0.00 B | 0.00 | 0.00 | 0.00 |
| Nickel | 41000 | 1600 | 9.38 | 3.7 | 11.6 | 34.4 | 4.7 | 4.6 | 3.0 | 3.8 | 5.2 |
| Selenium | 10000 | 390 | 0.3 | 0.46 B | <0.35 | 0.43 B | <0.34 | <0.36 | <0.33 | <0.34 | <0.34 |
| Silver | 10000 | 390 | 1 | <0.13 E | 2.5 E | 8.3 E | <0.12 | <0.13 | 0.21 B | 0.43 B | 0.42 B |
| Thallium | 180 | 7 | 0.73 | <0.35 | 0.87 B | 0.83 B | <0.35 | <0.37 | <0.34 | <0.35 | <0.35 |
| Uranium | | | | <1.0 | <1.0 | 3.4 B | 1.7 BN | <1.0 N | <0.99 N | <0.99 N | <1.0 N |
| Vanadium | 14000 | 550 | 19.7 | 5.3 | 8.8 | 9.9 | 10.3 | 5.5 | 5.2 | 6.2 | 9.7 |
| Zinc | 100000 | 23000 | 60.2 | 34.2 | 50 | 50.5 | 29.8 | 21.3 | 28.8 | 34.5 | 45.6 |

# TABLE 11
# (continued)

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Sandia Canyon | Bayo Canyon | | | | | Mortandad Canyon | |
| | EPA MSSL Industrial | EPA MSSL Residential | LANL Bkground | SC-6 0-12 cm (12/13/99) | BC-1 0-14 cm (12/13/99) | BC-2 14-27 cm (12/13/99) | BC-3 10-22 cm (12/13/99) | BC-4 4-11 cm (12/13/99) | BC-5[c] 14-27 cm (12/13/99) | MC-1 0-5 cm (12/14/99) | MC-2 0-8 cm (12/14/99) |
| Antimony | 31 | 31 | 0.83 | <0.28 N | <0.29 | 0.72 BN | <0.28 | <0.29 N | <0.29 N | <0.29 N | <0.27 N |
| Arsenic | 360 | 22 | 3.98 | 2.5 | 2.0 | 1.7 | 1.4 | 1.6 | 1.7 | 2.8 | 2.0 |
| Barium | 100000 | 5400 | 127 | 65.2 | 46.6 | 33.3 | 29.8 | 32.7 | 37.2 | 78.9 | 47.4 |
| Beryllium | 2200 | 150 | 1.31 | 0.67 | 0.55 | 0.47 B | 0.43 B | 0.40 B | 0.53 | 0.73 | 0.50 B |
| Cadmium | 1000 | 39 | 0.4 | 0.06 B | 0.08 B | 0.13 B | 0.12 B | 0.14 B | 0.04 B | 0.05 B | 0.17 B |
| Cobalt | 29000 | 3400 | 4.73 | 2.4 B | 1.5 B | 1.4 B | 1.1 B | 1.4 B | 1.5 B | 3.2 | 1.5 B |
| Copper | 76000 | 2900 | 11.2 | 7.6 | 7.9 | 4.1 B | 3.2 B | 3.4 B | 4.5 B | 7.1 | 3.6 B |
| Lead | 2000 | 400 | 19.7 | 17.5 | 8.8 | 8.3 | 7.2 | 7.4 | 8.7 | 10.2 | 8.0 |
| Mercury | 610 | 23 | 0.1 | 0.00 | 0.00 B | 0.00 B | 0.00 B | 0.00 B | 0.00 B | 0.00 B | 0.00 B |
| Nickel | 41000 | 1600 | 9.38 | 4.8 | 5.3 | 3.4 | 2.3 | 2.2 | 3.3 | 6.6 | 2.7 |
| Selenium | 10000 | 390 | 0.3 | <0.34 | <0.36 | <0.35 | <0.35 | <0.32 | <0.35 | <0.35 | <0.33 |
| Silver | 10000 | 390 | 1 | 0.33 B | <0.13 | <0.13 | <0.13 | <0.12 | <0.13 | <0.13 | <0.12 |
| Thallium | 180 | 7 | 0.73 | <0.35 | <0.37 | <0.36 | <0.36 | <0.33 | <0.36 | <0.36 | <0.34 |
| Uranium | | | | <1.0 N | 2.0 B | <1.0 | 1.3 B | 1.2 BN | <1.0 N | <1.0 N | <0.98 N |
| Vanadium | 14000 | 550 | 19.7 | 10.6 | 5.8 | 5.6 | 3.6 | 4.7 | 6.6 | 11.7 | 4.9 |
| Zinc | 100000 | 23000 | 60.2 | 55.0 | 21.6 | 28.1 | 16.2 | 16.2 | 32.0 | 37.6 | 19.3 |

# TABLE 11
# (continued)

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | | Canada del Buey | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | LANL Bkground | MC-3 15-24 cm (12/14/99) | MC-4 0-5 cm (12/14/99) | MC-5A 0-13 cm (12/14/99) | MC-5B 22-30 cm (12/14/99) | CC-1 10-17 cm (12/15/99) | CC-2 5-15 cm (12/15/99) | CC-3 1-13 cm (12/15/99) | CC-4 0-2 cm (12/15/99) |
| Antimony | 31 | 31 | 0.83 | <0.27 N | <0.28 N | <0.28 N | <0.28 N | <0.32 N | <0.29 N | <0.33 N | <0.32 N |
| Arsenic | 360 | 22 | 3.98 | 1.5 | 1.8 | 1.9 | 1.5 | 2.3 | 3.0 | 1.7 | 2.4 |
| Barium | 100000 | 5400 | 127 | 39.3 | 30.2 | 56.2 | 33.8 | 90.6 | 128 | 58.0 | 102 |
| Beryllium | 2200 | 150 | 1.31 | 0.39 B | 0.33 B | 0.48 B | 0.39 B | 0.59 B | 0.84 | 0.39 B | 0.67 |
| Cadmium | 1000 | 39 | 0.4 | 0.61 | <0.03 | 0.24 B | 0.25 B | 1.1 | 0.15 B | <0.04 | <0.04 |
| Cobalt | 29000 | 3400 | 4.73 | 1.5 B | 1.8 B | 2.0 B | 1.1 B | 3.1 | 5.0 | 2.8 B | 4.6 |
| Copper | 76000 | 2900 | 11.2 | 2.8 B | 3.3 B | 3.7 B | 2.6 B | 9.8 | 8.3 | 3.4 B | 5.1 B |
| Lead | 2000 | 400 | 19.7 | 6.7 | 7.8 | 8.1 | 5.3 | 11.5 | 14.1 | 7.9 | 9.5 B |
| Mercury | 610 | 23 | 0.1 | 0.00 | 0.00 B | 0.00 B | 0.00 B | 0.00 B | 0.03 B | 0.02 B | 0.03 B |
| Nickel | 41000 | 1600 | 9.38 | 2.5 | 2.5 | 3.0 | 2.1 | 6.0 | 8.0 | 4.0 | 5.8 |
| Selenium | 10000 | 390 | 0.3 | <0.33 | <0.34 | <0.35 | <0.34 | <0.39 | <0.36 | <0.41 | <0.39 |
| Silver | 10000 | 390 | 1 | <0.12 | <0.12 | <0.13 | <0.12 | <0.14 | <0.13 | <0.15 | <0.14 |
| Thallium | 180 | 7 | 0.73 | <0.34 | <0.39 | <0.36 | <0.35 | <0.40 | 0.57 B | <0.42 | 0.59 B |
| Uranium | | | | <0.99 N | 1.1 BN | 1.8 BN | <0.9 9N | <1.2 N | 1.3 BN | <1.2 N | 1.4 B |
| Vanadium | 14000 | 550 | 19.7 | 4.7 | 9.1 | 6.6 | 4.1 | 8.9 | 15.9 | 8.7 | 13.8 |
| Zinc | 100000 | 23000 | 60.2 | 16.8 | 61.0 | 18.0 | 16.5 | 28.0 | 152 | 28.1 | 28.9 E |

## TABLE 11
## (continued)

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Canada del Buey | | | | | | Pajarito Canyon | |
| | EPA MSSL Industrial | EPA MSSL Residential | LANL Bkground | CC-5A 18-26 cm (12/15/99) | CC-5B 30-39 cm (12/15/99) | CC-6 0-7.5 cm (12/15/99) | CC-7 0-7 cm (12/15/99) | CC-8 20-33 cm (12/15/99) | CC-9[d] 5-20 cm (12/15/99) | PC-1 0-17 cm (12/16/99) | PC-2 0-24 cm (12/16/99) |
| Antimony | 31 | 31 | 0.83 | <0.30 N | <0.33 N | <0.34 N | <0.32 N | <0.35 N | <0.30 N | <0.29 | <0.28 |
| Arsenic | 360 | 22 | 3.98 | 2.3 | 2.8 | 2.8 | 2.6 | 2.5 | 2.8 | 4.0 | 2.9 |
| Barium | 100000 | 5400 | 127 | 116 | 120 | 115 | 102 | 107 | 126 | 162 | 110 |
| Beryllium | 2200 | 150 | 1.31 | 0.68 | 0.81 | 0.70 | 0.70 | 0.67 | 0.76 | 1.2 | 0.75 |
| Cadmium | 1000 | 39 | 0.4 | 0.05 B | 0.05 B | 0.12 B | <0.04 | 0.63 | 0.98 | 0.08 B | <0.03 |
| Cobalt | 29000 | 3400 | 4.73 | 4.3 | 4.9 | 4.4 | 4.0 | 4.1 | 4.5 | 6.1 | 4.3 |
| Copper | 76000 | 2900 | 11.2 | 5.7 | 7.5 | 6.3 B | 6.0 | 5.5 B | 7.3 | 13.4 | 6.5 |
| Lead | 2000 | 400 | 19.7 | 15.3 B | 27.0 B | 11.0 B | 9.7 B | 10.4 B | 14.4 B | 18.6 B | 11.7 B |
| Mercury | 610 | 23 | 0.1 | 0.03 B | 0.03 B | 0.03 B | 0.03 B | 0.03 B | 0.03 B | 0.02 B | <0.02 |
| Nickel | 41000 | 1600 | 9.38 | 9.3 | 7.7 | 6.8 | 7.5 | 6.5 | 7.1 | 11.1 | 6.8 |
| Selenium | 10000 | 390 | 0.3 | <0.36 | <0.41 | <0.42 | <0.39 | <0.43 | <0.36 | <0.36 | 0.43 B |
| Silver | 10000 | 390 | 1 | <0.13 | <0.15 | 0.23 B | <0.14 | <0.16 | <0.13 | <0.13 | <0.12 |
| Thallium | 180 | 7 | 0.73 | 0.62 B | 0.68 B | <0.43 | <0.40 | <0.44 | <0.37 | 0.83 B | 0.52 B |
| Uranium | | | | 2.3 B | 1.7 B | 1.2 B | 2.2 B | <1.2 | <1.1 | 2.5 B | 1.0 B |
| Vanadium | 14000 | 550 | 19.7 | 12.2 | 20.0 | 10.7 | 13.2 | 10.2 | 12.1 | 20.4 | 15.5 |
| Zinc | 100000 | 23000 | 60.2 | 35.8 E | 46.0 E | 25.1 E | 33.1 E | 21.7 E | 144 E | 56.0 | 36.2 |

## TABLE 11
## (continued)

| Analyte | Sample Location, Depth, and Date Collected | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Pajarito Canyon | | | Ancho Canyon | | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | LANL Bkground | PC-3 0-21 cm (12/16/99) | PC-4 0-5 cm (12/16/99) | PC-5[e] 0-24 cm (12/16/99) | AC-1 0-5 cm (12/16/99) | AC-2 0-17 cm (12/16/99) | AC-3 5-16 cm (12/16/99) | AC-4 0-7 cm (12/16/99) | AC-5 10-24 cm (12/16/99) |
| Antimony | 31 | 31 | 0.83 | <0.31 | <0.28 | <0.28 | <0.28 | <0.28 | <0.28 | <0.28 | <0.29 |
| Arsenic | 360 | 22 | 3.98 | 4.0 | 3.8 | 3.2 | 2.2 | 2.5 | 2.3 | 1.8 | 2.0 |
| Barium | 100000 | 5400 | 127 | 166 | 148 | 119 | 77.0 | 70.1 | 80.0 | 51.8 | 51.2 |
| Beryllium | 2200 | 150 | 1.31 | 1.2 | 0.99 | 0.79 | 0.70 | 0.65 | 0.74 | 0.48 B | 0.47 B |
| Cadmium | 1000 | 39 | 0.4 | 0.10 B | 0.05 B | <0.03 | 0.06 B | 0.03 B | 0.04 B | 0.03 B | 0.04 B |
| Cobalt | 29000 | 3400 | 4.73 | 5.8 | 5.3 | 4.9 | 2.7 | 2.5 B | 3.0 | 2.0 B | 2.3 B |
| Copper | 76000 | 2900 | 11.2 | 13.1 | 11.2 | 6.9 | 11.3 | 9.5 | 8.2 | 5.3 | 4.5 B |
| Lead | 2000 | 400 | 19.7 | 21.8 B | 30.9 | 11.3 B | 11.4 B | 11.4 B | 12.2 B | 8.3 B | 9.5 B |
| Mercury | 610 | 23 | 0.1 | 0.03 B | 0.02 B | 0.02 B | 0.13 | 0.06 | 0.05 | 0.05 | 0.04 |
| Nickel | 41000 | 1600 | 9.38 | 11.3 | 10.0 | 7.5 | 4.6 | 4.5 | 5.4 | 3.6 B | 3.6 B |
| Selenium | 10000 | 390 | 0.3 | <0.38 | 0.40 B | <0.34 | 0.34 B | 0.43 B | 0.53 B | 0.45 B | <0.35 |
| Silver | 10000 | 390 | 1 | <0.14 | 0.14 B | <0.12 | <0.12 | <0.12 | <0.13 | <0.12 | 0.43 B |
| Thallium | 180 | 7 | 0.73 | 0.55 B | 0.59 B | <0.35 | <0.35 | <0.35 | 0.50 B | <0.35 | <0.36 |
| Uranium | | | | 2.3 B | 2.0 B | 1.2 B | 4.2 | 1.8 B | 1.6 B | 2.1 B | 1.1 B |
| Vanadium | 14000 | 550 | 19.7 | 22.6 | 20.5 | 16.8 | 8.9 | 9.4 | 10.9 | 8.5 | 8.4 |
| Zinc | 100000 | 23000 | 60.2 | 58.4 | 41.1 | 36.5 | 33.3 | 31.8 | 40.4 | 28.1 | 27.5 |

# TABLE 11
## (continued)

| Analyte | Sample Location, Depth, and Date Collected | | | | | |
|---|---|---|---|---|---|---|
| | Reference | | | QA/QC Samples | | |
| | EPA MSSL[a] Industrial | EPA MSSL Residential | LANL Bkground | AC-EB (12/16/99) | ACS-EB (12/06/99) | CC-EB (12/15/99) |
| Antimony | 31 | 31 | 0.83 | <5.0 | <5.0 | <5.0 |
| Arsenic | 360 | 22 | 3.98 | <3.3 | <3.3 | <3.3 |
| Barium | 100000 | 5400 | 127 | 0.92 B | <0.40 | 0.46 B |
| Beryllium | 2200 | 150 | 1.31 | <0.30 | <0.30 | <0.30 |
| Cadmium | 1000 | 39 | 0.4 | 0.53 B | <0.30 | <0.30 |
| Cobalt | 29000 | 3400 | 4.73 | <1.7 | <1.7 | <1.7 |
| Copper | 76000 | 2900 | 11.2 | 26.3 B | <1.0 | 10 B |
| Lead | 2000 | 400 | 19.7 | <2.1 | <2.1 | <2.1 |
| Mercury | 610 | 23 | 0.1 | <0.10 | <0.10 | <0.10 |
| Nickel | 41000 | 1600 | 9.38 | 3.0 B | <0.80 | 1.6 B |
| Selenium | 10000 | 390 | 0.3 | <2.9 | <2.9 | <2.9 |
| Silver | 10000 | 390 | 1 | <2.0 | <2.0 | <2.0 |
| Thallium | 180 | 7 | 0.73 | <2.3 | <2.3 | <2.3 |
| Uranium | | | | <10.5 | <10.5 | <10.5 |
| Vanadium | 14000 | 550 | 19.7 | <0.90 | <0.90 | <0.90 |
| Zinc | 100000 | 23000 | 60.2 | 38.5 | 4.2 B | 18.0 B |

* All results reported in micrograms per liter ($\mu g/\ell$).
a EPA Region 6 Human Health Medium-Specific Screening Levels (EPA MSSL) for inorganic chemicals in tap water (July 1999).
b ACS-18-3 is a duplicate sample of ACS-18-1.
c BC-5 is a duplicate sample of BC-2.
d CC-9 is a duplicate sample of CC-2.
e PC-5 is a duplicate sample of PC-2.

B The reported values were 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).
N Spike Recovery not within control limits.
E The reported value is estimated because of the presence of interference.

## TABLE 12: Summary of Preliminary Analytical Results for Sediment Samples - PCBs
## Los Alamos National Laboratory, New Mexico

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Acid Canyon | | | | | | | |
| | EPA MSSL[a] Industrial | EPA MSSL Residential | ACS-18-1 0-26 cm (12/6/99) | ACS-18-2 26-46 cm (12/6/99) | ACS-18-3[b] 0-26 cm (12/6/99) | ACS-35-0 2-10 cm (12/6/99) | ACS-12-1 0-30 cm (12/6/99) | ACS-12-2 30-62 cm (12/6/99) | ACS-48-0 0-12 cm (12/6/99) | ACS-3-1 0-28 cm (12/6/99) |
| Aroclor-1016 | 34000 | 3900 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |
| Aroclor-1221 | 680 | 220 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |
| Aroclor-1232 | 680 | 220 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |
| Aroclor-1242 | 680 | 220 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |
| Aroclor-1248 | 680 | 220 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |
| Aroclor-1254 | 9800 | 1100 | 117 | 323 | 124 | <41 | 367 | 635 | 107 | 37 |
| Aroclor-1260 | 680 | 220 | <40 | <44 | <39 | <41 | <34 | <38 | <38 | <35 |

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Acid Canyon | | | Sandia Canyon | | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | ACS-3-2 37-62 cm (12/6/99) | ACS-3-3 62-89 cm (12/6/99) | ACS-3-4 89-104 cm (12/6/99) | SC-1 0-17 cm (12/13/99) | SC-2 0-3 cm (12/13/99) | SC-3 8-19 cm (12/13/99) | SC-4 2-12 cm (12/13/99) | SC-5 0-18 cm (12/13/99) |
| Aroclor-1016 | 34000 | 3900 | <35 | <35 | <37 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1221 | 680 | 220 | <35 | <35 | <37 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1232 | 680 | 220 | <35 | <35 | <37 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1242 | 680 | 220 | <35 | <35 | <37 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1248 | 680 | 220 | <35 | <35 | <37 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1254 | 9800 | 1100 | 13 | 625 | 344 | <33 | <35 | <34 | <34 | <33 |
| Aroclor-1260 | 680 | 220 | <35 | <35 | <37 | <33 | <35 | 48 | 48 | 140 |

## TABLE 12
## (continued)

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Sandia Canyon | Bayo Canyon | | | | | Mortandad Canyon | |
| | EPA MSSL Industrial | EPA MSSL Residential | SC-6 0-12 cm (12/13/99) | BC-1 1-14 cm (12/13/99) | BC-2 14-27 cm (12/13/99) | BC-3 10-22 cm (12/13/99) | BC-4 4-11 cm (12/13/99) | BC-5[c] 14-27 cm (12/13/99) | MC-1 0-5 cm (12/14/99) | MC-2 0-8 cm (12/14/99) |
| Aroclor-1016 | 34000 | 3900 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1221 | 680 | 220 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1232 | 680 | 220 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1242 | 680 | 220 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1248 | 680 | 220 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1254 | 9800 | 1100 | <33 | <34 | <34 | <33 | <32 | <34 | <32 | <33 |
| Aroclor-1260 | 680 | 220 | 58 | <34 | 39 | <33 | <32 | <34 | <32 | <33 |

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Mortandad Canyon | | | | Canada del Buey | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | MC-3 15-24 cm (12/14/99) | MC-4 0-5 cm (12/14/99) | MC-5A 0-13 cm (12/14/99) | MC-5B 22-30 cm (12/14/99) | CC-1 10-17 cm (12/15/99) | CC-2 5-15 cm (12/15/99) | CC-3 1-13 cm (12/15/99) | CC-4 0-2 cm (12/15/99) |
| Aroclor-1016 | 34000 | 3900 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1221 | 680 | 220 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1232 | 680 | 220 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1242 | 680 | 220 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1248 | 680 | 220 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1254 | 9800 | 1100 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |
| Aroclor-1260 | 680 | 220 | <34 | <33 | <34 | <31 | <39 | <35 | <37 | <37 |

## TABLE 12
## (continued)

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Canada del Buey | | | | | | Pajarito Canyon | |
| | EPA MSSL Industrial | EPA MSSL Residential | CC-5A 18-26 cm (12/15/99) | CC-5B 30-39 cm (12/15/99) | CC-6 0-7.5 cm (12/15/99) | CC-7 0-7 cm (12/15/99) | CC-8 20-33 cm (12/15/99) | CC-9[d] 5-22 cm (12/15/99) | PC-1 0-17 cm (12/16/99) | PC-2 0-24 cm (12/16/99) |
| Aroclor-1016 | 34000 | 3900 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1221 | 680 | 220 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1232 | 680 | 220 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1242 | 680 | 220 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1248 | 680 | 220 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1254 | 9800 | 1100 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |
| Aroclor-1260 | 680 | 220 | <36 | <41 | <40 | <38 | <41 | <35 | <36 | <33 |

| PCB | Sample Location, Depth, and Date Collected | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | Pajarito Canyon | | | Ancho Canyon | | | | |
| | EPA MSSL Industrial | EPA MSSL Residential | PC-3 0-21 cm (12/16/99) | PC-4 0-5 cm (12/16/99) | PC-5[e] 0-24 cm (12/16/99) | AC-1 0-5 cm (12/16/99) | AC-2 0-17 cm (12/16/99) | AC-3 5-16 cm (12/16/99) | AC-4 0-7 cm (12/16/99) | AC-5 10-24 cm (12/16/99) |
| Aroclor-1016 | 34000 | 3900 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1221 | 680 | 220 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1232 | 680 | 220 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1242 | 680 | 220 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1248 | 680 | 220 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1254 | 9800 | 1100 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |
| Aroclor-1260 | 680 | 220 | <38 | <34 | <32 | <34 | <34 | <34 | <33 | <31 |

# TABLE 12
# (continued)

| PCB | Sample Location, Depth, and Date Collected | | | | |
|---|---|---|---|---|---|
| | Reference | | QA/QC Samples | | |
| | EPA MSSL Industrial | EPA MSSL Residential | CC-EB (12/15/99) | AC-EB (12/16/99) | ACS-EB (12/06/99) |
| Aroclor-1016 | 34000 | 3900 | <1.0 | <1.0 | <1.0 |
| Aroclor-1221 | 680 | 220 | <1.0 | <1.0 | <1.0 |
| Aroclor-1232 | 680 | 220 | <1.0 | <1.0 | <1.0 |
| Aroclor-1242 | 680 | 220 | <1.0 | <1.0 | <1.0 |
| Aroclor-1248 | 680 | 220 | <1.0 | <1.0 | <1.0 |
| Aroclor-1254 | 9800 | 1100 | <1.0 | <1.0 | <1.0 |
| Aroclor-1260 | 680 | 220 | <1.0 | <1.0 | <1.0 |

* All results reported in micrograms per liter ($\mu g/\ell$).
a EPA Region 6 Human Health Medium-Specific Screening Levels.
b ACS-18-3 is a duplicate sample of ACS-18-1.
c BC-5 is a duplicate sample of BC-2.
d CC-9 is a duplicated sample of CC-2.
e PC-5 is a duplicate sample of PC-2.

## TABLE 13: Summary of Preliminary Analytical Results for Sediment Samples - Radionuclides
## Los Alamos National Laboratory, New Mexico

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | EPA PRG[a] Commercial | EPA PRG Residential | LANL Bkground | ACS-18-1 0-26 cm (12/6/99) | | | ACS-18-3 Duplicate of ACS-18-1 (12/6/99) | | | ACS-18-2 26-46 cm (12/6/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.27 J | 0.21 | 0.21 | 0.21 J | 0.18 | 0.18 | 0.65 J | 0.27 | 0.14 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | **77** | 19 | 0.2 | **82** | 20 | 0.2 | **112** | 22 | 0.1 |
| Uranium-234 | 69 | 18 | 2.59 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-238 | 73 | 18 | 2.29 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Strontium-90 | 57 | 14 | 1.04 | 0.36 | 0.51 | 0.85 | 0.55 | 0.55 | 0.90 | 1.21 J | 0.60 | 0.87 |
| Gross Alpha | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gross Beta | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.51** | 0.18 | 0.12 | **0.74** | 0.16 | 0.12 | **0.65** | 0.22 | 0.13 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | **4.01** | 0.49 | 0.15 | **3.30** | 0.43 | 0.14 | **3.35** | 0.43 | 0.15 |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | -- | -- | -- | 2.2 | 1.5 | 1.3 |
| Lead-212 | | | | 1.26 | 0.32 | 0.13 | 1.07 | 0.33 | 0.13 | 1.19 | 0.30 | 0.14 |
| Lead-214 | | | | 1.22 | 0.36 | 0.17 | 1.27 | 0.37 | 0.18 | 0.95 | 0.33 | 0.22 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **30.5** | 4.3 | 1.1 | **30.0** | 4.1 | 0.9 | **29.0** | 4.4 | 0.9 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | 2.40 | 0.75 | 0.79 | 1.28 | 0.63 | 0.90 |

# TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | ACS-35-0 2-10 cm (12/6/99) | | | ACS-12-1 0-30 cm (12/6/99) | | | ACS-12-2 30-62 cm (12/6/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.12 | 0.11 | 0.13 | -0.036 | 0.075 | 0.20 | 0.43 J | 0.25 | 0.17 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | **27.5** | 6.0 | 0.1 | 0.12 | 0.13 | 0.18 | 0.018 | 0.062 | 0.14 |
| Uranium-234 | 69 | 18 | 2.59 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-238 | 73 | 18 | 2.29 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Strontium-90 | 57 | 14 | 1.04 | -0.91 | 0.56 | 1.0 | 3.54 | 0.95 | 0.88 | **20.7** | 4.3 | 1.4 |
| Gross Alpha | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gross Beta | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.079** | 0.060 | 0.13 | **3.19** | 0.44 | 0.13 | **5.53** | 0.70 | 0.11 |
| Actinium-228 | | | | -- | -- | -- | 1.22 | 0.30 | 0.47 | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | 0.19 | 0.13 | 0.1 | **12.8** | 1.4 | 0.3 | **23.8** | 2.7 | 0.3 |
| Lead-210 | 3.2 | 0.78 | | **1.55** | 0.90 | 0.87 | -- | -- | -- | -- | -- | -- |
| Lead-212 | | | | 0.67 | 0.14 | 0.09 | 1.04 | 0.20 | 0.14 | 1.34 | 0.22 | 0.18 |
| Lead-214 | | | | 0.53 | 0.14 | 0.14 | 0.94 | 0.20 | 0.19 | 1.21 | 0.20 | 0.24 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **28.3** | 4.1 | 1 | **29.3** | 4.1 | 0.9 | **27.8** | 4.2 | 1.5 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | ACS-48-0 0-12 cm (12/6/99) | | | ACS-3-1 0-28 cm (12/6/99) | | | ACS-3-2 37-62 cm (12/6/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 1.02 | 0.43 | 0.15 | 0.48 J | 0.30 | 0.22 | 0.062 | 0.079 | 0.11 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | **184** | 45 | 0.1 | **137** | 34 | 0.2 | **2.73** | 0.70 | 0.10 |
| Uranium-234 | 69 | 18 | 2.59 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-238 | 73 | 18 | 2.29 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Strontium-90 | 57 | 14 | 1.04 | 2.12 J | 0.76 | 0.95 | 0.89 J | 0.56 | 0.85 | 0.74 | 0.51 | 0.80 |
| Gross Alpha | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gross Beta | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.93** | 0.18 | 0.15 | **0.25** | 0.11 | 0.13 | -0.063 | 0.078 | 0.14 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | **3.70** | 0.47 | 0.17 | 1.71 | 0.32 | 0.14 | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **2.4** | 1.3 | 1.5 | **1.8** | 1.3 | 1.4 | -- | -- | -- |
| Lead-212 | | | | 1.09 | 0.21 | 0.23 | 1.30 | 0.34 | 0.14 | 1.29 | 0.37 | 0.14 |
| Lead-214 | | | | 0.95 | 0.18 | 0.18 | 1.31 | 0.37 | 0.19 | 1.15 | 0.39 | 0.20 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **26.0** | 4.2 | 1.1 | **30.0** | 4.5 | 1.1 | **32.7** | 4.8 | 1.4 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | 2.34 | 0.75 | 0.89 | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | Sandia Canyon | | |
| | EPA PRG | EPA PRG | LANL | ACS-3-3 62-89 cm (12/6/99) | | | ACS-3-4 89-104 cm (12/6/99) | | | SC-1 0-17 cm (12/13/99) | | |
| | Commercial | Residential | Bkground | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 1.06 | 0.44 | 0.15 | 0.84 J | 0.37 | 0.15 | NA | NA | NA |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | **117** | 28 | 0.1 | **140** | 33 | 0.1 | NA | NA | NA |
| Uranium-234 | 69 | 18 | 2.59 | NA | NA | NA | NA | NA | NA | 1.08 | 0.34 | 0.07 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NA | NA | NA | NA | NA | 0.092 J | 0.084 | 0.050 |
| Uranium-238 | 73 | 18 | 2.29 | NA | NA | NA | NA | NA | NA | 0.904 J | 0.030 | 0.040 |
| Strontium-90 | 57 | 14 | 1.04 | 5.6 | 1.3 | 0.9 | 10.8 | 2.3 | 0.8 | NA | NA | NA |
| Gross Alpha | | | | NA | NA | NA | NA | NA | NA | 23.5 | 6.3 | 6.0 |
| Gross Beta | | | | NA | NA | NA | NA | NA | NA | 32.3 | 6.8 | 8.3 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **2.84** | 0.39 | 0.13 | **7.10** | 0.89 | 0.15 | NA | NA | NA |
| Actinium-228 | | | | 1.49 | 0.28 | 0.42 | -- | -- | -- | NA | NA | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | **29.3** | 3.3 | 0.3 | **10.6** | 1.2 | 0.3 | NA | NA | NA |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | -- | -- | -- | NA | NA | NA |
| Lead-212 | | | | 1.69 | 0.23 | 0.26 | 1.49 | 0.26 | 0.20 | NA | NA | NA |
| Lead-214 | | | | 1.25 | 0.25 | 0.22 | 1.09 | 0.24 | 0.29 | NA | NA | NA |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **29.0** | 4.4 | 1.5 | **27.9** | 4.3 | 1.2 | NA | NA | NA |
| Thallium-208 | | | | -- | -- | -- | 0.59 | 0.17 | 0.14 | NA | NA | NA |
| Thorium-234 | | | | 1.47 | 0.78 | 0.89 | -- | -- | -- | NA | NA | NA |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Sandia Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | SC-2 0-3 cm (12/13/99) | | | SC-3 8-19 cm (12/13/99) | | | SC-4 2-12 cm (12/13/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Uranium-234 | 69 | 18 | 2.59 | 1.46 | 0.45 | 0.11 | 1.05 | 0.37 | 0.13 | 1.13 | 0.36 | 0.08 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.102 J | 0.098 | 0.10 | **0.17 J** | 0.14 | 0.12 | 0.077 J | 0.079 | 0.052 |
| Uranium-238 | 73 | 18 | 2.29 | 1.15 | 0.38 | 0.08 | 1.06 | 0.37 | 0.13 | 1.34 | 0.41 | 0.04 |
| Strontium-90 | 57 | 14 | 1.04 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gross Alpha | | | | 36.7 | 7.5 | 5.6 | 30.0 | 6.8 | 4.8 | 26.3 | 5.8 | 3.7 |
| Gross Beta | | | | 45.5 | 6.7 | 5.7 | 43.3 | 7.1 | 6.9 | 49.4 | 7.6 | 6.8 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Actinium-228 | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Lead-210 | 3.2 | 0.78 | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Lead-212 | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Lead-214 | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Potassium-40 | 0.25 | 0.068 | 38.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Thallium-208 | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Thorium-234 | | | | NA | NA | NA | NA | NA | NA | NA | NA | NA |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Sandia Canyon | | | | | | Bayo Canyon | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | SC-5 0-18 cm (12/13/99) | | | SC-6 0-12 cm (12/13/99) | | | BC-1 0-14 cm (12/13/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | NA | NA | NA | NA | NA | NA | 0.023 | 0.052 | 0.095 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NA | NA | NA | NA | NA | NA | 0.083 J | 0.073 | 0.060 |
| Uranium-234 | 69 | 18 | 2.59 | 1.37 | 0.41 | 0.07 | 1.48 | 0.49 | 0.17 | 1.46 | 0.44 | 0.04 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.076 J | 0.078 | 0.052 | 0.09 | 0.11 | 0.19 | 0.12 | 0.10 | 0.05 |
| Uranium-238 | 73 | 18 | 2.29 | 1.18 | 0.37 | 0.07 | 1.36 | 0.47 | 0.17 | 1.64 | 0.48 | 0.08 |
| Strontium-90 | 57 | 14 | 1.04 | NA | NA | NA | NA | NA | NA | 0.85 | 0.53 | 0.81 |
| Gross Alpha | | | | 26.4 | 6.2 | 5.4 | 27.3 | 6.1 | 4.4 | 34.0 | 7.3 | 4.4 |
| Gross Beta | | | | 39.1 | 6.1 | 5.6 | 43.3 | 6.9 | 6.6 | 43.4 | 7.1 | 6.9 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NA | NA | NA | NA | NA | NA | **0.83** | 0.20 | 0.15 |
| Actinium-228 | | | | NA | NA | NA | NA | NA | NA | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | NA | NA | NA | NA | NA | NA | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | NA | NA | NA | NA | NA | NA | **1.9** | 1.7 | 1.5 |
| Lead-212 | | | | NA | NA | NA | NA | NA | NA | 1.62 | 0.41 | 0.16 |
| Lead-214 | | | | NA | NA | NA | NA | NA | NA | 1.68 | 0.48 | 0.25 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | NA | NA | NA | NA | NA | NA | **30.6** | 4.7 | 1.3 |
| Thallium-208 | | | | NA | NA | NA | NA | NA | NA | -- | -- | -- |
| Thorium-234 | | | | NA | NA | NA | NA | NA | NA | -- | -- | -- |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Bayo Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | BC-2 14-27 cm (12/13/99) | | | BC-3 10-22 cm (12/13/99) | | | BC-4 4-11 cm (12/13/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.13 | 0.13 | 0.17 | 0.003 | 0.062 | 0.13 | 0.068 | 0.098 | 0.15 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.037 | 0.059 | 0.085 | 0.051 | 0.066 | 0.094 | -0.011 | 0.013 | 0.10 |
| Uranium-234 | 69 | 18 | 2.59 | 1.74 | 0.60 | 0.13 | 1.35 | 0.40 | 0.13 | 1.21 | 0.38 | 0.08 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.13 J | 0.13 | 0.09 | 0.15 J | 0.11 | 0.08 | 0.035 | 0.057 | 0.094 |
| Uranium-238 | 73 | 18 | 2.29 | 1.34 | 0.49 | 0.13 | 1.40 | 0.41 | 0.07 | 0.90 J | 0.31 | 0.04 |
| Strontium-90 | 57 | 14 | 1.04 | 0.34 | .060 | 1.0 | 0.23 | 0.61 | 1.0 | 0.40 | 0.52 | 0.86 |
| Gross Alpha | | | | 33.8 | 7.4 | 5.0 | 30.7 | 6.8 | 5.2 | 25.5 | 6.3 | 4.9 |
| Gross Beta | | | | 49.9 | 7.8 | 7.2 | 46.3 | 7.2 | 6.7 | 47.8 | 7.4 | 6.6 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.38** | 0.15 | 0.15 | **0.06** | 0.12 | 0.24 | **0.32** | 0.12 | 0.14 |
| Actinium-228 | | | | 1.71 | 0.35 | 0.59 | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | **2.5** | 1.8 | 1.5 | **2.5** | 1.5 | 1.2 |
| Lead-212 | | | | 1.43 | 0.26 | 0.27 | 1.83 | 0.28 | 0.15 | 1.21 | 0.34 | 0.21 |
| Lead-214 | | | | 1.35 | 0.26 | 0.24 | 1.59 | 0.29 | 0.27 | 1.25 | 0.41 | 0.19 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **29.1** | 4.6 | 1.9 | **31.3** | 5.4 | 2.1 | **32.6** | 4.7 | 1.4 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | 0.33 | 0.12 | 0.12 |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Bayo Canyon | | | Mortandad Canyon | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | BC-5 Duplicate of BC-2 (12/13/99) | | | MC-1 0-5 cm (12/14/99) | | | MC-2 0-8 cm (12/14/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.066 | 0.079 | 0.11 | 0.053 | 0.078 | 0.12 | 0.17 J | 0.11 | 0.11 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.057 | 0.066 | 0.085 | 0.030 | 0.048 | 0.070 | 0.14 J | 0.10 | 0.11 |
| Uranium-234 | 69 | 18 | 2.59 | 1.65 | 0.47 | 0.10 | 0.78 J | 0.26 | 0.1 | 0.75 J | 0.25 | 0.08 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.13 J | 0.11 | 0.12 | 0.026 | 0.047 | 0.091 | 0.026 | 0.047 | 0.091 |
| Uranium-238 | 73 | 18 | 2.29 | 1.48 | 0.43 | 0.09 | 0.87 J | 0.28 | 0.09 | 0.76 J | 0.26 | 0.08 |
| Strontium-90 | 57 | 14 | 1.04 | 0.16 | 0.52 | 0.89 | 0.20 | 0.52 | 0.88 | 0.08 | 0.43 | 0.75 |
| Gross Alpha | | | | 30.3 | 6.9 | 5.9 | 21.0 | 5.2 | 4.3 | 16.4 | 4.8 | 4.7 |
| Gross Beta | | | | 44.4 | 7.0 | 6.6 | 37.4 | 6.4 | 6.6 | 37.2 | 6.4 | 6.6 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.36** | 0.17 | 0.17 | **0.04** | 0.11 | 0.23 | **0.26** | 0.11 | 0.11 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **4.0** | 1.6 | 1.7 | **3.7** | 1.4 | 1.4 | **2.4** | 1.3 | 1.2 |
| Lead-212 | | | | 1.16 | 0.26 | 0.19 | 1.27 | 0.22 | 0.17 | 1.12 | 0.28 | 0.13 |
| Lead-214 | | | | 1.34 | 0.24 | 0.24 | 1.07 | 0.22 | 0.22 | 0.91 | 0.29 | 0.20 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **26.8** | 4.2 | 2.0 | **32.8** | 5.3 | 1.5 | **31.0** | 5.0 | 1.6 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | MC-3 15-24 cm (12/14/99) | | | MC-4 0-5 cm (12/14/99) | | | MC-5A 0-13 cm (12/14/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.028 | 0.065 | 0.12 | 0.003 | 0.044 | 0.10 | 0.82 | 0.26 | 0.09 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.015 | 0.046 | 0.092 | 0.017 | 0.042 | 0.081 | **106** | 21 | 0.07 |
| Uranium-234 | 69 | 18 | 2.59 | 0.62 J | 0.24 | 0.16 | 0.51 J | 0.20 | 0.07 | 0.73 | 0.26 | 0.07 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.055 J | 0.065 | 0.050 | 0.087 | 0.082 | 0.10 | 0.121 | 0.098 | 0.085 |
| Uranium-238 | 73 | 18 | 2.29 | 0.56 J | 0.22 | 0.04 | 0.56 J | 0.21 | 0.07 | 0.74 | 0.26 | 0.08 |
| Strontium-90 | 57 | 14 | 1.04 | 0.2 | 1.1 | 2.0 | 0.44 | 0.49 | 0.80 | -0.01 | 0.52 | 0.91 |
| Gross Alpha | | | | 19.5 | 5.2 | 4.7 | 16.2 | 4.6 | 3.8 | 20.0 | 5.1 | 4.1 |
| Gross Beta | | | | 47.0 | 7.5 | 7.3 | 39.4 | 6.8 | 7.2 | 42.9 | 6.7 | 6.3 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.005 | 0.068 | 0.12 | **0.44** | 0.15 | 0.16 | **0.124** | 0.095 | 0.14 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | **1.9** | 1.5 | 1.3 | -- | -- | -- |
| Lead-212 | | | | 0.91 | 0.28 | 0.13 | 1.22 | 0.28 | 0.14 | 1.04 | 0.30 | 0.15 |
| Lead-214 | | | | 0.81 | 0.29 | 0.22 | 0.89 | 0.27 | 0.21 | 0.99 | 0.32 | 0.21 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **27.2** | 4.5 | 1.8 | **26.9** | 4.4 | 1.3 | **28.2** | 4.7 | 1.7 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Mortandad Canyon | | | Canada del Buey | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | MC-5B 22-30 cm (12/14/99) | | | CC-1 10-17 cm (12/15/99) | | | CC-2 5-20 cm (12/15/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.46 J | 0.19 | 0.12 | 0.23 | 0.15 | 0.17 | 0.030 | 0.058 | 0.12 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | **67** | 13 | 0.07 | 0.017 | 0.050 | 0.12 | -0.002 | 0.005 | 0.066 |
| Uranium-234 | 69 | 18 | 2.59 | 0.53 J | 0.19 | 0.11 | 0.99 | 0.48 | 0.19 | 0.68 J | 0.28 | 0.14 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.102 J | 0.084 | 0.098 | 0.04 | 0.10 | 0.24 | 0.029 | 0.072 | 0.17 |
| Uranium-238 | 73 | 18 | 2.29 | 0.72 J | 0.23 | 0.06 | 1.0 | 0.48 | 0.11 | 0.72 J | 0.29 | 0.12 |
| Strontium-90 | 57 | 14 | 1.04 | -0.05 | 0.54 | 0.95 | -0.02 | 0.37 | 0.65 | -0.17 | 0.36 | 0.65 |
| Gross Alpha | | | | 13.9 | 4.5 | 4.3 | 17.1 | 4.4 | 3.5 | 20.4 | 5.4 | 4.8 |
| Gross Beta | | | | 37.7 | 6.8 | 7.6 | 37.0 | 5.8 | 5.4 | 27.3 | 5.6 | 6.7 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.005 | 0.075 | 0.14 | -0.06 | 0.12 | 0.22 | **0.13** | 0.10 | 0.17 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **1.50** | 0.90 | 1.5 | **3.7** | 1.6 | 1.4 | **2.7** | 1.3 | 1.4 |
| Lead-212 | | | | 0.94 | 0.19 | 0.14 | 1.02 | 0.22 | 0.25 | 1.26 | 0.34 | 0.22 |
| Lead-214 | | | | 0.75 | 0.17 | 0.18 | 1.16 | 0.24 | 0.24 | 1.02 | 0.37 | 0.24 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **30.4** | 4.6 | 1.3 | **24.7** | 4.5 | 2.4 | **22.8** | 4.0 | 1.0 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Canada del Buey | | | | | | | | |
| | EPA PRG | EPA PRG | LANL | CC-3 0-13 cm (12/15/99) | | | CC-4 0-2 cm (12/15/99) | | | CC-5A 18-26 cm (12/15/99) | | |
| | Commercial | Residential | Bkground | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.012 | 0.057 | 0.15 | 0.11 | 0.11 | 0.16 | -0.006 | 0.056 | 0.16 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.034 | 0.055 | 0.11 | 0.007 | 0.036 | 0.11 | 0.006 | 0.031 | 0.092 |
| Uranium-234 | 69 | 18 | 2.59 | 0.82 J | 0.40 | 0.15 | 1.11 | 0.50 | 0.18 | 1.07 | 0.41 | 0.10 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.0 | 0.0 | 0.1 | 0.14 J | 0.16 | 0.12 | 0.12 J | 0.13 | 0.08 |
| Uranium-238 | 73 | 18 | 2.29 | 1.04 | 0.46 | 0.1 | 1.08 | 0.48 | 0.10 | 0.87 J | 0.36 | 0.10 |
| Strontium-90 | 57 | 14 | 1.04 | 0.03 | 0.55 | 0.97 | -0.06 | 0.33 | 0.59 | 0.01 | 0.41 | 0.72 |
| Gross Alpha | | | | 18.8 | 5.3 | 4.2 | 21.5 | 5.3 | 4.2 | 29.9 | 6.6 | 4.5 |
| Gross Beta | | | | 35.3 | 6.2 | 6.5 | 37.4 | 6.0 | 6.0 | 36.4 | 5.8 | 5.6 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.012 | 0.095 | 0.17 | **0.10** | 0.10 | 0.21 | -0.05 | 0.12 | 0.22 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | **3.8** | 1.5 | 1.8 | **2.7** | 1.3 | 1.5 |
| Lead-212 | | | | 1.17 | 0.33 | 0.23 | 1.23 | 0.23 | 0.25 | 1.45 | 0.26 | 0.17 |
| Lead-214 | | | | 1.0 | 0.36 | 0.20 | 1.03 | 0.23 | 0.25 | 1.35 | 0.24 | 0.23 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **26.6** | 4.6 | 1.7 | **28.8** | 4.7 | 1.4 | **25.2** | 4.8 | 1.8 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Canada del Buey | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | CC-5B 30-39 cm (12/15/99) | | | CC-6 0-7.5 cm (12/15/99) | | | CC-7 0-7 cm (12/15/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.060 | 0.097 | 0.20 | 0.16 J | 0.12 | 0.14 | 0.18 J | 0.12 | 0.15 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.034 | 0.054 | 0.090 | 0.013 | 0.034 | 0.079 | 0.031 | 0.056 | 0.11 |
| Uranium-234 | 69 | 18 | 2.59 | 0.84 | 0.28 | 0.08 | 0.99 J | 0.38 | 0.19 | 0.99 J | 0.45 | 0.1 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.100 | 0.096 | 0.14 | 0.11 J | 0.11 | 0.07 | 0.045 | 0.091 | 0.12 |
| Uranium-238 | 73 | 18 | 2.29 | 0.85 | 0.29 | 0.12 | 1.16 | 0.42 | 0.14 | 0.76 J | 0.39 | 0.18 |
| Strontium-90 | 57 | 14 | 1.04 | 0.31 | 0.85 | 1.5 | -0.19 | 0.44 | 0.78 | -0.33 | 0.47 | 0.84 |
| Gross Alpha | | | | 14.4 | 4.5 | 4.5 | 17.2 | 4.7 | 4.0 | 18.6 | 5.1 | 4.3 |
| Gross Beta | | | | 33.0 | 6.1 | 6.7 | 35.9 | 6.0 | 6.0 | 32.9 | 6.4 | 7.5 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.017 | 0.088 | 0.18 | **0.21** | 0.13 | 0.15 | **0.092** | 0.072 | 0.15 |
| Actinium-228 | | | | 1.52 | 0.38 | 0.57 | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **3.1** | 1.4 | 1.2 | -- | -- | -- | **3.3** | 1.2 | 1.1 |
| Lead-212 | | | | 1.25 | 0.23 | 0.15 | 1.22 | 0.34 | 0.16 | 1.16 | 0.30 | 0.20 |
| Lead-214 | | | | 1.26 | 0.24 | 0.20 | 1.21 | 0.39 | 0.19 | 0.83 | 0.31 | 0.18 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **24.6** | 4.3 | 1.6 | **22.7** | 3.9 | 1.7 | **35.7** | 4.2 | 1.3 |
| Thallium-208 | | | | 0.51 | 0.13 | 0.14 | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Canada del Buey | | | | | | Pajarito Canyon | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | CC-8 20-33 cm (12/15/99) | | | CC-9 Duplicate of CC-2 (12/15/99) | | | PC-1 0-17 cm (12/16/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.20 J | 0.14 | 0.19 | 0.12 | 0.11 | 0.17 | 0.1 | 0.11 | 0.20 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | -0.010 | 0.040 | 0.15 | 0.13 J | 0.10 | 0.11 | 0.034 | 0.055 | 0.091 |
| Uranium-234 | 69 | 18 | 2.59 | 1.13 | 0.40 | 0.10 | 0.82 J | 0.31 | 0.18 | 0.91 J | 0.39 | 0.14 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.026 | 0.053 | 0.072 | 0.042 | 0.068 | 0.11 | 0.035 | 0.071 | 0.096 |
| Uranium-238 | 73 | 18 | 2.29 | 0.74 J | 0.30 | 0.10 | 0.81 J | 0.31 | 0.09 | 0.82 J | 0.36 | 0.14 |
| Strontium-90 | 57 | 14 | 1.04 | 0.7 | 1.7 | 3.0 | 0.05 | 0.53 | 0.91 | 0.55 | 0.47 | 0.75 |
| Gross Alpha | | | | 22.3 | 5.5 | 4.5 | 15.6 | 4.3 | 3.5 | 19.3 | 5.0 | 4.1 |
| Gross Beta | | | | 40.1 | 6.7 | 6.6 | 33.8 | 5.7 | 5.8 | 30.6 | 5.0 | 4.8 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.016 | 0.095 | 0.17 | -0.003 | 0.10 | 0.20 | **0.41** | 0.14 | 0.15 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **2.5** | 1.1 | 1.5 | **2.7** | 1.4 | 1.2 | **2.6** | 1.4 | 1.3 |
| Lead-212 | | | | 1.11 | 0.20 | 0.22 | 1.20 | 0.21 | 0.16 | 1.18 | 0.34 | 0.16 |
| Lead-214 | | | | 1.04 | 0.19 | 0.20 | 1.00 | 0.18 | 0.22 | 1.01 | 0.33 | 0.24 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **23.4** | 3.9 | 1.6 | **21.0** | 3.9 | 1.8 | **20.1** | 4.2 | 1.5 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | 0.52 | 0.16 | 0.12 |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
# (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Pajarito Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | PC-2 0-24 cm (12/16/99) | | | PC-3 0-21 cm (12/16/99) | | | PC-4 0-5 cm (12/16/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.065 | 0.072 | 0.12 | 0.035 | 0.077 | 0.17 | 0.15 | 0.12 | 0.17 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.040 | 0.050 | 0.068 | 0.006 | 0.045 | 0.13 | 0.007 | 0.035 | 0.10 |
| Uranium-234 | 69 | 18 | 2.59 | 0.85 J | 0.35 | 0.07 | 0.73 J | 0.31 | 0.16 | 0.72 J | 0.32 | 0.16 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.060 | 0.086 | 0.081 | 0.016 | 0.057 | 0.16 | 0.025 | 0.064 | 0.15 |
| Uranium-238 | 73 | 18 | 2.29 | 0.77 J | 0.33 | 0.12 | 0.85 J | 0.34 | 0.13 | 1.18 | 0.44 | 0.12 |
| Strontium-90 | 57 | 14 | 1.04 | 0.20 | 0.45 | 0.77 | 0.26 | 0.40 | 0.68 | 0.39 | 0.41 | 0.68 |
| Gross Alpha | | | | 21.0 | 5.7 | 5.6 | 21.2 | 5.2 | 4.0 | 19.7 | 4.9 | 4.0 |
| Gross Beta | | | | 32.5 | 5.7 | 6.0 | 30.6 | 5.3 | 5.5 | 30.6 | 5.4 | 5.8 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.054** | 0.096 | 0.18 | **0.34** | 0.18 | 0.19 | **0.37** | 0.14 | 0.13 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | **3.4** | 1.5 | 1.5 | -- | -- | -- |
| Lead-212 | | | | 1.27 | 0.25 | 0.20 | 1.19 | 0.24 | 0.19 | 1.11 | 0.31 | 0.21 |
| Lead-214 | | | | 0.94 | 0.24 | 0.24 | 1.17 | 0.23 | 0.29 | 0.95 | 0.35 | 0.18 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **25.3** | 4.3 | 1.6 | **23.0** | 4.7 | 1.7 | **24.0** | 4.2 | 2.3 |
| Thallium-208 | | | | 0.46 | 0.14 | 0.15 | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Pajarito Canyon | | | Ancho Canyon | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | PC-5 Duplicate of PC-2 (12/16/99) | | | AC-1 0-5 cm (12/16/99) | | | AC-2 0-17 cm (12/16/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.062 | 0.072 | 0.12 | 0.040 | 0.059 | 0.11 | 0.14 | 0.11 | 0.15 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.000 | 0.028 | 0.095 | 0.050 | 0.058 | 0.092 | -0.021 | 0.033 | 0.14 |
| Uranium-234 | 69 | 18 | 2.59 | 0.83 J | 0.33 | 0.14 | 1.62 | 0.51 | 0.16 | 1.30 | 0.54 | 0.28 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.076 | 0.097 | 0.13 | 0.054 | 0.089 | 0.17 | -0.03 | 0.10 | 0.38 |
| Uranium-238 | 73 | 18 | 2.29 | 0.89 J | 0.35 | 0.14 | 2.66 | 0.75 | 0.14 | 1.28 | 0.54 | 0.32 |
| Strontium-90 | 57 | 14 | 1.04 | 0.14 | 0.40 | 0.69 | -0.47 | 0.44 | 0.78 | 0.23 | 0.36 | 0.61 |
| Gross Alpha | | | | 19.4 | 4.8 | 4.0 | 24.6 | 5.1 | 3.1 | 19.9 | 4.9 | 3.8 |
| Gross Beta | | | | 34.7 | 5.5 | 5.3 | 39.6 | 5.5 | 4.4 | 40.8 | 6.0 | 5.1 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.052** | 0.097 | 0.18 | **0.39** | 0.16 | 0.15 | **0.16** | 0.16 | 0.17 |
| Actinium-228 | | | | -- | -- | -- | 1.14 | 0.34 | 0.46 | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | -- | -- | -- | **2.9** | 1.6 | 2.0 | **3.5** | 1.3 | 1.4 |
| Lead-212 | | | | 1.20 | 0.36 | 0.21 | 1.30 | 0.25 | 0.20 | 1.43 | 0.23 | 0.23 |
| Lead-214 | | | | 1.26 | 0.42 | 0.23 | 1.09 | 0.22 | 0.27 | 1.02 | 0.26 | 0.28 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **22.2** | 3.9 | 1.7 | **27.7** | 4.8 | 1.8 | **29.9** | 5.3 | 2.3 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# TABLE 13
## (continued)

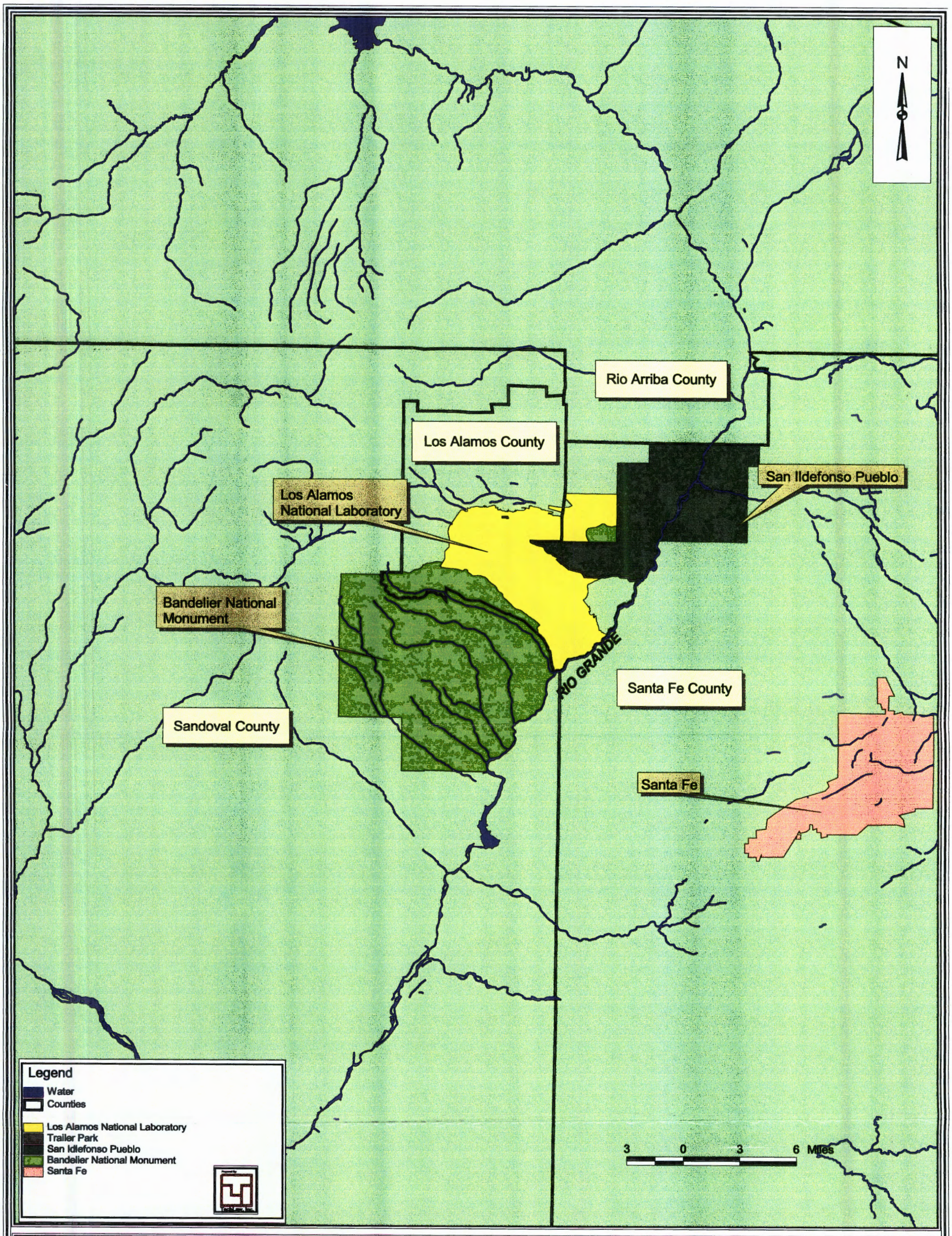
| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Ancho Canyon | | | | | | | | |
| | EPA PRG Commercial | EPA PRG Residential | LANL Bkground | AC-3 5-16 cm (12/16/99) | | | AC-4 0-7 cm (12/16/99) | | | AC-5 10-24 cm (12/16/99) | | |
| | | | | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.129 J | 0.097 | 0.097 | 0.018 | 0.037 | 0.080 | 0.027 | 0.051 | 0.11 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.025 | 0.044 | 0.087 | 0.013 | 0.025 | 0.034 | -0.009 | 0.009 | 0.083 |
| Uranium-234 | 69 | 18 | 2.59 | 0.93 | 0.36 | 0.12 | 1.25 | 0.43 | 0.1 | 0.81 | 0.33 | 0.22 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | 0.15 | 0.14 | 0.17 | 0.046 | 0.073 | 0.12 | 0.033 | 0.082 | 0.19 |
| Uranium-238 | 73 | 18 | 2.29 | 1.34 | 0.46 | 0.12 | 1.55 | 0.50 | 0.12 | 1.05 | 0.39 | 0.11 |
| Strontium-90 | 57 | 14 | 1.04 | 0.31 | 0.38 | 0.63 | 0.22 | 0.40 | 0.67 | 0.24 | 0.43 | 0.72 |
| Gross Alpha | | | | 28.4 | 5.9 | 3.7 | 22.6 | 5.4 | 4.4 | 19.5 | 4.7 | 3.3 |
| Gross Beta | | | | 41.0 | 4.1 | 5.5 | 43.1 | 6.8 | 6.3 | 39.7 | 5.9 | 5.1 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | **0.36** | 0.14 | 0.14 | **0.37** | 0.14 | 0.14 | **0.12** | 0.11 | 0.21 |
| Actinium-228 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Lead-210 | 3.2 | 0.78 | | **4.2** | 1.4 | 1.3 | -- | -- | -- | **3.2** | 1.6 | 1.6 |
| Lead-212 | | | | 1.38 | 0.36 | 0.16 | 1.04 | 0.29 | 0.20 | 1.07 | 0.22 | 0.22 |
| Lead-214 | | | | 1.16 | 0.41 | 0.20 | 0.91 | 0.33 | 0.19 | 1.06 | 0.23 | 0.25 |
| Potassium-40 | 0.25 | 0.068 | 38.6 | **28.2** | 4.4 | 1.6 | **28.4** | 4.3 | 0.8 | **28.6** | 4.6 | 1.2 |
| Thallium-208 | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Thorium-234 | | | | 1.96 | 0.79 | 0.98 | -- | -- | -- | -- | -- | -- |

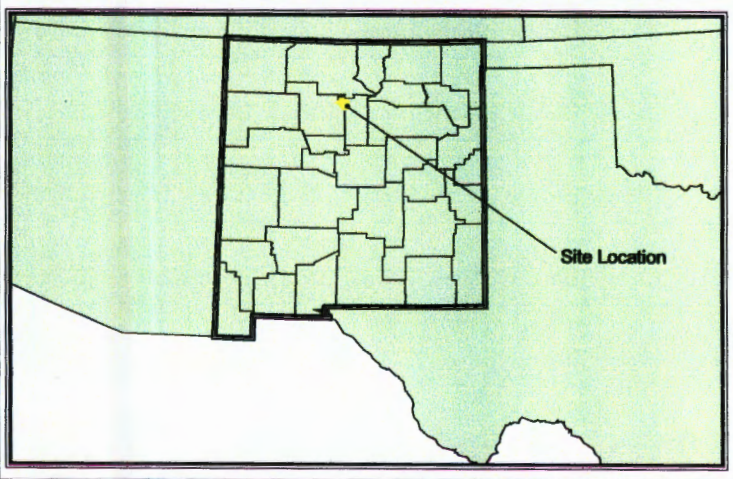
## TABLE 13
## (continued)

| Radionuclide | Sample Location, Depth, and Date Collected | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | QA/QC Samples | | | | | | | | |
| | EPA PRG[a] | EPA PRG | LANL | ACS-EB (12/6/99) | | | CC-EB (12/15/99) | | | AC-EB (12/16/99) | | |
| | Commercial | Residential | Bkground | Result | Sigma Error | MDC | Result | Sigma Error | MDC | Result | Sigma Error | MDC |
| Plutonium-238 | 11 | 2.7 | 0.006 | -0.5 | 0.11 | 0.37 | -0.10 | 0.51 | 1.5 | 0.37 | 0.61 | 1.2 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 0.013 | 0.099 | 0.28 | 0.08 | 0.39 | 1.1 | -0.023 | 0.047 | 0.56 |
| Uranium-234 | 69 | 18 | 2.59 | NA | NA | NA | 0.1 | 0.11 | 0.13 | 0.08 | 0.10 | 0.14 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NA | NA | 0.032 | 0.065 | 0.087 | 0.0 | 0.0 | 0.1 |
| Uranium-238 | 73 | 18 | 2.29 | NA | NA | NA | 0.021 | 0.053 | 0.12 | 0.57 | 0.081 | 0.077 |
| Strontium-90 | 57 | 14 | 1.04 | 0.13 | 0.87 | 1.5 | -0.25 | 0.50 | 0.88 | 0.38 | 0.85 | 1.4 |
| Gross Alpha | | | | NA | NA | NA | -0.11 | 0.63 | 1.2 | -0.36 | 0.48 | 1.0 |
| Gross Beta | | | | NA | NA | NA | -0.14 | 0.96 | 1.7 | -0.9 | 1.0 | 1.8 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | -0.5 | 6.4 | 13 | -13.0 | 7.8 | 14 | **0.5** | 8.2 | 16 |

* All results reported in pico Curies per gram (pCi/g).
a Preliminary Remediation Goals
NA Not Analyzed
– Radionuclide was not detected.
J Result is greater than sample detection limit but less than stated reported limit.

# FIGURES

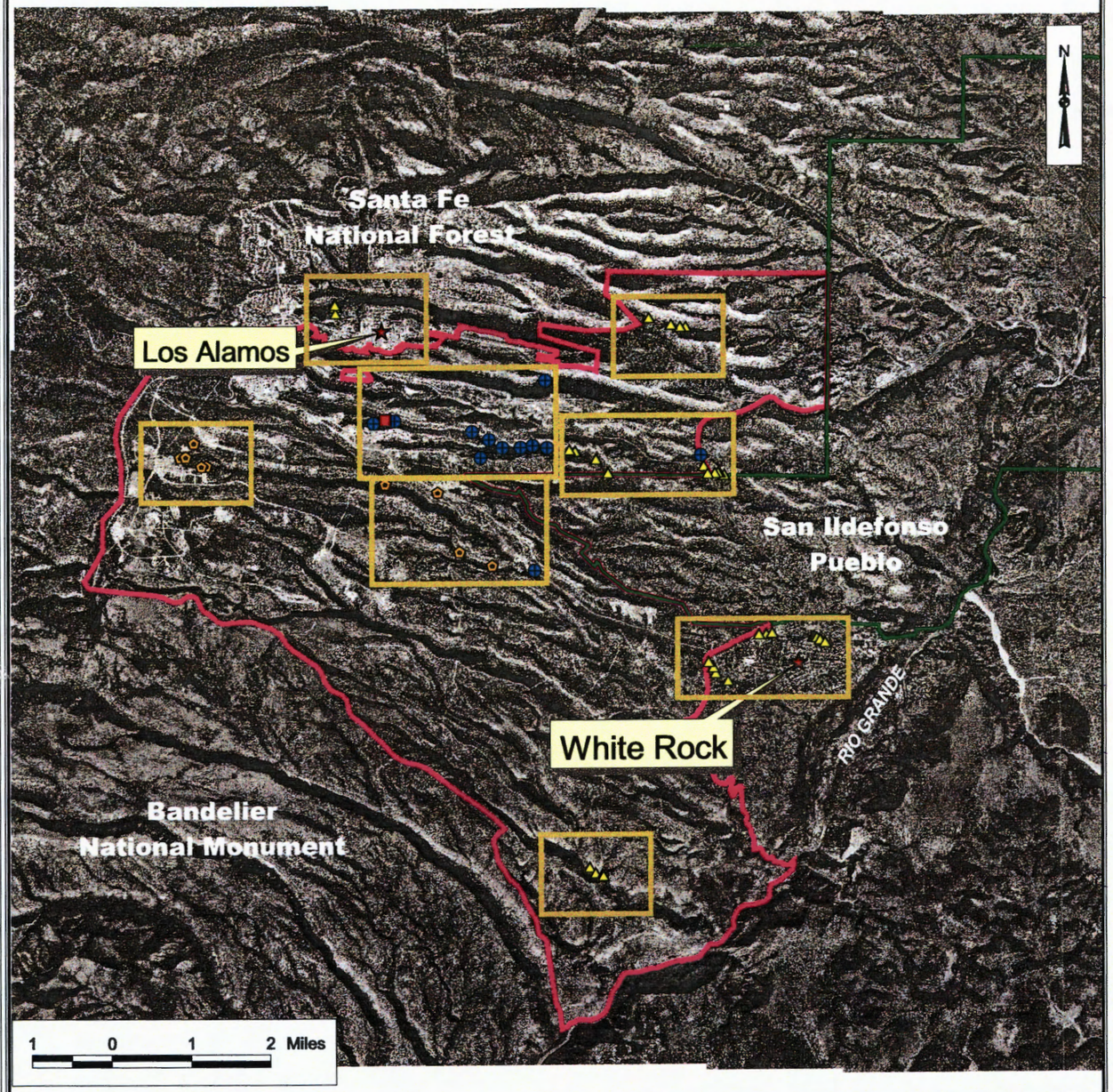


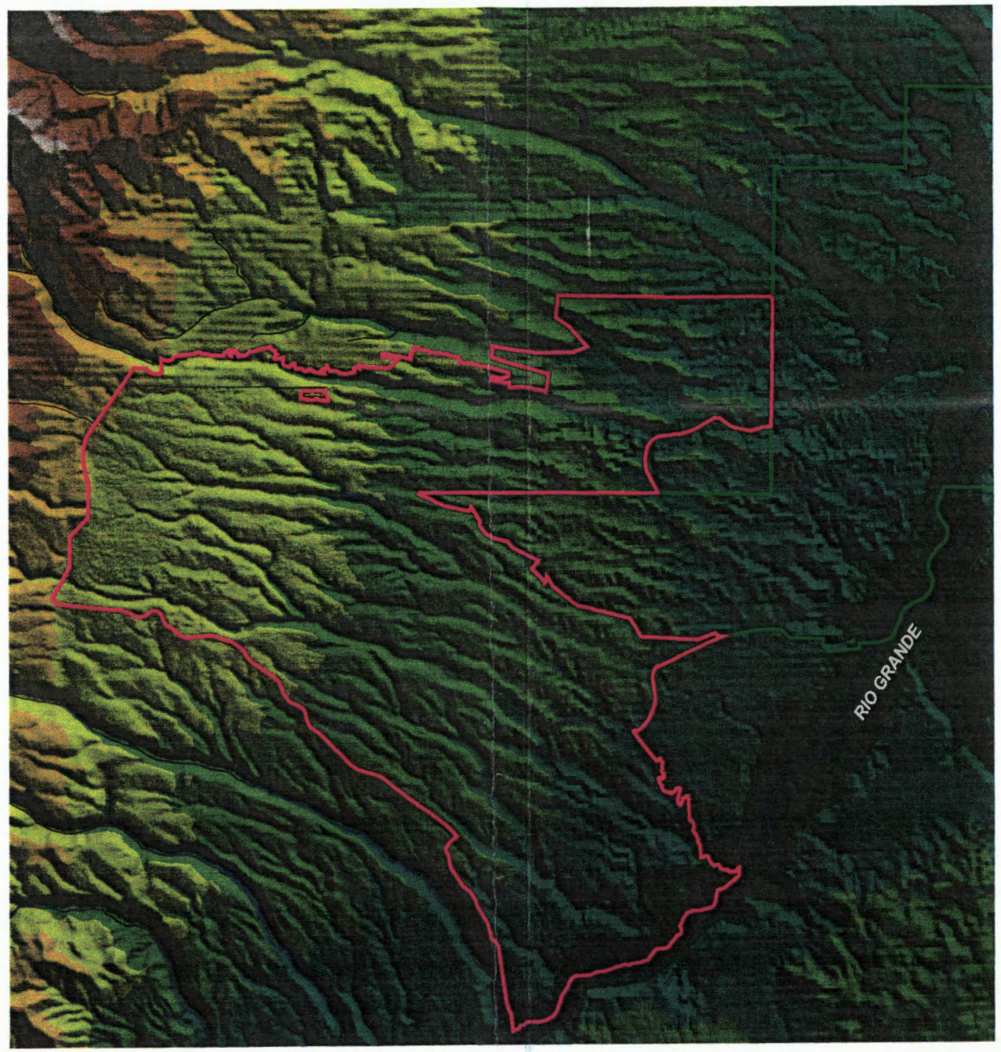




# Figure 1

Site Location Map
Los Alamos National Laboratory

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY




Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Sample Areas (Areas of Interest)

# Figure 2

## Aerial View and Digital Elevation Model
## Los Alamos National Laboratory

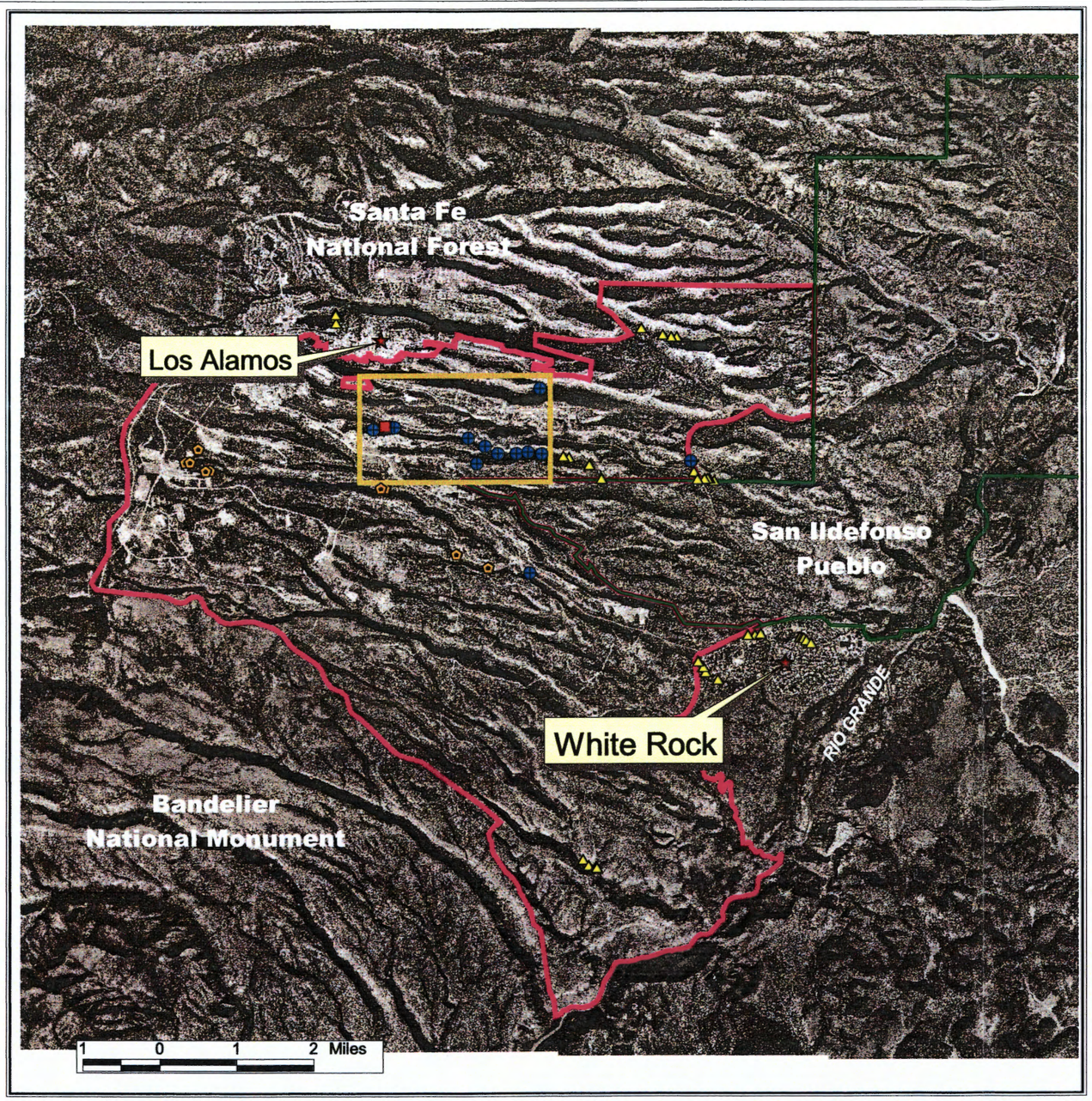
Prepared by Tech-Law, Inc.

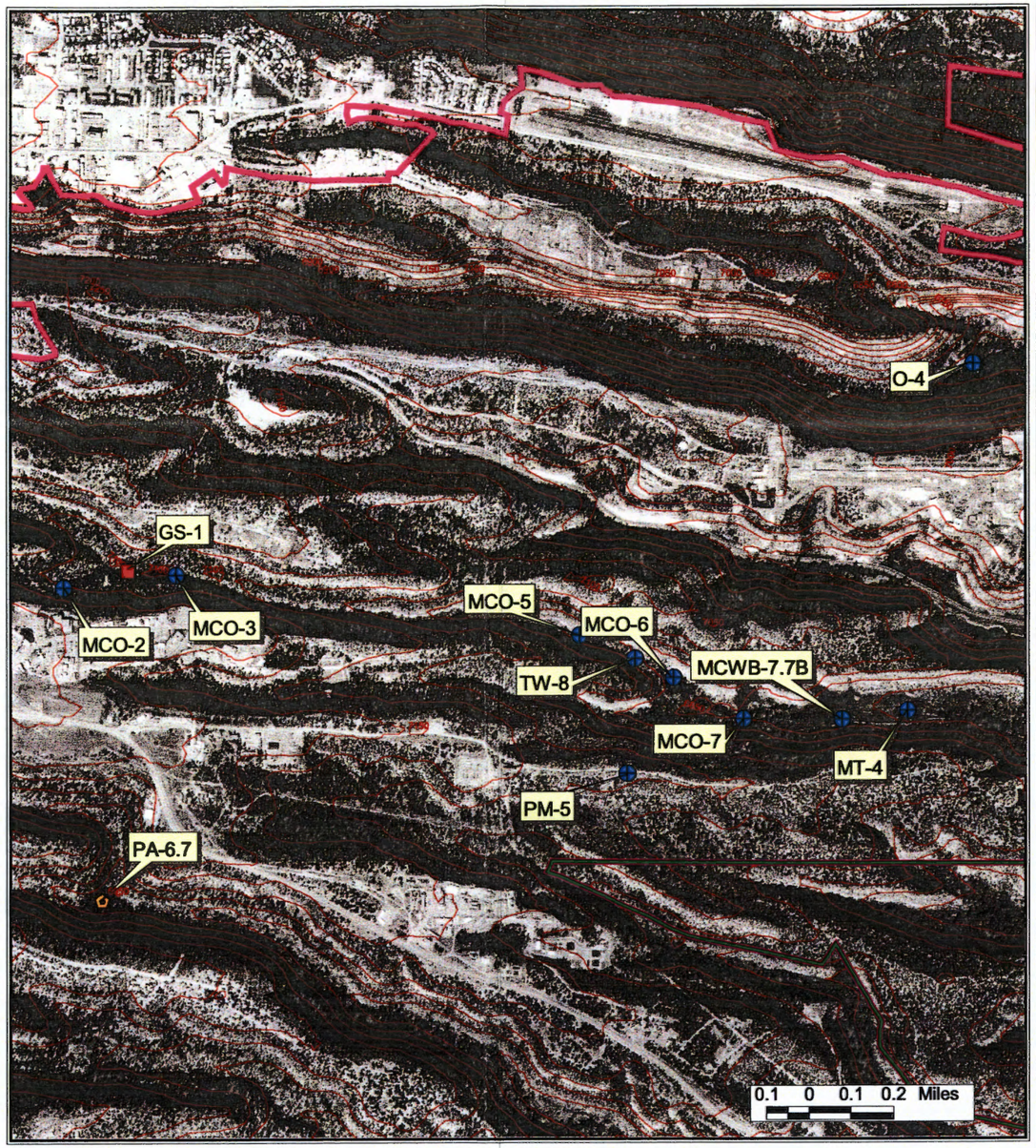
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

- Los Alamos National Laboratory
- San Ildefonso Pueblo
- Rivers

Elevation in Feet

Elevation Range
- 10135 - 10735
- 9535 - 10135
- 8935 - 9535
- 8335 - 8935
- 7735 - 8335
- 7135 - 7735
- 6535 - 7135
- 5935 - 6535
- 5335 - 5935

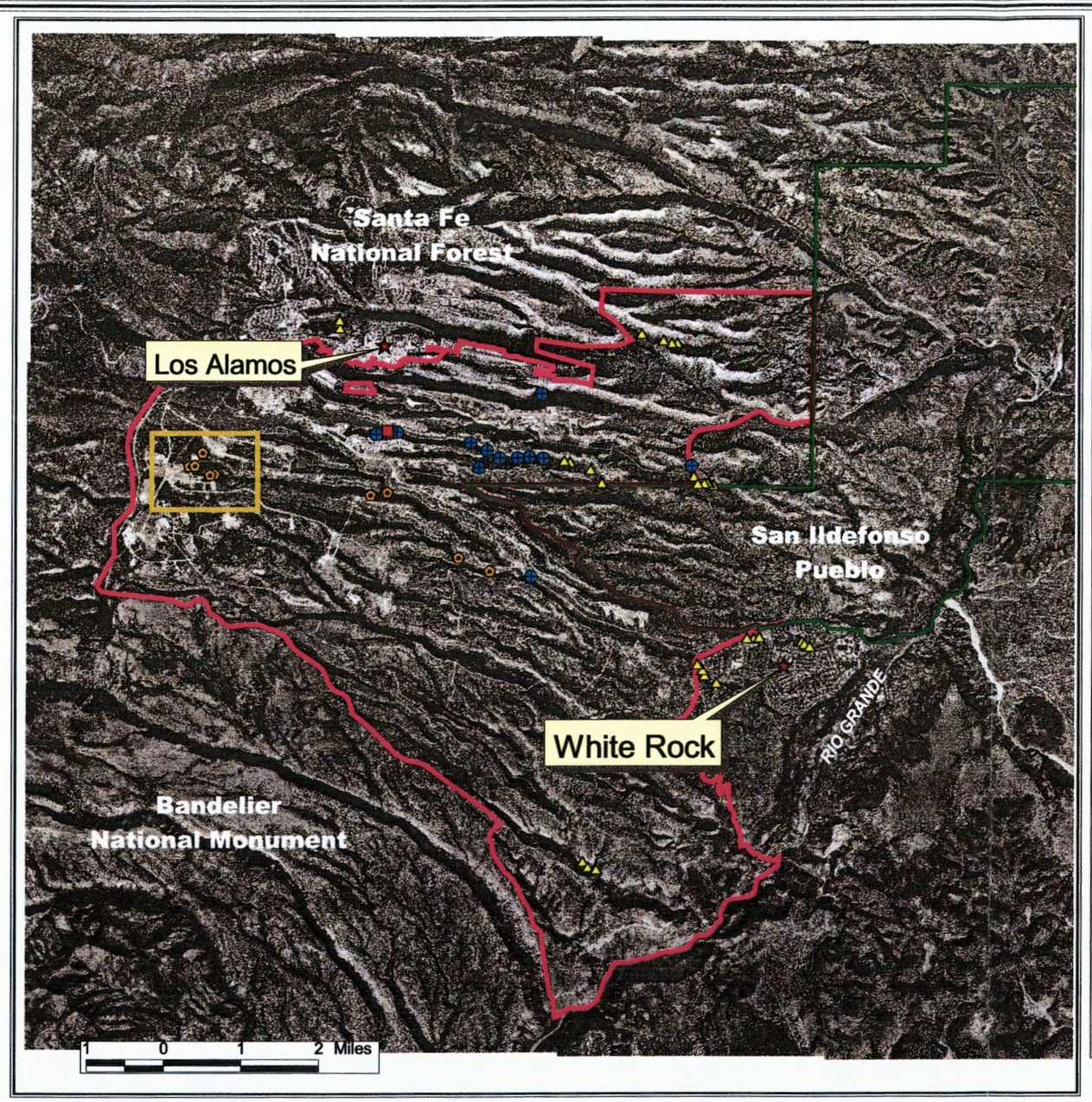


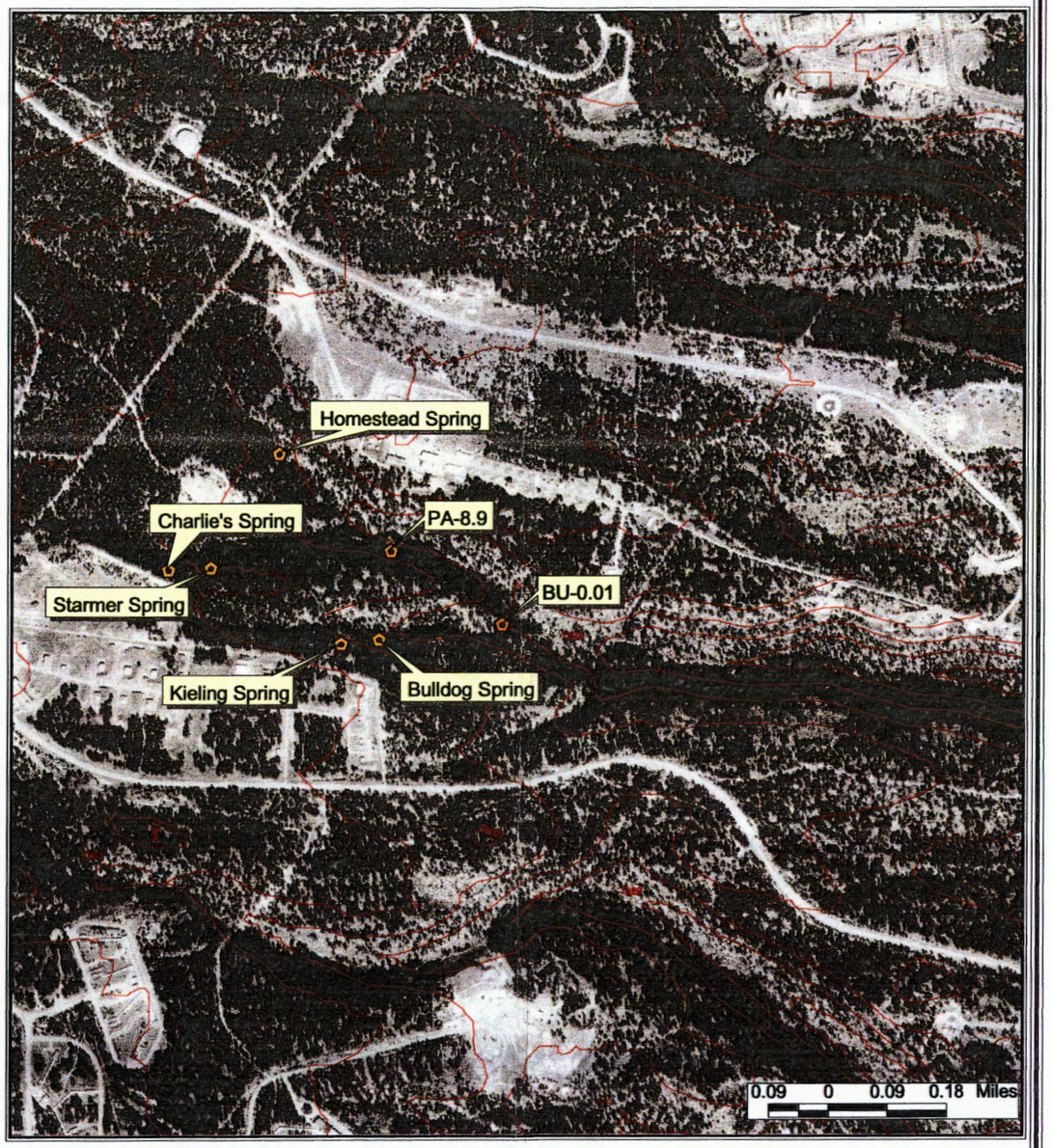



# Figure 3

Aerial View/Sample Locations
Mortandad Canyon
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

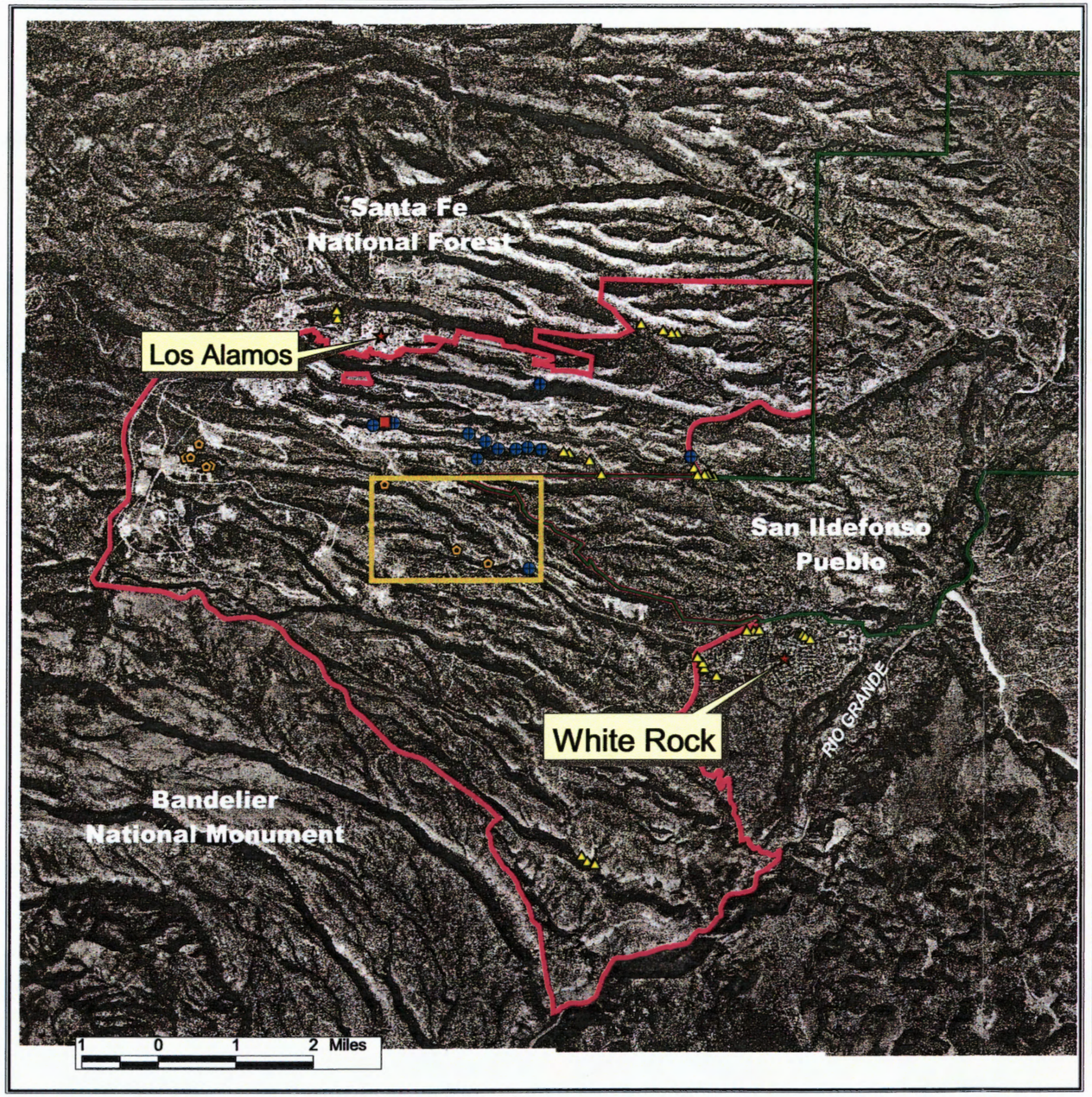


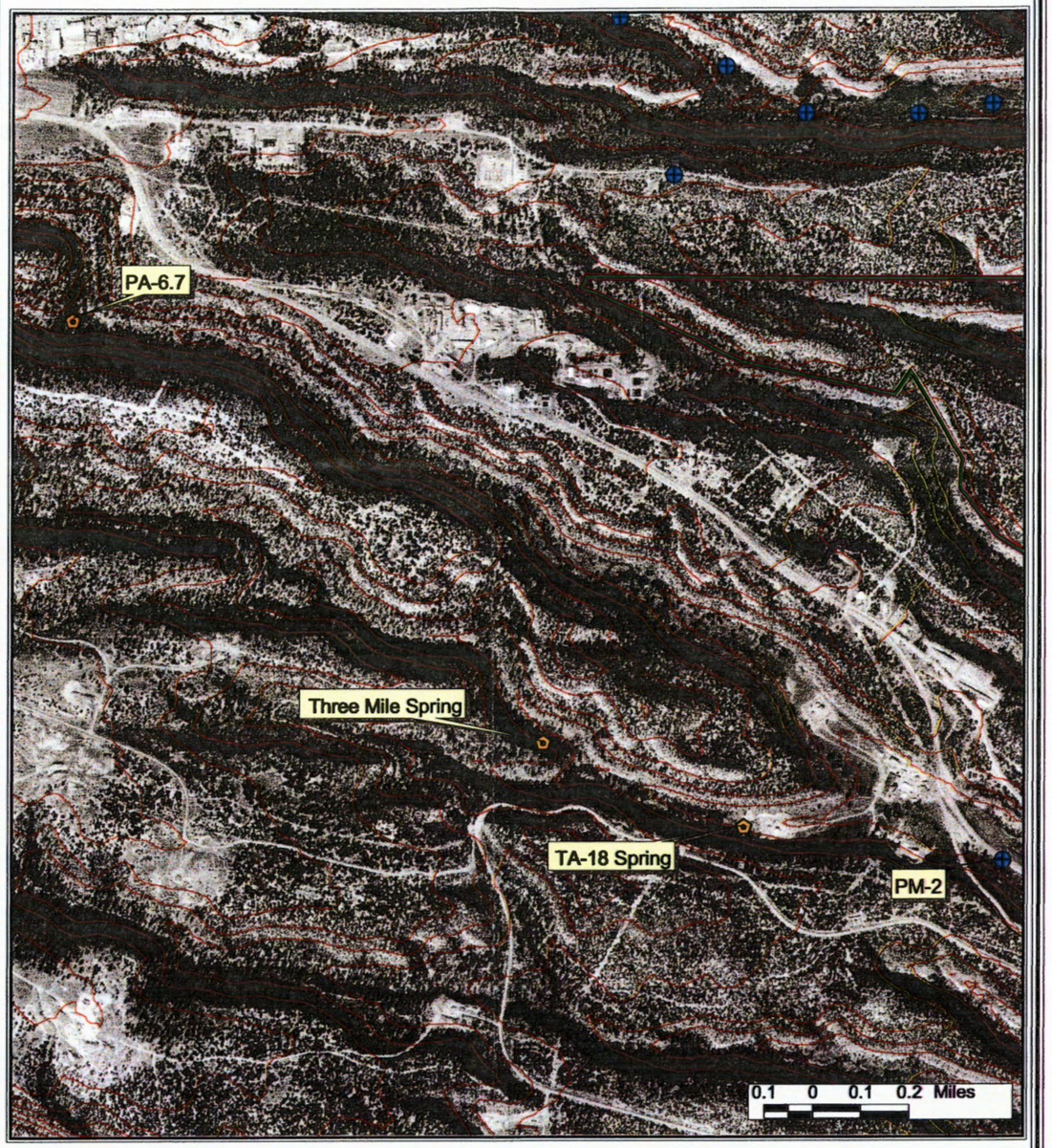



# Figure 4

Aerial View/Sample Locations
Upper Pajarito Canyon
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

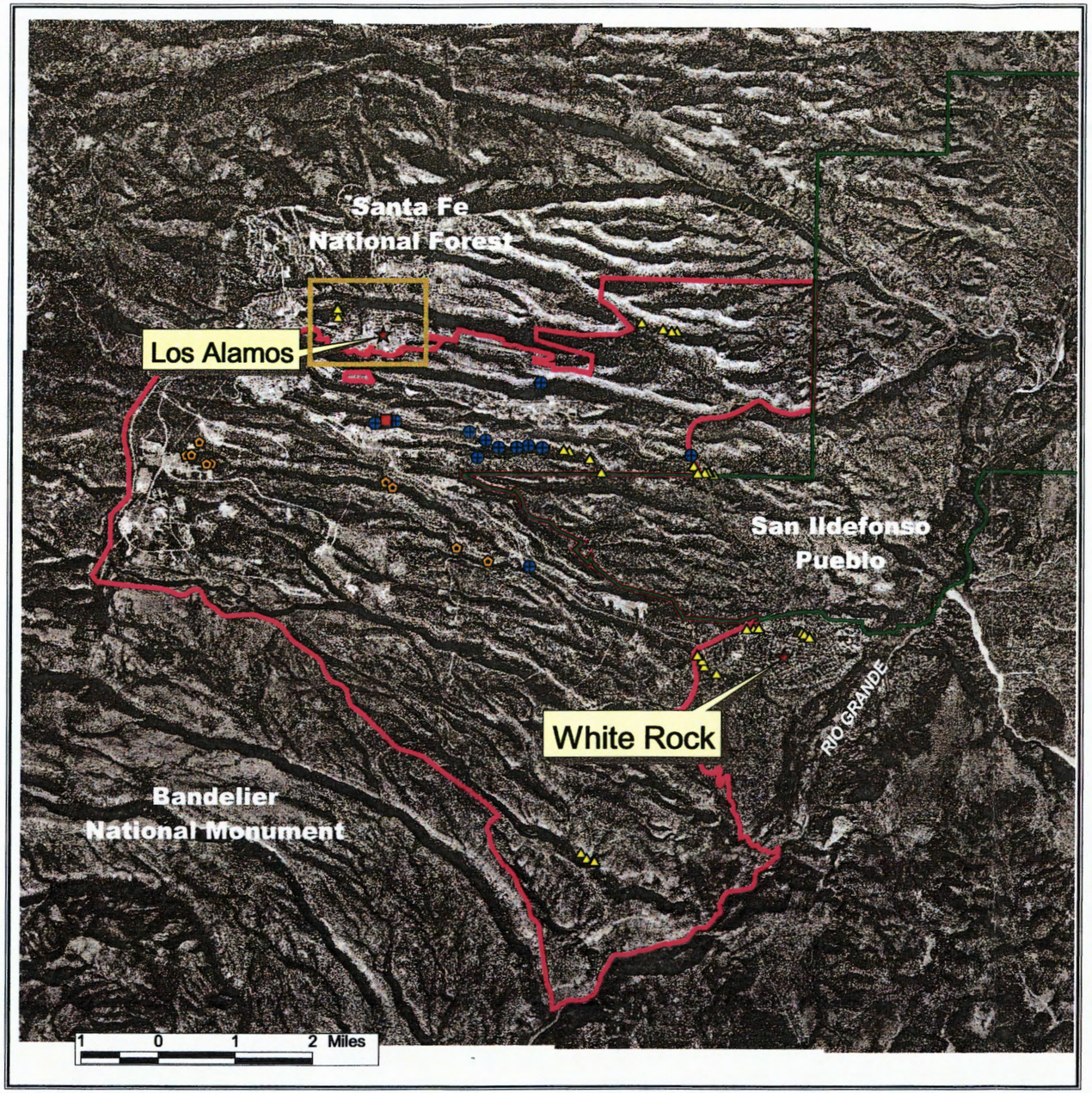


# Figure 5

Aerial View/Sample locations
Middle Pajarito Canyon
Los Alamos National Laboratory

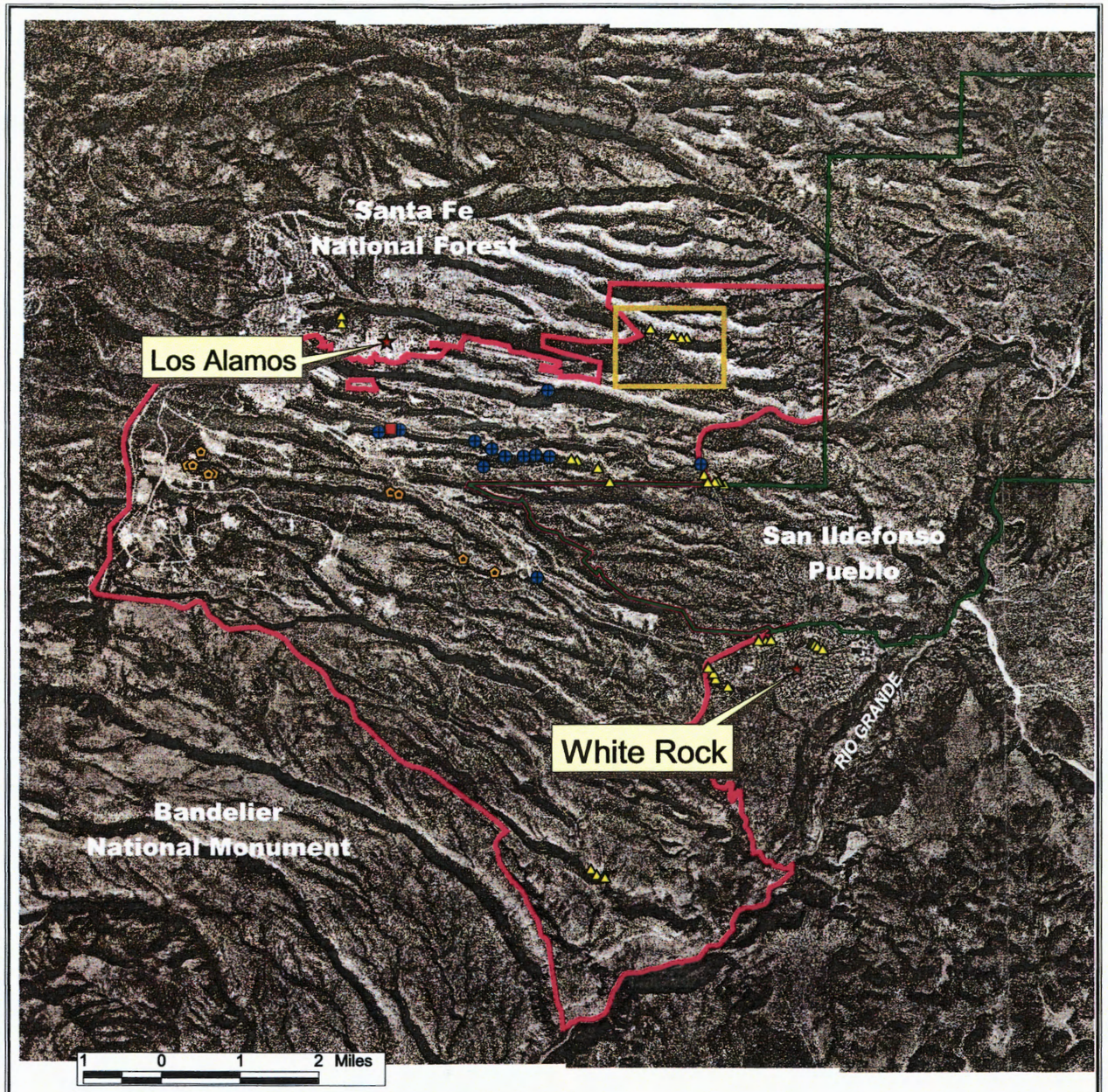
Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)



# Figure 6

Aerial View/Sample Locations
Acid Canyon
Los Alamos National Laboratory

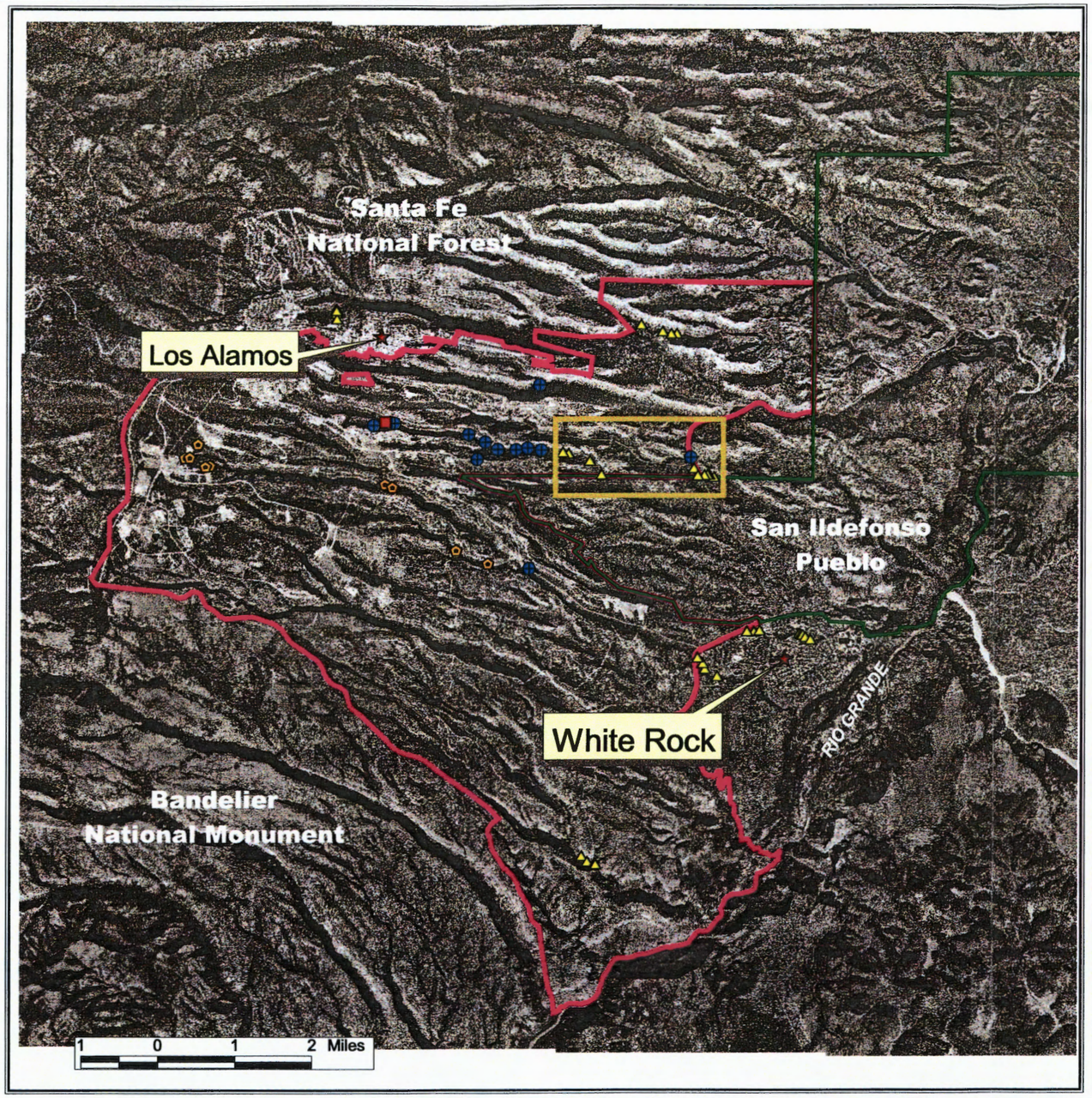
Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

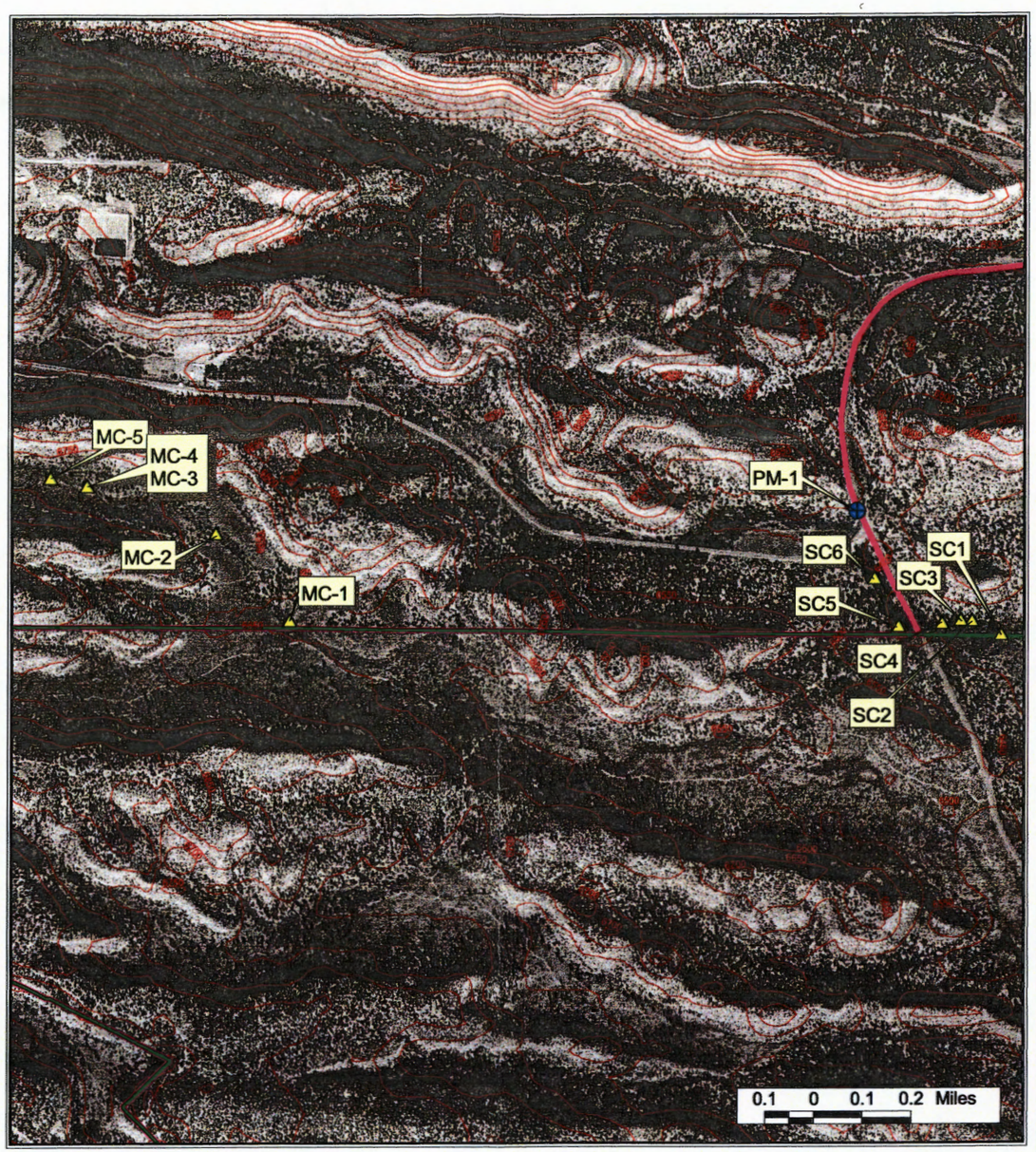


# Figure 7

Aerial View/Sample Locations
Bayo Canyon
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

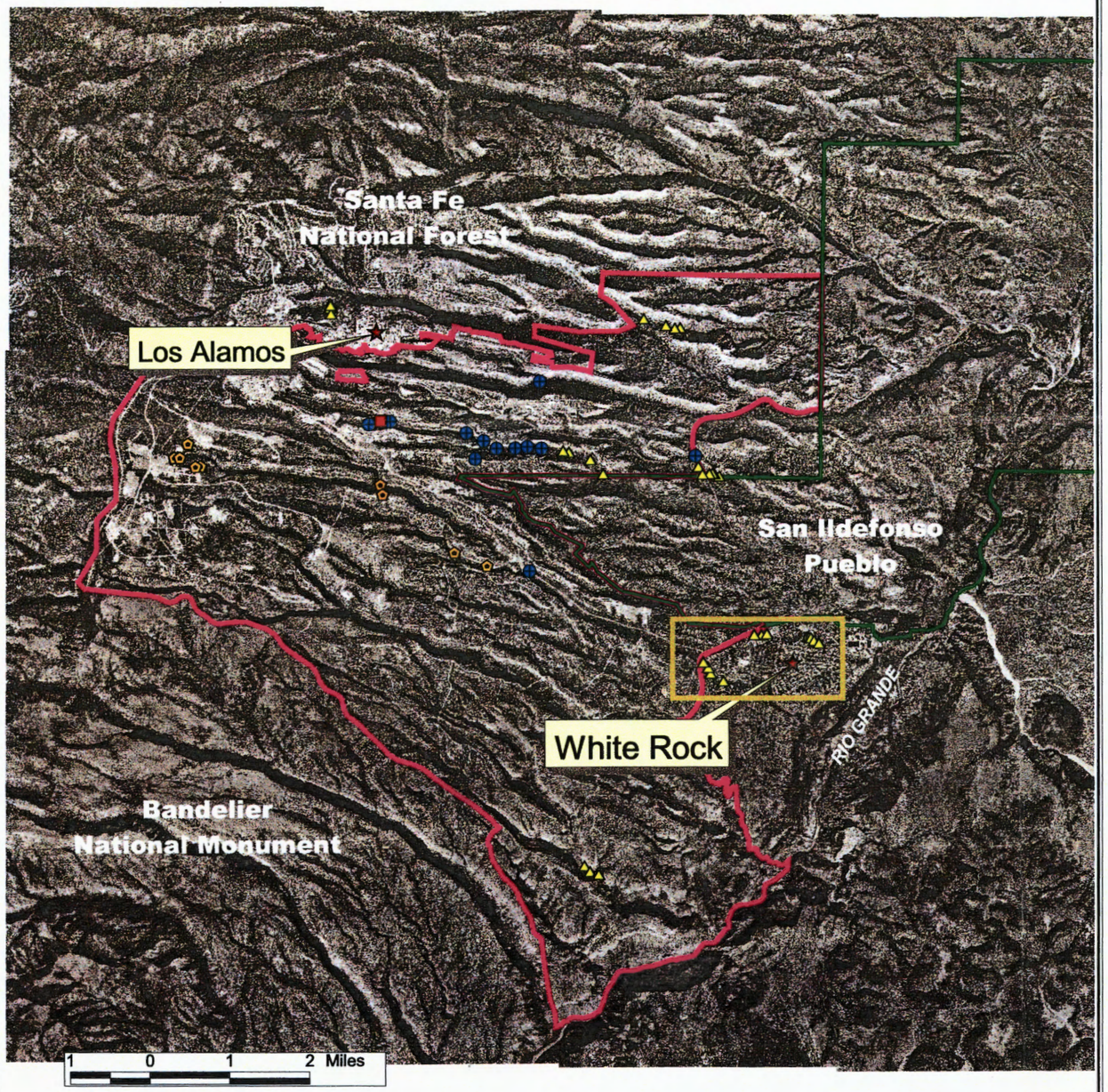


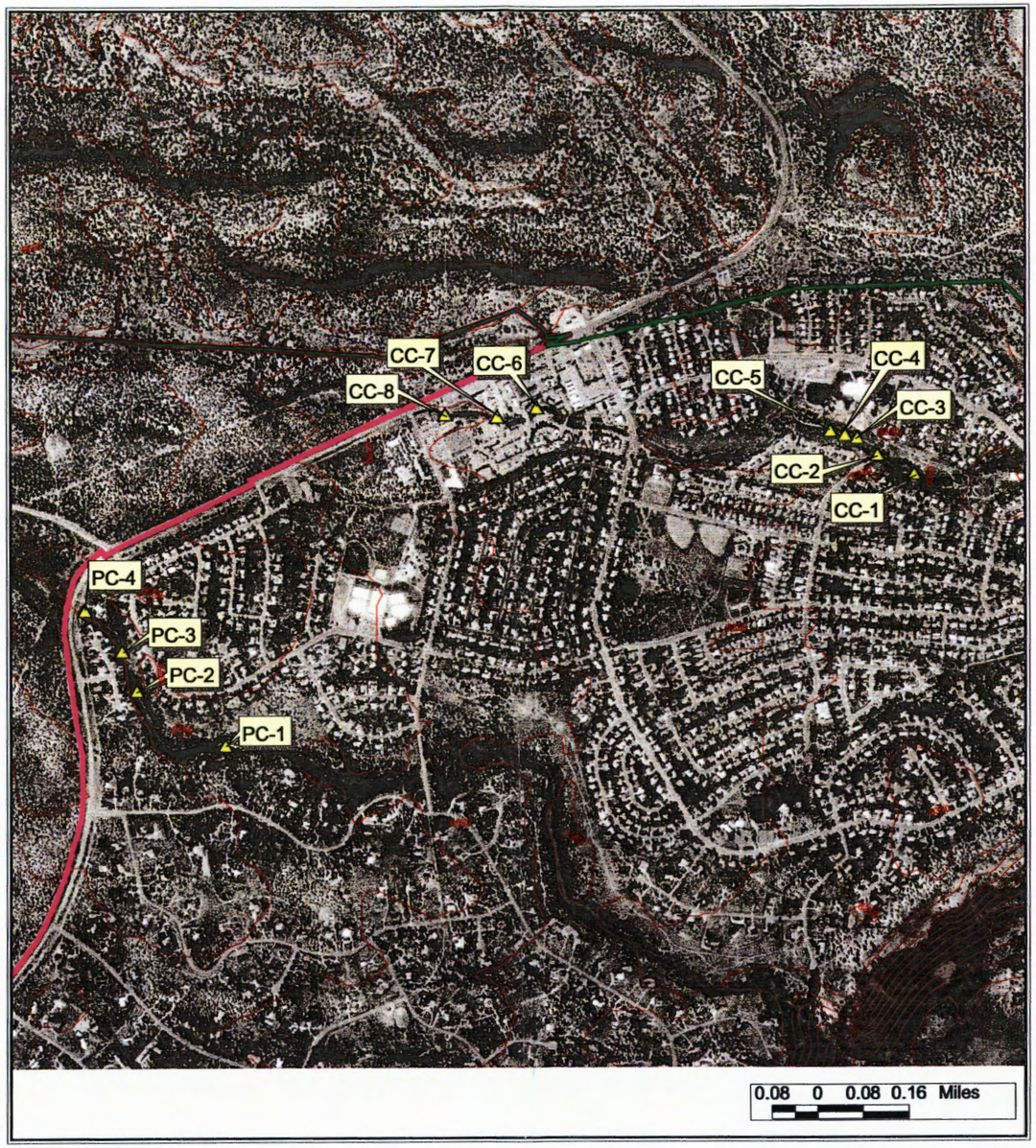



# Figure 8

Aerial View/Sample Locations
Mortandad/Sandia Canyons
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

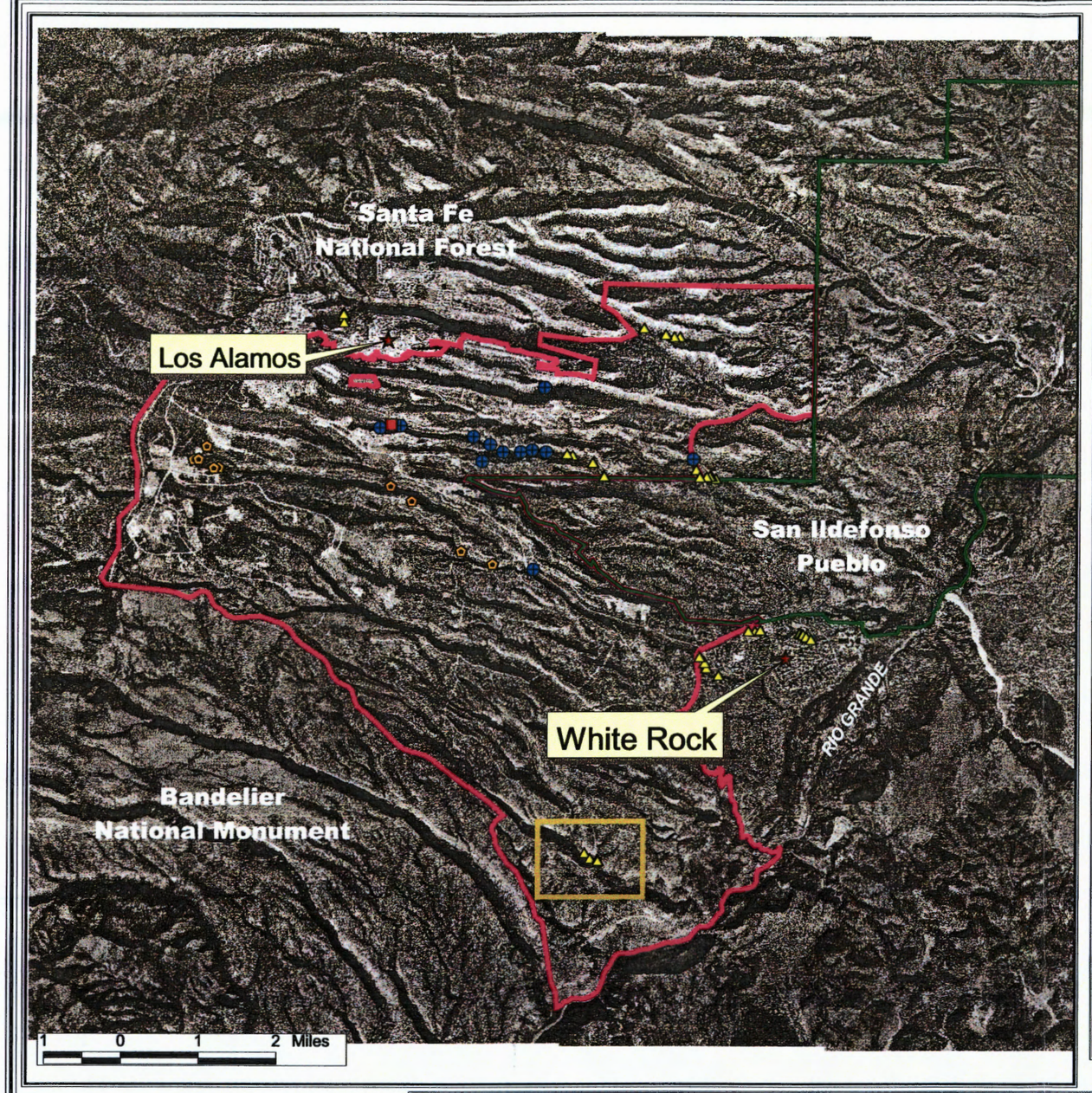


# Figure 9

Aerial View/Sample Locations
Lower Pajarito/Canada del Buey
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)



# Figure 10

Aerial View/Sample Locations
Ancho Canyon
Los Alamos National Laboratory

Legend
- Effluent
- Groundwater
- Sediment
- Spring/Surface Water
- San Ildefonso Pueblo
- Los Alamos National Laboratory
- Contours (50 Ft Intervals)

# APPENDIX A

## Field Logbooks

# Logbook 1

# Field Log Book

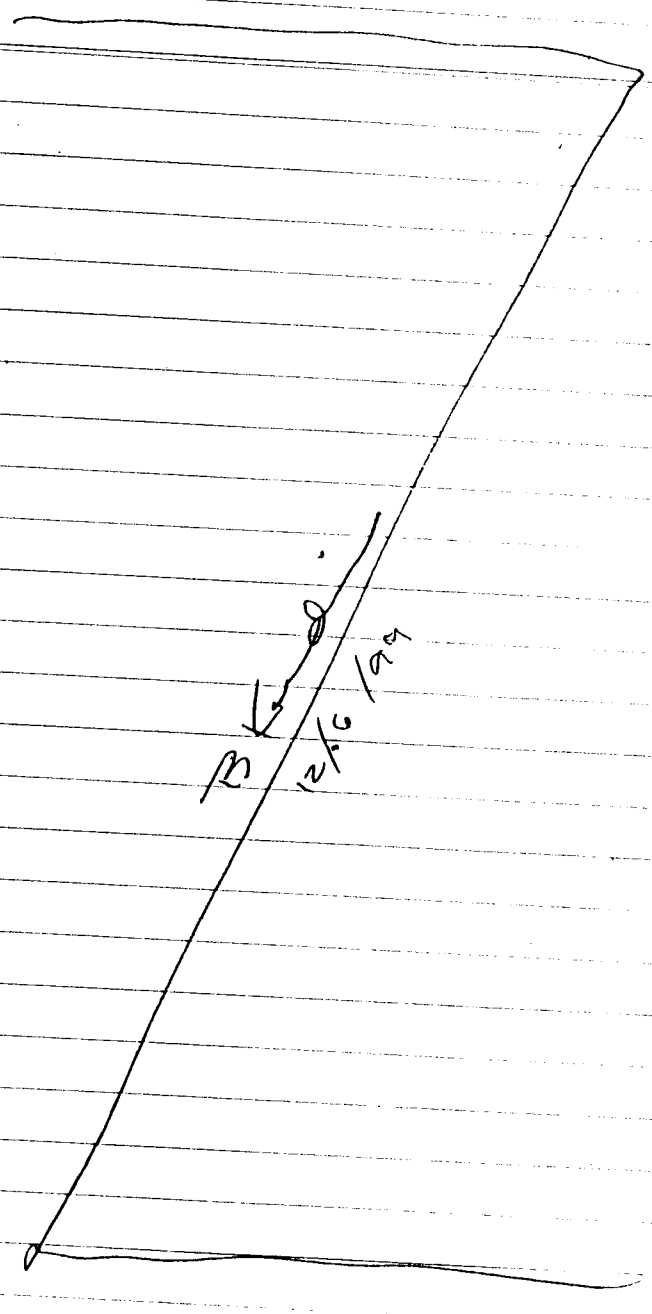
for

Los Alamos National Lab. - Phase 2

By: TechLaw, Inc.
750 N. St Paul
Suite 600
Dallas, TX 75201

For: U.S. EPA
1445 Ross Ave
Dallas, TX 75202

02




LANL - Phase 2 Los Alamos, NM

Dec. 6, 1999 01300.06.015

1021 Arrive at Los Alamos Aquatic Center. Met w/ Steve Ramey, LANL. Waited for Pray Simmons.

1030 Hiked into Acid Canyon. Decided Mr. Simmons would join us when he arrived.

1033 Arrived at first sample location where hiking trail crosses the stream channel.

1047 3cm layer crust removed. Began collecting sample ALS-35-0

1049 Roll 1, Photo 1 of sample material in sieve. Facing down by B. Kendrick witnessed by J. Hoxley

1102 Completed sample collection at ALS-35-0. Sample was collected by Chris Hanlon Fletcher and Jim Hoxley. Decanted the sampling equipment using Alconox and DI Water. Final depth at this location was 2 to 10 cm.

1122 Arrive at second sample location - ALS-18. Will collect 0-26 cm (ALS-18-1) and 20-40 cm

LANL - Phase 2 Los Alamos, NM

Dec. 6, 1999 01300.00.015

(ACS-18-2). ACS-18-1 material was homogeneous fine sand, brown in color

1140 Completed sampling ACS-18-1 and ACS-18-3 (dupe). Recovered the bowl and trowel.

1200 Completed sampling ACS-18-2 from 26 to 46 cm. Recovered equipment.

1210 Roll 1, Photo 2 of ACS-18 brown looking east by B Kendrick witnessed by J Hovey

1220 Arrive at ACS-12 location where three samples will be collected ACS-12-1, ACS-12-2, ACS-12-3. Chris decided to collected only 2 samples at this location

1235 Collected sample ACS-12-1 from 0-30 cm depth. Material was fine sand, light gray-brown in color.

1245 Collected sample ACS-12-2 from 30-61 cm depth. Material was fine sand silt, brown in color

TBKendrick

B Kendrick 12/6/99

B Kendrick 12/6/99



LANL - Phase 2 Los Alamos, NM

Dec. 6, 1999 01300.06.015

1252 Roll 1, Photo 3 of ACS-12 location looking E by B Kendrick witnessed by J Hovsky

1254 Roll 1 Photo 4 of ACS-12 and ACS-48 in background looking E by B Kendrick, witnessed by J Hovsky

1300 Collected sample ACS-48 from 0-12 cm depth. Material were gray-brown fine sand. Collected MI/MSIP for metals and PCB

1307 Roll 1, Photo 5 of location ACS-48 looking down by B Kendrick witnessed by J Hovsky.

1319 Arrived at ACS-3 where 4 samples are scheduled.

1330 - Collected ACS-3-1 from 0-28 cm. Material were light brown fine sand.

1340 Collected ACS-3-2 from 37-62 cm. Material were light brown fine sand.

B Kendrick

LANL - Phase 2 Los Alamos, NM

Dec. 6, 1999 01300.06.015

1350 Collected ACS-3-3 from 62 - 89 cm in depth. Material was light brown fine sand.

1400 Collected ALS-3-4 from 89-104 cm in depth. Material was dark brown fine sand.

1410 Collected equipment rinsate ACS-EB.

1425 Roll 1 Photo 6 of ALS-3 location facing SE by B. Kendrick and J. Horsley

1430 Depart ACS-3. M. Dale, S. Kennedy and R. Moyer arrived at the site

1450 Arrive back at the Los Alamos Aquatic Center

1500 Depart Aquatic Center

1520 Arrive at NMED Oversight Bureau White Rock Office. Labeled and sealed a sample bottles containing samples collected at ALS locations

B Kendrick

B 12/6/99



LANL - Phase 2
Dec 6, 1999

Los Alamos, NM
01300.06.015

Samples collected from the south fork of Acid Canyon are listed below:

| Sample No | Date | Time |
|---|---|---|
| ACS-35-0 | 12/6 | 1102 |
| ACS-18-1 | 12/6 | 1140 |
| ACS-18-2 | 12/6 | 1200 |
| ACS-18-3 | 12/6 | 1210 |
| ACS-12-1 | 12/6 | 1235 |
| ACS-12-2 | 12/6 | 1245 |
| ACS-48-0 (1st Min) | 12/6 | 1300 |
| ACS-3-1 | 12/6 | 1330 |
| ACS-3-2 | 12/6 | 1340 |
| ACS-3-3 | 12/6 | 1350 |
| ACS-3-4 | 12/6 | 1400 |
| ACS-EB | 12/6 | 1410 |

End of Day

B 12/6/99

BKendall
12/7/99



LANL - Phase 2 Los Alamos, NM

Dec. 7, 1999 01300.06.015

0813 Weather is partly cloudy and approximately 20°F. Depart NMED White Rock office to meet w/ LANL personnel. Today's schedule is to start sampling wells in Mortandad Canyon. The wells scheduled for the day include TW-8, MCO-2, MCO-3, and MCO-4B.

0825 Arrive at ESH-18. Met w/ David Rogers, Max ~~Mahan~~ Maes, Consuela Montoya. Had a safety meeting. Also attending the meeting were Rich Mayer, EPA and Bob Wings, NMED.

0847 Naomi Achulata, Noah Cannedabi of San Ildefonso arrived at the meeting. The generator for TW-8 failed; therefore, we will not sample that well today. We will start with MT-4 and work our way back up.

BKendall

LANL - Phase 2 Los Alamos, NM

Dec. 7, 1999 01300.01.015

0900 Depart ESH-18 to pick up compressor and then proceed into Mortandad Canyon.

0925 Arrive at MT-4. Water level was measured at 59.64 ft below TOC. Total depth is approximately 74 feet. The amount of water within the well was calculated to be 2.34 gallons. Began purging at 0950 hours. Purging is at approx. 580 ml/min. Procedures to be used at Mortandad Canyon will be to purge at least one well volume and then monitor water quality parameters.

1003 Water level was 59.65 ft below TOC. Conductivity 560, Temp. 10.4°C, TDS 307 ppm, pH 5.61B (10.1°C)

1014 Cond 560
Temp 10.3°C
TDS 307 ppm
pH 5.95
Turb. 4.85

B Kendrick 12/7/99



LANL - Phase 2 Los Alamos, NM

Dec. 7, 1999 01300.02.015

1020 Pump rate is approx. 540 ml/min

1023 pH 6.54

Temp 10.4

TDS 307

Cond 560

Turb 1.57

1030 Pump rate is approx. 540 ml/min

1036 Water level was 59.64 feet below TOC.

1105 Collected sample MT-4 and well water MT-4

Cond 562

TDS 308

Temp 9.6

pH 6.43

1115 Water level was approx 59.69 feet below TOC

1120 Roll, Photo 7 of MT-4 facing E by BKendrick witnessed by J. Hoxley

1130 Depart MT-4

1135 Arrive at MCO-4B.

Top of pump were measured to be 23.54 feet below TOC

BKendrick

MCO 12/5/92



LANL - Phase 2 Los Alamos, NM
Dec 7, 1994 01300.06.015

water level was below the level of the pump. Well volume was calculated based on the top of the pump. Well volume was estimated to be 1.76 gallons

1146 Begin purging of MCO-4B

1154 Well was able to get some water out of MCO-4B. Therefore, either the water level was below the pump intake or the bladder pump was not functioning properly. Called David Program to substitute MCO-4B for MCO-5

1200 Depart MCO-4B. Travel to RTC office for screening.

1218 Arrive at RTC Office

1223 RTC personnel screened sampler and truck.

1225 Depart RTC office. Sam Illeforis personnel departed.

BKendall

LANL - Phase 2 Los Alamos, NM

Dec 7, 1999 01300.01.015

1245 Arrive at MCO-3. Protective casing was not locked

1250 Water level was at 5.95 w/ 2.5 feet of stick up. Total depth of well is 12 feet. Estimated 3 volumes of water is approx 7 gallons

1310 Begin purging activities. Pump rate is approx 1 liter every 1 min 40 sec

1312 Cond 553
Temp 4.2°C
pH –
TDS 353

1320 Water Level is 5.93 feet

1325 Cond 563
Temp 4.2
pH 5.9 ?
TDS 359

1324 Water level is 5.95 feet
Cond 563
Temp 4.2
pH 6.17?
TDS 359

BK

12/7/99

BK

12/7/99



LANL - Phase 2 Los Alamos, NM

Dec 7, 1999 01300.06.015

1400 Collected sample MCO-3 from well MCO-3

1413 Roll 1, Photo 8 of MCO-3 facing E by B Gentry witnessed by J Hawley

1417 Depart MCO-3

1430 Arrive at MCO-2

1443 Water level in MCO-2 was 6.35 TOC. One well volume is approx 2.45 gallons

1455 Start purging activities Purge rate is approx 500 ml/min

1458 Cond —

pH 7.40

Temp 8.5 °C

Turb 86

DO 0.35

Water Level 8.61

1511 Slowed pump rate

Water level 8.68

1512 pH 7.44 DO 0.40

temp 8.5

cond .321

Turb 55

Bkwell

B Kendall
12/7/99



LANL - Phase 2 Los Alamos, NM

Dec. 7, 1999 01300.06.015

1504 Pump rate is now 3.6 ml/min

15:07 Water level now 8.22 feet

1508 pH 7.66
cond 0.253
temp 8.2
turb 21
DO 0.32

1513 Water level is now 7.99 feet
pH 7.66
DO 0.20
cond .242
turb 15
temp 8.2

1530 Collected sample MCO-2
at MCO-2

1536 pH 8.0
cond 0.243
turb 8.0
temp 7.8
DO 0.42
Water level 7.81 feet
below TOC

BKendall

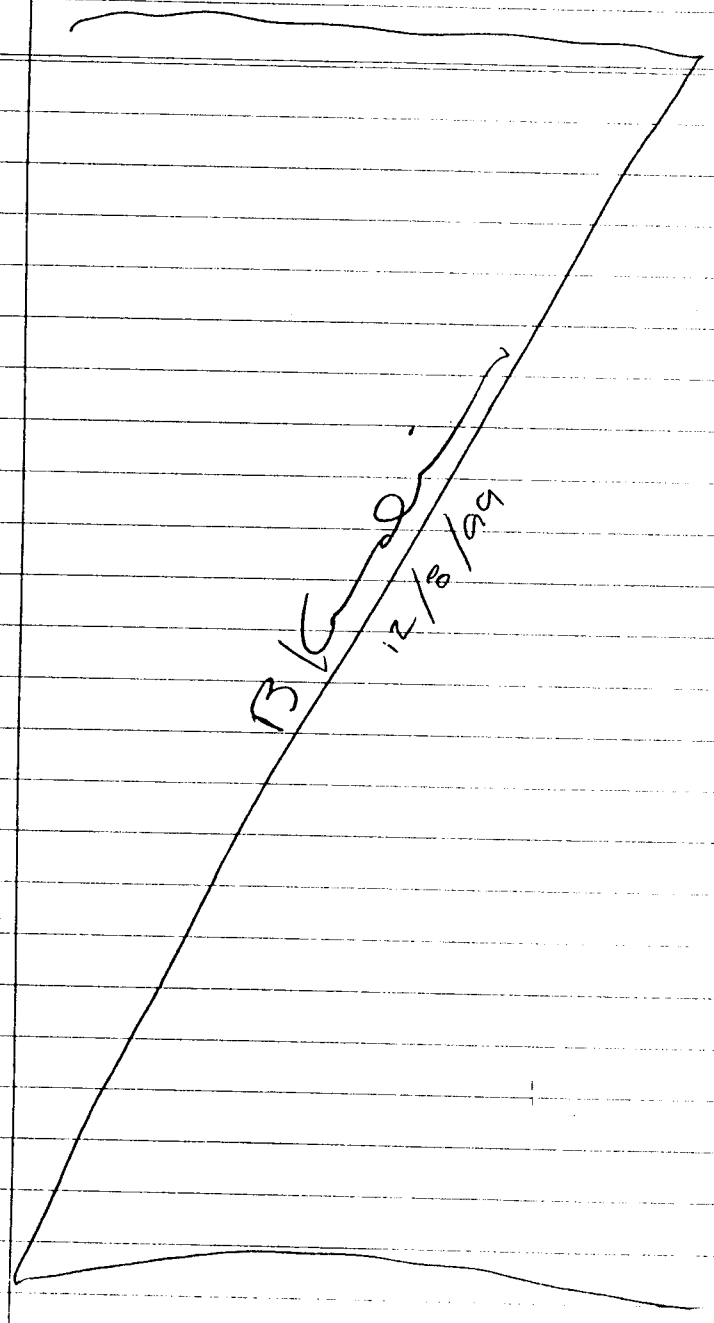
LANL - Phase 2 Los Alamos, NM
Dec. 7, 1999 01300.06.015

1542 Drill 1, Plug 1 of MCO-2 lining N by B Kendricks
witnessed by J Hoveling
1545 Report MCO-2 and Mortandad Canyon.
1555 Arrive at White Rock office
Summary of day's sampling:

| Well/Sample No. | Date | Time |
|---|---|---|
| MT-4 | 12/7 | 1105 |
| MCO-4B | 12/7 | Dry |
| MCO-3 | 12/7 | 1400 |
| MCO-1 (MCO-3 dupe) | 12/7 | 1310 |
| MCO-2 | 12/7 | 1530 |

End of Day

BKendricks






LANL - Phase 2 Los Alamos, NM

Dec. 8, 1999 01700.00.015

0705 Arrive at White Rock office to package samples for shipment to Southwest Laboratory. Prepared two coolers containing samples from Acid Canyon and Mortandad Canyon.

0840 Arrive at ESH-18 and met with Max Maez. The plan is to begin the day's sampling at MCO-5 in Mortandad Canyon

0848 Depart ESH-18 enroute to MCO-5

0908 Arrive at MCO-5

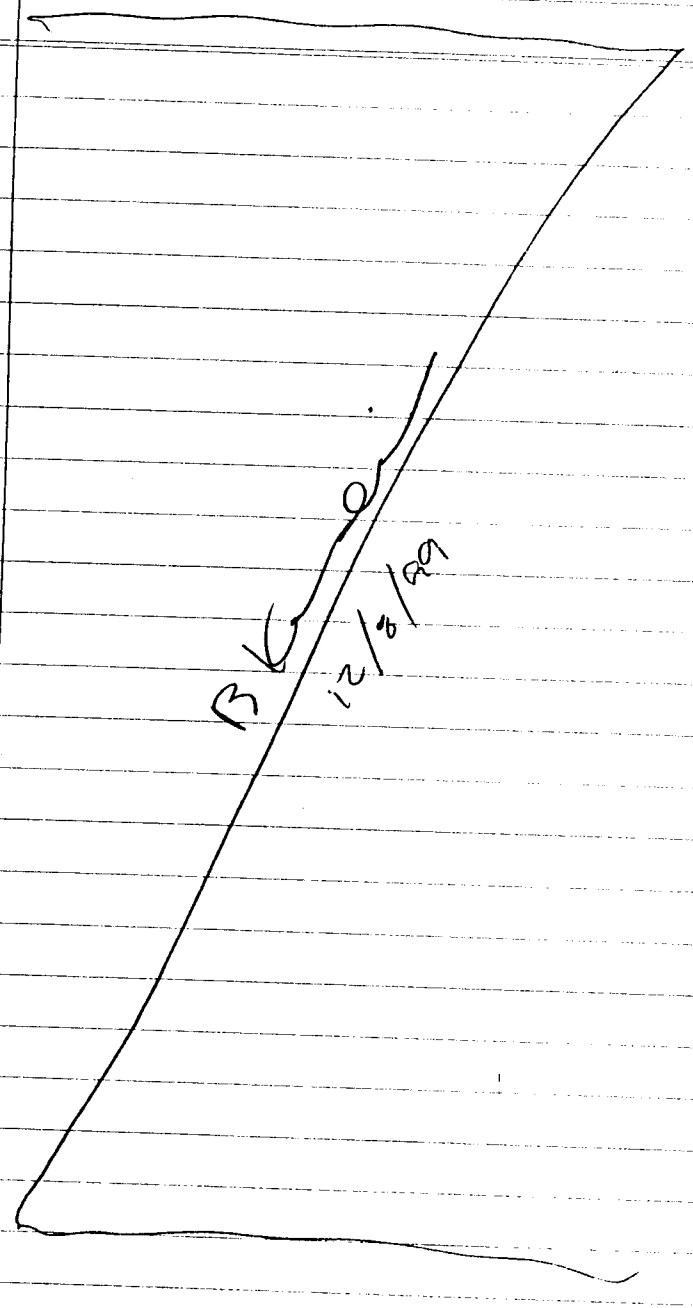
0912 Max Maez arrived at the MCO-5 location.

0915 Water level in MCO-5 was 26.20 feet below TOC. Total depth of MCO-5 is 46 feet below TOC. Purge of 3 well volumes is estimated to be 22.5 gallons

0930 Purge rate is approx 650 ml/min

| | | | |
|---|---|---|---|
| Cond | 0.513 | Temp | 15.8 |
| pH | 6.46 | DO | 5.47 |
| Turb | 73 | | |

TBKendall






LANL - Phase 2 Los Alamos, NM

Dec. 8, 1989 01300.016.015

0936 Water level is 26.20 feet below TOC

0941 pH 6.53

turb 3

DO 5.58

Temp 8.4

Cond .540

Water Level — 26.20

Pump Rate 440 ml/min

0948 Pump Rate 470 ml/min

pH 6.93

cond 0.410

turb 1.5

DO 6.14

Temp 7.4

Water Level 26.13 feet

1010 pH 6.96

Cond 0.409

Turb 1

temp 7.3

Water level → 26.22 feet

1013 Roll 1, Photo 10 of MCP-5 facing E by B Kendrick witnessed by J Hosking

TBK

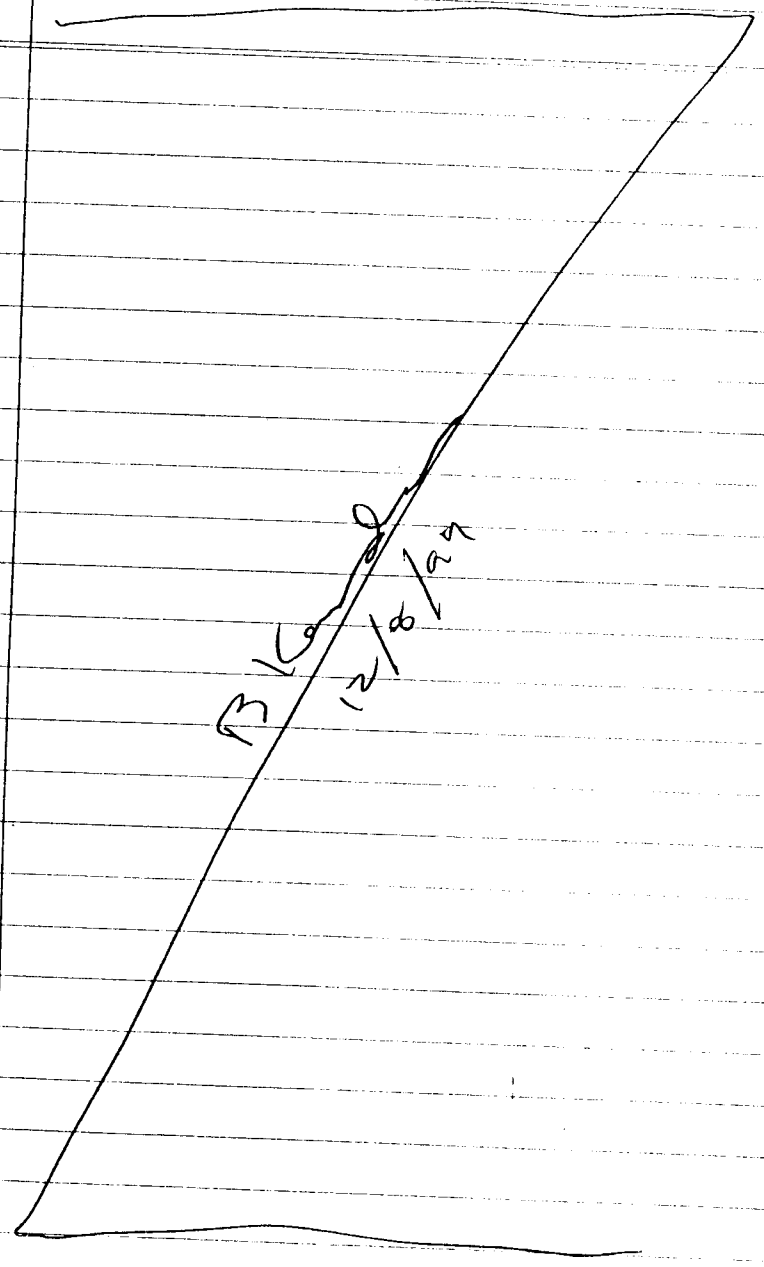
TB Kendall
12/8/99



LANL - Phase 2 Los Alamos, NM
Dec. 8, 1999 01300.06.015

1015 pH 6.97
Cond 0.403
turb 1
temp 7.3
Water level 26.25
pump rate 490 ml/min
1045 Collected MCO-5 and
well MCO-5 (included MS/MSD)
1050 pump rate now 510 ml/min
pH 7.00
Cond 0.403
turb 1
temp 7.2
Water level was 26.24 feet
1102 Depart MCO-5. Started
the generator for TW-B at approx
1050 hours
1107 Arrive at MCO-6
1111 Water level in MCO-6 was
39.00 feet below TOC.
1120 Pump rate 540 ml/min
pH 7.28 temp 7.7
Cond 0.413
turb 2

TBKendall






LANL - Phase 2 Los Alamos, NM

Dec. 8, 1999 01300.06.015

1123 Water level is 39.01 feet

1135 pH 7.07

cond 0.413

turb 1

temp 7.8

Water level 39.04 feet

pump rate 830 ml/min

1140 pH 7.06

cond 0.413

turb 1

temp 7.3

Water level 39.02 feet

1145 pH 7.06

cond 0.413

turb 1

temp 7.3

Water level - 39.03 feet

1146 Roll 1, Photo 11 at MCO-6

with Jim Hoxsey, Collection

GPS information

1200 Collected MCO-6 BIC at

well MCO-6

TBK

TBK 12/8/99



LANL - Phase 2 Los Alamos, NM

Dec 8, 1999 01300.06.015

1210 Final parameters

pH 7.25

cond 0.410

turb 2

temp 7.6

Water level 39.01

pump rate ~~34~~ 8k

1220 Depart MCO-6

1225 Arrive at MCO-7

1233 Water level in MCO-7

was 41.73 feet below TOC

One well volume is 19.36 gallons

1240 Pump rate is 600 ml/min

1242 pH 6.84

cond 0.513

Turb 5

Temp 8.4

pump rate 800 ml/min

1250 pH 6.91

cond 0.513

turb 9

temp 8.5

TBK

12/8/99
BKendall



LANL - Phase 2 Los Alamos, NM
Dec. 8, 1999 01300.06.015

1300 cond 0.506
pH 6.93
turb 13
temp 8.5
1304 Water level — 41.75 feet
1306 Pump rate 760 ml/min
Turb: 5.59 NTU (Max)
1310 pH 6.92
cond 0.510
turb 8
temp 8.5
Water level — 41.74 feet
Turb: 3.96 NTU (Max)
1320 pH 6.92
cond 0.509
turb 13
temp 8.5
Water level — 41.73
turb 5.51 NTU (Max)
1330 pH 6.91
cond 0.509
turb 12 (9.45 - Max)
temp 8.5
water level 41.89

BKendall

BKC 12/8/99



LANL - Phase 2 Los Alamos, NM

Dec. 8, 1999 01300.06.015

1334 Pump rate 720 ml/min

1335 pH 6.92

cond 0.557

turb 13 (5.10 - Max)

temp 3.5

water level - 41.82 feet

1350 Collected sample MCO-7

at well MCO-7

1400 Roll 1, Prob 12 of MCO-7

facing SE by B Kendall

witnessed by J Hosley

1402 Water level - 41.87 feet

pH 6.87

cond 0.508

turb 8

temp 8.4

pump rate —

1410 Depart MCO-7

1416 Arrive at MCWB-7.7B

1424 Water level is 60.58 feet

below TOC. Total Depth is

70.0 feet. One well volume

is approx. 3.76 gallons

BKendall

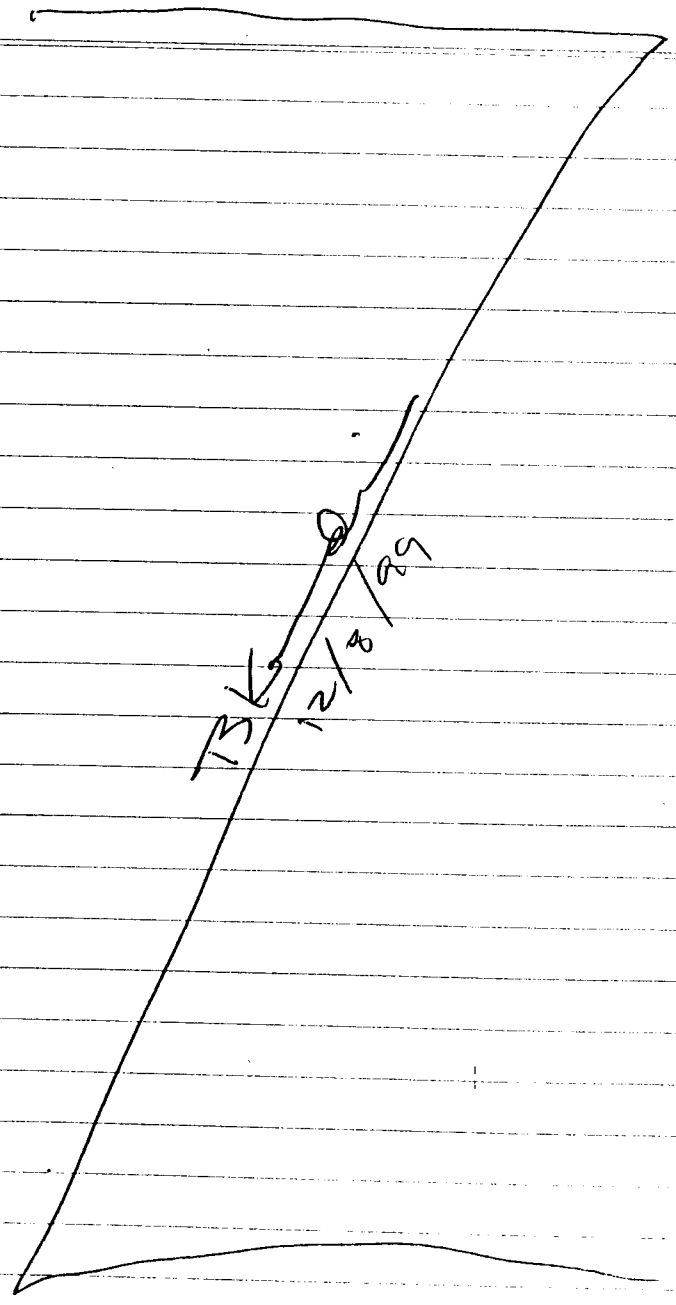
BK 12/8/99



LANL - Phase 2 Los Alamos, NM
Dec. 8, 1999 01300.06.015

1435 Pump rate 400 ml/min
Water level 60.13 feet
1437 pH 6.95
cond 0.511
turb 1.55 (2)
temp 8.4
Water level 60.16 feet
1442 Pump rate 340 ml/min
pH 6.98
cond 0.511
turb 1
temp 8.8
Water level 60.18 feet
1447 pH 6.97
cond 0.511
turb 0
temp 8.8
1452 pH 6.94
cond 0.501
turb 0
temp 8.9
Water level 60.18 feet
Pump Rate 340 ml/min

BK






LANL - Phase 2 Los Alamos, NM
Dec. 8, 1999 01300.06.015

1457 pH 6.95
cond 0.507
turb 0
temp 9.0
1502 pH 6.94
cond 0.509
turb 0
temp 9.0
water level 60.22 feet
pump rate 910 ml/min
1510 Collected MCWB-7.7B and well MCWB-7.7B.
1514 Roll 1, Photo 13 of MCWB-7.7B facing W by B Kendrick witnessed by J Hoxley
1520 Depart MCWB-7.7B
1526 Arrive at TW-8
1530 Roll 1, Photo 14 of TW-8 wellhead with water flowing out facing SE by B Kendrick witnessed by J Hoxley
1537 Roll 1, Photo 15 of overall view of TW-8 facing E by B Kendrick witnessed by J Hoxley
B Kendrick

LANL - Phase 2 Los Alamos, NM

Dec. 8, 1999 01300.06.015

1537 pH 7.70

cond 112

turb 1

temp 17.0

1545 Collected TW-8 at well TW-8

1558 Departed TW-8 location

Below is a summary of samples collected during the day's activities

| Sample No | Date | Time |
|---|---|---|
| MCO-5 (MS/MSD) | 12/3/99 | 1045 |
| MCO-6 | 12/3/99 | 1200 |
| MCO-7 | 12/3/99 | 1350 |
| MCWB-7.7B | 12/3/99 | 1510 |
| TW-8 | 12/3/99 | 1545 |

End of Day

12/8/99

LANL - Phase 2 Los Alamos, NM

Dec 9, 1999 01300.06.015

1355 Arrive at ESH-18 to pick up David Rogers. Started down to Gaging Station 1 in Mortandad Canyon

1415 Arrive at Gaging Station 1 in Mortandad Canyon

1427 Called Deborah Hall at TA-50 and she said they would start releasing.

1440 Collected MCD-FB at GS-1 location. MCD-FB is a field blank collected by transferring DI water to appropriate sample containers

1455 Water discharge arrived at GS-1 location

1500 Water quality parameters:

pH 7.48

cond 0.4955

turb 51?

DO 8.17 ↓

temp 2.1 °C.

1510 Collected GS-1 from Gaging Station 1.

B Kendrick 12/9/99



LANL - Phase 2 Los Alamos, NM
Dec. 9, 1999 01300.06.015

1517 Roll 1, Photo 16 of Gaging Station 1 weir facing W by B Kendrick witnessed by J Hoxsey

1519 Roll 1, Photo 17 of Gaging Station 1 facing S by B Kendrick witnessed by J Hoxsey

1525 Deposit GS-1 location

Below is a summary of samples collected during the day's activities

| Sample No | Date | Time |
|---|---|---|
| MCO-FB | 12/9 | 1440 |
| GS-1 | 12/9 | 1510 |

Prior the conducting the sampling activities this day, the TechLaw sampling team arrived at the ~~PAO~~ NMED Oversight Bureau White Rock Office at 0800 hours. Because FedEx failed to pick up the ~~so~~ BK sample coolers prepared during the previous day, the TechLaw sampling team

12/9/99



LANL - Phase 2 Los Alamos, NM
Dec. 9, 1999 01300.06.015

The two sampler ~~coolers~~ BK coolers were then re-sealed and new custody seals were applied. In addition, four additional sample coolers were prepared for shipment. At approx. 1000 hours, FedEx picked up the six sample coolers. Three coolers were sent to Southwest Laboratories of Oklahoma, two sample coolers were sent to Quanterra Laboratories, and one sample cooler was sent to Coastal Scientific Laboratory. At approximately 1010 hours, called David Moss of TA-50 Radioactive Wastewater Treatment to determine what time the plant would discharge into Mortandad Canyon. Mr. Moss stated that the plant would be ready to discharge into the canyon at approximately 1400 hours. He also stated that he would call when he knew a more definite time for the discharge. Meanwhile, the Technical sampling team prepared

12/9/99



sample containers for GS-1 and MCO-FB. The team then prepare sample containers for tomorrow's sampling activities. At approx. 1310 hours, called David Moss to get information on the scheduled discharge event from the TA-50 plant. Mr. Moss stated the he would call when the plant was ready to discharge and that the plant would not discharge until the sampling team was in place in Mortandad Canyon and ready to collect the samples. At approximately 1335, Deborah Hall of TA-50 plant called and informed the TechLaw team that the plant was now ready to discharge into the canyon. She said the plant would not discharge until the sampling team was in place within the canyon. Called David Rogers and informed him that the sampling team was on its way to pick him

TBK
12/9/99



at the ESH-18 office and then to proceed to Mortandad Canyon and Gaging Station 1. Mr. Rogers stated that he would meet the sampling team outside the ESH-18 office at TA-59. The team met Mr. Rogers at 1355 hours.

End of Day

TBK-9

BK 12/10/99



LANL-Phase 2 Los Alamos, NM

Dec 10, 1999 01304.06.015

0715 Arrive at guard shack at entrance ~~the~~ to the area where the sampling is scheduled to take place. Met David Rogers outside the gate.

0733 M. Dale and Rich Mayer arrived at the gate location. Mr. Dale entered the gated area to get badges for the sampling team.

0738 M. Dale and D. Rogers went into the gated area to get badges.

0754 M. Dale came out of gated area with security badges.

0758 Entered the gated area.

0802 Arrived at TA-8 security area.

0819 Depart TA-8 security area

0821 Arrive at DX-2 Group Office Building to sign in

0830 Arrive at Homestead Spring. Flow from the spring was reported by ½ of the flow from the past spring.

LANL-Phase 2 Los Alamos, NM

Dec 10, 1999 01300.06.015

0920 Collected Homestead Spring sample in Pajarito Canyon. Cond of spring water 84, temp 7.7°C, and TDS 46

0935 Photo 1 + 2 of Homestead Spring face

0937 Depart Homestead Spring area.

1004 Arrive at Starmer's Spring located in Starmer Gulch

1030 Collected Starmer's Spring at Starmer Gulch

1032 Cond 111
temp 7.8°C
TDS 61 ppm

1032 Photo 3,4,5 of Starmer's Spring by NMED

1033 Depart Starmer's Spring area

1035 Arrive at Charlie's Spring located upstream of Starmer's Spring in Starmer Gulch.

1055 Rick Hooper decided to not sample at Charlie's Spring.

RK 12/10/99

M 12/12/08



LANL-Phase 2 Los Alamos, NM

Dec. 10, 1999 01300.06.015

1056 Cond 140

Temp 7.5

TDS 76

1115 Arrive back at truck and eat lunch

1140 Depart truck for Kieling Spring

1200 Arrive at Kieling Spring

1220 Collected sample at Kieling Spring

1236 Cond 238 µS/cm

TDS 130 mg/L

Temp 8.1 °C

1240 Depart Kieling Spring

1247 Arrive at Bulldog Spring

1300 Collect Bulldog Spring sample in Arroyo DeLadelita

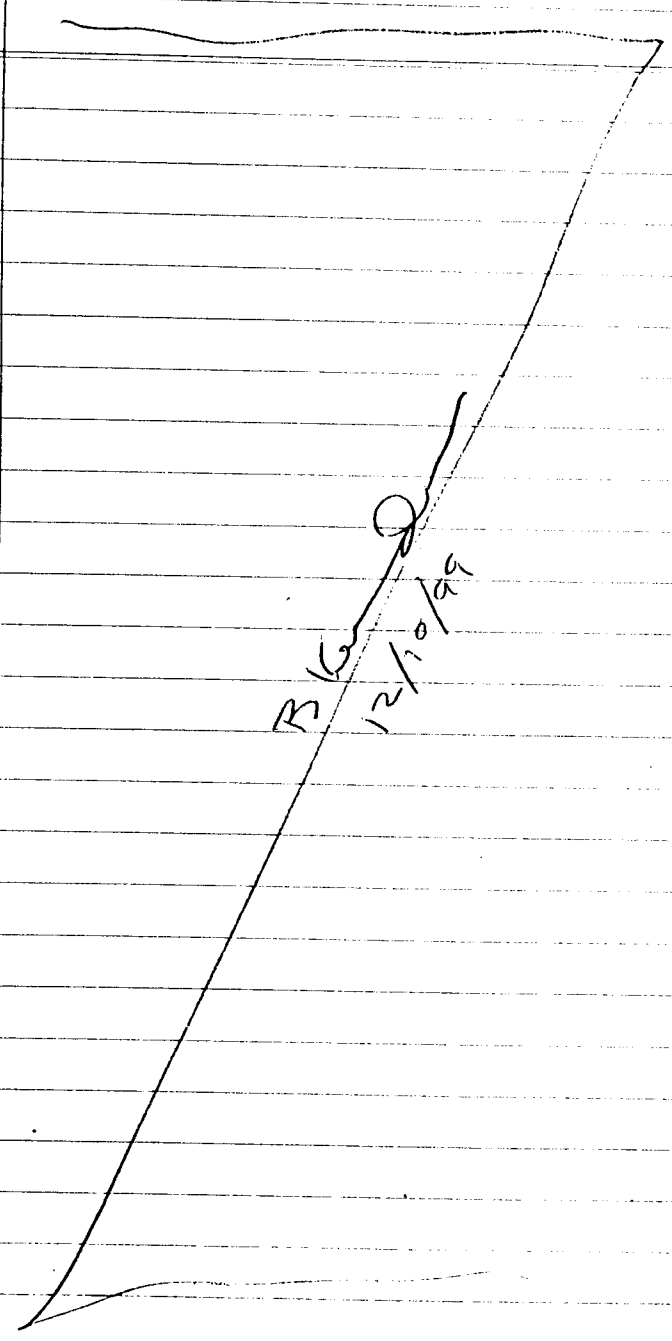
1305 Cond 240 µS/cm

TDS ~~Temp~~ 132 mg/L

Temp ~~TDS~~ 7.3 °C

1310 Depart Bulldog Spring location

1325 Arrive at BU-001 surface water location.





LANL- Phase 2 Los Alamos, NM

Dec 10, 1999 01300.00.015

1345 Collected sample Bu-0.01 from surface water

1348 Cond 227 µS/cm
temp 0.1 °C
TDS 125 mg/L

1353 Deploy Bu-0.01 location

1410 Arrive at PA-8.9

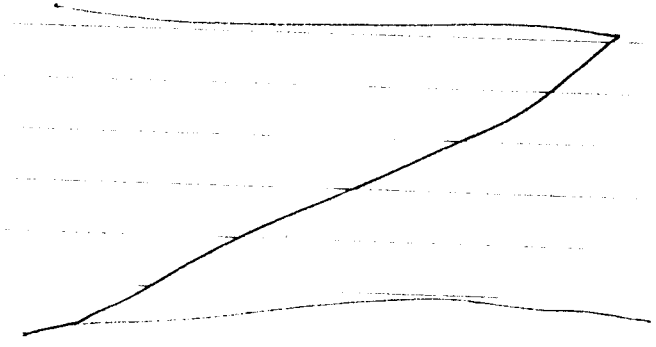
1425 Collected PA-8.9 in Pajarito Canyon

1427 Cond 109 µS/cm
Temp 2.4 °C
TDS 59 mg/L

1430 Depart PA-8.9

1445 Arrive at trucks and depart field

1458 Depart security area enroute to White Rock office



Bk. ...

TMC 12/10/94

LANL - Phase 2 Los Alamos, NM

Dec 10, 1994 0730 [illegible]

Below is a summary of samples collected during the day's activities

| Sample No./Location | Date | Time |
|---|---|---|
| Homestead Spring | 12/10 | 0920 |
| Charlie's Spring | 12/10 | Dry |
| Starmer Spring | 12/10 | 1030 |
| Bulldog Spring | 12/10 | 1300 |
| Kisling Spring | 12/10 | 1220 |
| BN-0.01 | 12/10 | 1345 |
| PA - B.9 | 12/10 | 1425 |

Jim Hourley led a separate sampling team into a separate area associated with TA-18. This group was scheduled to collect samples from TA-18 Spring, Threemile (B) Spring, PA-6.7 surface water, and TM-0.4 surface water. Information concerning these activities is recorded in Log Book No 2 from this sampling event.

12/13/99



LANL-Phase 2 Los Alamos, NM

Dec 13, 1999 0130 [illegible]

0800 Field team consisting of Consuelo Montoya, LANL, Bill Turney, LANL, and Rory Gauthier, NPS met at NMED White Rock office. Chris Hanlon-Mayer, NMED will arrive at approximately 0830 hours. Bruce Wedgeworth and Sandra Jacquez also arrived

0847 Depart White Rock office. Bill Turney decided not to go with the sampling team.

0852 proceed along State Road 4.

0905 Arrive at first sampling location on east side of State Road 4 in Sandia Canyon. This location will be designated as SC-1. Sample SC-1 will be collected from 0 - 17 cm. in depth

0911 Bill I photo #1 view of sampling location SC-1 facing S by D Kendrick witnessed by J Hourlay

0916 Bill I, photo #2 close-up view of SC-1 facing S by D Kendrick [illegible]

BK 12/13/95



LANL - Area 2 Los Alamos, NM
Dec 17, 1995 01300.01.015.

witnessed by J Hurley.

0923 Sample material consists of a light brown mud to fine sand with some silt and rootlets

0925 Collected sample SC-1

0932 Departure SC-1

0936 Arrive at SC-2 location

0945 Roll 1, Photo 20 view of SC-2 location. Sample will be collected from the top 3 cm of material - Material consists of mud to fine sand with some silt. Facing S by B Kendrick witnessed by J Hurley

0946 Roll 1 Photo 21 closeup view SC-2 sample material. Facing S by B Kendrick witnessed by J Hurley

0955 Collected sample SC-2

Departure SC-2 location

1000 Arrive at SC-3 location Sample will be collected from 8 to 11 cm in depth. Material was mud to fine sand.

BK 12/13/99



LANL - Phase 2 Los Alamos, NM

Dec 13, 1999 DIBON. PG. 015

1010 Roll 1, Photo 22 View of SC-3 location facing S by B Kendrick witnessed by J Hourley

1011 Roll 1, Photo 23 closeup view of SC-3 facing S by B Kendrick witnessed by J Hourley

1025 Collected sample SC-3

1032 Departed SC-3 location

1035 Arrive at SC-4 location SC-4 consists of a sediment layer from 2 to 12 cm in depth.

1037 Roll 1, Photo 24 View of SC-4 location facing SE by B Kendrick witnessed by J Hourley.

1038 Roll 1, Photo 25 closeup of SC-4 facing SE by B Kendrick witnessed by J Hourley

1050 Collected Sample SC-4

11 [illegible] Arrived at SC-5 location on the west side of State Rd 4 within Sandia Canyon.

BK 12/13/99



LANL - Phase 2 Los Alamos, NM

Dec. 13, 1999 01300.06.015

1117 Roll 2, Photo 1 View of SC-6 facing SW by B Kendrick witnessed by J Hawley

1118 Roll 2, Photo 2 Close-up view of SC-6 facing SW by B Kendrick witnessed by J Hawley

Sample will be collected from 0-12 cm

1125 Collected sample SC-6

1130 Depart SC-6

1133 Arrive at SC-5 location

1140 Roll 2, Photo 3 of sample location SC-5 facing ~~NE~~ SE by B Kendrick witnessed by J Hawley

1142 Roll 2, Photo 4 Close-up of SC-5 location facing ~~NE~~ SE by B Kendrick witnessed by J Hawley

1150 Collected sample SC-5

1200 Depart SC-5 location

1210 Depart Sandia Canyon Area

A total of six samples were collected from Sandia Canyon

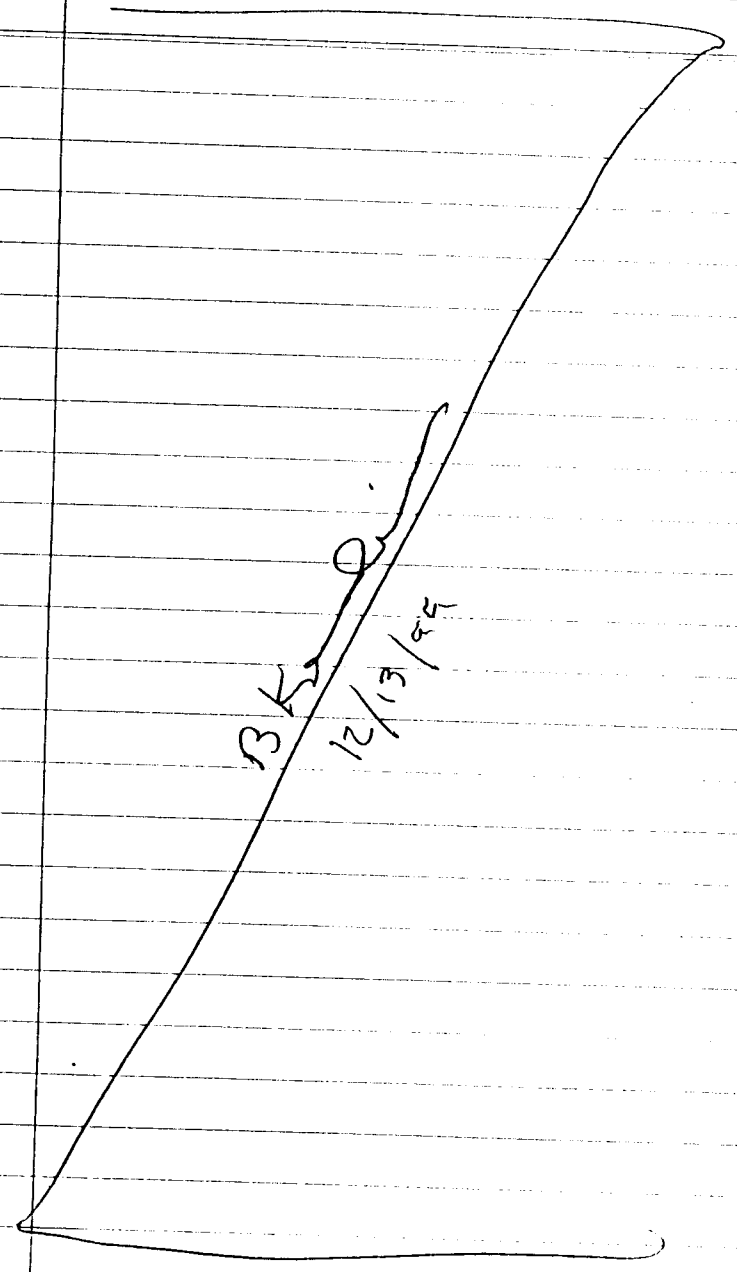
BK

BK 12/23/99



LANL-Phase 2 Los Alamos, NM
Dec 13, 1999 01300.06.015

1253 Arrive at parking spot in bottom of Bayo Canyon
1315 Arrive at location BC-1 located in Bayo Canyon (eastern most sediment sample location.
1320 Roll 2, Photo 5 View of location BC-1 facing S by BKendrick witnessed by J Housley
1321 Roll 2, Photo 6 closeup of sample location BC-1 facing S by BKendrick witnessed by J Housley.
1340 Collected sample BC-1
1343 Depart location BC-1
1351 Arrive at BC-2 location
1355 Roll 2, Photo 7 of BC-2 location. Sample will be collected from 14 to 27 cm depth. Facing E by BKendrick witnessed by J Housley.
1356 Roll 2, Photo 8 of closeup of BC-2 Facing E by BKendrick witnessed by J Housley




LANL-Phase 2 — Los Alamos, NM

Dec 13, 1999 — 01300-06.015

1410 Collected sample BC-2 and a core

1414 Depart BC-2

1418 Arrive at BC-3

1422 Roll 2, Photo 9 View of BC-3 facing E by B Kendrick witnessed by Jim Housley

1424 Roll 2, Photo 10 Closeup of BC-3 facing E by B Kendrick witnessed by J. Housley

1430 Collected BC-3

1435 Depart BC-3 area

1446 Arrive at BC-4 location

1450 Roll 2, Photo 11 View of BC-4 facing SE by B Kendrick witnessed by J Housley. GPS was sited approx 1 meter W of actual location of sample BC-4

1452 Roll 2, Photo 12 Closeup of BC-4 location facing SE by B Kendrick witnessed by J Housley. Depth of sample is 4 to 11 cm.

B K
12/13/99



LANL - Phase 2 Los Alamos, NM
Dec. 13, 1999 01300.06.015

1505 Collected Sample BC-4
1515 Depart BC-4 and Bayo Canyon. Enroute to White Rock Office.
1535 Arrive back at White Rock office. Prepare sample bottles for sampling production wells PM-1, PM-2, PM-5, 04.
1700 Arrive at Los Alamos County Annex located on Trinity Dr. to meet with Bob Beers and NMED water personnel. County personnel directed the Techlaw team to the LANL power plant where the water wells person is stationed. The county person was not at the plant. A LANL employee called the county person and left a message.
1740 Bob Beers arrived at the plant.
1755 Depart power plant
1800 Arrive at PM-5. Wait
1810 Walter opened the pump house

BK 12/23/99



LANL - Phase 2 Los Alamos, NM
Dec 13, 1999 01300.06.015

1805 Water quality parameters
Cond 0.179
temp 24.4
turb 0
pH 7.07
DO 4.03

1810 Collected sample PM-5 from well head at production well Pajarito Mesa 5

1813 Roll 2, Photo 13 of the pump and sampling point at PM-5 location by BK witnessed by JH

1832 Depart PM-5 location

1839 Arrive at PM-2 location for Production well PM-2

1844 Water quality parameters
pH 7.11
Cond 0.092
turb 0
temp 23.1
DO 4.51

1848 Roll 2, Photo 14 View of pump and sampling point at PM-2 location by BK witnessed by JH.

BK 12/13/99



LANL-Phase 2 Los Alamos, NM
Dec. 13, 1999 01300-06.015

1850 Collected sample PM-2
1911 Depart PM-2 location
1925 Arrive at PM-1 location
1943 Water quality measurements
pH 7.33
Cond 0.215
Turb ~~8~~ BK 0
Temp 26.1
DO 4.14 → 3.92 → 4.02
1952 Roll 2, Photo 15 View of PM-1 pump and sampling point at PM-1 location by BK and witnessed by JH.
1955 Collected sample PM-1 from PM-1 production well.
2011 Depart PM-1 location
2025 Arrive at O-4 sampling location
2030 Roll 2, Photo 16 View of O-4 pump and sampling point at O-4 location by BK witnessed by JH.

BK 12/13/99



LANL - Phase 2 Los Alamos, NM
Dec 13, 1999 01300.06.015

2032 Water quality parameters
pH 6.75
cond 0.221
turb 0
DO 3.85
temp 27.3

2040 Collected sample O-4 from O-4 production well.

2055 Depart O-4 location enroute to White Rock Office.

| Sample No/Location | Date | Time |
|---|---|---|
| SC-1 | 12/13/99 | 0925 |
| SC-2 | 12/13/99 | 0955 |
| SC-3 | 12/13/99 | 1025 |
| SC-4 | 12/13/99 | 1050 |
| SC-5 | 12/13/99 | 1150 |
| SC-6 (MS/MSD) | 12/13/99 | 1125 |
| BC-1 | 12/13/99 | 1340 |
| BC-2 | 12/13/99 | 1410 |
| BC-3 | 12/13/99 | 1430 |
| BC-4 | 12/13/99 | 1505 |
| BC-5 (dupe of BC-2) | 12/13/99 | 1420 |

B 12/13/99



LANL - Phase 2 Los Alamos, NM

Dec 13, 1999 21300.08.015

| Sample No/Location | Date | Time |
|---|---|---|
| B BK PM-1 | 12/13/99 | 2011 |
| PM-2 | 12/13/99 | 1850 |
| PM-5 | 12/13/99 | 1810 |
| D-4 | 12/13/99 | 2040 |

END OF DAY

BK 12/14/99



LANL - Phase 2 Los Alamos, NM

Dec 14, 1999 01300.06.015

0830 Sampling team met at White Rock office. Team consisted of Chris Hanlon-Meyer, NMED, consultant Montoya, LANL, and Sandra Jaquez, NMED. Traveled to Mortandad Canyon.

0915 Arrived in Mortandad Canyon

1000 - J. Housley sampled MC-1 on east side of gauging station and west side of cement bar. Sampled surface 0-5cm. Area = 25cm x 25cm

1005 - Roll 2 Photo 18 - Photo of MC-1 facing North. Photo taken by J. Housley.

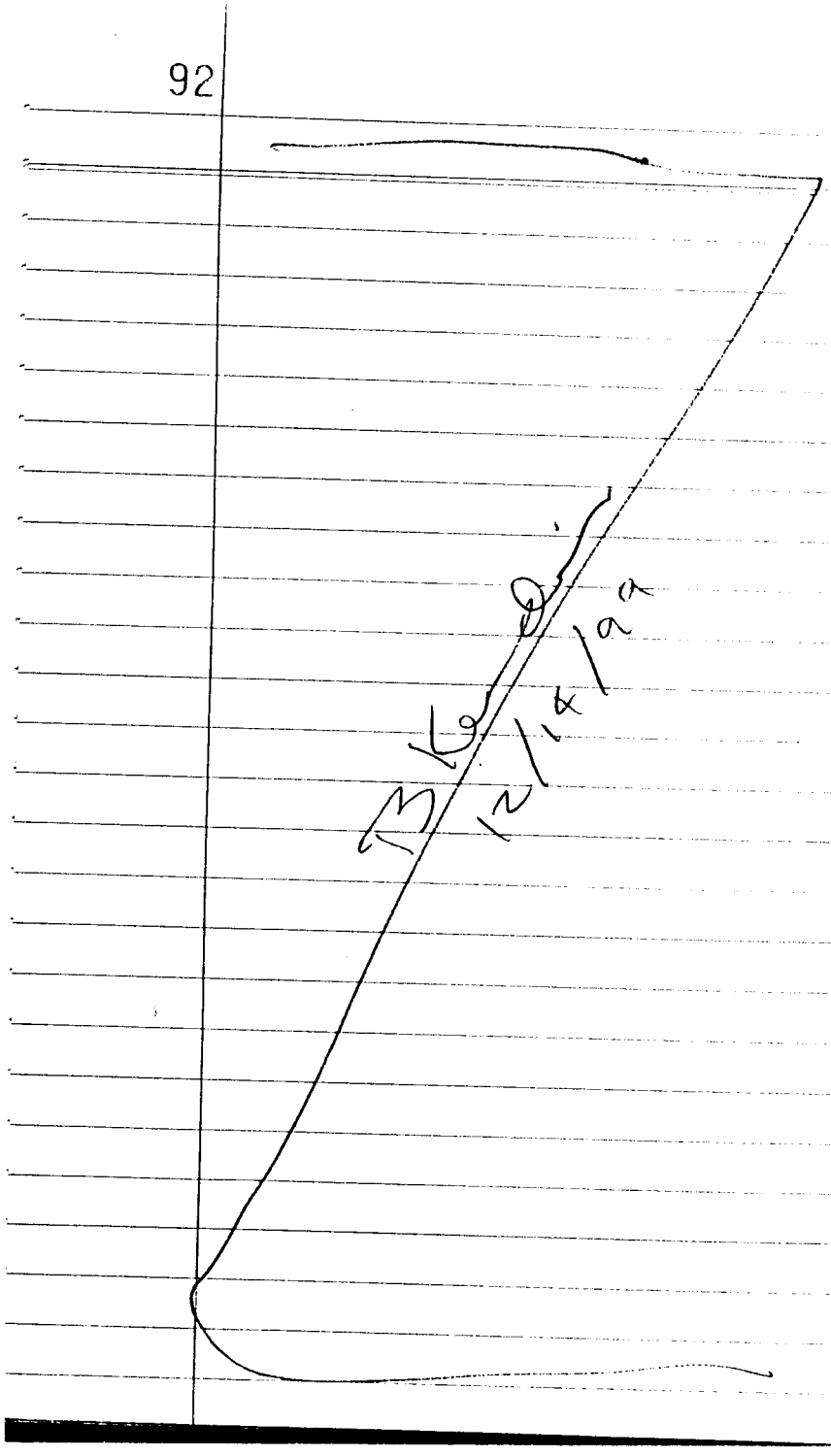
1010 - Decon equipment.

1015 - Depart MC-1 location

1040 - Arrive at MC-3 and MC-4 locations

1055 Roll 2, Photo 19 of MC-3 and MC-4 locations facing S by Pikenbrink witnessed by J. Housley

1057 Roll 2, Photo 20 closeup view of MC-3 facing S by Pikenbrink witnessed by J. Housley





LANL - Phase 2 Los Alamos, NM

Dec 14, 1999 01300.06.015

1058 Roll 2, Photo 21 Closeup view of MC-4 location facing N by B Kendrick witnessed by J Hawley

1126 Sample depth for MC-3 were between 15 and 24 cm below the surface.

1115 Collected Sample MC-3

1121 Sample MC-4 were collected from 0 to 5 cm in depth directly in the stream channel

1130 Collected sample MC-4

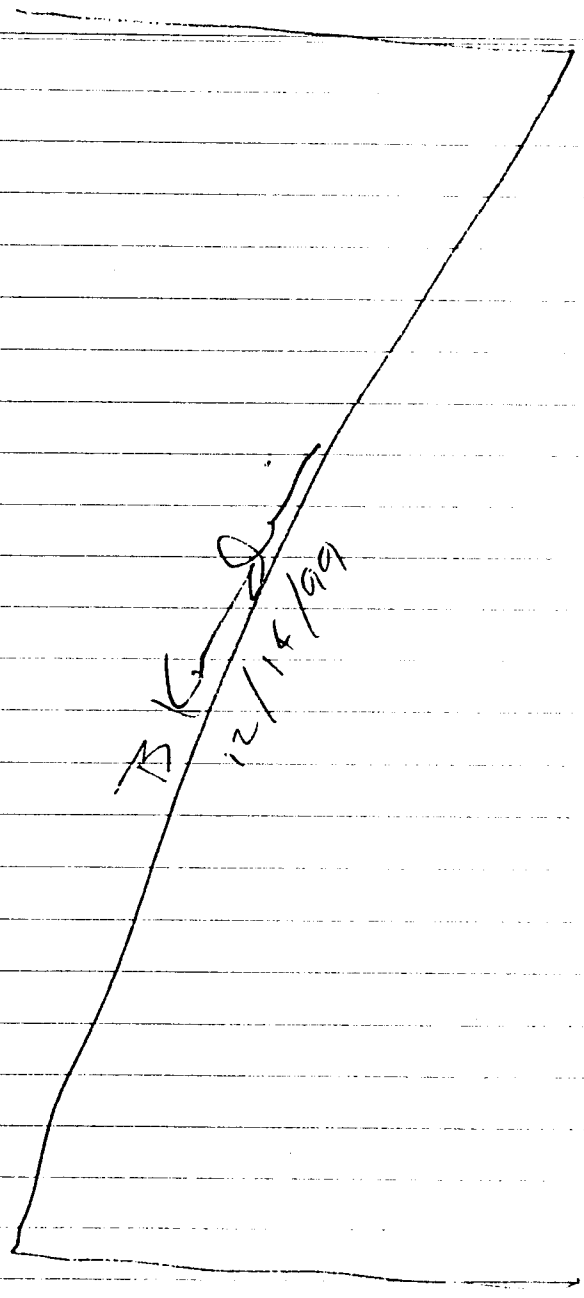
1135 Depart MC-3 & MC-2 location

1142 Arrive at MC-2 location

1147 Roll 2, Photo 22 View of location MC-2 facing S by B Kendrick witnessed by J Hawley

1149 Roll 2, Photo 23 Closeup of location MC-2 facing S by B Kendrick witnessed by J Hawley.

B Kendrick






LANL-Phase 2 Los Alamos, NM

Dec 14, 1999 01300.06.015

1200 Collected Sample MC-2 (0-8 cm)

1207 Depart MC-2 area

1220 Arrive at location MC-5 where two samples will be collected. The first sample will be collected from 0-13 cm and then from 22 to 30 cm for the second sample. The first sample will be designated as MC-5a (0-13 cm) and the second sample will be designated as MC-5b (22-30 cm).

1226 Roll 2, Photo 24 View of MC-5 location facing S by B Kendrick witnessed by J. Housley

1227 Roll 2, Photo 25 Closeup view of MC-5 sample location showing sediment layers to be sampled facing S by B Kendrick witnessed by J Housley.

1235 Collected MC-5a (0-13 cm)

1250 Collected MC-5b (22-30 cm)

1255 Depart MC-5 sample location enroute to White Rock Office

BW 12/14/99



LANL - Phase 2 Los Alamos, NM

Dec 14, 1999 01300.DL.015

1345 Depart White Rock office to locate sample points within Canada del Buey within the White Rock community. Personnel present include Chris Hawker-Meyer and Bill Turney, LANL.

1430 Return to White Rock office after selecting 5 locations for 6 samplers in the lower part of Canada del Buey near the elementary school. Prepared samplers for shipment on 12/15.

End of Day

RK. O.

BLD 12/15/99

LANL - Phase 2 Los Alamos, NM

Dec 15, 1999 01300.06.015

See Field Log Book No. 2 for information regarding the remainder of the sampling event.

BKG
12/15/09

# Logbook 2

Field Log Book #2
for
Los Alamos Nat'l Laboratories - Phase 2

By: TechLaw, Inc.
750 N. St. Paul
Suite 600
Dallas, Tx 75201

For: U.S. EPA
1445 Ross Ave
Dallas, Tx 75202

LANL - Phase 2 LOS ALAMOS, NM
12-10-99 01300.DQ.015

Field Team:
James Housley - Techlaw
Chris Hanlon-Meyer - NMED
Bruce Wedgeworth - DOE
Harvey Decker - ESH-18
Wx: overcast, wind
Arrived at TA-18 at 0835. Harvey Decker arrived at 0845.
Arrived at Sandia spring at 0830 to find it dry. Moved back to TMD.4 at 0852. It was also dry with @ ½" of snow in water. Arrived at TA-18 at 0856. Spring was flowing. While sampling equipment was prepared, Chris and Bruce laydown tarp downstream to measure flow. A plastic tray was used to collect the water as it ran off the tarp. Measurements are below.

| Sample Time | Time(s) | Volume (L) |
|---|---|---|
| 1011 - | 11.79 | 3.42 |
| | 13.28 | 3.952 |
| | 12.63 | 3.82 |
| | 12.54 | 3.8 |
| | 14.55 | 4.3 |
| | 12.33 | 3.7 |
| 1019 - | 13.36 | 4.1 |

J. Housley

LANL-Phase 2 Los Alamos, NM

12-10-99 01300.06.015

Began pumping at 1025. Field parameter sample collected at 1028. Field parameters are listed below: pH - 6.1

Cond. - 0.201

Turb. - 29?

D.O. - 1.24

Temp. - 8.2 °C

Collected Anions, Ammonia, Perchlorate, Explosives and dissolved cations. An MS/MSD was also collected at 1105. Sample was collected by placing tube in stream immediately adjacent to the spring percolates. Sample was collected using a peristaltic pump by J. Hensley. Left site at 1130. Arrived at PA 6.7 at 1200. The creek was frozen solid. Weir measurement showed 0.82 ft. Creek was solid above and below sample weir. Decision was made to head back at 1210. Before leaving, we went downstream of the two mile (frozen) & Pajarito Confluence. One area had a small Pajarito flow of ~~sample~~ water so a sample was collected. J. Hensley collected field parameters as follows at 1235: pH - 6.85

Cond. - 0.145

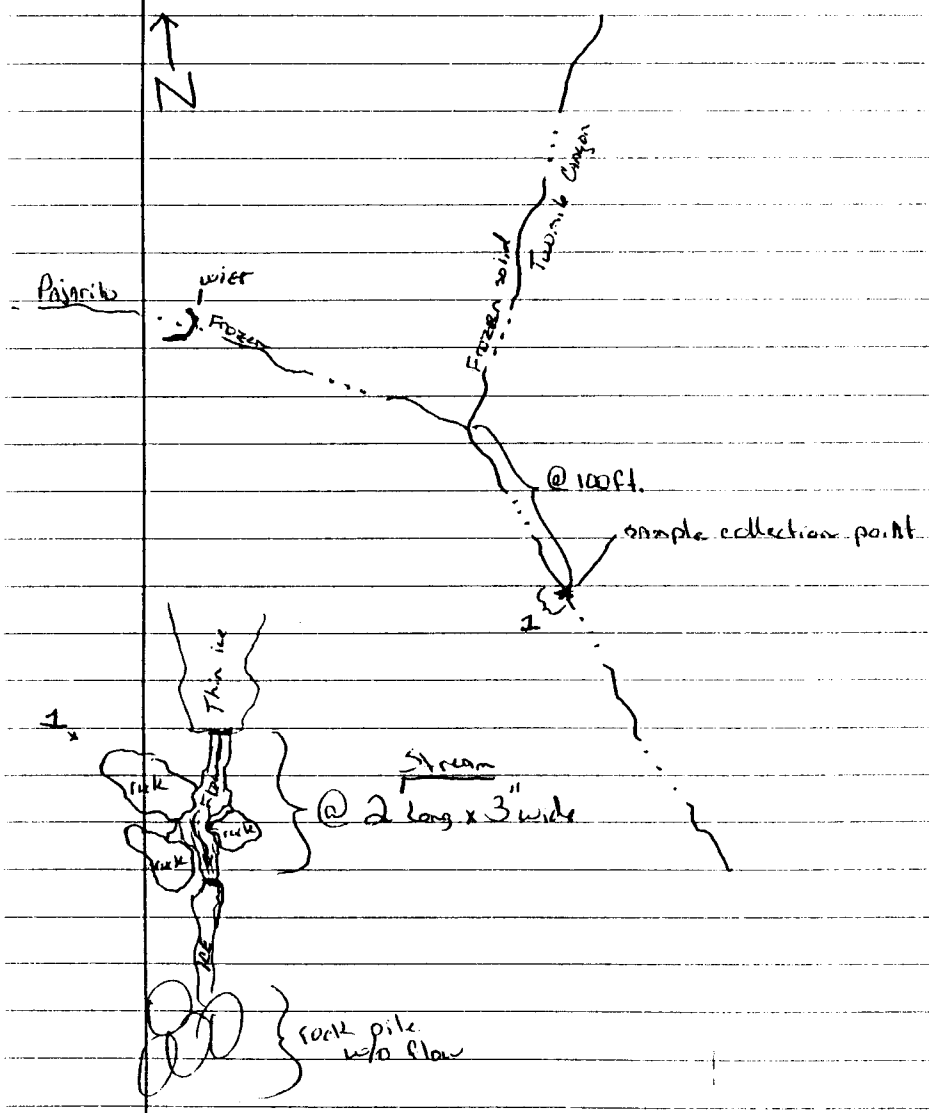
Turb. - 94?

D.O. - 6.55

Temp. - 2.7

LANL-Phase 2 Los Alamos, NM

12-10-99 01300.06.015






LANL-Phase 2 Los Alamos, NM

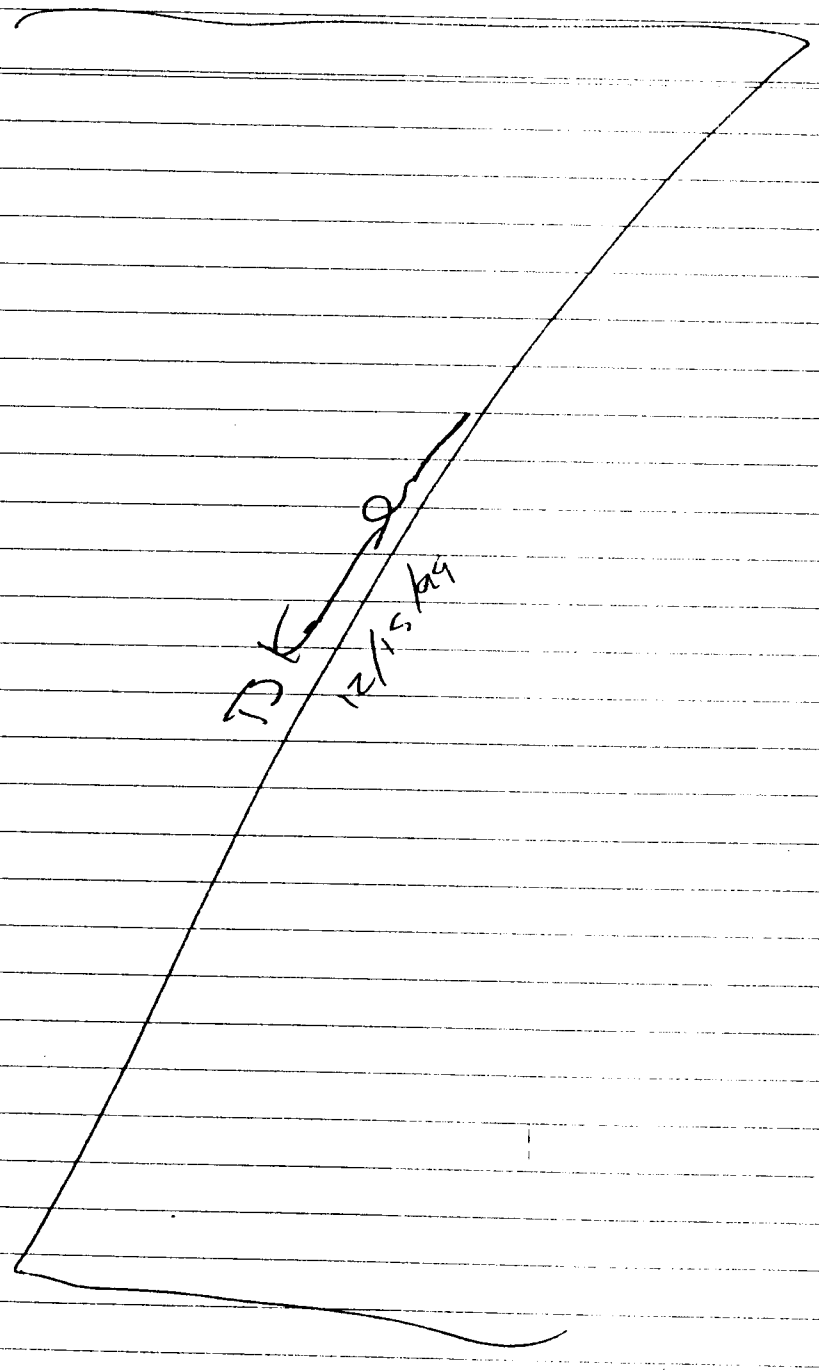
12-10-99 01300.06.015

Collected samples at 1252. Field blank (FB-6.7) was collected at 1300. Sample location was paced back to confluence and determined to be 100'. Back at truck at 1330. At NMED office at 1350 to unload and label samples.

| Station | Time | Parameters |
|---|---|---|
| TA-18 | 1105 | Anions<br>Perchlorate<br>Explosives<br>Ammonia<br>Dissolved Cations |
| TA-18 ms/msd | 1105 | Anions<br>Perchlorate<br>Explosives<br>Ammonia<br>Dissolved Cations |
| PA 6.7 | 1252 | Anions<br>Perchlorate<br>Explosives<br>Ammonia<br>Dissolved Cations |
| FB-6.7 | 1300 | Same Parameters |

Samples were labeled and custody seals applied at 1500.

Continuation of
Log Book No. 1






LANL- Phase 2 Los Alamos, NM

Dec 15, 1999 01300.06.015

0815 Arrived at [illegible] staging area for the PCB [illegible]

0858 Roll 3, Photo 1 View of location CC-8 facing S by B Kendrick witnessed by J Hawley

0900 Roll 3, Photo 2 Close-up view of location CC-8 facing S. Sample will be collected from 20 to 33 cm By B. Kendrick - witnessed by J Hawley

0915 Sediment was chipped out from location using a chisel and hammer. Sediment was frozen. The team placed the sample material inside the bucket for it to thaw. The team then proceeded to the next sample location.

0925 Arrived at location CC-7

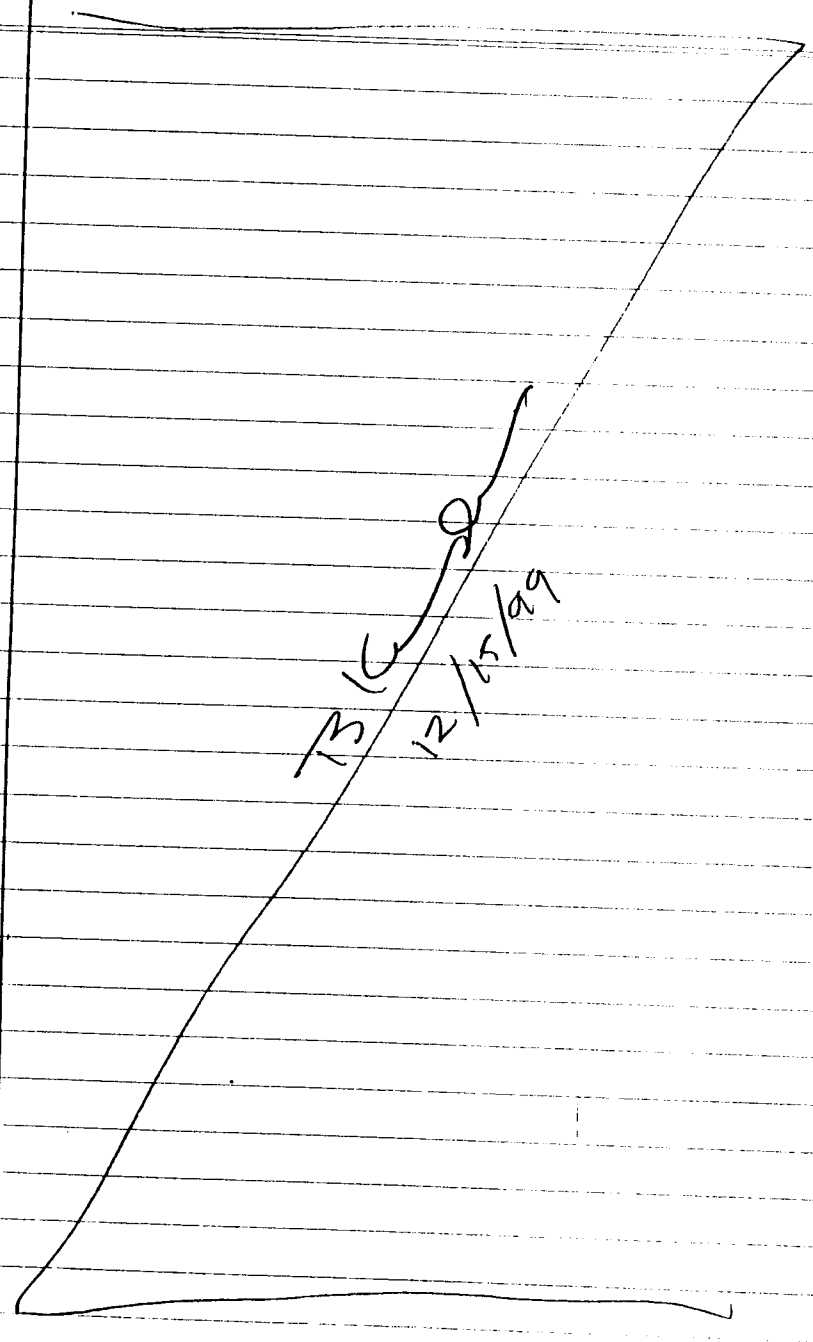
0933 Roll 3, Photo 3 View of CC-7 facing N by B Kendrick witnessed by J Hawley

0934 Roll 3, Photo 4 Close up of CC-7 facing N by B Kendrick witnessed by J Hawley. Sample will be collected from 0 to 7 cm.

1000 Collected Sample CC-7

1012 Departed location CC-7

B Kendrick






LANL - Phase 2 Los Alamos, NM

Dec. 15, 1999 01300.06.015

1017 Arrive at location CC-6

1019 Roll 3, Photo 5 View of location CC-6 looking southeast complex facing N by B Kendrick witnessed by J Hoasley

1020 Roll 3 Photo 6 Close-up view of CC-6. Sample will be collected from a depth of 0 to 7.5 cm Facing N by B Kendrick, witnessed by J Hoasley

1034 Sediment was frozen. Ten fill sample in stainless steel bowl to truck to thaw. Depart CC-6 location.

1125 Sample material from CC-B and CC-6 had thawed enough to place into sample containers

1135 Collected sample CC-B

1150 Collected equipment blank CC-EB2

1200 Collected sample CC-6

1215 Arrive at White Rock office for lunch

1300 Arrive back at Cerro del Buey to continue sample collection

1309 Arrive at sample location CC-5

FC. Q.

LANL - Phase 2 Los Alamos, NM

Dec. 15, 1999 01300.OL.015

1311 Roll 3, Photo 7 View of CL-5 location. Two samples will be collected at this location (CL-5a and CL-5b). Facing E by B Kendrick witnessed by J Hawley

1313 Roll 3, Photo 8 Closeup view of CL-5 location. CL-5a will be collected from 13 to 26 cm in depth. CL-5b will be collected from 30 to 35 cm in depth. Facing E by B Kendrick witnessed by J Hawley

1330 Collected sample CL-5A

1345 Sample material for CL-5B was frozen. Team placed the sample in plastic bagging for transport back to White Rock Office.

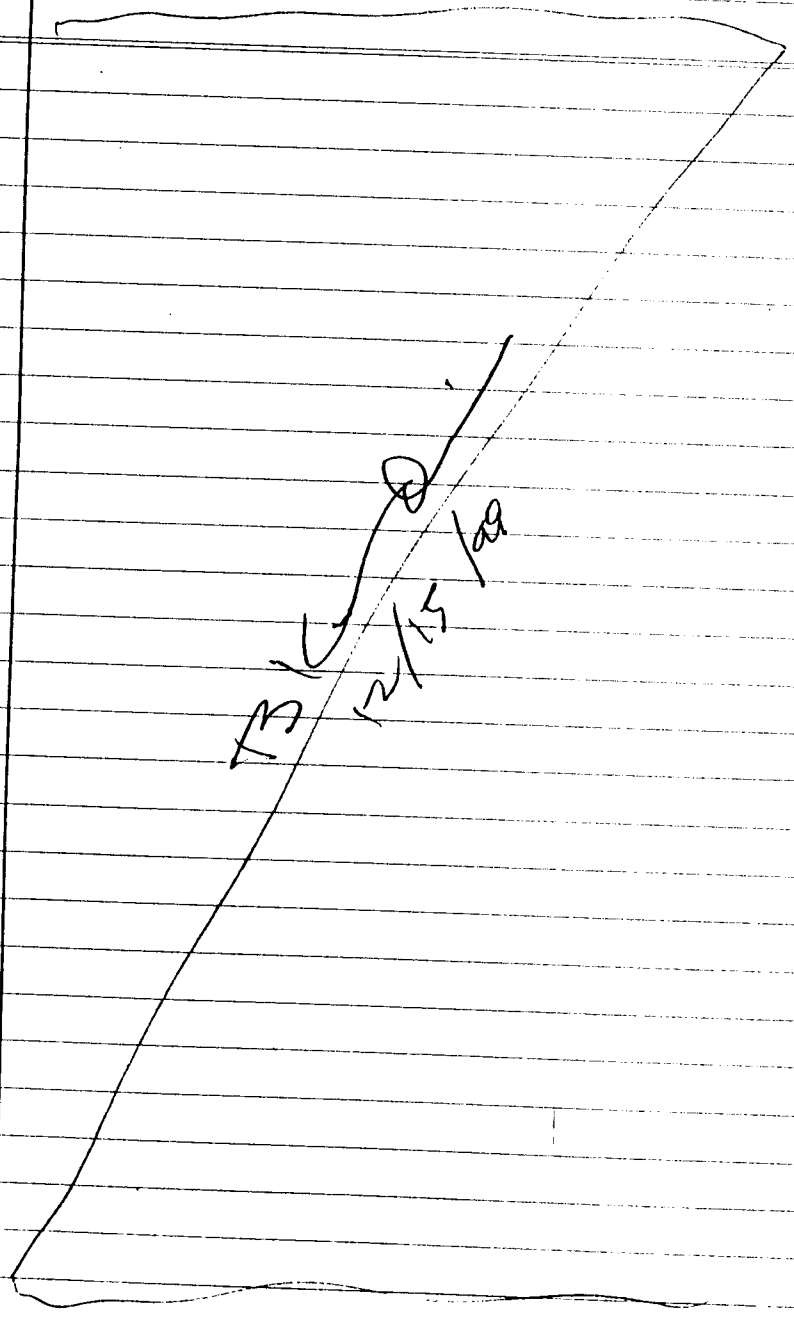
1357 Depart CL-5 location

1400 Arrive at location CL-4 Sample material will be collected from the fine-grained sediment located on the surface to a depth of approx 2 cm

1405 Roll 3, Photo 9 at location CL-4 facing N by B Kendrick witnessed by J Hawley.

B Kendrick

B Kendrick 12/15/99





LANL - Phase 2 Los Alamos, NM

Dec 15, 1989 01300.OC.015

1415 Collected Sample CC-4

1424 Arrive at location CC-3
Sample material will be collected from 0 to 13 cm

1430 Roll 3, Photo 10 View of location CC-3 facing N by B Kendrick witnessed by J Hosley

1432 Roll 3, Photo 11 Closeup view location CC-3 facing N by B Kendrick witnessed by J Hosley

1445 Sample material for CC-3 was frozen solid. Placed material in plastic bag to transport back to Ultra Rock office

1456 Arrive at location CC-2 located inside of culvert before described
Sample will be collected at a depth of 5 to 20 cm

1505 Roll 3 Photo 16 View of CC-2 location facing N by B Kendrick witnessed by J Hosley

1515 Collected Sample CC-2

1525 Arrival at sample location CC-1
Sample will be collected from 15 to 17 cm in depth

BK 12/15/99



LANL - Phase 2 Los Alamos, NM

Dec 15, 1999 01300.02.015

1530 Roll 3 Photo 13 View of sample location CC-1 facing N by BKendall witnessed by J Hoorley

1532 Roll 3, Photo 14 of closeup of location CC-1 facing N by BKendall witnessed by J. Hoorley

1545 Collected sample CC-1

1553 Depart Canada del Buey area enroute to White Rock office

Below is a summary of samples collected during the day.

| Sample No/Loc | Date | Time |
|---|---|---|
| CC-1 | 12/15/99 | 1545 |
| CC-2 | 12/15/99 | 1515 |
| CC-3 | 12/15/99 | 1445 |
| CC-4 MI/MID | 12/15/99 | 1415 |
| CC-5A | 12/15/99 | 1370 |
| CC-5B | 12/15/99 | 1345 |
| CC-6 | 12/15/99 | 1034 |
| CC-7 | 12/15/99 | 1000 |
| CC-8 | 12/15/99 | 0915 |
| CC-9 (dupe of CC-2) | 12/15/99 | 0830 |
| | ~~12/15/99~~ | — |
| CC-EB | 12/15/99 | 1150 |

END OF DAY

TRK.

B 12/16/99



LANL - Phase 2 Los Alamos, NM

Dec 16, 1999 01700.06.015

0955 Arrive at PC-1 location located in Pajarito Canyon.

1002 Roll 3, Photo 15 View of PC-1 facing E by B Kendrick witnessed by J Hawley

1005 Roll 3, Photo 16 Close up view of PC-1 which will be sampled from 0 - 17 cm in depth facing E by B Kendrick witnessed by J Hawley

1020 Collected Sample PC-1

1040 Arrive at PC-2 location in Pajarito Canyon

1043 Roll 3, Photo 17 View of PC-2 by B Kendrick witnessed by J Hawley

1045 Roll 3, Photo 18 Close up view of PC-2. Sample will be collected from 0-24 cm in depth. Facing S by B Kendrick witnessed by J Hawley

1105 Collected PC-2 from Pajarito Canyon plus a duplicate

1113 Arrive at PC-3 location

1117 Roll 3, Photo 19 View of PC-3 location facing S by B Kendrick witnessed by J Hawley (See Field of Hawley).

B Kendrick
12/16/99



LANL - Phase 2 Los Alamos, NM

Dec 16, 1999 01300.06.015

Roll 3, Photo 20 (1114) Close up view of PC-3 location facing S by B Kendrick witnessed by J Housley. Sample will be collected from 0-21 cm

1130 Collected sample PC-3

1146 Arrived at PC-4 location approximately 150 feet east of State Road 4. Sample will be collected from 0 to 5 cm in depth.

1152 Roll 3, Photo 21 View of PC-4 facing N by B Kendrick witnessed by J Housley

1154 Roll 3, Photo 22 Close-up view of PC-4 facing N by B Kendrick witnessed by J Housley

1210 Collected sample PC-4

1217 Depart Pajarito Canyon

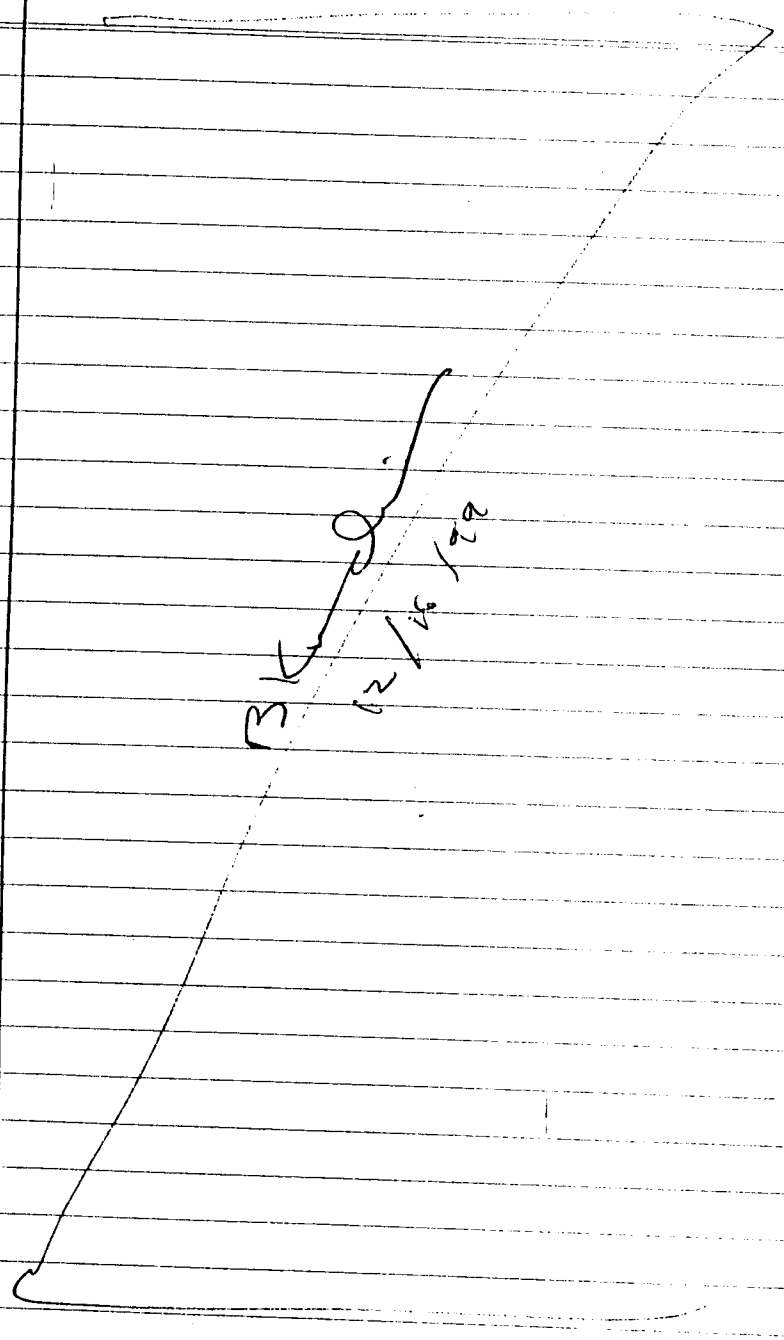
1344 Arrive at AC-5 in Ancho Canyon. Sample will be collected from 10 to 24 cm in depth.

1347 Roll 4, Photo 1 View of AC-5 facing S by B Kendrick witnessed by J Housley

1346 Roll 4 Photo 2 Close up view of AC-5 facing S by B Kendrick witnessed by J Housley

1400 Collected sample AC-5

B Kendrick





LANL - Phase 2 Los Alamos, NM

Dec 16, 1999 01300.OE.015

1408 Arrived at AC-4. Sample will be collected from 0 - 7 cm

1410 Roll 4, Photo 3 View of AC-4 facing S by B Kendrick witnessed by J Hourley

1412 Roll 4, Photo 4 Closeup view of AC-4 facing S by B Kendrick witnessed by J Hourley

1425 Collected AC-4

1435 Arrived at AC-3

1440 Roll 4, Photo 5 View of AC-3 facing N by B Kendrick witnessed by J Hourley

1442 Roll 4, Photo 6 Closeup view of AC-3 facing N by B Kendrick witnessed by J Hourley

1450 Collected Sample AC-3. AC-2 is located approximately 50 feet S of AC-3.

1454 Roll 4, Photo 7 of View of AC-2 facing N by B Kendrick witnessed by J Hourley

1500 Roll 4, Photo 8 Closeup of AC-2 facing N by B Kendrick witnessed by J Hourley. Sample was collected from 0 to 17 cm in depth.

1515 Collected Sample AC-2

B Kendrick
Reviewed



LANL - Phase 2 Los Alamos, NM

Dec 16, 1994 01300.06.015

1523 Arrive at location AC-1. Sample material will be collected from 0 to 5 cm in depth

1527 Roll 4, Photo 9 View of AC-1 located approx 300 feet west of Ancho Canyon Gaging Station. Facing N by B Kendrick witnessed by J Hosley

1529 Roll 4, Photo 10 Close up of AC-1 facing N by B Kendrick witnessed by J Hosley

1540 Collected AC-1

1556 Arrive back at vehicle Prepared to collect one equipment blank.

1610 Collected equipment blank AC-EB

1615 Depart Ancho Canyon area enroute to White Rock office.

B Kendrick

LANL - Phase 2 Los Alamos, NM

Dec 16, 1999 01300.06.015

Below is a summary of the samples collected during this day's activities

| Sample #/Location | Date | Time |
|---|---|---|
| PC-1 | 12/16/99 | 1020 |
| PC-2 | 12/16/99 | 1105 |
| PC-3 | 12/16/99 | 130 |
| PC-4 | 12/16/99 | 1210 |
| PC-5 (Dupe of PC-2) | 12/16/99 | 1230 |
| AC-1 | 12/16/99 | 1540 |
| AC-2 | 12/16/99 | 1515 |
| AC-3 | 12/16/99 | 1450 |
| AC-4 | 12/16/99 | 1425 |
| AC-5 (MS/MSD) | 12/16/99 | 1400 |
| AC-EB | 12/16/99 | 1610 |

END OF DAY

BLG 12/17/99



LANL- Phase 2 Los Alamos, NM

Dec 17, 1999 01300.06.015

1000 Arrive at well SM-30. Weather was approximately 35°F and clear. Present at the location were Steve Calhoun, Jenny Harris, Deborah Steven, PMC Jenny works for ATS. Danny Katzman and Harry Decker were present. Michael Dale and Robert Wingo were present. Well SM-30 was developed on Monday (12/13). Approximately 63 gallons were removed during well development operations.

1021 Opened wellhead and screened using an OVA. Readings from OVA were 163-70 ppm However, readings were questionable. Breathing zone measurement were 0 ppm. Photo 11.

1025 Water level in SM-30 was measured to be 22.27 feet below TOC.

1037 Began purging SM-30

1045 Measured flow rate to be approximately 425 ml/min

pH 6.05

cond 0.159

temp 13.1

turb 6 (1100)

DO 2.77

BLG

BKendall
12/17/99



LANL - Phase 2 Los Alamos, NM
Dec 17, 1999 0130.00.00.015

1050 Water quality parameters
pH 6.08
cond 0.149
turb 5
temp 13.3
DO 2.43

1100 Water quality parameters
pH 5.97
cond 0.150
turb 5
temp 13.7
DO 1.88

1102 Water level was 22.30 feet below TOC

1105 Water quality parameters
pH 5.93
cond 0.146
turb 5
DO 2.25
temp 13.6

1110 Water quality parameters
pH 5.81
cond 0.146
turb 4
DO 2.36
Temp 13.6

1112 Roll 4, Photo 12 View of SM-3.0 while purging facing W by BKendall

LANL - Phase 2 Los Alamos, NM

Dec 17, 1999 01300.06.015

Witnessed by J Hartley

1135 Water quality parameters

pH 5.89

cond 0.149

turb ~~13.3~~ 4

DO 2.21

temp 13.3

1154 Completed sampling using peristaltic pump. Pulled tubing from well

1210 Collected SM-30 sampler

1220 Depart SM-30 location.

The following is a summary of samples collected during the day's activities

| Sample No/Location | Date | Time |
|---|---|---|
| SM-30 (MS/MSD) | 12/17/99 | 1210 |
| SD-30 | 12/17/99 | 1130 |
| (Dupe of SM-30) | — | — |

END OF DAY

B Kuhlmann

# APPENDIX B

## Chronological Summary of Field Activities

# Chronological Summary
# 1999 Groundwater Sampling Mission
# Los Alamos National Laboratory

This section provides a brief summary of all sampling activities that were conducted by TechLaw (TL) staff from December 6, 1999 through December 17, 1999 at Los Alamos National Laboratory (LANL). This summary is based on TechLaw's daily logbooks and does not include all recorded details. Copies of the logbooks are included in Appendix A.

**December 6, 1999 (Monday)**

**Weather:** Temperature low 30's, clear.
**Proposed work:** Begin sediment sampling in proximity of the TA-45 tributary to Acid and Pueblo Canyon confluence.
**In Attendance (sampling):** B. Kendrick, TL-WAM; J. Housley, TL Team Member; B. Wingo, NMED; C. Hanlon-Meyer, NMED; S. Reneau, LANL;

Bret Kendrick, TL-WAM and Jim Housley, TL team member arrived at the Los Alamos Aquatic Center at 1021 and discuss safety issues and sampling logistics prior to the sampling event. It was decided that Ray Sisneros was to join the sample team in the canyon when he arrived, so at 1030 the team entered the Acid Canyon tributary. Sampling activities began at 1033 at an area where a hiking trail crossed the stream channel.

A three centimeter frozen crust was removed to collect sample ACS-35-0. The sample was collected by Chris Hanlon-Meyer and Jim Housley to a depth of ten centimeters. An area of soil large enough to fill all sample containers was extracted and placed into a stainless steel bowl and mixed into an homogeneous sample using a stainless steel trowel. A 2 cm sieve was used to filter roots and gravel from the sediment. All sampling equipment was decontaminated using Fantastic and DI water before moving to the next location.

Two samples were collected at the next location using the same methodology as previously described. Because these samples were collected from an embankment of alluvial deposition, the trowel was used to score vertical lines in the sediment as an outline of the area to be removed for a representative sample. At 1140, ACS-18-1 was collected from 0 to 26 cm from a brown, homogenous, fine sand. A duplicate of ACS-18-1 was collected from the same depth and labeled as ACS-18-3. A second sample, ACS-18-2, was obtained from 26 to 46 cm at 1200. Sampling equipment was decontaminated between the two stations and after the final sample was collected.

Samples ACS-12-1 and ACS-12-2 were collected from an embankment at the next location using the trowel as stated earlier to provide an outline of the sample collection area. ACS-12-1 was collected at 1235 from 0 to 30 cm in depth and was composed of a fine sand which was grayish-brown in color. At 1245, after decontaminating the sampling equipment, ACS-12-2 was collected from 30 to 62 cm. Sediment was a brown, fine, sandy silt. Sampling equipment was decontaminated before leaving to the next sample location.

Sample ACS-48 was collected at 1300 from 0 to 12 cm in depth using the stainless steel trowel

and bowl as mentioned previously. The sediment was a grayish-brown fine sand. An MS/MSD was also collected for metals and PCBs at this location. Sampling equipment was decontaminated before leaving for the next location.

The final station was ACS-3 where four samples were to be collected from an alluvial embankment. The first sample, ACS-3-1, was collected from 0 to 28 cm at 1330. The second sample was ACS-3-2 located from 32 to 62 cm and ACS-3-3 from 62 to 89 cm. All three of these samples consisted of a light brown, fine sand. ACS-3-4 was collected at 1400 from 89 to 104 cm in depth and was a dark brown, fine sand. After the final sample was collected, the sampling equipment was again decontaminated using Fantastic and DI water.

An equipment blank, ACS-EB, was prepared at 1410 by pouring DI water over the equipment used into a stainless steel bowl. The DI water was the poured from the bowl into sample jars to be analyzed for residual contaminants persistent after decontamination.

At 1430, M. Dale and S. Yanicak from the New Mexico Environment Department arrived with Rich Mayer, the EPA-WAM. The team arrived back to the Aquatic Center at1450 and departed to the NMED Oversight Bureau, White Rock Office at 1500. Upon arrival, B. Kendrick and J. Housley prepared the samples for shipment.

**December 7, 1999 (Tuesday)**

**Weather:** Partly Cloudy, approximately 20 degrees.
**Proposed Work:** Start sampling wells TW-8, MCO-2, MCO-3, and MCO-4B in Mortandad Canyon
**In Attendance:** R. Mayer, EPA-WAM; B. Kendrick, TL-WAM; J. Housley, TL team member; B. Wingo, NMED; M. Dale, NMED; N. Archuleta, San Ildefonso Indian Reservation; and N. Kaniatobe, San Ildefonso Indian Reservation.

**Activities:** TL team members met with David Rogers, Max Maes, Consuelo Montoya at ESH-18 for a safety meeting at 0825 hours. Naomi Archuleta and Noah Kaniatobe arrived at the meeting at 0847. The sampling team proceeded to well MT-4 and arrived at 0925. This well was installed in 1988 and is constructed of two-inch diameter PVC pipe. The well had a locked steel outer protective casing which was secured by concrete. The water level was measured at 59.64 feet below the top of casing (TOC), and the total well depth is approximately 74 feet. Low-flow purging began at 0950 at a rate of 580 ml/min. Purged water was not containerized and was discharged directly onto the ground surface. This disposal method had been agreed to by NMED prior to this sampling event. The water level was measured at 1008 at a depth of 59.65 feet below TOC and water quality parameters were collected at 1008, 1014, and 1023. There was no draw-down of the water level while purging, and water quality parameters were stable. Sample MT-4 was collected at 1105 using a bladder pump. After sample collection, water quality parameters and water level were again measured to ensure well stabilization. Sample team departed MT-4 at 1130.

The team then proceeded to well MCO-4B in lower Mortandad Canyon. This well was installed in 1990 and was constructed of two-inch diameter polyvinyl chloride (PVC) pipe. The well had

a one-foot square concrete well pad and a locked, steel outer protective casing. The second well to be sampled was MCO-4B. The top of the pump was measured at 23.54 feet below TOC. The water level was below the top of the pump. At 1146, an attempt was made to purge the well but no water could be removed. Therefore, either the pump intake was above the water level or the pump was not functioning properly. A call was placed to David Rogers to verify the substitution of MCO-5 for MCO-4B. MCO-4B was departed at 1200. After stopping at the RTC office to scan the samples and trash, the San Ildefonso Pueblo personnel departed.

The sample team arrived at MCO-3, located at the base of a steep ravine and along a creek bed, at 1245 to find that the well's steel outer protective casing was not locked. MCO-3 is a three inch diameter, black plastic well with a total depth of twelve feet. The water level was measured at 5.95 feet below TOC. TOC was 2.5 feet above ground surface. The well was purged and sampled using a battery powered peristaltic pump. MCO-1 was collected as a duplicate of MCO-3. The team departed MCO-3 at 1417.

The sample team arrived at MCO-2 which is a two inch, black plastic well with a locking cap. The total depth of the well is nine feet, and the water level was measured at 6.35 feet below TOC. Purging was initiated using a battery powered peristaltic pump, and water quality parameters were measured every four minutes. After parameters stabilized, samples were collected. The team departed MCO-2 and Mortindad Canyon at 1545 to return to the NMEDOB White Rock office. Samples were prepared for shipment. by B. Kendrick and J. Housley.

**December 8, 1999 (Wednesday)**
**Weather:** Temperature in the mid 20s, overcast.
**Proposed work:** Sample MCO-5, MCO-6, MCO-7, MCWB-7.7B, and MCO-8.
**In Attendance:** R. Mayer, EPA-WAM; B. Kendrick, TL-WAM; J. Housley, TL team member; B. Wingo, NMED; M. Maes, LANL;

**Activities:** The TL team and Bob Wingo of NMED arrived at ESH-18 and met with Max Maes. The team then proceeded to well MCO-5 in lower Mortandad Canyon along a dry creek bed that crosses the dirt road. This well was installed in 1960 and is constructed of three-inch black plastic pipe. A locked, steel protective outer casing was secured in place by concrete. The water level was detected at 26.20 feet below TOC with a total well depth of 46 feet. Three well volumes were purged using a dedicated bladder pump. Purged water was not containerized and was discharged directly onto the ground surface. MCO-5 samples were collected after water quality parameters had stabilized. Samples were also collected at this location for a matrix spike/matrix spike duplicate. The team departed MCO-5 at 1102.

The team arrived at MCO-6 at 1107, which was installed in March 1974. The well is constructed of four-inch diameter plastic pipe. It has a locked, steel outer protective casing with no well pad present. An initial water level was measured at 39.00 feet, and according to published boring logs, the well reaches a total depth of 47 feet. The well was purged and sampled with a dedicated bladder pump. The sample team departed the site at 1220.
The sampling team then proceeded to well MCO-7. Well MCO-7 was installed in 1960 and is constructed of three-inch black plastic pipe. The well had a locked, steel protective outer casing which was secured by concrete. Due to low water flow and limited recharge, samples were collected after one borehole volume was purged and measured parameters had stabilized prior to

sampling.

The team members arrived at well MCWB-7.7B at 1416. This well was installed in 1994 and is constructed of three-inch diameter PVC pipe. The well had a locked, steel protective outer casing and a three-foot square concrete well pad. The water level was detected at 60.08 feet below TOC with a total depth of 70 feet. One well volume was purged, and after the water quality parameters had stabilized, the well was sampled. All purged water was containerized. The team departed MCWB-7.7B at 1520.

The team arrived at well TW-8 at 1526. The well is an eight inch diameter steel well with a locked steel casing and a concrete pad. The well extends to a total depth of 1,065 feet and is pumped by an electric generator. The generator was started at approximately 1050 to purge the well. Water quality parameters and samples were collected from a faucet on the wellhead. The team departed for the day to the NMED White Rock office to prepare samples for shipment.

**December 9, 1999 (Thursday)**
**Weather:** Clear, low 40's
**Proposed Work:** Sample Gauging Station 1 (GS-1) and ship coolers.
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL team member; B. Wingo, NMED; D. Rogers, LANL.

**Activities:** The TL team received a call from Mr. David Moss at the TA-50 Radioactive Wastewater Treatment Plant who said the plant was to start discharging water at approximately 1400, making it possible to collect a sample at Gauging Station-1. Samples that were previously collected were packed in coolers and prepared for shipment. Three coolers were sent to Southwest Laboratories of Oklahoma, two were sent to Quanterra Laboratories, and one was sent to Coastal Scientific Laboratory via FedEx.

The TL team arrived at ESH-18 to pick up David Rogers and proceeded to Mortindad Canyon, to sample TA-50 effluent, at Gauging Station-1. The sample was to be collected using a battery powered peristaltic pump to remove water from the streambed as it was released from TA-50. At 1427, B. Kendrick called Deborah Hall at TA-50, and she said they would start releasing. A field blank was collected while waiting for the release water to arrive by transferring DI water to appropriate sample containers and labeled as MCO-FB. Release water arrived at sample station at 1445. After water quality parameters were obtained, sample GS-1 was collected from the gauging station. The team departed the gauging station at 1525.

**December 10, 1999 (Friday)**

**Weather:** overcast, 40's
**Team A, Proposed Work:** Sample Upper Pajarito Springs
**In Attendance:** B. Kendrick, TL-WAM; R. Mayer, EPA-WAM; B. Wingo, NMED; S, Yanicak,

NMED; M. Dale, NMED; and D. Rogers, LANL..

**Activities:** Team members met outside the TA-8 security area. Michael Dale and David Rogers brought badges to enter the gated area. The team arrived at 0900 Homestead Spring. The flow rate was reportedly half as much as the rate during the previous sampling event. Homestead Spring was sampled using a peristaltic pump after water quality parameters had been obtained.

Team A proceeded to Starmer's Spring, located in Starmer's Gulch, at 1004. The team collected samples from the spring using a peristaltic pump after water quality parameters had been assessed. The team departed Starmer's Spring at 1033.

After arriving at Charlie's Spring, which is located upstream of Starmer's Gulch, Rich Mayer, EPA WAM, decided not to sample because the area had little water. The team moved on to collect water from Kieling Spring at 1220, Bulldog Spring at 1300, BU-0.01 at 1345, and PA-8.9 at 1425. After sampling PA-8.9, Team A departed the field and returned to the NMED White Rock office where TL prepared sample containers for shipment.

**Team B, Proposed Work:** Sample Middle and Lower Pajarito surface waters
**In Attendance:** J. Housley, TL Team Member, C. Hanlon-Meyer, NMED; B. Wedgeworth, NMED; and H. Decker, LANL.

**Activities:** Jim Housley, Bruce Wedgeworth, and Chris Hanlon-Meyer arrived at TA-18 at 0835. Harvey Decker arrived at 0845, and the team entered the guard gates. After entering, the sample team hiked to Threemile Spring in Pajarito Canyon and found it dry. The team departed and went to sample surface water at station TM-0.4. It was also dry so the team moved on to TA-18 Spring. The spring was flowing, so NMED personnel measured the flow rate and J. Housley prepared sampling equipment. After completing flow rate measurements, field parameters and samples were collected using a battery powered peristaltic pump. Samples which required filtering were collected from an in-line 0.45$\mu$ filter. A surface water sample and matrix spike/matrix spike duplicate was also collected at TA-18 Spring.

Team B left Technical Area-18 and proceeded to PA-6.7 to collect surface water from the Pajarito and Twomile Canyon confluence. The sampling location was in the lower end of Pajarito Canyon and was frozen. The Twomile Canyon stream was smaller than Pajarito stream and was frozen solid. The team inspected the stream downstream of the confluence and located a small area of flowing water approximately 100 feet from the confluence. It was deduced that the stream must have been from Pajarito so the sample was collected. A peristaltic pump was used to collect the samples, and any samples which required filtering were collected with a 0.45$\mu$ in-line filter. A field blank, labeled FB-6.7, was also collected at this site by transferring DI water into sample containers. Team B returned to the NMED White Rock office at 1350, and J. Housley labeled and sealed sample containers. Rich Mayer returned to Dallas.

**December 13, 1999 (Monday)**

**Weather:** 40's, partly cloudy

**Proposed Work:** Sample Sandia and Bayo Canyon, and production wells PM-1, PM-2, PM-5, O-4.
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL Team Member; C. Montoya, LANL; B. Turney, LANL; C. Hanlon-Meyer, NMED; B. Wedgeworth, NMED, Sandra Jacquez, NMED; and Rory Gauthier, NPS.

**Activities:** Sediment samples were collected along embankments of alluvial deposits in Sandia and Bayo Canyon. The method for collecting the sediment was as stated earlier of Acid Canyon where a stainless steel trowel was used to score an outline of the area of soil to be removed. The sediment is removed and placed into a large stainless steel bowl to be homogenized. If debris such as roots or gravel was present in the mixture, it was sieved before filling sample jars. All sample locations were logged with a Trimble GPS Pro XR/XRS system and downloaded to Pathfinder Office 2.0 software for later incorporation into the report.

The sample team arrived at the first sampling location on the east side of State Road 4 in Sandia Canyon. The location was designated as SC-1 and consisted of sediment 0 to 17 cm in depth. The sample material was a light brown, medium to fine grain sand with some silt and rootlets and was collected by TL at 0925. The second sample was a medium to fine sand with some silt that was located from 0 to 3 cm. The sample was labeled as SC-2 and was collected at 0955. The team arrived at the next location labeled SC-3 to collect a sample from 8 to 19 cm in depth. The sediment was medium to fine sand and was collected at 1025. SC-4 was collected at the next location at 1050 from 2 to 12 cm in depth. The sample team crossed to the west side of State Road 4 to collect the final two samples. After locating SC-5, the sample team continued on to SC-6 and worked back toward the vehicles. SC-6 was collected from 0 to 12 cm in depth at 1125. A matrix spike/matrix spike duplicate was also collected at this location. The sample team arrived at the final sample location and collected SC-5 at 1150. At 1210 the sample team departed Sandia Canyon and continued to Bayo Canyon to complete the day's sediment sampling.

A total of five samples were collected in Bayo Canyon. BC-1 was collected at 1340, BC-2 at 1410, BC-3 at 1430, and BC-4 at 1505. The fifth sample was BC-5 and was collected as a duplicate of BC-2. TL departed Bayo Canyon at 1515 to the NMED White Rock office to prepare samples for shipment.

TL prepared bottles afterward for collection of water from local production wells. The TL team met with Mr. Bob Beers of LANL, and Walter of the County Water Department, at the LANL power plant. All wells were purged when we arrived at their individual sites. The first production well sampled was PM-5 at 1810. The sample was collected from the well head after water quality parameters were established. The second well was PM-2 which was sampled in the same manner at 1850. Production wells PM-1 and O-4 were collected at 1955 and 2040 respectively. TL departed O-4 and proceeded to the NMED White Rock office at 2055 to prepare samples for shipment.

**December 14, 1999 (Tuesday)**

**Weather:** Mid to high 40's, slight breeze
**Proposed Work:** Sediment sampling in Mortindad Canyon
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL Team Member; C. Montoya, LANL; C. Hanlon-Meyer, NMED; Sandra Jacquez, NMED.

**Activities:** Sample team arrived at MC-1 and sampled sediment 0 to 5 cm at 1000. The sample area was scored with a stainless steel trowel, and sediment was placed into a stainless steel bowl. The sediment was sieved to remove larger gravel from the sample and then placed into sample jars. The sampling locations were logged with a Trimble GPS Pro XR/XRS system and downloaded to Pathfinder 2.0 software for later processing.

The sample team moved to MC-3 and collected sediment located from 15 to 24 cm in depth in the same manner as mentioned above. The sample was collected at 1115. The next location, MC-4, was located approximately four feet from MC-3 and was located directly in the dry stream channel. MC-4 was collected from 0 to 5 cm in depth at 1130. The team back-tracked to MC-2 where a sample was collected from 0 to 8 cm at 1200. The final location, MC-5, included two areas to be sampled. The first was designated as MC-5a and was collected from 0 to 13 cm at 1235. The second sample was designated as MC-5b and was collected from 22 to 30 cm in depth at 1250. The sample team departed the canyon and returned to the NMED White Rock office.

B. Kendrick, Chris Hanlon-Meyer, and Bill Turney departed to locate sample locations for Canada del Buey Canyon within the White Rock community while J. Housley labeled and sealed collected samples. Five locations for six samples were located to be sampled the next day.

**December 15, 1999 (Wednesday)**

**Weather:** Not recorded
**Proposed Work:** Sample Canada del Buey.
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL team member; C. Montoya, LANL; B. Turney, LANL.

**Activities:** The sample team arrived at Canada del Buey behind McDonalds Restaurant in White Rock at 0815. The first sample to be collected was CC-8 at a depth from 20 to 33 cm. The sample was collected at 0915 in the same manner as previous sediment samples. A hammer and stainless steel chisel were used to chip out the outlined area of soil because the soil was frozen solid. In order to fill sample jars, the bowl of sample material was placed on the dash of the truck in the sun so it could defrost. CC-7 was the second location and was collected from 0 to 7 cm. The sample was collected at 1000 and the team moved west through the canyon to station CC-6. This sample was collected in the same manner as above from 0 to 7.5 cm in depth. The sample was collected at 1034 and the stainless steel bowl was placed in the truck to thaw. At 1125 the CC-8 and CC-6 had defrosted enough to transfer into sample containers. The sampling equipment was decontaminated, and an equipment blank was collected at 1150. The blank was labeled as CC-EB.

The team drove to a location farther west to continue sampling the canyon and arrived at location

CC-5 at 1309. Two samples were collected at the location. The first was designated as CC-5a and was located from 18 to 26 cm in depth. The sample was collected at 1330. The second sample was designated as CC-5b and was collected from 30 to 39 cm in depth at 1345. The samples were placed in plastic bags for transport back to the NMEDOB White Rock office to be transferred to sample containers when thawed. The next sampling location was CC-4 where a surface sample was collected to a depth of approximately 2 cm. CC-4 and a matrix spike/matrix spike duplicate were collected at 1415. The next sample location was CC-3 and was collected from 0 to 13 cm in depth. The sample was collected at 1445 and was also frozen solid. It too was placed in plastic bags and taken to the NMEDOB office to be thawed. The next location, CC-2, was located inside a culvert under the dead end on LaJano Road. The sample was collected from 5 to 20 cm in depth at 1515. Sample CC-9 was also collected here as a duplicate sample of CC-2. The final sample of the day was CC-1 which was sampled from 10 to 17 cm. The sample was collected at 1545 and TL returned to the NMEDOB office to prepare samples for shipment.

**December 16, 1999 (Thursday)**

**Weather:** Not Recorded
**Team 1 (LANL-ESH) Proposed Work:** Sample Pajarito and Ancho Canyon
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL team member; S. Yanicak, LANL; C. Hanlon-Meyer; C. Montoya, LANL; B. Turney, LANL.

**Activities:** The team sampled locations in Pajarito and Ancho Canyon in the same manner as previous sediment sampling. The sample team arrived at PC-1 and sampled a depth of 0 to 17 cm at 1020. PC-2 was sampled from 0 to 24 cm at 1105. A duplicate sample was also collected from this location and labeled PC-5. The team collected PC-3 from 0 to 21 cm in depth at 1130 and PC-4 was collected from 0 to 5 cm in depth at 1210. The final Pajarito Canyon sampling location, PC-4, was located approximately 150 feet east of State Road 4.

The team drove to a public access area of Ancho Canyon and collected the final five sediment samples. Sample AC-5 and a matrix spike/matrix spike duplicate was collected from 10 to 24 cm in depth at 1400. The second location was AC-4 where a sample was collected from 0 to 7 cm in depth at 1425. Sample AC-3 was collected at 1450 and the team moved approximately 50 feet south to sample AC-2. AC-2 was collected from 0 to 17 cm in depth at 1515. The final location, AC-1, was sampled from 0 to 5 cm in depth. The location was approximately 300 feet west of the Ancho Canyon Gauging Station and was sampled at 1540. The equipment was decontaminated and an equipment blank, AC-EB, was collected. The team departed the canyon and returned to the NMED office to prepare samples for shipment.

**December 17, 1998 (Friday)**

**Weather:** 35, clear
**Proposed Work:** Sample SM-30 groundwater well.
**In Attendance:** B. Kendrick, TL-WAM; J. Housley, TL Team Member; B. Wingo, NMED; M. Dale, NMED; S. Calhoun, PMC; J. Harris, ATS; D. Steven, PMC; D. Katzman, ER-LANL; H.

Decker, LANL;

**Activities:** The well was developed on Monday (12/13) when approximately 63 gallons were removed. The well was enclosed in a flush mounted road box and was screened with an OVA when opened. Readings fluctuated around 163 to 170 in the well but were very questionable. Readings obtained in the breathing zone were consistently zero. The water level was measured at 22.27 feet below TOC, and low-flow purging was initiated. The well was purged using a battery powered peristaltic pump at a flow rate of 425 ml/minute. Water quality parameters including pH, conductivity, turbidity, dissolved oxygen, and temperature were monitored for fifty minutes to ensure stabilization. When confident that the parameters had stabilized, samples were collected using the peristaltic pump. Samples which required filtering were collected from a 0.45$\mu$ in-line filter. SM-30 samples were collected along with an MS/MSD sample and a duplicate labeled as SD-30. The TL team departed the site to the NMED White Rock office at 1220 to prepare samples for shipment.

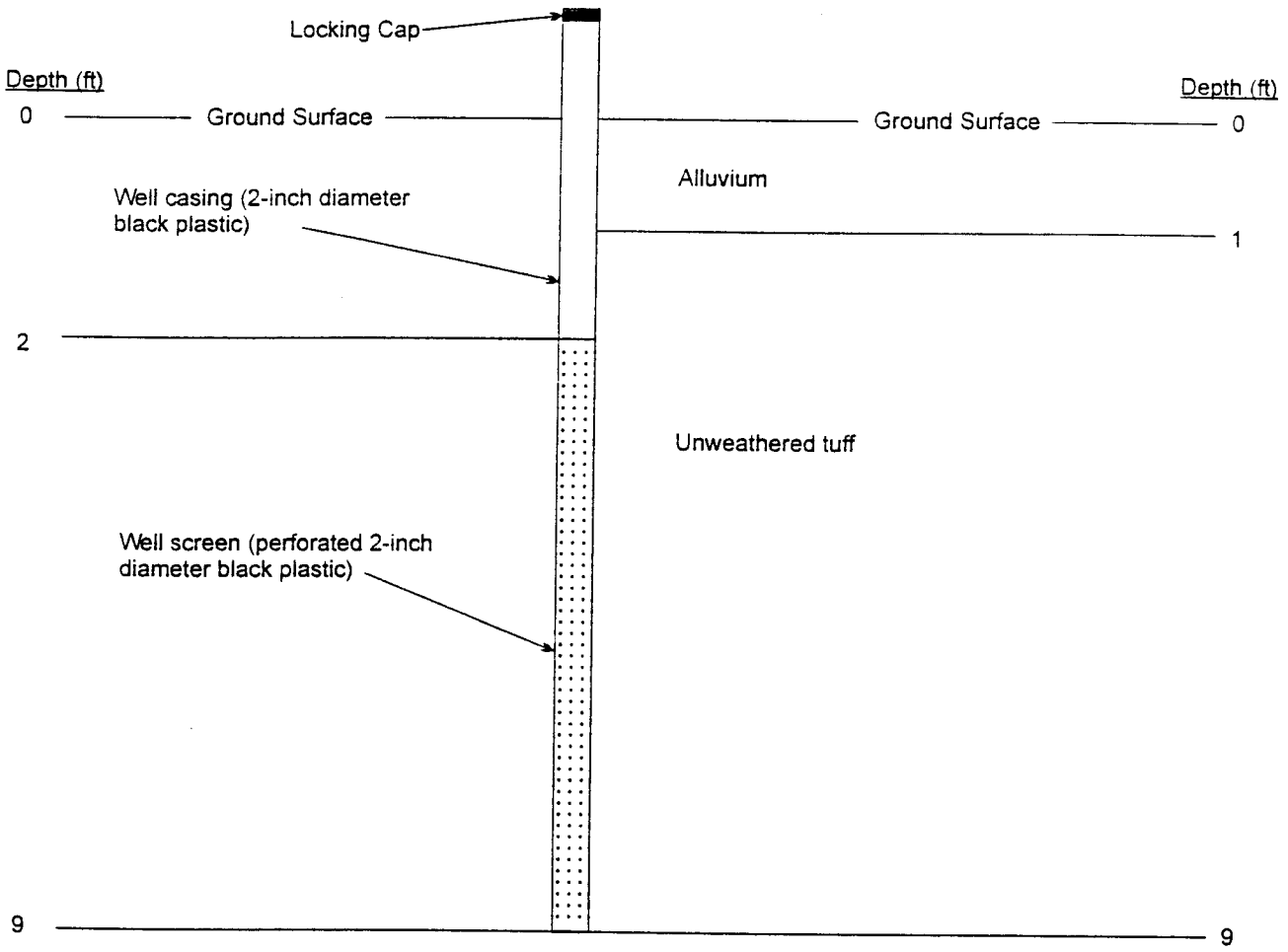
# APPENDIX C

## Generalized Well Construction and Lithologic Descriptions

# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-2
**Date Completed:** November 1960
**Location:** Mortandad Canyon

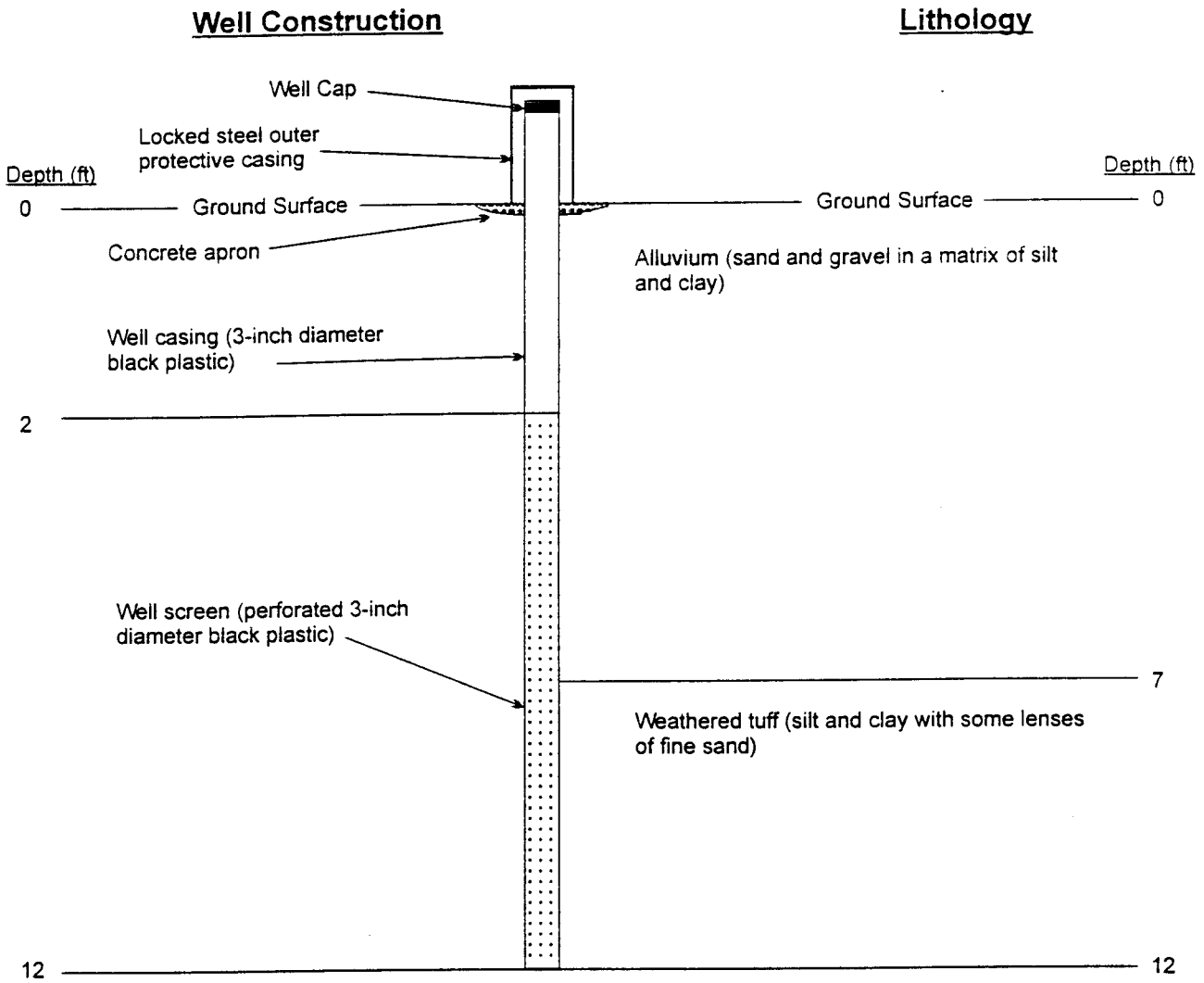
**Well Diameter:** 2 inches
**Length of Well Screen:** 7 feet
**Total Depth of Well:** 9 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-3
**Date Completed:** March 1967
**Location:** Mortandad Canyon

**Well Diameter:** 3 inches
**Length of Well Screen:** 10 feet
**Total Depth of Well:** 12 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-5

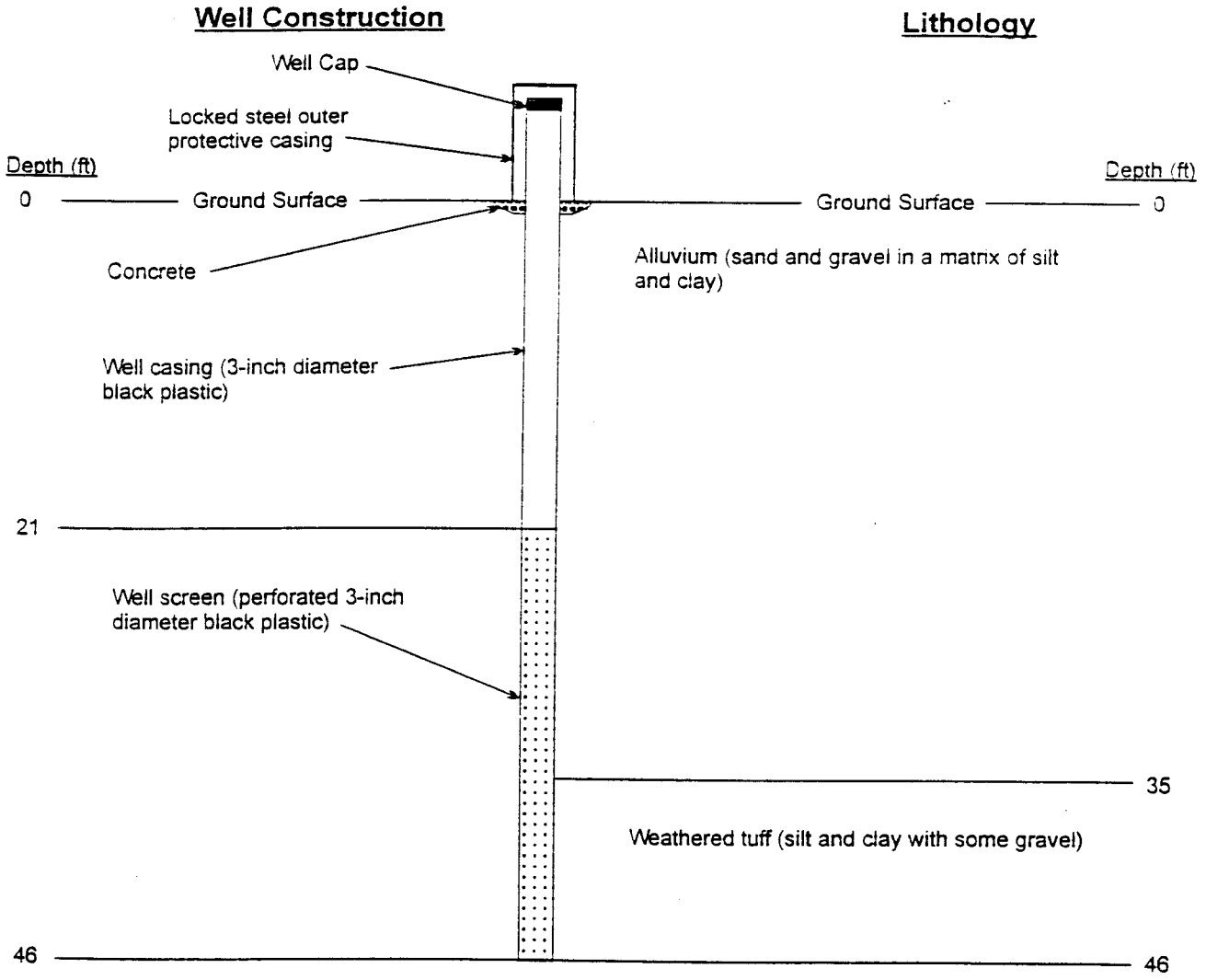
**Date Completed:** October 1960

**Location:** Mortandad Canyon

**Well Diameter:** 3 inches

**Length of Well Screen:** 25 feet

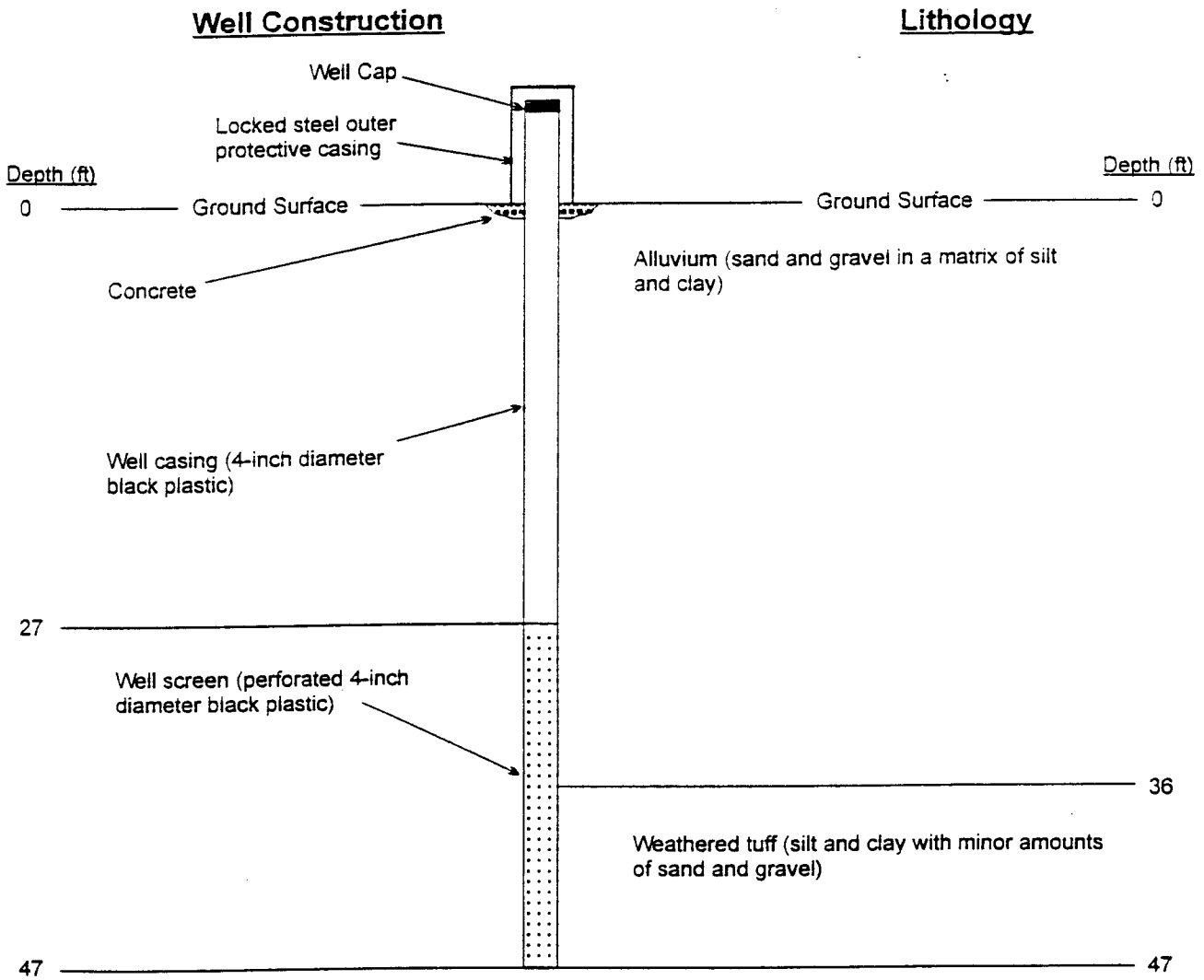
**Total Depth of Well:** 46 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-6
**Date Completed:** March 1974
**Location:** Mortandad Canyon

**Well Diameter:** 4 inches
**Length of Well Screen:** 20 feet
**Total Depth of Well:** 47 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MCO-7

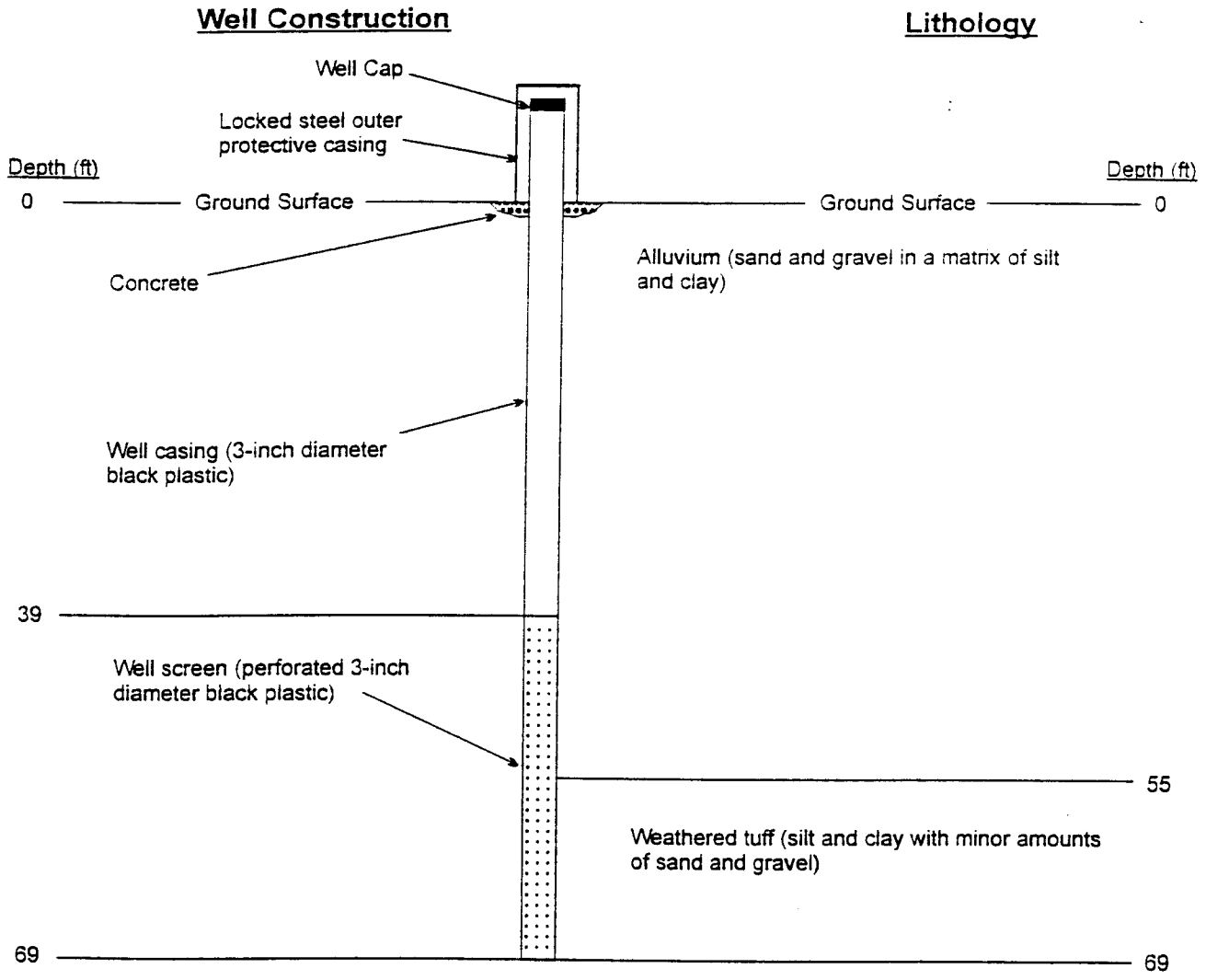
**Date Completed:** October 1960

**Location:** Mortandad Canyon

**Well Diameter:** 3 inches

**Length of Well Screen:** 30 feet

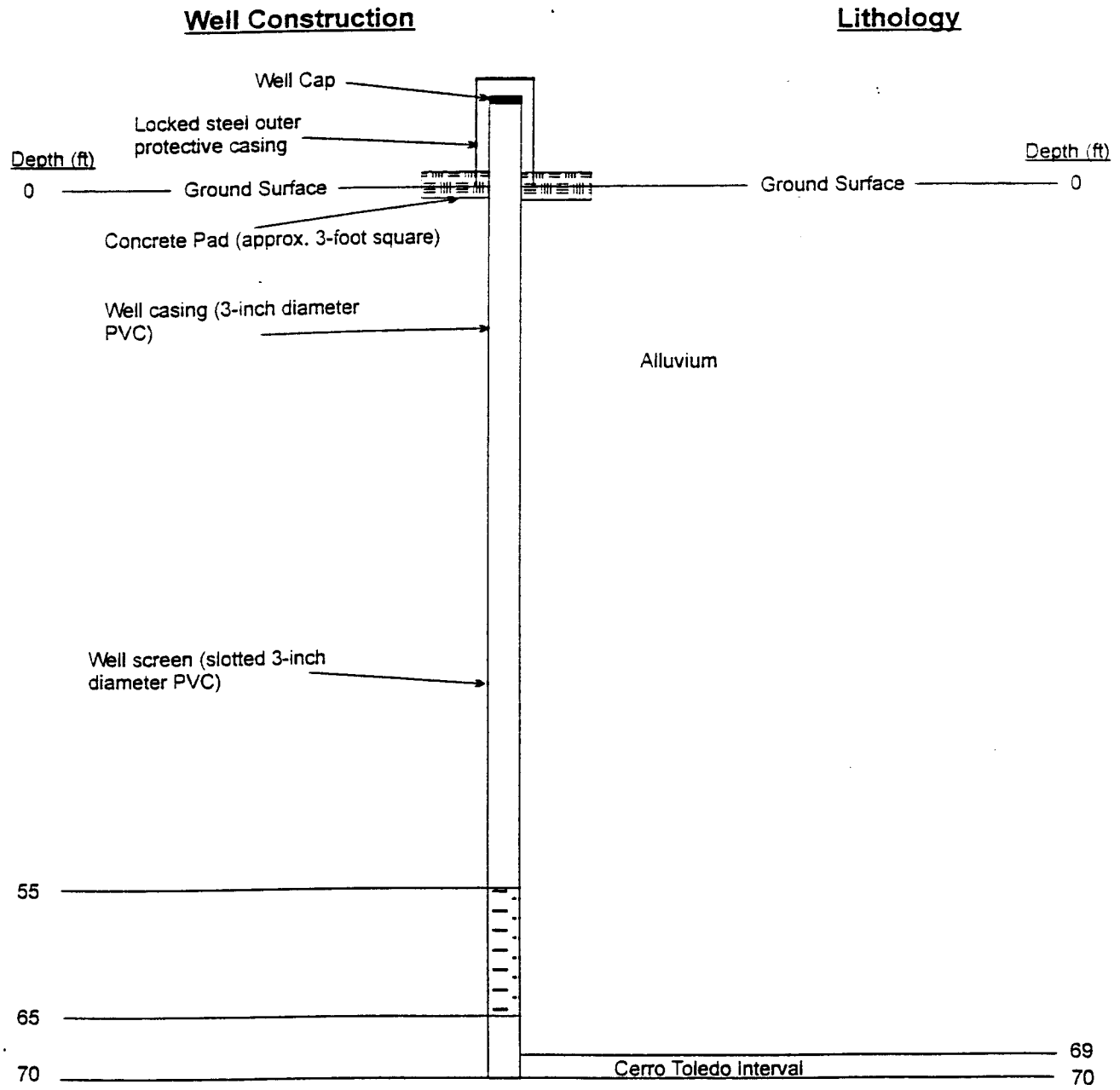
**Total Depth of Well:** 69 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MCWB-7.7B
**Date Completed:** December 1994
**Location:** Mortandad Canyon

**Well Diameter:** 3 inches
**Length of Well Screen:** 10 feet
**Total Depth of Well:** 70 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** MT-4

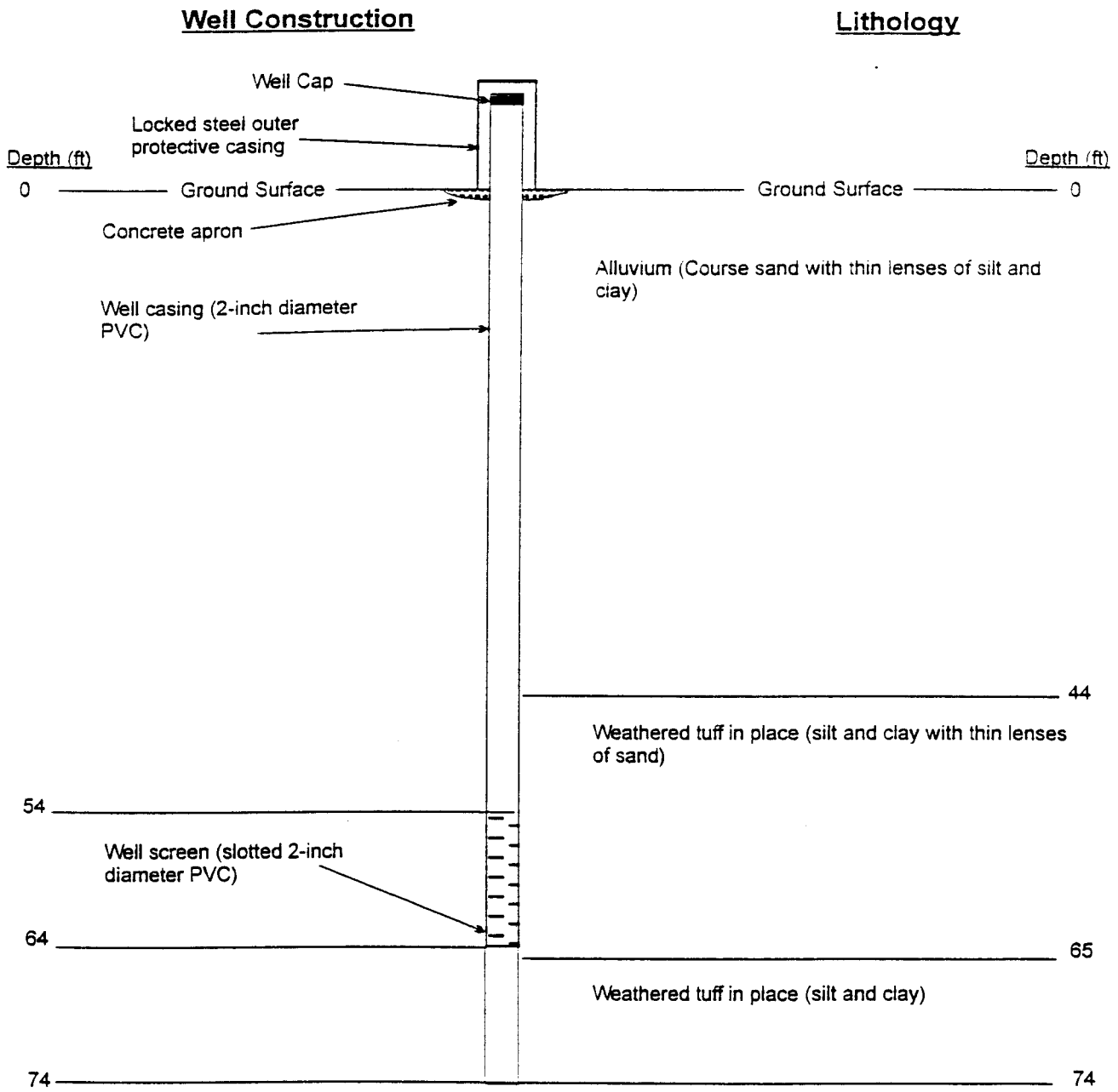
**Date Completed:** November 1988

**Location:** Mortandad Canyon

**Well Diameter:** 2 inches

**Length of Well Screen:** 10 feet

**Total Depth of Well:** 74 feet



# Generalized Well Construction and Lithologic Description

**Well Designation:** TW-8

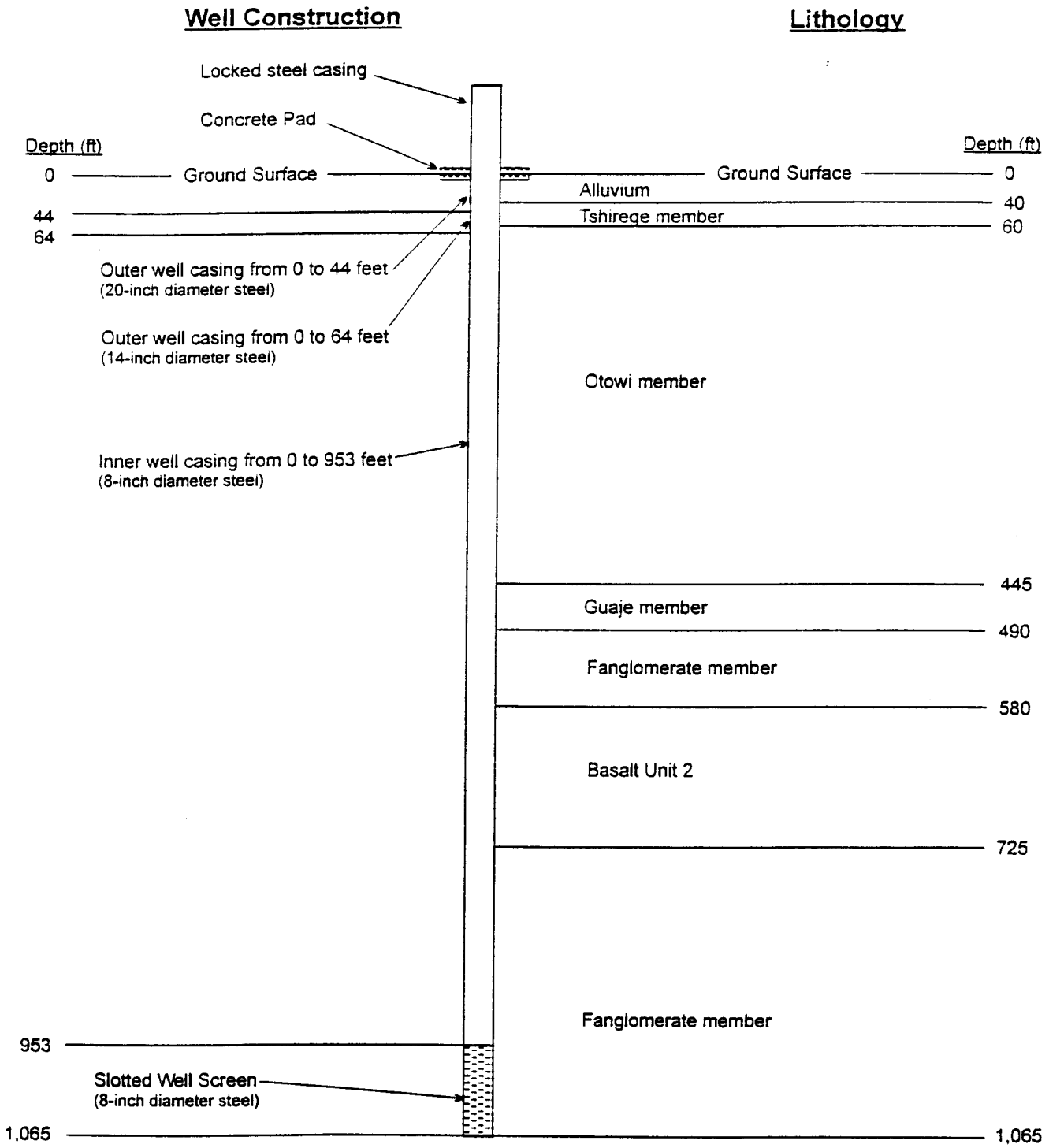
**Date Completed:** December 1960

**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

# 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 5, 6, 7, 8, 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. The secondary MCLs are not enforceable by the EPA.

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 MSSL)*

The USEPA Region 6 Human Health Medium-Specific Screening Levels address common human health exposure pathways. They do not consider all potential human health exposure pathways nor address ecological concerns. The comparison of preliminary investigation data against risk-based media concentrations provides for an initial evaluation for the relative environmental concern for a site or set of environmental data. EPA MSSL 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 MSSL 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 (filtered) sample 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 WHL)*

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 WHLs apply to all discharges to the surface waters of New Mexico.

*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 applies 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 E

## Comparison Tables

## Acid Canyon Sediment Sample Comparison Summary of Preliminary Analytical Results for - Radionuclides *
## Los Alamos National Laboratory, New Mexico

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-3 | | | | | | | | |
| | EPA PRG[a] | EPA PRG | LANL | 0-28 cm | | | 37-62 cm | | | 62-89 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | 1.02 | NS | NS | 0.062 | NS | NS | 1.06 | NS | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 184 | NS | NS | 2.73 | NS | NS | 117 | NS | NS |
| Uranium-234 | 69 | 18 | 2.59 | NA | NS | NS | NA | NS | NS | NA | NS | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NS | NS | NA | NS | NS | NA | NS | NS |
| Uranium-238 | 73 | 18 | 2.29 | NA | NS | NS | NA | NS | NS | NA | NS | NS |
| Strontium-90 | 57 | 14 | 1.04 | 2.12 | NS | NS | 0.74 | NS | NS | 5.6 | NS | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.93 | NS | NS | -0.063 | NS | NS | 2.84 | NS | NS |
| Actinium-228 | | | | -- | NS | NS | -- | NS | NS | 1.49 | NS | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | 3.70 | NS | NS | -- | NS | NS | 29.3 | NS | NS |
| Lead-210 | 3.2 | 0.78 | | 2.4 | NS | NS | -- | NS | NS | -- | NS | NS |
| Lead-212 | | | | 1.09 | NS | NS | 1.29 | NS | NS | 1.69 | NS | NS |
| Lead-214 | | | | 0.95 | NS | NS | 1.15 | NS | NS | 1.25 | NS | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | 26.0 | NS | NS | 32.7 | NS | NS | 29.0 | NS | NS |
| Thallium-208 | | | | -- | NS | NS | -- | NS | NS | -- | NS | NS |
| Thorium-234 | | | | -- | NS | NS | -- | NS | NS | 1.47 | NS | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-3 | | | Fixed Point Site ACS-4 | | | | | |
| | EPA PRG | EPA PRG | LANL | 89-104 cm | | | 0-18 cm | | | 24-53 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | 0.84 | NS | NS | NS | 1.14 | NS | NS | 0.005 | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 140 | NS | NS | NS | 451 | NS | NS | 4.09 | NS |
| Uranium-234 | 69 | 18 | 2.59 | NA | NS | NS | NS | 3.1 | NS | NS | 0.86 | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NS | NS | NS | 0.27 | NS | NS | 0.08 | NS |
| Uranium-238 | 73 | 18 | 2.29 | NA | NS | NS | NS | 3.6 | NS | NS | 0.76 | NS |
| Strontium-90 | 57 | 14 | 1.04 | 10.8 | NS | NS | NS | 4.37 | NS | NS | 0.53 | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 7.10 | NS | NS | NS | 0.23 | NS | NS | <0.20 | NS |
| Actinium-228 | | | | -- | NS | NS | NS | <1.1 | NS | NS | 1.5 | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | 10.6 | NS | NS | NS | 10.3 | NS | NS | <0.66 | NS |
| Lead-210 | 3.2 | 0.78 | | -- | NS | NS | NS | -- | NS | NS | -- | NS |
| Lead-212 | | | | 1.49 | NS | NS | NS | 1.28 | NS | NS | 1.56 | NS |
| Lead-214 | | | | 1.09 | NS | NS | NS | <0.36 | NS | NS | 1.44 | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | 27.9 | NS | NS | NS | -- | NS | NS | -- | NS |
| Thallium-208 | | | | 0.59 | NS | NS | NS | <0.30 | NS | NS | <0.19 | NS |
| Thorium-234 | | | | -- | NS | NS | NS | -- | NS | NS | -- | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-4 | | | | | | Fixed Point Site ACS-10 | | |
| | EPA PRG | EPA PRG | LANL | 59-69 cm | | | 74-84 cm | | | 0-15 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | 0.019 | NS | NS | 0.137 | NS | NS | 4.53 | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | 2.25 | NS | NS | 30.2 | NS | NS | 373 | NS |
| Uranium-234 | 69 | 18 | 2.59 | NS | 1.93 | NS | NS | 3.29 | NS | NS | 10.2 | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | 0.13 | NS | NS | 0.199 | NS | NS | 0.52 | NS |
| Uranium-238 | 73 | 18 | 2.29 | NS | 1.05 | NS | NS | 1.71 | NS | NS | 4.02 | NS |
| Strontium-90 | 57 | 14 | 1.04 | NS | 2.13 | NS | NS | 2.07 | NS | NS | 56 | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | <0.16 | NS | NS | <0.21 | NS | NS | 17.4 | NS |
| Actinium-228 | | | | NS | 1.55 | NS | NS | 1.68 | NS | NS | 1.55 | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | <0.53 | NS | NS | 1.17 | NS | NS | 68 | NS |
| Lead-210 | 3.2 | 0.78 | | NS | -- | NS | NS | -- | NS | NS | -- | NS |
| Lead-212 | | | | NS | 1.59 | NS | NS | 1.28 | NS | NS | 1.87 | NS |
| Lead-214 | | | | NS | 1.21 | NS | NS | 1.45 | NS | NS | 1.69 | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | -- | NS | NS | -- | NS | NS | -- | NS |
| Thallium-208 | | | | NS | 0.52 | NS | NS | 0.54 | NS | NS | 0.52 | NS |
| Thorium-234 | | | | NS | -- | NS | NS | -- | NS | NS | -- | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-10 | | | Fixed Point Site ACS-11 | | | | | |
| | EPA PRG | EPA PRG | LANL | 15-36 cm | | | 0-30 cm | | | 30-53 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | 9.6 | NS | NS | NS | 13 | NS | NS | 3.8 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | 1880 | NS | NS | NS | 2780 | NS | NS | 1620 |
| Uranium-234 | 69 | 18 | 2.59 | NS | 5.37 | NS | NS | NS | NA | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | 0.285 | NS | NS | NS | NA | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | 2.53 | NS | NS | NS | NA | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | 32.7 | NS | NS | NS | NA | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | 15.2 | NS | NS | NS | NA | NS | NS | NA |
| Actinium-228 | | | | NS | 1.61 | NS | NS | NS | NA | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | 228 | NS | NS | NS | NA | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | -- | NS | NS | NS | NA | NS | NS | NA |
| Lead-212 | | | | NS | 1.79 | NS | NS | NS | NA | NS | NS | NA |
| Lead-214 | | | | NS | 1.45 | NS | NS | NS | NA | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | -- | NS | NS | NS | NA | NS | NS | NA |
| Thallium-208 | | | | NS | <0.25 | NS | NS | NS | NA | NS | NS | NA |
| Thorium-234 | | | | NS | -- | NS | NS | NS | NA | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-11 | | | Fixed Point Site ACS-12 | | | | | |
| | EPA PRG | EPA PRG | LANL | 64-84 cm | | | 0-30 cm | | | 24-53 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.8 | -0.036 | NS | NS | 0.43 | NS | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 134.4 | 0.12 | NS | NS | 0.018 | NS | NS |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | 3.54 | NS | NS | 20.7 | NS | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | 3.19 | NS | NS | 5.53 | NS | NS |
| Actinium-228 | | | | NS | NS | NA | 1.22 | NS | NS | -- | NS | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | 12.8 | NS | NS | 23.8 | NS | NS |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | -- | NS | NS | -- | NS | NS |
| Lead-212 | | | | NS | NS | NA | 1.04 | NS | NS | 1.34 | NS | NS |
| Lead-214 | | | | NS | NS | NA | 0.94 | NS | NS | 1.21 | NS | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | 29.3 | NS | NS | 27.8 | NS | NS |
| Thallium-208 | | | | NS | NS | NA | -- | NS | NS | -- | NS | NS |
| Thorium-234 | | | | NS | NS | NA | -- | NS | NS | -- | NS | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-15 | | | | | | | | |
| | EPA PRG | EPA PRG | LANL | 0-10 cm | | | 25-41 cm | | | 41-65 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.46 | NS | NS | 0.074 | NS | NS | 0.27 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 94.2 | NS | NS | 9.57 | NS | NS | 37.4 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | 4.63 | NS | NS | NA | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | 0.336 | NS | NS | NA | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | 2.56 | NS | NS | NA | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | 1.19 | NS | NS | NA | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | 0.57 | NS | NS | NA | NS | NS | NA |
| Actinium-228 | | | | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | 4.4 | NS | NS | NA | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Lead-212 | | | | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Lead-214 | | | | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Thallium-208 | | | | NS | NS | -- | NS | NS | NA | NS | NS | NA |
| Thorium-234 | | | | NS | NS | -- | NS | NS | NA | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-16 | | | | | | | | |
| | EPA PRG | EPA PRG | LANL | 0-15 cm | | | 19-35 cm | | | 35-56 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.51 | NS | NS | 16.8 | NS | NS | 0.85 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 114.5 | NS | NS | 4990 | NS | NS | 267 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | 5 | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | 1.3 | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | 5.1 | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | 70 | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | 0.11 | NS | NS | NA |
| Actinium-228 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | 93 | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Lead-212 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Lead-214 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Thallium-208 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Thorium-234 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-16 | | | Fixed Point Site ACS-18 | | | | | |
| | EPA PRG | EPA PRG | LANL | 56-68 cm | | | 0-26 cm | | | 26-46 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.25 | 0.27 | NS | NS | 0.65 | NS | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 112.1 | 77 | NS | NS | 112 | NS | NS |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NA | NS | NS | NA | NS | NS |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | 0.36 | NS | NS | 1.21 | NS | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | 0.51 | NS | NS | 0.65 | NS | NS |
| Actinium-228 | | | | NS | NS | NA | -- | NS | NS | -- | NS | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | 4.01 | NS | NS | 3.35 | NS | NS |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | -- | NS | NS | 2.2 | NS | NS |
| Lead-212 | | | | NS | NS | NA | 1.26 | NS | NS | 1.19 | NS | NS |
| Lead-214 | | | | NS | NS | NA | 1.22 | NS | NS | 0.95 | NS | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | 30.5 | NS | NS | 29.0 | NS | NS |
| Thallium-208 | | | | NS | NS | NA | -- | NS | NS | -- | NS | NS |
| Thorium-234 | | | | NS | NS | NA | -- | NS | NS | 1.28 | NS | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-23 | | | | | | | | |
| | EPA PRG | EPA PRG | LANL | 5-14 cm | | | 27-45 cm | | | 45-58 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 2.3 | NS | NS | 0.81 | NS | NS | 3.19 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 218 | NS | NS | 82.9 | NS | NS | 393 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | NA | NS | NS | 4.64 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | NA | NS | NS | 0.22 |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | NA | NS | NS | 2.66 |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | NA | NS | NS | 46.9 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | NA | NS | NS | 148 |
| Actinium-228 | | | | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | NA | NS | NS | 67 |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Lead-212 | | | | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Lead-214 | | | | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Thallium-208 | | | | NS | NS | NA | NS | NS | NA | NS | NS | -- |
| Thorium-234 | | | | NS | NS | NA | NS | NS | NA | NS | NS | -- |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-23 | | | | | | Fixed Point Site ACS-24 | | |
| | EPA PRG | EPA PRG | LANL | 56-68 cm | | | 68-77 cm | | | 26-46 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 4.5 | NS | NS | 1.58 | NS | 0.1 | NS |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 548 | NS | NS | 277 | NS | 92 | NS |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | NA | NS | 3.3 | NS |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | NA | NS | 0.26 | NS |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | NA | NS | 1.83 | NS |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | NA | NS | 0.48 | NS |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | NA | NS | <0.31 | NS |
| Actinium-228 | | | | NS | NS | NA | NS | NS | NA | NS | <1.1 | NS |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | NA | NS | 1.3 | NS |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | NA | NS | -- | NS |
| Lead-212 | | | | NS | NS | NA | NS | NS | NA | NS | 1.05 | NS |
| Lead-214 | | | | NS | NS | NA | NS | NS | NA | NS | 1.28 | NS |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | NA | NS | -- | NS |
| Thallium-208 | | | | NS | NS | NA | NS | NS | NA | NS | <0.28 | NS |
| Thorium-234 | | | | NS | NS | NA | NS | NS | NA | NS | -- | NS |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-24 | | | Fixed Point Site ACS-30 | | | Fixed Point Site ACS-33 | | |
| | EPA PRG | EPA PRG | LANL | 12-24 cm | | | 0-14 cm | | | 5-23 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | 1.46 | NS | NS | 0.193 | NS | NS | NS | 0.445 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | 205 | NS | NS | 68.4 | NS | NS | NS | 129.7 |
| Uranium-234 | 69 | 18 | 2.59 | NS | 4.8 | NS | NS | 2.53 | NS | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | 0.85 | NS | NS | 0.127 | NS | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | 2.35 | NS | NS | 1.5 | NS | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | 1.04 | NS | NS | 0.36 | NS | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | 6.9 | NS | NS | 0.25 | NS | NS | NS | NA |
| Actinium-228 | | | | NS | 1.63 | NS | NS | <0.67 | NS | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | 35.8 | NS | NS | <0.55 | NS | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | -- | NS | NS | -- | NS | NS | NS | NA |
| Lead-212 | | | | NS | 1.71 | NS | NS | 0.52 | NS | NS | NS | NA |
| Lead-214 | | | | NS | 1.45 | NS | NS | 1 | NS | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | -- | NS | NS | -- | NS | NS | NS | NA |
| Thallium-208 | | | | NS | 0.56 | NS | NS | <0.16 | NS | NS | NS | NA |
| Thorium-234 | | | | NS | -- | NS | NS | -- | NS | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-33 | | | Fixed Point Site ACS-35 | | | Fixed Point Site ACS-36 | | |
| | EPA PRG | EPA PRG | LANL | 40-55 cm | | | 2-10 cm | | | 0-10 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.098 | 0.12 | NS | NS | NS | NS | 0.12 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 20.6 | 27.5 | NS | NS | NS | NS | 26 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NA | NS | NS | NS | NS | 1.27 |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NA | NS | NS | NS | NS | 0.076 |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NA | NS | NS | NS | NS | 1 |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | -0.91 | NS | NS | NS | NS | 0.38 |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | 0.079 | NS | NS | NS | NS | 0.12 |
| Actinium-228 | | | | NS | NS | NA | -- | NS | NS | NS | NS | -- |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | 0.19 | NS | NS | NS | NS | 0.67 |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | 1.55 | NS | NS | NS | NS | -- |
| Lead-212 | | | | NS | NS | NA | 0.67 | NS | NS | NS | NS | -- |
| Lead-214 | | | | NS | NS | NA | 0.53 | NS | NS | NS | NS | -- |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | 28.3 | NS | NS | NS | NS | -- |
| Thallium-208 | | | | NS | NS | NA | -- | NS | NS | NS | NS | -- |
| Thorium-234 | | | | NS | NS | NA | -- | NS | NS | NS | NS | -- |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-37 | | | | | | Fixed Point Site ACS-46 | | |
| | EPA PRG | EPA PRG | LANL | 5-35 cm | | | 42-61 cm | | | 0-20 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.114 | NS | NS | 0.009 | NS | NS | 0.124 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 23.9 | NS | NS | 9.51 | NS | NS | 17.4 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Actinium-228 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-212 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-214 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Thallium-208 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Thorium-234 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-46 | | | Fixed Point Site ACS-47 | | | | | |
| | EPA PRG | EPA PRG | LANL | 20-33 cm | | | 0-10 cm | | | 14-29 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 0.183 | NS | NS | 2 | NS | NS | 37.3 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 46.1 | NS | NS | 1002 | NS | NS | 7780 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Actinium-228 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-212 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Lead-214 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Thallium-208 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |
| Thorium-234 | | | | NS | NS | NA | NS | NS | NA | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-47 | | | | | | | | |
| | EPA PRG | EPA PRG | LANL | 29-39 cm | | | 39-49 cm | | | 58-86 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | NS | NS | 4.5 | NS | NS | 17.8 | NS | NS | 0.91 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | NS | NS | 1660 | NS | NS | 6780 | NS | NS | 234 |
| Uranium-234 | 69 | 18 | 2.59 | NS | NS | NA | NS | NS | 21.5 | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NS | NS | NA | NS | NS | 2 | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NS | NS | NA | NS | NS | 16.6 | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | NS | NS | NA | NS | NS | 80 | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | NS | NS | NA | NS | NS | -0.007 | NS | NS | NA |
| Actinium-228 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | NS | NS | NA | NS | NS | 64 | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Lead-212 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Lead-214 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Thallium-208 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |
| Thorium-234 | | | | NS | NS | NA | NS | NS | -- | NS | NS | NA |

## Acid Canyon Sediment Samples Comparison Summary - Radionuclides (continued)

| Radionuclide | Sample Location and Depth | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Reference | | | Acid Canyon | | | | | | | | |
| | | | | Fixed Point Site ACS-48 | | | Trail - East of ACS-12 | | | Trail - West of ACS-11 | | |
| | EPA PRG | EPA PRG | LANL | 0-12 cm | | | 0-0.5 cm | | | 0-0.5 cm | | |
| | Commercial | Residential | Background | EPA | NMED | LANL | EPA | NMED | LANL | EPA | NMED | LANL |
| Plutonium-238 | 11 | 2.7 | 0.006 | 1.02 | NS | NS | NS | NS | -0.007 | NS | NS | 0.013 |
| Plutonium-239/240 | 10 | 2.5 | 0.068 | 184 | NS | NS | NS | NS | 0.123 | NS | NS | 0.096 |
| Uranium-234 | 69 | 18 | 2.59 | NA | NS | NS | NS | NS | NA | NS | NS | NA |
| Uranium-235 | 0.57 | 0.16 | 0.20 | NA | NS | NS | NS | NS | NA | NS | NS | NA |
| Uranium-238 | 73 | 18 | 2.29 | NA | NS | NS | NS | NS | NA | NS | NS | NA |
| Strontium-90 | 57 | 14 | 1.04 | 2.12 | NS | NS | NS | NS | NA | NS | NS | NA |
| Cesium-137 | 0.072 | 0.020 | 0.9 | 0.93 | NS | NS | NS | NS | NA | NS | NS | NA |
| Actinium-228 | | | | -- | NS | NS | NS | NS | NA | NS | NS | NA |
| Americium-241 | 7.5 | 1.9 | 0.04 | 3.70 | NS | NS | NS | NS | NA | NS | NS | NA |
| Lead-210 | 3.2 | 0.78 | | 2.4 | NS | NS | NS | NS | NA | NS | NS | NA |
| Lead-212 | | | | 1.09 | NS | NS | NS | NS | NA | NS | NS | NA |
| Lead-214 | | | | 0.95 | NS | NS | NS | NS | NA | NS | NS | NA |
| Potassium-40 | 0.25 | 0.068 | 36.8 | 26.0 | NS | NS | NS | NS | NA | NS | NS | NA |
| Thallium-208 | | | | -- | NS | NS | NS | NS | NA | NS | NS | NA |
| Thorium-234 | | | | -- | NS | NS | NS | NS | NA | NS | NS | NA |

* All results reported in pico Curies per gram (pCi/g).
a Preliminary Remediation Goals.
NA Not Analyzed.
NS Not Sampled.
-- Radionuclide not detected.

# APPENDIX F

## Analytical Data

# VOC Data

**SOUTHWEST LABORATORY OF OKLAHOMA**
**1700 West Albany, Suite A / Broken Arrow, OK 74012**
**918-251-2858**

SDG NARRATIVE

January 24, 2000

CLIENT: TECHLAW

SDG NO.: 41536

---

VOLATILE FRACTION

Five water samples plus MS/MSD were submitted for Volatile Organic Analysis. The samples were analyzed by GC/MS following Method SW846-8260B.

No major problems occurred during the analyses of these samples. Sample SM-30 DISS was run diluted based on a screen analysis which is submitted in the screen data section. The sample required still further dilution to achieve linearity. Both sets of data are submitted. The 4-methyl-2-pentanone in the 250UL run was carryover from a previous run as confirmed by the screen analysis and the MS/MSD. .

Blanks: VBLK1 contained low level 4-methyl-2-pentanone less than five times the PQL.

Surrogates: Sample SD-30 contained surrogates outside QC recovery limits. The diluted reanalysis contained surrogates within limits. Both sets of data are submitted.

Laboratory Control Spikes: LCS1, LCS2, LCSD2 and LCS3 each contained one compound outside QC recovery limits (high). LCSD2 contained three compounds outside QC recovery limits (two high / one low).

Internal Standards: No problems.

Matrix Spikes: Sample SM-30 DISSMS contained four compounds and SW-30 DISSMSD contained three compounds outside QC recovery limits (analytical batch K991222A). Four compounds exceeded their RPD limits for that sample. Analytical batch L991230A contained an MS/MSD from SWLO episode 41531. Analytical batch N991229A contained an MS/MSD from SWLO episode 41524.

Harry M. Borg
Organic Program Manager

January 24, 2000

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PM-2

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.07

Sample wt/vol: 5 (g/mL) ML Lab File ID: K30658.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/22/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U |
| 75-01-4 | Vinyl Chloride | 5 | U |
| 74-83-9 | Bromomethane | 5 | U |
| 75-00-3 | Chloroethane | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5 | U |
| 67-64-1 | Acetone | 5 | U |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-09-2 | Methylene Chloride | 5 | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 6 | |
| 78-93-3 | 2-Butanone | 5 | U |
| 67-66-3 | Chloroform | 5 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U |
| 56-23-5 | Carbon Tetrachloride | 5 | U |
| 71-43-2 | Benzene | 5 | U |
| 107-06-2 | 1,2-Dichloroethane | 5 | U |
| 79-01-6 | Trichloroethene | 4 | J |
| 78-87-5 | 1,2-Dichloropropane | 5 | U |
| 75-27-4 | Bromodichloromethane | 5 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 26 | B |
| 108-88-3 | Toluene | 5 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U |
| 127-18-4 | Tetrachloroethene | 1 | J |
| 591-78-6 | 2-Hexanone | 5 | U |
| 124-48-1 | Dibromochloromethane | 5 | U |
| 108-90-7 | Chlorobenzene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |
| 100-42-5 | Styrene | 5 | U |
| 75-25-2 | Bromoform | 5 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PM-5

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.08

Sample wt/vol: 5 (g/mL) ML Lab File ID: K30659.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/22/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U |
| 75-01-4 | Vinyl Chloride | 5 | U |
| 74-83-9 | Bromomethane | 5 | U |
| 75-00-3 | Chloroethane | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5 | U |
| 67-64-1 | Acetone | 5 | U |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-09-2 | Methylene Chloride | 5 | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5 | |
| 78-93-3 | 2-Butanone | 5 | U |
| 67-66-3 | Chloroform | 5 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U |
| 56-23-5 | Carbon Tetrachloride | 5 | U |
| 71-43-2 | Benzene | 5 | U |
| 107-06-2 | 1,2-Dichloroethane | 5 | U |
| 79-01-6 | Trichloroethene | 3 | J |
| 78-87-5 | 1,2-Dichloropropane | 5 | U |
| 75-27-4 | Bromodichloromethane | 5 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 24 | B |
| 108-88-3 | Toluene | 5 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U |
| 127-18-4 | Tetrachloroethene | 3 | J |
| 591-78-6 | 2-Hexanone | 5 | U |
| 124-48-1 | Dibromochloromethane | 5 | U |
| 108-90-7 | Chlorobenzene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |
| 100-42-5 | Styrene | 5 | U |
| 75-25-2 | Bromoform | 5 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U |

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SD-30

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.06

Sample wt/vol: 5 (g/mL) ML Lab File ID: K30657.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/22/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 20.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 100 | U |
| 75-01-4 | Vinyl Chloride | 100 | U |
| 74-83-9 | Bromomethane | 100 | U |
| 75-00-3 | Chloroethane | 100 | U |
| 75-35-4 | 1,1-Dichloroethene | 510 | |
| 67-64-1 | Acetone | 100 | U |
| 75-15-0 | Carbon Disulfide | 100 | U |
| 75-09-2 | Methylene Chloride | 100 | U |
| 75-34-3 | 1,1-Dichloroethane | 340 | |
| 540-59-0 | 1,2-Dichloroethene (total) | 120 | |
| 78-93-3 | 2-Butanone | 100 | U |
| 67-66-3 | Chloroform | 47 | J |
| 71-55-6 | 1,1,1-Trichloroethane | 22000 | E |
| 56-23-5 | Carbon Tetrachloride | 100 | U |
| 71-43-2 | Benzene | 100 | U |
| 107-06-2 | 1,2-Dichloroethane | 200 | |
| 79-01-6 | Trichloroethene | 310 | |
| 78-87-5 | 1,2-Dichloropropane | 100 | U |
| 75-27-4 | Bromodichloromethane | 100 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 100 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 100 | U |
| 108-88-3 | Toluene | 100 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 100 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 100 | U |
| 127-18-4 | Tetrachloroethene | 50 | J |
| 591-78-6 | 2-Hexanone | 100 | U |
| 124-48-1 | Dibromochloromethane | 100 | U |
| 108-90-7 | Chlorobenzene | 100 | U |
| 100-41-4 | Ethylbenzene | 100 | U |
| 1330-20-7 | Xylene (total) | 100 | U |
| 100-42-5 | Styrene | 100 | U |
| 75-25-2 | Bromoform | 100 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 100 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SD-30DL

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.06DL

Sample wt/vol: 5 (g/mL) ML Lab File ID: L41871.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/30/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 200.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 1000 | U |
| 75-01-4 | Vinyl Chloride | 1000 | U |
| 74-83-9 | Bromomethane | 1000 | U |
| 75-00-3 | Chloroethane | 1000 | U |
| 75-35-4 | 1,1-Dichloroethene | 1000 | U |
| 67-64-1 | Acetone | 1000 | U |
| 75-15-0 | Carbon Disulfide | 1000 | U |
| 75-09-2 | Methylene Chloride | 1000 | U |
| 75-34-3 | 1,1-Dichloroethane | 1000 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 1000 | U |
| 78-93-3 | 2-Butanone | 1000 | U |
| 67-66-3 | Chloroform | 1000 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 7400 | D |
| 56-23-5 | Carbon Tetrachloride | 1000 | U |
| 71-43-2 | Benzene | 1000 | U |
| 107-06-2 | 1,2-Dichloroethane | 1000 | U |
| 79-01-6 | Trichloroethene | 1000 | U |
| 78-87-5 | 1,2-Dichloropropane | 1000 | U |
| 75-27-4 | Bromodichloromethane | 1000 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 1000 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 1000 | U |
| 108-88-3 | Toluene | 1000 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 1000 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 1000 | U |
| 127-18-4 | Tetrachloroethene | 1000 | U |
| 591-78-6 | 2-Hexanone | 1000 | U |
| 124-48-1 | Dibromochloromethane | 1000 | U |
| 108-90-7 | Chlorobenzene | 1000 | U |
| 100-41-4 | Ethylbenzene | 1000 | U |
| 1330-20-7 | Xylene (total) | 1000 | U |
| 100-42-5 | Styrene | 1000 | U |
| 75-25-2 | Bromoform | 1000 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 1000 | U |

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SM-30 DISS

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.03

Sample wt/vol: 5 (g/mL) ML Lab File ID: K30645.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/22/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 20.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 100 | U |
| 75-01-4 | Vinyl Chloride | 100 | U |
| 74-83-9 | Bromomethane | 100 | U |
| 75-00-3 | Chloroethane | 100 | U |
| 75-35-4 | 1,1-Dichloroethene | 100 | U |
| 67-64-1 | Acetone | 100 | U |
| 75-15-0 | Carbon Disulfide | 100 | U |
| 75-09-2 | Methylene Chloride | 100 | U |
| 75-34-3 | 1,1-Dichloroethane | 100 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 110 | |
| 78-93-3 | 2-Butanone | 100 | U |
| 67-66-3 | Chloroform | 100 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 1200 | |
| 56-23-5 | Carbon Tetrachloride | 100 | U |
| 71-43-2 | Benzene | 100 | U |
| 107-06-2 | 1,2-Dichloroethane | 100 | U |
| 79-01-6 | Trichloroethene | 82 | J |
| 78-87-5 | 1,2-Dichloropropane | 100 | U |
| 75-27-4 | Bromodichloromethane | 100 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 100 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 93000 | BE |
| 108-88-3 | Toluene | 100 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 100 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 100 | U |
| 127-18-4 | Tetrachloroethene | 100 | U |
| 591-78-6 | 2-Hexanone | 100 | U |
| 124-48-1 | Dibromochloromethane | 100 | U |
| 108-90-7 | Chlorobenzene | 100 | U |
| 100-41-4 | Ethylbenzene | 100 | U |
| 1330-20-7 | Xylene (total) | 100 | U |
| 100-42-5 | Styrene | 480 | |
| 75-25-2 | Bromoform | 100 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 100 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

TRIP BLANK

Lab Name: SWL-TULSA Contract: LA PHASE 2

Lab Code: SWOK Case No.: TECHLAW SAS No.: SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.09

Sample wt/vol: 5 (g/mL) ML Lab File ID: N37810.D

Level: (low/med) LOW Date Received: 12/18/99

% Moisture: not dec. _____ Date Analyzed: 12/29/99

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: ____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U |
| 75-01-4 | Vinyl Chloride | 5 | U |
| 74-83-9 | Bromomethane | 5 | U |
| 75-00-3 | Chloroethane | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5 | U |
| 67-64-1 | Acetone | 5 | U |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-09-2 | Methylene Chloride | 5 | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5 | U |
| 78-93-3 | 2-Butanone | 5 | U |
| 67-66-3 | Chloroform | 5 | U |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U |
| 56-23-5 | Carbon Tetrachloride | 5 | U |
| 71-43-2 | Benzene | 5 | U |
| 107-06-2 | 1,2-Dichloroethane | 5 | U |
| 79-01-6 | Trichloroethene | 5 | U |
| 78-87-5 | 1,2-Dichloropropane | 5 | U |
| 75-27-4 | Bromodichloromethane | 5 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 5 | U |
| 108-88-3 | Toluene | 5 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U |
| 127-18-4 | Tetrachloroethene | 5 | U |
| 591-78-6 | 2-Hexanone | 5 | U |
| 124-48-1 | Dibromochloromethane | 5 | U |
| 108-90-7 | Chlorobenzene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |
| 100-42-5 | Styrene | 5 | U |
| 75-25-2 | Bromoform | 5 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U |

FORM I VOA

# Inorganic Data

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41411**
**SDG: 41411A**

**DATE: January 14, 2000**
**SOW NO.: SW846**
**EPISODE NO.: 41411**

### INORGANIC METAL FRACTION:

Eleven soil samples plus one MS/MSD were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

Uranium was left out of the spiking solution in the initial ICP prep. Therefore the samples were re-prepped and re-analyzed for Uranium. The run analysis QC failed for selenium in the initial ICP analysis. Therefore selenium was re-analyzed. The re-analysis data for each is the data reported on the Forms.

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Se, As, Cd, Co, Pb, Ag, Tl, & Sb. No action required.

**Linearity near the CRDL (CRA & CRI):** The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Co & Se. No action required.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cd, Ag, Tl, & Zn. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spike (and MSD):** The following element was outside the control limits of 75-125% recovery: Sb. All associated samples were flagged with a "N" on Form I's. No action required.

**Duplicates (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** The serial dilution was outside the control limits of 10% for the following elements: Ag. All associated samples were flagged with an "E" on Form I's. No action required.

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___

Lab Code: SWOK__ Case No.: 41411 SAS No.: _____ SDG No.:41411A

SOW No.: SW846__

| Client Sample ID | Lab Sample ID |
|---|---|
| _ASC-12-1_____ | _41411.05_____ |
| _ASC-12-2_____ | _41411.06_____ |
| _ASC-18-1_____ | _41411.02_____ |
| _ASC-18-2_____ | _41411.03_____ |
| _ASC-18-3_____ | _41411.04_____ |
| _ASC-3-1_____ | _41411.08_____ |
| _ASC-3-2_____ | _41411.09_____ |
| _ASC-3-3_____ | _41411.10_____ |
| _ASC-3-4_____ | _41411.11_____ |
| _ASC-35-0_____ | _41411.01_____ |
| _ASC-48-0_____ | _41411.07_____ |
| _ASC-48-0S_____ | _41411.13S_____ |
| _ASC-48-0M_____ | _41411.14SD_____ |

e ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:
____BATCH_ID#S=_ICP=991212I4__ICP=991222I5__AV=991215HG5_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Susan S. Turner for... Deborah J. Inman_____

Date: January 12, 2000 Title: Inorganic Program Manager

1 2

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID 4

ASC-12-1

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41411 SAS No.: _____ SDG No.: 41411A
Matrix (soil/water): SOIL_ Lab Sample ID: 41411.05
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: _95.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 0.27 | U | N | P |
| 7440-38-2 | Arsenic__ | 2.0 | | | P |
| 7440-39-3 | Barium___ | 40.2 | | | P |
| 7440-41-7 | Beryllium | 0.61 | | | P |
| 7440-43-9 | Cadmium__ | 2.5 | | | P |
| 7440-48-4 | Cobalt___ | 1.7 | B | | P |
| 7440-50-8 | Copper___ | 11.6 | | | P |
| 7439-92-1 | Lead____ | 57.7 | | | P |
| 7439-97-6 | Mercury__ | 0.67 | | | AV |
| 7440-02-0 | Nickel___ | 7.4 | | | P |
| 7782-49-2 | Selenium_ | 0.36 | B | | P |
| 7440-22-4 | Silver___ | 0.80 | B | E | P |
| 7440-28-0 | Thallium_ | 0.34 | U | | P |
| 7440-62-2 | Vanadium_ | 6.7 | | | P |
| 7440-66-6 | Zinc____ | 51.6 | | | P |
| 7440-61-1 | Uranium__ | 2.2 | B | | P |

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-12-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.06
Level (low/med): LOW Date Received: 12/10/99
% Solids: 86.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.31 | U | N | P |
| 7440-38-2 | Arsenic | 2.8 | | | P |
| 7440-39-3 | Barium | 51.4 | | | P |
| 7440-41-7 | Beryllium | 0.73 | | | P |
| 7440-43-9 | Cadmium | 3.2 | | | P |
| 7440-48-4 | Cobalt | 2.2 | B | | P |
| 7440-50-8 | Copper | 28.1 | | | P |
| 7439-92-1 | Lead | 66.0 | | | P |
| 7439-97-6 | Mercury | 1.2 | | | AV |
| 7440-02-0 | Nickel | 13.8 | | | P |
| 7782-49-2 | Selenium | 0.70 | | | P |
| 7440-22-4 | Silver | 3.9 | | E | P |
| 7440-28-0 | Thallium | 0.62 | B | | P |
| 7440-62-2 | Vanadium | 10.9 | | | P |
| 7440-66-6 | Zinc | 53.6 | | | P |
| 7440-61-1 | Uranium | 6.4 | | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-18-1

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41411 SAS No.: _____ SDG No.: 41411A
Matrix (soil/water): SOIL_ Lab Sample ID: 41411.02
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: _82.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 0.32 | U | N | P |
| 7440-38-2 | Arsenic__ | 2.2 | | | P |
| 7440-39-3 | Barium___ | 36.2 | | | P |
| 7440-41-7 | Beryllium | 0.60 | | | P |
| 7440-43-9 | Cadmium__ | 1.1 | | | P |
| 7440-48-4 | Cobalt___ | 1.4 | B | | P |
| 7440-50-8 | Copper___ | 8.0 | | | P |
| 7439-92-1 | Lead____ | 37.1 | | | P |
| 7439-97-6 | Mercury__ | 0.48 | | | AV |
| 7440-02-0 | Nickel___ | 8.3 | | | P |
| 7782-49-2 | Selenium_ | 0.48 | B | | P |
| 7440-22-4 | Silver___ | 0.18 | B | E | P |
| 7440-28-0 | Thallium_ | 0.40 | U | | P |
| 7440-62-2 | Vanadium_ | 6.9 | | | P |
| 7440-66-6 | Zinc____ | 49.5 | | | P |
| 7440-61-1 | Uranium__ | 3.0 | B | | P |

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-18-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.03
Level (low/med): LOW Date Received: 12/10/99
% Solids: 74.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.35 | U | N | P |
| 7440-38-2 | Arsenic | 3.1 | | | P |
| 7440-39-3 | Barium | 43.3 | | | P |
| 7440-41-7 | Beryllium | 0.67 | | | P |
| 7440-43-9 | Cadmium | 2.2 | | | P |
| 7440-48-4 | Cobalt | 1.9 | B | | P |
| 7440-50-8 | Copper | 10.4 | | | P |
| 7439-92-1 | Lead | 48.1 | | | P |
| 7439-97-6 | Mercury | 0.58 | | | AV |
| 7440-02-0 | Nickel | 8.0 | | | P |
| 7782-49-2 | Selenium | 0.55 | B | | P |
| 7440-22-4 | Silver | 1.3 | | E | P |
| 7440-28-0 | Thallium | 0.44 | U | | P |
| 7440-62-2 | Vanadium | 9.4 | | | P |
| 7440-66-6 | Zinc | 46.7 | | | P |
| 7440-61-1 | Uranium | 1.3 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-18-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.04
Level (low/med): LOW Date Received: 12/10/99
% Solids: 83.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.31 | U | N | P |
| 7440-38-2 | Arsenic | 2.3 | | | P |
| 7440-39-3 | Barium | 51.9 | | | P |
| 7440-41-7 | Beryllium | 0.63 | | | P |
| 7440-43-9 | Cadmium | 1.2 | | | P |
| 7440-48-4 | Cobalt | 1.7 | B | | P |
| 7440-50-8 | Copper | 9.7 | | | P |
| 7439-92-1 | Lead | 50.0 | | | P |
| 7439-97-6 | Mercury | 0.57 | | | AV |
| 7440-02-0 | Nickel | 8.0 | | | P |
| 7782-49-2 | Selenium | 0.45 | B | | P |
| 7440-22-4 | Silver | 0.61 | B | E | P |
| 7440-28-0 | Thallium | 0.39 | U | | P |
| 7440-62-2 | Vanadium | 8.0 | | | P |
| 7440-66-6 | Zinc | 52.7 | | | P |
| 7440-61-1 | Uranium | 3.8 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-3-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.08
Level (low/med): LOW Date Received: 12/10/99
% Solids: 93.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 2.3 | | | P |
| 7440-39-3 | Barium | 41.9 | | | P |
| 7440-41-7 | Beryllium | 0.62 | | | P |
| 7440-43-9 | Cadmium | 0.61 | | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 4.9 | B | | P |
| 7439-92-1 | Lead | 19.4 | | | P |
| 7439-97-6 | Mercury | 0.19 | | | AV |
| 7440-02-0 | Nickel | 3.9 | | | P |
| 7782-49-2 | Selenium | 0.53 | B | | P |
| 7440-22-4 | Silver | 0.13 | U | E | P |
| 7440-28-0 | Thallium | 0.37 | U | | P |
| 7440-62-2 | Vanadium | 6.0 | | | P |
| 7440-66-6 | Zinc | 39.3 | | | P |
| 7440-61-1 | Uranium | 1.0 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID 10

ASC-3-2

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41411 SAS No.: _____ SDG No.: 41411A
Matrix (soil/water): SOIL_ Lab Sample ID: 41411.09
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: _94.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 0.28 | U | N | P |
| 7440-38-2 | Arsenic__ | 2.0 | | | P |
| 7440-39-3 | Barium___ | 49.5 | | | P |
| 7440-41-7 | Beryllium | 0.56 | | | P |
| 7440-43-9 | Cadmium__ | 0.41 | | | P |
| 7440-48-4 | Cobalt___ | 1.5 | B | | P |
| 7440-50-8 | Copper___ | 2.6 | B | | P |
| 7439-92-1 | Lead____ | 9.0 | | | P |
| 7439-97-6 | Mercury__ | 0.03 | B | | AV |
| 7440-02-0 | Nickel___ | 3.7 | | | P |
| 7782-49-2 | Selenium_ | 0.46 | B | | P |
| 7440-22-4 | Silver___ | 0.13 | U | E | P |
| 7440-28-0 | Thallium_ | 0.35 | U | | P |
| 7440-62-2 | Vanadium_ | 5.3 | | | P |
| 7440-66-6 | Zinc____ | 34.2 | | | P |
| 7440-61-1 | Uranium__ | 1.0 | U | | P |

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID 11

ASC-3-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.10
Level (low/med): LOW Date Received: 12/10/99
% Solids: 94.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 2.5 | | | P |
| 7440-39-3 | Barium | 56.9 | | | P |
| 7440-41-7 | Beryllium | 0.84 | | | P |
| 7440-43-9 | Cadmium | 2.5 | | | P |
| 7440-48-4 | Cobalt | 3.2 | | | P |
| 7440-50-8 | Copper | 31.6 | | | P |
| 7439-92-1 | Lead | 98.2 | | | P |
| 7439-97-6 | Mercury | 0.81 | | | AV |
| 7440-02-0 | Nickel | 11.6 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 2.5 | | E | P |
| 7440-28-0 | Thallium | 0.87 | B | | P |
| 7440-62-2 | Vanadium | 8.8 | | | P |
| 7440-66-6 | Zinc | 50.0 | | | P |
| 7440-61-1 | Uranium | 1.0 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-3-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.11
Level (low/med): LOW Date Received: 12/10/99
% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.31 | U | N | P |
| 7440-38-2 | Arsenic | 3.0 | | | P |
| 7440-39-3 | Barium | 56.4 | | | P |
| 7440-41-7 | Beryllium | 2.3 | | | P |
| 7440-43-9 | Cadmium | 10.5 | | | P |
| 7440-48-4 | Cobalt | 5.3 | | | P |
| 7440-50-8 | Copper | 81.0 | | | P |
| 7439-92-1 | Lead | 42.3 | | | P |
| 7439-97-6 | Mercury | 2.2 | | | AV |
| 7440-02-0 | Nickel | 34.4 | | | P |
| 7782-49-2 | Selenium | 0.43 | B | | P |
| 7440-22-4 | Silver | 8.3 | | E | P |
| 7440-28-0 | Thallium | 0.83 | B | | P |
| 7440-62-2 | Vanadium | 9.9 | | | P |
| 7440-66-6 | Zinc | 50.5 | | | P |
| 7440-61-1 | Uranium | 3.4 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-35-0

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.01
Level (low/med): LOW Date Received: 12/10/99
% Solids: 80.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.32 | U | N | P |
| 7440-38-2 | Arsenic | 1.8 | | | P |
| 7440-39-3 | Barium | 27.4 | | | P |
| 7440-41-7 | Beryllium | 0.45 | B | | P |
| 7440-43-9 | Cadmium | 0.39 | | | P |
| 7440-48-4 | Cobalt | 0.98 | B | | P |
| 7440-50-8 | Copper | 29.6 | | | P |
| 7439-92-1 | Lead | 38.4 | | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 3.8 | | | P |
| 7782-49-2 | Selenium | 0.57 | B | | P |
| 7440-22-4 | Silver | 0.14 | U | E | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-62-2 | Vanadium | 5.2 | | | P |
| 7440-66-6 | Zinc | 64.8 | | | P |
| 7440-61-1 | Uranium | 1.2 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-48-0

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411A
Matrix (soil/water): SOIL Lab Sample ID: 41411.07
Level (low/med): LOW Date Received: 12/10/99
% Solids: 87.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.31 | U | N | P |
| 7440-38-2 | Arsenic | 1.9 | | | P |
| 7440-39-3 | Barium | 36.5 | | | P |
| 7440-41-7 | Beryllium | 0.48 | B | | P |
| 7440-43-9 | Cadmium | 0.55 | | | P |
| 7440-48-4 | Cobalt | 1.4 | B | | P |
| 7440-50-8 | Copper | 4.9 | B | | P |
| 7439-92-1 | Lead | 25.3 | | | P |
| 7439-97-6 | Mercury | 0.31 | | | AV |
| 7440-02-0 | Nickel | 3.1 | | | P |
| 7782-49-2 | Selenium | 0.41 | B | | P |
| 7440-22-4 | Silver | 0.22 | B | E | P |
| 7440-28-0 | Thallium | 0.39 | U | | P |
| 7440-62-2 | Vanadium | 6.1 | | | P |
| 7440-66-6 | Zinc | 38.1 | | | P |
| 7440-61-1 | Uranium | 1.6 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

| | |
|---|---|
| CONTRACT: TECHLAW | DATE: January 26, 2000 |
| CASE: 41536 | SOW NO.: SW846 |
| SDG: 41536 | EPISODE NO.: 41536 |

### INORGANIC METAL FRACTION:

Two dissolved and two total water samples were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analysis was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

The samples were filtered before analysis. Since digestion was not required for these samples, a prep blank and lab controls do not apply. The run QC appears on the forms. A Form XIII is in the package in order to enable our software generating program to record the results on the forms.

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Cd, Ni, Se, U, Cu, Mg,

No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.

**Preparation Blanks**: The following element showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cu. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spike (and MSD):** (Dissolved metals) The following elements were outside the control limits of 75-125% recovery: Fe & Al. All associated samples were flagged with a "N" on Form I's. No action required.

**Duplicates (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** The serial dilution was outside the control limits of 10% for the following elements: Mg. All associated samples were flagged with an "E" on Form I's. No action required.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-EB

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41536 SAS No.: SDG No.: 41536
Matrix (soil/water): WATER Lab Sample ID: 41536.02
Level (low/med): LOW Date Received: 12/18/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 0.92 | B | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.53 | B | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 26.3 | B | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 3.0 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 0.90 | U | | P |
| 7440-66-6 | Zinc | 38.5 | | | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-61-1 | Uranium | 10.5 | U | | P |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-EB

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41536 SAS No.: SDG No.: 41536
Matrix (soil/water): WATER Lab Sample ID: 41536.01
Level (low/med): LOW Date Received: 12/18/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 0.46 | B | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 10 | B | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 1.6 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 0.90 | U | | P |
| 7440-66-6 | Zinc | 18.0 | B | | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-61-1 | Uranium | 10.5 | U | | P |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID 006

SD-30

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41536 SAS No.: SDG No.: 41536
Matrix (soil/water): WATER Lab Sample ID: 41536.06
Level (low/med): LOW Date Received: 12/18/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 928 | | N | P |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | 9350 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 457 | | N | P |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | 2400 | | E | P |
| 7439-96-5 | Manganese | 5.2 | B | | P |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | 1560 | B | | P |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | 26700 | | | P |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 7732-18-5 | Silicon | 7680 | | | P |
| 7440-61-1 | Uranium | | | | NR |
| 7440-24-6 | Strontium | 54.9 | | | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SM-30 DISS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41536 SAS No.: _____ SDG No.: 41536_
Matrix (soil/water): WATER Lab Sample ID: 41536.03
Level (low/med): LOW__ Date Received: 12/18/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 494 | | N | P |
| 7440-36-0 | Antimony_ | | | | NR |
| 7440-38-2 | Arsenic__ | | | | NR |
| 7440-39-3 | Barium___ | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium__ | | | | NR |
| 7440-70-2 | Calcium__ | 9260 | | | P |
| 7440-48-4 | Cobalt___ | | | | NR |
| 7440-50-8 | Copper___ | | | | NR |
| 7439-89-6 | Iron_____ | 277 | | N | P |
| 7439-92-1 | Lead_____ | | | | NR |
| 7439-95-4 | Magnesium | 2280 | | E | P |
| 7439-96-5 | Manganese | 4.6 | B | | P |
| 7439-97-6 | Mercury__ | | | | NR |
| 7440-02-0 | Nickel___ | | | | NR |
| 7440-09-7 | Potassium | 1500 | B | | P |
| 7782-49-2 | Selenium_ | | | | NR |
| 7440-22-4 | Silver___ | | | | NR |
| 7440-23-5 | Sodium___ | 26900 | | | P |
| 7440-28-0 | Thallium_ | | | | NR |
| 7440-62-2 | Vanadium_ | | | | NR |
| 7440-66-6 | Zinc_____ | | | | NR |
| 7732-18-5 | Silicon__ | 6800 | | | P |
| 7440-61-1 | Uranium__ | | | | NR |
| 7440-24-6_ | Strontium | 54.7 | | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

# SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599


## *SDG NARRATIVE*

01

**CONTRACT: TECHLAW**
**CASE: 41411**
**SDG: 41411B**

**DATE: January 21, 2000**
**SOW NO.: SW846**
**EPISODE NO.: 41411**

## INORGANIC METAL FRACTION:

One water sample was submitted for ICP and Hg analysis. No major problems occurred during the digestion or analysis of this sample. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Sb, As, Cr, Tl, U // No action required.

**Linearity near the CRDL (CRA & CRI):** The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Hg, Sb, Be, Ag, Ba // No action required.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blanks: Cr, Cu, Zn // No action required. The Preparation Blank read above the CRDL for Pb; there was no further action required for the sample since the Pb level was nondetected. The results from the original digestion are reported on the Form 1 for this sample.

**Lab Control Spikes:** No problems.

**Matrix Spike(s) (and MSD):** No problems.

**Duplicate(s) (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** No problems.

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



- **SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

# COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___

Lab Code: SWOK__ Case No.: 41411 SAS No.: _____ SDG No.:41411B

SOW No.: SW846__

| Client Sample ID | Lab Sample ID |
|---|---|
| _ASC-EB_____ | _41411.12_____ |
| _ASC-EBS_____ | _41411.12S_____ |
| _ASC-EBSD_____ | _41411.12SD_____ |

Were ICP interelement corrections applied ? Yes/No NO_

Were ICP background corrections applied ? Yes/No NO_
If yes - were raw data generated before application of background corrections ? Yes/No

Comments:
____BATCH_ID_#'S:__P=000113I4,_000119I4_____
_____AV=991215HG2_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Susan S. Turner for... Deborah J. Inman_____

Date: January 21, 2000 Title: Inorganic Program Manager__

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

ASC-EB

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41411 SAS No.: SDG No.: 41411B
Matrix (soil/water): WATER Lab Sample ID: 41411.12
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 0.40 | U | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-47-3 | Chromium | 0.50 | U | | P |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 1.0 | U | | P |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 0.80 | U | | P |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 0.90 | U | | P |
| 7440-66-6 | Zinc | 4.2 | B | | P |
| 7440-61-1 | Uranium | 10.5 | U | | P |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## SDG NARRATIVE

CONTRACT: TECHLAW
CASE: 41450
SDG: 41450

DATE: January 14, 2000
SOW NO.: SW846
EPISODE NO.: 41450

### INORGANIC METAL FRACTION:

Four total and five dissolved samples plus two MS/MSD's were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Sb, Hg, Mg, Ni, & Cu. No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cu. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spikes (and MSD):** No problems.

**Duplicates (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** The serial dilution was outside the control limits of 10% for the following elements: Dissolved metals- Mn; total metals- Zn. All associated samples were flagged with an "E" on Form I's. No action required.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

CLIENT SAMPLE ID 3

# INORGANIC ANALYSES DATA SHEET

GS-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.07
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 28.0 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.90 | B | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 19.0 | B | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 34.0 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 2.5 | B | | P |
| 7440-66-6 | Zinc | 273 | | E | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID#=GS-1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

GS-1 DISS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41450 SAS No.: _____ SDG No.: 41450_
Matrix (soil/water): WATER Lab Sample ID: 41450.08
Level (low/med): LOW__ Date Received: 12/14/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 32.1 | U | | P |
| 7440-36-0 | Antimony_ | | | | NR |
| 7440-38-2 | Arsenic__ | | | | NR |
| 7440-39-3 | Barium___ | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium__ | | | | NR |
| 7440-70-2 | Calcium__ | 83100 | | | P |
| 7440-48-4 | Cobalt___ | | | | NR |
| 7440-50-8 | Copper___ | | | | NR |
| 7439-89-6 | Iron_____ | 24.2 | U | | P |
| 7439-92-1 | Lead_____ | | | | NR |
| 7439-95-4 | Magnesium | 3440 | | | P |
| 7439-96-5 | Manganese | 11.1 | | E | P |
| 7439-97-6 | Mercury__ | | | | NR |
| 7440-02-0 | Nickel___ | | | | NR |
| 7440-09-7 | Potassium | 6110 | | | P |
| 7782-49-2 | Selenium_ | | | | NR |
| 7440-22-4 | Silver___ | | | | NR |
| 7440-23-5 | Sodium___ | 45700 | | | P |
| 7440-28-0 | Thallium_ | | | | NR |
| 7440-62-2 | Vanadium_ | | | | NR |
| 7440-66-6 | Zinc_____ | | | | NR |
| 7732-18-5 | Silicon__ | 22400 | | | P |
| 7440-24-6 | Strontium | 85.9 | | | P |

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CLIENT_ID#=GS-1_DISS

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-FB

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.05
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 0.40 | U | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 1.0 | U | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 0.80 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 0.90 | U | | P |
| 7440-66-6 | Zinc | 8.1 | B | E | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID#=MCO-FB

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID 6

MCO-FB DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.06
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | 537 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | 72.9 | B | | P |
| 7439-96-5 | Manganese | 1.2 | U | E | P |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | 353 | U | | P |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | 2300 | | | P |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 7732-18-5 | Silicon | 89.0 | U | | P |
| 7440-24-6 | Strontium | 1.6 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:
CLIENT_ID#=MCO-FB_DISS

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCWB-7 7B

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.01
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 149 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 1.0 | U | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 2.1 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 5.2 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 1.3 | B | | P |
| 7440-66-6 | Zinc | 5.3 | B | E | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID#=MCWB-7.7B

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCWB-7 7B D

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.02
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | 22700 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | 5750 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | E | P |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | 7640 | | | P |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | 87900 | | | P |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 7732-18-5 | Silicon | 17100 | | | P |
| 7440-24-6 | Strontium | 156 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:
CLIENT_ID#=MCWB-7.7B_DISS

FORM I - IN

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

TA-18 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.12
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 251 | | | P |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | 11800 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 461 | | | P |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | 3710 | | | P |
| 7439-96-5 | Manganese | 128 | | E | P |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | 3080 | | | P |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | 16800 | | | P |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 7732-18-5 | Silicon | 14800 | | | P |
| 7440-24-6 | Strontium | 80.0 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:
CLIENT_ID#=TA-18_DISS

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

TW-8

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.03
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | 5.0 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | U | | P |
| 7440-39-3 | Barium | 6.9 | B | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.30 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 1.0 | U | | P |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 4.4 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.10 | U | | AV |
| 7440-02-0 | Nickel | 0.80 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 2.9 | U | | P |
| 7440-22-4 | Silver | 2.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.3 | U | | P |
| 7440-62-2 | Vanadium | 5.5 | B | | P |
| 7440-66-6 | Zinc | 468 | | E | P |
| 7732-18-5 | Silicon | | | | NR |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
CLIENT_ID#=TW-8

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

TW-8 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41450 SAS No.: SDG No.: 41450
Matrix (soil/water): WATER Lab Sample ID: 41450.04
Level (low/med): LOW Date Received: 12/14/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | | | | NR |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | | | | NR |
| 7440-70-2 | Calcium | 11700 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-92-1 | Lead | | | | NR |
| 7439-95-4 | Magnesium | 4180 | | | P |
| 7439-96-5 | Manganese | 1.7 | B | E | P |
| 7439-97-6 | Mercury | | | | NR |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | 1740 | B | | P |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | 12600 | | | P |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| 7732-18-5 | Silicon | 32600 | | | P |
| 7440-24-6 | Strontium | 53.3 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:
CLIENT_ID#=TW-8_DISS

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41407**
**SDG: 41407**

**DATE: January 14, 2000**
**SOW NO.: SW846**
**EPISODE NO.: 41407**

**INORGANIC METAL FRACTION:**

Seven water samples plus one MS/MSD were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analysis was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Ba, Cd, Cu, Ni, Se, Tl, & U. No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cd, Cu, Se, & U. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spike (and MSD):** No problems.

**Duplicates (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** No problems.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-1

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.02
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P |
| 7440-38-2 | Arsenic__ | 3.3 | B | | P |
| 7440-39-3 | Barium___ | 48.6 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium__ | 0.54 | B | | P |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P |
| 7440-50-8 | Copper___ | 10.2 | B | | P |
| 7439-92-1 | Lead____ | 2.1 | U | | P |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 10 | B | | P |
| 7782-49-2 | Selenium_ | 2.9 | U | | P |
| 7440-22-4 | Silver___ | 2.0 | U | | P |
| 7440-28-0 | Thallium_ | 3.0 | B | | P |
| 7440-62-2 | Vanadium_ | 0.90 | U | | P |
| 7440-66-6 | Zinc_____ | 15.5 | B | | P |
| 7440-61-1 | Uranium__ | 19.2 | B | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-2

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.03
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P |
| 7440-38-2 | Arsenic__ | 13.4 | | | P |
| 7440-39-3 | Barium___ | 121 | | | P |
| 7440-41-7 | Beryllium | 0.68 | B | | P |
| 7440-43-9 | Cadmium__ | 0.30 | U | | P |
| 7440-48-4 | Cobalt___ | 2.2 | B | | P |
| 7440-50-8 | Copper___ | 6.0 | B | | P |
| 7439-92-1 | Lead____ | 2.1 | U | | P |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 8.0 | B | | P |
| 7782-49-2 | Selenium_ | 2.9 | U | | P |
| 7440-22-4 | Silver___ | 2.0 | U | | P |
| 7440-28-0 | Thallium_ | 2.6 | B | | P |
| 7440-62-2 | Vanadium_ | 2.8 | B | | P |
| 7440-66-6 | Zinc____ | 14.5 | B | | P |
| 7440-61-1 | Uranium__ | 21.2 | B | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-3

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.04
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P_ |
| 7440-38-2 | Arsenic__ | 3.3 | U | | P_ |
| 7440-39-3 | Barium___ | 49.5 | | | P_ |
| 7440-41-7 | Beryllium | 0.30 | U | | P_ |
| 7440-43-9 | Cadmium__ | 0.85 | B | | P_ |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P_ |
| 7440-50-8 | Copper___ | 10.0 | B | | P_ |
| 7439-92-1 | Lead____ | 2.1 | U | | P_ |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 10.3 | B | | P_ |
| 7782-49-2 | Selenium_ | 2.9 | U | | P_ |
| 7440-22-4 | Silver___ | 2.0 | U | | P_ |
| 7440-28-0 | Thallium_ | 5.4 | B | | P_ |
| 7440-62-2 | Vanadium_ | 0.90 | U | | P_ |
| 7440-66-6 | Zinc____ | 16.9 | B | | P_ |
| 7440-61-1 | Uranium__ | 16.7 | B | | P_ |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-5

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.05
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P |
| 7440-38-2 | Arsenic__ | 3.3 | U | | P |
| 7440-39-3 | Barium___ | 92.4 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium__ | 0.46 | B | | P |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P |
| 7440-50-8 | Copper___ | 2.4 | B | | P |
| 7439-92-1 | Lead____ | 2.1 | U | | P |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 8.2 | B | | P |
| 7782-49-2 | Selenium_ | 2.9 | U | | P |
| 7440-22-4 | Silver___ | 2.0 | U | | P |
| 7440-28-0 | Thallium_ | 2.3 | U | | P |
| 7440-62-2 | Vanadium_ | 0.90 | U | | P |
| 7440-66-6 | Zinc_____ | 4.7 | B | | P |
| 7440-61-1 | Uranium__ | 10.5 | U | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-6

Lab Name: SOUTHWEST_LABORATORIES___ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.08
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P |
| 7440-38-2 | Arsenic__ | 3.3 | U | | P |
| 7440-39-3 | Barium___ | 87.0 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium__ | 0.92 | B | | P |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P |
| 7440-50-8 | Copper___ | 2.7 | B | | P |
| 7439-92-1 | Lead____ | 2.4 | B | | P |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 9.3 | B | | P |
| 7782-49-2 | Selenium_ | 2.9 | U | | P |
| 7440-22-4 | Silver___ | 2.0 | U | | P |
| 7440-28-0 | Thallium_ | 2.4 | B | | P |
| 7440-62-2 | Vanadium_ | 0.90 | U | | P |
| 7440-66-6 | Zinc____ | 11.9 | B | | P |
| 7440-61-1 | Uranium__ | 21.2 | B | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-7

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.09
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P |
| 7440-38-2 | Arsenic__ | 3.3 | U | | P |
| 7440-39-3 | Barium___ | 237 | | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium__ | 7.6 | | | P |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P |
| 7440-50-8 | Copper___ | 1.2 | B | | P |
| 7439-92-1 | Lead____ | 2.1 | U | | P |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 7.8 | B | | P |
| 7782-49-2 | Selenium_ | 2.9 | U | | P |
| 7440-22-4 | Silver___ | 2.0 | U | | P |
| 7440-28-0 | Thallium_ | 2.7 | B | | P |
| 7440-62-2 | Vanadium_ | 2.4 | B | | P |
| 7440-66-6 | Zinc____ | 7.8 | B | | P |
| 7440-61-1 | Uranium__ | 20.0 | B | | P |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1 2

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MT-4

Lab Name: SOUTHWEST_LABORATORIES___ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41407 SAS No.: _____ SDG No.: 41407_
Matrix (soil/water): WATER Lab Sample ID: 41407.01
Level (low/med): LOW__ Date Received: 12/10/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 5.0 | U | | P_ |
| 7440-38-2 | Arsenic__ | 3.3 | U | | P_ |
| 7440-39-3 | Barium___ | 139 | | | P_ |
| 7440-41-7 | Beryllium | 0.30 | U | | P_ |
| 7440-43-9 | Cadmium__ | 0.92 | B | | P_ |
| 7440-48-4 | Cobalt___ | 1.7 | U | | P_ |
| 7440-50-8 | Copper___ | 2.5 | B | | P_ |
| 7439-92-1 | Lead____ | 2.1 | U | | P_ |
| 7439-97-6 | Mercury__ | 0.10 | U | | AV |
| 7440-02-0 | Nickel___ | 6.1 | B | | P_ |
| 7782-49-2 | Selenium_ | 2.9 | U | | P_ |
| 7440-22-4 | Silver___ | 2.0 | U | | P_ |
| 7440-28-0 | Thallium_ | 3.1 | B | | P_ |
| 7440-62-2 | Vanadium_ | 1.2 | B | | P_ |
| 7440-66-6 | Zinc____ | 6.9 | B | | P_ |
| 7440-61-1 | Uranium__ | 27.4 | B | | P_ |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41405**
**SDG: 41405**

**DATE: 1/12/00**
**SOW NO.: SW846**
**EPISODE NO.: 41405**

## INORGANIC METAL FRACTION:

Seven water samples, plus one matrix spike and one matrix spike duplicate were submitted for ICP analysis. No major problems occurred during the digestion or analysis of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |

The samples were filtered prior to analysis. The Form 13 indicates the volume of sample filtered prior to analysis.

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** No problems.

**Linearity near the CRDL (CRA & CRI):** No problems.

**Lab Control Spikes:** No problems.

**Matrix Spikes (and MSD):** No problems.

**Duplicates (and MSD):** No problems.

**Serial Dilution (ICP):** The water serial dilution was outside the control limits of 10% for the following elements: K, Na All associated samples were flagged with an "E" on Form I's. No action required.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-1 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.02
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-70-2 | Calcium | 77800 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 4560 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 9400 | | E | P |
| 7440-23-5 | Sodium | 44600 | | E | P |
| 7732-18-5 | Silicon | 21800 | | | P |
| 7440-24-6 | Strontium | 143 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-2 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.03
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 100 | B | | P |
| 7440-70-2 | Calcium | 21700 | | | P |
| 7439-89-6 | Iron | 12400 | | | P |
| 7439-95-4 | Magnesium | 5490 | | | P |
| 7439-96-5 | Manganese | 1730 | | | P |
| 7440-09-7 | Potassium | 3530 | | E | P |
| 7440-23-5 | Sodium | 31500 | | E | P |
| 7732-18-5 | Silicon | 38500 | | | P |
| 7440-24-6 | Strontium | 121 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-3 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.04
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-70-2 | Calcium | 79400 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 4740 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 9900 | | E | P |
| 7440-23-5 | Sodium | 45600 | | E | P |
| 7732-18-5 | Silicon | 22300 | | | P |
| 7440-24-6 | Strontium | 147 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-5 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.05
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-70-2 | Calcium | 32100 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 3230 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 18300 | | E | P |
| 7440-23-5 | Sodium | 63400 | | E | P |
| 7732-18-5 | Silicon | 17700 | | | P |
| 7440-24-6 | Strontium | 136 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-6 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.08
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 32.1 | U | | P |
| 7440-70-2 | Calcium | 31900 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 3130 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 18300 | | E | P |
| 7440-23-5 | Sodium | 65800 | | E | P |
| 7732-18-5 | Silicon | 17600 | | | P |
| 7440-24-6 | Strontium | 135 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MCO-7 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405
Matrix (soil/water): WATER Lab Sample ID: 41405.09
Level (low/med): LOW Date Received: 12/10/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 48.0 | B | | P |
| 7440-70-2 | Calcium | 28000 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 6720 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 23700 | | E | P |
| 7440-23-5 | Sodium | 80800 | | E | P |
| 7732-18-5 | Silicon | 18600 | | | P |
| 7440-24-6 | Strontium | 185 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MT-4 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41405 SAS No.: SDG No.: 41405

Matrix (soil/water): WATER Lab Sample ID: 41405.01

Level (low/med): LOW Date Received: 12/10/99

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 38.3 | B | | P |
| 7440-70-2 | Calcium | 24000 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 5830 | | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 6950 | | E | P |
| 7440-23-5 | Sodium | 94900 | | E | P |
| 7732-18-5 | Silicon | 18500 | | | P |
| 7440-24-6 | Strontium | 154 | | | P |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

**CONTRACT: TECHLAW** **DATE: 1/19/00**
**CASE: 41535** **SOW NO.: SW846**
**SDG: 41535** **EPISODE NO.: 41535**

## INORGANIC METAL FRACTION:

Three water samples were submitted for ICP analysis. No major problems occurred during the digestion or analysis of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: U // No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.
**Preparation Blanks**: No problems.
**Lab Control Spikes:** No problems.
**Duplicates (LCSD):** No problems.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PM-1

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41535 SAS No.: _____ SDG No.: 41535_
Matrix (soil/water): WATER Lab Sample ID: 41535.01
Level (low/med): LOW__ Date Received: 12/18/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-38-2 | Arsenic__ | 3.3 | U | | P_ |
| 7440-39-3 | Barium___ | | | | NR |
| 7440-61-1 | Uranium__ | 10.5 | U | | P_ |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PM-2

Lab Name: SOUTHWEST_LABORATORIES___ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41535 SAS No.: _____ SDG No.: 41535_
Matrix (soil/water): WATER Lab Sample ID: 41535.03
Level (low/med): LOW__ Date Received: 12/18/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-38-2 | Arsenic__ | | | | NR |
| 7440-39-3 | Barium___ | 24.0 | B | | P |
| 7440-61-1 | Uranium__ | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture:
Color After: COLORLESS Clarity After: CLEAR_ Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

0-4

Lab Name: SOUTHWEST_LABORATORIES___ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41535 SAS No.: _____ SDG No.: 41535_
Matrix (soil/water): WATER Lab Sample ID: 41535.02
Level (low/med): LOW__ Date Received: 12/18/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-38-2 | Arsenic__ | 3.3 | U | | P_ |
| 7440-39-3 | Barium___ | | | | NR |
| 7440-61-1 | Uranium__ | 10.5 | U | | P_ |

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599



## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41451**
**SDG: 41451**

**DATE: 1/12/00**
**SOW NO.: SW846**
**EPISODE NO.: 41451**

## INORGANIC METAL FRACTION:

Four water samples were submitted for ICP analysis. No major problems occurred during the digestion or analysis of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |

The samples were filtered prior to analysis. The Form 13 indicates the volume of sample filtered prior to analysis.

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Mg // No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1 -

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

FB-6 7 DISS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41451 SAS No.: _____ SDG No.: 41451_
Matrix (soil/water): WATER Lab Sample ID: 41451.04
Level (low/med): LOW__ Date Received: 12/14/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 32.1 | U | | P |
| 7440-70-2 | Calcium__ | 511 | B | | P |
| 7439-89-6 | Iron____ | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 100 | B | | P |
| 7439-96-5 | Manganese | 1.2 | U | | P |
| 7440-09-7 | Potassium | 353 | U | | P |
| 7440-23-5 | Sodium___ | 2340 | | | P |
| 7732-18-5 | Silicon__ | 89.0 | U | | P |
| 7440-24-6 | Strontium | 1.5 | | | P |

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CLIENT_ID=FB-6.7_DISS

U.S. EPA - CLP

1 →

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

HOMESTEAD

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41451 SAS No.: SDG No.: 41451

Matrix (soil/water): WATER Lab Sample ID: 41451.06

Level (low/med): LOW Date Received: 12/14/99

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 196 | B | | P |
| 7440-70-2 | Calcium | 7910 | | | P |
| 7439-89-6 | Iron | 123 | | | P |
| 7439-95-4 | Magnesium | 2820 | | | P |
| 7439-96-5 | Manganese | 4.0 | B | | P |
| 7440-09-7 | Potassium | 2190 | B | | P |
| 7440-23-5 | Sodium | 8160 | | | P |
| 7732-18-5 | Silicon | 16900 | | | P |
| 7440-24-6 | Strontium | 62.3 | | | P |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

CLIENT_ID=HOMESTEAD_DISS

FORM I - IN

U.S. EPA - CLP

1 -

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PA-6 7 DISS

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41451 SAS No.: _____ SDG No.: 41451_
Matrix (soil/water): WATER Lab Sample ID: 41451.02
Level (low/med): LOW__ Date Received: 12/14/99
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum_ | 121 | B | | P |
| 7440-70-2 | Calcium__ | 12900 | | | P |
| 7439-89-6 | Iron_____ | 79.8 | B | | P |
| 7439-95-4 | Magnesium | 4140 | | | P |
| 7439-96-5 | Manganese | 2.0 | B | | P |
| 7440-09-7 | Potassium | 2470 | B | | P |
| 7440-23-5 | Sodium___ | 15800 | | | P |
| 7732-18-5 | Silicon__ | 13800 | | | P |
| 7440-24-6 | Strontium | 90.2 | | | P |

Color Before: _____ Clarity Before: _____ Texture: _____
Color After: _____ Clarity After: _____ Artifacts: _____

Comments:
CLIENT_ID=PA-6.7_DISS

FORM I - IN

U.S. EPA - CLP

1 -

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

STARMER

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41451 SAS No.: SDG No.: 41451

Matrix (soil/water): WATER Lab Sample ID: 41451.08

Level (low/med): LOW Date Received: 12/14/99

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 121 | B | | P |
| 7440-70-2 | Calcium | 10300 | | | P |
| 7439-89-6 | Iron | 63.7 | B | | P |
| 7439-95-4 | Magnesium | 3570 | | | P |
| 7439-96-5 | Manganese | 1.5 | B | | P |
| 7440-09-7 | Potassium | 2380 | B | | P |
| 7440-23-5 | Sodium | 10600 | | | P |
| 7732-18-5 | Silicon | 16900 | | | P |
| 7440-24-6 | Strontium | 78.6 | | | P |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

CLIENT_ID=STARMER_DISS

FORM I - IN

# SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599


## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41488**
**SDG: 41488**

**DATE: 1/17/00**
**SOW NO.: SW846**
**EPISODE NO.: 41488**

## INORGANIC METAL FRACTION:

Three dissolved and one total water samples were submitted for ICP analysis. No major problems occurred during the digestion or analysis of these samples. Please see the DC-1 (Sample Log-In Sneet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Mg // No action required.

**Linearity near the CRDL (CRA & CRI):** No problems.
**Preparation Blanks**: No problems.
**Lab Control Spikes:** No problems.
**Duplicates (LCSD):** No problems.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BU-0 01 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41488 SAS No.: SDG No.: 41488
Matrix (soil/water): WATER Lab Sample ID: 41488.06
Level (low/med): LOW Date Received: 12/16/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 47.3 | B | | P |
| 7440-39-3 | Barium | | | | NR |
| 7440-70-2 | Calcium | 21000 | | | P |
| 7439-89-6 | Iron | 24.2 | U | | P |
| 7439-95-4 | Magnesium | 6010 | | | P |
| 7439-96-5 | Manganese | 1.7 | B | | P |
| 7440-09-7 | Potassium | 3460 | | | P |
| 7440-23-5 | Sodium | 26500 | | | P |
| 7732-18-5 | Silicon | 20700 | | | P |
| 7440-24-6 | Strontium | 131 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:
CLIENT_ID=BU-0.01_DISS

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BULLDOG DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41488 SAS No.: SDG No.: 41488
Matrix (soil/water): WATER Lab Sample ID: 41488.02
Level (low/med): LOW Date Received: 12/16/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 70.9 | B | | P |
| 7440-39-3 | Barium | | | | NR |
| 7440-70-2 | Calcium | 21700 | | | P |
| 7439-89-6 | Iron | 29.9 | B | | P |
| 7439-95-4 | Magnesium | 5950 | | | P |
| 7439-96-5 | Manganese | 1.5 | B | | P |
| 7440-09-7 | Potassium | 3620 | | | P |
| 7440-23-5 | Sodium | 28300 | | | P |
| 7732-18-5 | Silicon | 23800 | | | P |
| 7440-24-6 | Strontium | 133 | | | P |

Color Before: Clarity Before: Texture:
Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PA-8 9 DISS

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41488 SAS No.: SDG No.: 41488
Matrix (soil/water): WATER Lab Sample ID: 41488.04
Level (low/med): LOW Date Received: 12/16/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 139 | B | | P |
| 7440-39-3 | Barium | | | | NR |
| 7440-70-2 | Calcium | 10800 | | | P |
| 7439-89-6 | Iron | 75.1 | B | | P |
| 7439-95-4 | Magnesium | 3560 | | | P |
| 7439-96-5 | Manganese | 6.2 | B | | P |
| 7440-09-7 | Potassium | 2490 | B | | P |
| 7440-23-5 | Sodium | 11900 | | | P |
| 7732-18-5 | Silicon | 18000 | | | P |
| 7440-24-6 | Strontium | 77.4 | | | P |

Color Before:
Color After:
Clarity Before:
Clarity After:
Texture:
Artifacts:

Comments:
CLIENT_ID=PA-8.9_DISS

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PM-5

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41488 SAS No.: SDG No.: 41488
Matrix (soil/water): WATER Lab Sample ID: 41488.07
Level (low/med): LOW Date Received: 12/16/99
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-39-3 | Barium | 29.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7732-18-5 | Silicon | | | | NR |
| 7440-24-6 | Strontium | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

TM

## *SDG NARRATIVE*

**CONTRACT: TECHLAW** **DATE: 1/14/2000**
**CASE: 41534** **SOW NO.: SW846**
**SDG: 41534** **EPISODE NO.: 41534**

**INORGANIC METAL FRACTION:**

Ten soil samples plus one MS/MSD were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analysis were completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

This is an addendum package for 41534 to include the results of the arsenic and nickel analysis on these samples. The results for arsenic and nickel were omitted from the original package. Therefore an addendum forms package was created to fix this oversight.

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Sb, Tl, Ag, & Hg. No action required.

**Linearity near the CRDL (CRA & CRI):** The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Se & U. No action required.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Ba, Ni, Cd, Ag, & Zn. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spike (and MSD):** The following element was outside the control limits of 75-125% recovery: Sb. All associated samples were flagged with a "N" on Form I's. No action required.

**Duplicates (LCSD and MSD):** No problems.

**Serial Dilution (ICP):** No problems.

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
**AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534

Matrix (soil/water): SOIL Lab Sample ID: 41534.06

Level (low/med): LOW Date Received: 12/18/99

% Solids: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.2 | | | P |
| 7440-39-3 | Barium | 77.0 | | | P |
| 7440-41-7 | Beryllium | 0.70 | | | P |
| 7440-43-9 | Cadmium | 0.06 | B | | P |
| 7440-48-4 | Cobalt | 2.7 | | | P |
| 7440-50-8 | Copper | 11.3 | | | P |
| 7439-92-1 | Lead | 11.4 | B | | P |
| 7439-97-6 | Mercury | 0.13 | | | AV |
| 7440-02-0 | Nickel | 4.6 | | | P |
| 7782-49-2 | Selenium | 0.34 | B | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | N | P |
| 7440-62-2 | Vanadium | 8.9 | | | P |
| 7440-66-6 | Zinc | 33.3 | | | P |
| 7440-61-1 | Uranium | 4.2 | | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534

Matrix (soil/water): SOIL Lab Sample ID: 41534.07

Level (low/med): LOW Date Received: 12/18/99

% Solids: 95.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.5 | | | P |
| 7440-39-3 | Barium | 70.1 | | | P |
| 7440-41-7 | Beryllium | 0.65 | | | P |
| 7440-43-9 | Cadmium | 0.03 | B | | P |
| 7440-48-4 | Cobalt | 2.5 | B | | P |
| 7440-50-8 | Copper | 9.5 | | | P |
| 7439-92-1 | Lead | 11.4 | B | | P |
| 7439-97-6 | Mercury | 0.06 | | | AV |
| 7440-02-0 | Nickel | 4.5 | | | P |
| 7782-49-2 | Selenium | 0.43 | B | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | N | P |
| 7440-62-2 | Vanadium | 9.4 | | | P |
| 7440-66-6 | Zinc | 31.8 | | | P |
| 7440-61-1 | Uranium | 1.8 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534

Matrix (soil/water): SOIL Lab Sample ID: 41534.08

Level (low/med): LOW Date Received: 12/18/99

% Solids: 91.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.3 | | | P |
| 7440-39-3 | Barium | 80.0 | | | P |
| 7440-41-7 | Beryllium | 0.74 | | | P |
| 7440-43-9 | Cadmium | 0.04 | B | | P |
| 7440-48-4 | Cobalt | 3.0 | | | P |
| 7440-50-8 | Copper | 8.2 | | | P |
| 7439-92-1 | Lead | 12.2 | B | | P |
| 7439-97-6 | Mercury | 0.05 | | | AV |
| 7440-02-0 | Nickel | 5.4 | | | P |
| 7782-49-2 | Selenium | 0.53 | B | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.50 | B | N | P |
| 7440-62-2 | Vanadium | 10.9 | | | P |
| 7440-66-6 | Zinc | 40.4 | | | P |
| 7440-61-1 | Uranium | 1.6 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534

Matrix (soil/water): SOIL Lab Sample ID: 41534.09

Level (low/med): LOW Date Received: 12/18/99

% Solids: 96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 1.8 | | | P |
| 7440-39-3 | Barium | 51.8 | | | P |
| 7440-41-7 | Beryllium | 0.48 | B | | P |
| 7440-43-9 | Cadmium | 0.03 | B | | P |
| 7440-48-4 | Cobalt | 2.0 | B | | P |
| 7440-50-8 | Copper | 5.3 | | | P |
| 7439-92-1 | Lead | 8.3 | B | | P |
| 7439-97-6 | Mercury | 0.05 | | | AV |
| 7440-02-0 | Nickel | 3.6 | B | | P |
| 7782-49-2 | Selenium | 0.45 | B | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | N | P |
| 7440-62-2 | Vanadium | 8.5 | | | P |
| 7440-66-6 | Zinc | 28.1 | | | P |
| 7440-61-1 | Uranium | 2.1 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

AC-5

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534
Matrix (soil/water): SOIL Lab Sample ID: 41534.10
Level (low/med): LOW Date Received: 12/18/99
% Solids: 93.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 2.0 | | | P |
| 7440-39-3 | Barium | 51.2 | | | P |
| 7440-41-7 | Beryllium | 0.47 | B | | P |
| 7440-43-9 | Cadmium | 0.04 | B | | P |
| 7440-48-4 | Cobalt | 2.3 | B | | P |
| 7440-50-8 | Copper | 4.5 | B | | P |
| 7439-92-1 | Lead | 9.5 | B | | P |
| 7439-97-6 | Mercury | 0.04 | | | AV |
| 7440-02-0 | Nickel | 3.6 | B | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.43 | B | | P |
| 7440-28-0 | Thallium | 0.36 | U | N | P |
| 7440-62-2 | Vanadium | 8.4 | | | P |
| 7440-66-6 | Zinc | 27.5 | | | P |
| 7440-61-1 | Uranium | 1.1 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534

Matrix (soil/water): SOIL Lab Sample ID: 41534.01

Level (low/med): LOW Date Received: 12/18/99

% Solids: 89.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 4.0 | | | P |
| 7440-39-3 | Barium | 162 | | | P |
| 7440-41-7 | Beryllium | 1.2 | | | P |
| 7440-43-9 | Cadmium | 0.08 | B | | P |
| 7440-48-4 | Cobalt | 6.1 | | | P |
| 7440-50-8 | Copper | 13.4 | | | P |
| 7439-92-1 | Lead | 18.6 | B | | P |
| 7439-97-6 | Mercury | 0.02 | B | | AV |
| 7440-02-0 | Nickel | 11.1 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.83 | B | N | P |
| 7440-62-2 | Vanadium | 20.4 | | | P |
| 7440-66-6 | Zinc | 56.0 | | | P |
| 7440-61-1 | Uranium | 2.5 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534
Matrix (soil/water): SOIL Lab Sample ID: 41534.02
Level (low/med): LOW Date Received: 12/18/99
% Solids: 94.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.9 | | | P |
| 7440-39-3 | Barium | 110 | | | P |
| 7440-41-7 | Beryllium | 0.75 | | | P |
| 7440-43-9 | Cadmium | 0.03 | U | | P |
| 7440-48-4 | Cobalt | 4.3 | | | P |
| 7440-50-8 | Copper | 6.5 | | | P |
| 7439-92-1 | Lead | 11.7 | B | | P |
| 7439-97-6 | Mercury | 0.02 | U | | AV |
| 7440-02-0 | Nickel | 6.8 | | | P |
| 7782-49-2 | Selenium | 0.43 | B | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.52 | B | N | P |
| 7440-62-2 | Vanadium | 15.5 | | | P |
| 7440-66-6 | Zinc | 36.2 | | | P |
| 7440-61-1 | Uranium | 1.0 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534
Matrix (soil/water): SOIL Lab Sample ID: 41534.03
Level (low/med): LOW Date Received: 12/18/99
% Solids: 85.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.31 | U | N | P |
| 7440-38-2 | Arsenic | 4.0 | | | P |
| 7440-39-3 | Barium | 166 | | | P |
| 7440-41-7 | Beryllium | 1.2 | | | P |
| 7440-43-9 | Cadmium | 0.10 | B | | P |
| 7440-48-4 | Cobalt | 5.8 | | | P |
| 7440-50-8 | Copper | 13.1 | | | P |
| 7439-92-1 | Lead | 21.8 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 11.3 | | | P |
| 7782-49-2 | Selenium | 0.38 | U | | P |
| 7440-22-4 | Silver | 0.14 | U | | P |
| 7440-28-0 | Thallium | 0.55 | B | N | P |
| 7440-62-2 | Vanadium | 22.6 | | | P |
| 7440-66-6 | Zinc | 58.4 | | | P |
| 7440-61-1 | Uranium | 2.3 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PC-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534
Matrix (soil/water): SOIL Lab Sample ID: 41534.04
Level (low/med): LOW Date Received: 12/18/99
% Solids: 92.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 3.8 | | | P |
| 7440-39-3 | Barium | 148 | | | P |
| 7440-41-7 | Beryllium | 0.99 | | | P |
| 7440-43-9 | Cadmium | 0.05 | B | | P |
| 7440-48-4 | Cobalt | 5.3 | | | P |
| 7440-50-8 | Copper | 11.2 | | | P |
| 7439-92-1 | Lead | 30.9 | | | P |
| 7439-97-6 | Mercury | 0.02 | B | | AV |
| 7440-02-0 | Nickel | 10.0 | | | P |
| 7782-49-2 | Selenium | 0.40 | B | | P |
| 7440-22-4 | Silver | 0.14 | B | | P |
| 7440-28-0 | Thallium | 0.59 | B | N | P |
| 7440-62-2 | Vanadium | 20.5 | | | P |
| 7440-66-6 | Zinc | 41.1 | | | P |
| 7440-61-1 | Uranium | 2.0 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

PC-5

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41534 SAS No.: SDG No.: 41534
Matrix (soil/water): SOIL Lab Sample ID: 41534.05
Level (low/med): LOW Date Received: 12/18/99
% Solids: 94.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 3.2 | | | P |
| 7440-39-3 | Barium | 119 | | | P |
| 7440-41-7 | Beryllium | 0.79 | | | P |
| 7440-43-9 | Cadmium | 0.03 | U | | P |
| 7440-48-4 | Cobalt | 4.9 | | | P |
| 7440-50-8 | Copper | 6.9 | | | P |
| 7439-92-1 | Lead | 11.3 | B | | P |
| 7439-97-6 | Mercury | 0.02 | B | | AV |
| 7440-02-0 | Nickel | 7.5 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | N | P |
| 7440-62-2 | Vanadium | 16.8 | | | P |
| 7440-66-6 | Zinc | 36.5 | | | P |
| 7440-61-1 | Uranium | 1.2 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

## *SDG NARRATIVE*

**CONTRACT: TECHLAW** **DATE: 1/24/00**
**CASE: 41509** **SOW NO.: SW846**
**SDG: 41509A** **EPISODE NO.: 41509**

### INORGANIC METAL FRACTION:

Twenty soil samples, plus one matrix spike and one matrix spike duplicate were submitted for ICP and Hg analysis. No major problems occurred during the digestion or analysis of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analyses was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

**Initial and Continuing Calibration Checks**: No problems.
**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Sb, Co, As, Tl, V, U No action required.

**Linearity near the CRDL (CRA & CRI):** The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Sb, Ba, Be, Ag No action required.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cd, Co, Cu, Sb, As, V, Zn
No action required.
**Lab Control Spikes:** No problems.

**Matrix Spikes (and MSD):** The following elements were outside the control limits of 75-125% recovery: Sb, U All associated samples were flagged with a "N" on Form I's.
No action required.
**Duplicates (LCSD and MSD):** No problems.
**Serial Dilution (ICP):** No problems.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.01
Level (low/med): LOW Date Received: 12/17/99
% Solids: 91.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 2.0 | | | P |
| 7440-39-3 | Barium | 46.6 | | | P |
| 7440-41-7 | Beryllium | 0.55 | | | P |
| 7440-43-9 | Cadmium | 0.08 | B | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 7.9 | | | P |
| 7439-92-1 | Lead | 8.8 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 5.3 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.37 | U | | P |
| 7440-62-2 | Vanadium | 5.8 | | | P |
| 7440-66-6 | Zinc | 21.6 | | | P |
| 7440-61-1 | Uranium | 2.0 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.02
Level (low/med): LOW Date Received: 12/17/99
% Solids: 95.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.72 | B | N | P |
| 7440-38-2 | Arsenic | 1.7 | | | P |
| 7440-39-3 | Barium | 33.3 | | | P |
| 7440-41-7 | Beryllium | 0.47 | B | | P |
| 7440-43-9 | Cadmium | 0.13 | B | | P |
| 7440-48-4 | Cobalt | 1.4 | B | | P |
| 7440-50-8 | Copper | 4.1 | B | | P |
| 7439-92-1 | Lead | 8.3 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 3.4 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.36 | U | | P |
| 7440-62-2 | Vanadium | 5.6 | | | P |
| 7440-66-6 | Zinc | 28.1 | | | P |
| 7440-61-1 | Uranium | 1.0 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.03
Level (low/med): LOW Date Received: 12/17/99
% Solids: 95.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 1.4 | | | P |
| 7440-39-3 | Barium | 29.8 | | | P |
| 7440-41-7 | Beryllium | 0.43 | B | | P |
| 7440-43-9 | Cadmium | 0.12 | B | | P |
| 7440-48-4 | Cobalt | 1.1 | B | | P |
| 7440-50-8 | Copper | 3.2 | B | | P |
| 7439-92-1 | Lead | 7.2 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 2.3 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.36 | U | | P |
| 7440-62-2 | Vanadium | 3.6 | | | P |
| 7440-66-6 | Zinc | 16.2 | | | P |
| 7440-61-1 | Uranium | 1.3 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BC-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.04
Level (low/med): LOW Date Received: 12/17/99
% Solids: 99.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.26 | U | N | P |
| 7440-38-2 | Arsenic | 1.6 | | | P |
| 7440-39-3 | Barium | 32.7 | | | P |
| 7440-41-7 | Beryllium | 0.40 | B | | P |
| 7440-43-9 | Cadmium | 0.14 | B | | P |
| 7440-48-4 | Cobalt | 1.4 | B | | P |
| 7440-50-8 | Copper | 3.4 | B | | P |
| 7439-92-1 | Lead | 7.4 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 2.2 | | | P |
| 7782-49-2 | Selenium | 0.32 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.33 | U | | P |
| 7440-62-2 | Vanadium | 4.7 | | | P |
| 7440-66-6 | Zinc | 16.2 | | | P |
| 7440-61-1 | Uranium | 1.2 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

BC-5

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.05
Level (low/med): LOW Date Received: 12/17/99
% Solids: 94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 1.7 | | | P |
| 7440-39-3 | Barium | 37.2 | | | P |
| 7440-41-7 | Beryllium | 0.53 | | | P |
| 7440-43-9 | Cadmium | 0.04 | B | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 4.5 | B | | P |
| 7439-92-1 | Lead | 8.7 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 3.3 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.36 | U | | P |
| 7440-62-2 | Vanadium | 6.6 | | | P |
| 7440-66-6 | Zinc | 32.0 | | | P |
| 7440-61-1 | Uranium | 1.0 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.20
Level (low/med): LOW Date Received: 12/17/99
% Solids: 81.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.32 | U | N | P |
| 7440-38-2 | Arsenic | 2.3 | | | P |
| 7440-39-3 | Barium | 90.6 | | | P |
| 7440-41-7 | Beryllium | 0.59 | B | | P |
| 7440-43-9 | Cadmium | 1.1 | | | P |
| 7440-48-4 | Cobalt | 3.1 | | | P |
| 7440-50-8 | Copper | 9.8 | | | P |
| 7439-92-1 | Lead | 11.5 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 6.0 | | | P |
| 7782-49-2 | Selenium | 0.39 | U | | P |
| 7440-22-4 | Silver | 0.14 | U | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-62-2 | Vanadium | 8.9 | | | P |
| 7440-66-6 | Zinc | 28.0 | | | P |
| 7440-61-1 | Uranium | 1.2 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.21
Level (low/med): LOW Date Received: 12/17/99
% Solids: 91.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 3.0 | | | P |
| 7440-39-3 | Barium | 128 | | | P |
| 7440-41-7 | Beryllium | 0.84 | | | P |
| 7440-43-9 | Cadmium | 0.15 | B | | P |
| 7440-48-4 | Cobalt | 5.0 | | | P |
| 7440-50-8 | Copper | 8.3 | | | P |
| 7439-92-1 | Lead | 14.1 | | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 8.0 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.57 | B | | P |
| 7440-62-2 | Vanadium | 15.9 | | | P |
| 7440-66-6 | Zinc | 152 | | | P |
| 7440-61-1 | Uranium | 1.3 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.22
Level (low/med): LOW Date Received: 12/17/99
% Solids: 81.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.33 | U | N | P |
| 7440-38-2 | Arsenic | 1.7 | | | P |
| 7440-39-3 | Barium | 58.0 | | | P |
| 7440-41-7 | Beryllium | 0.39 | B | | P |
| 7440-43-9 | Cadmium | 0.04 | U | | P |
| 7440-48-4 | Cobalt | 2.8 | B | | P |
| 7440-50-8 | Copper | 3.4 | B | | P |
| 7439-92-1 | Lead | 7.9 | | | P |
| 7439-97-6 | Mercury | 0.02 | B | | AV |
| 7440-02-0 | Nickel | 4.0 | | | P |
| 7782-49-2 | Selenium | 0.41 | U | | P |
| 7440-22-4 | Silver | 0.15 | U | | P |
| 7440-28-0 | Thallium | 0.42 | U | | P |
| 7440-62-2 | Vanadium | 8.7 | | | P |
| 7440-66-6 | Zinc | 28.1 | | | P |
| 7440-61-1 | Uranium | 1.2 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

012

CLIENT SAMPLE ID

MC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A

Matrix (soil/water): SOIL Lab Sample ID: 41509.06

Level (low/med): LOW Date Received: 12/17/99

% Solids: 93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 2.8 | | | P |
| 7440-39-3 | Barium | 78.9 | | | P |
| 7440-41-7 | Beryllium | 0.73 | | | P |
| 7440-43-9 | Cadmium | 0.05 | B | | P |
| 7440-48-4 | Cobalt | 3.2 | | | P |
| 7440-50-8 | Copper | 7.1 | | | P |
| 7439-92-1 | Lead | 10.2 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 6.6 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.36 | U | | P |
| 7440-62-2 | Vanadium | 11.7 | | | P |
| 7440-66-6 | Zinc | 37.6 | | | P |
| 7440-61-1 | Uranium | 1.0 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: -

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.07
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.27 | U | N | P |
| 7440-38-2 | Arsenic | 2.0 | | | P |
| 7440-39-3 | Barium | 47.4 | | | P |
| 7440-41-7 | Beryllium | 0.50 | B | | P |
| 7440-43-9 | Cadmium | 0.17 | B | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 3.6 | B | | P |
| 7439-92-1 | Lead | 8.0 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 2.7 | | | P |
| 7782-49-2 | Selenium | 0.33 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.34 | U | | P |
| 7440-62-2 | Vanadium | 4.9 | | | P |
| 7440-66-6 | Zinc | 19.3 | | | P |
| 7440-61-1 | Uranium | 0.98 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.08
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.27 | U | N | P |
| 7440-38-2 | Arsenic | 1.5 | | | P |
| 7440-39-3 | Barium | 39.3 | | | P |
| 7440-41-7 | Beryllium | 0.39 | B | | P |
| 7440-43-9 | Cadmium | 0.61 | | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 2.8 | B | | P |
| 7439-92-1 | Lead | 6.7 | | | P |
| 7439-97-6 | Mercury | 0.00 | | | AV |
| 7440-02-0 | Nickel | 2.5 | | | P |
| 7782-49-2 | Selenium | 0.33 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.34 | U | | P |
| 7440-62-2 | Vanadium | 4.7 | | | P |
| 7440-66-6 | Zinc | 16.8 | | | P |
| 7440-61-1 | Uranium | 0.99 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MC-4

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract:TECHLAW___
Lab Code: SWOK__ Case No.: 41509 SAS No.: _____ SDG No.: 41509A
Matrix (soil/water): SOIL_ Lab Sample ID: 41509.09
Level (low/med): LOW__ Date Received: 12/17/99
% Solids: _96.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 0.28 | U | N | P |
| 7440-38-2 | Arsenic__ | 1.8 | | | P |
| 7440-39-3 | Barium___ | 30.2 | | | P |
| 7440-41-7 | Beryllium | 0.33 | B | | P |
| 7440-43-9 | Cadmium__ | 0.03 | U | | P |
| 7440-48-4 | Cobalt___ | 1.8 | B | | P |
| 7440-50-8 | Copper___ | 3.3 | B | | P |
| 7439-92-1 | Lead____ | 7.8 | | | P |
| 7439-97-6 | Mercury__ | 0.00 | B | | AV |
| 7440-02-0 | Nickel___ | 2.5 | | | P |
| 7782-49-2 | Selenium_ | 0.34 | U | | P |
| 7440-22-4 | Silver___ | 0.12 | U | | P |
| 7440-28-0 | Thallium_ | 0.39 | B | | P |
| 7440-62-2 | Vanadium_ | 9.1 | | | P |
| 7440-66-6 | Zinc____ | 61.0 | | | P |
| 7440-61-1 | Uranium__ | 1.1 | B | N | P |

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MC-5A

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.10
Level (low/med): LOW Date Received: 12/17/99
% Solids: 94.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 1.9 | | | P |
| 7440-39-3 | Barium | 56.2 | | | P |
| 7440-41-7 | Beryllium | 0.48 | B | | P |
| 7440-43-9 | Cadmium | 0.24 | B | | P |
| 7440-48-4 | Cobalt | 2.0 | B | | P |
| 7440-50-8 | Copper | 3.7 | B | | P |
| 7439-92-1 | Lead | 8.1 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 3.0 | | | P |
| 7782-49-2 | Selenium | 0.35 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.36 | U | | P |
| 7440-62-2 | Vanadium | 6.6 | | | P |
| 7440-66-6 | Zinc | 18.0 | | | P |
| 7440-61-1 | Uranium | 1.8 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

017

1

INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

MC-5B

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW

Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A

Matrix (soil/water): SOIL Lab Sample ID: 41509.11

Level (low/med): LOW Date Received: 12/17/99

% Solids: 96.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 1.5 | | | P |
| 7440-39-3 | Barium | 33.8 | | | P |
| 7440-41-7 | Beryllium | 0.39 | B | | P |
| 7440-43-9 | Cadmium | 0.25 | B | | P |
| 7440-48-4 | Cobalt | 1.1 | B | | P |
| 7440-50-8 | Copper | 2.6 | B | | P |
| 7439-92-1 | Lead | 5.3 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 2.1 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | | P |
| 7440-62-2 | Vanadium | 4.1 | | | P |
| 7440-66-6 | Zinc | 16.5 | | | P |
| 7440-61-1 | Uranium | 0.99 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-1

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.12
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.4 | | | P |
| 7440-39-3 | Barium | 83.0 | | | P |
| 7440-41-7 | Beryllium | 0.73 | | | P |
| 7440-43-9 | Cadmium | 0.03 | U | | P |
| 7440-48-4 | Cobalt | 2.7 | | | P |
| 7440-50-8 | Copper | 5.3 | | | P |
| 7439-92-1 | Lead | 9.7 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 4.7 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.12 | U | | P |
| 7440-28-0 | Thallium | 0.35 | U | | P |
| 7440-62-2 | Vanadium | 10.3 | | | P |
| 7440-66-6 | Zinc | 29.8 | | | P |
| 7440-61-1 | Uranium | 1.7 | B | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.13
Level (low/med): LOW Date Received: 12/17/99
% Solids: 92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N | P |
| 7440-38-2 | Arsenic | 1.8 | | | P |
| 7440-39-3 | Barium | 57.8 | | | P |
| 7440-41-7 | Beryllium | 0.66 | | | P |
| 7440-43-9 | Cadmium | 0.41 | | | P |
| 7440-48-4 | Cobalt | 2.0 | B | | P |
| 7440-50-8 | Copper | 4.7 | B | | P |
| 7439-92-1 | Lead | 10.5 | | | P |
| 7439-97-6 | Mercury | 0.00 | B | | AV |
| 7440-02-0 | Nickel | 4.6 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.37 | U | | P |
| 7440-62-2 | Vanadium | 5.5 | | | P |
| 7440-66-6 | Zinc | 21.3 | | | P |
| 7440-61-1 | Uranium | 1.0 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.14
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.27 | U | N | P |
| 7440-38-2 | Arsenic | 1.6 | | | P |
| 7440-39-3 | Barium | 47.3 | | | P |
| 7440-41-7 | Beryllium | 0.48 | B | | P |
| 7440-43-9 | Cadmium | 0.07 | B | | P |
| 7440-48-4 | Cobalt | 1.5 | B | | P |
| 7440-50-8 | Copper | 6.4 | | | P |
| 7439-92-1 | Lead | 16.0 | | | P |
| 7439-97-6 | Mercury | 0.00 | | | AV |
| 7440-02-0 | Nickel | 3.0 | | | P |
| 7782-49-2 | Selenium | 0.33 | U | | P |
| 7440-22-4 | Silver | 0.21 | B | | P |
| 7440-28-0 | Thallium | 0.34 | U | | P |
| 7440-62-2 | Vanadium | 5.2 | | | P |
| 7440-66-6 | Zinc | 28.8 | | | P |
| 7440-61-1 | Uranium | 0.99 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.15
Level (low/med): LOW Date Received: 12/17/99
% Solids: 94.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 1.8 | | | P |
| 7440-39-3 | Barium | 54.2 | | | P |
| 7440-41-7 | Beryllium | 0.55 | | | P |
| 7440-43-9 | Cadmium | 0.08 | B | | P |
| 7440-48-4 | Cobalt | 2.6 | | | P |
| 7440-50-8 | Copper | 6.1 | | | P |
| 7439-92-1 | Lead | 19.9 | | | P |
| 7439-97-6 | Mercury | 0.00 | | | AV |
| 7440-02-0 | Nickel | 3.8 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.43 | B | | P |
| 7440-28-0 | Thallium | 0.35 | U | | P |
| 7440-62-2 | Vanadium | 6.2 | | | P |
| 7440-66-6 | Zinc | 34.5 | | | P |
| 7440-61-1 | Uranium | 0.99 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-5

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.16
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.4 | | | P |
| 7440-39-3 | Barium | 65.8 | | | P |
| 7440-41-7 | Beryllium | 0.73 | | | P |
| 7440-43-9 | Cadmium | 0.11 | B | | P |
| 7440-48-4 | Cobalt | 2.3 | B | | P |
| 7440-50-8 | Copper | 8.9 | | | P |
| 7439-92-1 | Lead | 17.4 | | | P |
| 7439-97-6 | Mercury | 0.00 | | | AV |
| 7440-02-0 | Nickel | 5.2 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.42 | B | | P |
| 7440-28-0 | Thallium | 0.35 | U | | P |
| 7440-62-2 | Vanadium | 9.7 | | | P |
| 7440-66-6 | Zinc | 45.6 | | | P |
| 7440-61-1 | Uranium | 1.00 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

1
INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

SC-6

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509A
Matrix (soil/water): SOIL Lab Sample ID: 41509.17
Level (low/med): LOW Date Received: 12/17/99
% Solids: 96.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.28 | U | N | P |
| 7440-38-2 | Arsenic | 2.5 | | | P |
| 7440-39-3 | Barium | 65.2 | | | P |
| 7440-41-7 | Beryllium | 0.67 | | | P |
| 7440-43-9 | Cadmium | 0.06 | B | | P |
| 7440-48-4 | Cobalt | 2.4 | B | | P |
| 7440-50-8 | Copper | 7.6 | | | P |
| 7439-92-1 | Lead | 17.5 | | | P |
| 7439-97-6 | Mercury | 0.00 | | | AV |
| 7440-02-0 | Nickel | 4.8 | | | P |
| 7782-49-2 | Selenium | 0.34 | U | | P |
| 7440-22-4 | Silver | 0.33 | B | | P |
| 7440-28-0 | Thallium | 0.35 | U | | P |
| 7440-62-2 | Vanadium | 10.6 | | | P |
| 7440-66-6 | Zinc | 55.0 | | | P |
| 7440-61-1 | Uranium | 1.00 | U | N | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

TM

## *SDG NARRATIVE*

**CONTRACT: TECHLAW**
**CASE: 41509B**
**SDG: 41509**

**DATE: January 17, 2000**
**SOW NO.: SW846**
**EPISODE NO.: 41509**

**INORGANIC METAL FRACTION:**

Nine soil samples plus one MS/MSD was submitted for ICP and Hg analysis. No major problems occurred during the digestion or analyses of these samples. Please see the DC-1 (Sample Log-In Sheet) for sample conditions and cooler temperatures at receipt. The sample's analysis was completed according to the following:

| SWL SOP # | Method SOP is based |
|---|---|
| SWL-IN-205 | SW846 3010A, 3050A, & 6010B |
| SWL-IN-207 | SW846 7470A & 7471A |

**Initial and Continuing Calibration Checks**: No problems.

**Initial and Continuing Calibration Blanks:** The following elements showed low level concentrations below the Contract Required Detection Limit in the Calibration Blanks: Co, Sb, & U. No action required.

**Linearity near the CRDL (CRA & CRI):** The CRI standard was outside of our in-house warning limits of 70 - 130%R for the following elements: Sb, Ba, Be, & Ag. No action required.

**Preparation Blanks**: The following elements showed low level concentrations below the Contract Required Detection Limit in the Preparation Blank: Cd, Cu, & Co. No action required.

**Lab Control Spikes:** No problems.

**Matrix Spike (and MSD):** The following elements were outside the control limits of 75-125% recovery: Sb. All associated samples were flagged with a "N" on Form I's. No action required.

**Duplicates (LCSD and MSD):** The following element was outside the control limits of 0-20% RPD: LCSSD- no problem; MSD- Sb. All associated samples were flagged with a "*" on Form I's. No action required.

**Serial Dilution (ICP):** The serial dilution was outside the control limits of 10% for the following elements: Zn. All associated samples were flagged with an "E" on Form I's. No action required.

**SW846 MDLs:** The IDL column on the Form 10s contain our MDLs rather than IDLs and the CRDL column on the Form 10s contain our PQLS rather than CRDLs. MDLs are done on an annual basis (SWOK SOP states between November and February) instead of requiring the quarterly change needed for IDLs.

Sincerely,

Deborah J. Inman
Inorganic Program Manager

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-2

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.21
Level (low/med): LOW Date Received: 12/17/99
% Solids: 91.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.29 | U | N* | P |
| 7440-38-2 | Arsenic | 3.0 | | | P |
| 7440-39-3 | Barium | 128 | | | P |
| 7440-41-7 | Beryllium | 0.84 | | | P |
| 7440-43-9 | Cadmium | 0.15 | B | | P |
| 7440-48-4 | Cobalt | 5.0 | | | P |
| 7440-50-8 | Copper | 8.3 | | | P |
| 7439-92-1 | Lead | 14.1 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 8.0 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.57 | B | | P |
| 7440-62-2 | Vanadium | 15.9 | | | P |
| 7440-66-6 | Zinc | 152 | | E | P |
| 7440-61-1 | Uranium | 1.3 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-3

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.22
Level (low/med): LOW Date Received: 12/17/99
% Solids: 81.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.33 | U | N* | P |
| 7440-38-2 | Arsenic | 1.7 | | | P |
| 7440-39-3 | Barium | 58.0 | | | P |
| 7440-41-7 | Beryllium | 0.39 | B | | P |
| 7440-43-9 | Cadmium | 0.04 | U | | P |
| 7440-48-4 | Cobalt | 2.8 | B | | P |
| 7440-50-8 | Copper | 3.4 | B | | P |
| 7439-92-1 | Lead | 7.9 | B | | P |
| 7439-97-6 | Mercury | 0.02 | B | | AV |
| 7440-02-0 | Nickel | 4.0 | B | | P |
| 7782-49-2 | Selenium | 0.41 | U | | P |
| 7440-22-4 | Silver | 0.15 | U | | P |
| 7440-28-0 | Thallium | 0.42 | U | | P |
| 7440-62-2 | Vanadium | 8.7 | | | P |
| 7440-66-6 | Zinc | 28.1 | | E | P |
| 7440-61-1 | Uranium | 1.2 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-4

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.23
Level (low/med): LOW Date Received: 12/17/99
% Solids: 84.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.32 | U | N* | P |
| 7440-38-2 | Arsenic | 2.4 | | | P |
| 7440-39-3 | Barium | 102 | | | P |
| 7440-41-7 | Beryllium | 0.67 | | | P |
| 7440-43-9 | Cadmium | 0.04 | U | | P |
| 7440-48-4 | Cobalt | 4.6 | | | P |
| 7440-50-8 | Copper | 5.1 | B | | P |
| 7439-92-1 | Lead | 9.5 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 5.8 | | | P |
| 7782-49-2 | Selenium | 0.39 | U | | P |
| 7440-22-4 | Silver | 0.14 | U | | P |
| 7440-28-0 | Thallium | 0.59 | B | | P |
| 7440-62-2 | Vanadium | 13.8 | | | P |
| 7440-66-6 | Zinc | 28.9 | | E | P |
| 7440-61-1 | Uranium | 1.4 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-5A

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.26
Level (low/med): LOW Date Received: 12/17/99
% Solids: 90.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.30 | U | N* | P |
| 7440-38-2 | Arsenic | 2.3 | | | P |
| 7440-39-3 | Barium | 116 | | | P |
| 7440-41-7 | Beryllium | 0.68 | | | P |
| 7440-43-9 | Cadmium | 0.05 | B | | P |
| 7440-48-4 | Cobalt | 4.3 | | | P |
| 7440-50-8 | Copper | 5.7 | | | P |
| 7439-92-1 | Lead | 15.3 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 9.3 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.62 | B | | P |
| 7440-62-2 | Vanadium | 12.2 | | | P |
| 7440-66-6 | Zinc | 35.8 | | E | P |
| 7440-61-1 | Uranium | 2.3 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-5B

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.27
Level (low/med): LOW Date Received: 12/17/99
% Solids: 80.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.33 | U | N* | P |
| 7440-38-2 | Arsenic | 2.8 | | | P |
| 7440-39-3 | Barium | 120 | | | P |
| 7440-41-7 | Beryllium | 0.81 | | | P |
| 7440-43-9 | Cadmium | 0.05 | B | | P |
| 7440-48-4 | Cobalt | 4.9 | | | P |
| 7440-50-8 | Copper | 7.5 | | | P |
| 7439-92-1 | Lead | 27.0 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 7.7 | | | P |
| 7782-49-2 | Selenium | 0.41 | U | | P |
| 7440-22-4 | Silver | 0.15 | U | | P |
| 7440-28-0 | Thallium | 0.68 | B | | P |
| 7440-62-2 | Vanadium | 20.0 | | | P |
| 7440-66-6 | Zinc | 46.0 | | E | P |
| 7440-61-1 | Uranium | 1.7 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-6

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: TECHLAW___
Lab Code: SWOK__ Case No.: 41509 SAS No.: _____ SDG No.: 41509B
Matrix (soil/water): SOIL_ Lab Sample ID: 41509.28
Level (low/med): LOW__ Date Received: 12/17/99
% Solids: _78.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony_ | 0.34 | U | N* | P |
| 7440-38-2 | Arsenic__ | 2.8 | | | P |
| 7440-39-3 | Barium___ | 115 | | | P |
| 7440-41-7 | Beryllium | 0.70 | | | P |
| 7440-43-9 | Cadmium__ | 0.12 | B | | P |
| 7440-48-4 | Cobalt___ | 4.4 | | | P |
| 7440-50-8 | Copper___ | 6.3 | B | | P |
| 7439-92-1 | Lead____ | 11.0 | B | | P |
| 7439-97-6 | Mercury__ | 0.03 | B | | AV |
| 7440-02-0 | Nickel___ | 6.8 | | | P |
| 7782-49-2 | Selenium_ | 0.42 | U | | P |
| 7440-22-4 | Silver___ | 0.23 | B | | P |
| 7440-28-0 | Thallium_ | 0.43 | U | | P |
| 7440-62-2 | Vanadium_ | 10.7 | | | P |
| 7440-66-6 | Zinc____ | 25.1 | | E | P |
| 7440-61-1 | Uranium__ | 1.2 | B | | P |

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM
Color After: YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

1

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-7

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.29
Level (low/med): LOW Date Received: 12/17/99
% Solids: 84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.32 | U | N* | P |
| 7440-38-2 | Arsenic | 2.6 | | | P |
| 7440-39-3 | Barium | 102 | | | P |
| 7440-41-7 | Beryllium | 0.70 | | | P |
| 7440-43-9 | Cadmium | 0.04 | U | | P |
| 7440-48-4 | Cobalt | 4.0 | | | P |
| 7440-50-8 | Copper | 6.0 | | | P |
| 7439-92-1 | Lead | 9.7 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 7.5 | | | P |
| 7782-49-2 | Selenium | 0.39 | U | | P |
| 7440-22-4 | Silver | 0.14 | U | | P |
| 7440-28-0 | Thallium | 0.40 | U | | P |
| 7440-62-2 | Vanadium | 13.2 | | | P |
| 7440-66-6 | Zinc | 33.1 | | E | P |
| 7440-61-1 | Uranium | 2.2 | B | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-8

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.30
Level (low/med): LOW Date Received: 12/17/99
% Solids: 76.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.35 | U | N* | P |
| 7440-38-2 | Arsenic | 2.5 | | | P |
| 7440-39-3 | Barium | 107 | | | P |
| 7440-41-7 | Beryllium | 0.67 | | | P |
| 7440-43-9 | Cadmium | 0.63 | | | P |
| 7440-48-4 | Cobalt | 4.1 | | | P |
| 7440-50-8 | Copper | 5.5 | B | | P |
| 7439-92-1 | Lead | 10.4 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 6.5 | | | P |
| 7782-49-2 | Selenium | 0.43 | U | | P |
| 7440-22-4 | Silver | 0.16 | U | | P |
| 7440-28-0 | Thallium | 0.44 | U | | P |
| 7440-62-2 | Vanadium | 10.2 | | | P |
| 7440-66-6 | Zinc | 21.7 | | E | P |
| 7440-61-1 | Uranium | 1.2 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSES DATA SHEET

CLIENT SAMPLE ID

CC-9

Lab Name: SOUTHWEST_LAB_OF_OK Contract: TECHLAW
Lab Code: SWOK Case No.: 41509 SAS No.: SDG No.: 41509B
Matrix (soil/water): SOIL Lab Sample ID: 41509.31
Level (low/med): LOW Date Received: 12/17/99
% Solids: 91.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7440-36-0 | Antimony | 0.30 | U | N* | P |
| 7440-38-2 | Arsenic | 2.8 | | | P |
| 7440-39-3 | Barium | 126 | | | P |
| 7440-41-7 | Beryllium | 0.76 | | | P |
| 7440-43-9 | Cadmium | 0.98 | | | P |
| 7440-48-4 | Cobalt | 4.5 | | | P |
| 7440-50-8 | Copper | 7.3 | | | P |
| 7439-92-1 | Lead | 14.4 | B | | P |
| 7439-97-6 | Mercury | 0.03 | B | | AV |
| 7440-02-0 | Nickel | 7.1 | | | P |
| 7782-49-2 | Selenium | 0.36 | U | | P |
| 7440-22-4 | Silver | 0.13 | U | | P |
| 7440-28-0 | Thallium | 0.37 | U | | P |
| 7440-62-2 | Vanadium | 12.1 | | | P |
| 7440-66-6 | Zinc | 144 | | E | P |
| 7440-61-1 | Uranium | 1.1 | U | | P |

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

# General Chemistry Data

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

# SDG NARRATIVE

**CLIENT: TECHLAW** | **DATE: January 14, 2000**
**PROJECT: LA PHASE 2** | **EPISODE NO.: 41536**

## INORGANIC FRACTION:

Two water samples, plus one matrix spike and one matrix spike duplicate, were submitted for the following classical inorganic analysis: IC(F,Cl,SO4), Total Alkalinity. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-301 | EPA 300.0 | IC(F,Cl,SO4) |
| SWL-IN-500 | EPA 310.1 | Total Alkalinity |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

## QC SUMMARY

Initial and Continuing Calibration Check: No problems.
Blanks: All blanks were below the reporting limit.
Lab Control Spikes: No problems.
Matrix Spikes & MSD: No problems.
Duplicates (LCS & MSD): No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41536.03

REPORTED : 01/13/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41536.03
SAMPLE #: SM-30 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/17/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 40.0 | 12/29/99 08:45 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/29/99 08:45 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 22.4 | 12/26/99 16:41 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/26/99 16:41 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 5.6 | 12/26/99 16:41 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41336.04

REPORTED : 01/13/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41336.04 MS1
SAMPLE #: SM-30 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/17/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 144 | 12/29/99 08:45 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/29/99 08:45 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 32.8 | 12/26/99 16:57 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 9.7 | 12/26/99 16:57 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 15.9 | 12/26/99 16:57 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41536.05

REPORTED : 01/13/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41536.05 SD1
SAMPLE #: SM-30 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/17/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 140 | 12/29/99 08:45 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/29/99 08:45 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 33.5 | 12/26/99 17:14 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 10.4 | 12/26/99 17:14 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 16.3 | 12/26/99 17:14 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41536.06

REPORTED : 01/13/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41536.06
SAMPLE #: SD-30
LOCATION:
MATRIX : Water

SAMPLED : 12/17/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 54.0 | 12/29/99 08:45 | JCL | SM 2320B |
| ARBONATE | 20.0 | mg/l | ND | 12/29/99 08:45 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 22.2 | 12/26/99 17:31 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/26/99 17:31 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 5.6 | 12/26/99 17:31 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

# SDG NARRATIVE

**CLIENT: TECHLAW**
**PROJECT: LA PHASE 2**

**DATE: January 14, 2000**
**EPISODE NO.: 41450**

## INORGANIC FRACTION:

Five water samples, plus one matrix spike and one matrix spike duplicate, were submitted for the following classical inorganic analysis: IC(F,Cl,SO4), Nitrate-Nitrite, Total Phosphorous, Ammonia Nitrogen (NH3-N), Total Alkalinity, TKN. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-301 | EPA 300.0 | IC(F,Cl,SO4) |
| SWL-IN-304 | EPA 353.2 | Nitrate-Nitrite |
| SWL-IN-305 | EPA 365.1 | Total Phosphorous |
| SWL-IN-400 | EPA 350.3 | Ammonia Nitrogen (NH3-N) |
| SWL-IN-500 | EPA 310.1 | Total Alkalinity |
| SWL-IN-503 | EPA 351.3 | TKN |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

## QC SUMMARY

Initial and Continuing Calibration Check: No problems.
Blanks: All blanks were below the reporting limit.
Lab Control Spikes: No problems.
Matrix Spikes & MSD: The following were outside the control limits: Nitrate-Nitrite // No further action was taken since sample concentration was greater than four times the spike added.
Duplicates (LCS & MSD): No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41450.05

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41450.05
SAMPLE #: MCO-FB
LOCATION:
MATRIX : Water

SAMPLED : 12/09/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | ND | 12/15/99 00:20 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/15/99 00:20 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | ND | 12/15/99 00:20 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41450.07

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41450.07
SAMPLE #: GS-1
LOCATION:
MATRIX : Water

SAMPLED : 12/09/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | 1.1 | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 100 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 3.1 | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 1.1 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.32 | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 33.1 | 12/15/99 00:37 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.61 | 12/15/99 00:37 | SS | EPA 300.0/SW 9056 |
| SULFATE | 2.0 | mg/l | 161 | 12/15/99 23:22 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41450.09

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41450.09
SAMPLE #: TA-18
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| MMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| CARBONATE | 20.0 | mg/l | 46.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 16.0 | 12/15/99 00:53 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.10 | 12/15/99 00:53 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 7.1 | 12/15/99 00:53 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41450.10

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41450.10 MS1
SAMPLE #: TA-18
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | 4.0 | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 138 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 20.4 | 12/15/99 | TGG | EPA 351.3 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.54 | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 26.8 | 12/15/99 01:44 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 10.1 | 12/15/99 01:44 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 17.4 | 12/15/99 01:44 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41450.11

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41450.11 SD1
SAMPLE #: TA-18
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | 4.2 | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 136 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 19.9 | 12/15/99 | TGG | EPA 351.3 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.94 | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 27.2 | 12/15/99 02:01 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 10.2 | 12/15/99 02:01 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 17.6 | 12/15/99 02:01 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

## *SDG NARRATIVE*

**CLIENT: TECHLAW**
**PROJECT: LA PHASE 2**

**DATE: 01/08/2000**
**EPISODE NO.: 41488**

## INORGANIC FRACTION:

Three water samples were submitted for the following classical inorganic analysis: IC(F,Cl,SO4), Nitrate-Nitrate, Total Phosphorous, Ammonia Nitrogen (NH3-N), Total Alkalinity, Bicarbonate, Carbonate , and TKN. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-301 | EPA 300.0 | IC(F,Cl,SO4) |
| SWL-IN-304 | EPA 353.2 | Nitrate-Nitrate |
| SWL-IN-305 | EPA 365.1 | Total Phosphorous |
| SWL-IN-400 | EPA 350.3 | Ammonia Nitrogen (NH3-N) |
| SWL-IN-500 | EPA 310.1 | Total Alkalinity, Bicarbonate, Carbonate |
| SWL-IN-503 | EPA 351.3 | TKN |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

**Initial and Continuing Calibration Check**: No problems.

**Blanks:** All blanks were below the reporting limit.

**Lab Control Spikes:** No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41488.01

REPORTED : 01/06/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41488.01
SAMPLE #: BULLDOG
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/16/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 01/04/00 09:40 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 82.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 2.5 | 12/30/99 17:00 | JCL | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 0.20 | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 19.5 | 12/17/99 01:16 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.29 | 12/17/99 01:16 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 13.5 | 12/17/99 01:16 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41488.03

REPORTED : 01/06/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41488.03
SAMPLE #: PA-8.9
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/16/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 01/04/00 09:40 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 46.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 4.8 | 12/30/99 17:00 | JCL | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.10 | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 7.2 | 12/17/99 01:32 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/17/99 01:32 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 4.9 | 12/17/99 01:32 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41488.05

REPORTED : 01/06/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41488.05
SAMPLE #: BU-0.01
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/16/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 01/04/00 09:40 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 74.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | 1.7 | 12/30/99 17:00 | JCL | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 0.18 | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 20.8 | 12/17/99 02:23 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.22 | 12/17/99 02:23 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 13.0 | 12/17/99 02:23 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

## *SDG NARRATIVE*

**CLIENT: TECHLAW**
**PROJECT: LA PHASE 2**

**DATE: 1/04/2000**
**EPISODE NO.: 41451**

### INORGANIC FRACTION:

Five water samples were submitted for the following classical inorganic analysis: IC(F,Cl,SO4), Nitrate-Nitrate, Total Phosphorous, Ammonia Nitrogen (NH3-N), Total Alkalinity, TKN, Ammonia. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-301 | EPA 300.0 | IC(F,Cl,SO4) |
| SWL-IN-304 | EPA 353.2 | Nitrate-Nitrate |
| SWL-IN-305 | EPA 365.1 | Total Phosphorous |
| SWL-IN-400 | EPA 350.3 | Ammonia Nitrogen (NH3-N) |
| SWL-IN-500 | EPA 310.1 | Total Alkalinity |
| SWL-IN-503 | EPA 351.3 | TKN |
| SWL-IN-504 | EPA 350.2 | Ammonia |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are he following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

**Initial and Continuing Calibration Check**: No problems.

**Blanks:** All blanks were below the reporting limit.

**Lab Control Spikes:** No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41451.01

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41451.01
SAMPLE #: PA-6.7
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 52.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 13.2 | 12/15/99 02:18 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.13 | 12/15/99 02:18 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 7.9 | 12/15/99 02:18 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41451.03

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41451.03
SAMPLE #: FB-6.7
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | ND | 12/15/99 02:34 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/15/99 02:34 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | ND | 12/15/99 02:34 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41451.05

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41451.05
SAMPLE #: HOMESTEAD
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 36.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 3.6 | 12/15/99 02:51 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/15/99 02:51 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 2.7 | 12/15/99 02:51 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41451.07

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41451.07
SAMPLE #: STARMER
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| MMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| ICARBONATE | 20.0 | mg/l | 42.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 1.1 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 7.4 | 12/15/99 03:08 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | ND | 12/15/99 03:08 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 5.1 | 12/15/99 03:08 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41451.09

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41451.09
SAMPLE #: KIELING
LOCATION:
MATRIX : Water

SAMPLED : 12/10/99
SUBMITTED: 12/14/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/27/99 14:00 | KAL | EPA 350.3 |
| BICARBONATE | 20.0 | mg/l | 82.0 | 12/27/99 10:30 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/27/99 10:30 | JCL | SM 2320B |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 0.59 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |
| INORGANIC CHLORIDE | 0.20 | mg/l | 22.7 | 12/15/99 03:25 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.16 | 12/15/99 03:25 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 12.3 | 12/15/99 03:25 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

## *SDG NARRATIVE*

**CLIENT: TECHLAW**
**PROJECT: LA PHASE 2**

**DATE: 01/13/2000**
**EPISODE NO.:41535**

## INORGANIC FRACTION:

Two water samples were submitted for the following classical inorganic analysis: Nitrate-Nitrate, Total Phosphorous, Ammonia Nitrogen (NH3-N) and TKN. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-304 | EPA 353.2 | Nitrate-Nitrate |
| SWL-IN-305 | EPA 365.1 | Total Phosphorous |
| SWL-IN-400 | EPA 350.3 | Ammonia Nitrogen (NH3-N) |
| SWL-IN-503 | EPA 351.3 | TKN |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

**Initial and Continuing Calibration Check**: No problems.

**Blanks:** All blanks were below the reporting limit.

**Lab Control Spikes:** No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

# SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany Broken Arrow, Oklahoma 74012 Office (918) 251-2858 Fax (918) 251-2599


TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41535.01

REPORTED : 01/20/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41535.01
SAMPLE #: PM-1
LOCATION:
MATRIX : Water

SAMPLED : 12/13/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | RESULTS** | | UNITS | DATE PREPARED | DATE ANALYZED | REFERENCE METHOD |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | U | mg/L | | 01/07/00 | EPA 350.3 |
| NITROGEN (TKN) | 6.4 | | mg/l | | 12/30/99 | EPA 351.3 |
| NITRATE-NITRITE | 0.45 | | mg/l | | 01/09/00 | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | U | mg/l | 12/21/99 | 12/29/99 | EPA 365.2 |

# SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany Broken Arrow, Oklahoma 74012 Office (918) 251-2858 Fax (918) 251-2599


TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41535.02

REPORTED : 01/20/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41535.02
SAMPLE #: 0-4
LOCATION:
MATRIX : Water

SAMPLED : 12/13/99
SUBMITTED: 12/18/99

MISCELLANEOUS

| PARAMETER | RESULTS** | | UNITS | DATE PREPARED | DATE ANALYZED | REFERENCE METHOD |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | U | mg/L | | 01/07/00 | EPA 350.3 |
| NITROGEN (TKN) | 7.0 | | mg/l | | 12/30/99 | EPA 351.3 |
| NITRATE-NITRITE | 0.35 | | mg/l | | 01/09/00 | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | U | mg/l | 12/21/99 | 12/29/99 | EPA 365.2 |

# SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599


## *SDG NARRATIVE*

**CLIENT: TECHLAW** **DATE: 12/29/99**
**PROJECT: LA PHASE 2** **EPISODE NO.: 41405**

## INORGANIC FRACTION:

Seven water samples, plus one matrix spike and one matrix spike duplicate were submitted for IC (F, Cl, SO4), Total Alkalinity, Bicarbonate, and Carbonate analysis. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-301 | EPA 300.0 | IC (F, Cl, SO4) |
| SWL-IN-500 | EPA 310.1/SM2320/B | Total Alkalinity, Bicarbonate, Carbonate |

Refer to Sample Receipt Notification for details of sample conditions at receipt. An explanation of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

**Initial and Continuing Calibration Check**: No problems.

**Initial and Continuing Calibration Blanks:** All blanks were below the reporting limit.

**CRI (Low Standard):** No problems.

**Blanks**: All blanks were below the reporting limit.

**Lab Control Spikes:** No problems.
**Matrix Spikes:** No problems.

Sincerely,

Susan S. Turner for...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.01

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.01
SAMPLE #: MT-4 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 180 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 21.8 | 12/14/99 00:41 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 1.1 | 12/14/99 00:41 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 23.3 | 12/14/99 00:41 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.02

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.02
SAMPLE #: MCC-1 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 98.0 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 12.8 | 12/14/99 00:58 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.53 | 12/14/99 00:58 | SS | EPA 300.0/SW 9056 |
| SULFATE | 2.0 | mg/l | 167 | 12/15/99 03:42 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.03

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.03
SAMPLE #: MCO-2 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 160 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 6.0 | 12/14/99 01:15 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.82 | 12/14/99 01:15 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 1.5 | 12/14/99 01:15 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.04

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.04
SAMPLE #: MCO-3 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 98.0 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 12.9 | 12/14/99 01:32 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 0.53 | 12/14/99 01:32 | SS | EPA 300.0/SW 9056 |
| SULFATE | 2.0 | mg/l | 173 | 12/15/99 03:59 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY.10168

REPORT : 41405.05

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.05
SAMPLE #: MCO-5 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 172 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 12.5 | 12/14/99 02:22 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 1.2 | 12/14/99 02:22 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 34.0 | 12/14/99 02:22 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.06

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.06 MS1
SAMPLE #: MCO-5 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 172 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 22.9 | 12/14/99 02:39 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 11.0 | 12/14/99 02:39 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 44.8 | 12/14/99 02:39 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.07

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.07 SD1
SAMPLE #: MCO-5 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 272 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 23.2 | 12/14/99 02:56 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 11.3 | 12/14/99 02:56 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 44.8 | 12/14/99 02:56 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.08

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.08
SAMPLE #: MCO-6 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 182 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 13.1 | 12/14/99 03:13 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 1.3 | 12/14/99 03:13 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 31.0 | 12/14/99 03:13 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41405.09

REPORTED : 12/29/99

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41405.09
SAMPLE #: MCO-7 DISS
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| BICARBONATE | 20.0 | mg/l | 194 | 12/17/99 13:00 | JCL | SM 2320B |
| CARBONATE | 20.0 | mg/l | ND | 12/17/99 13:00 | JCL | SM 2320B |
| INORGANIC CHLORIDE | 0.20 | mg/l | 21.0 | 12/14/99 03:29 | SS | EPA 300.0/SW 9056 |
| FLUORIDE | 0.10 | mg/l | 1.3 | 12/14/99 03:29 | SS | EPA 300.0/SW 9056 |
| SULFATE | 0.20 | mg/l | 28.9 | 12/14/99 03:29 | SS | EPA 300.0/SW 9056 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

**SOUTHWEST LABORATORY OF OKLAHOMA, INC.**
1700 West Albany / Broken Arrow, Oklahoma 74012 / Office (918) 251-2858 / Fax (918) 251-2599

# SDG NARRATIVE

**CLIENT: TECHLAW**
**PROJECT: LA PHASE 2**

**DATE: January 14, 2000**
**EPISODE NO.: 41407**

## INORGANIC FRACTION:

Seven water samples, plus one matrix spike and one matrix spike duplicate, were submitted for the following classical inorganic analysis: Nitrate-Nitrite, Total Phosphorous, Ammonia Nitrogen (NH3-N), and TKN. The sample's analyses were completed according to the following:

| SWL SOP # | Method SOP is based | Parameter |
|---|---|---|
| SWL-IN-304 | EPA 353.2 | Nitrate-Nitrite |
| SWL-IN-305 | EPA 365.1 | Total Phosphorous |
| SWL-IN-400 | EPA 350.3 | Ammonia Nitrogen (NH3-N) |
| SWL-IN-503 | EPA 351.3 | TKN |

Refer to Sample Receipt Notification for details of sample conditions at receipt. Explanations of the forms are the following:

Form 1 (Sample results) - will be provided by our Reporting Department.
Form 3 (Blanks) - This information is included on the QC spreadsheet.
Form 7 (Laboratory Control Sample) - Provided by the LCS/LCSD Quality Control Data Sheets.

## QC SUMMARY

Initial and Continuing Calibration Check: No problems.
Blanks: All blanks were below the reporting limit.
Lab Control Spikes: No problems.
Matrix Spikes & MSD: The following were outside the control limits: Nitrate-Nitrite // No action required.
Duplicates (LCS & MSD): No problems.

Sincerely,

Susan S. Turner for ...
Deborah J. Inman
Inorganic Program Manager

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.01

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.01
SAMPLE #: MT-4
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 1.0 | mg/l | 12.6 | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
N/A = NOT APPLICABLE

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.02

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.02
SAMPLE #: MCO-1
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 1.5 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.11 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.03

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.03
SAMPLE #: MCO-2
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | ND | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.48 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.04

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.04
SAMPLE #: MCO-3
LOCATION:
MATRIX : Water

SAMPLED : 12/07/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 0.72 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.11 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.05

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.05
SAMPLE #: MCO-5
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| MMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| ITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | ND | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.06

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.06 MS1
SAMPLE #: MCO-5
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | 3.9 | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | 19.6 | 12/15/99 | TGG | EPA 351.3 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.92 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.07

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.07 SD1
SAMPLE #: MCO-5
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | 4.1 | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | 19.0 | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 1.0 | mg/l | 14.5 | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.89 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.08

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.08
SAMPLE #: MCO-6
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 1.0 | mg/l | 11.4 | 12/17/99 15:00 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.25 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

TECHLAW, INC.
122 E 42ND STREET SUITE 2200
NEW YORK, NY 10168

REPORT : 41407.09

REPORTED : 01/04/00

Attn: Julie Shanahan

PROJECT : LA PHASE 2
LAB# : 41407.09
SAMPLE #: MCO-7
LOCATION:
MATRIX : Water

SAMPLED : 12/08/99
SUBMITTED: 12/10/99

MISCELLANEOUS

| PARAMETER | REPORTING LIMIT | UNITS | RESULTS | DATE/TIME ANALYZED | ANALYST | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| AMMONIA (N) | 0.10 | mg/l | ND | 12/20/99 09:30 | KAL | EPA 350.3 |
| NITROGEN (TKN) | 1.0 | mg/l | ND | 12/15/99 | TGG | EPA 351.3 |
| NITRATE-NITRITE | 0.10 | mg/l | 1.8 | 12/16/99 14:56 | DSF | EPA 353.2 |
| TOTAL PHOSPHORUS | 0.10 | mg/l | 0.24 | 12/29/99 10:44 | DSF | EPA 365.2 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS

AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

11950 Industriplex Blvd. • Baton Rouge, LA 70809 • Office (225) 753-8650 • Fax (225) 751-1405

January 09, 2000

Ms Julie Shanahar
TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

AATSLA: 39360

Dear Ms Shanahar:

Enclosed are the analytical data for the samples received in our Laboratory on December 20, 1999 for the above episode.

| Client Identification | Laboratory Identification | Matrix | Date Collected |
|---|---|---|---|
| SM-30 | 39360.01 | WATER | 12/13/99 |
| SD-30 | 39360.02 | WATER | 12/13/99 |
| PM-1 | 39360.03 | WATER | 12/13/99 |
| PM-2 | 39360.04 | WATER | 12/13/99 |
| PM-5 | 39360.05 | WATER | 12/13/99 |
| 0-4 | 39360.06 | WATER | 12/13/99 |
| SM-30MS | 39360.07 | WATER | 12/13/99 |
| SM-30MSD | 39360.08 | WATER | 12/13/99 |

All samples were analyzed within appropriate holding times for parameters listed on the enclosed Chain of Custody. Quality control criteria were within acceptable limits.

AATS is pleased to have had the opportunity to provide this analytical characterization and is eager to assist you with any future requirements.

Sincerely,

Dean Saia
Project Officer

DS/yk

Enclosure

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** SM-30 **Project ID:**

**AATS ID:** 39360.01 **Report:** 39360.01

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** SD-30 **Project ID:**

**AATS ID:** 39360.02 **Report:** 39360.02

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

ID = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
IA = NOT APPLICABLE
thodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** PM-1 **Project ID:**

**AATS ID:** 39360.03 **Report:** 39360.03

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** PM-2 **Project ID:**

**AATS ID:** 39360.04 **Report:** 39360.04

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

D = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
A = NOT APPLICABLE
hodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** PM-5 **Project ID:**

**AATS ID:** 39360.05 **Report:** 39360.05

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** 0-4 **Project ID:**

**AATS ID:** 39360.06 **Report:** 39360.06

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

D = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
A = NOT APPLICABLE
ıodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** SM-30MS **Project ID:**

**AATS ID:** 39360.07 **Report:** 39360.07

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.5 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** SM-30MSD **Project ID:**

**AATS ID:** 39360.08 **Report:** 39360.08

**Collected:** 12/13/1999 **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/20/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.4 | 12/21/99 | EPA 300 |

= NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
= NOT APPLICABLE
thodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

11950 Industriplex Blvd. • Baton Rouge, LA 70809 • Office (225) 753-8650 • Fax (225) 751-1405

January 09, 2000

Ms Julie Shanahar
TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

AATSLA: 39246

Dear Ms Shanahar:

Enclosed are the analytical data for the samples received in our Laboratory on December 14, 1999 for the above episode.

| Client Identification | Laboratory Identification | Matrix | Date Collected |
|---|---|---|---|
| MLO-1 | 39246.01 | WATER | 12/07/99 |
| MLO-2 | 39246.02 | WATER | 12/07/99 |
| MLO-3 | 39246.03 | WATER | 12/07/99 |
| MLO-5 | 39246.04 | WATER | 12/08/99 |
| MLO-5MS | 39246.05 | WATER | 12/08/99 |
| MLO-5MSD | 39246.06 | WATER | 12/08/99 |
| MLO-6 | 39246.07 | WATER | 12/08/99 |
| MLO-7 | 39246.08 | WATER | N/A |
| MLO-7.7B | 39246.09 | WATER | 12/07/99 |
| MT-4 | 39246.10 | WATER | 12/08/99 |
| TW-8 | 39246.11 | WATER | 12/09/99 |
| MLO-FB | 39246.12 | WATER | 12/09/99 |
| GS-1 | 39246.13 | WATER | 12/10/99 |
| HOMESTEAD | 39246.14 | WATER | 12/10/99 |
| STARMER | 39246.15 | WATER | 12/10/99 |
| BULLDOG | 39246.16 | WATER | 12/10/99 |
| KIALING | 39246.17 | WATER | 12/10/99 |
| BU-0.01 | 39246.18 | WATER | 12/10/99 |
| PA-8.9 | 39246.19 | WATER | 12/10/99 |
| PA-6.7 | 39246.20 | WATER | 12/10/99 |
| TA-18 | 39246.21 | WATER | 12/10/99 |
| TA-18MS | 39246.22 | WATER | 12/10/99 |
| TA-18MSD | 39246.23 | WATER | 12/10/99 |
| FB-6.7 | 39246.24 | WATER | 12/10/99 |

All samples were analyzed within appropriate holding times for parameters listed on the enclosed Chain of Custody. Quality control criteria were within acceptable limits.

AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.
11950 Industriplex Blvd. • Baton Rouge, LA 70809 • Office (225) 753-8650 • Fax (225) 751-1405

Ms Julie Shanahar
TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

AATSLA: 39246

AATS is pleased to have had the opportunity to provide this analytical characterization and is eager to assist you with any future requirements.

Sincerely,

Dean Saia
Project Officer

DS/yk

Enclosure

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** MLO -1 **Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.01 **Report:** 39246.01

**Collected:** **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/14/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 2.5 | mg/L | 3.0 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
ethodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -2 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.02 Report: 39246.02

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -3 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.03 Report: 39246.03

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 2.0 | mg/L | 4.4 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -5 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.04 Report: 39246.04

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.1 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -5MS
Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.05
Report: 39246.05

Collected:
Report Date: 01/09/2000
Page: 1
Received: 12/14/1999
Last Modified:
Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 1.0 | mg/L | 4.4 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -5MSD

Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.06

Report: 39246.06

Collected:

Report Date: 01/09/2000

Page: 1

Received: 12/14/1999

Last Modified:

Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 1.0 | mg/L | 4.6 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -6 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.07 Report: 39246.07

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 1.0 | mg/L | 1.1 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO -7 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.08 Report: 39246.08

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 1.0 | mg/L | 1.8 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLWB-7.7B Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.09 Report: 39246.09

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.7 | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MT-4 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.10 Report: 39246.10

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.4 | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: TW-8 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.11 Report: 39246.11

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: MLO-FB

Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.12

Report: 39246.12

Collected:

Report Date: 01/09/2000

Page: 1

Received: 12/14/1999

Last Modified:

Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** GS-1 **Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.13 **Report:** 39246.13

**Collected:** **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/14/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.5 | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: HOMESTEAD

Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.14

Report: 39246.14

Collected:

Report Date: 01/09/2000

Page: 1

Received: 12/14/1999

Last Modified:

Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 0.6 | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: STARMER
Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.15
Report: 39246.15

Collected:
Received: 12/14/1999
Report Date: 01/09/2000
Last Modified:
Page: 1
Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** BULLDOG
**Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.16
**Report:** 39246.16

**Collected:**
**Received:** 12/14/1999
**Report Date:** 01/09/2000
**Last Modified:**
**Page:** 1
**Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** KIALING **Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.17 **Report:** 39246.17

**Collected:** **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/14/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: BU-0.01 Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.18 Report: 39246.18

Collected: Report Date: 01/09/2000 Page: 1
Received: 12/14/1999 Last Modified: Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ID = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
A = NOT APPLICABLE
ethodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

| | | | |
|---|---|---|---|
| Client Name: | TECHLAW INC. EH & S<br>750 N. SAINT PAUL ST.<br>SUITE 600<br>DALLAS, TX 75201 | | |
| Client ID: | PA-8.9 | Project ID: | LOS ALAMO'S NAT. LAB |
| AATS ID: | 39246.19 | Report: | 39246.19 |
| Collected: | | Report Date: 01/09/2000 | Page: 1 |
| Received: | 12/14/1999 | Last Modified: | Matrix: Water |

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
'ethodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

| | | | |
|---|---|---|---|
| Client Name: | TECHLAW INC. EH & S<br>750 N. SAINT PAUL ST.<br>SUITE 600<br>DALLAS, TX 75201 | | |
| Client ID: | PA-6.7 | Project ID: | LOS ALAMO'S NAT. LAB |
| AATS ID: | 39246.20 | Report: | 39246.20 |
| Collected: | | Report Date: 01/09/2000 | Page: 1 |
| Received: | 12/14/1999 | Last Modified: | Matrix: Water |

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 0.6 | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** TA-18 **Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.21 **Report:** 39246.21

**Collected:** **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/14/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
I = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

Client Name: TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

Client ID: TA-18MS
Project ID: LOS ALAMO'S NAT. LAB

AATS ID: 39246.22
Report: 39246.22

Collected:
Report Date: 01/09/2000
Page: 1
Received: 12/14/1999
Last Modified:
Matrix: Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.9 | 12/21/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

**Client Name:** TECHLAW INC. EH & S
750 N. SAINT PAUL ST.
SUITE 600
DALLAS, TX 75201

**Client ID:** TA-18MSD **Project ID:** LOS ALAMO'S NAT. LAB

**AATS ID:** 39246.23 **Report:** 39246.23

**Collected:** **Report Date:** 01/09/2000 **Page:** 1
**Received:** 12/14/1999 **Last Modified:** **Matrix:** Water

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | 1.9 | 12/21/99 | EPA 300 |

) = NOT DETECTED ABOVE QUANTITATION LIMIT
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
\ = NOT APPLICABLE
odology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# AMERICAN ANALYTICAL & TECHNICAL SERVICES

11950 Industriplex Blvd. Baton Rouge, LA 70809 504 753-8650

| | | | |
|---|---|---|---|
| Client Name: | TECHLAW INC. EH & S<br>750 N. SAINT PAUL ST.<br>SUITE 600<br>DALLAS, TX 75201 | | |
| Client ID: | FB-6.7 | Project ID: | LOS ALAMO'S NAT. LAB |
| AATS ID: | 39246.24 | Report: | 39246.24 |
| Collected: | | Report Date: 01/09/2000 | Page: 1 |
| Received: | 12/14/1999 | Last Modified: | Matrix: Water |

| TEST | DATE EXTRACTED | DETECTION LIMIT | UNITS | RESULTS | DATE ANALYZED | METHOD REFERENCE |
|---|---|---|---|---|---|---|
| | | *** INORGANICS *** | | | | |
| PERCHLORATE | | 0.5 | mg/L | ND | 12/17/99 | EPA 300 |

ND = NOT DETECTED ABOVE QUANTITATION LIMIT
B = ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
I = UNABLE TO QUANTITATE DUE TO MATRIX INTERFERENCE
NA = NOT APPLICABLE
Methodology: SM = STANDARD METHODS, 18th EDITION, 1995
EPA = #EPA600/4-79-020, MARCH 1985

* = SURROGATE RECOVERY OUTSIDE OF QC LIMITS
D = SURROGATES DILUTED OUT
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION

SW = EPA METHODOLOGY, "#SW846", THIRD EDITION, SEPTEMBER 1994

# PCB Data

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

## SDG NARRATIVE

| | |
|---|---|
| CLIENT: | TECHLAW |
| PROJECT: | LA PHASE 2 |
| SDG: | 41534 |
| FRACTION: | PCBs |

10 soil samples were extracted by SW846 method 3550 and analyzed for PCBs as aroclors by SW846 method 8082. No major problems occurred during the analysis of the samples. All of the surrogate recoveries in this SDG exceeded control limits (most on 1 column only). No corrective action was taken because no arochlors were detected in the samples.

| | |
|---|---|
| Blanks: | No corrective action required. |
| Surrogates: | Recoveries exceeded control limits (see above). |
| Laboratory Control Spike: | No corrective action required. |
| Matrix Spikes: | No corrective action required. |

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41534.11ms | | |
| analyte | 1260 peak #1 on rtx-pest2 | | |
| As=area of analyte in sample | | = | 1748076 |
| V(f)=final volume of extract (ml) | | = | 10 |
| D=dilution factor | | = | 1 |
| CF=calibration factor (1/ng/ml) | | = | 2243.68 |
| W(V)=weight of sample extracted (g) | | = | 31.9 |
| %m=% moisture | | = | 6 |

$$\text{conc (ug/kg)} = \frac{As}{CF} \cdot \frac{V(f)}{W(V)} \cdot \frac{D}{(100-\%m)/100} \cdot \frac{ml}{ml} \cdot \frac{ng}{g}$$

$$= \frac{1748076}{2243.68} \cdot \frac{10}{31.9} \cdot \frac{1}{0.94}$$

$$= 259.825$$

Drew Cowan
GC Supervisor
Dc

December 29, 1999

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.01

Sample wt/vol: 30.7 (g/mL) G Lab File ID:_____

% Moisture: 11 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 36 | U |
| 11104-28-2 | Aroclor-1221 | 36 | U |
| 11141-16-5 | Aroclor-1232 | 36 | U |
| 53469-21-9 | Aroclor-1242 | 36 | U |
| 12672-29-6 | Aroclor-1248 | 36 | U |
| 11097-69-1 | Aroclor-1254 | 36 | U |
| 11096-82-5 | Aroclor-1260 | 36 | U |
| Surrogate amount spiked | | 7.32 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.02

Sample wt/vol: 31.3 (g/mL) G Lab File ID:_____

% Moisture: 5 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.73 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PC-3

ab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.03

Sample wt/vol: 30.2 (g/mL) G Lab File ID:_____

% Moisture: 14 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 38 | U |
| 11104-28-2 | Aroclor-1221 | 38 | U |
| 11141-16-5 | Aroclor-1232 | 38 | U |
| 53469-21-9 | Aroclor-1242 | 38 | U |
| 12672-29-6 | Aroclor-1248 | 38 | U |
| 11097-69-1 | Aroclor-1254 | 38 | U |
| 11096-82-5 | Aroclor-1260 | 38 | U |
| Surrogate amount spiked | | 7.70 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.04

Sample wt/vol: 31.6 (g/mL) G Lab File ID:

% Moisture: 7 decanted: (Y/N) Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 34 | U |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.81 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PC-5

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.05

Sample wt/vol: 33.3 (g/mL) G Lab File ID:_____

% Moisture: 6 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 32 | U |
| 11104-28-2 | Aroclor-1221 | 32 | U |
| 11141-16-5 | Aroclor-1232 | 32 | U |
| 53469-21-9 | Aroclor-1242 | 32 | U |
| 12672-29-6 | Aroclor-1248 | 32 | U |
| 11097-69-1 | Aroclor-1254 | 32 | U |
| 11096-82-5 | Aroclor-1260 | 32 | U |
| Surrogate amount spiked | | 6.39 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.06

Sample wt/vol: 30.5 (g/mL) G Lab File ID:

% Moisture: 6 decanted: (Y/N) Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 34 | U |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.98 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.07

Sample wt/vol: 30.7 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.1 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.79 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.08

Sample wt/vol: 31.7 (g/mL) G Lab File ID:_____

% Moisture: 8 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.86 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.09

Sample wt/vol: 30.8 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 33 | U |
| 11104-28-2------ | Aroclor-1221 | 33 | U |
| 11141-16-5------ | Aroclor-1232 | 33 | U |
| 53469-21-9------ | Aroclor-1242 | 33 | U |
| 12672-29-6------ | Aroclor-1248 | 33 | U |
| 11097-69-1------ | Aroclor-1254 | 33 | U |
| 11096-82-5------ | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.69 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-5

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41534

Matrix: (soil/water) SOIL Lab Sample ID: 41534.10

Sample wt/vol: 34.0 (g/mL) G Lab File ID:_____

% Moisture: 6 decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/22/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 31 | U |
| 11104-28-2------ | Aroclor-1221 | 31 | U |
| 11141-16-5------ | Aroclor-1232 | 31 | U |
| 53469-21-9------ | Aroclor-1242 | 31 | U |
| 12672-29-6------ | Aroclor-1248 | 31 | U |
| 11097-69-1------ | Aroclor-1254 | 31 | U |
| 11096-82-5------ | Aroclor-1260 | 31 | U |
| Surrogate amount spiked | | 6.26 | |

FORM I PEST

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

# SDG NARRATIVE

| | |
|---|---|
| CLIENT: | TECHLAW |
| PROJECT: | LA PHASE 2 |
| SDG: | 41509 |
| FRACTION: | PCBs |

31 soil samples were extracted by SW846 method 3510B and analyzed for PCBs as aroclors by SW846 method 8082. No major problems occurred during the analysis of the samples.

| | |
|---|---|
| Blanks: | No corrective action required. |
| Surrogates: | Several of the samples had the surrogates out high but those samples had no hits. No corrective action required. |
| Laboratory Control Spike: | One set of Laboratory Control Spikes had Arochlor 1016 beyond recovery limits and since none of the samples had Arochlor 1016 no corrective action was required. |
| Matrix Spikes: | Arochlor 1016 is out high in both sets of Matrix Spikes but none of the samples had Arochlor 1016 no corrective action required. |

Example Calculation:

| | | | | |
|---|---|---|---|---|
| sample # | 41509.02 | | | |
| analyte | 1260 peak #1 on rtx-pest | | | |
| As=area of analyte in sample | | = | 63125 | |
| V(f)=final volume of extract (ml) | | = | 10 | |
| D=dilution factor | = | 1 | | |
| CF=calibration factor (1/ng/ml) | | = | 718.753 | |
| W(V)=weight of sample extracted (g) | | | = | 30.6 |
| %m=% moisture | = | 4 | | |

$$\text{conc (ug/kg)} = \frac{\text{As}}{\text{CF}} \cdot \frac{\text{V(f)}}{\text{W(V)}} \cdot \frac{\text{D}}{(100-\%m)/100} \cdot \frac{\text{ml}}{\text{ml}} \cdot \frac{\text{ng}}{\text{g}}$$

$$= \frac{63125}{718.753} \cdot \frac{10}{30.6} \cdot \frac{1}{0.96}$$

$$= 29.897$$

Jeff Cummins for
Drew Cowan
GC Supervisor
Dc

January 4, 2000

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.01

Sample wt/vol: 32.0 (g/mL) G Lab File ID:_____

% Moisture: 9 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.87 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.02

Sample wt/vol: 30.6 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 39 | |
| Surrogate amount spiked | | 6.81 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BC-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.03

Sample wt/vol: 31.5 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.61 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.04

Sample wt/vol: 30.8 (g/mL) G Lab File ID: _____

% Moisture: 1 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 32 | U |
| 11104-28-2 | Aroclor-1221 | 32 | U |
| 11141-16-5 | Aroclor-1232 | 32 | U |
| 53469-21-9 | Aroclor-1242 | 32 | U |
| 12672-29-6 | Aroclor-1248 | 32 | U |
| 11097-69-1 | Aroclor-1254 | 32 | U |
| 11096-82-5 | Aroclor-1260 | 32 | U |
| Surrogate amount spiked | | 6.56 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BC-5

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.05

Sample wt/vol: 30.6 (g/mL) G Lab File ID:_____

% Moisture: 5 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.2 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 34 | U |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.88 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.06

Sample wt/vol: 32.7 (g/mL) G Lab File ID:

% Moisture: 6 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.1 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 32 | U |
| 11104-28-2 | Aroclor-1221 | 32 | U |
| 11141-16-5 | Aroclor-1232 | 32 | U |
| 53469-21-9 | Aroclor-1242 | 32 | U |
| 12672-29-6 | Aroclor-1248 | 32 | U |
| 11097-69-1 | Aroclor-1254 | 32 | U |
| 11096-82-5 | Aroclor-1260 | 32 | U |
| Surrogate amount spiked | | 6.51 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.07

Sample wt/vol: 30.8 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.69 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.08

Sample wt/vol: 30.3 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.5 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 34 | U |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.80 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.09

Sample wt/vol: 30.8 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.69 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-5A

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.10

Sample wt/vol: 30.8 (g/mL) G Lab File ID:_____

% Moisture: 5 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.1 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.84 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

MC-5B

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.11

Sample wt/vol: 33.3 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 31 | U |
| 11104-28-2 | Aroclor-1221 | 31 | U |
| 11141-16-5 | Aroclor-1232 | 31 | U |
| 53469-21-9 | Aroclor-1242 | 31 | U |
| 12672-29-6 | Aroclor-1248 | 31 | U |
| 11097-69-1 | Aroclor-1254 | 31 | U |
| 11096-82-5 | Aroclor-1260 | 31 | U |
| Surrogate amount spiked | | 6.19 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.12

Sample wt/vol: 30.9 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.74 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.13

Sample wt/vol: 30.7 (g/mL) G Lab File ID:_____

% Moisture: 8 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 35 | U |
| 11104-28-2 | Aroclor-1221 | 35 | U |
| 11141-16-5 | Aroclor-1232 | 35 | U |
| 53469-21-9 | Aroclor-1242 | 35 | U |
| 12672-29-6 | Aroclor-1248 | 35 | U |
| 11097-69-1 | Aroclor-1254 | 35 | U |
| 11096-82-5 | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.08 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.14

Sample wt/vol: 30.2 (g/mL) G Lab File ID:_____

% Moisture: 3 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 01/04/00

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 34 | U |
| 11096-82-5------ | Aroclor-1260 | 48 | |
| Surrogate amount spiked | | 6.83 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.15

Sample wt/vol: 31.4 (g/mL) G Lab File ID:_____

% Moisture: 6 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 01/04/00

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 34 | U |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 48 | |
| Surrogate amount spiked | | 6.78 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-5

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.16

Sample wt/vol: 31.5 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 01/04/00

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.1 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 33 | U |
| 11104-28-2------ | Aroclor-1221 | 33 | U |
| 11141-16-5------ | Aroclor-1232 | 33 | U |
| 53469-21-9------ | Aroclor-1242 | 33 | U |
| 12672-29-6------ | Aroclor-1248 | 33 | U |
| 11097-69-1------ | Aroclor-1254 | 33 | U |
| 11096-82-5------ | Aroclor-1260 | 140 | |
| Surrogate amount spiked | | 6.61 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-6

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.17

Sample wt/vol: 31.0 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 01/04/00

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 33 | U |
| 11104-28-2------ | Aroclor-1221 | 33 | U |
| 11141-16-5------ | Aroclor-1232 | 33 | U |
| 53469-21-9------ | Aroclor-1242 | 33 | U |
| 12672-29-6------ | Aroclor-1248 | 33 | U |
| 11097-69-1------ | Aroclor-1254 | 33 | U |
| 11096-82-5------ | Aroclor-1260 | 58 | |
| Surrogate amount spiked | | 6.72 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-6MS

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.18MS

Sample wt/vol: 32.6 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 300 | |
| 11104-28-2 | Aroclor-1221 | 32 | U |
| 11141-16-5 | Aroclor-1232 | 32 | U |
| 53469-21-9 | Aroclor-1242 | 32 | U |
| 12672-29-6 | Aroclor-1248 | 32 | U |
| 11097-69-1 | Aroclor-1254 | 32 | U |
| 11096-82-5 | Aroclor-1260 | 310 | |
| Surrogate amount spiked | | 6.39 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SC-6MSD

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.19MSD

Sample wt/vol: 34.0 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 280 | |
| 11104-28-2------ | Aroclor-1221 | 30 | U |
| 11141-16-5------ | Aroclor-1232 | 30 | U |
| 53469-21-9------ | Aroclor-1242 | 30 | U |
| 12672-29-6------ | Aroclor-1248 | 30 | U |
| 11097-69-1------ | Aroclor-1254 | 30 | U |
| 11096-82-5------ | Aroclor-1260 | 300 | |
| Surrogate amount spiked | | 6.13 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.20

Sample wt/vol: 30.7 (g/mL) G Lab File ID:_____

% Moisture: 18 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 39 | U |
| 11104-28-2------ | Aroclor-1221 | 39 | U |
| 11141-16-5------ | Aroclor-1232 | 39 | U |
| 53469-21-9------ | Aroclor-1242 | 39 | U |
| 12672-29-6------ | Aroclor-1248 | 39 | U |
| 11097-69-1------ | Aroclor-1254 | 39 | U |
| 11096-82-5------ | Aroclor-1260 | 39 | U |
| Surrogate amount spiked | | 7.94 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.21

Sample wt/vol: 30.4 (g/mL) G Lab File ID:_____

% Moisture: 8 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.6 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 35 | U |
| 11104-28-2------ | Aroclor-1221 | 35 | U |
| 11141-16-5------ | Aroclor-1232 | 35 | U |
| 53469-21-9------ | Aroclor-1242 | 35 | U |
| 12672-29-6------ | Aroclor-1248 | 35 | U |
| 11097-69-1------ | Aroclor-1254 | 35 | U |
| 11096-82-5------ | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.15 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.22

Sample wt/vol: 32.8 (g/mL) G Lab File ID:_____

% Moisture: 19 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 37 | U |
| 11104-28-2 | Aroclor-1221 | 37 | U |
| 11141-16-5 | Aroclor-1232 | 37 | U |
| 53469-21-9 | Aroclor-1242 | 37 | U |
| 12672-29-6 | Aroclor-1248 | 37 | U |
| 11097-69-1 | Aroclor-1254 | 37 | U |
| 11096-82-5 | Aroclor-1260 | 37 | U |
| Surrogate amount spiked | | 7.53 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BB1219SB

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: BB1219SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 33 | U |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 33 | U |
| Surrogate amount spiked | | 6.67 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

LC1219SB

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: LC1219SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 0 decanted: (Y/N) Date Received:

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 340 | |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 300 | |
| Surrogate amount spiked | | 6.67 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

LD1219SB

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: LD1219SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 0 decanted: (Y/N) __ Date Received:

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 320 | |
| 11104-28-2 | Aroclor-1221 | 33 | U |
| 11141-16-5 | Aroclor-1232 | 33 | U |
| 53469-21-9 | Aroclor-1242 | 33 | U |
| 12672-29-6 | Aroclor-1248 | 33 | U |
| 11097-69-1 | Aroclor-1254 | 33 | U |
| 11096-82-5 | Aroclor-1260 | 290 | |
| Surrogate amount spiked | | 6.67 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.23

Sample wt/vol: 31.8 (g/mL) G Lab File ID:_____

% Moisture: 16 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 37 | U |
| 11104-28-2 | Aroclor-1221 | 37 | U |
| 11141-16-5 | Aroclor-1232 | 37 | U |
| 53469-21-9 | Aroclor-1242 | 37 | U |
| 12672-29-6 | Aroclor-1248 | 37 | U |
| 11097-69-1 | Aroclor-1254 | 37 | U |
| 11096-82-5 | Aroclor-1260 | 37 | U |
| Surrogate amount spiked | | 7.49 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-4MS

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.24MS

Sample wt/vol: 30.3 (g/mL) G Lab File ID:_____

% Moisture: 14 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 380 | |
| 11104-28-2 | Aroclor-1221 | 38 | U |
| 11141-16-5 | Aroclor-1232 | 38 | U |
| 53469-21-9 | Aroclor-1242 | 38 | U |
| 12672-29-6 | Aroclor-1248 | 38 | U |
| 11097-69-1 | Aroclor-1254 | 38 | U |
| 11096-82-5 | Aroclor-1260 | 340 | |
| Surrogate amount spiked | | 7.68 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-4MSD

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.25MSD

Sample wt/vol: 33.5 (g/mL) G Lab File ID:_____

% Moisture: 14 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 370 | |
| 11104-28-2 | Aroclor-1221 | 34 | U |
| 11141-16-5 | Aroclor-1232 | 34 | U |
| 53469-21-9 | Aroclor-1242 | 34 | U |
| 12672-29-6 | Aroclor-1248 | 34 | U |
| 11097-69-1 | Aroclor-1254 | 34 | U |
| 11096-82-5 | Aroclor-1260 | 330 | |
| Surrogate amount spiked | | 6.94 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-5A

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.26

Sample wt/vol: 30.2 (g/mL) G Lab File ID:_____

% Moisture: 10 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.3 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 36 | U |
| 11104-28-2------ | Aroclor-1221 | 36 | U |
| 11141-16-5------ | Aroclor-1232 | 36 | U |
| 53469-21-9------ | Aroclor-1242 | 36 | U |
| 12672-29-6------ | Aroclor-1248 | 36 | U |
| 11097-69-1------ | Aroclor-1254 | 36 | U |
| 11096-82-5------ | Aroclor-1260 | 36 | U |
| Surrogate amount spiked | | 7.36 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-5B

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.27

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 19 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.5 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 41 | U |
| 11104-28-2------ | Aroclor-1221 | 41 | U |
| 11141-16-5------ | Aroclor-1232 | 41 | U |
| 53469-21-9------ | Aroclor-1242 | 41 | U |
| 12672-29-6------ | Aroclor-1248 | 41 | U |
| 11097-69-1------ | Aroclor-1254 | 41 | U |
| 11096-82-5------ | Aroclor-1260 | 41 | U |
| Surrogate amount spiked | | 8.23 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-6

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.28

Sample wt/vol: 30.9 (g/mL) G Lab File ID:_____

% Moisture: 21 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 40 | U |
| 11104-28-2 | Aroclor-1221 | 40 | U |
| 11141-16-5 | Aroclor-1232 | 40 | U |
| 53469-21-9 | Aroclor-1242 | 40 | U |
| 12672-29-6 | Aroclor-1248 | 40 | U |
| 11097-69-1 | Aroclor-1254 | 40 | U |
| 11096-82-5 | Aroclor-1260 | 40 | U |
| Surrogate amount spiked | | 8.19 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-7

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.29

Sample wt/vol: 30.8 (g/mL) G Lab File ID:_____

% Moisture: 15 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.7 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 38 | U |
| 11104-28-2------ | Aroclor-1221 | 38 | U |
| 11141-16-5------ | Aroclor-1232 | 38 | U |
| 53469-21-9------ | Aroclor-1242 | 38 | U |
| 12672-29-6------ | Aroclor-1248 | 38 | U |
| 11097-69-1------ | Aroclor-1254 | 38 | U |
| 11096-82-5------ | Aroclor-1260 | 38 | U |
| Surrogate amount spiked | | 7.64 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-8

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.30

Sample wt/vol: 31.1 (g/mL) G Lab File ID:_____

% Moisture: 23 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 41 | U |
| 11104-28-2 | Aroclor-1221 | 41 | U |
| 11141-16-5 | Aroclor-1232 | 41 | U |
| 53469-21-9 | Aroclor-1242 | 41 | U |
| 12672-29-6 | Aroclor-1248 | 41 | U |
| 11097-69-1 | Aroclor-1254 | 41 | U |
| 11096-82-5 | Aroclor-1260 | 41 | U |
| Surrogate amount spiked | | 8.35 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-9

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41509

Matrix: (soil/water) SOIL Lab Sample ID: 41509.31

Sample wt/vol: 31.0 (g/mL) G Lab File ID:_____

% Moisture: 9 decanted: (Y/N) __ Date Received: 12/17/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/19/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.6 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 35 | U |
| 11104-28-2------ | Aroclor-1221 | 35 | U |
| 11141-16-5------ | Aroclor-1232 | 35 | U |
| 53469-21-9------ | Aroclor-1242 | 35 | U |
| 12672-29-6------ | Aroclor-1248 | 35 | U |
| 11097-69-1------ | Aroclor-1254 | 35 | U |
| 11096-82-5------ | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.09 | |

FORM I PEST

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

## SDG NARRATIVE

CLIENT: TECHLAW

PROJECT: LA PHASE 2

SDG: 41536

FRACTION: PCBs

2 water samples were extracted by SW846 method 3510B and analyzed for PCBs as aroclors by SW846 method 8082. No major problems occurred during the analysis of the samples.

Blanks: No corrective action required.

Surrogates: No corrective action required.

Laboratory Control Spike: No corrective action required.

Matrix Spikes: No corrective action required.

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41536.02ms | | |
| analyte | 1260 peak #1 on rtx-pest2 | | |
| As=area of analyte in sample | | = | 775312 |
| V(f)=final volume of extract (ml) | | = | 10 |
| D=dilution factor | | = | 1 |
| CF=calibration factor (1/ng/ml) | | = | 1048.055 |
| W(V)=volume of sample extracted (ml) | | = | 750 |

$$\text{conc (ug/L)} = \frac{As}{CF} \cdot \frac{V(f)}{W(V)} \cdot \frac{D}{} \cdot \frac{ml}{ml} \cdot \frac{ng}{ml}$$

$$= \frac{775312}{1048.055} \cdot \frac{10}{750} \cdot 1$$

$$= 9.864$$

Drew Cowan
GC Supervisor
Dc

December 30, 1999

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CC-EB

ıb Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.01

Sample wt/vol: 1000 (g/mL) ML Lab File ID:_____

% Moisture: _____ decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:12/20/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.3 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 1.0 | U |
| 11104-28-2 | Aroclor-1221 | 1.0 | U |
| 11141-16-5 | Aroclor-1232 | 1.0 | U |
| 53469-21-9 | Aroclor-1242 | 1.0 | U |
| 12672-29-6 | Aroclor-1248 | 1.0 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |
| Surrogate amount spiked | | 0.20 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

AC-EB

.b Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41536

Matrix: (soil/water) WATER Lab Sample ID: 41536.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID:_____

% Moisture: _____ decanted: (Y/N) __ Date Received: 12/18/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:12/20/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/28/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.2 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 1.0 | U |
| 11104-28-2 | Aroclor-1221 | 1.0 | U |
| 11141-16-5 | Aroclor-1232 | 1.0 | U |
| 53469-21-9 | Aroclor-1242 | 1.0 | U |
| 12672-29-6 | Aroclor-1248 | 1.0 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |
| Surrogate amount spiked | | 0.20 | |

FORM I PEST

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

## SDG NARRATIVE

CLIENT: TECHLAW

PROJECT: LA PHASE 2

SDG: 41411

FRACTION: PCBs

1 water and 13 soil samples were extracted by SW846 methods 3510B and 3550. Then analyzed for PCBs as aroclors by SW846 method 8082. No major problems occurred during the analysis of the samples. 1 of the samples contained an aroclor below the reporting limit.

It should be noted that SWLO is in the process of updating our form generation software to "work" with the most recent update of method 8082. As a result, no form 10's can be generated at this time for aroclors other than 1016 and 1260. This is because under the newest 8082 results for the other aroclors are calculated using a single point calibration.

Blanks: No corrective action required.

Surrogates: No corrective action required.

Laboratory Control Spike: No corrective action required.

Matrix Spikes: No corrective action required.

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41411.01 | | |
| analyte | 1260 peak #1 on rtx-pest | | |
| As=area of analyte in sample | | = | 20453 |
| V(f)=final volume of extract (ml) | | = | 10 |
| D=dilution factor | | = | 1 |
| CF=calibration factor (1/ng/ml) | | = | 1300.02 |
| W(V)=weight of sample extracted (g) | | = | 30 |
| %m=% moisture | | = | 19 |

$$\text{conc (ug/kg)} = \frac{As \quad V(f) \quad D}{CF \quad W(V) \quad (100-\%m)/100} \quad \frac{ml}{ml} \quad \frac{ng}{g}$$

$$= \frac{20453 \quad 10 \quad 1}{1300.02 \quad 30 \quad 0.81}$$

$$= 6.474$$

Drew Cowan
GC Supervisor
Dc

December 22, 1999

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-35-0

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 19 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 41 | U |
| 11104-28-2 | Aroclor-1221 | 41 | U |
| 11141-16-5 | Aroclor-1232 | 41 | U |
| 53469-21-9 | Aroclor-1242 | 41 | U |
| 12672-29-6 | Aroclor-1248 | 41 | U |
| 11097-69-1 | Aroclor-1254 | 41 | U |
| 11096-82-5 | Aroclor-1260 | 41 | U |
| Surrogate amount spiked | | 8.23 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-18-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 18 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.5 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 40 | U |
| 11104-28-2 | Aroclor-1221 | 40 | U |
| 11141-16-5 | Aroclor-1232 | 40 | U |
| 53469-21-9 | Aroclor-1242 | 40 | U |
| 12672-29-6 | Aroclor-1248 | 40 | U |
| 11097-69-1 | Aroclor-1254 | 117 | |
| 11096-82-5 | Aroclor-1260 | 40 | U |
| Surrogate amount spiked | | 8.13 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-18-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.03

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 26 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 44 | U |
| 11104-28-2 | Aroclor-1221 | 44 | U |
| 11141-16-5 | Aroclor-1232 | 44 | U |
| 53469-21-9 | Aroclor-1242 | 44 | U |
| 12672-29-6 | Aroclor-1248 | 44 | U |
| 11097-69-1 | Aroclor-1254 | 323 | |
| 11096-82-5 | Aroclor-1260 | 44 | U |
| Surrogate amount spiked | | 9.01 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-18-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.04

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 16 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.3 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 39 | U |
| 11104-28-2------ | Aroclor-1221 | 39 | U |
| 11141-16-5------ | Aroclor-1232 | 39 | U |
| 53469-21-9------ | Aroclor-1242 | 39 | U |
| 12672-29-6------ | Aroclor-1248 | 39 | U |
| 11097-69-1------ | Aroclor-1254 | 124 | |
| 11096-82-5------ | Aroclor-1260 | 39 | U |
| Surrogate amount spiked | | 7.94 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-12-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.05

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 4 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 34 | U |
| 11104-28-2------ | Aroclor-1221 | 34 | U |
| 11141-16-5------ | Aroclor-1232 | 34 | U |
| 53469-21-9------ | Aroclor-1242 | 34 | U |
| 12672-29-6------ | Aroclor-1248 | 34 | U |
| 11097-69-1------ | Aroclor-1254 | 367 | |
| 11096-82-5------ | Aroclor-1260 | 34 | U |
| Surrogate amount spiked | | 6.94 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-12-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.06

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 14 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.3 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 38 | U |
| 11104-28-2 | Aroclor-1221 | 38 | U |
| 11141-16-5 | Aroclor-1232 | 38 | U |
| 53469-21-9 | Aroclor-1242 | 38 | U |
| 12672-29-6 | Aroclor-1248 | 38 | U |
| 11097-69-1 | Aroclor-1254 | 580 | E |
| 11096-82-5 | Aroclor-1260 | 38 | U |
| Surrogate amount spiked | | 7.75 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-12-2DL

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.06DL

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 14 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: 7.3 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 77 | U |
| 11104-28-2------ | Aroclor-1221 | 77 | U |
| 11141-16-5------ | Aroclor-1232 | 77 | U |
| 53469-21-9------ | Aroclor-1242 | 77 | U |
| 12672-29-6------ | Aroclor-1248 | 77 | U |
| 11097-69-1------ | Aroclor-1254 | 635 | D |
| 11096-82-5------ | Aroclor-1260 | 77 | U |
| Surrogate amount spiked | | 7.75 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-48-0

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 12 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.0 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 38 | U |
| 11104-28-2 | Aroclor-1221 | 38 | U |
| 11141-16-5 | Aroclor-1232 | 38 | U |
| 53469-21-9 | Aroclor-1242 | 38 | U |
| 12672-29-6 | Aroclor-1248 | 38 | U |
| 11097-69-1 | Aroclor-1254 | 107 | |
| 11096-82-5 | Aroclor-1260 | 38 | U |
| Surrogate amount spiked | | 7.58 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-3-1

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 7 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.1 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 35 | U |
| 11104-28-2------ | Aroclor-1221 | 35 | U |
| 11141-16-5------ | Aroclor-1232 | 35 | U |
| 53469-21-9------ | Aroclor-1242 | 35 | U |
| 12672-29-6------ | Aroclor-1248 | 35 | U |
| 11097-69-1------ | Aroclor-1254 | 37 | |
| 11096-82-5------ | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.17 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-3-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 6 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.5 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 35 | U |
| 11104-28-2------ | Aroclor-1221 | 35 | U |
| 11141-16-5------ | Aroclor-1232 | 35 | U |
| 53469-21-9------ | Aroclor-1242 | 35 | U |
| 12672-29-6------ | Aroclor-1248 | 35 | U |
| 11097-69-1------ | Aroclor-1254 | 13 | |
| 11096-82-5------ | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.09 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-3-3

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 5 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 35 | U |
| 11104-28-2 | Aroclor-1221 | 35 | U |
| 11141-16-5 | Aroclor-1232 | 35 | U |
| 53469-21-9 | Aroclor-1242 | 35 | U |
| 12672-29-6 | Aroclor-1248 | 35 | U |
| 11097-69-1 | Aroclor-1254 | 567 | |
| 11096-82-5 | Aroclor-1260 | 35 | U |
| Surrogate amount spiked | | 7.02 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-3-3DL

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.10DL

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 5 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 2.0

GPC Cleanup: (Y/N) N pH: 6.8 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 69 | U |
| 11104-28-2 | Aroclor-1221 | 69 | U |
| 11141-16-5 | Aroclor-1232 | 69 | U |
| 53469-21-9 | Aroclor-1242 | 69 | U |
| 12672-29-6 | Aroclor-1248 | 69 | U |
| 11097-69-1 | Aroclor-1254 | 625 | D |
| 11096-82-5 | Aroclor-1260 | 69 | U |
| Surrogate amount spiked | | 7.02 | |

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-3-4

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) SOIL Lab Sample ID: 41411.11

Sample wt/vol: 30.0 (g/mL) G Lab File ID:_____

% Moisture: 11 decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:12/14/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.6 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 12674-11-2 | Aroclor-1016 | 37 | U |
| 11104-28-2 | Aroclor-1221 | 37 | U |
| 11141-16-5 | Aroclor-1232 | 37 | U |
| 53469-21-9 | Aroclor-1242 | 37 | U |
| 12672-29-6 | Aroclor-1248 | 37 | U |
| 11097-69-1 | Aroclor-1254 | 344 | |
| 11096-82-5 | Aroclor-1260 | 37 | U |
| Surrogate amount spiked | | 7.49 | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ASC-EB

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHL SDG No.: 41411

Matrix: (soil/water) WATER Lab Sample ID: 41411.12

Sample wt/vol: 1000 (g/mL) ML Lab File ID:_____

% Moisture: _____ decanted: (Y/N) __ Date Received: 12/10/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:12/11/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 12/17/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 8.4 Sulfur Cleanup: (Y/N) N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 12674-11-2------ | Aroclor-1016 | 1.0 | U |
| 11104-28-2------ | Aroclor-1221 | 1.0 | U |
| 11141-16-5------ | Aroclor-1232 | 1.0 | U |
| 53469-21-9------ | Aroclor-1242 | 1.0 | U |
| 12672-29-6------ | Aroclor-1248 | 1.0 | U |
| 11097-69-1------ | Aroclor-1254 | 1.0 | U |
| 11096-82-5------ | Aroclor-1260 | 1.0 | U |
| Surrogate amount spiked | | 0.20 | |

# Explosives Data

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

# SDG NARRATIVE

| | |
|---|---|
| CLIENT: | TECHLAW |
| PROJECT: | LA PHASE 2 |
| SDG NO: | 41450 |
| FRACTION: | EXPLOSIVES |

3 water samples were analyzed for explosives by SW-846, method 8330.

No major problems occurred during the analysis of the samples.

| | |
|---|---|
| Blanks: | No corrective action required. |
| Surrogates: | No corrective action required. |
| Laboratory Control Spikes: | 4 out of 28 recoveries were slightly outside control limits, no corrective action was taken. |
| Matrix Spikes: | 2 out of 28 recoveries and 1 out of 14 RPDs were slightly outside control limits, no corrective action was taken. |

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41450.10ms | | |
| analyte | hmx | | |
| As=area of analyte in sample | | = | 6322754 |
| D=dilution factor | | = | 2 |
| CF=calibration factor (1/ug/l) | | = | 70411.256 |

$$\text{conc (ug/l)} = \frac{As \quad D}{CF} \qquad \frac{ug}{l}$$

$$= \frac{6322754 \quad 2}{70411.256}$$

$$= 179.6$$

Jennifer Freeman

Jennifer Freeman
Drew Cowan
GC Supervisor
jf

December 21, 1999

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

TA-18

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41450

Matrix: (soil/water) WATER Lab Sample ID: 41450.09

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

FORM I

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

# SDG NARRATIVE

| | |
|---|---|
| CLIENT: | TECHLAW |
| PROJECT: | LA PHASE 2 |
| SDG NO: | 41535 |
| FRACTION: | EXPLOSIVES |

1 water sample was analyzed for explosives by SW-846, method 8330.

No major problems occurred during the analysis of the sample.

| | |
|---|---|
| Blanks: | No corrective action required. |
| Surrogates: | No corrective action required. |
| Laboratory Control Spikes: | 1 out of 28 recoveries was slightly outside control limits, no corrective action was taken. |
| Matrix Spikes: | 2 out of 28 recoveries and 2 out of 14 RPDs were slightly outside control limits, no corrective action was taken. |

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41535.03ms | | |
| analyte | hmx | | |
| As=area of analyte in sample | | = | 14341493 |
| D=dilution factor | | = | 2 |
| CF=calibration factor (1/ug/l) | | = | 160360.6 |

$$\text{conc (ug/l)} = \frac{As \quad D}{CF} \quad \frac{ug}{l}$$

$$= \frac{14341493 \quad 2}{160360.604}$$

$$= 178.9$$

Drew Cowan
GC Supervisor
dc

December 30, 1999

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PM-2

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41535

Matrix: (soil/water) WATER Lab Sample ID: 41535.03

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/18/99

Extraction Volume: 5 ML Date Extracted: 12/27/99

Extraction Method: SEPF Date Analyzed: 12/27/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

# SDG NARRATIVE

| | |
|---|---|
| CLIENT: | TECHLAW |
| PROJECT: | LA PHASE 2 |
| SDG NO: | 41451 |
| FRACTION: | EXPLOSIVES |

5 water samples were analyzed for explosives by SW-846, method 8330.

No major problems occurred during the analysis of the samples.

| | |
|---|---|
| Blanks: | No corrective action required. |
| Surrogates: | No corrective action required. |
| Laboratory Control Spikes: | 4 out of 28 recoveries were slightly outside control limits, no corrective action was taken. |
| Matrix Spikes: | No corrective action required (SWLO episode 41450). |

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41450.10ms | | |
| analyte | hmx | | |
| As=area of analyte in sample | | = | 6322754 |
| D=dilution factor | | = | 2 |
| CF=calibration factor (1/ug/l) | | = | 70411.256 |

$$\text{conc (ug/l)} = \frac{As \quad D}{CF} \qquad \frac{ug}{l}$$

$$= \frac{6322754 \quad 2}{70411.256}$$

$$= 179.6$$

Jon Barrows
Drew Cowan
GC Supervisor
Jb

December 21, 1999

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PA-6.7

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41451

Matrix: (soil/water) WATER Lab Sample ID: 41451.01

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

FB-6.7

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41451

Matrix: (soil/water) WATER Lab Sample ID: 41451.03

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

FORM I

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

HOMESTEAD

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41451

Matrix: (soil/water) WATER Lab Sample ID: 41451.05

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

STARMER

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41451

Matrix: (soil/water) WATER Lab Sample ID: 41451.07

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

KIELING

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41451

Matrix: (soil/water) WATER Lab Sample ID: 41451.09

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/14/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

SOUTHWEST LABORATORY OF OKLAHOMA
1700 West Albany, Suite A/ Broken Arrow, OK 74012
918-251-2858

# SDG NARRATIVE

CLIENT: TECHLAW

PROJECT: LA PHASE 2

SDG NO: 41488

FRACTION: EXPLOSIVES

4 water samples were analyzed for explosives by SW-846, method 8330.

No major problems occurred during the analysis of the samples.

Blanks: No corrective action required.

Surrogates: No corrective action required.

Laboratory Control Spikes: 4 out of 28 recoveries were slightly outside control limits, no corrective action was taken.

Matrix Spikes: No corrective action required (SWLO episode 41450).

Example Calculation:

| | | | |
|---|---|---|---|
| sample # | 41450.10ms | | |
| analyte | hmx | | |
| As=area of analyte in sample | | = | 6322754 |
| D=dilution factor | | = | 2 |
| CF=calibration factor (1/ug/l) | | = | 70411.256 |

$$\text{conc (ug/l)} = \frac{As \quad D}{CF} \quad \frac{ug}{l}$$

$$= \frac{6322754 \quad 2}{70411.256}$$

$$= 179.6$$

Jon Barrows for
Drew Cowan
GC Supervisor
jb

December 21, 1999

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BULLDOG

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41488

Matrix: (soil/water) WATER Lab Sample ID: 41488.01

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/16/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PA-8.9

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41488

Matrix: (soil/water) WATER Lab Sample ID: 41488.03

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/16/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BU0.01

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41488

Matrix: (soil/water) WATER Lab Sample ID: 41488.05

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/16/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

FORM I

1D
EXPLOSIVES ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PM-5

Lab Name: SWL-TULSA

Lab Code: SWOK Case No.: TECHLAW SDG No.: 41488

Matrix: (soil/water) WATER Lab Sample ID: 41488.07

Sample Amt: 5 ML % Moisture: _____ Date Received: 12/16/99

Extraction Volume: 5 ML Date Extracted: 12/16/99

Extraction Method: SEPF Date Analyzed: 12/17/99

GPC Cleanup: (Y/N) N Dilution Factor: 2.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: UG/L | Q |
|---|---|---|---|
| 2691-41-0 | HMX | 13.0 | U |
| 121-82-4 | RDX | 14.0 | U |
| 99-35-4 | TNB | 7.30 | U |
| 99-65-0 | DNB | 4.00 | U |
| 479-45-8 | TETRYL | 10.0 | U |
| 98-95-3 | NB | 7.00 | U |
| 118-96-7 | TNT | 6.40 | U |
| 1946-51-0 | 4ADNT | 7.00 | U |
| 35572-78-2 | 2ADNT | 12.0 | U |
| 606-20-2 | 26DNT | 9.40 | U |
| 121-14-2 | 24DNT | 5.70 | U |
| 88-72-2 | 2NT | 12.0 | U |
| 99-99-0 | 4NT | 7.90 | U |
| 99-08-1 | 3NT | 8.00 | U |
| Surrogate amount spiked | | 400.00 | |

# Radionuclide Data

Quanterra - St. Louis

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

Quanterra
Environmental Services

# ANALYTICAL REPORT

PROJECT NO. TECHLAW

Phase 2

Lot #: F9L140165

Julie Shanahan

Techlaw, Inc.
750 N St Paul
Suite 600
Dallas, TX 75201

QUANTERRA INCORPORATED

Ron Martino
Project Manager

February 9, 2000

Data is incomplete without Case Narrative

# CASE NARRATIVE

## Lot # F9L140165

I. Introduction
On December 10, 1999, samples were received at the Quanterra St. Louis laboratory from Techlaw. A copy of the chain of custody and the condition upon receipt report is included with the analytical data.

III. Analytical Results/Methodology
The analytical results for this report are presented by analytical tests. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits.

III. Quality Control
The QA/QC information can be found immediately following the analytical data. This QA/QC data are used to assess the laboratory's accuracy and precision during the analytical procedure.

IV. Comments/Nonconformances

**Enriched Tritium**

Quanterra was directed to use the University of Miami Tritium Laboratory for the enriched tritium and this laboratory was not audited and approved by Quanterra, therefore, Quanterra does not warrant and is not responsible for their work pursuant to our Standard Terms and Conditions. The analysis was performed and reported directly to Techlaw. Quanterra was only responsible for the delivery of the samples to the University of Miami.

**Strontium 90**

There were no anomalies associated with this analysis.

**Gamma**

There were no anomalies associated with this analysis.

**Isoplutonium**

Samples ACS-18-1, ACS-18-1, ACS-48-0, ACS-3-1, ACS-3-4, ACS3-3, contain high Pu-239 activity which tails into and through the Pu-242 tracer region of interest. These samples have tracer recoveries > 100 % recovery. The activity results for these samples are biased low by at least as much as the tracer bias is greater than 100%. This bias is caused by the calculation algorithem not truncating the yield at 100%. Three samples were rerun for yields > 125% upper control limit.

The LCS for this batch has only Pu 239 reported. Pu 238 is in the spike sample as a second radionuclide but the spike list was not complete. If The data is released I can attempt to delete the LCS and re-create it which should bring in the new list.

Quanterra - St. Louis

# METHODS SUMMARY

**F9L140165**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| Cs-137 & Hits by Gamma GAMMA SPEC MULTI ISO CAL | HASL Gamma (Cs | |
| Isotopic Pu by Alpha Spe Alpha Spectroscopy | NAS Iso Pu (SHO | |
| STRONTIUM 90 Sr90-Y90 cal | DOE SR-90 BY GF | |
| STRONTIUM 90 Sr90-Y90 cal | SMWW SR-90 BY G | |

**References:**

| | |
|---|---|
| DOE | "DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY |
| HASL | Health and Safety Laboratory |
| NAS | National Academy of Science |
| SMWW | "STANDARD METHODS FOR WASTE WATER" |

Data is incomplete without Case Narrative

# SAMPLE SUMMARY

**F9L140165**

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| D69PL | 010 | ACS-EB | 12/06/99 | 14:10 |
| D69PM | 011 | MCO-1 | 12/07/99 | 13:10 |
| D69PR | 012 | MCO-2 | 12/07/99 | 15:30 |
| D69Q6 | 014 | MCO-5 | 12/08/99 | 10:45 |
| D69QA | 015 | MCO-6 | 12/08/99 | 12:00 |
| D69QC | 016 | MCO-7 | 12/08/99 | 13:50 |
| D69QE | 017 | MCWB-7.7B | 12/08/99 | 15:10 |
| D69QM | 018 | MT-4 | 12/07/99 | 11:05 |
| D69QQ | 019 | TW-8 | 12/07/99 | 15:45 |
| D69R1 | 020 | ACS-35-0 | 12/06/99 | 11:02 |
| D69R8 | 021 | ACS-18-1 | 12/06/99 | 11:40 |
| D69RA | 022 | ACS-18-2 | 12/06/99 | 12:00 |
| D69RD | 023 | ACS-18-3 | 12/06/99 | 12:10 |
| D69RF | 024 | ACS-12-1 | 12/06/99 | 12:35 |
| D69TP | 025 | ACS-12-2 | 12/06/99 | 12:45 |
| D69TQ | 026 | ACS-48-0 | 12/06/99 | 13:00 |
| D69TV | 027 | ACS-3-1 | 12/06/99 | 13:30 |
| D69TX | 028 | ACS-3-2 | 12/06/99 | 13:40 |
| D69V2 | 029 | ACS-3-4 | 12/06/99 | 14:00 |
| D69V9 | 030 | ACS-3-3 | 12/06/99 | 13:50 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# TECHLAW, INC.

## Client Sample ID: ACS-EB

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-010
Work Order: D69PL
Matrix: WATER

Date Collected: 12/06/99 1410
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/L | Gamma (Cs & hits) | | | |
| Cesium 137 | -0.5 | U | 6.4 | 13 | 01/18/00 | 01/20/00 | 3018145 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/L | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | -0.05 | U | 0.11 | 0.37 | 12/15/99 | 12/22/99 | 9356205 | 80 |
| Plutonium 239/40 | 0.013 | U | 0.099 | 0.28 | 12/15/99 | 12/22/99 | 9356205 | 80 |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 0.13 | U | 0.87 | 1.5 | 01/05/00 | 12/23/99 | 3005192 | 69 |

NOTE(S)

Data are incomplete without the case narrative.
MDC is determined by instrument performance only.
Bold results are greater than the MDC
Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: MCO-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-011
Work Order: D69PM
Matrix: WATER

Date Collected: 12/07/99 1310
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 84 | | 17 | 3 | 01/05/00 | 02/03/00 | 0005192 | 20 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

# TECHLAW, INC.

## Client Sample ID: MCO-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-012
Work Order: D69FR
Matrix: WATER

Date Collected: 12/07/99 1530
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 0.33 | U | 0.53 | 0.90 | 01/05/00 | 02/03/00 | C005192 | 59 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: MCO-5

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-014
Work Order: D69Q6
Matrix: WATER

Date Collected: 12/08/99 1045
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 45.6 | | 9.0 | 0.8 | 01/05/00 | 02/03/00 | 0005192 | 70 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

# TECHLAW, INC.

## Client Sample ID: MCO-6

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-015
Work Order: D69QA
Matrix: WATER

Date Collected: 12/08/99 1200
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | | SR-90 BY GFPC | | | |
| Strontium 90 | 44.6 | | 8.9 | | 0.7 | 01/05/00 | 02/03/00 | 0005192 | 73 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: MCO-7

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-016
Work Order: D69QC
Matrix: WATER

Date Collected: 12/08/99 1350
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 1.86 | J | 0.77 | 1.0 | 01/05/00 | 02/03/00 | 0005192 | 54 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: MCWB-7.7B

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-017
Work Order: D69QE
Matrix: WATER

Date Collected: 12/08/99 1510
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 0.09 | U | 0.45 | 0.78 | 01/05/00 | 02/03/00 | 0005192 | [illegible] |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MT-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-018
Work Order: D69QM
Matrix: WATER

Date Collected: 12/07/99 1105
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | -0.01 | U | 0.37 | 0.64 | 01/05/00 | 02/03/00 | 0005192 | 77 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: TW-8

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-019
Work Order: D69QQ
Matrix: WATER

Date Collected: 12/07/99 1545
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | pCi/L | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.19 | U | 0.40 | 0.67 | 01/05/00 | 02/03/00 | 0005192 | 75 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-35-0

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-020
Work Order: D69R1
Matrix: SOLID

Date Collected: 12/06/99 1102
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.12 | U | 0.11 | 0.13 | 12/16/99 | 12/29/99 | 9351210 | 78 |
| **Plutonium 239/40** | 27.5 | | 6.0 | 0.1 | 12/16/99 | 12/29/99 | 9351210 | 78 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.079 | U | 0.060 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| **Americium 241HP** | 0.19 | | 0.13 | 0.1 | 12/20/99 | 01/24/00 | 0019340 | |
| **Lead 210** | 1.55 | | 0.90 | 0.87 | 12/20/99 | 01/24/00 | 0019340 | |
| **Lead 212** | 0.67 | | 0.14 | 0.09 | 12/20/99 | 01/24/00 | 0019340 | |
| **Lead 214** | 0.53 | | 0.14 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| **Potassium 40** | 28.3 | | 4.1 | 1 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.91 | U | 0.56 | 1.0 | 12/16/99 | 01/12/00 | 9351222 | 60 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: ACS-35-0 DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-020X
Work Order: D69R1
Matrix: SOLID

Date Collected: 12/06/99 1102
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.025 | U | 0.059 | 0.11 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 0.174 | | 0.088 | 0.099 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 0.67 | | 0.19 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 0.57 | | 0.20 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 27.0 | | 3.9 | 0.8 | 12/20/99 | 01/24/00 | 0019340 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: ACS-18-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-021
Work Order: D69R8
Matrix: SOLID

Date Collected: 12/06/99 1140
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.27 | J | 0.21 | 0.21 | 12/16/99 | 12/29/99 | 9351210 | 111 |
| Plutonium 239/40 | 77 | + | 19 | 0.2 | 12/16/99 | 12/29/99 | 9351210 | 111 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.51 | | 0.18 | 0.12 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 4.01 | | 0.49 | 0.15 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.26 | | 0.32 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.22 | | 0.36 | 0.17 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 30.5 | | 4.3 | 1.1 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.36 | U | 0.51 | 0.35 | 12/16/99 | 01/12/00 | 9351222 | 62 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: ACS-18-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-022
Work Order: D69RA
Matrix: SOLID

Date Collected: 12/06/99 1200
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.65 | | 0.22 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 3.35 | | 0.43 | 0.15 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 210 | 2.2 | | 1.5 | 1.3 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.19 | | 0.30 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 0.95 | | 0.33 | 0.22 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 29.0 | | 4.4 | 0.9 | 12/20/99 | 01/24/00 | 0019340 | |
| Thorium 234 | 1.28 | | 0.63 | 0.90 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 1.21 | J | 0.60 | 0.87 | 12/16/99 | 01/12/00 | 9351222 | 61 |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.65 | J | 0.27 | 0.14 | 01/03/00 | 01/11/00 | 0003308 | 107 |
| Plutonium 239/40 | 112 | + | 22 | 0.1 | 01/03/00 | 01/11/00 | 0003308 | 107 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-18-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-023
Work Order: D69RD
Matrix: SOLID

Date Collected: 12/06/99 1210
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.21 | J | 0.18 | 0.18 | 12/16/99 | 12/29/99 | 9351210 | 116 |
| Plutonium 239/40 | 82 | - | 20 | 0.2 | 12/16/99 | 12/29/99 | 9351210 | 116 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.74 | | 0.16 | 0.12 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 3.30 | | 0.43 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.07 | | 0.33 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.27 | | 0.37 | 0.18 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 30.0 | | 4.1 | 0.9 | 12/20/99 | 01/24/00 | 0019340 | |
| Thorium 234 | 2.40 | | 0.75 | 0.79 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.55 | U | 0.55 | 0.90 | 12/16/99 | 01/12/00 | 9351222 | 57 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-12-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-024
Work Order: D69RF
Matrix: SOLID

Date Collected: 12/06/99 1235
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 3.19 | | 0.44 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclices --- | | | | | | | | |
| Actinium 228 | 1.22 | | 0.30 | 0.47 | 12/20/99 | 01/24/00 | 0019340 | |
| Americium 241HP | 12.8 | | 1.4 | 0.3 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.04 | | 0.20 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 0.94 | | 0.20 | 0.19 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 29.3 | | 4.1 | 0.9 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 3.54 | | 0.95 | 0.88 | 12/16/99 | 01/12/00 | 9351222 | 59 |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | -0.036 | U | 0.075 | 0.20 | 01/03/00 | 01/11/00 | 0003308 | 93 |
| Plutonium 239/40 | 0.12 | U | 0.13 | 0.18 | 01/03/00 | 01/11/00 | 0003308 | 93 |

NOTE(S)

Data are incomplete without the case narrative.
MDC is determined by instrument performance only.
Bold results are greater than the MDC
U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-12-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F91140165-025
Work Order: D69TP
Matrix: SOLID

Date Collected: 12/06/99 1245
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/g | Gamma (Cs & hits) | | | |
| Cesium 137 | 5.53 | | 0.70 | 0.11 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 23.8 | | 2.7 | 0.3 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.34 | | 0.22 | 0.18 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.21 | | 0.20 | 0.24 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 27.8 | | 4.2 | 1.5 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | pCi/g | SR-90 BY GFPC | | | |
| Strontium 90 | 20.7 | | 4.3 | 1.4 | 12/16/99 | 01/12/00 | 9351222 | 37 |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.43 | J | 0.25 | 0.17 | 01/03/00 | 01/11/00 | 0003308 | 76 |
| Plutonium 239/40 | 0.018 | U | 0.062 | 0.14 | 01/03/00 | 01/11/00 | 0003308 | 76 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: ACS-48-0

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-026
Work Order: D69TQ
Matrix: SOLID

Date Collected: 12/06/99 1300
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 1.02 | | 0.43 | 0.15 | 12/16/99 | 12/29/99 | 9351210 | 123 |
| Plutonium 239/40 | 184 | + | 45 | 0.1 | 12/16/99 | 12/29/99 | 9351210 | 123 |
| Gamma Cs-137 & Hits by HASL AM-02 MOD | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.93 | | 0.18 | 0.15 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 3.70 | | 0.47 | 0.17 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 210 | 2.4 | | 1.3 | 1.5 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.09 | | 0.21 | 0.23 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 0.95 | | 0.18 | 0.18 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 26.0 | | 4.2 | 1.1 | 12/20/99 | 01/24/00 | 0019340 | |
| SR-90 BY GFPC DOE 7500-SR MOD | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 2.12 | J | 0.76 | 0.95 | 12/16/99 | 01/12/00 | 9351222 | 54 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-3-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-027
Work Order: D69TV
Matrix: SOLID

Date Collected: 12/06/99 1330
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.48 | J | 0.30 | 0.22 | 12/16/99 | 12/29/99 | 9351210 | 109 |
| Plutonium 239/40 | 137 | + | 34 | 0.2 | 12/16/99 | 12/29/99 | 9351210 | 109 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.25 | | 0.11 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 1.71 | | 0.32 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 210 | 1.8 | | 1.3 | 1.4 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.30 | | 0.34 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.31 | | 0.37 | 0.19 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 30.0 | | 4.5 | 1.1 | 12/20/99 | 01/24/00 | 0019340 | |
| Thorium 234 | 2.34 | | 0.75 | 0.89 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.89 | J | 0.56 | 0.85 | 12/16/99 | 01/12/00 | 9351222 | 56 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: ACS-3-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-028
Work Order: D69TX
Matrix: SOLID

Date Collected: 12/06/99 1340
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.062 | U | 0.079 | 0.11 | 12/16/99 | 12/29/99 | 9351210 | 74 |
| **Plutonium 239/40** | 2.73 | | 0.70 | 0.10 | 12/16/99 | 12/29/99 | 9351210 | 74 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | -0.063 | U | 0.078 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| **Lead 212** | 1.29 | | 0.37 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| **Lead 214** | 1.15 | | 0.39 | 0.20 | 12/20/99 | 01/24/00 | 0019340 | |
| **Potassium 40** | 32.7 | | 4.8 | 1.4 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.74 | U | 0.51 | 0.80 | 12/16/99 | 01/12/00 | 9351222 | 66 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: ACS-3-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-030
Work Order: D69V9
Matrix: SOLID

Date Collected: 12/06/99 1350
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 1.06 | | 0.44 | 0.15 | 12/16/99 | 12/29/99 | 9351210 | 107 |
| Plutonium 239/40 | 117 | + | 28 | 0.1 | 12/16/99 | 12/29/99 | 9351210 | 107 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 2.84 | | 0.39 | 0.13 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Actinium 228 | 1.49 | | 0.28 | 0.42 | 12/20/99 | 01/24/00 | 0019340 | |
| Americium 241HP | 29.3 | | 3.3 | 0.3 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.69 | | 0.23 | 0.26 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.25 | | 0.25 | 0.22 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 29.0 | | 4.4 | 1.5 | 12/20/99 | 01/24/00 | 0019340 | |
| Thorium 234 | 1.47 | | 0.78 | 0.89 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 5.6 | | 1.3 | 0.9 | 12/16/99 | 01/12/00 | 9351222 | 54 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

# TECHLAW, INC.

## Client Sample ID: ACS-3-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L140165-029
Work Order: D69V2
Matrix: SOLID

Date Collected: 12/06/99 1400
Date Received: 12/10/99 0910

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.84 | J | 0.37 | 0.15 | 12/16/99 | 12/29/99 | 9351210 | 125 |
| Plutonium 239/40 | 140 | + | 33 | 0.1 | 12/16/99 | 12/29/99 | 9351210 | 125 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/g | Gamma (Cs & hits) | | | |
| Cesium 137 | 7.10 | | 0.89 | 0.15 | 12/20/99 | 01/24/00 | 0019340 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Americium 241HP | 10.6 | | 1.2 | 0.3 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 212 | 1.49 | | 0.26 | 0.20 | 12/20/99 | 01/24/00 | 0019340 | |
| Lead 214 | 1.09 | | 0.24 | 0.29 | 12/20/99 | 01/24/00 | 0019340 | |
| Potassium 40 | 27.9 | | 4.3 | 1.2 | 12/20/99 | 01/24/00 | 0019340 | |
| Thallium 208 | 0.59 | | 0.17 | 0.14 | 12/20/99 | 01/24/00 | 0019340 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | pCi/g | SR-90 BY GFPC | | | |
| Strontium 90 | 10.8 | | 2.3 | 0.8 | 12/16/99 | 01/12/00 | 9351222 | 64 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

J Result is greater than sample detection limit but less than stated reporting limit.

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: BC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-001
Work Order: D6F05
Matrix: SOLID

Date Collected: 12/13/99 1340
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.023 | J | 0.052 | 0.095 | 01/03/00 | 01/11/00 | 0003308 | 94 |
| Plutonium 239/40 | 0.083 | J | 0.073 | 0.060 | 01/03/00 | 01/11/00 | 0003308 | 94 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# TECHLAW, INC.

## Client Sample ID: BC-1 DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-001X
Work Order: D6F05
Matrix: SOLID

Date Collected: 12/13/99 1340
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.108 | U | 0.0998 | 0.13 | 01/03/00 | 01/11/00 | 0003308 | 92 |
| Plutonium 239/40 | 0.063 | U | 0.073 | 0.098 | 01/03/00 | 01/11/00 | 0003308 | 92 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

Quanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: AC-EB

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-006
Work Order: D6MKE
Matrix: WATER

Date Collected: 12/16/99 1610
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/L | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.5 | U | 8.2 | 16 | 01/18/00 | 01/19/00 | 0018145 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

Quanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: AC-EB DUP

## Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-006X
Work Order: D6MKE
Matrix: WATER

Date Collected: 12/16/99 1610
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/L | Gamma (Cs & hits) | | | |
| Cesium 137 | -8.5 | U | 9.9 | 18 | 01/18/00 | 01/19/00 | 0018145 | |

NOTE(S)

Data are incomplete without the case narrative.
MDC is determined by instrument performance only.
Bold results are greater than the MDC
Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

Quanterra - St. Louis

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Matrix: SOLID

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso Pu (SHORT CT) | | | F9L170000-210B | |
| Plutonium 238 | 0.047 | U | 0.078 | 0.12 | 12/16/99 | 12/29/99 | 9351210 | 95 |
| Plutonium 239/40 | 0.083 | U | 0.077 | 0.084 | 12/16/99 | 12/29/99 | 9351210 | 95 |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | SR-90 BY GFPC | | | F9L170000-222B | |
| Strontium 90 | 0.07 | U | 0.42 | 0.72 | 12/16/99 | 01/12/00 | 9351222 | 68 |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso Pu (SHORT CT) | | | F0A030000-308B | |
| Plutonium 238 | 0.036 | U | 0.053 | 0.080 | 01/03/00 | 01/11/00 | 0003308 | 83 |
| Plutonium 239/40 | 0.020 | U | 0.046 | 0.084 | 01/03/00 | 01/11/00 | 0003308 | 83 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | Gamma (Cs & hits) | | | F0A190000-340B | |
| Cesium 137 | -0.0008 | U ? | 0.039 | 0.074 | 12/20/99 | 01/24/00 | 0019340 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC

? For informational purposes only. The result does not follow significant figures SOP

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Matrix: WATER

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/L | Iso Pu (SHORT CT) | | | F9L220000-205B | |
| Plutonium 238 | 0.04 | U | 0.14 | 0.35 | 12/15/99 | 12/22/99 | 9356205 | 99 |
| Plutonium 239/40 | -0.035 | U | 0.030 | 0.23 | 12/15/99 | 12/22/99 | 9356205 | 99 |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | | pCi/L | SR-90 BY GFPC | | | F0A050000-192B | |
| Strontium 90 | -0.08 | U | 0.41 | 0.73 | 01/05/00 | 02/03/00 | 0005192 | 48 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/L | Gamma (Cs & hits) | | | F0A180000-145B | |
| Americium 241 | -4.4 | U | 8.8 | 15 | 01/18/00 | 01/20/00 | 0018145 | |
| Cesium 137 | -4.6 | U | 7.5 | 16 | 01/18/00 | 01/20/00 | 0018145 | |
| Cobalt 60 | 11 | U | 10 | 24 | 01/18/00 | 01/20/00 | 0018145 | |
| Invalid | 0.0 | | 0.0 | 0.0 | 01/18/00 | 01/20/00 | 0018145 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

old results are greater than the MDC

For informational purposes only. The result does not follow significant figures SOP

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

Quanterra - St. Louis

# DUPLICATE EVALUATION REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Work Order #: D69R
Matrix: SOLID

Date Sampled: 12/06/99
Date Received: 12/10/99

| Parameter | SAMPLE Result | | Total Uncert. (2σ+/-) | % Yld | DUPLICATE Result | | Total Uncert. (2 σ+/-) | % Yld | QC Sample ID Precision | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL** | pCi/g | | | | **Gamma (Cs & hits)** | | | | F9L140165-020 | |
| Cesium 137 | 0.079 | U | 0.060 | | 0.025 | U | 0.059 | | 104 | RPD |
| ---Other Dedected Radionuclides--- | | | | | | | | | | |
| Americium 241HP | 0.19 | | 0.13 | | 0.174 | | 0.088 | | 11 | RPD |
| Lead 212 | 0.67 | | 0.14 | | 0.67 | | 0.19 | | 0.4 | RPD |
| Lead 214 | 0.53 | | 0.14 | | 0.57 | | 0.20 | | 7 | RPD |
| Potassium 40 | 28.3 | | 4.1 | | 27.0 | | 3.9 | | 5 | RPD |
| | Batch #: | | 0019340 | (Sample) | 0019340 | (Duplicate) | | | | |

NOTE(S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results

U Analyte analyzed for but was not detected

Data is incomplete without Case Narrative

Quanterra - St. Louis

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Matrix: SOLID

| Parameter | Spike Amount | Result | | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | | QC Control Limits |
|---|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | Lab Sample ID F0A030000-308C | |
| Plutonium 238 | 10.6 | 9.6 | - | 2.0 | 0.08 | 73 | 90 | - | 68 - 126 |
| Plutonium 239/40 | 12.4 | 11.8 | - | 2.5 | 0.04 | 73 | 95 | + | 68 - 126 |
| | Batch #: | 0003308 | | | AnalysisDate | 01/11/00 | | | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | F0A190000-340C | |
| Cesium 137 | 18900 | 18100 | + | 2000 | 70 | | 96 | + | 88 - 117 |
| | Batch #: | 0019340 | | | AnalysisDate | 01/24/00 | | | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | F9L170000-210C | |
| Plutonium 239/40 | 6.21 | 6.5 | - | 1.5 | 0.04 | 97 | 105 | + | 68 - 126 |
| | Batch #: | 9351210 | | | AnalysisDate | 12/29/99 | | | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | F9L170000-222C | |
| Strontium 90 | 5.45 | 5.3 | | 1.2 | 0.7 | 76 | 98 | | 49 - 126 |
| | Batch #: | 9351222 | | | AnalysisDate | 01/12/00 | | | |

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

\+ For informational purposes only. The detection limit does not follow significant figures SOP.
\+ For informational purposes only. The detection limit does not follow significant figures SOP.
\+ For informational purposes only. The detection limit does not follow significant figures SOP.

Data is incomplete without Case Narrative

Quanterra - St. Louis

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Matrix: WATER

| Parameter | Spike Amount | Result | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | Lab Sample ID | QC Control Limits |
|---|---|---|---|---|---|---|---|---|
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | pCi/L | | SR-90 BY GFPC | | | F0A050000-192C | |
| Strontium 90 | 9.72 | 10.4 | 2.2 | 0.7 | 66 | 107 | | 34 - 126 |
| | Batch #: | 0005192 | | AnalysisDate | 02/03/00 | | | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | pCi/L | | Gamma (Cs & hits) | | | F0A180000-145C | |
| Cesium 137 | 25300 | 26300 | 2500 | 100 | | 104 | | 88 - 117 |
| | Batch #: | 0018145 | | AnalysisDate | 01/20/00 | | | |

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

+ For informational purposes only. The detection limit does not follow significant figures SOP.
+ For informational purposes only. The detection limit does not follow significant figures SOP.
+ For informational purposes only. The detection limit does not follow significant figures SOP.

Data is incomplete without Case Narrative

Quanterra - St. Louis

# Laboratory Control Sample/LCS Duplicate Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L140165
Matrix: WATER

| Parameter | | Spike Amount | Result | Total Uncert. (2 σ+/-) | % Yld | % Rec | QC Control Limits | Precision | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/L | Iso Pu (SHORT CT) | | | | | F9L220000-205C |
| Plutonium 238 | | 10.6 | 9.9 | 2.5 | 78 | 93 | (67 - 120) | | |
| | Spk 2 | 10.6 | 8.6 | 2.1 | 82 | 81 | (67 - 120) | 15 | RPD |
| Plutonium 239/40 | | 12.4 | 11.4 | 2.9 | 78 | 92 | (67 - 120) | | |
| | Spk 2 | 12.4 | 10.8 | 2.6 | 82 | 87 | (67 - 120) | 5 | RPD |

Batch #: 9356205 Analysis Date 12/22/99

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

Data is incomplete without Case Narrative

:anterra - St. Louis

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

Quanterra
Environmental Services

# ANALYTICAL REPORT

PROJECT NO. TECHLAW

Phase 2

Lot #: F9L220151

Julie Shanahan

Techlaw
750 N. St. Paul
Dallas, TX 75201

QUANTERRA INCORPORATED

Ron Martino
Project Manager

January 27, 2000

## CASE NARRATIVE

**Lot # F9L220151**

I. Introduction

On December 18, 1999, samples were received at the Quanterra St. Louis laboratory from Techlaw. A copy of the chain of custody and the condition upon receipt report is included with the analytical data.

III. Analytical Results/Methodology

The analytical results for this report are presented by analytical tests. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits.

III. Quality Control

The QA/QC information can be found immediately following the analytical data. This QA/QC data are used to assess the laboratory's accuracy and precision during the analytical procedure.

IV. Comments/Nonconformances

**Strontium 90**

There were no anomalies associated with this analysis.

**Isouranium**

There were no anomalies associated with this analysis.

**Gamma**

There were no anomalies associated with this analysis.

**Isoplutonium**

There were no anomalies associated with this analysis.

**ABT**

The percent RPD for the sample and sample duplicate in the beta analysis is at 55% which is outside the QC limits.

# METHODS SUMMARY

F9L220151

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| Cs-137 & Hits by Gamma GAMMA SPEC MULTI ISO CAL | HASL Gamma (Cs | |
| Gross Alpha/Beta by GFPC Th230/Sr90-Y90 cal | DOE GROSS A/B | |
| Isotopic Pu by Alpha Spe Alpha Spectroscopy | NAS Iso Pu (SHO | |
| Isotopic U by Alpha Spec Alpha Spectroscopy | NAS Iso U (SHOR | |
| STRONTIUM 90 Sr90-Y90 cal | DOE SR-90 BY GF | |

**References:**

DOE "DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY

HASL Health and Safety Laboratory

NAS National Academy of Science

# SAMPLE SUMMARY

**F9L220151**

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| D6PQP | 001 | PC-1 | 12/16/99 | 10:20 |
| D6PQR | 002 | PC-2 | 12/16/99 | 11:05 |
| D6PQV | 003 | PC-3 | 12/16/99 | 11:30 |
| D6PQW | 004 | PC-4 | 12/16/99 | 12:10 |
| D6PR0 | 005 | PC-5 | 12/16/99 | 12:30 |
| D6PR2 | 006 | AC-1 | 12/16/99 | 15:40 |
| D6PR6 | 007 | AC-2 | 12/16/99 | 15:15 |
| D6PR7 | 008 | AC-3 | 12/16/99 | 14:50 |
| D6PR8 | 009 | AC-4 | 12/16/99 | 14:25 |
| D6PR9 | 010 | AC-5 | 12/16/99 | 14:00 |
| D6PRA | 011 | CC-1 | 12/15/99 | 15:45 |
| D6PRC | 012 | CC-2 | 12/15/99 | 15:15 |
| D6PRE | 013 | CC-3 | 12/15/99 | 14:45 |
| D6PRG | 014 | CC-4 | 12/15/99 | 14:15 |
| D6PRH | 015 | CC-5A | 12/15/99 | 13:30 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# TECHLAW, INC.

## Client Sample ID: PC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-001
Work Order: D6PQP
Matrix: SOLID

Date Collected: 12/16/99 1020
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.1 | U | 0.11 | 0.20 | 01/03/00 | 01/14/00 | 0003310 | 79 |
| Plutonium 239/40 | 0.034 | U + | 0.055 | 0.091 | 01/03/00 | 01/14/00 | 0003310 | 79 |
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.91 | J | 0.39 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| Uranium 235 | 0.035 | U + | 0.071 | 0.096 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| Uranium 238 | 0.82 | J | 0.36 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| Gamma Cs-137 & Hits by HASL AM-02 MOD | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.41 | | 0.14 | 0.15 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.6 | | 1.4 | 1.3 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.18 | | 0.34 | 0.16 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.01 | | 0.33 | 0.24 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 20.1 | | 4.2 | 1.5 | 12/23/99 | 01/04/00 | 0003180 | |
| Thallium 208 | 0.52 | | 0.16 | 0.12 | 12/23/99 | 01/04/00 | 0003180 | |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 19.3 | | 5.0 | 4.1 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 30.6 | | 5.0 | 4.8 | 01/10/00 | 01/11/00 | 0010176 | |
| SR-90 BY GFPC DOE 7500-SR MOD | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.55 | U | 0.47 | 0.75 | 01/12/00 | 01/25/00 | 0011354 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: PC-1 DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-001X
Work Order: D6PQP
Matrix: SOLID

Date Collected: 12/16/99 1020
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.43 | | 0.19 | 0.17 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 4.0 | | 2.1 | 1.6 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.10 | | 0.24 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 0.95 | | 0.23 | 0.25 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 22.0 | | 3.9 | 1.2 | 12/23/99 | 01/04/00 | 0003180 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.098 | U + | 0.096 | 0.12 | 01/03/00 | 01/14/00 | 0003310 | 96 |
| Plutonium 239/40 | -0.016 | U + | 0.014 | 0.086 | 01/03/00 | 01/14/00 | 0003310 | 96 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.96 | J | 0.38 | 0.22 | 01/03/00 | 01/13/00 | 0003368 | 56 |
| Uranium 235 | 0.08 | U | 0.10 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 56 |
| Uranium 238 | 1.05 | | 0.40 | 0.11 | 01/03/00 | 01/13/00 | 0003368 | 56 |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 13.2 | | 3.7 | 3.2 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 17.4 | | 3.8 | 4.6 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.10 | U | 0.47 | 0.80 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: PC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-002
Work Order: D6PQR
Matrix: SOLID

Date Collected: 12/16/99 1105
Date Received: 12/18/99 0830

| Paramater | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.065 | U + | 0.072 | 0.12 | 01/03/00 | 01/14/00 | 0003310 | 95 |
| Plutonium 239/40 | 0.040 | U + | 0.050 | 0.068 | 01/03/00 | 01/14/00 | 0003310 | 95 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.85 | J | 0.35 | 0.07 | 01/03/00 | 01/13/00 | 0003368 | 55 |
| Uranium 235 | 0.060 | U + | 0.086 | 0.081 | 01/03/00 | 01/13/00 | 0003368 | 55 |
| Uranium 238 | 0.77 | J | 0.33 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 55 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.054 | U + | 0.096 | 0.13 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.27 | | 0.25 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 0.94 | | 0.24 | 0.24 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 25.3 | | 4.3 | 1.6 | 12/23/99 | 01/04/00 | 0003180 | |
| Thallium 208 | 0.46 | | 0.14 | 0.15 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 21.0 | | 5.7 | 5.6 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 32.5 | | 5.7 | 6.0 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.20 | U | 0.45 | 0.77 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: PC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-003
Work Order: D6PQV
Matrix: SOLID

Date Collected: 12/16/99 1130
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.035 | U + | 0.077 | 0.17 | 01/03/00 | 01/14/00 | 0003310 | 88 |
| Plutonium 239/40 | 0.006 | U - | 0.045 | 0.13 | 01/03/00 | 01/14/00 | 0003310 | 88 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.73 | J | 0.31 | 0.16 | 01/03/00 | 01/13/00 | 0003368 | 58 |
| Uranium 235 | 0.016 | U - | 0.057 | 0.16 | 01/03/00 | 01/13/00 | 0003368 | 58 |
| Uranium 238 | 0.85 | J | 0.34 | 0.13 | 01/03/00 | 01/13/00 | 0003368 | 58 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.34 | | 0.18 | 0.19 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.4 | | 1.5 | 1.5 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.19 | | 0.24 | 0.19 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.17 | | 0.23 | 0.29 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 23.0 | | 4.7 | 1.7 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 21.2 | | 5.2 | 4.0 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 30.6 | | 5.3 | 5.5 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.26 | U | 0.40 | 0.68 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: PC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-004
Work Order: D6PQW
Matrix: SOLID

Date Collected: 12/16/99 1210
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.15 | U | 0.12 | 0.17 | 01/03/00 | 01/14/00 | 0003310 | 83 |
| Plutonium 239/40 | 0.007 | U + | 0.035 | 0.10 | 01/03/00 | 01/14/00 | 0003310 | 83 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.72 | J | 0.32 | 0.16 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| Uranium 235 | 0.025 | U + | 0.064 | 0.15 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| Uranium 238 | 1.18 | | 0.44 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.37 | | 0.14 | 0.13 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.11 | | 0.31 | 0.21 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 0.95 | | 0.35 | 0.18 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 24.0 | | 4.2 | 2.3 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 19.7 | | 4.9 | 4.0 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 30.6 | | 5.4 | 5.8 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.39 | U | 0.41 | 0.68 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: PC-5

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-005
Work Order: D6PR0
Matrix: SOLID

Date Collected: 12/16/99 1230
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.062 | U + | 0.072 | 0.12 | 01/03/00 | 01/14/00 | 0003310 | 92 |
| Plutonium 239/40 | -0.0000009 | U ? + | 0.028 | 0.095 | 01/03/00 | 01/14/00 | 0003310 | 92 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.83 | J | 0.33 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 61 |
| Uranium 235 | 0.076 | U + | 0.097 | 0.13 | 01/03/00 | 01/13/00 | 0003368 | 61 |
| Uranium 238 | 0.89 | J | 0.35 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 61 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.052 | U + | 0.097 | 0.18 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.20 | | 0.36 | 0.21 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.26 | | 0.42 | 0.23 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 22.2 | | 3.9 | 1.7 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 19.4 | | 4.8 | 4.0 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 34.7 | | 5.5 | 5.3 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.14 | U | 0.40 | 0.69 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

+ For informational purposes only. The detection limit does not follow significant figures SOP.

? For informational purposes only. The result does not follow significant figuresSOP

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-006
Work Order: D6PR2
Matrix: SOLID

Date Collected: 12/16/99 1540
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.040 | U - | 0.059 | 0.11 | 01/03/00 | 01/14/00 | 0003310 | 86 |
| Plutonium 239/40 | 0.050 | U + | 0.058 | 0.092 | 01/03/00 | 01/14/00 | 0003310 | 86 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.62 | | 0.51 | 0.16 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| Uranium 235 | 0.054 | U + | 0.089 | 0.17 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| Uranium 238 | 2.66 | | 0.75 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 53 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.39 | | 0.16 | 0.15 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Actinium 228 | 1.14 | | 0.34 | 0.46 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 210 | 2.9 | | 1.6 | 2.0 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.30 | | 0.25 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.09 | | 0.22 | 0.27 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 27.7 | | 4.8 | 1.8 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 24.6 | | 5.1 | 3.1 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 39.6 | | 5.5 | 4.4 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.47 | U | 0.44 | 0.78 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-007
Work Order: D6PR6
Matrix: SOLID

Date Collected: 12/16/99 1515
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | **pCi/g** | **Iso Pu (SHORT CT)** | | | |
| Plutonium 238 | 0.14 | U | 0.11 | 0.15 | 01/03/00 | 01/14/00 | 0003310 | 80 |
| Plutonium 239/40 | -0.021 | U + | 0.033 | 0.14 | 01/03/00 | 01/14/00 | 0003310 | 80 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | **pCi/g** | **Iso U (SHORT CT)** | | | |
| Uranium 234 | 1.30 | | 0.54 | 0.28 | 01/03/00 | 01/13/00 | 0003368 | 35 |
| Uranium 235 | -0.03 | U | 0.10 | 0.38 | 01/03/00 | 01/13/00 | 0003368 | 35 |
| Uranium 238 | 1.28 | | 0.54 | 0.32 | 01/03/00 | 01/13/00 | 0003368 | 35 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | **pCi/g** | **Gamma (Cs & hits)** | | | |
| Cesium 137 | 0.16 | U | 0.16 | 0.17 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.5 | | 1.3 | 1.4 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.43 | | 0.23 | 0.23 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.02 | | 0.26 | 0.28 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 29.9 | | 5.3 | 2.3 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | | **pCi/g** | **GROSS A/B** | | | |
| Gross Alpha | 19.9 | | 4.9 | 3.8 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 40.8 | | 6.0 | 5.1 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | **pCi/g** | **SR-90 BY GFPC** | | | |
| Strontium 90 | 0.23 | U | 0.36 | 0.61 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

U Analyte analyzed for but was not detected

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: AC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-008
Work Order: D6PR7
Matrix: SOLID

Date Collected: 12/16/99 1450
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.129 | J + | 0.097 | 0.097 | 01/03/00 | 01/14/00 | 0003310 | 74 |
| Plutonium 239/40 | 0.025 | U + | 0.044 | 0.087 | 01/03/00 | 01/14/00 | 0003310 | 74 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.93 | J | 0.36 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| Uranium 235 | 0.15 | U | 0.14 | 0.17 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| Uranium 238 | 1.34 | | 0.46 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.36 | | 0.14 | 0.14 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 4.2 | | 1.4 | 1.3 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.38 | | 0.36 | 0.16 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.15 | | 0.41 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 28.2 | | 4.4 | 1.6 | 12/23/99 | 01/04/00 | 0003180 | |
| Thorium 234 | 1.96 | | 0.79 | 0.98 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 28.4 | | 5.9 | 3.7 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 41.0 | | 4.1 | 5.5 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.31 | U | 0.38 | 0.63 | 01/12/00 | 01/25/00 | 0011354 | |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

- For informational purposes only. The detection limit does not follow significant figures SOP.

J Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-009
Work Order: D6PR8
Matrix: SOLID

Date Collected: 12/16/99 1425
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.018 | U + | 0.037 | 0.080 | 01/03/00 | 01/14/00 | 0003310 | 86 |
| Plutonium 239/40 | 0.013 | U + | 0.025 | 0.034 | 01/03/00 | 01/14/00 | 0003310 | 86 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.25 | | 0.43 | 0.1 | 01/03/00 | 01/13/00 | 0003368 | 51 |
| Uranium 235 | 0.046 | U + | 0.073 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 51 |
| Uranium 238 | 1.55 | | 0.50 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 51 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.37 | | 0.14 | 0.14 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.04 | | 0.29 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 0.91 | | 0.33 | 0.19 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 28.4 | | 4.3 | 0.8 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 22.6 | | 5.4 | 4.4 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 43.1 | | 6.8 | 6.3 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.22 | U | 0.40 | 0.67 | 01/12/00 | 01/25/00 | 0011354 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-5

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-010
Work Order: D6PR9
Matrix: SOLID

Date Collected: 12/16/99 1400
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.027 | U + | 0.051 | 0.11 | 01/03/00 | 01/14/00 | 0003310 | 87 |
| Plutonium 239/40 | -0.0097 | U + | 0.0099 | 0.083 | 01/03/00 | 01/14/00 | 0003310 | 87 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.81 | J | 0.33 | 0.22 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| Uranium 235 | 0.033 | U + | 0.082 | 0.19 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| Uranium 238 | 1.05 | | 0.39 | 0.11 | 01/03/00 | 01/13/00 | 0003368 | 50 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.12 | U | 0.11 | 0.21 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.2 | | 1.6 | 1.6 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.07 | | 0.22 | 0.22 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.06 | | 0.23 | 0.25 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 28.6 | | 4.6 | 1.2 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 19.5 | | 4.7 | 3.3 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 39.7 | | 5.9 | 5.1 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.24 | U | 0.43 | 0.72 | 01/12/00 | 01/28/00 | 0011354 | |

OTE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

# TECHLAW, INC.

## Client Sample ID: CC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-011
Work Order: D6PRA
Matrix: SOLID

Date Collected: 12/15/99 1545
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.23 | J | 0.15 | 0.17 | 01/03/00 | 01/14/00 | 0003310 | 71 |
| Plutonium 239/40 | 0.017 | U + | 0.053 | 0.12 | 01/03/00 | 01/14/00 | 0003310 | 71 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.99 | J | 0.48 | 0.19 | 01/03/00 | 01/13/00 | 0003368 | 30 |
| Uranium 235 | 0.04 | U | 0.10 | 0.24 | 01/03/00 | 01/13/00 | 0003368 | 30 |
| Uranium 238 | 1.0 | J | 0.48 | 0.11 | 01/03/00 | 01/13/00 | 0003368 | 30 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | -0.06 | U | 0.12 | 0.22 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.7 | | 1.6 | 1.4 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.02 | | 0.22 | 0.25 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.16 | | 0.24 | 0.24 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 24.7 | | 4.5 | 2.4 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 17.1 | | 4.4 | 3.5 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 37.0 | | 5.3 | 5.4 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.02 | U | 0.37 | 0.65 | 01/12/00 | 01/25/00 | 0011354 | |

OTE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-012
Work Order: D6PRC
Matrix: SOLID

Date Collected: 12/15/99 1515
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.030 | U + | 0.058 | 0.12 | 01/03/00 | 01/14/00 | 0003310 | 96 |
| Plutonium 239/40 | -0.0027 | U + | 0.0055 | 0.066 | 01/03/00 | 01/14/00 | 0003310 | 96 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.68 | J | 0.28 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 66 |
| Uranium 235 | 0.029 | U + | 0.072 | 0.17 | 01/03/00 | 01/13/00 | 0003368 | 66 |
| Uranium 238 | 0.72 | J | 0.29 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 66 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| esium 137 | 0.13 | U | 0.10 | 0.17 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead-210 | 2.7 | | 1.3 | 1.4 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.26 | | 0.34 | 0.22 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.02 | | 0.37 | 0.24 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 22.8 | | 4.0 | 1.0 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 20.4 | | 5.4 | 4.8 | 01/10/00 | 01/11/00 | 0010176 | |
| Gross Beta | 27.3 | | 5.6 | 6.7 | 01/10/00 | 01/11/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.17 | U | 0.36 | 0.65 | 01/12/00 | 01/25/00 | 0011354 | |

TE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

.d results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-013
Work Order: D6PRE
Matrix: SOLID

Date Collected: 12/15/99 1445
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.012 | U + | 0.057 | 0.15 | 01/03/00 | 01/14/00 | 0003310 | 88 |
| Plutonium 239/40 | 0.034 | U + | 0.055 | 0.11 | 01/03/00 | 01/14/00 | 0003310 | 88 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.82 | J | 0.40 | 0.15 | 01/03/00 | 01/13/00 | 0003368 | 38 |
| Uranium 235 | 0.0 | U | 0.0 | 0.1 | 01/03/00 | 01/13/00 | 0003368 | 38 |
| Uranium 238 | 1.04 | | 0.46 | 0.1 | 01/03/00 | 01/13/00 | 0003368 | 38 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.012 | U + | 0.095 | 0.17 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.17 | | 0.33 | 0.23 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.0 | | 0.36 | 0.20 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 26.6 | | 4.6 | 1.7 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 18.8 | | 5.3 | 4.2 | 01/10/00 | 01/12/00 | 0010176 | |
| Gross Beta | 35.3 | | 6.2 | 6.5 | 01/10/00 | 01/12/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.03 | U | 0.55 | 0.97 | 01/12/00 | 01/25/00 | 0011354 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-014
Work Order: D6PRG
Matrix: SOLID

Date Collected: 12/15/99 1415
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.11 | U | 0.11 | 0.16 | 01/03/00 | 01/14/00 | 0003310 | 82 |
| Plutonium 239/40 | 0.007 | U + | 0.036 | 0.11 | 01/03/00 | 01/14/00 | 0003310 | 82 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.11 | | 0.50 | 0.18 | 01/03/00 | 01/13/00 | 0003368 | 37 |
| Uranium 235 | 0.14 | J | 0.16 | 0.12 | 01/03/00 | 01/13/00 | 0003368 | 37 |
| Uranium 238 | 1.08 | | 0.48 | 0.10 | 01/03/00 | 01/13/00 | 0003368 | 37 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/g | Gamma (Cs & hits) | | | |
| esium 137 | 0.10 | U | 0.10 | 0.21 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.8 | | 1.5 | 1.8 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.23 | | 0.23 | 0.25 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.03 | | 0.23 | 0.25 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 28.8 | | 4.7 | 1.4 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | | pCi/g | GROSS A/B | | | |
| Gross Alpha | 21.5 | | 5.3 | 4.2 | 01/10/00 | 01/12/00 | 0010176 | |
| Gross Beta | 37.4 | | 6.0 | 6.0 | 01/10/00 | 01/12/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | pCi/g | SR-90 BY GFPC | | | |
| Strontium 90 | -0.06 | U | 0.33 | 0.59 | 01/12/00 | 01/25/00 | 0011354 | |

TE(S)

ta are incomplete without the case narrative.

: is determined by instrument performance only.

.d results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-5A

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L220151-015
Work Order: D6PRH
Matrix: SOLID

Date Collected: 12/15/99 1330
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | -0.006 | U + | 0.056 | 0.16 | 01/03/00 | 01/14/00 | 0003310 | 93 |
| Plutonium 239/40 | 0.006 | U + | 0.031 | 0.092 | 01/03/00 | 01/14/00 | 0003310 | 93 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.07 | | 0.41 | 0.10 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| Uranium 235 | 0.12 | J | 0.13 | 0.08 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| Uranium 238 | 0.87 | J | 0.36 | 0.10 | 01/03/00 | 01/13/00 | 0003368 | 54 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | -0.05 | U | 0.12 | 0.22 | 12/23/99 | 01/04/00 | 0003180 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.7 | | 1.3 | 1.5 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 212 | 1.45 | | 0.26 | 0.17 | 12/23/99 | 01/04/00 | 0003180 | |
| Lead 214 | 1.35 | | 0.24 | 0.23 | 12/23/99 | 01/04/00 | 0003180 | |
| Potassium 40 | 25.2 | | 4.8 | 1.8 | 12/23/99 | 01/04/00 | 0003180 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 29.9 | | 6.6 | 4.5 | 01/10/00 | 01/12/00 | 0010176 | |
| Gross Beta | 36.4 | | 5.8 | 5.6 | 01/10/00 | 01/12/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.01 | U | 0.41 | 0.72 | 01/12/00 | 01/25/00 | 0011334 | |

OTE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

uanterra - St. Louis

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L220151
Matrix: SOLID

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | Gamma (Cs & hits) | | | F0A030000-180B | |
| Cesium 137 | 0.053 | U | 0.044 | 0.10 | 12/23/99 | 01/04/00 | 0003180 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso Pu (SHORT CT) | | | F0A030000-310B | |
| Plutonium 238 | 0.024 | U + | 0.050 | 0.11 | 01/03/00 | 01/14/00 | 0003310 | 91 |
| Plutonium 239/40 | 0.019 | U + | 0.038 | 0.067 | 01/03/00 | 01/14/00 | 0003310 | 91 |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | GROSS A/B | | | F0A100000-176B | |
| Gross Alpha | -0.3 | U | 0.2 | 4.4 | 01/10/00 | 01/12/00 | 0010176 | |
| Gross Beta | 3.7 | U | 2.8 | 4.5 | 01/10/00 | 01/12/00 | 0010176 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | SR-90 BY GFPC | | | F0A110000-354B | |
| Strontium 90 | 0.31 | U | 0.43 | 0.71 | 01/12/00 | 01/25/00 | 0011354 | 69 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso U (SHORT CT) | | | F0A030000-368B | |
| Uranium 234 | 0.009 | U + | 0.046 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 48 |
| Uranium 235 | 0.0 | U - | 0.0 | 0.07 | 01/03/00 | 01/13/00 | 0003368 | 48 |
| Uranium 238 | -0.013 | U + | 0.015 | 0.14 | 01/03/00 | 01/13/00 | 0003368 | 48 |

OTE(S)

ta are incomplete without the case narrative.

C is determined using instrument performance only
ld results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.
Analyte analyzed for but was not detected

anterra - St. Louis

# DUPLICATE EVALUATION REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L220151
Work Order #: D6PQ
Matrix: SOLID

Date Sampled: 12/16/99
Date Received: 12/18/99

| Parameter | SAMPLE Result | | Total Uncert. (2σ+/-) | % Yld | DUPLICATE Result | | Total Uncert. (2σ+/-) | % Yld | QC Sample ID Precision | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL** | pCi/g | | | | Gamma (Cs & hits) | | | | F9L220151-001 | |
| esium 137 | 0.41 | | 0.14 | | 0.43 | | 0.19 | | 4 | %RPD |
| ---Other Dedected Radionuclides--- | | | | | | | | | | |
| Lead 210 | 2.6 | | 1.4 | | 4.0 | | 2.1 | | 44 | %RPD |
| Lead 212 | 1.18 | | 0.34 | | 1.10 | | 0.24 | | 7 | %RPD |
| Lead 214 | 1.01 | | 0.33 | | 0.95 | | 0.23 | | 6 | %RPD |
| Potassium 40 | 20.1 | | 4.2 | | 22.0 | | 3.9 | | 9 | %RPD |
| | Batch #: | | 0003180 | (Sample) | 0003180 | | (Duplicate) | | | |
| **Iso PLUTONIUM (SHORT CT)** | pCi/g | | | | Iso Pu (SHORT CT) | | | | F9L220151-001 | |
| Plutonium 238 | 0.1 | U | 0.11 | 79 | 0.098 | U | + 0.096 | 96 | 0.3 | %RPD |
| Plutonium 239/40 | 0.034 | U | + 0.055 | 79 | -0.016 | U | + 0.014 | 96 | 565 | %RPD |
| | Batch #: | | 0003310 | (Sample) | 0003310 | | (Duplicate) | | | |
| **Iso URANIUM (SHORT CT)** | pCi/g | | | | Iso U (SHORT CT) | | | | F9L220151-001 | |
| ranium 234 | 0.91 | J | 0.39 | 53 | 0.96 | J | 0.38 | 56 | 6 | %RPD |
| ranium 235 | 0.035 | U | + 0.071 | 53 | 0.08 | U | 0.10 | 56 | 79 | %RPD |
| ranium 238 | 0.82 | J | 0.36 | 53 | 1.05 | | 0.40 | 56 | 24 | %RPD |
| | Batch #: | | 0003368 | (Sample) | 0003368 | | (Duplicate) | | | |
| **ROSS A/B BY DOE RP-710 MOD** | pCi/g | | | | GROSS A/B | | | | F9L220151-001 | |
| ross Alpha | 19.3 | | 5.0 | | 13.2 | | 3.7 | | 38 | %RPD |
| ross Beta | 30.6 | | 5.0 | | 17.4 | | 3.8 | | 55 | %RPD |
| | Batch #: | | 0010176 | (Sample) | 0010176 | | (Duplicate) | | | |
| **R-90 BY GFPC DOE 7500-SR** | pCi/g | | | | SR-90 BY GFPC | | | | F9L220151-001 | |
| rontium 90 | 0.55 | U | 0.47 | | 0.10 | U | 0.47 | | 138 | %RPD |
| | Batch #: | | 0011354 | (Sample) | 0011354 | | (Duplicate) | | | |

**TE(S)**

a are incomplete without the case narrative.
lculations are performed before rounding to avoid round-off error in calculated results

For informational purposes only. The detection limit does not follow significant figures SOP.

Analyte analyzed for but was not detected

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

:lient Lot ID: F9L220151
Matrix: SOLID

| Parameter | Spike Amount | Result | | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | | QC Control Limits |
|---|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | pCi/g | | | Gamma (Cs & hits) | | | Lab Sample ID F0A030000-180C | |
| Cesium 137 | 18900 | 18400 | - | 2100 | 60 | | 97 | - | 88 - 117 |
| | Batch #: | 0003180 | | | AnalysisDate | 01/04/00 | | | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso Pu (SHORT CT) | | | F0A030000-310C | |
| Plutonium 238 | 5.29 | 5.1 | + | 1.2 | 0.1 | 95 | 97 | + | 68 - 126 |
| Plutonium 239/40 | 6.21 | 6.9 | - | 1.5 | 0.06 | 95 | 111 | - | 68 - 126 |
| | Batch #: | 0003310 | | | AnalysisDate | 01/14/00 | | | |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso U (SHORT CT) | | | F0A030000-368C | |
| Uranium 234 | 6.01 | 7.1 | | 1.9 | 0.3 | 42 | 117 | | 63 - 128 |
| Uranium 238 | 6.01 | 7.6 | + | 2.0 | 0.07 | 42 | 127 | - | 63 - 128 |
| | Batch #: | 0003368 | | | AnalysisDate | 01/13/00 | | | |
| **GROSS A/B BY DOE RP-710 MOD** | | pCi/g | | | GROSS A/B | | | F0A100000-176C | |
| Gross Alpha | 27.1 | 16.5 | | 4.6 | 3.9 | | 61 | | 48 - 147 |
| Gross Beta | 26.8 | 24.7 | | 4.7 | 5.2 | | 92 | | 68 - 145 |
| | Batch #: | 0010176 | | | AnalysisDate | 01/12/00 | | | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | pCi/g | | | SR-90 BY GFPC | | | F0A110000-354C | |
| Strontium 90 | 9.70 | 10.0 | | 2.1 | 0.6 | 81 | 103 | | 49 - 126 |
| | Batch #: | 0011354 | | | AnalysisDate | 01/25/00 | | | |

**NOTE(S)**

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

\+ For informational purposes only. The detection limit does not follow significant figures SOP.
\+ For informational purposes only. The detection limit does not follow significant figures SOP.
\+ For informational purposes only. The detection limit does not follow significant figures SOP.

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

# ANALYTICAL REPORT

PROJECT NO. TECHLAW

Phase 2

Lot #: F9L160225

Julie Shanahan

Techlaw, Inc.
750 N St Paul
Suite 600
Dallas, TX 75201

QUANTERRA INCORPORATED

Ron Martino
Project Manager

February 4, 2000

# CASE NARRATIVE

## Lot # F9L160225

I. Introduction

On December 16, 1999, samples were received at the Quanterra St. Louis laboratory from Techlaw. A copy of the chain of custody and the condition upon receipt report is included with the analytical data.

III. Analytical Results/Methodology

The analytical results for this report are presented by analytical tests. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits.

III. Quality Control

The QA/QC information can be found immediately following the analytical data. This QA/QC data are used to assess the laboratory's accuracy and precision during the analytical procedure.

IV. Comments/Nonconformances

**Strontium 90**

The LCS has a low recovery 8% for the Yttrium carrier. The LCS Strontium preparation was counted with acceptable results.

Sample MC-3 has a low carrier recovery for Yttrium at 37% but within acceptance criteria.

**Isouranium**

The Blank has a U-234 activity result (0.3564 pCi/g) which is greater than the MDA (0.07961 pCi/g) but is less than the CRDL (1 pCi/g). This activity in the blank is caused by Pu-242 tracer tailing into the U-234 region of interest.

**Gamma**

There were no anomalies associated with this analysis.

**Isoplutonium**

There were no anomalies associated with this analysis.

**ABT**

There were no anomalies associated with this analysis.

# METHODS SUMMARY

**F9L160225**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| Cs-137 & Hits by Gamma GAMMA SPEC MULTI ISO CAL | HASL Gamma (Cs | |
| Gross Alpha/Beta by GFPC Th230/Sr90-Y90 cal | DOE GROSS A/B | |
| Isotopic Pu by Alpha Spe Alpha Spectroscopy | NAS Iso Pu (SHO | |
| Isotopic U by Alpha Spec Alpha Spectroscopy | NAS Iso U (SHOR | |
| STRONTIUM 90 Sr90-Y90 cal | DOE SR-90 BY GF | |

**References:**

| | |
|---|---|
| DOE | "DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY |
| HASL | Health and Safety Laboratory |
| NAS | National Academy of Science |

# SAMPLE SUMMARY

**F9L160225**

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| D6F05 | 001 | BC-1 | 12/13/99 | 13:40 |
| D6F0P | 002 | BC-2 | 12/13/99 | 14:10 |
| D6F0T | 003 | BC-3 | 12/13/99 | 14:30 |
| D6F11 | 004 | BC-4 | 12/13/99 | 15:05 |
| D6F15 | 005 | BC-5 | 12/13/99 | 14:20 |
| D6F17 | 006 | SC-1 | 12/13/99 | 09:25 |
| D6F1D | 007 | SC-2 | 12/13/99 | 09:55 |
| D6F37 | 008 | SC-3 | 12/13/99 | 10:25 |
| D6F3A | 009 | SC-4 | 12/13/99 | 10:50 |
| D6F3H | 010 | SC-5 | 12/13/99 | 11:50 |
| D6F45 | 011 | SC-6 | 12/13/99 | 11:25 |
| D6F4Q | 012 | MC-1 | 12/14/99 | 10:00 |
| D6F52 | 013 | MC-2 | 12/14/99 | 12:00 |
| D6F56 | 014 | MC-3 | 12/14/99 | 11:15 |
| D6F5D | 015 | MC-4 | 12/14/99 | 11:30 |
| D6F5J | 016 | MC-5A | 12/14/99 | 12:55 |
| D6F5K | 017 | MC-5B | 12/14/99 | 12:50 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

# TECHLAW, INC.

## Client Sample ID: BC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-001
Work Order: D6F05
Matrix: SOLID

Date Collected: 12/13/99 1340
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.023 | U | 0.052 | 0.095 | 01/03/00 | 01/11/00 | 0003308 | 94 |
| Plutonium 239/40 | 0.083 | J | 0.073 | 0.060 | 01/03/00 | 01/11/00 | 0003308 | 94 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.46 | | 0.44 | 0.04 | 01/03/00 | 01/13/00 | 0003360 | 82 |
| Uranium 235 | 0.12 | J | 0.10 | 0.05 | 01/03/00 | 01/13/00 | 0003360 | 82 |
| Uranium 238 | 1.64 | | 0.48 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 82 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.83 | | 0.20 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 1.9 | | 1.7 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.62 | | 0.41 | 0.16 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.68 | | 0.48 | 0.25 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 30.6 | | 4.7 | 1.3 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 34.0 | | 7.3 | 4.4 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 43.4 | | 7.1 | 6.9 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.85 | J | 0.53 | 0.81 | 01/12/00 | 01/29/00 | 0012121 | 70 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: BC-1 DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-001X
Work Order: D6F05
Matrix: SOLID

Date Collected: 12/13/99 1340
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.108 | U | 0.0998 | 0.13 | 01/03/00 | 01/11/00 | 0003308 | 92 |
| Plutonium 239/40 | 0.063 | U | 0.073 | 0.098 | 01/03/00 | 01/11/00 | 0003308 | 92 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.49 | | 0.43 | 0.11 | 01/03/00 | 01/13/00 | 0003360 | 90 |
| Uranium 235 | 0.101 | U | 0.091 | 0.10 | 01/03/00 | 01/13/00 | 0003360 | 90 |
| Uranium 238 | 1.89 | | 0.52 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 90 |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 26.5 | | 6.0 | 4.5 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 45.5 | | 7.1 | 6.9 | 01/10/00 | 01/13/00 | 0010205 | |

TE(S)

:a are incomplete without the case narrative.
: is determined by instrument performance only.
:d results are greater than the MDC
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: BC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-002
Work Order: D6F0P
Matrix: SOLID

Date Collected: 12/13/99 1410
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.13 | U | 0.13 | 0.17 | 01/03/00 | 01/11/00 | 0003308 | 73 |
| Plutonium 239/40 | 0.037 | U | 0.059 | 0.085 | 01/03/00 | 01/11/00 | 0003308 | 73 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.74 | | 0.60 | 0.13 | 01/03/00 | 01/13/00 | 0003360 | 56 |
| Uranium 235 | 0.13 | J | 0.13 | 0.09 | 01/03/00 | 01/13/00 | 0003360 | 56 |
| Uranium 238 | 1.34 | | 0.49 | 0.13 | 01/03/00 | 01/13/00 | 0003360 | 56 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.38 | | 0.15 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Actinium 228 | 1.71 | | 0.35 | 0.59 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.43 | | 0.26 | 0.27 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.35 | | 0.26 | 0.24 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 29.1 | | 4.5 | 1.9 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 33.8 | | 7.4 | 5.0 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 49.9 | | 7.8 | 7.2 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.34 | U | 0.60 | 1.0 | 01/12/00 | 01/29/00 | 0012121 | 57 |

**TE(S)**

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: BC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-003
Work Order: D6F0T
Matrix: SOLID

Date Collected: 12/13/99 1430
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.003 | U | 0.062 | 0.13 | 01/03/00 | 01/11/00 | 0003308 | 93 |
| Plutonium 239/40 | 0.051 | U | 0.066 | 0.094 | 01/03/00 | 01/11/00 | 0003308 | 93 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.35 | | 0.40 | 0.13 | 01/03/00 | 01/13/00 | 0003360 | 94 |
| Uranium 235 | 0.15 | J | 0.11 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 94 |
| Uranium 238 | 1.40 | | 0.41 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 94 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.06 | U | 0.12 | 0.24 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.5 | | 1.8 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.83 | | 0.28 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.59 | | 0.29 | 0.27 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 31.3 | | 5.4 | 2.1 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 30.7 | | 6.8 | 5.2 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 46.3 | | 7.2 | 6.7 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.23 | U | 0.61 | 1.0 | 01/12/00 | 01/29/00 | 0012121 | 57 |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: BC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-004
Work Order: D6F11
Matrix: SOLID

Date Collected: 12/13/99 1505
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.068 | U | 0.098 | 0.15 | 01/03/00 | 01/11/00 | 0003308 | 72 |
| Plutonium 239/40 | -0.011 | U | 0.013 | 0.10 | 01/03/00 | 01/11/00 | 0003308 | 72 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.21 | | 0.38 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 76 |
| Uranium 235 | 0.035 | U | 0.057 | 0.094 | 01/03/00 | 01/13/00 | 0003360 | 76 |
| Uranium 238 | 0.90 | J | 0.31 | 0.04 | 01/03/00 | 01/13/00 | 0003360 | 76 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.32 | | 0.12 | 0.14 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.5 | | 1.5 | 1.2 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.21 | | 0.34 | 0.21 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.25 | | 0.41 | 0.19 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 32.6 | | 4.7 | 1.4 | 12/28/99 | 01/05/00 | 9363247 | |
| Thallium 208 | 0.33 | | 0.12 | 0.12 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 25.5 | | 6.3 | 4.9 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 47.8 | | 7.4 | 6.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.40 | U | 0.52 | 0.86 | 01/12/00 | 01/29/00 | 0012121 | 70 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: BC-5

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-005
Work Order: D6F15
Matrix: SOLID

Date Collected: 12/13/99 1400
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.066 | U | 0.079 | 0.11 | 01/03/00 | 01/11/00 | 0003308 | 85 |
| Plutonium 239/40 | 0.057 | U | 0.066 | 0.085 | 01/03/00 | 01/11/00 | 0003308 | 85 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.65 | | 0.47 | 0.10 | 01/03/00 | 01/13/00 | 0003360 | 91 |
| Uranium 235 | 0.13 | J | 0.11 | 0.12 | 01/03/00 | 01/13/00 | 0003360 | 91 |
| Uranium 238 | 1.48 | | 0.43 | 0.09 | 01/03/00 | 01/13/00 | 0003360 | 91 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.36 | | 0.17 | 0.17 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 4.0 | | 1.6 | 1.7 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.16 | | 0.26 | 0.19 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.34 | | 0.24 | 0.24 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 25.9 | | 4.2 | 2.0 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 30.3 | | 6.9 | 5.9 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 44.4 | | 7.0 | 6.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.16 | U | 0.52 | 0.89 | 01/12/00 | 01/29/00 | 0012121 | 66 |

NOTE(S)

Data are incomplete without the case narrative.
MDC is determined by instrument performance only.
Yld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: SC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-006
Work Order: D6F17
Matrix: SOLID

Date Collected: 12/13/99 0925
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | | pCi/g | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.08 | | 0.34 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 92 |
| Uranium 235 | 0.092 | J | 0.084 | 0.050 | 01/03/00 | 01/13/00 | 0003360 | 92 |
| Uranium 238 | 0.904 | J | 0.030 | 0.040 | 01/03/00 | 01/13/00 | 0003360 | 92 |
| GROSS A/B BY DOE RP-710 MOD | | | | pCi/g | GROSS A/B | | | |
| Gross Alpha | 23.5 | | 6.3 | 6.0 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 32.3 | | 6.8 | 8.3 | 01/10/00 | 01/13/00 | 0010205 | |

:TE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: SC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-007
Work Order: D6F1D
Matrix: SOLID

Date Collected: 12/13/99 0955
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.46 | | 0.45 | 0.11 | 01/03/00 | 01/13/00 | 0003360 | 80 |
| Uranium 235 | 0.102 | J | 0.098 | 0.10 | 01/03/00 | 01/13/00 | 0003360 | 80 |
| Uranium 238 | 1.15 | | 0.38 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 80 |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 36.7 | | 7.5 | 5.6 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 45.5 | | 6.7 | 5.7 | 01/10/00 | 01/13/00 | 0010205 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: SC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-008
Work Order: D6F37
Matrix: SOLID

Date Collected: 12/13/99 1025
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.05 | | 0.37 | 0.13 | 01/03/00 | 01/13/00 | 0003360 | 67 |
| Uranium 235 | 0.17 | J | 0.14 | 0.12 | 01/03/00 | 01/13/00 | 0003360 | 67 |
| Uranium 238 | 1.06 | | 0.37 | 0.13 | 01/03/00 | 01/13/00 | 0003360 | 67 |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 30.0 | | 6.8 | 4.8 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 43.3 | | 7.1 | 6.9 | 01/10/00 | 01/13/00 | 0010205 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: SC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-009
Work Order: D6F3A
Matrix: SOLID

Date Collected: 12/13/99 1050
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT). NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.13 | | 0.36 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| Uranium 235 | 0.077 | J | 0.079 | 0.052 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| Uranium 238 | 1.34 | | 0.41 | 0.04 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 26.3 | | 5.8 | 3.7 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 49.4 | | 7.6 | 6.8 | 01/10/00 | 01/13/00 | 0010205 | |

:TE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: SC-5

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-010
Work Order: D6F3H
Matrix: SOLID

Date Collected: 12/13/99 1150
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.37 | | 0.41 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| Uranium 235 | 0.076 | J | 0.078 | 0.052 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| Uranium 238 | 1.18 | | 0.37 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 88 |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 26.4 | | 6.2 | 5.4 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 39.1 | | 6.1 | 5.6 | 01/10/00 | 01/13/00 | 0010205 | |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: SC-6

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-011
Work Order: D6F45
Matrix: SOLID

Date Collected: 12/13/99 1125
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| ranium 234 | 1.48 | | 0.49 | 0.17 | 01/03/00 | 01/13/00 | 0003360 | 54 |
| ranium 235 | 0.09 | J | 0.11 | 0.19 | 01/03/00 | 01/13/00 | 0003360 | 54 |
| ranium 238 | 1.36 | | 0.47 | 0.17 | 01/03/00 | 01/13/00 | 0003360 | 54 |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| ross Alpha | 27.3 | | 6.1 | 4.4 | 01/10/00 | 01/13/00 | 0010205 | |
| ross Beta | 43.3 | | 6.9 | 6.6 | 01/10/00 | 01/13/00 | 0010205 | |

TE(S)

a are incomplete without the case narrative.

is determined by instrument performance only.

d results are greater than the MDC

Analyte analyzed for but was not detected

uanterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: MC-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-012
Work Order: D6F4Q
Matrix: SOLID

Date Collected: 12/14/99 1000
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.053 | U | 0.078 | 0.12 | 01/03/00 | 01/11/00 | 0003308 | 79 |
| Plutonium 239/40 | 0.030 | U | 0.048 | 0.070 | 01/03/00 | 01/11/00 | 0003308 | 79 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.78 | J | 0.26 | 0.1 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| Uranium 235 | 0.026 | J | 0.047 | 0.091 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| Uranium 238 | 0.87 | J | 0.28 | 0.09 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/g | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.04 | U | 0.11 | 0.23 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.7 | | 1.4 | 1.4 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.27 | | 0.22 | 0.17 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.07 | | 0.22 | 0.22 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 32.8 | | 5.3 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | | pCi/g | GROSS A/B | | | |
| Gross Alpha | 21.0 | | 5.2 | 4.3 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 37.4 | | 6.4 | 6.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | pCi/g | SR-90 BY GFPC | | | |
| Strontium 90 | 0.20 | U | 0.52 | 0.88 | 01/12/00 | 01/29/00 | 0012121 | 66 |

OTE(S)

ata are incomplete without the case narrative.
DC is determined by instrument performance only.
Yld results are greater than the MDC
Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MC-2

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-013
Work Order: D6F52
Matrix: SOLID

Date Collected: 12/14/99 1200
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.17 | J | 0.11 | 0.11 | 01/03/00 | 01/11/00 | 0003308 | 84 |
| Plutonium 239/40 | 0.14 | J | 0.10 | 0.11 | 01/03/00 | 01/11/00 | 0003308 | 84 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.75 | J | 0.25 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 80 |
| Uranium 235 | 0.026 | U | 0.047 | 0.091 | 01/03/00 | 01/13/00 | 0003360 | 90 |
| Uranium 238 | 0.76 | J | 0.26 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 90 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.26 | | 0.11 | 0.11 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.4 | | 1.3 | 1.2 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.12 | | 0.28 | 0.13 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 0.91 | | 0.29 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 31.0 | | 5.0 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 16.4 | | 4.8 | 4.7 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 37.2 | | 6.4 | 6.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.08 | U | 0.43 | 0.75 | 01/12/00 | 01/29/00 | 0012121 | 89 |

:TE(S)

ta are incomplete without the case narrative.

: is determined by instrument performance only.

:d results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MC-3

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-014
Work Order: D6F56
Matrix: SOLID

Date Collected: 12/14/99 1115
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.028 | U | 0.065 | 0.12 | 01/03/00 | 01/11/00 | 0003308 | 77 |
| Plutonium 239/40 | 0.015 | U | 0.046 | 0.092 | 01/03/00 | 01/11/00 | 0003308 | 77 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.62 | J | 0.24 | 0.16 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| Uranium 235 | 0.055 | J | 0.065 | 0.050 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| Uranium 238 | 0.56 | J | 0.22 | 0.04 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.005 | U | 0.068 | 0.12 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 0.91 | | 0.28 | 0.13 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 0.81 | | 0.29 | 0.22 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 27.2 | | 4.5 | 1.8 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 19.5 | | 5.2 | 4.7 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 47.0 | | 7.5 | 7.3 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.2 | U | 1.1 | 2.0 | 01/12/00 | 01/29/00 | 0012121 | 37 |

OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MC-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-015
Work Order: D6F5D
Matrix: SOLID

Date Collected: 12/14/99 1130
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso PLUTONIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.003 | U | 0.044 | 0.10 | 01/03/00 | 01/11/00 | 0003308 | 95 |
| Plutonium 239/40 | 0.017 | U | 0.042 | 0.081 | 01/03/00 | 01/11/00 | 0003308 | 95 |
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.51 | J | 0.20 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| Uranium 235 | 0.087 | U | 0.082 | 0.10 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| Uranium 238 | 0.56 | J | 0.21 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 83 |
| Gamma Cs-137 & Hits by HASL AM-02 MOD | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.44 | | 0.15 | 0.16 | 12/28/99 | 01/07/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 1.9 | | 1.5 | 1.3 | 12/28/99 | 01/07/00 | 9363247 | |
| Lead 212 | 1.22 | | 0.28 | 0.14 | 12/28/99 | 01/07/00 | 9363247 | |
| Lead 214 | 0.89 | | 0.27 | 0.21 | 12/28/99 | 01/07/00 | 9363247 | |
| Potassium 40 | 26.9 | | 4.4 | 1.3 | 12/28/99 | 01/07/00 | 9363247 | |
| GROSS A/B BY DOE RP-710 MOD | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 16.2 | | 4.6 | 3.8 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 39.4 | | 6.8 | 7.2 | 01/10/00 | 01/13/00 | 0010205 | |
| SR-90 BY GFPC DOE 7500-SR MOD | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.44 | U | 0.49 | 0.80 | 01/12/00 | 01/29/00 | 0012121 | 70 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Yld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MC-5A

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160225-016
Work Order: D6F5J
Matrix: SOLID

Date Collected: 12/14/99 1255
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.82 | J | 0.26 | 0.09 | 01/03/00 | 01/11/00 | 0003308 | 112 |
| Plutonium 239/40 | 106 | + | 21 | 0.07 | 01/03/00 | 01/11/00 | 0003308 | 112 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/g | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.73 | J | 0.26 | 0.07 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| Uranium 235 | 0.121 | J | 0.098 | 0.085 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| Uranium 238 | 0.74 | J | 0.26 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 73 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/g | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.124 | U | 0.095 | 0.14 | 12/28/99 | 01/07/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.04 | | 0.30 | 0.15 | 12/28/99 | 01/07/00 | 9363247 | |
| Lead 214 | 0.99 | | 0.32 | 0.21 | 12/28/99 | 01/07/00 | 9363247 | |
| Potassium 40 | 28.2 | | 4.7 | 1.7 | 12/28/99 | 01/07/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | | pCi/g | GROSS A/B | | | |
| Gross Alpha | 20.0 | | 5.1 | 4.1 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 42.9 | | 6.7 | 6.3 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | | pCi/g | SR-90 BY GFPC | | | |
| Strontium 90 | -0.01 | U | 0.52 | 0.91 | 01/10/00 | 01/29/00 | 0012121 | 66 |

OTE(S)

ıta are incomplete without the case narrative.

DC is determined by instrument performance only.

ıld results are greater than the MDC

For informational purposes only. The detection limit does not follow significant figures SOP.

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: MC-5B

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L160223-017
Work Order: D6F5K
Matrix: SOLID

Date Collected: 12/14/99 1250
Date Received: 12/16/99 0915

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.46 | J | 0.19 | 0.12 | 01/03/00 | 01/11/00 | 0003308 | 100 |
| Plutonium 239/40 | 67 | + | 13 | 0.07 | 01/03/00 | 01/11/00 | 0003308 | 100 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.53 | J | 0.19 | 0.11 | 01/03/00 | 01/13/00 | 0003360 | 98 |
| Uranium 235 | 0.102 | J | 0.084 | 0.098 | 01/03/00 | 01/13/00 | 0003360 | 98 |
| Uranium 238 | 0.72 | J | 0.23 | 0.06 | 01/03/00 | 01/13/00 | 0003360 | 98 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.005 | U | 0.075 | 0.14 | 12/28/99 | 01/07/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 1.50 | | 0.90 | 1.5 | 12/28/99 | 01/07/00 | 9363247 | |
| Lead 212 | 0.94 | | 0.19 | 0.14 | 12/28/99 | 01/07/00 | 9363247 | |
| Lead 214 | 0.75 | | 0.17 | 0.18 | 12/28/99 | 01/07/00 | 9363247 | |
| Potassium 40 | 30.4 | | 4.6 | 1.3 | 12/28/99 | 01/07/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 13.9 | | 4.5 | 4.3 | 01/10/00 | 01/13/00 | 0010205 | |
| Gross Beta | 37.7 | | 6.8 | 7.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.05 | U | 0.54 | 0.95 | 01/12/00 | 01/29/00 | 0012121 | 63 |

OTE(S)

ta are incomplete without the case narrative.
C is determined by instrument performance only.
ld results are greater than the MDC
For informational purposes only. The detection limit does not follow significant figures SOP.
Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-5B

### Quanterra, Inc. - Radiochemistry

Lab Sample ID:F9L210115-001
Work Order: D6MCA
Matrix: SOLID

Date Collected: 12/15/99 1345
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Gamma Cs-137 & Hits by HASL AM-02 MOD | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.017 | U | 0.088 | 0.18 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Actinium 228 | 1.52 | | 0.38 | 0.57 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 210 | 3.1 | | 1.4 | 1.2 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.25 | | 0.23 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.26 | | 0.24 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 24.6 | | 4.3 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| Thallium 208 | 0.51 | | 0.13 | 0.14 | 12/28/99 | 01/05/00 | 9363247 | |

TE(S)

:a are incomplete without the case narrative.
: is determined by instrument performance only.
:d results are greater than the MDC
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-5B DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-001X
Work Order: D6MJA
Matrix: SOLID

Date Collected: 12/15/99 1345
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Gamma Cs-137 & Hits by HASL AM-02 MOD | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.138 | U | 0.095 | 0.19 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.9 | | 1.0 | 1.1 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.32 | | 0.33 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.05 | | 0.37 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 26.0 | | 4.3 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| Thallium 208 | 0.42 | | 0.14 | 0.11 | 12/28/99 | 01/05/00 | 9363247 | |

OTE(S)

ıta are incomplete without the case narrative.

DC is determined by instrument performance only.

ɔld results are greater than the MDC

Analyte analyzed for but was not detected

anterra - St. Louis

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L160225
Matrix: SOLID

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | Gamma (Cs & hits) | | | F9L290000-247B | |
| esium 137 | -0.018 | U | 0.039 | 0.068 | 12/28/99 | 01/05/00 | 9363247 | |
| adium (226) | -0.16 | U | 0.75 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| adium 228 | -0.28 | U | 0.17 | 0.25 | 12/28/99 | 01/05/00 | 9363247 | |
| ranium 235 | -0.45 | U | 0.17 | 0.26 | 12/28/99 | 01/05/00 | 9363247 | |
| ranium 238 | -0.61 | U | 0.42 | 0.85 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| rotactinium 231 | 0.8 | U | 1.5 | 2.6 | 12/28/99 | 01/05/00 | 9363247 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso Pu (SHORT CT) | | | F0A030000-308B | |
| lutonium 238 | 0.036 | U | 0.053 | 0.080 | 01/03/00 | 01/11/00 | 0003308 | 83 |
| lutonium 239/40 | 0.020 | U | 0.046 | 0.084 | 01/03/00 | 01/11/00 | 0003308 | 83 |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | GROSS A/B | | | F0A100000-205B | |
| ross Alpha | 0.2 | U | 2.0 | 3.8 | 01/10/00 | 01/13/00 | 0010205 | |
| ross Beta | 6.1 | J | 3.0 | 4.6 | 01/10/00 | 01/13/00 | 0010205 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | SR-90 BY GFPC | | | F0A120000-121B | |
| rontium 90 | -0.05 | U | 0.43 | 0.75 | 01/12/00 | 01/29/00 | 0012121 | 74 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso U (SHORT CT) | | | F0A030000-360B | |
| anium 234 | 0.36 | J | 0.15 | 0.08 | 01/03/00 | 01/13/00 | 0003360 | 100 |
| anium 235 | 0.016 | U | 0.039 | 0.092 | 01/03/00 | 01/13/00 | 0003360 | 100 |
| anium 238 | 0.017 | U | 0.031 | 0.061 | 01/03/00 | 01/13/00 | 0003360 | 100 |

E(S)

a are incomplete without the case narrative.

is determined using instrument performance only
d results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# DUPLICATE EVALUATION REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L160225
Work Order #: D6F0
Matrix: SOLID

Date Sampled: 12/13/99
Date Received: 12/16/99

| Parameter | SAMPLE Result | | Total Uncert. (2σ+/-) | % Yld | DUPLICATE Result | | Total Uncert. (2 σ+/-) | % Yld | QC Sample ID Precision | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT)** | | **pCi/g** | | | **Iso Pu (SHORT CT)** | | | | **F9L160225-001** | |
| Plutonium 238 | 0.023 | U | 0.052 | 94 | 0.108 | U | 0.0998 | 92 | 130 | %RPD |
| Plutonium 239/40 | 0.083 | J | 0.073 | 94 | 0.063 | U | 0.073 | 92 | 28 | %RPD |
| | **Batch #:** | | 0003308 (Sample) | | 0003308 (Duplicate) | | | | | |
| **Iso URANIUM (SHORT CT)** | | **pCi/g** | | | **Iso U (SHORT CT)** | | | | **F9L160225-001** | |
| Uranium 234 | 1.46 | | 0.44 | 82 | 1.49 | | 0.43 | 90 | 2 | %RPD |
| Uranium 235 | 0.12 | J | 0.10 | 82 | 0.101 | U | 0.091 | 90 | 18 | %RPD |
| Uranium 238 | 1.64 | | 0.48 | 82 | 1.89 | | 0.52 | 90 | 14 | %RPD |
| | **Batch #:** | | 0003360 (Sample) | | 0003360 (Duplicate) | | | | | |
| **GROSS A/B BY DOE RP-710 MOD** | | **pCi/g** | | | **GROSS A/B** | | | | **F9L160225-001** | |
| Gross Alpha | 34.0 | | 7.3 | | 26.5 | | 6.0 | | 25 | %RPD |
| Gross Beta | 43.4 | | 7.1 | | 45.5 | | 7.1 | | 5 | %RPD |
| | **Batch #:** | | 0010205 (Sample) | | 0010205 (Duplicate) | | | | | |

**OTE(S)**

ata are incomplete without the case narrative.
alculations are performed before rounding to avoid round-off error in calculated results

Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: BKGSD-09

### Quanterra, Inc. - Radiochemistry

Lab Sample ID:A9L150222-001
Work Order: D6D5T
Matrix: SOLID

Date Collected: 12/14/99 1120
Date Received: 12/15/99 0945

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM | (SHORT CT) NAS ONLY MOD | | | pCi/g | Iso U (SHORT CT) | | | |
| Uranium 234 | 3.81 | | 0.90 | 0.12 | 01/03/00 | 01/27/00 | 0003356 | 86 |
| Uranium 235 | 0.22 | J | 0.13 | 0.1 | 01/03/00 | 01/27/00 | 0003356 | 86 |
| Uranium 238 | 2.98 | | 0.73 | 0.06 | 01/03/00 | 01/27/00 | 0003356 | 86 |

:TE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

# TECHLAW, INC.

## Client Sample ID: BKGSD-09 DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID:A9L150222-001X
Work Order: D6D5T
Matrix: SOLID

Date Collected: 12/14/99 1120
Date Received: 12/15/99 0945

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| Iso URANIUM (SHORT CT) NAS ONLY MOD | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 3.46 | | 0.87 | 0.11 | 01/03/00 | 01/27/00 | 0003356 | 68 |
| Uranium 235 | 0.17 | J | 0.12 | 0.09 | 01/03/00 | 01/27/00 | 0003356 | 68 |
| Uranium 238 | 3.05 | | 0.78 | 0.04 | 01/03/00 | 01/27/00 | 0003356 | 68 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

:anterra - St. Louis

Quanterra
Environmental Services

Quanterra Incorporated
13715 Rider Trail North
Earth City, Missouri 63045

314 298-8566 Telephone
314 298-8757 Fax

# ANALYTICAL REPORT

PROJECT NO. TECHLAW

Phase 2

Lot #: F9L210115

Julie Shanahan

Techlaw, Inc.
750 N St Paul
Suite 600
Dallas, TX 75201

QUANTERRA INCORPORATED

Ron Martino
Project Manager

February 4, 2000

# CASE NARRATIVE

## Lot # F9L210115

I. Introduction

On December 21, 1999, samples were received at the Quanterra St. Louis laboratory from Techlaw. A copy of the chain of custody and the condition upon receipt report is included with the analytical data.

III. Analytical Results/Methodology

The analytical results for this report are presented by analytical tests. Each set of data will include sample identification information, the analytical results, and the appropriate detection limits.

III. Quality Control

The QA/QC information can be found immediately following the analytical data. This QA/QC data are used to assess the laboratory's accuracy and precision during the analytical procedure.

IV. Comments/Nonconformances

**Strontium 90**

There were no anomalies associated with this analysis.

**Isouranium**

There were no anomalies associated with this analysis.

**Gamma**

There were no anomalies associated with this analysis.

**Isoplutonium**

For the water samples, MDA achieved for Pu-238 is > CRDL 1 pCi/L. This was the effect of reduced tracer recoveries ranging 20-30% and a higher detector background in the Pu-238 region of interest as compared to the Pu-239/240 region of interest. All MDA's achieved are less than 1.54 pCi/L. Data is accepted to report.

**ABT**

There were no anomalies associated with this analysis.

# METHODS SUMMARY

**F9L210115**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| Cs-137 & Hits by Gamma GAMMA SPEC MULTI ISO CAL | HASL Gamma (Cs | |
| Gross Alpha/Beta by GFPC Th230/Sr90-Y90 cal | DOE GROSS A/B | |
| Gross Alpha/Beta by GFPC Th230/Sr90-Y90 cal | SW846 GROSS A/B | |
| Isotopic Pu by Alpha Spe Alpha Spectroscopy | NAS Iso Pu (SHO | |
| Isotopic U by Alpha Spec Alpha Spectroscopy | NAS Iso U (SHOR | |
| STRONTIUM 90 Sr90-Y90 cal | DOE SR-90 BY GF | |
| STRONTIUM 90 Sr90-Y90 cal | SMWW SR-90 BY G | |

**References:**

| | |
|---|---|
| DOE | "DOE METHODS FOR EVALUATING ENVIRONMENTAL AND WASTE MANAGEMENT SAMPLES" OCTOBER 1994 US DEPARTMENT OF ENERGY |
| HASL | Health and Safety Laboratory |
| NAS | National Academy of Science |
| SMWW | "STANDARD METHODS FOR WASTE WATER" |
| SW846 | "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates. |

# SAMPLE SUMMARY

**F9L210115**

| WO # | SAMPLE# | CLIENT SAMPLE ID | DATE | TIME |
|---|---|---|---|---|
| D6MJA | 001 | CC-5B | 12/15/99 | 13:45 |
| D6MJE | 002 | CC-6 | 12/15/99 | 10:34 |
| D6MK9 | 003 | CC-7 | 12/15/99 | 10:00 |
| D6MKA | 004 | CC-8 | 12/15/99 | 09:15 |
| D6MKD | 005 | CC-9 | 12/15/99 | 08:30 |
| D6MKE | 006 | AC-EB | 12/16/99 | 16:10 |
| D6MKG | 007 | CC-EB | 12/15/99 | 11:50 |
| D6MKJ | 008 | GS-1 | 12/09/99 | 15:10 |
| D6MKL | 009 | O-4 | 12/13/99 | 20:40 |
| D6MKM | 010 | PM-1 | 12/13/99 | 20:11 |
| D6MKP | 011 | MCO-FB | 12/09/99 | 14:40 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

THIS IS NOT AN INVOICE

BILL TO:
Julie Shanahan
Techlaw, Inc.
750 N St Paul
Suite 600,TX 75201

REPORT SENT TO:
Julie Shanahan
Techlaw, Inc.
750 N St Paul
Suite 600,TX 75201

PHONE: 214 953-0045 FAX: 214 754-0819

PHONE:214 953-0045 FAX: 214 754-0819

LOT ID. : F9L210115 QUOTE: 034321
P.O. NUMBER :
SAMPLE RECEIVING DATE : 12/21/99
PROJECT NUMBER : TECHLAW
SAMPLING SITE : Phase 2
REPORT RECIPIENT : Julie Shanahan
REPORT DATE : 0/00/00

| QUANT | PARAMETER | UNIT COST | AMOUNT |
|---|---|---|---|
| 5 | SOLID, GROSS A/B | 55.00 | 275.00 |
| 2 | WATER, GROSS A/B | 55.00 | 110.00 |
| 6 | WATER, SR-90 BY GFPC | 110.00 | 660.00 |
| 5 | SOLID, SR-90 BY GFPC | 110.00 | 550.00 |
| 5 | SOLID, Gamma (Cs & hits) | 89.00 | 445.00 |
| 2 | WATER, Gamma (Cs & Hits) | 89.00 | 178.00 |
| 5 | SOLID, Iso Plutonium | 120.00 | 600.00 |
| 2 | WATER, Iso Plutonium | 120.00 | 240.00 |
| 5 | SOLID, Iso Uranium | 120.00 | 600.00 |
| 2 | WATER, Iso Uranium | 120.00 | 240.00 |
| | | | 3,898.00 |

# TECHLAW, INC.

## Client Sample ID: CC-5B

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-001
Work Order: D6MJA
Matrix: SOLID

Date Collected: 12/15/99 1345
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.060 | U | 0.097 | 0.20 | 01/05/00 | 01/27/00 | 0005167 | 79 |
| Plutonium 239/40 | 0.034 | U | 0.054 | 0.090 | 01/05/00 | 01/27/00 | 0005167 | 79 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.84 | J | 0.28 | 0.08 | 01/03/00 | 01/28/00 | 0003356 | 75 |
| Uranium 235 | 0.100 | U | 0.096 | 0.14 | 01/03/00 | 01/28/00 | 0003356 | 75 |
| Uranium 238 | 0.85 | J | 0.29 | 0.12 | 01/03/00 | 01/28/00 | 0003356 | 75 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.017 | U | 0.088 | 0.18 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Actinium 228 | 1.52 | | 0.38 | 0.57 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 210 | 3.1 | | 1.4 | 1.2 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.25 | | 0.23 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.26 | | 0.24 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 24.6 | | 4.3 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| Thallium 208 | 0.51 | | 0.13 | 0.14 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 14.4 | | 4.5 | 4.5 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 33.0 | | 6.1 | 6.7 | 12/28/99 | 01/20/00 | 0019152 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.31 | U | 0.85 | 1.5 | 01/12/00 | 01/29/00 | 0012121 | 40 |

OTE(S)

ta are incomplete without the case narrative.

C is determined by instrument performance only.

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-5B DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-001X
Work Order: D6MJA
Matrix: SOLID

Date Collected: 12/15/99 1345
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.138 | U | 0.095 | 0.19 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.9 | | 1.0 | 1.1 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.32 | | 0.33 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.05 | | 0.37 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 26.0 | | 4.3 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| Thallium 208 | 0.42 | | 0.14 | 0.11 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 18.6 | | 4.8 | 3.7 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 33.3 | | 6.1 | 6.7 | 12/28/99 | 01/20/00 | 0019152 | |

:TE(S)

ta are incomplete without the case narrative.

: is determined by instrument performance only.

ld results are greater than the MDC

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-6

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-002
Work Order: D6MJE
Matrix: SOLID

Date Collected: 12/15/99 1034
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.16 | J | 0.12 | 0.14 | 01/05/00 | 01/27/00 | 0005167 | 81 |
| Plutonium 239/40 | 0.013 | U | 0.034 | 0.079 | 01/05/00 | 01/27/00 | 0005167 | 81 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.99 | J | 0.38 | 0.19 | 01/03/00 | 01/27/00 | 0003356 | 47 |
| Uranium 235 | 0.11 | J | 0.11 | 0.07 | 01/03/00 | 01/27/00 | 0003356 | 47 |
| Uranium 238 | 1.16 | | 0.42 | 0.14 | 01/03/00 | 01/27/00 | 0003356 | 47 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.21 | | 0.13 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 212 | 1.22 | | 0.34 | 0.16 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.21 | | 0.39 | 0.19 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 22.7 | | 3.9 | 1.7 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 17.2 | | 4.7 | 4.0 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 35.9 | | 6.0 | 6.0 | 12/28/99 | 01/20/00 | 0019152 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.19 | U | 0.44 | 0.78 | 01/12/00 | 01/29/00 | 0012121 | 70 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-7

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-003
Work Order: D6MK9
Matrix: SOLID

Date Collected: 12/15/99 1000
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.18 | J | 0.12 | 0.15 | 01/05/00 | 01/27/00 | 0005167 | 78 |
| Plutonium 239/40 | 0.031 | U | 0.056 | 0.11 | 01/05/00 | 01/27/00 | 0005167 | 78 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.99 | J | 0.45 | 0.1 | 01/03/00 | 01/28/00 | 0003356 | 36 |
| Uranium 235 | 0.045 | U | 0.091 | 0.12 | 01/03/00 | 01/28/00 | 0003356 | 36 |
| Uranium 238 | 0.76 | J | 0.39 | 0.18 | 01/03/00 | 01/28/00 | 0003356 | 36 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.092 | U | 0.072 | 0.15 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 3.3 | | 1.2 | 1.1 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.16 | | 0.30 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 0.83 | | 0.31 | 0.18 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 35.7 | | 4.2 | 1.3 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 18.6 | | 5.1 | 4.3 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 32.9 | | 6.4 | 7.5 | 12/28/99 | 01/20/00 | 0019152 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | -0.33 | U | 0.47 | 0.84 | 01/12/00 | 01/29/00 | 0012121 | 72 |

NOTE(S)

Data are incomplete without the case narrative.
MDC is determined by instrument performance only.
Yld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-8

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F91210115-004
Work Order: D6MKA
Matrix: SOLID

Date Collected: 12/15/99 0915
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.20 | J | 0.14 | 0.19 | 01/05/00 | 01/27/00 | 0005167 | 75 |
| Plutonium 239/40 | -0.010 | U | 0.040 | 0.15 | 01/05/00 | 01/27/00 | 0005167 | 75 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 1.13 | | 0.40 | 0.10 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| Uranium 235 | 0.026 | U | 0.053 | 0.072 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| Uranium 238 | 0.74 | J | 0.30 | 0.10 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | 0.016 | U | 0.095 | 0.17 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.5 | | 1.1 | 1.5 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.11 | | 0.20 | 0.22 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.04 | | 0.19 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 23.4 | | 3.9 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 22.3 | | 5.5 | 4.5 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 40.1 | | 6.7 | 6.6 | 12/28/99 | 01/20/00 | 0019152 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.7 | U | 1.7 | 3.0 | 01/12/00 | 01/29/00 | 0012121 | 18 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-9

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-005
Work Order: D6MKD
Matrix: SOLID

Date Collected: 12/15/99 0830
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | 0.12 | U | 0.11 | 0.17 | 01/05/00 | 01/27/00 | 0005167 | 78 |
| Plutonium 239/40 | 0.13 | J | 0.10 | 0.11 | 01/05/00 | 01/27/00 | 0005167 | 78 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.82 | J | 0.31 | 0.18 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| Uranium 235 | 0.042 | U | 0.068 | 0.11 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| Uranium 238 | 0.81 | J | 0.31 | 0.09 | 01/03/00 | 01/28/00 | 0003356 | 70 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | | Gamma (Cs & hits) | | | |
| Cesium 137 | -0.003 | U ? | 0.10 | 0.20 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Lead 210 | 2.7 | | 1.4 | 1.2 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 212 | 1.20 | | 0.21 | 0.16 | 12/28/99 | 01/05/00 | 9363247 | |
| Lead 214 | 1.00 | | 0.18 | 0.22 | 12/28/99 | 01/05/00 | 9363247 | |
| Potassium 40 | 21.0 | | 3.9 | 1.8 | 12/28/99 | 01/05/00 | 9363247 | |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | | GROSS A/B | | | |
| Gross Alpha | 15.6 | | 4.3 | 3.5 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 33.8 | | 5.7 | 5.8 | 12/28/99 | 01/20/00 | 0019152 | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.05 | U | 0.53 | 0.91 | 01/12/00 | 01/29/00 | 0012121 | 72 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

? For informational purposes only. The result does not follow significant figures SOP

J Result is greater than sample detection limit but less than stated reporting limit.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-EB

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-006
Work Order: D6MKE
Matrix: WATER

Date Collected: 12/16/99 1610
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | **pCi/L** | **Gamma (Cs & hits)** | | | |
| Cesium 137 | 0.5 | U | 8.2 | 16 | 01/18/00 | 01/19/00 | 0019145 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | **pCi/L** | **Iso Pu (SHORT CT)** | | | |
| Plutonium 238 | 0.37 | U | 0.61 | 1.2 | 01/25/00 | 01/28/00 | 0025149 | 26 |
| Plutonium 239/40 | -0.023 | U | 0.047 | 0.56 | 01/25/00 | 01/28/00 | 0025149 | 26 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | **pCi/L** | **Iso U (SHORT CT)** | | | |
| Uranium 234 | 0.08 | U | 0.10 | 0.14 | 01/25/00 | 01/28/00 | 0025155 | 97 |
| Uranium 235 | 0.0 | U - | 0.0 | 0.1 | 01/25/00 | 01/28/00 | 0025155 | 97 |
| Uranium 238 | 0.057 | U | 0.081 | 0.077 | 01/25/00 | 01/28/00 | 0025155 | 97 |
| **GROSS A/B BY GFPC SW846 9310 MOD** | | | | **pCi/L** | **GROSS A/B** | | | |
| Gross Alpha | -0.36 | U | 0.48 | 1.0 | 01/04/00 | 01/10/00 | 0004164 | |
| Gross Beta | -0.9 | U | 1.0 | 1.8 | 01/04/00 | 01/10/00 | 0004164 | |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | | | **pCi/L** | **SR-90 BY GFPC** | | | |
| Strontium 90 | 0.38 | U | 0.95 | 1.4 | 01/07/00 | 02/01/00 | 0007293 | 71 |

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

* For informational purposes only. The detection limit does not follow significant figures SOP.

U Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: AC-EB DUP

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-006X
Work Order: D6MKE
Matrix: WATER

Date Collected: 12/16/99 1610
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **GROSS A/B BY GFPC SW846 9310 MOD** | | | pCi/L | | GROSS A/B | | | |
| Gross Alpha | -0.24 | U | 0.61 | 1.2 | 01/04/00 | 01/11/00 | 0004164 | |
| Gross Beta | 0.3 | U | 1.0 | 1.7 | 01/04/00 | 01/11/00 | 0004164 | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/L | | Gamma (Cs & hits) | | | |
| Cesium 137 | -8.5 | U | 9.9 | 18 | 01/18/00 | 01/19/00 | 0018145 | |

NOTE(S)

ata are incomplete without the case narrative.
DC is determined by instrument performance only.
old results are greater than the MDC
Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: CC-EB

### Quanterra, Inc. - Radiochemistry

Lab Sample ID:F9LZ10115-007
Work Order: D6MKG
Matrix: WATER

Date Collected: 12/15/99 1150
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | | pCi/L | Gamma (Cs & hits) | | | |
| Cesium 137 | -13.0 | U | 7.8 | 14 | 01/18/00 | 01/19/00 | 0018145 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/L | Iso Pu (SHORT CT) | | | |
| Plutonium 238 | -0.10 | U | 0.51 | 1.5 | 01/25/00 | 01/28/00 | 0025149 | 20 |
| Plutonium 239/40 | 0.08 | U | 0.39 | 1.1 | 01/25/00 | 01/28/00 | 0025149 | 20 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | | pCi/L | Iso U (SHORT CT) | | | |
| Uranium 234 | 0.1 | U | 0.11 | 0.13 | 01/25/00 | 01/28/00 | 0025155 | 104 |
| Uranium 235 | 0.032 | U | 0.065 | 0.087 | 01/25/00 | 01/28/00 | 0025155 | 104 |
| Uranium 238 | 0.021 | U | 0.053 | 0.12 | 01/25/00 | 01/28/00 | 0025155 | 104 |
| **GROSS A/B BY GFPC SW846 9310 MOD** | | | | pCi/L | GROSS A/B | | | |
| Gross Alpha | -0.11 | U | 0.63 | 1.2 | 01/04/00 | 01/11/00 | 0004164 | |
| Gross Beta | -0.14 | U | 0.96 | 1.7 | 01/04/00 | 01/11/00 | 0004164 | |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | -0.25 | U | 0.50 | 0.88 | 01/07/00 | 01/24/00 | 0007293 | 70 |

**OTE(S)**

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: GS-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-008
Work Order: D6MKJ
Matrix: WATER

Date Collected: 12/09/99 1510
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 11.0 | | 2.3 | 0.8 | 01/07/00 | 01/24/00 | 0007293 | 71 |

:OTE(S)

ata are incomplete without the case narrative.

DC is determined by instrument performance only.

old results are greater than the MDC

# TECHLAW, INC.

## Client Sample ID: 0-4

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-009
Work Order: D6MKL
Matrix: WATER

Date Collected: 12/13/99 2040
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MDD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | 0.44 | U | 0.43 | 0.70 | 01/07/00 | 01/24/00 | 0007293 | 76 |

OTE(S)

ıta are incomplete without the case narrative.

DC is determined by instrument performance only.

ıld results are greater than the MDC

Analyte analyzed for but was not detected

# TECHLAW, INC.

## Client Sample ID: PM-1

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-010
Work Order: D6MKM
Matrix: WATER

Date Collected: 12/13/99 2011
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | pCi/L | | SR-90 BY GFPC | | | |
| Strontium 90 | 0.33 | U | 0.39 | 0.65 | 01/07/00 | 01/24/00 | 0007293 | 78 |

OTE(S)

ıta are incomplete without the case narrative.

C is determined by instrument performance only.

ıld results are greater than the MDC

Analyte analyzed for but was not detected

anterra - St. Louis

# TECHLAW, INC.

## Client Sample ID: MCO-FB

### Quanterra, Inc. - Radiochemistry

Lab Sample ID: F9L210115-011
Work Order: D6MKP
Matrix: WATER

Date Collected: 12/09/99 1440
Date Received: 12/18/99 0830

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| SR-90 BY GFPC SMWW 7500-SR MOD | | | | pCi/L | SR-90 BY GFPC | | | |
| Strontium 90 | -0.62 | U | 0.48 | 0.86 | 01/07/00 | 01/24/00 | 0007293 | -- |

TE(S)

a are incomplete without the case narrative.
is determined by instrument performance only.
d results are greater than the MDC
Analyte analyzed for but was not detected

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Matrix: SOLID

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/g | Gamma (Cs & hits) | | | F9L290000-247B | |
| Cesium 137 | -0.018 | U | 0.039 | 0.068 | 12/28/99 | 01/05/00 | 9363247 | |
| Radium (226) | -0.16 | U | 0.75 | 1.6 | 12/28/99 | 01/05/00 | 9363247 | |
| Radium 228 | -0.28 | U | 0.17 | 0.25 | 12/28/99 | 01/05/00 | 9363247 | |
| Uranium 235 | -0.45 | U | 0.17 | 0.26 | 12/28/99 | 01/05/00 | 9363247 | |
| Uranium 238 | -0.61 | U | 0.42 | 0.85 | 12/28/99 | 01/05/00 | 9363247 | |
| --- Other Detected Radionuclides --- | | | | | | | | |
| Protactinium 231 | 0.8 | U | 1.5 | 2.6 | 12/28/99 | 01/05/00 | 9363247 | |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso U (SHORT CT) | | | F0A030000-356B | |
| Uranium 234 | 0.100 | J | 0.073 | 0.066 | 01/03/00 | 01/27/00 | 0003356 | 95 |
| Uranium 235 | 0.012 | U | 0.029 | 0.069 | 01/03/00 | 01/27/00 | 0003356 | 95 |
| Uranium 238 | 0.044 | U | 0.048 | 0.056 | 01/03/00 | 01/27/00 | 0003356 | 95 |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/g | Iso Pu (SHORT CT) | | | F0A050000-167B | |
| Plutonium 238 | 0.079 | U | 0.097 | 0.17 | 01/05/00 | 01/27/00 | 0005167 | 70 |
| Plutonium 239/40 | -0.0038 | U | 0.0076 | 0.090 | 01/05/00 | 01/27/00 | 0005167 | 70 |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | | pCi/g | SR-90 BY GFPC | | | F0A120000-121B | |
| Strontium 90 | -0.05 | U | 0.43 | 0.75 | 01/12/00 | 01/29/00 | 0012121 | 74 |
| **GROSS A/B BY DOE RP-710 MOD** | | | pCi/g | GROSS A/B | | | F0A190000-152B | |
| Gross Alpha | 0.6 | U | 2.0 | 3.7 | 12/28/99 | 01/20/00 | 0019152 | |
| Gross Beta | 0.4 | U | 3.6 | 6.2 | 12/28/99 | 01/20/00 | 0019152 | |

OTE(S)

ıta are incomplete without the case narrative.

C is determined using instrument performance only

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# METHOD BLANK REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Matrix: WATER

| Parameter | Result | Qual | Total Uncert. (2 σ+/-) | MDC | Prep Date | Analysis Date | Lab Sample ID Batch # | Yld % |
|---|---|---|---|---|---|---|---|---|
| **GROSS A/B BY GFPC SW846 9310 MOD** | | | pCi/L | GROSS A/B | | | F0A040000-164B | |
| Gross Alpha | 0.45 | U | 0.43 | 0.66 | 01/04/00 | 01/11/00 | 0004164 | |
| Gross Beta | 2.8 | J | 1.2 | 1.9 | 01/04/00 | 01/11/00 | 0004164 | |
| Invalid | 0.0 | | 0.0 | 0.0 | 01/04/00 | 01/11/00 | 0004164 | |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | | pCi/L | SR-90 BY GFPC | | | F0A070000-293B | |
| Strontium 90 | 0.10 | U | 0.36 | 0.63 | 01/07/00 | 01/24/00 | 0007293 | 80 |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | | pCi/L | Gamma (Cs & hits) | | | F0A180000-145B | |
| Americium 241 | -4.4 | U | 8.9 | 15 | 01/18/00 | 01/20/00 | 0018145 | |
| Cesium 137 | -4.6 | U | 7.5 | 16 | 01/18/00 | 01/20/00 | 0018145 | |
| Cobalt 60 | 11 | U | 10 | 24 | 01/18/00 | 01/20/00 | 0018145 | |
| Invalid | 0.0 | | 0.0 | 0.0 | 01/18/00 | 01/20/00 | 0018145 | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | | pCi/L | Iso Pu (SHORT CT) | | | F0A250000-149B | |
| Plutonium 238 | 0.12 | U | 0.37 | 0.87 | 01/25/00 | 01/28/00 | 0025149 | 34 |
| Plutonium 239/40 | 0.19 | U | 0.32 | 0.66 | 01/25/00 | 01/28/00 | 0025149 | 34 |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | | pCi/L | Iso U (SHORT CT) | | | F0A250000-155B | |
| Uranium 234 | 0.015 | U | 0.052 | 0.14 | 01/25/00 | 01/28/00 | 0025155 | 87 |
| Uranium 235 | 0.043 | U | 0.090 | 0.20 | 01/25/00 | 01/28/00 | 0025155 | 87 |
| Uranium 238 | -0.01 | U | 0.014 | 0.14 | 01/25/00 | 01/28/00 | 0025155 | 87 |

OTE(S)

ta are incomplete without the case narrative.

C is determined using instrument performance only

ld results are greater than the MDC

Result is greater than sample detection limit but less than stated reporting limit.

Analyte analyzed for but was not detected

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L160225
Matrix: SOLID

| Parameter | Spike Amount | Result | | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | | Lab Sample ID / QC Control Limits |
|---|---|---|---|---|---|---|---|---|---|
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso Pu (SHORT CT) | | | | F0A030000-308C |
| Plutonium 238 | 10.6 | 9.6 | + | 2.0 | 0.08 | 73 | 90 | + | 68 - 126 |
| Plutonium 239/40 | 12.4 | 11.8 | + | 2.5 | 0.04 | 73 | 95 | + | 68 - 126 |
| | Batch #: | 0003308 | | | AnalysisDate | 01/11/00 | | | |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso U (SHORT CT) | | | | F0A030000-360C |
| Uranium 234 | 6.01 | 5.8 | + | 1.3 | 0.1 | 87 | 96 | + | 63 - 128 |
| Uranium 238 | 6.01 | 5.9 | + | 1.3 | 0.07 | 87 | 98 | + | 63 - 128 |
| | Batch #: | 0003360 | | | AnalysisDate | 01/13/00 | | | |
| **GROSS A/B BY DOE RP-710 MOD** | | pCi/g | | | GROSS A/B | | | | F0A100000-205C |
| Gross Alpha | 27.1 | 13.6 | | 4.1 | 3.6 | | 50 | | 48 - 147 |
| Gross Beta | 26.8 | 24.0 | | 5.0 | 6.0 | | 90 | | 68 - 145 |
| | Batch #: | 0010205 | | | AnalysisDate | 01/13/00 | | | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | pCi/g | | | SR-90 BY GFPC | | | | F0A120000-121C |
| Strontium 90 | 9.70 | 9.2 | | 1.8 | 0.3 | 91 | 95 | | 49 - 126 |
| | Batch #: | 0012121 | | | AnalysisDate | 01/31/00 | | | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | pCi/g | | | Gamma (Cs & hits) | | | | F9L290000-247C |
| Cesium 137 | 18900 | 18300 | + | 1900 | 70 | | 97 | + | 88 - 117 |
| | Batch #: | 9363247 | | | AnalysisDate | 01/06/66 | | | |

**NOTE(S)**

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

+ For informational purposes only. The detection limit does not follow significant figures SOP.
+ For informational purposes only. The detection limit does not follow significant figures SOP.
+ For informational purposes only. The detection limit does not follow

Quanterra - St. Louis

# DUPLICATE EVALUATION REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Work Order #: D6MJ
Matrix: SOLID

Date Sampled: 12/15/99
Date Received: 12/18/99

| Parameter | SAMPLE Result | | Total Uncert. (2σ+/-) | % Yld | DUPLICATE Result | | Total Uncert. (2σ+/-) | % Yld | QC Sample ID Precision | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gamma Cs-137 & Hits by HASL** | pCi/g | | | | Gamma (Cs & hits) | | | | F9L210115-001 | |
| Cesium 137 | 0.017 | U | 0.088 | | 0.138 | U | 0.095 | | 156 | %RPD |
| ---Other Dedected Radionuclides--- | | | | | | | | | | |
| Lead 210 | 3.1 | | 1.4 | | 2.9 | | 1.0 | | 9 | %RPD |
| Lead 212 | 1.25 | | 0.23 | | 1.32 | | 0.33 | | 6 | %RPD |
| Lead 214 | 1.26 | | 0.24 | | 1.05 | | 0.37 | | 18 | %RPD |
| Potassium 40 | 24.6 | | 4.3 | | 26.0 | | 4.3 | | 6 | %RPD |
| Thallium 208 | 0.51 | | 0.13 | | 0.42 | | 0.14 | | 18 | %RPD |
| | Batch #: | | 9363247 | (Sample) | 9363247 | (Duplicate) | | | | |
| **GROSS A/B BY DOE RP-710 MOD** | pCi/g | | | | GROSS A/B | | | | F9L210115-001 | |
| Gross Alpha | 14.4 | | 4.5 | | 18.6 | | 4.8 | | 25 | %RPD |
| Gross Beta | 33.0 | | 6.1 | | 33.3 | | 6.1 | | 0.9 | %RPD |
| | Batch #: | | 0019152 | (Sample) | 0019152 | (Duplicate) | | | | |

OTE(S)

ata are incomplete without the case narrative.
alculations are performed before rounding to avoid round-off error in calculated results

Analyte analyzed for but was not detected

ıanterra - St. Louis

# DUPLICATE EVALUATION REPORT

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Work Order #: D6MK
Matrix: WATER

Date Sampled: 12/16/99
Date Received: 12/18/99

| Parameter | SAMPLE Result | | Total Uncert. (2σ+/-) | % Yld | DUPLICATE Result | | Total Uncert. (2 σ+/-) | % Yld | QC Sample ID Precision | |
|---|---|---|---|---|---|---|---|---|---|---|
| **GROSS A/B BY GFPC SW846** | | pCi/L | | | GROSS A/B | | | | F9L210115-006 | |
| Gross Alpha | -0.36 | U | 0.48 | | -0.24 | U | 0.61 | | -42 | %RPD |
| Gross Beta | -0.9 | U | 1.0 | | 0.3 | U | 1.0 | | -426 | %RPD |
| | Batch #: | | 0004164 | (Sample) | 0004164 | | (Duplicate) | | | |
| **Gamma Cs-137 & Hits by HASL** | | pCi/L | | | Gamma (Cs & hits) | | | | F9L210115-006 | |
| Cesium 137 | 0.5 | U | 8.2 | | -8.5 | U | 9.9 | | -223 | %RPD |
| | Batch #: | | 0018145 | (Sample) | 0018145 | | (Duplicate) | | | |

OTE(S)

ata are incomplete without the case narrative.
alculations are performed before rounding to avoid round-off error in calculated results

Analyte analyzed for but was not detected

uanterra - St. Louis

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Matrix: SOLID

| Parameter | Spike Amount | Result | | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | | Lab Sample ID / QC Control Limits |
|---|---|---|---|---|---|---|---|---|---|
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso U (SHORT CT) | | | | F0A030000-356C |
| Uranium 234 | 6.01 | 5.5 | + | 1.3 | 0.07 | 72 | 92 | + | 63 - 128 |
| Uranium 238 | 6.01 | 5.9 | + | 1.4 | 0.04 | 72 | 97 | + | 63 - 128 |
| | Batch #: | 0003356 | | | AnalysisDate | 01/27/00 | | | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | pCi/g | | | Iso Pu (SHORT CT) | | | | F0A050000-167C |
| Plutonium 238 | 5.29 | 5.4 | | 1.3 | 0.1 | 91 | 102 | | 68 - 126 |
| Plutonium 239/40 | 6.21 | 6.4 | | 1.5 | 0.1 | 91 | 103 | | 68 - 126 |
| | Batch #: | 0005167 | | | AnalysisDate | 01/27/00 | | | |
| **SR-90 BY GFPC DOE 7500-SR MOD** | | pCi/g | | | SR-90 BY GFPC | | | | F0A120000-121C |
| Strontium 90 | 9.70 | 9.2 | | 1.8 | 0.3 | 91 | 95 | | 49 - 126 |
| | Batch #: | 0012121 | | | AnalysisDate | 01/31/00 | | | |
| **GROSS A/B BY DOE RP-710 MOD** | | pCi/g | | | GROSS A/B | | | | F0A190000-152C |
| Gross Alpha | 27.1 | 19.5 | | 5.2 | 4.9 | | 72 | | 48 - 147 |
| Gross Beta | 26.3 | 24.2 | | 5.4 | 6.8 | | 90 | | 68 - 145 |
| | Batch #: | 0019152 | | | AnalysisDate | 01/20/00 | | | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | pCi/g | | | Gamma (Cs & hits) | | | | F9L290000-247C |
| Cesium 137 | 18900 | 18300 | - | 1900 | 70 | | 97 | + | 88 - 117 |
| | Batch #: | 9363247 | | | AnalysisDate | 01/06/66 | | | |

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

\+ For informational purposes only. The detection limit does not follow significant figures SOP.

\+ For informational purposes only. The [illegible]

anterra - St. Louis

# Laboratory Control Sample Report

## Quanterra, Inc. - Radiochemistry

Client Lot ID: F9L210115
Matrix: WATER

| Parameter | Spike Amount | Result | Total Uncert. (2 σ+/-) | MDC | % Yld | % Rec | Lab Sample ID / QC Control Limits |
|---|---|---|---|---|---|---|---|
| **GROSS A/B BY GFPC SW846 9310 MOD** | | pCi/L | | GROSS A/B | | | F0A040000-164C |
| Gross Alpha | 45.0 | 50.8 | 5.8 | 1.0 | | 113 | 67 - 125 |
| | Batch #: | 0004164 | | AnalysisDate | 01/11/00 | | |
| **GROSS A/B BY GFPC SW846 9310 MOD** | | pCi/L | | GROSS A/B | | | F0A040000-164C |
| Gross Beta | 97.0 | 98 | 10 | 2 | | 101 | 64 - 125 |
| | Batch #: | 0004164 | | AnalysisDate | 01/11/00 | | |
| **SR-90 BY GFPC SMWW 7500-SR MOD** | | pCi/L | | SR-90 BY GFPC | | | F0A070000-293C |
| Strontium 90 | 9.71 | 11.7 | 2.4 | 0.8 | 71 | 120 | 34 - 126 |
| | Batch #: | 0007293 | | AnalysisDate | 01/24/00 | | |
| **Gamma Cs-137 & Hits by HASL AM-02 MOD** | | pCi/L | | Gamma (Cs & hits) | | | F0A180000-145C |
| Cesium 137 | 25300 | 26300 | 2500 | 100 | | 104 | 88 - 117 |
| | Batch #: | 0018145 | | AnalysisDate | 01/20/00 | | |
| **Iso PLUTONIUM (SHORT CT) NAS ONLY MOD** | | pCi/L | | Iso Pu (SHORT CT) | | | F0A250000-149C |
| Plutonium 238 | 10.6 | 11.6 | 3.1 | 0.5 | 52 | 110 | 67 - 120 |
| Plutonium 239/40 | 12.4 | 11.6 | 3.1 | 0.3 | 52 | 94 | 67 - 120 |
| | Batch #: | 0025149 | | AnalysisDate | 01/28/00 | | |
| **Iso URANIUM (SHORT CT) NAS ONLY MOD** | | pCi/L | | Iso U (SHORT CT) | | | F0A250000-155C |
| Uranium 234 | 12.0 | 9.8 | 2.3 | 0.1 | 77 | 82 | 58 - 129 |
| Uranium 238 | 12.0 | 10.7 | 2.5 | 0.2 | 77 | 89 | 58 - 129 |
| | Batch #: | 0025155 | | AnalysisDate | 01/28/00 | | |

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

\+ For informational purposes only. The detection limit does not follow significant figures SOP.
\+ For informational purposes only. The detection limit does not follow significant figures SOP.

# APPENDIX G

## Chain-of-Custody Forms

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc | Julie Shannahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Total Metals | Total Uranium | Nitrate/Nitrite | Total P | Ammonia | TKN | Dissolved Calcium | Anions | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MT-4 | 12/7/99 | 1105 | | X | Mortandad Canyon | Water | 1 | X | X | | | | | | | |
| MT-4 | 12/7/99 | 1105 | | X | ↓ | Water | 1 | | | X | X | X | X | | | |
| MT-4 | 12/7/99 | 1105 | | X | | Water | 1 | | | | | | | X | | |
| MT-4 | 12/7/99 | 1105 | | X | | Water | 1 | | | | | | | | X | |
| MCO-1 | 12/7/99 | 1310 | | X | | Water | 1 | X | X | | | | | | | |
| MCO-1 | 12/7/99 | 1310 | | X | | Water | 1 | | | X | X | X | X | | | |
| MCO-1 | 12/7/99 | 1310 | | X | | Water | 1 | | | | | | | X | | |
| MCO-1 | 12/7/99 | 1310 | | X | | Water | 1 | | | | | | | | X | |
| MCO-2 | 12/7/99 | 1530 | | X | | Water | 1 | X | X | | | | | | | |
| MCO-2 | 12/7/99 | 1530 | | X | | Water | 1 | | | X | X | X | X | | | |
| MCO-2 | 12/7/99 | 1530 | | X | | Water | 1 | | | | | | | X | | |
| MCO-2 | 12/7/99 | 1530 | | X | | Water | 1 | | | | | | | | X | |
| MCO-3 | 12/7/99 | 1400 | | X | | Water | 1 | X | X | | | | | | | |
| MCO-3 | 12/7/99 | 1400 | | X | | Water | 1 | | | X | X | X | X | | | |
| MCO-3 | 12/7/99 | 1400 | | X | | Water | 1 | | | | | | | X | | |
| MCO-3 | 12/7/99 | 1400 | | X | ↓ | Water | 1 | | | | | | | | X | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| Bret Kendrick (TB Kendrick) | 12/8/99 | 1500 | FedEx |

| 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) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

REMARKS:
Airbill B016082751 90

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Tech Law, Inc | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) [signature]

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Total Metals | Dissolved Metals | Anions | Ammonia | TKN | Nitrate/Nitrite | Total P | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-5 | 12/8/99 | 1045 | | X | Mortandad Canyon | Water | 8 | X | X | X | X | X | X | X | | MS/MSD |
| MCO-6 | 12/8/99 | 1200 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| MCO-7 | 12/8/99 | 1350 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/9/99 | 1500 | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | REMARKS: |
|---|---|---|---|---|
| | | | | Airbill: 801608275168 |

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc. | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) [signature]

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | PCBs | Total Metals | Total Uranium | Nitrate/Nitrite | Total P | Ammonia | TKN | Dissolved Cations | Anions | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACS-35-0 | 12/6/99 | 1102 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-18-1 | 12/6/99 | 1140 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-18-2 | 12/6/99 | 1200 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-18-3 | 12/6/99 | 1210 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-12-1 | 12/6/99 | 1235 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-12-2 | 12/6/99 | 1245 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-43-0 | 12/6/99 | 1300 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-3-1 | 12/6/99 | 1330 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-3-2 | 12/6/99 | 1340 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-3-3 | 12/6/99 | 1350 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-3-4 | 12/6/99 | 1400 | | X | Acid Canyon | Soil | 1 | X | X | X | | | | | | | |
| ACS-EB | 12/6/99 | 1410 | | X | Acid Canyon | Water | 1 | X | | | | | | | | | |
| ACS-EB | 12/6/99 | 1410 | | X | Acid Canyon | Water | 1 | | X | X | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/8/99 | 1500 | FedEx | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) | REMARKS: |
|---|---|---|---|---|
| | | | | Airbill 801608275205 |

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Tech Law, Inc. | Julie Shanahan | (212) 949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: *(Signature)* B. Kendrick (B Kendrick) / James Hardy (James Hardy)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Total Metals | Dissolved Metals | Anions | Ammonia | TKN | Nitrate/Nitrite | Total P | Explosives | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MKWB-7.7B | 12/8/99 | 1510 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| TW-8 | 12/8/99 | 1545 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| MCO-FB | 12/9/99 | 1440 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| GS-1 | 12/9/99 | 1510 | | X | Mortandad Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| TA-18 | 12/10/99 | 1105 | | X | Threemile Canyon | Water | 8 | | X | X | X | X | X | X | X | MS/MSD |

| RELINQUISHED BY: *(Signature)* | DATE | TIME | RECEIVED BY: *(Signature)* |
|---|---|---|---|
| B Kendrick (Brent Kendrick) | 12/13/99 | 1500 | |

| 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)* |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: *(Signature)* | DATE | TIME | RECEIVED BY: *(Signature)* |
|---|---|---|---|
| | | | |

REMARKS: FED EX # 8016 0875135

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Techlaw, Inc | Julie Shannahan | (212) 949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) B. Kendrick (B. Kendrick) / James Hasley (James Hasley)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Dissolved Cations | Anions | Ammonia | TKN | Nitrate/Nitrite | Total P | Explosives | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PA-6.7 | 12/10/99 | 1252 | | X | Pajarito Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| FB-6.7 | 12/10/99 | 1300 | | X | Pajarito Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| Homestead | 12/10/99 | 0920 | | X | Pajarito Canyon | Water | 4 | X | X | X | X | X | X | X | | |
| Starmer | 12/10/99 | 1030 | | X | Starmer Gulch | Water | 4 | X | X | X | X | X | X | X | | |
| Kieling | 12/10/99 | 1220 | | X | Starmer Gulch | Water | 4 | X | X | X | X | X | X | X | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| B. Kendrick (B. Kendrick) | 12/13/99 | 1500 | |

| 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) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

REMARKS:
Airbill 801608275124

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) Bret Kendrick (BKendrick) / James Horsley (James Horsley)

ANALYTICAL TESTS REQUESTED: Pan Volatiles

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Pan Volatiles | | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-1 | 12/7/99 | 1310 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCO-2 | 12/7/99 | 1530 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCO-3 | 12/7/99 | 1400 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCO-5 | 12/8/99 | 1045 | | X | Mortandad Canyon | Water | 2 | X | | | | | | | | MS/MSD |
| MCO-6 | 12/8/99 | 1200 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCO-7 | 12/8/99 | 1350 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCWB-7.78 | 12/8/99 | 1510 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MT-4 | 12/7/99 | 1105 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| TW-8 | 12/8/99 | 1545 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| MCO-FB | 12/9/99 | 1440 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| GS-1 | 12/9/99 | 1510 | | X | Mortandad Canyon | Water | 1 | X | | | | | | | | |
| Homestead | 12/10/99 | 0920 | | X | Pajarito Canyon | Water | 1 | X | | | | | | | | |
| Starmer | 12/10/99 | 1030 | | X | Starmer Gulch | Water | 1 | X | | | | | | | | |
| Bulldog | 12/10/99 | 1300 | | X | Starmer Gulch | Water | 1 | X | | | | | | | | |
| Kiating | 12/10/99 | 1220 | | X | Starmer Gulch | Water | 1 | X | | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/10/99 | 1500 | |

| 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) |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |

REMARKS: Airbill 80160827514 6

[SR012-1192-03]

# 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

TM

SAMPLING FIRM: Tech Law, Inc.
CLIENT CONTACT: Julie Shanahan
PHONE NUMBER: (212) 949-4004
P.O. or PROPOSAL NUMBER:
PROJECT NAME: Los Alamos National Laboratory - Phase 2

SAMPLER: (Signature) Bret Kendrick (BKendrick) / James Hawley (James Hawley)

ANALYTICAL TESTS REQUESTED: Perchlorate

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Perchlorate | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| BU-0.01 | 12/10/99 | 1345 | | X | Sturman Canyon | Water | 1 | X | |
| PA-8.9 | 12/10/99 | 1425 | | X | Pajarito Canyon | Water | 1 | X | |
| PA-6.7 | 12/10/99 | 1252 | | X | Pajarito Canyon | Water | 1 | X | |
| TA-18 | 12/10/99 | 1105 | | X | Threemile Canyon | Water | 2 | X | MS/MSD |
| FB-6.7 | 12/10/99 | 1300 | | X | Pajarito Canyon | Water | 1 | X | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/10/99 | 1500 | |
| | | | |
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED FOR LABORATORY BY: (Signature) |
|---|---|---|---|
| | | | |

REMARKS: Airbill B0160827514G

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Techlaw, Inc. | Julie Shanahan | 212-945-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) James Hawley (James Hawley) / B. Kundrick (TSK [illegible])

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Metals (Dissolved) | Anions | Ammonia | TKN | Nitrate/Nitrite | Total P | Explosives | Barium (Total) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bulldog | 12-10-99 | 1300 | | X | Starmer Gulch | water | 1 | X | | | | | | | | |
| Bulldog | ↓ | ↓ | | X | ↓ | ↓ | 1 | | X | | | | | | | |
| Bulldog | | | | X | | | 1 | | | X | X | X | X | | | |
| Bulldog | | | | X | | | 1 | | | | | | | X | | |
| PA-8.9 | 12-10-99 | 1425 | | X | Pajarito Canyon | water | 1 | X | | | | | | | | |
| PA-8.9 | ↓ | ↓ | | X | ↓ | ↓ | 1 | | X | | | | | | | |
| PA-8.9 | | | | X | | | 1 | | | X | X | X | X | | | |
| PA-8.9 | | | | X | | | 1 | | | | | | | X | | |
| BU-0.01 | 12-10-99 | 1345 | | X | Starmers Gulch | water | 1 | X | | | | | | | | |
| BU-0.01 | ↓ | ↓ | | X | ↓ | ↓ | 1 | | X | | | | | | | |
| BU-0.01 | | | | X | | | 1 | | | X | X | X | X | | | |
| BU-0.01 | | | | X | | | 1 | | | | | | | X | | |
| PM-5 | 12-13-99 | 1810 | | X | Pajarito Mesa | water | 1 | | | | | | | X | | |
| PM-5 | ↓ | ↓ | | X | ↓ | ↓ | 1 | | | | | | | | X | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| James Hawley | 12-13-99 | 1500 | |
| 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) |

REMARKS:
Airbill No. 801608275102

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Truth Law, Inc. | Julie Shannahan | 212-949-4006 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) B. Kanderink (BKanderink) / James Hosta (James Hosta)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | PCBs | Total Metals | Total Uranium | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC-1 | 12/13/99 | 1340 | | X | Bayo Canyon | Soil | 1 | X | X | X | | | | | | |
| BC-2 | 12/13/99 | 1410 | | X | Bayo Canyon | | 1 | X | X | X | | | | | | |
| BC-3 | 12/13/99 | 1430 | | X | Bayo Canyon | | 1 | X | X | X | | | | | | |
| BC-4 | 12/13/99 | 1505 | | X | Bayo Canyon | | 1 | X | X | X | | | | | | |
| BC-5 | 12/13/99 | 1420 | | X | Bayo Canyon | | 1 | X | X | X | | | | | | |
| MC-1 | 12/14/99 | 1000 | | X | Mortandad Canyon | | 1 | X | X | X | | | | | | |
| MC-2 | 12/14/99 | 1200 | | X | | | 1 | X | X | X | | | | | | |
| MC-3 | 12/14/99 | 1115 | | X | | | 1 | X | X | X | | | | | | |
| MC-4 | 12/14/99 | 1170 | | X | | | 1 | X | X | X | | | | | | |
| MC-5A | 12/14/99 | 1235 | | X | | | 1 | X | X | X | | | | | | |
| MC-5B | 12/14/99 | 1250 | | X | | | 1 | X | X | X | | | | | | |
| SC-1 | 12/13/99 | 0925 | | X | Sandia Canyon | | 1 | X | X | X | | | | | | |
| SC-2 | 12/13/99 | 0955 | | X | | | 1 | X | X | X | | | | | | |
| SC-3 | 12/13/99 | 1025 | | X | | | 1 | X | X | X | | | | | | |
| SC-4 | 12/13/99 | 1050 | | X | | | 1 | X | X | X | | | | | | |
| SC-5 | 12/13/99 | 1150 | | X | | | 1 | X | X | X | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| B. Kanderink (BKanderink) | 12/16/99 | 1500 | |
| 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) |
| | | | |

REMARKS:
Airbill 8016082750 98

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc. | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) B Kendrick (BKendrick) / Smeathers (Jones Acosta)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | PCBs | Total Metals | Total Uranium | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC-6 | 12/13/99 | 1125 | | X | Sandia Canyon | Soil | 2 | X | X | X | | | | | | | MS/MSD |
| CC-1 | 12/15/99 | 1545 | | X | Cañada del Buey Canyon | | 1 | X | X | X | | | | | | | |
| CC-2 | 12/15/99 | 1515 | | X | | | 1 | X | X | X | | | | | | | |
| CC-3 | 12/15/99 | 1445 | | X | | | 1 | X | X | X | | | | | | | |
| CC-4 | 12/15/99 | 1415 | | X | | | 2 | X | X | X | | | | | | | MS/MSD |
| CC-5A | 12/15/99 | 1330 | | X | | | 1 | X | X | X | | | | | | | |
| CC-5B | 12/15/99 | 1345 | | X | | | 1 | X | X | X | | | | | | | |
| CC-6 | 12/15/99 | 1034 | | X | | | 1 | X | X | X | | | | | | | |
| CC-7 | 12/15/99 | 1000 | | X | | | 1 | X | X | X | | | | | | | |
| CC-8 | 12/15/99 | 0915 | | X | | | 1 | X | X | X | | | | | | | |
| CC-9 | 12/15/99 | 0830 | | X | | | 1 | X | X | X | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/16/99 | 1500 | |
| 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) |
| | | | |

REMARKS:
Airbill 8016082750 98

[SR012-1192-03]

# 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

TM

SAMPLING FIRM: TechLaw, Inc
CLIENT CONTACT: Julie Shanahan
PHONE NUMBER: 212-944-4004
P.O. or PROPOSAL NUMBER:
PROJECT NAME: Los Alamos National Laboratory - Phase 2

SAMPLER: (Signature) B Kendrick (B Kendrick)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | PCBs | Total Metals | Total Uranium | Dissolved Cations | Anions | VOCs | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC-EB | 12/15/99 | 1150 | | X | Cañada del Buey Canyon | Water | 2 | X | X | X | | | | | | |
| AC-EB | 12/16/99 | 1610 | | X | Ancho Canyon | Water | 2 | X | X | X | | | | | | |
| SM-30 | 12/17/99 | 1210 | | X | TA-3 | Water | 4 | | | | X | X | | | | MS/MSD |
| SD-30 | 12/17/99 | 1130 | | X | TA-3 | Water | 2 | | | | X | X | | | | |
| SM-30 | 12/17/99 | 1210 | | X | TA-3 | Water | 4 | | | | | | X | | | MS/MSD |
| SD-30 | 12/17/99 | 1130 | | X | TA-3 | Water | 2 | | | | | | X | | | |
| PM-2 | 12/13/99 | 1850 | | X | Production Well | Water | 2 | | | | | | X | | | |
| PM-5 | 12/13/99 | 1810 | | X | Production Well | Water | 2 | | | | | | X | | | |
| TB | | | | X | Trip Blank | Water | 2 | | | | | | X | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| B. Kendrick (B Kendrick) | 12/17/99 | 1500 | |
| 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) |
| | | | |

REMARKS: Airbill 8016082750 54

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc. | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: (Signature) B. Kendrick (BKendrick) / J. Hosley (J. Hosley)

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Non-Chlorinated | | | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM-30 | 12/17/99 | 1210 | | X | TA-3 | Water | 2 | X | | | | | | | | MS/MSD |
| SD-30 | 12/17/99 | 1130 | | X | TA-3 | Water | 1 | X | | | | | | | | |
| PM-1 | 12/17/99 | 2011 | | X | Production Well | Water | 1 | X | | | | | | | | |
| PM-2 | 12/13/99 | 1850 | | X | Production Well | Water | 1 | X | | | | | | | | |
| PM-5 | 12/13/99 | 1810 | | X | Production Well | Water | 1 | X | | | | | | | | |
| O-4 | 12/17/99 | 2040 | | X | Production Well | Water | 1 | X | | | | | | | | |

| RELINQUISHED BY: (Signature) | DATE | TIME | RECEIVED BY: (Signature) |
|---|---|---|---|
| B Kendrick (BKendrick) | 12/17/99 | 1500 | |
| 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) |
| | | | |

REMARKS:

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| TechLaw, Inc | Julie Shanahan | 212-949-4004 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: *(Signature)*

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | PCBs | Total Metals | Total Organics | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC-1 | 12/16/99 | 1020 | | X | Pajarito Canyon | Soil | 1 | X | X | X | | | | | | |
| PC-2 | 12/16/99 | 1105 | | X | ↓ | ↓ | 1 | X | X | X | | | | | | |
| PC-3 | 12/16/99 | 1130 | | X | | | 1 | X | X | X | | | | | | |
| PC-4 | 12/16/99 | 1210 | | X | | | 1 | X | X | X | | | | | | |
| PC-5 | 12/16/99 | 1230 | | X | | | 1 | X | X | X | | | | | | |
| AC-1 | 12/16/99 | 1540 | | X | Ancho Canyon | | 1 | X | X | X | | | | | | |
| AC-2 | 12/16/99 | 1515 | | X | | | 1 | X | X | X | | | | | | |
| AC-3 | 12/16/99 | 1450 | | X | | | 1 | X | X | X | | | | | | |
| AC-4 | 12/16/99 | 1425 | | X | | | 1 | X | X | X | | | | | | |
| AC-5 | 12/16/99 | 1400 | | X | | | 2 | X | X | X | | | | | | MS/MSD |

| RELINQUISHED BY: *(Signature)* | DATE | TIME | RECEIVED BY: *(Signature)* |
|---|---|---|---|
| Bret Kendrick (B Kendrick) | 12/17/99 | 1500 | |

| 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)* |
|---|---|---|---|
| | | | |

| RELINQUISHED BY: *(Signature)* | DATE | TIME | RECEIVED BY: *(Signature)* |
|---|---|---|---|
| | | | |

REMARKS:
Airbill 801608275065

[SR012-1192-03]

# 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

TM

| SAMPLING FIRM | CLIENT CONTACT | PHONE NUMBER |
|---|---|---|
| Tech Law, Inc | Julie Shanahan | 212-944-4014 |

| P.O. or PROPOSAL NUMBER | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLER: *(Signature)*

ANALYTICAL TESTS REQUESTED

| SAMPLE NO. | DATE | TIME | COMP. | GRAB | LOCATION | MATRIX | NUMBER OF CONTAINERS | Total As | Total Uranium | Ammonia | Nitrate/Nitrite | TKN | Total P | Total Ba | Explosives | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM-1 | 12/11/99 | 2011 | | X | Production Well | Water | 2 | X | X | X | X | X | X | | | |
| O-4 | 12/13/99 | 2040 | | X | Production Well | Water | 2 | X | X | X | X | X | X | | | |
| PM-2 | 12/13/99 | 1850 | | X | Production Well | Water | 2 | | | | | | | X | X | |

| RELINQUISHED BY: *(Signature)* | DATE | TIME | RECEIVED BY: *(Signature)* |
|---|---|---|---|
| Bret Kendrick (JKendrick) | 12/13/99 | 1500 | |
| 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)* |
| | | | |

REMARKS:
Airbill 8016082750 LS

[SR012-1192-03]

# Chain of Custody Record

Quanterra

QUA-4124

| Client | Project Manager | Date | Chain Of Custody Number |
|---|---|---|---|
| TechLaw, Inc. - Julie Shanahan | Bret Kendrick | 12/9/99 | 10099 |
| **Address** | **Telephone Number (Area Code)/Fax Number** | **Lab Number** | |
| 750 N. St. Paul; Suite 600 | (214) 953-0045 | | Page 1 of 2 |
| **City / State / Zip Code** | **Site Contact** | | |
| Dallas / TX / 75201 | Bret Kendrick (214) 793-8722 | | |
| **Project Name** | **Carrier/Waybill Number** | | |
| Los Alamos National Laboratory - Phase 2 | 801608275180 | | |
| **Contract/Purchase Order/Quote No.** | | | |
| 01300.06.015.04.00.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Analysis: Sr-90 | Analysis: Isotopic Pu | Analysis: Gamma Spec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACS-35-0 | 12/6/99 | 1102 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-18-1 | 12/6/99 | 1140 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-18-2 | 12/6/99 | 1200 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-18-3 | 12/6/99 | 1210 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-12-1 | 12/6/99 | 1235 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-12-2 | 12/6/99 | 1245 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-48-0 | 12/6/99 | 1300 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-3-1 | 12/6/99 | 1330 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-3-2 | 12/6/99 | 1340 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-3-4 | 12/6/99 | 1400 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |
| ACS-3-3 | 12/6/99 | 1350 | Soil | 1 liter | poly | 1 | Ice | | X | X | X |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished By: Bret Kendrick (BKendrick) | 12/9/99 | 1500 | 1. Received By | | |
| 2. Relinquished By | | | 2. Received By | | |
| 3. Relinquished By | | | 3. Received By | | |

Comments

**DISTRIBUTION:** WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# Chain of Custody Record

Quanterra

QUA-4124

| | | | |
|---|---|---|---|
| Client: TechLaw, Inc - Julie Shanahan | Project Manager: Bret Kendrick | Date: 12/9/99 | Chain Of Custody Number: 47000 |
| Address: 750 N. St. Paul; Suite 600 | Telephone Number (Area Code)/Fax Number: (214) 953-0045 | Lab Number: | Page 2 of 2 |
| City: Dallas; State: TX; Zip Code: 75201 | Site Contact: Bret Kendrick (214) 793-8722 | | |
| Project Name: Los Alamos National Laboratory - Phase 2 | Carrier/Waybill Number: 801608275180 | | |
| Contract/Purchase Order/Quote No.: 01300.06.015.04.00.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Analysis: Low Level Tritium |
|---|---|---|---|---|---|---|---|---|---|
| MCO-1 | 12/7/99 | 1310 | Water | 250 ml | poly | 1 | Ice | | X |
| MCO-2 | 12/7/99 | 1530 | Water | 250 ml | poly | 1 | Ice | | X |
| MCO-3 | 12/7/99 | 1400 | Water | 250 ml | poly | 1 | Ice | | X |
| MCO-5 | 12/8/99 | 1045 | Water | 250 ml | poly | 1 | Ice | | X |
| MCO-6 | 12/8/99 | 1200 | Water | 250 ml | poly | 1 | Ice | | X |
| MCO-7 | 12/8/99 | 1350 | Water | 250 ml | poly | 1 | Ice | | X |
| MCWB-7.7B | 12/8/99 | 1510 | Water | 250 ml | poly | 1 | Ice | | X |
| MT-4 | 12/7/99 | 1105 | Water | 250 ml | poly | 1 | Ice | | X |
| TW-8 | 12/8/99 | 1545 | Water | 250 ml | poly | 1 | Ice | | X |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished By: Bret Kendrick (BKendrick) | 12/9/99 | 1500 | 1. Received By | | |
| 2. Relinquished By | | | 2. Received By | | |
| 3. Relinquished By | | | 3. Received By | | |

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# Chain of Custody Record

**Quanterra**

QUA-4124

| Client | Project Manager | Date | Chain Of Custody Number |
|---|---|---|---|
| TechLaw, Inc. - Julie Shanahan | Bret Kendrick | 12/9/99 | 75 |
| **Address** | **Telephone Number (Area Code)/Fax Number** | **Lab Number** | **Page 1 of 1** |
| 750 N. St Paul, Suite 600 | (214) 953-0045 | | |
| **City / State / Zip Code** | **Site Contact** | | |
| Dallas / TX / 75201 | Bret Kendrick (214) 793-8722 | | |
| **Project Name** | **Carrier/Waybill Number** | | |
| Los Alamos National Laboratory - Phase 2 | 8016082751 79 | | |
| **Contract/Purchase Order/Quote No.** | | | |
| 01300.06.015.04.00.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Analysis: Sr-90 | Isotopic Pu | Gamma Spec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACS-EB | 12/6/99 | 1410 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| ACS-EB | 12/6/99 | 1410 | Water | 1 liter | poly | 1 | $HNO_3$ | | | X | |
| ACS-EB | 12/6/99 | 1410 | Water | 1 liter | poly | 1 | $HNO_3$ | | | | X |
| MCO-1 | 12/7/99 | 1310 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCO-2 | 12/7/99 | 1530 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCO-3 | 12/7/99 | 1400 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCO-5 | 12/8/99 | 1045 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCO-6 | 12/8/99 | 1200 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCO-7 | 12/8/99 | 1350 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MCWB-7.7B | 12/8/99 | 1510 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| MT-4 | 12/7/99 | 1105 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |
| TW-8 | 12/7/99 | 1545 | Water | 1 liter | poly | 1 | $HNO_3$ | | X | | |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished By: Bret Kendrick (BKendrick) | 12/9/99 | 1500 | 1. Received By | | |
| 2. Relinquished By | | | 2. Received By | | |
| 3. Relinquished By | | | 3. Received By | | |

Comments

**DISTRIBUTION:** WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

GBS Printed Products & Systems North Canton, Ohio 44720

# Chain of Custody Record

Quanterra

QUA-4124

| | | | |
|---|---|---|---|
| Client: Techlaw, Inc - Julie Shannahan | Project Manager: Bret Kendrick | Date: 12-14-99 | Chain Of Custody Number: 34155 |
| Address: 750 N. St. Paul - Suite 600 | Telephone Number (Area Code)/Fax Number: (214) 953-0045 | Lab Number: | Page 1 of 2 |
| City: Dallas; State: TX; Zip Code: 75201 | Site Contact: Bret Kendrick (214) 793-8722 | | |
| Project Name: Los Alamos National Laboratory-Phase 2 | Carrier/Waybill Number: 801608275113 - FED EX | | |
| Contract/Purchase Order/Quote No.: 01300.06.015.04.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Sr-90 | Isotopic Pu | Isotopic U | Gamma Spec | Gross Alpha/Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC-1 | 12-13-99 | 1340 | Soil | 1 L | poly | 1 | ice | | X | X | X | X | X |
| BC-2 | | 1410 | | | | 1 | | | X | X | X | X | X |
| BC-3 | | 1430 | | | | 1 | | | X | X | X | X | X |
| BC-4 | | 1505 | | | | 1 | | | X | X | X | X | X |
| BC-5 | | 1420 | | | | 1 | | | X | X | X | X | X |
| SC-1 | | 0925 | | | | 1 | | | | | X | | X |
| SC-2 | | 0955 | | | | 1 | | | | | X | | X |
| SC-3 | | 1025 | | | | 1 | | | | | X | | X |
| SC-4 | | 1050 | | | | 1 | | | | | X | | X |
| SC-5 | | 1150 | | | | 1 | | | | | X | | X |
| SC-6 | | 1125 | | | | 1 | | | | | X | | X |
| MC-1 | 12-14-99 | 1000 | | | | 1 | | | X | X | X | X | X |
| MC-2 | | 1200 | | | | 1 | | | X | X | X | X | X |
| MC-3 | | 1115 | | | | 1 | | | X | X | X | X | X |
| MC-4 | | 1130 | | | | 1 | | | X | X | X | X | X |
| MC-5A | | 1255 | | | | 1 | | | X | X | X | X | X |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ___ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify):

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| 1. Relinquished By: [signature] | 12-15-99 | 1500 | 1. Received By | | |
| 2. Relinquished By | | | 2. Received By | | |
| 3. Relinquished By | | | 3. Received By | | |

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# Chain of Custody Record

Quanterra

QUA-4124

| | | | |
|---|---|---|---|
| Client: Techlaw, Inc. - Julie Shannahan | Project Manager: Bret Kendrick | Date: 12-14-99 | Chain Of Custody Number: 34154 |
| Address: 750 N. St. Paul - Suite 600 | Telephone Number (Area Code)/Fax Number: (214) 953-0045 | Lab Number: | Page 2 of 2 |
| City: Dallas; State: Tx; Zip Code: 75201 | Site Contact: Bret Kendrick (214) 793-8722 | | |
| Project Name: Los Alamos National Laboratory - Phase 2 | Carrier/Waybill Number: 801608275113 - FED EX | | |
| Contract/Purchase Order/Quote No.: 01300.06.015.04.00.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Sr-90 | Isotopic Pu | Isotopic U | Gamma Spec. | Gross Alpha/Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MC-5B | 12-14-99 | 1250 | soil | 1 L | poly | 1 | ice | | X | X | X | X | X |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify):

| | | | | | |
|---|---|---|---|---|---|
| 1. Relinquished By: James Hardy | Date: 12-15-99 | Time: 1500 | 1. Received By | Date | Time |
| 2. Relinquished By | Date | Time | 2. Received By | Date | Time |
| 3. Relinquished By | Date | Time | 3. Received By | Date | Time |

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# Chain of Custody Record

Quanterra

QUA-4124

| Client | Project Manager | Date | Chain Of Custody Number |
|---|---|---|---|
| Tetra Tech, Inc - Julie Shanahan | Bret Kendrick | 12/17/99 | 46994 |
| **Address** | **Telephone Number (Area Code)/Fax Number** | **Lab Number** | |
| 750 N. St Paul, Suite 600 | (214) 953-0045 | | Page 1 of 1 |
| **City / State / Zip Code** | **Site Contact** | | |
| Dallas / TX / 75201 | Bret Kendrick (214) 793-8722 | | |
| **Project Name** | **Carrier/Waybill Number** | | |
| Los Alamos National Laboratory - Phase 2 | B01608275087 | | |
| **Contract/Purchase Order/Quote No.** | | | |
| 01300.06.015.04.00.00.00.00.99 | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Sr-90 | Isotopic Pu | Isotopic U | Gamma Spec | Gross Alpha/Beta |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC-1 | 12/16/99 | 1020 | Soil | 1 Liter | 1 Liter poly | 1 | Ice | | X | X | X | X | X |
| PC-2 | | 1105 | | | | 1 | | | X | X | X | X | X |
| PC-3 | | 1130 | | | | 1 | | | X | X | X | X | X |
| PC-4 | | 1210 | | | | 1 | | | X | X | X | X | X |
| PC-5 | | 1230 | | | | 1 | | | X | X | X | X | X |
| AC-1 | | 1540 | | | | 1 | | | X | X | X | X | X |
| AC-2 | | 1515 | | | | 1 | | | X | X | X | X | X |
| AC-3 | | 1450 | | | | 1 | | | X | X | X | X | X |
| AC-4 | | 1425 | | | | 1 | | | X | X | X | X | X |
| AC-5 | | 1400 | | | | 1 | | | X | X | X | X | X |
| CC-1 | 12/15/99 | 1545 | | | | 1 | | | X | X | X | X | X |
| CC-2 | | 1515 | | | | 1 | | | X | X | X | X | X |
| CC-3 | | 1445 | | | | 1 | | | X | X | X | X | X |
| CC-4 | | 1415 | | | | 1 | | | X | X | X | X | X |
| CC-5A | | 1330 | | | | 1 | | | X | X | X | X | X |

Analysis

Special Instructions

**Possible Hazard Identification**: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal**: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

**Turn Around Time Required**: ☒ Normal ☐ Rush

**QC Level**: ☐ I. ☐ II. ☐ III.

**Project Specific (Specify)**:

| 1. Relinquished By | Date | Time | 1. Received By | Date | Time |
|---|---|---|---|---|---|
| Bret Kendrick (BKendrick) | 12/17/99 | 1500 | | | |
| **2. Relinquished By** | **Date** | **Time** | **2. Received By** | **Date** | **Time** |
| | | | | | |
| **3. Relinquished By** | **Date** | **Time** | **3. Received By** | **Date** | **Time** |
| | | | | | |

Comments

**DISTRIBUTION:** WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# Chain of Custody Record

Quanterra

QUA-4124

| | | | |
|---|---|---|---|
| Client: TechLaw, Inc. - Julie Shumaker | Project Manager: Bret Kendrick | Date: 12/17/99 | Chain Of Custody Number: 46993 |
| Address: 750 N. St Paul, Suite 600 | Telephone Number (Area Code)/Fax Number: (214) 953-0045 | Lab Number: | Page 1 of 1 |
| City: Dallas; State: TX; Zip Code: 75201 | Site Contact: Bret Kendrick (214) 793-3722 | | |
| Project Name: Los Alamos National Laboratory - Phase 2 | Carrier/Waybill Number: B0160827 5076 | | |
| Contract/Purchase Order/Quote No. | | | |

| Sample I.D. No. and Description | Date | Time | Sample Type | Total Volume | Containers Type | Containers No. | Preservative | Condition on Receipt | Sr-90 | Isotopic U | Isotopic Pu | Gamma Spec | Gross Alpha/Beta | Dissolved Sr-90 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC-5B | 12/15/99 | 1345 | Soil | 1 Liter | Poly | 1 | Ice | | x | x | x | x | x | |
| CC-6 | ↓ | 1034 | ↓ | ↓ | ↓ | 1 | ↓ | | x | x | x | x | x | |
| CC-7 | | 1000 | | | | 1 | | | x | x | x | x | x | |
| CC-8 | | 0915 | | | | 1 | | | x | x | x | x | x | |
| CC-9 | | 0830 | | | | 1 | | | x | x | x | x | x | |
| AC-EB | 12/16/99 | 1610 | Water | 4 liters | Poly | 4 | $HNO_3$ | | x | x | x | x | x | |
| CC-EB | 12/15/99 | 1150 | Water | 4 Liters | Poly | 4 | $HNO_3$ | | x | x | x | x | x | |
| GS-1 | 12/9/99 | 1510 | Water | 1 Liter | Poly | 1 | $HNO_3$ | | | | | | | x |
| O-4 | 12/13/99 | 2040 | Water | 1 Liter | Poly | 1 | $HNO_3$ | | | | | | | x |
| PM-1 | 12/13/99 | 2011 | Water | 1 Liter | Poly | 1 | $HNO_3$ | | | | | | | x |
| MCO-FB | 12/9/99 | 1440 | Water | 1 Liter | Poly | 1 | $HNO_3$ | | | | | | | x |

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

| | Date | Time |
|---|---|---|
| 1. Relinquished By: Bret Kendrick (BKendrick) | 12/17/99 | 1500 |
| 2. Relinquished By: | | |
| 3. Relinquished By: | | |

| | Date | Time |
|---|---|---|
| 1. Received By: | | |
| 2. Received By: | | |
| 3. Received By: | | |

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

# OFFICIAL
# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLERS: *(Signature)* B Kendrick (BKendrick) / J. Hasley (J. Hasley)

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | Low Level Tritium | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCD-FB | 12/9/99 | 1440 | | X | Mortandad Canyon | 1 | X | | | | | | |
| GS-1 | 12/9/99 | 1510 | | X | Mortandad Canyon | 1 | X | | | | | | |
| SM-30 | 12/17/99 | 1210 | | X | TA-3 | 1 | X | | | | | | |
| SD-30 | 12/17/99 | 1130 | | X | TA-3 | 1 | X | | | | | | |

| Relinquished by: *(Signature)* | Date / Time | Received by: *(Signature)* | Relinquished by: *(Signature)* | Date / Time | Received by: *(Signature)* |
|---|---|---|---|---|---|
| B. Kendrick (BKendrick) | 12/17/99 1500 | | | | |
| 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 | |
| | | | | | |

Shipped by: FedEx

Airbill Number: 801608275032

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 11619

# OFFICIAL
# CHAIN OF CUSTODY RECORD

| PROJ. NO. | PROJECT NAME |
|---|---|
| | Los Alamos National Laboratory - Phase 2 |

SAMPLERS: *(Signature)* Bret Kendrick (BKendrick) / [illegible]

| STA. NO. | DATE | TIME | COMP. | GRAB | STATION LOCATION | NO. OF CONTAINERS | Stable N Isotopes | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-3 | 12/7/99 | 1400 | | X | | 3 | X | | | | | | |
| MCO-5 | 12/8/99 | 1045 | | X | | 3 | X | | | | | | |
| MCO-7 | 12/8/99 | 1350 | | X | | 3 | X | | | | | | |
| MT-4 | 12/7/99 | 1105 | | X | | 3 | X | | | | | | |
| TW-8 | 12/8/99 | 1545 | | X | | 3 | X | | | | | | |

| Relinquished by: *(Signature)* | Date / Time | Received by: *(Signature)* | Relinquished by: *(Signature)* | Date / Time | Received by: *(Signature)* |
|---|---|---|---|---|---|
| Bret Kendrick (BKendrick) | | | | | |
| 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 | |
| Shipped by: Bret Kendrick | | Airbill Number: 801608275157 | | | |

Distribution: White Accompanies Shipment; Pink to Coordinator Field Files; Green to Report; Yellow Returns with Warrant

EPA 7500-53
(11/96)

6- 11630

* U.S. GOVERNMENT PRINTING OFFICE: 1996-559-504

# APPENDIX H

## Photographs

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1049 |
| **Photo By:** | B. Kendrick | **Direction:** | Downward |
| **Description:** | View of sample material from ACS-35-0 being sieved for collection from Acid Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1211 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of sample location ACS-18 in Acid Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1252 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of sample location ACS-12 in Acid Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1254 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of sample location ACS-12 in Acid Canyon with sample location ACS-48 in the background. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1307 |
| **Photo By:** | B. Kendrick | **Direction:** | Downward |
| **Description:** | View of sample location ACS-48 in Acid Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 6, 1999 | **Time:** | 1425 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | View of sample location ACS-3 in Acid Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 7, 1999 | **Time:** | 1120 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of monitor well MT-4 in Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 7, 1999 | **Time:** | 1413 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of monitor well MCO-3 located in Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 7, 1999 | **Time:** | 1542 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of monitor well MCO-2 in Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1013 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of monitor well MCO-5 in Mortandad Canyon being purged using a dedicated bladder pump. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1146 |
| **Photo By:** | B. Kendrick | **Direction:** | Northwest |
| **Description:** | View of GPS data collection at monitor well MCO-6 in Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1400 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | View of sample collection by TechLaw personnel at well MCO-7, located in lower Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1514 |
| **Photo By:** | B. Kendrick | **Direction:** | West |
| **Description:** | A view of monitor well MCWB-7.7B in lower Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1530 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | View of water well TW-8 with water flowing from wellhead. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 8, 1999 | **Time:** | 1028 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | Overall view of well TW-8, located in lower Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 9, 1999 | **Time:** | 1517 |
| **Photo By:** | B. Kendrick | **Direction:** | West |

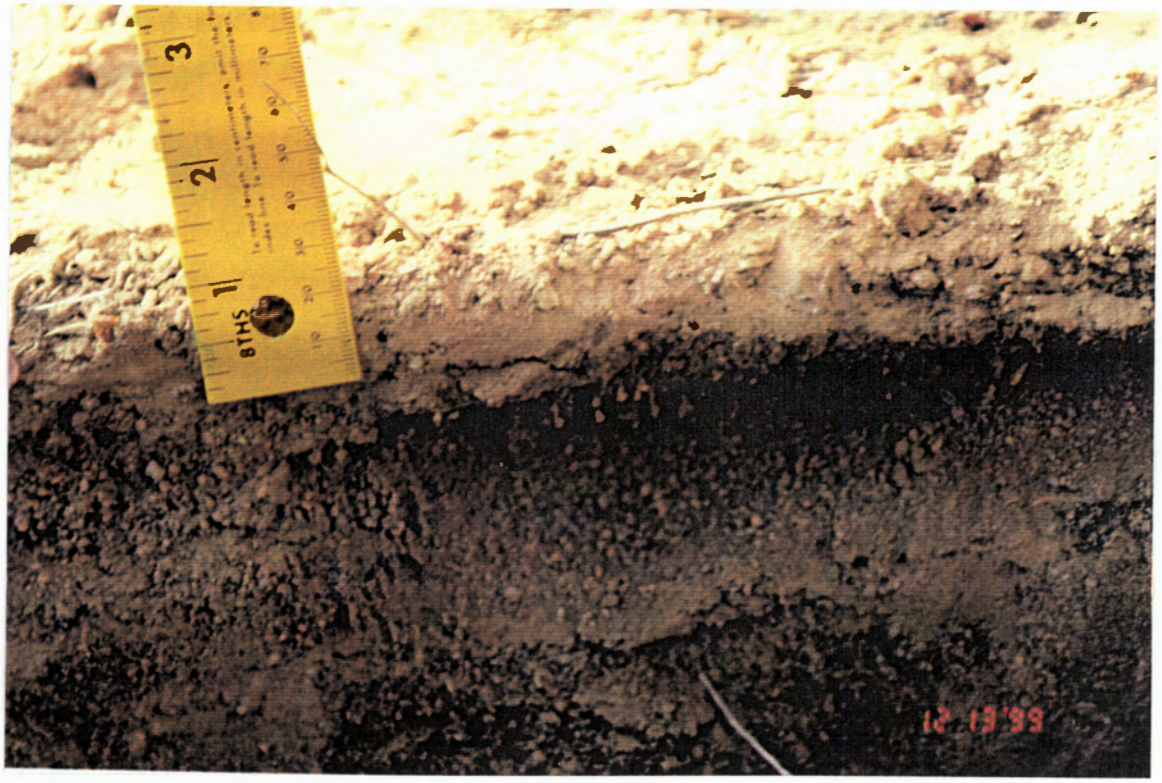
**Description:** View of weir at Gauging Station 1 (GS-1) where sample of effluent from TA-50 was collected.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-17 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 9, 1999 | **Time:** | 1519 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of Gauging Station 1 located in Mortandad Canyon where effluent sample GS-1 from Technical Area-50 was collected. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-18 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 10, 1999 | **Time:** | 0915 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location SC-1 in Sandia Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-19 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 0916 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | Close-up view of sample SC-1. Sample was collected from 0 to 17 centimeters in depth. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-20 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 0945 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location SC-2 located in Sandia Canyon. | | |




| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-21 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 0946 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample location SC-2 located in Sandia Canyon. Sample was collected from the top three centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-22 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1010 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** View of soil sample location SC-3 located in Sandia Canyon.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-23 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1011 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample location SC-3 located in Sandia Canyon. Sample was collected from 8 to 19 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-24 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1037 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |

**Description:** View of soil sample location SC-4 located in Sandia Canyon.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 1-25 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1038 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | Close-up view of soil sample location SC-2 located in Sandia Canyon. Sample was collected from 2 to 12 centimeters. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1117 |
| **Photo By:** | B. Kendrick | **Direction:** | Southwest |
| **Description:** | View of soil sample location SC-6 in Sandia Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1118 |
| **Photo By:** | B. Kendrick | **Direction:** | Southwest |

**Description:** Close-up view of sample location SC-6 in Sandia Canyon. Sample was collected from 0 to 12 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1140 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | View of soil sample location SC-5 in Sandia Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1142 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | Close-up view of sample location SC-5. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1320 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample station BC-1 in Bayou Canyon. | | |

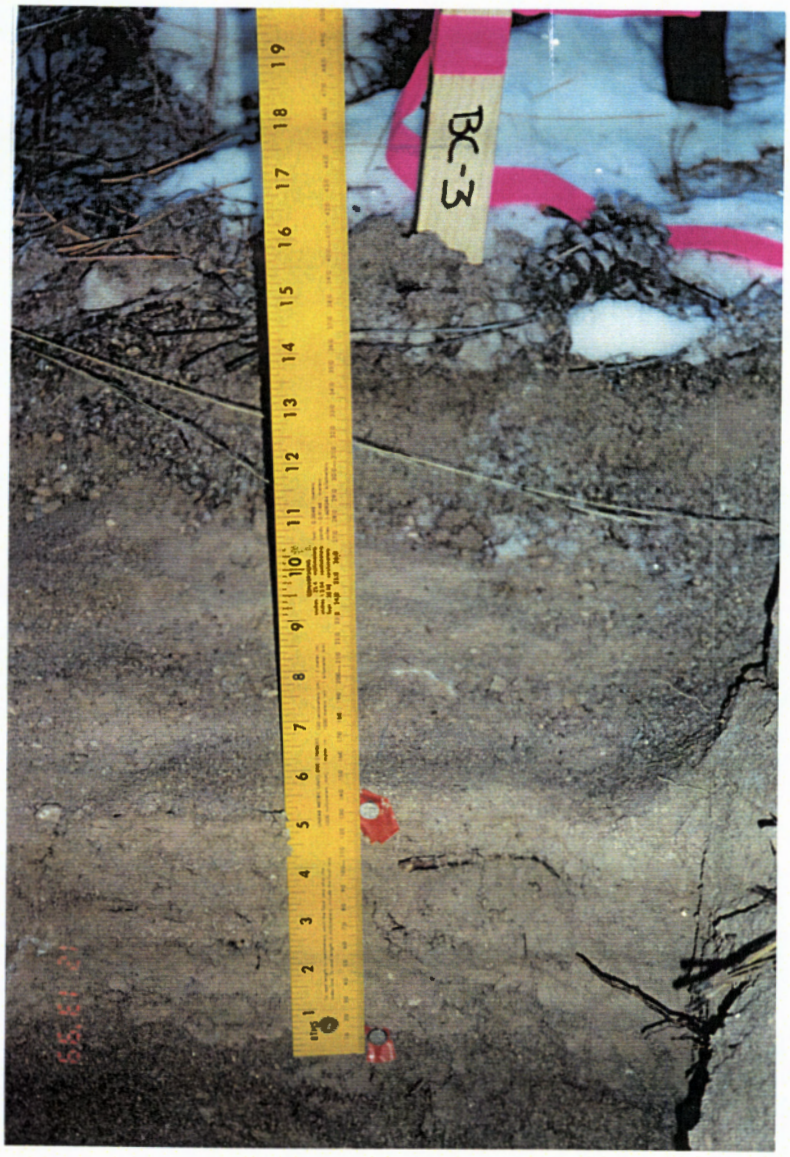
| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1321 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | Close-up view of sample station BC-1 in Bayou Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1355 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View os soil sample location BC-2 in Bayo Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1356 |
| **Photo By:** | B. Kendrick | **Direction:** | East |

**Description:** Close-up view of BC-1 in Bayo Canyon. A sample was collected from 14 to 27 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1422 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of soil sample station BC-3 in Bayo Canyon. | | |



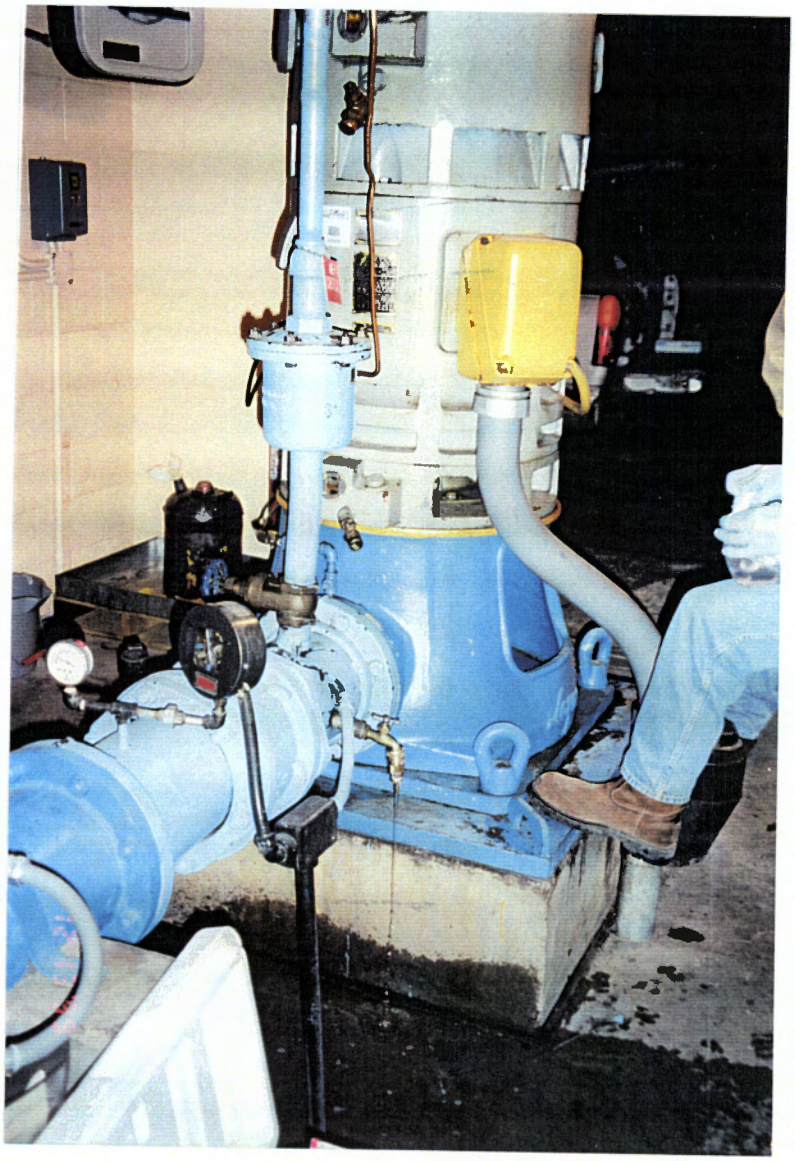

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1424 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | Close-up view of sample location BC-3 in Bayo Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1450 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | View of soil sample station BC-4 located in Bayo Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1452 |
| **Photo By:** | B. Kendrick | **Direction:** | Southeast |
| **Description:** | Close-up view of sample location BC-4 in Bayo Canyon. The sample was collected from a depth of 4 to 11 centimeters. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1813 |
| **Photo By:** | B. Kendrick | **Direction:** | Unknown |
| **Description:** | View of Pajarito Mesa production well, PM-5, wellhead and sample point. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1848 |
| **Photo By:** | B. Kendrick | **Direction:** | Unknown |
| **Description:** | View of Pajarito Mesa production well, PM-2, pump and sampling point. | | |



| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 1952 |
| **Photo By:** | B. Kendrick | **Direction:** | Unknown |
| **Description:** | View of pump and sample point of Pajarito Mesa production well, PM-1. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 13, 1999 | **Time:** | 2030 |
| **Photo By:** | B. Kendrick | **Direction:** | Unknown |
| **Description:** | View of production well O-4 pump and sampling point. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-18 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1005 |
| **Photo By:** | J. Housley | **Direction:** | North |

**Description:** View of soil sample station MC-1 in Mortandad Canyon. A sample was collected from 0 to 5 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-19 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1055 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** View of soil sample locations MC-3 and MC-4 located in Mortandad Canyon.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-20 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1057 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample station MC-3. A sample was collected between 15 and 24 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-21 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1058 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** Close-up view of soil sample station MC-4 in Mortandad Canyon. A sample was collected from 0 to 5 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-22 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1147 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** View of soil sample location MC-2 in Mortandad Canyon.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-23 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1149 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample station MC-2 in Mortandad Canyon. A sample was collected from 0 to 8 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-24 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1226 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample station MC-5 in Mortandad Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 2-25 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 14, 1999 | **Time:** | 1228 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample station MC-5 in Mortandad Canyon. Two samples were collected from the location. The first was from 0 to 13 centimeters in depth, and the second sample was from 22 to 30 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 0858 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location CC-8 in Canada del Buey. | | |

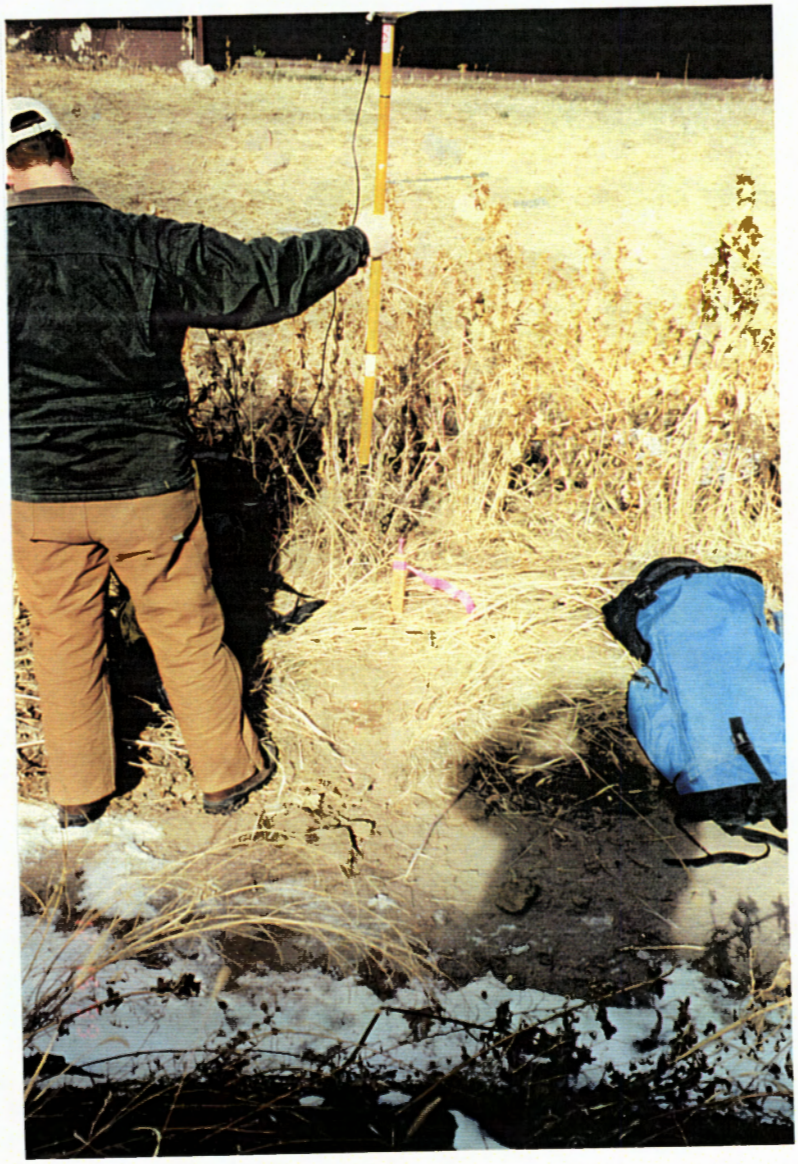
| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 0900 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample location CC-8 in Canada del Buey. A sample was collected at the location from 20 to 33 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 0933 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location CC-7 located in Canada del Buey. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 0934 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** Close-up view of CC-7 in Canada del Buey. A sample was collected from 0 to 7 centimeters in depth.



| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1019 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location CC-6 in Canada del Buey. The area is located behind an apartment complex. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1020 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** A close-up view of soil sample location CC-6 in Canada del Buey. A sample was collected from a depth of 0 to 7.5 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1311 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of soil sample location CC-5 in Canada del Buey | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1313 |
| **Photo By:** | B. Kendrick | **Direction:** | East |

**Description:** Close-up view of soil sample location CC-5 in Canada del Buey. Two samples were taken from the location. The first, CC-5A was collected from 13 to 26 centimeters in depth, and the second, CC-5B, was collected from 30 to 39 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1405 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location CC-4 in Canada del Buey. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1430 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location CC-3 in Canada del Buey. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1432 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | Close-up view of soil sample CC-3 in Canada del Buey. A sample was collected from 0 to 13 centimeters in depth. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1505 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** View of sample location CC-2 in Canada del Buey. The sample was collected at a depth of 5 to 20 centimeters and was located in a culvert under Lajano Road.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-13 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1530 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample station CC-1 located in Canada del Buey. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-14 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 15, 1999 | **Time:** | 1532 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** Close-up view of the sample location CC-1. The sample was collected from 10 to 17 centimeters in depth.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-15 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1003 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of soil sample location PC-1 in Pajarito Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-16 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1005 |
| **Photo By:** | B. Kendrick | **Direction:** | East |

**Description:** Close-up view of sample location PC-1 in Pajarito Canyon. A sample was collected from 0 to 17 centimeters. Note the splintered stake caused by hammering it into frozen soil.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-17 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1043 |
| **Photo By:** | B. Kendrick | **Direction:** | East |
| **Description:** | View of soil sampling location PC-2 in Pajarito Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-18 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1045 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | Close-up view of soil sample location PC-2 in Pajarito Canyon. A sample was collected from 0 to 24 centimeters in depth. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-19 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1117 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location PC-3 in Pajarito Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-20 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1114 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | Close-up view of soil sample location PC-3. A sample was collected from 0 to 21 centimeters in depth. | | |

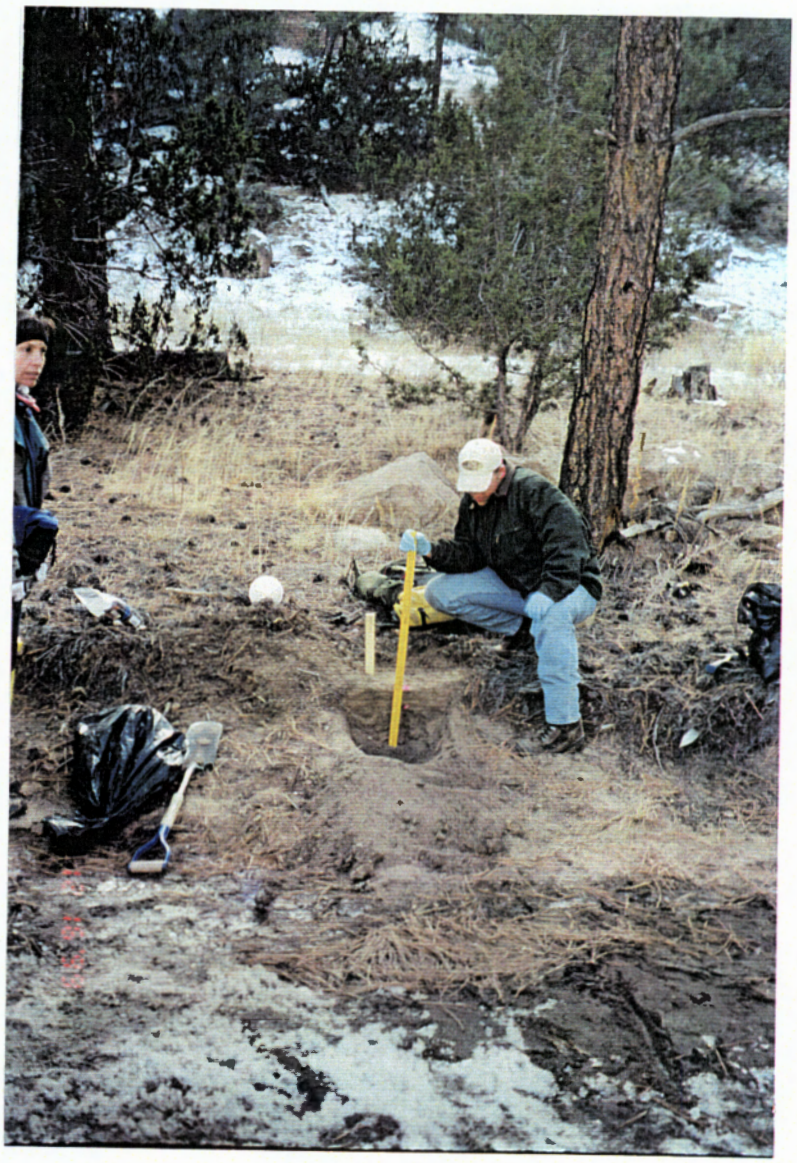
| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-21 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1152 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location PC-4 in Pajarito Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 3-22 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1154 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | Close-up view of soil sample location PC-4. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-1 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1347 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location AC-1 located in Ancho Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-2 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1749 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample location AC-5 in Ancho Canyon. A sample was collected from a depth of 10 to 24 centimeters.



| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-3 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1410 |
| **Photo By:** | B. Kendrick | **Direction:** | South |
| **Description:** | View of soil sample location AC-4 located in Ancho Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-4 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | September 9, 1998 | **Time:** | 1412 |
| **Photo By:** | B. Kendrick | **Direction:** | South |

**Description:** Close-up view of soil sample location AC-4 in Ancho Canyon. A sample was collected at a depth of 0 to 7 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-5 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1440 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location AC-3 located in Ancho Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-6 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1442 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | Close-up view of soil sample location AC-3 in Ancho Canyon. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-7 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1454 |
| **Photo By:** | B. Kendrick | **Direction:** | North |
| **Description:** | View of soil sample location AC-2 in Ancho Canyon. The location is approximately 50 feet south of AC-3. | | |

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-8 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1500 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** Close-up view of soil sample location AC-2 in Ancho Canyon. A sample was collected from a depth of 0 to 17 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-9 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1527 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

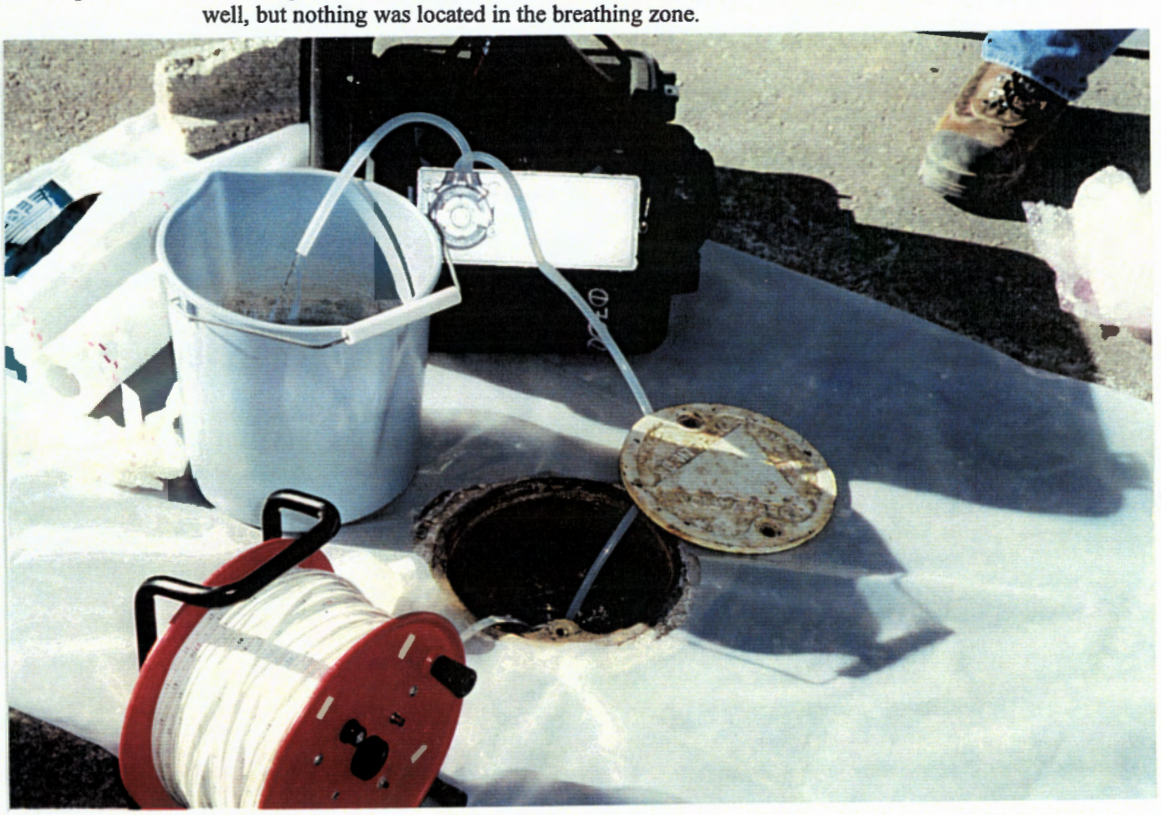
**Description:** View of soil sample location AC-1 in Ancho Canyon. AC-1 is located approximately 300 feet west of the Ancho Canyon Gaging Station.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-10 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 16, 1999 | **Time:** | 1529 |
| **Photo By:** | B. Kendrick | **Direction:** | North |

**Description:** Close-up view of soil sample location AC-1in Ancho Canyon. A sample was collected from a depth of 0 to 5 centimeters.

| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-11 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 17, 1999 | **Time:** | 1021 |
| **Photo By:** | B. Kendrick | **Direction:** | West |

**Description:** View of groundwater monitoring well SM-30 being screened with an OVA. Vapors were detected inside the well, but nothing was located in the breathing zone.



| | | | |
|---|---|---|---|
| **Photograph No.:** | 4-12 | **Facility:** | Los Alamos National Laboratory |
| **Date:** | December 17, 1999 | **Time:** | 1112 |
| **Photo By:** | B. Kendrick | **Direction:** | West |

**Description:** View of groundwater monitoring well SM-30 being purged with a peristaltic pump.

# APPENDIX I

## Trend Analysis

## TREND ANALYSIS

A trend analysis was completed for radiochemicals present within the shallow alluvial aquifers of Mortandad Canyon and Los Alamos Canyon. In addition, a trend analysis for strontium-90 (Sr-90) within TW series wells and PM series production wells was also completed. Historical data gathered from the following sources was used in the trend analysis.

- Los Alamos National Laboratory. Environmental Surveillance and Compliance at Los Alamos during 1994
- Los Alamos National Laboratory. Environmental Surveillance and Compliance at Los Alamos during 1995
- Los Alamos National Laboratory. Environmental Surveillance and Compliance at Los Alamos during 1996
- Los Alamos National Laboratory. Environmental Surveillance and Compliance at Los Alamos during 1997
- Los Alamos National Laboratory. Environmental Surveillance and Compliance at Los Alamos during 1998
- New Mexico Environment Department. July 1996. Hydrogeologic Evaluation of Los Alamos National Laboratory

In addition to the documents listed above, analytical data from the samples collected by EPA during the December 1999 sampling event were used where appropriate.

Included in the trend analysis are appropriate EPA and DOE water quality standards. A description of these water quality standards is provided below.

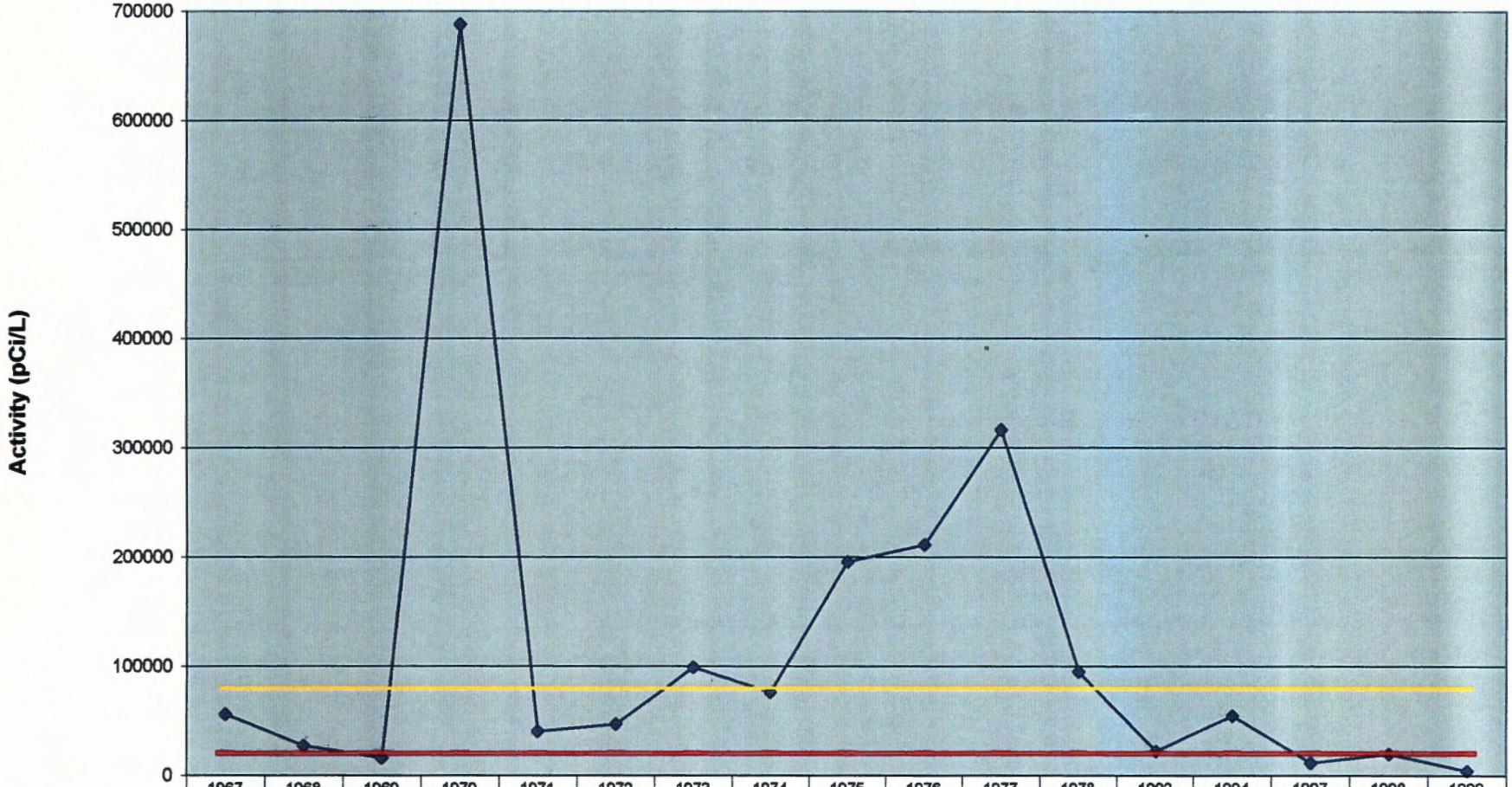
- *EPA Maximum Contaminant Levels (EPA MCLs).* EPA MCLs are defined as the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. A public water system means a system which has at least fifteen service connections or regularly serves an average of 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. The secondary MCLs are not enforceable by the EPA.

- *DOE Derived Concentration Guides (DOE DCG).* DOE DCG values are divided into two categories: 1) water ingestion from drinking water systems and 2) water ingestion in uncontrolled areas. The DOE DCG values for water ingestion from drinking water systems applies 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.

  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.

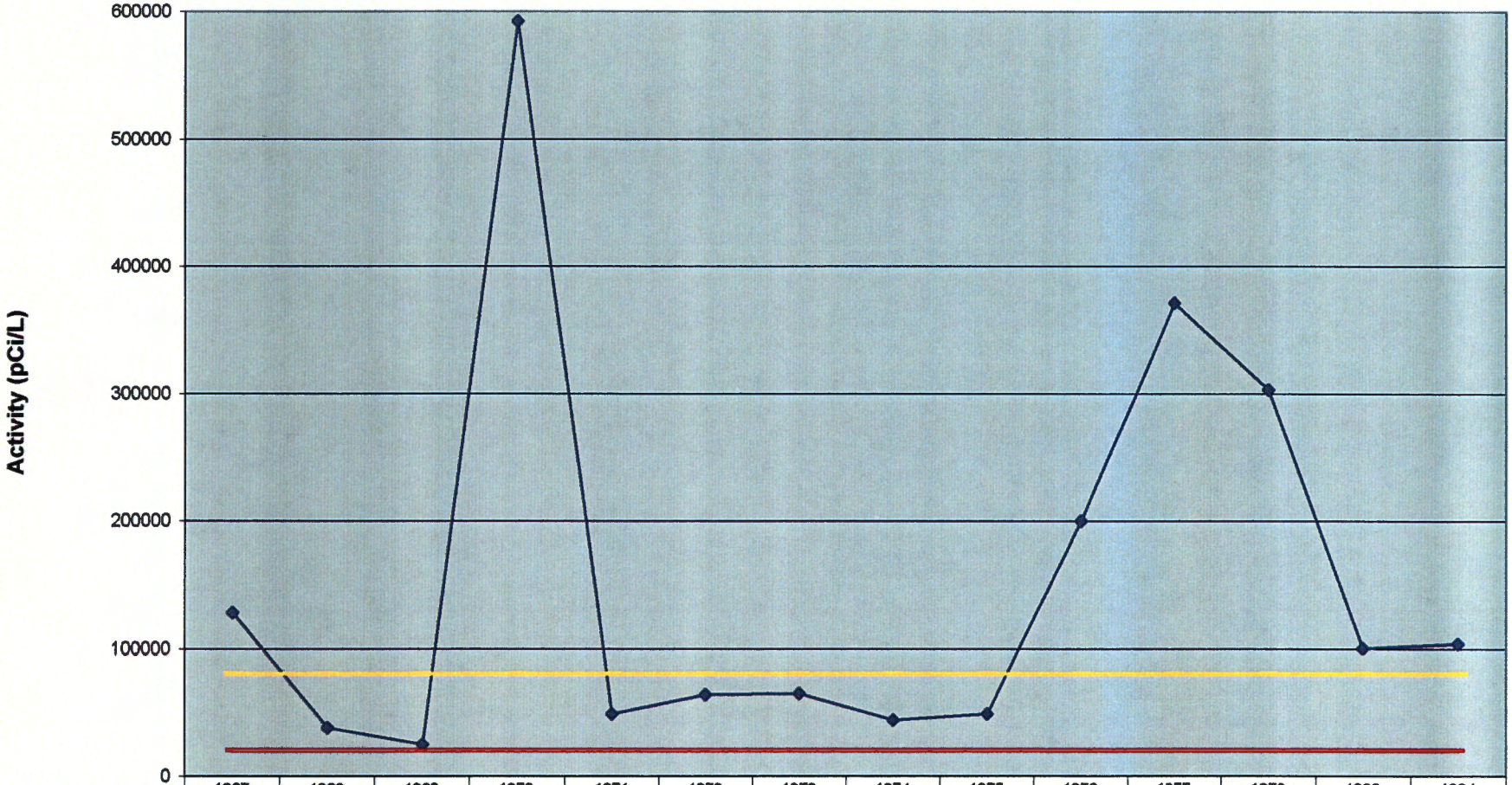
## Tritium Activity in Well MCO-3




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-3 | 56000 | 27000 | 16000 | 688000 | 40000 | 47000 | 99000 | 76000 | 195000 | 211000 | 316000 | 95000 | 22000 | 54500 | 11428 | 19211 | 4298 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Year Sampled

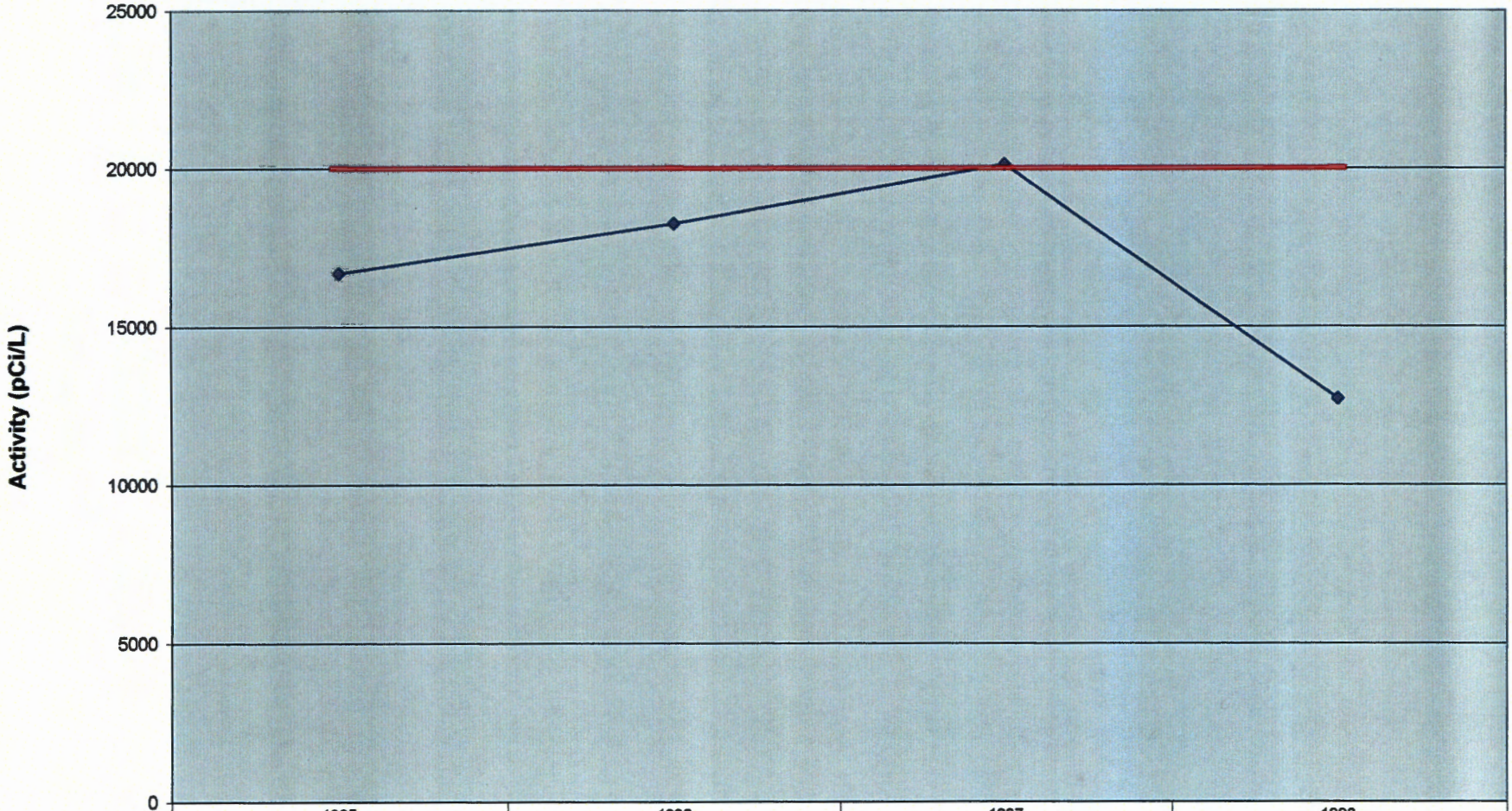
## Tritium Activity in Well MCO-4




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-4 | 128000 | 38000 | 25000 | 592000 | 49000 | 64000 | 65000 | 44000 | 49000 | 200000 | 371000 | 303000 | 100000 | 103700 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Year Sampled

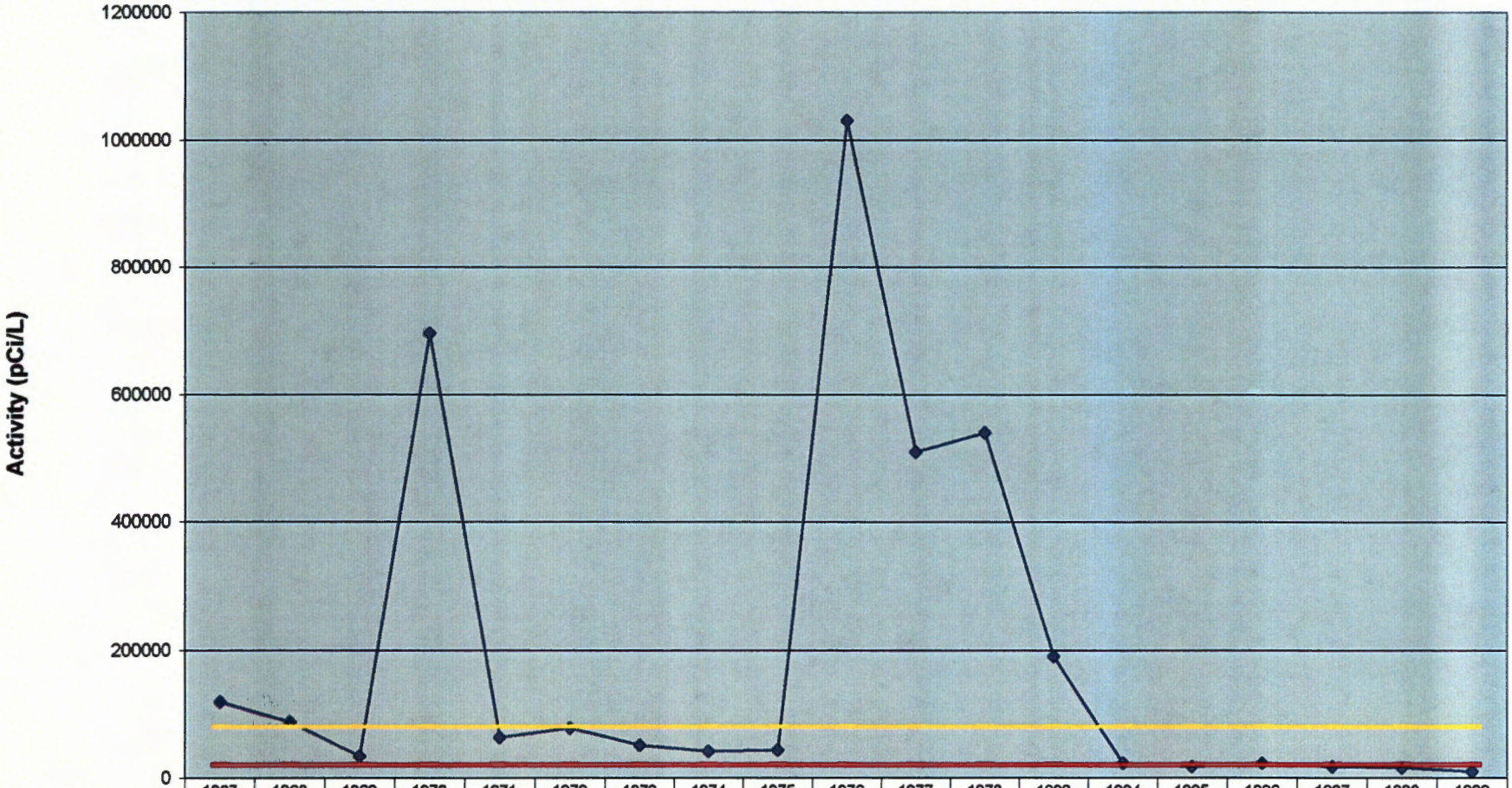
## Tritium Activity in Well MCO-4B




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| MCO-4B | 16700 | 18279 | 20128 | 12711 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 |

Year Sampled

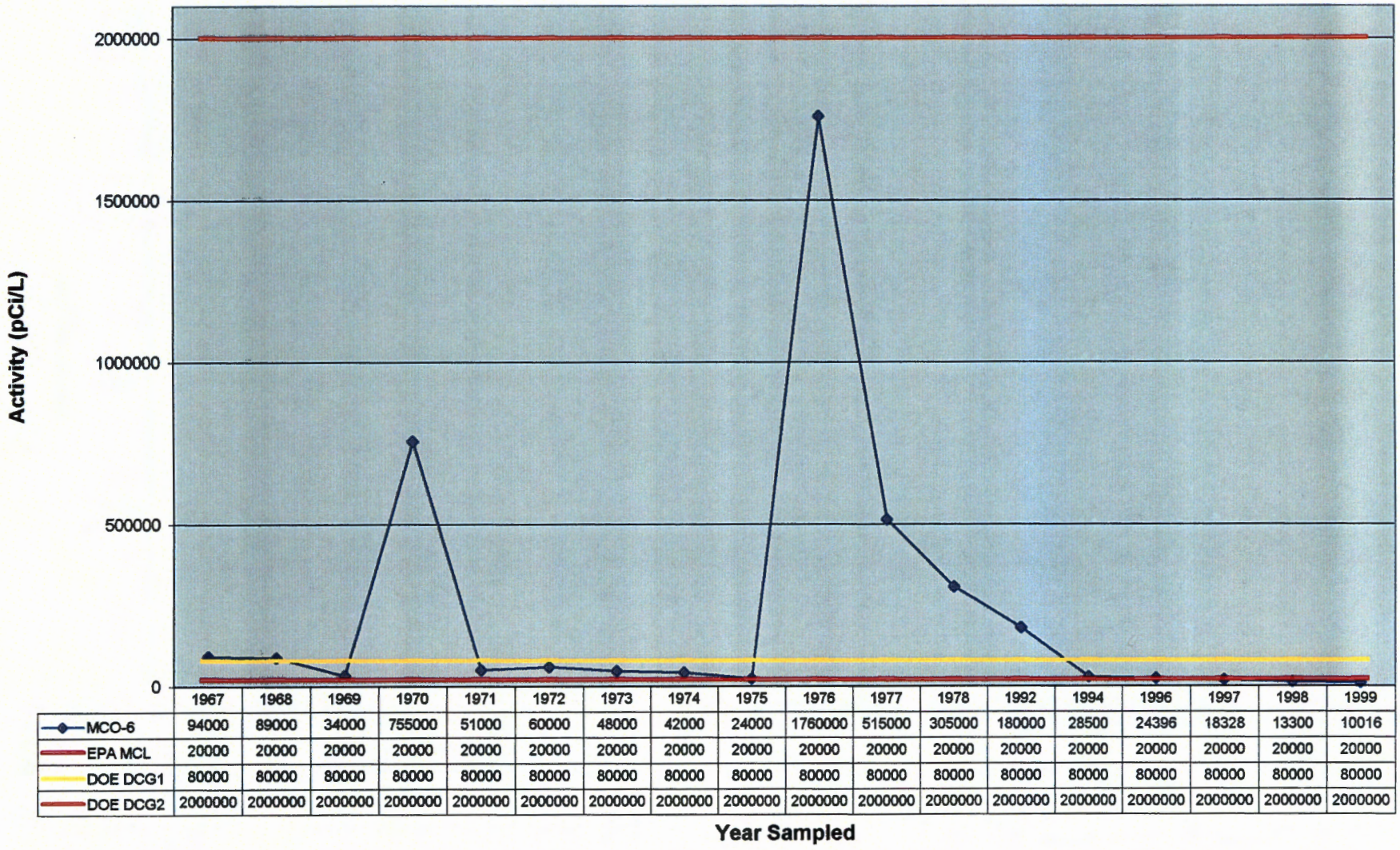
## Tritium Activity in Well MCO-5




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-5 | 119000 | 88000 | 34000 | 695000 | 64000 | 78000 | 51000 | 42000 | 44000 | 1030000 | 510000 | 540000 | 190000 | 22500 | 17100 | 22722 | 17728 | 16111 | 9959 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

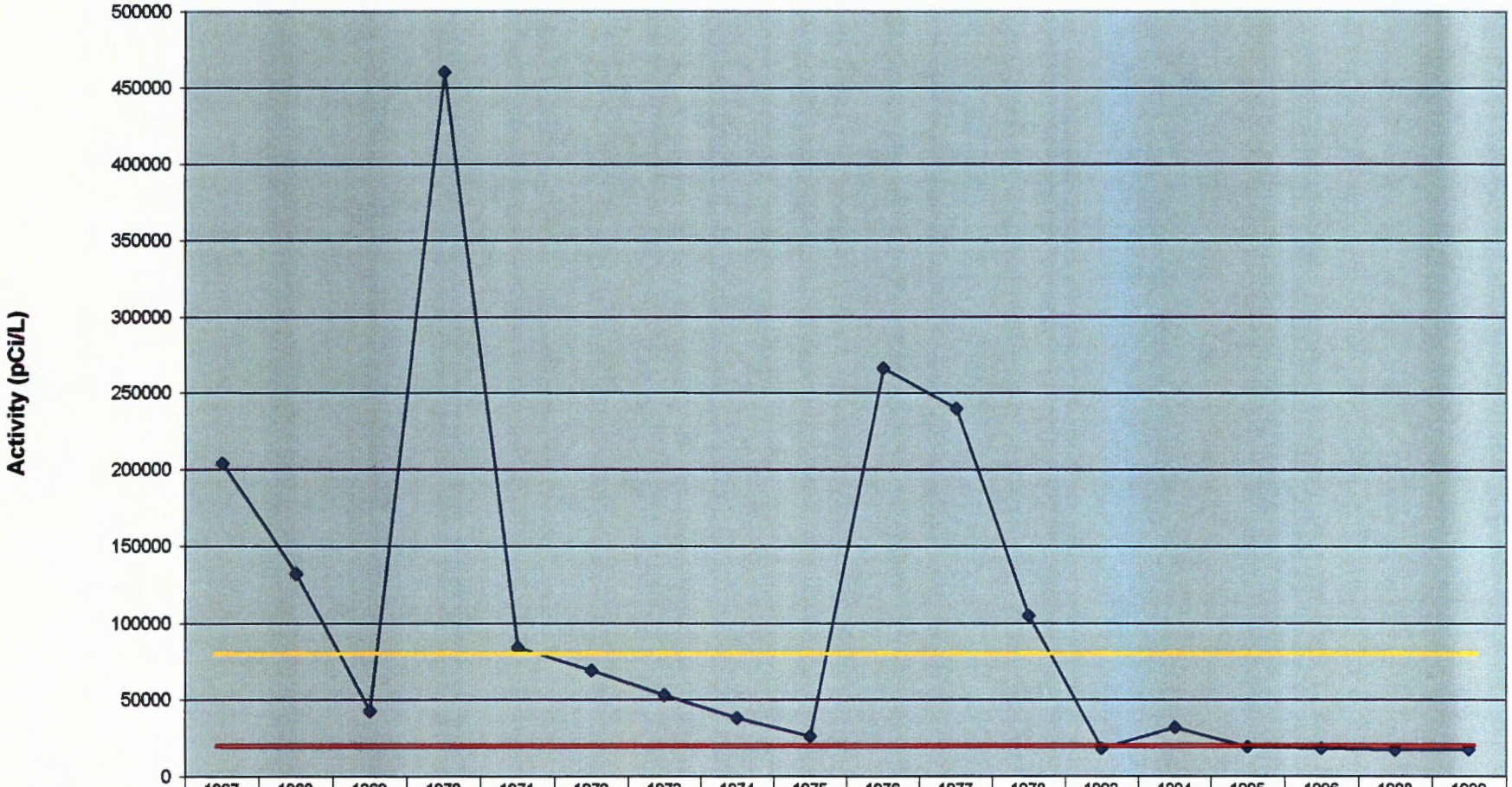
Year Sampled

# Tritium Activity in Well MCO-6




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-6 | 94000 | 89000 | 34000 | 755000 | 51000 | 60000 | 48000 | 42000 | 24000 | 1760000 | 515000 | 305000 | 180000 | 28500 | 24396 | 18328 | 13300 | 10016 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |
| DOE DCG2 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 | 2000000 |

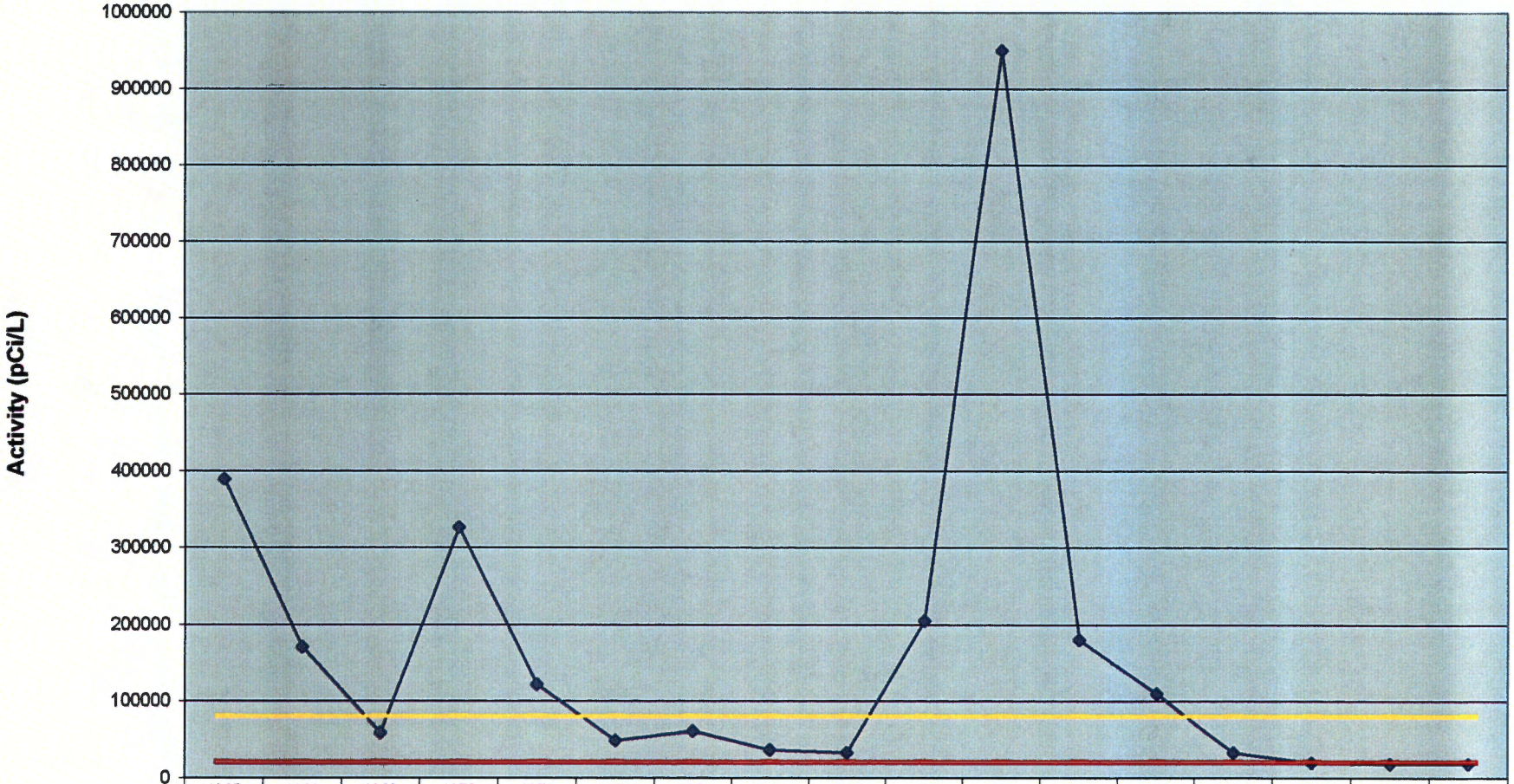
## Tritium Activity in Well MCO-7




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7 | 204000 | 132000 | 43000 | 460000 | 84000 | 69000 | 53000 | 38000 | 26000 | 266000 | 240000 | 105000 | 18000 | 32100 | 19200 | 18027 | 17200 | 17325 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Year Sampled

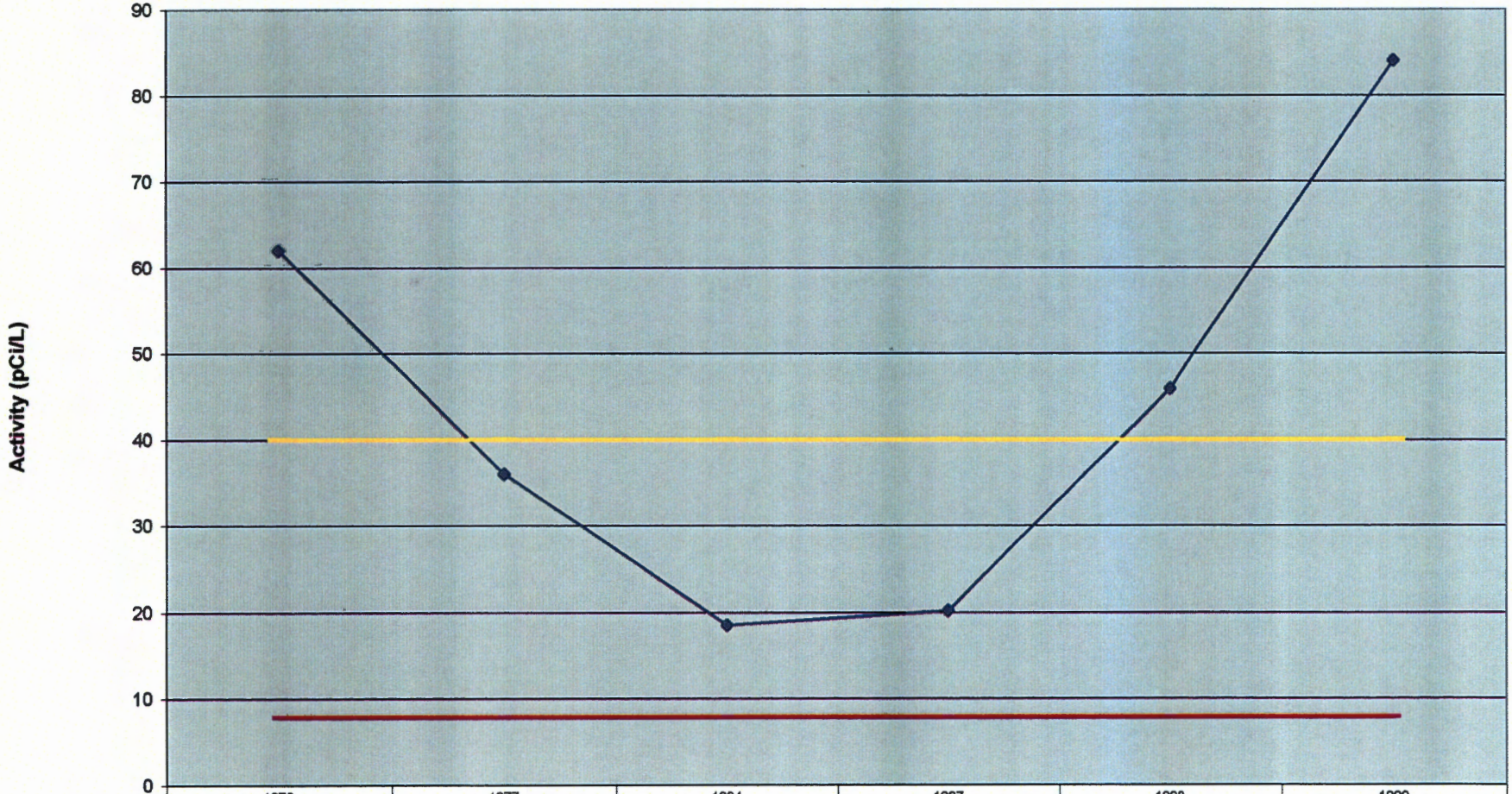
## Tritium Activity for Well MCO-7.5




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7.5 | 389000 | 171000 | 59000 | 326000 | 122000 | 49000 | 61000 | 36000 | 33000 | 205000 | 950000 | 180000 | 110000 | 32800 | 19800 | 18428 | 17800 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Year Sampled

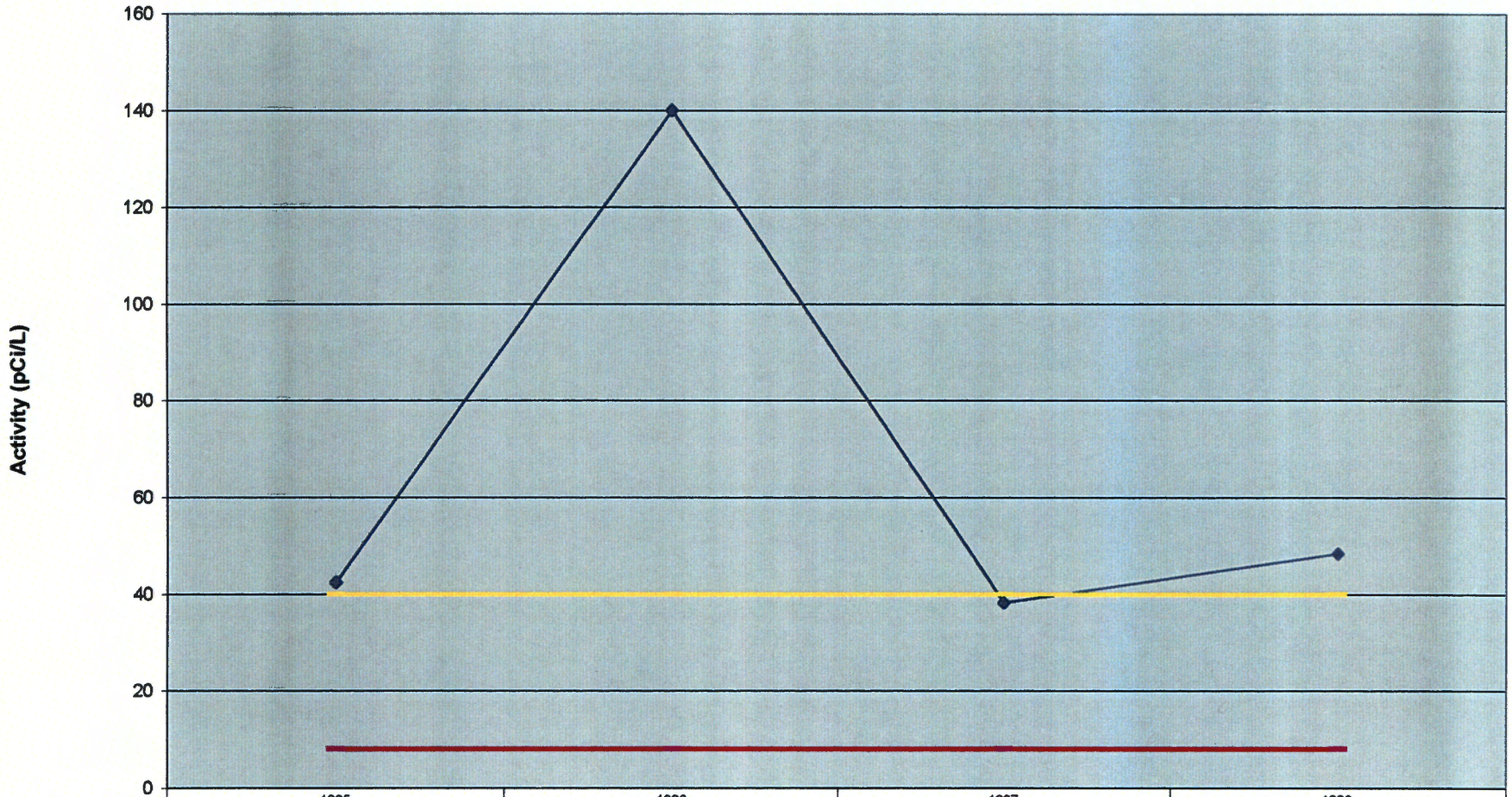
## Strontium-90 Activity in Well MCO-3




| | 1976 | 1977 | 1994 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|
| MCO-3 | 62 | 36 | 18.5 | 20.2 | 45.9 | 84 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 | 8 |
| DOE DCG | 40 | 40 | 40 | 40 | 40 | 40 |

Year Sampled

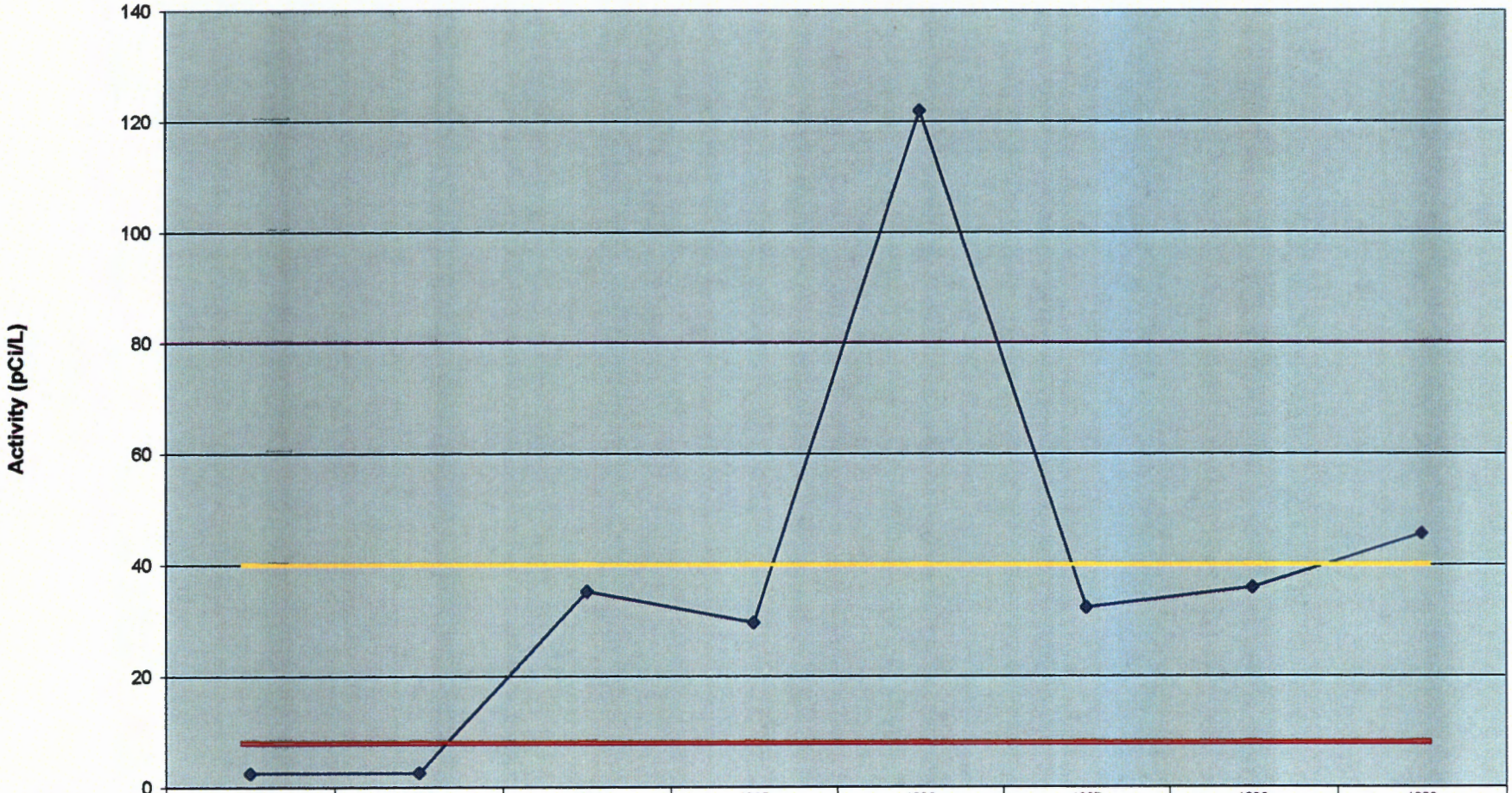
## Strontium-90 Activity in Well MCO-4B




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| MCO-4B | 42.4 | 140 | 38.3 | 48.4 |
| EPA MCL | 8 | 8 | 8 | 8 |
| DOE DCG | 40 | 40 | 40 | 40 |

Year Sampled

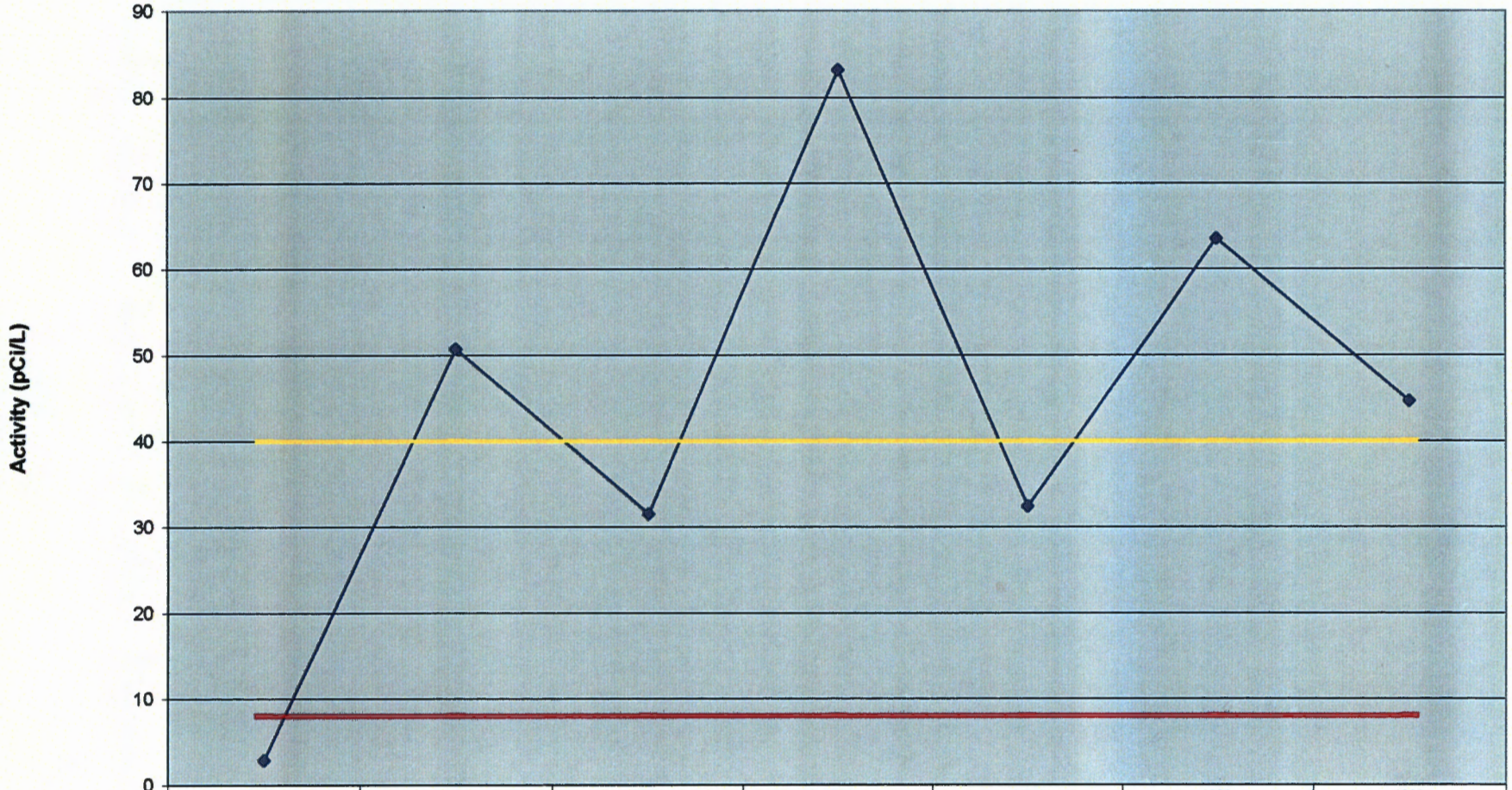
## Strontium-90 Activity in Well MCO-5




| | 1976 | 1978 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|
| MCO-5 | 2.5 | 2.6 | 35.2 | 29.6 | 121.9 | 32.3 | 35.9 | 45.6 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| DOE DCG | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |

Year Sampled

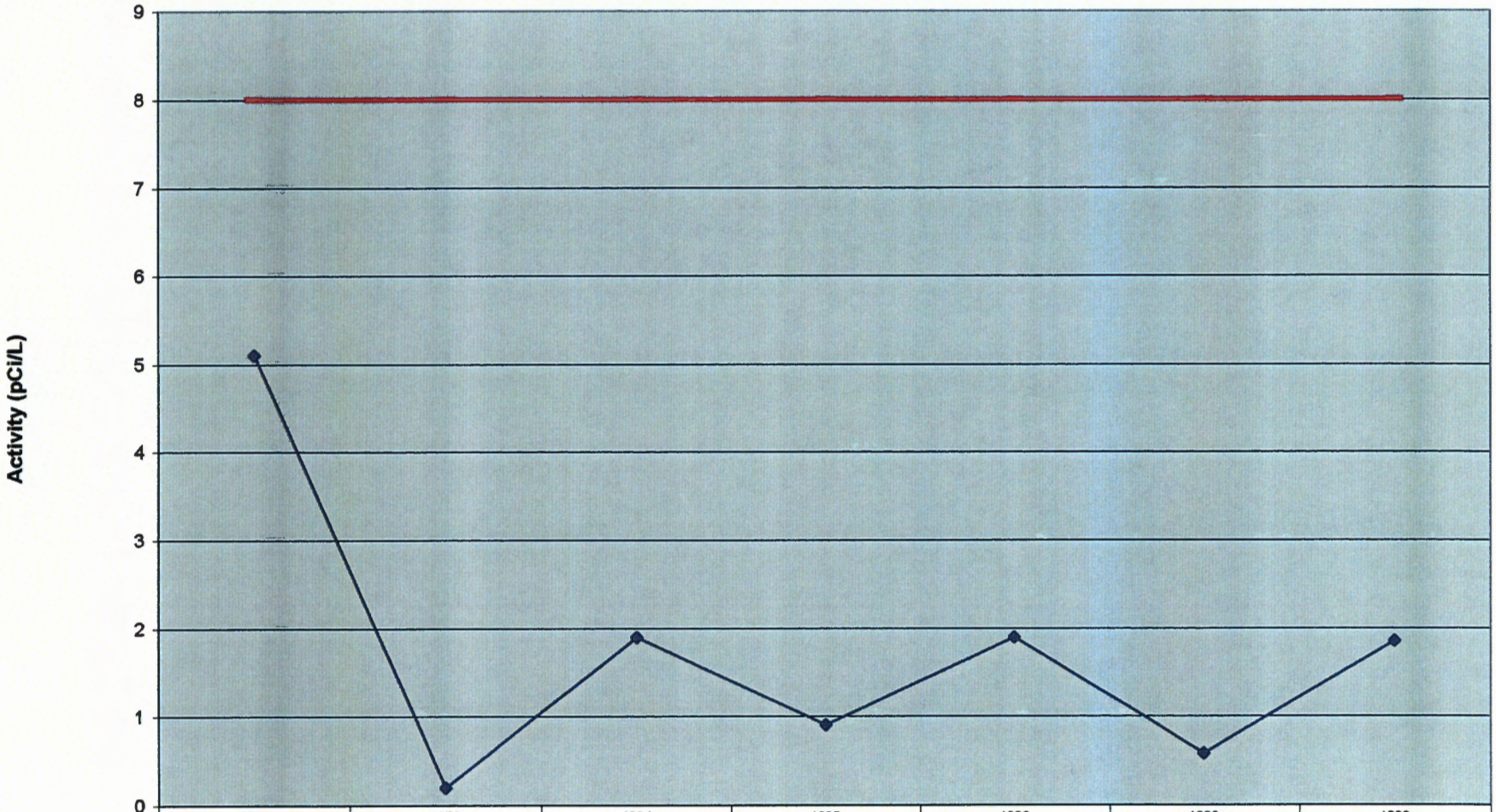
## Strontium-90 Activity in Well MCO-6




| | 1978 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|
| MCO-6 | 2.8 | 50.7 | 31.5 | 83.2 | 32.4 | 63.5 | 44.6 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| DOE DCG | 40 | 40 | 40 | 40 | 40 | 40 | 40 |

Year Sampled

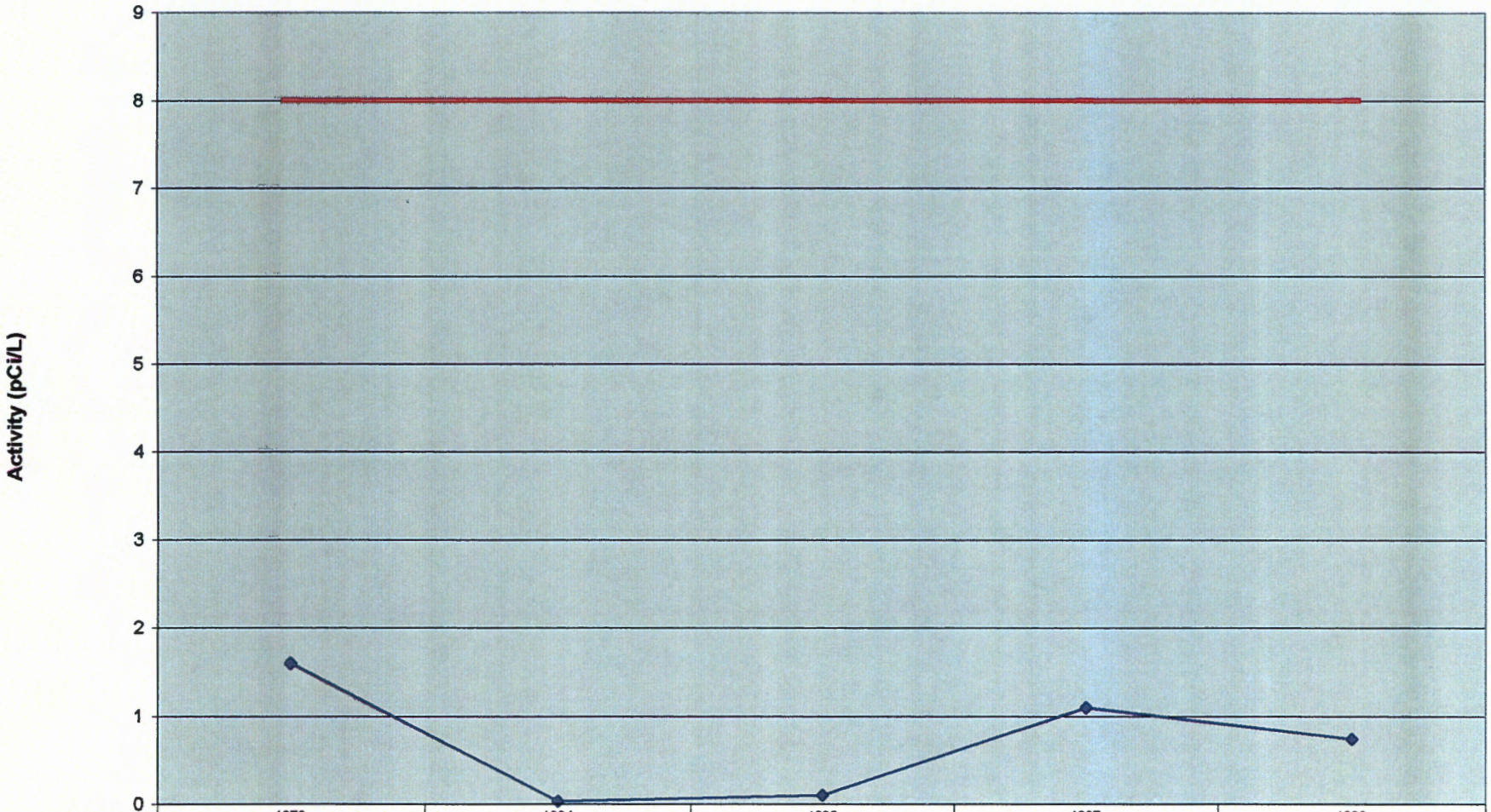
## Strontium-90 Activity in Well MCO-7




| | 1976 | 1978 | 1994 | 1995 | 1996 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|
| MCO-7 | 5.1 | 0.2 | 1.9 | 0.9 | 1.9 | 0.6 | 1.9 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

Year Sampled

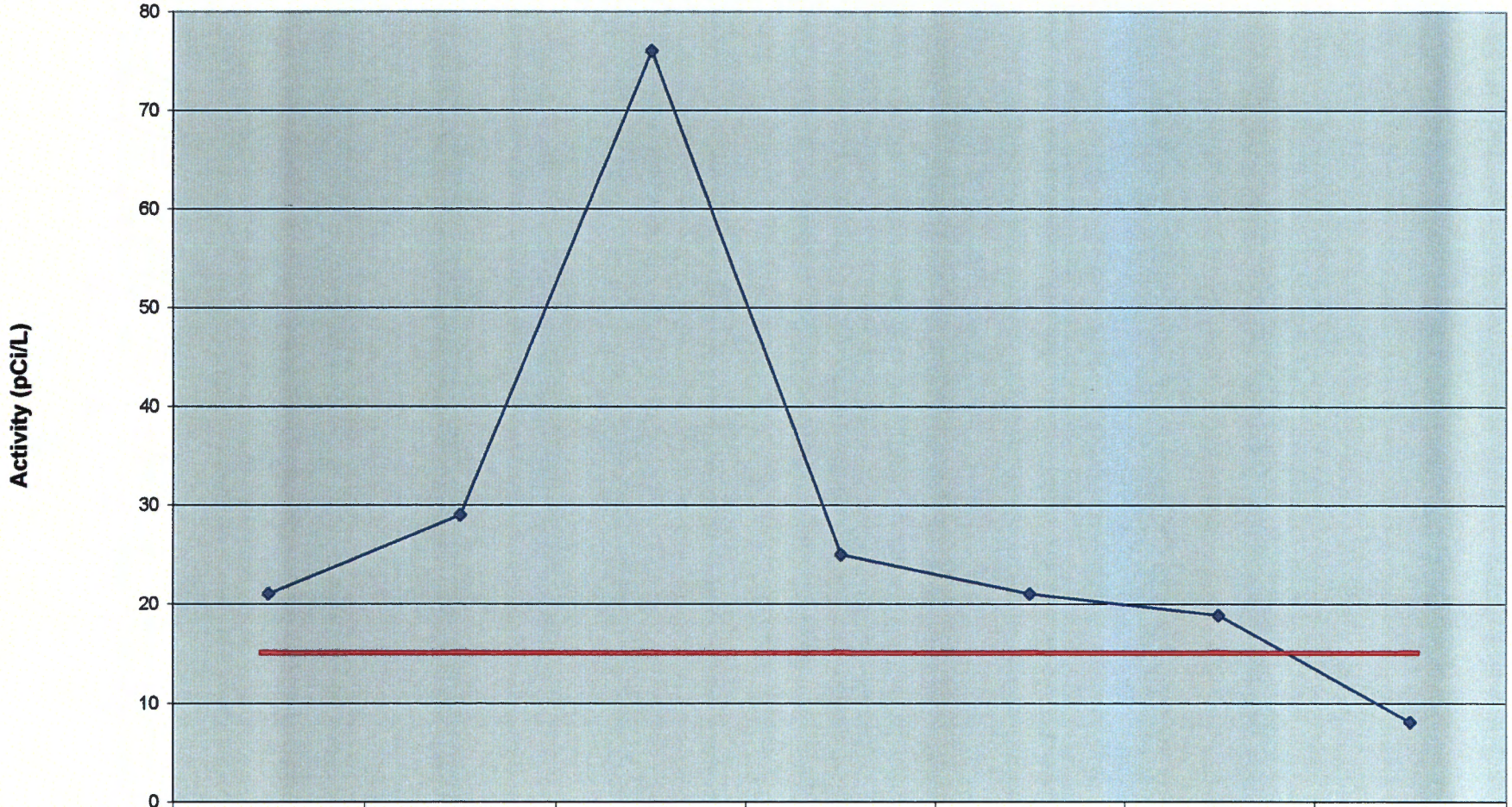
## Strontium-90 Activity in Well MCO-7.5




| | 1978 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|
| MCO-7.5 | 1.6 | 0.03 | 0.1 | 1.1 | 0.7 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 |

Year Sampled

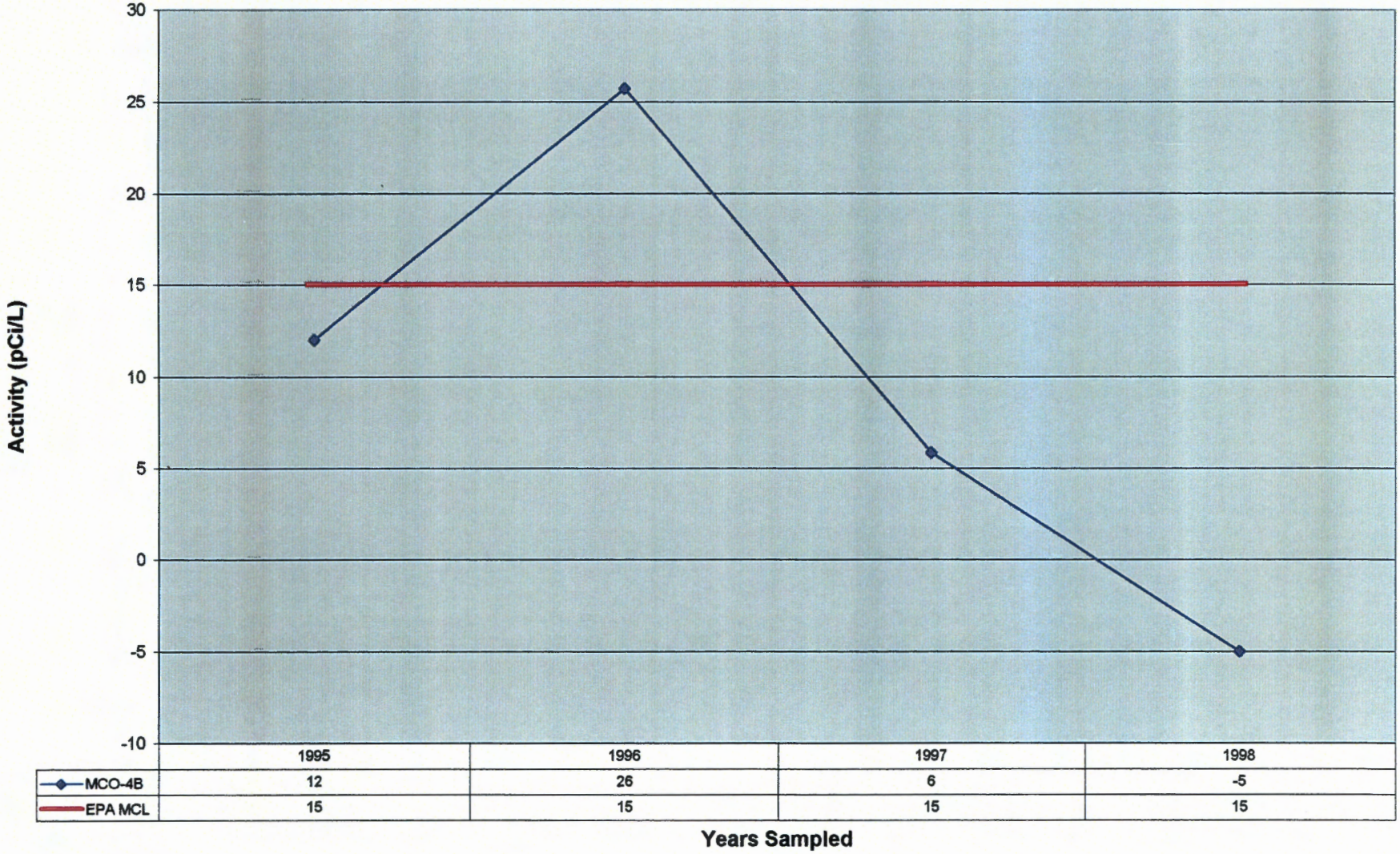
## Gross Alpha Avtivity for Well MCO-3




| | 1971 | 1973 | 1976 | 1977 | 1978 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|
| MCO-3 | 21 | 29 | 76 | 25 | 21 | 19 | 8 |
| EPA MCL | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

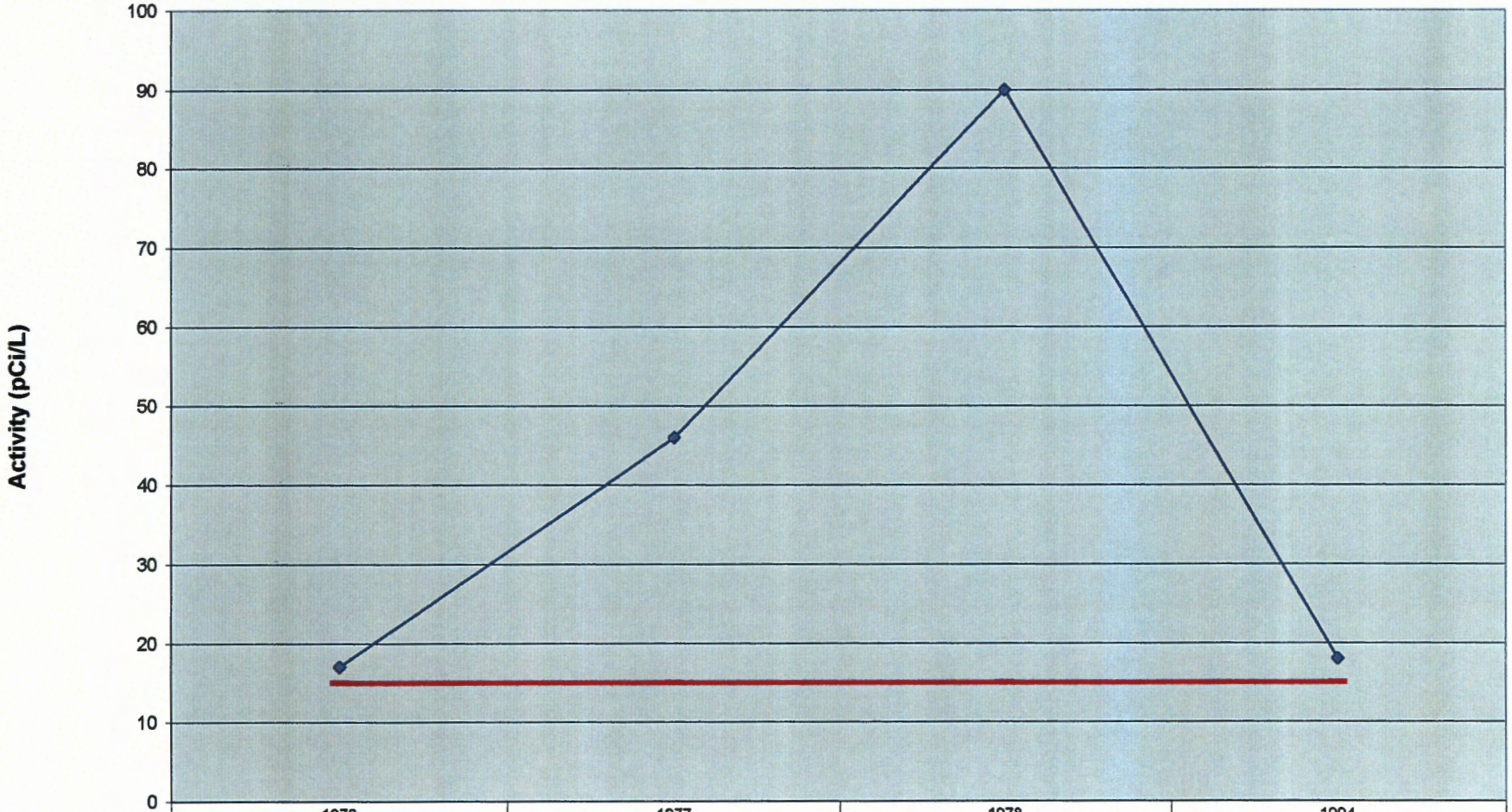
Years Sampled

## Gross Alpha Activity for Well MCO-4B




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| MCO-4B | 12 | 26 | 6 | -5 |
| EPA MCL | 15 | 15 | 15 | 15 |

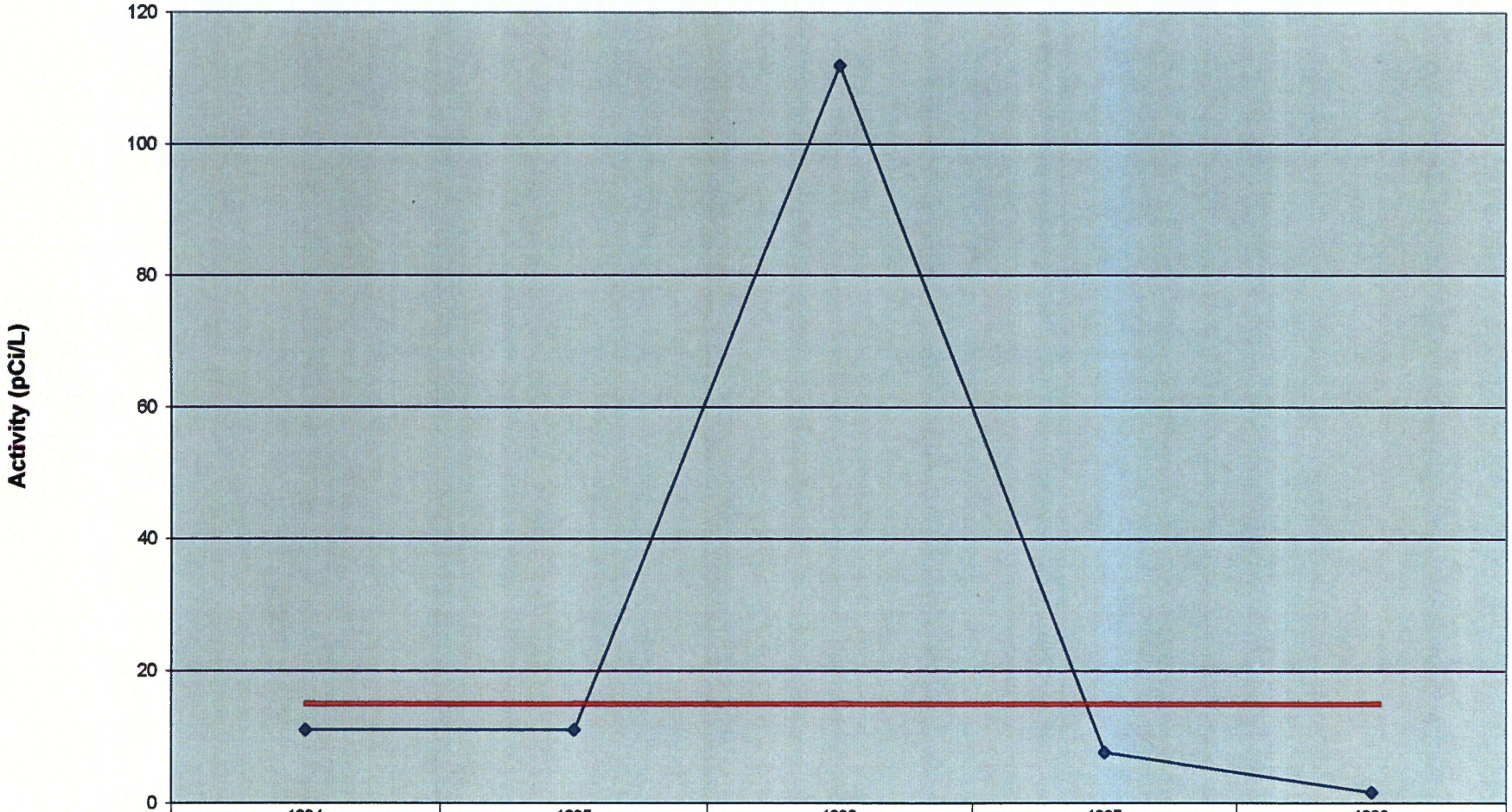
## Gross Alpha Activity for Well MCO-4




| | 1976 | 1977 | 1978 | 1994 |
|---|---|---|---|---|
| MCO-4 | 17 | 46 | 90 | 18 |
| EPA MCL | 15 | 15 | 15 | 15 |

Years Sampled

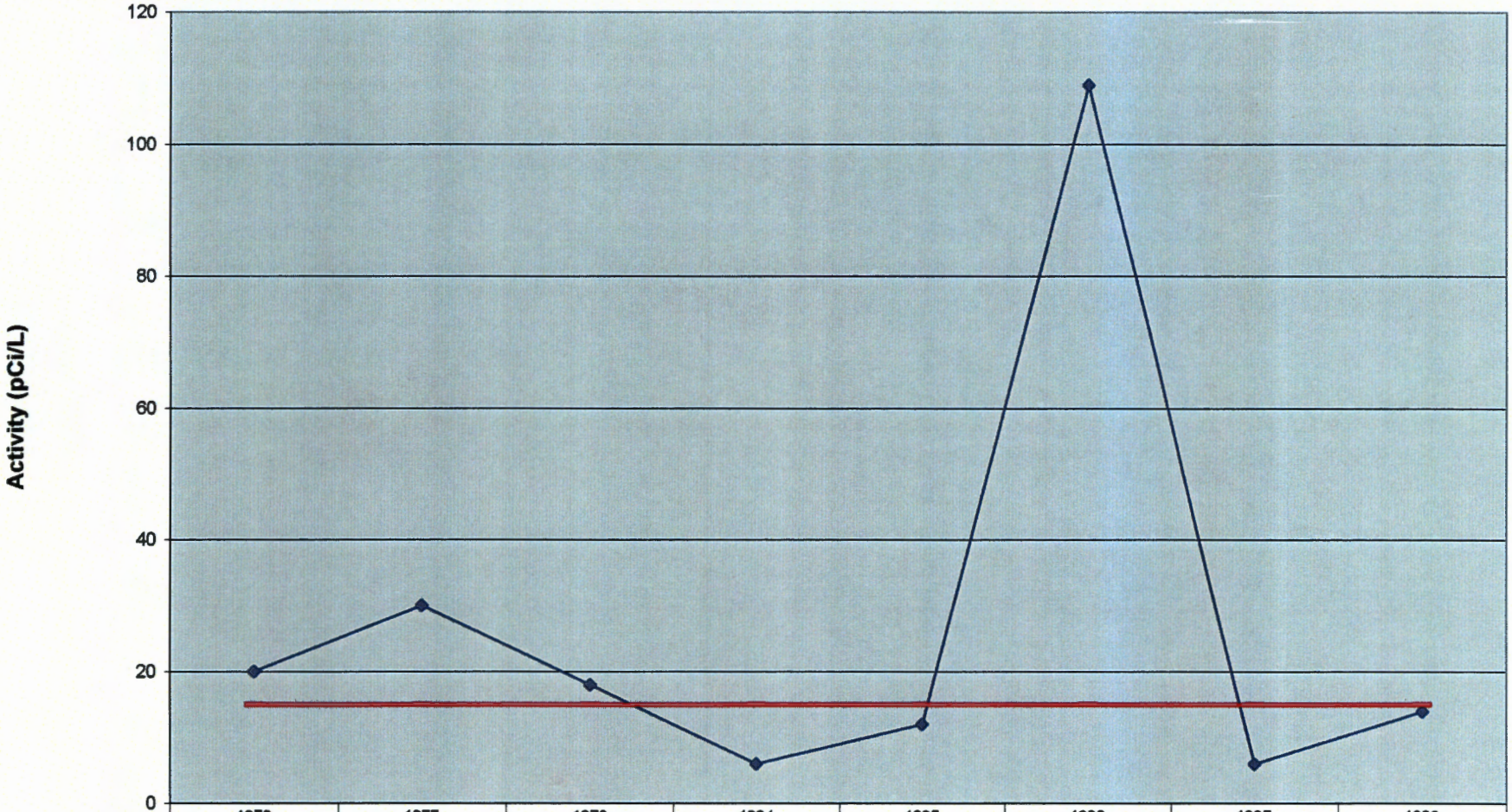
## Gross Alpha Activity for Well MCO- 5




| | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|
| MCO-5 | 11 | 11 | 112 | 8 | 2 |
| EPA MCL | 15 | 15 | 15 | 15 | 15 |

Years Sampled

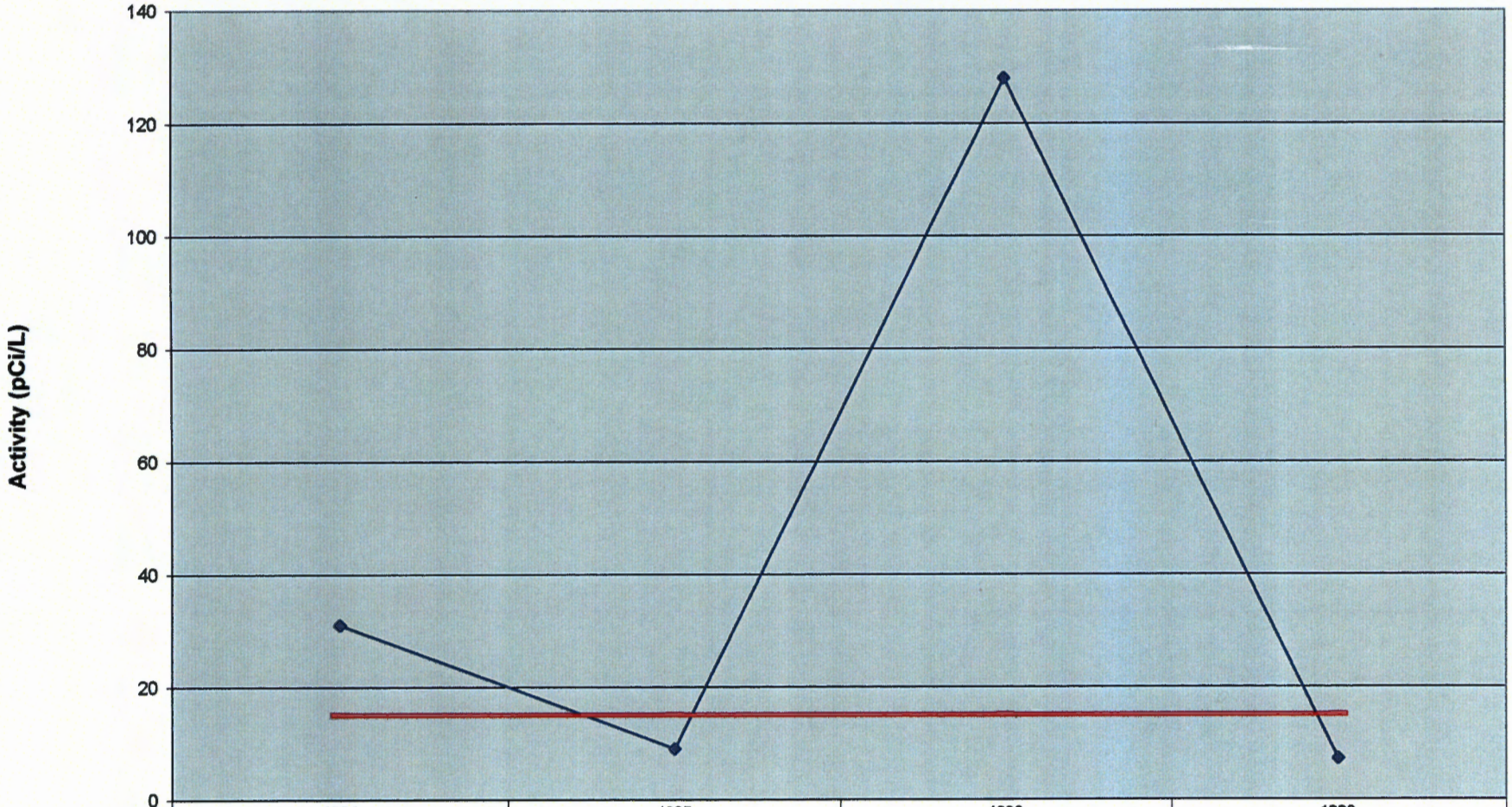
## Gross Alpha Activity for Well MCO-6




| | 1976 | 1977 | 1978 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|
| MCO-6 | 20 | 30 | 18 | 6 | 12 | 109 | 6 | 14 |
| EPA MCL | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

Years Sampled

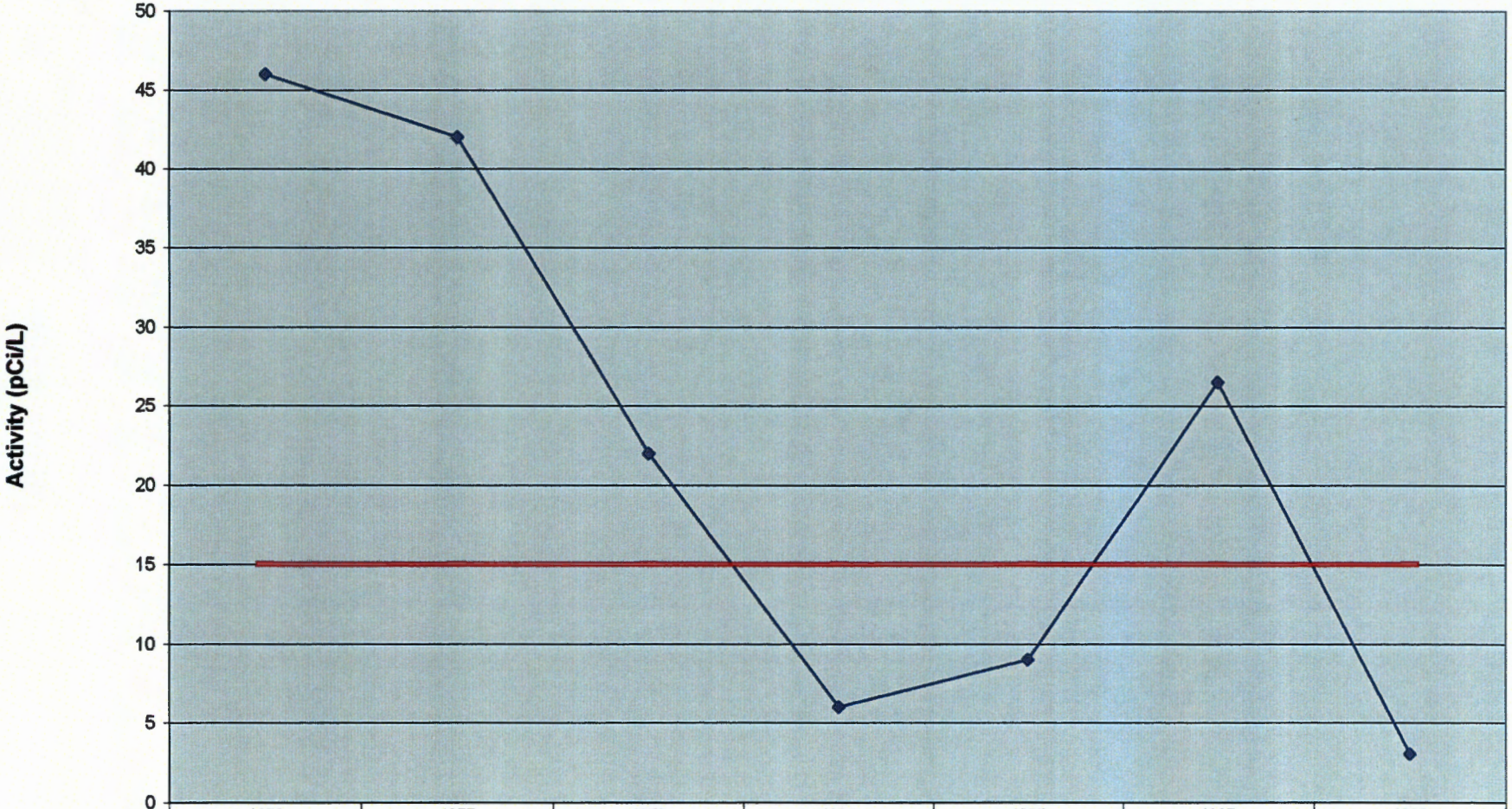
## Gross Alpha Activity for Well MCO-7




| | 1994 | 1995 | 1996 | 1998 |
|---|---|---|---|---|
| MCO-7 | 31 | 9 | 128 | 7 |
| EPA MCL | 15 | 15 | 15 | 15 |

Years Sampled

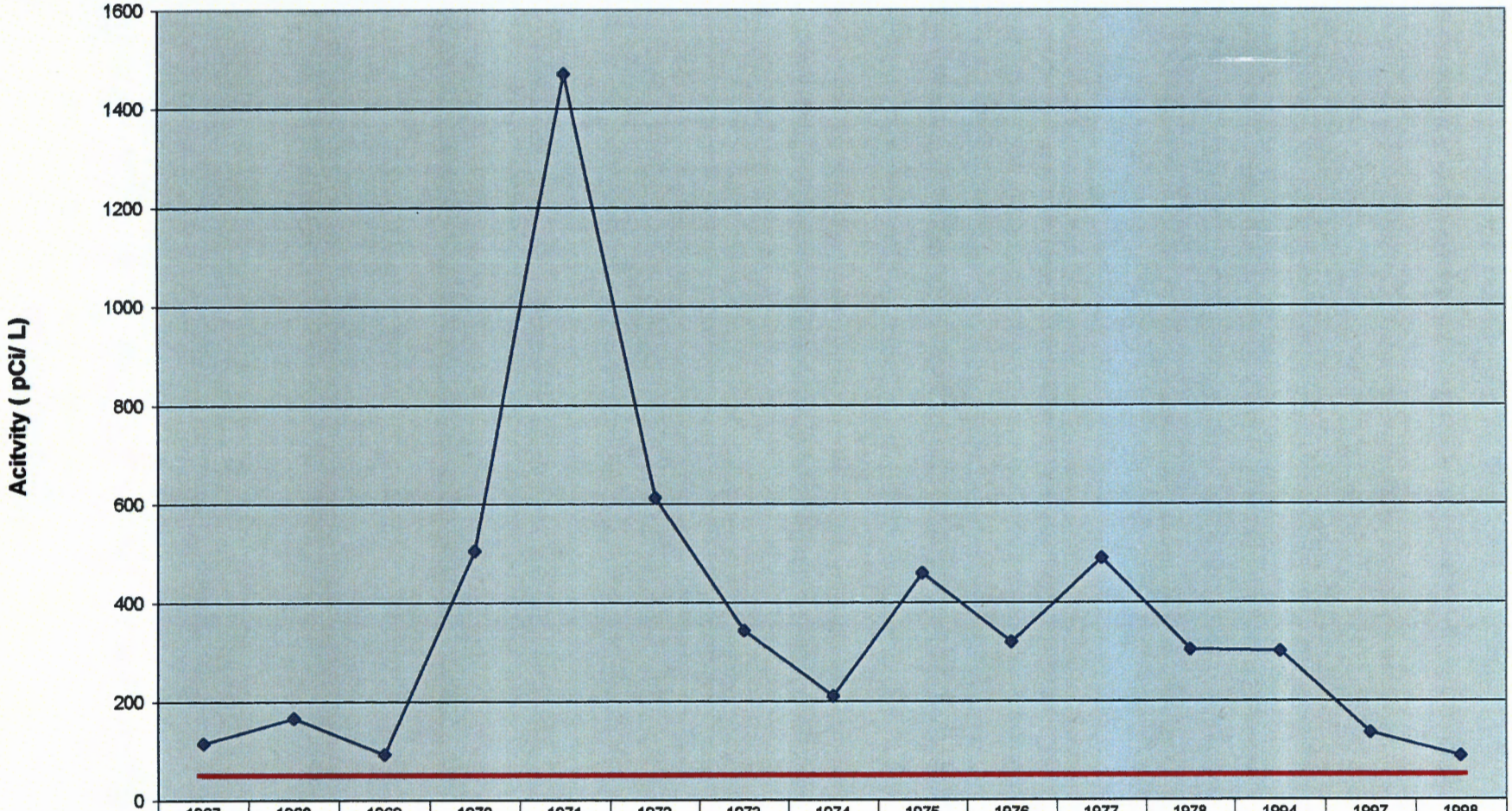
## Gross Alpha Activity for Well MCO-7.5




| | 1976 | 1977 | 1978 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|
| MCO-7.5 | 46 | 42 | 22 | 6 | 9 | 27 | 3 |
| EPA MCL | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

Years Sampled

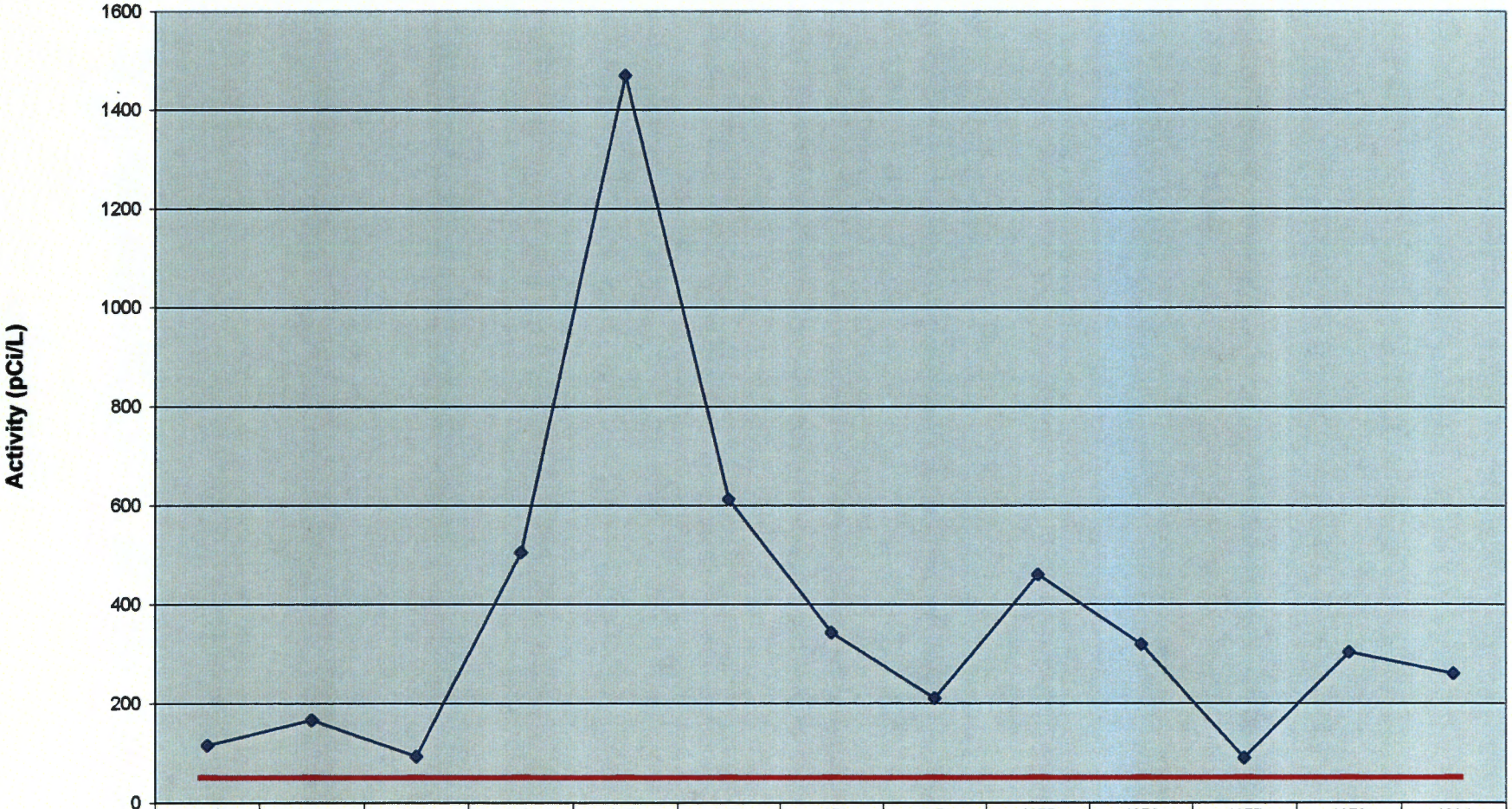
## Gross Beta Activity for Well MCO-3




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1994 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-3 | 116 | 166 | 93 | 505 | 1470 | 612 | 343 | 210 | 460 | 320 | 490 | 304 | 300 | 136 | 89 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Year Sampled

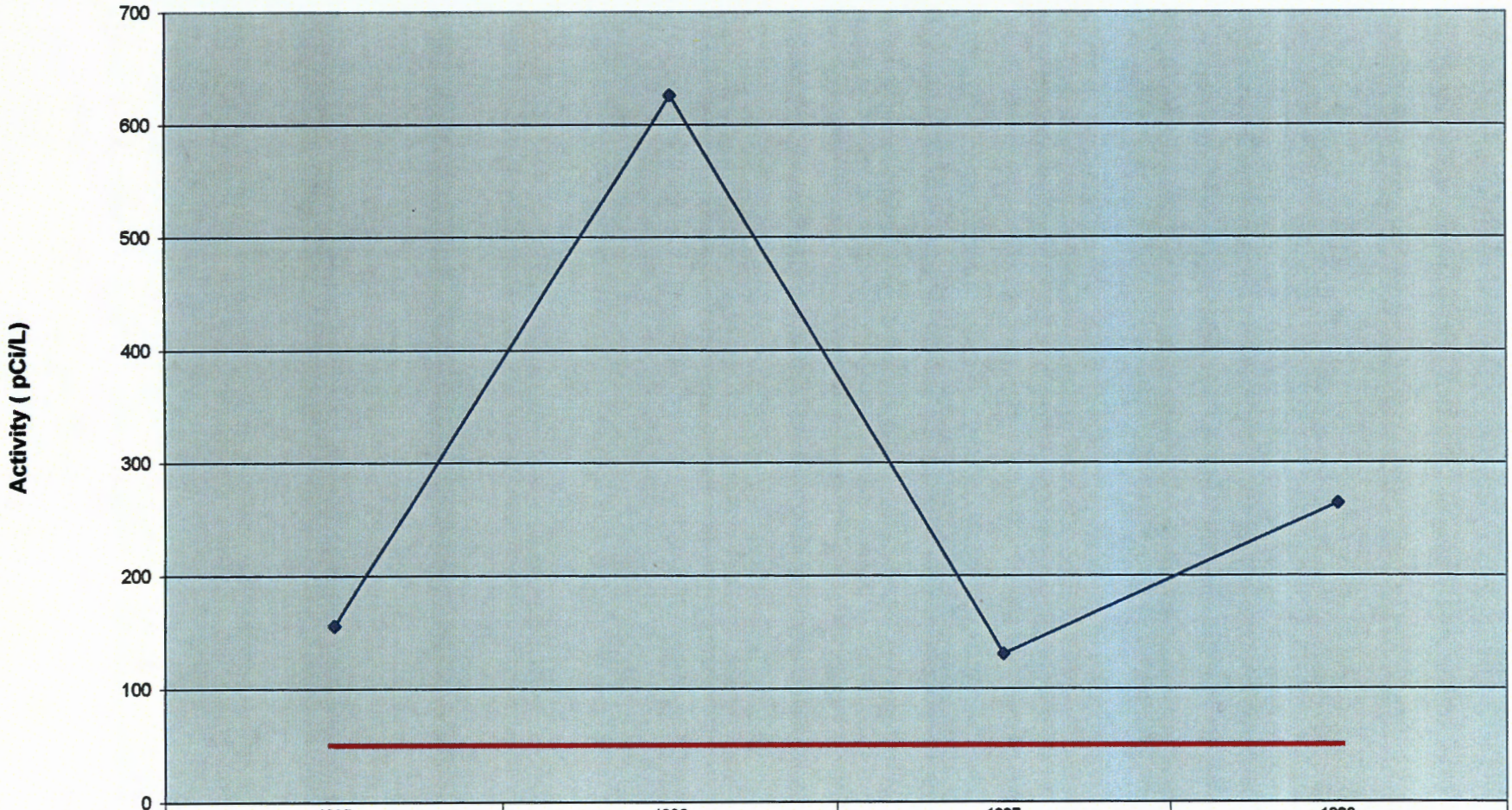
## Gross Beta Activity for Well MCO-4




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-4 | 116 | 166 | 93 | 505 | 1470 | 612 | 343 | 210 | 460 | 320 | 90 | 304 | 260 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

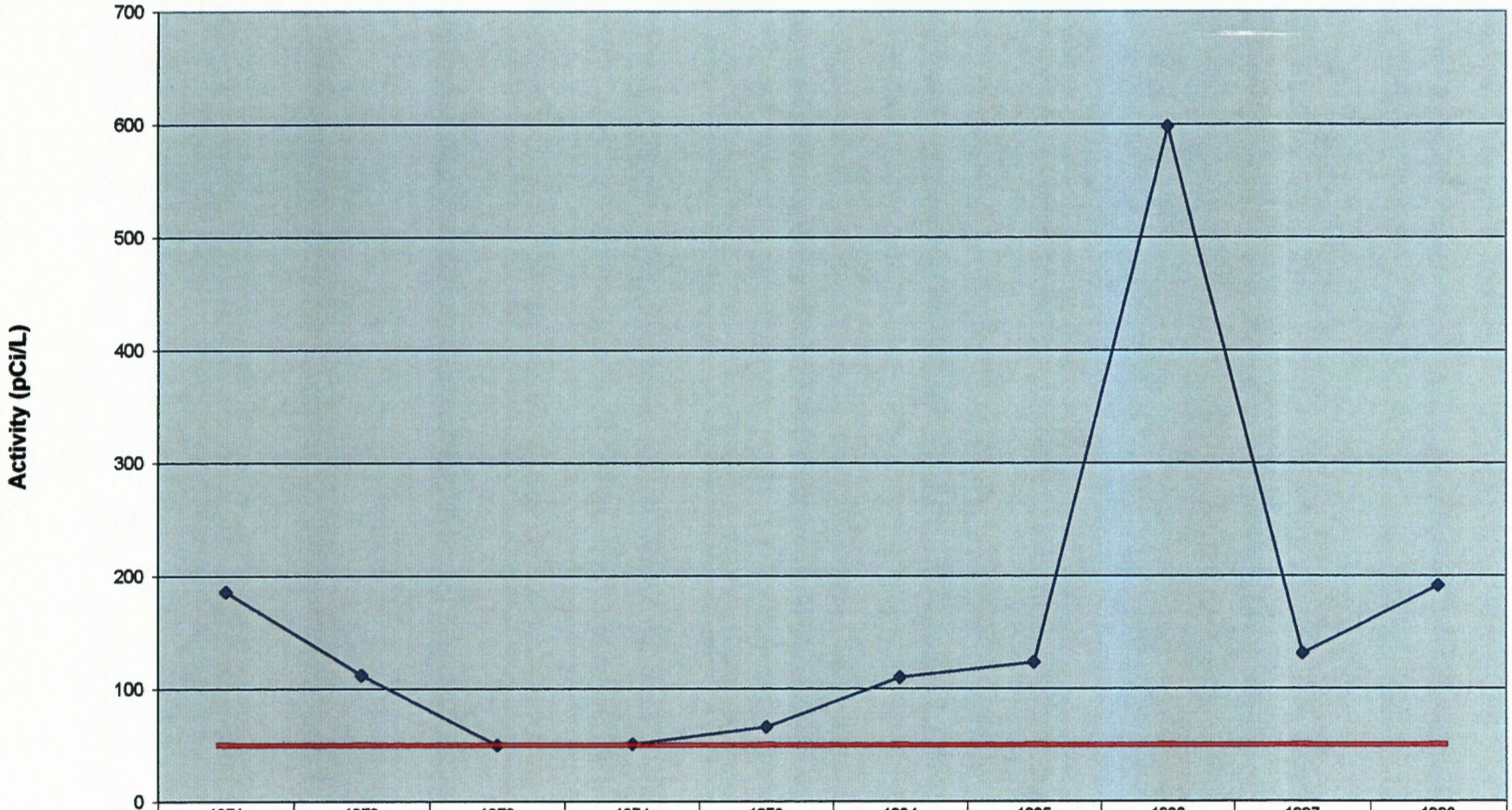
## Gross Beta Activity in Well MCO-4B




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| MCO-4B | 156 | 626 | 131 | 264 |
| EPA SL | 50 | 50 | 50 | 50 |

Years Sampled

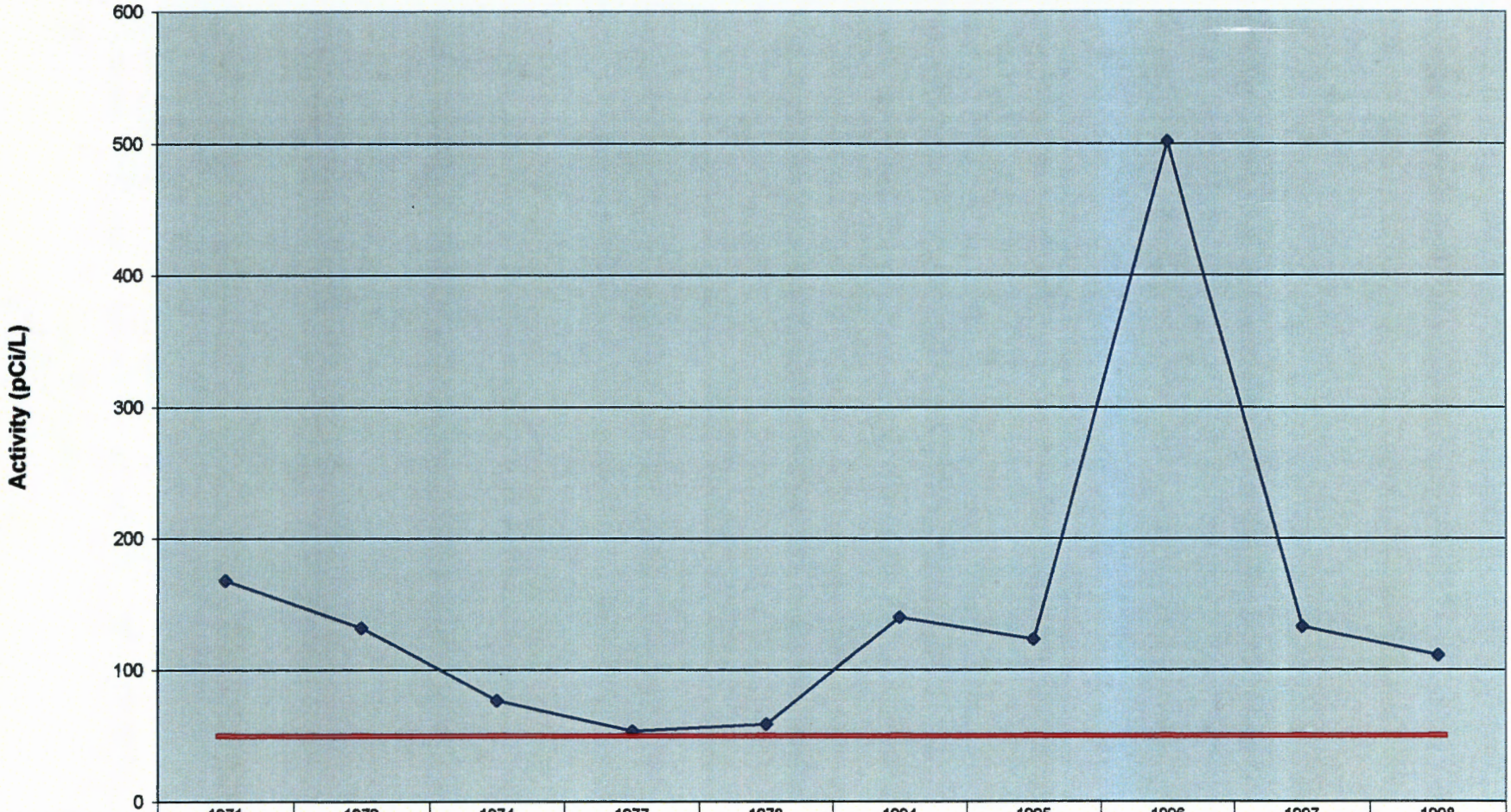
## Gross Beta Activity for Well MCO-5




| | 1971 | 1972 | 1973 | 1974 | 1978 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|
| MCO-5 | 186 | 112 | 50 | 51 | 66 | 110 | 123 | 598 | 131 | 191 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

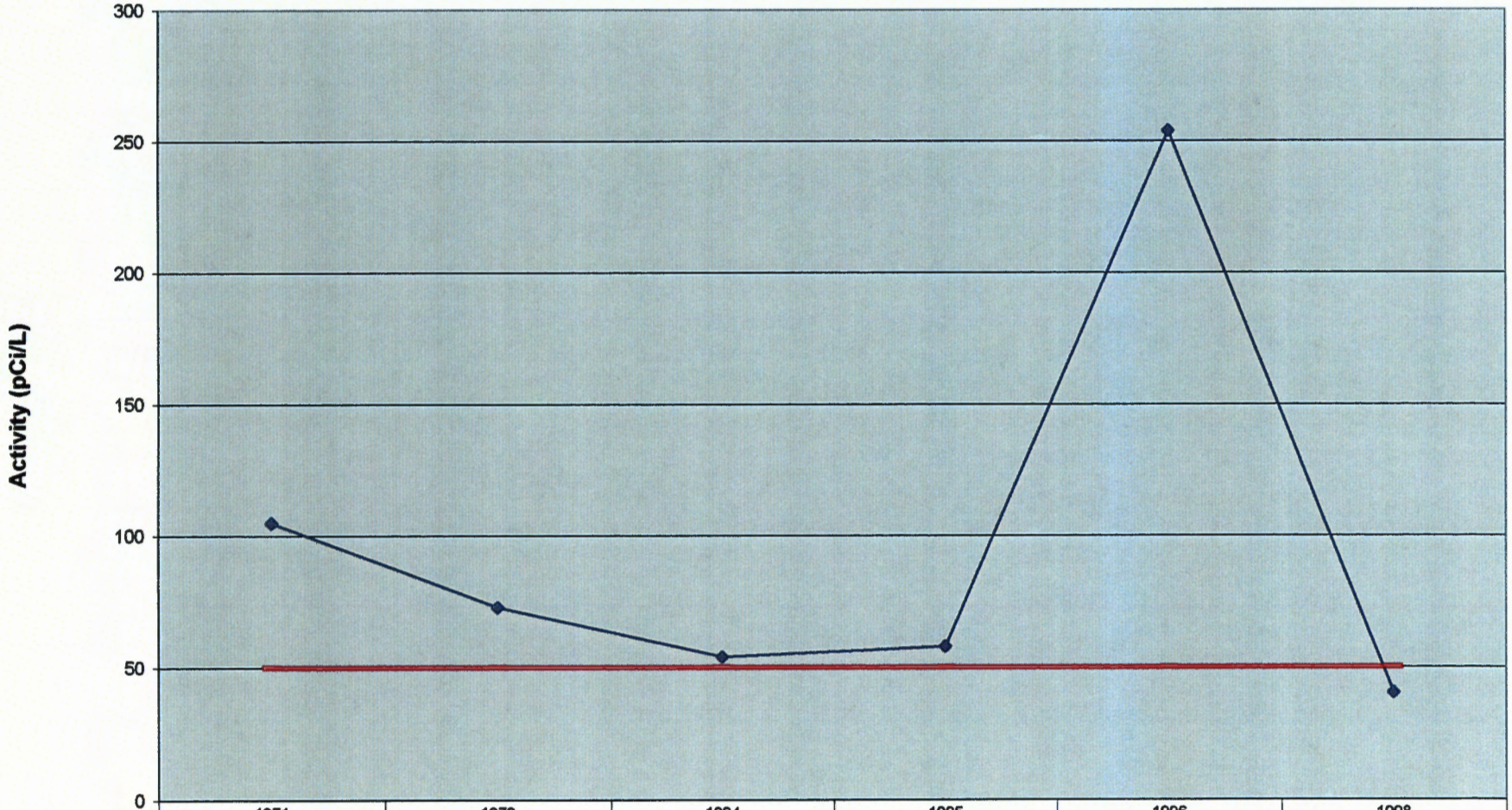
## Gross Beta Activity for Well MCO-6




| | 1971 | 1972 | 1974 | 1977 | 1978 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|
| MCO-6 | 168 | 132 | 77 | 54 | 59 | 140 | 123 | 502 | 133 | 111 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

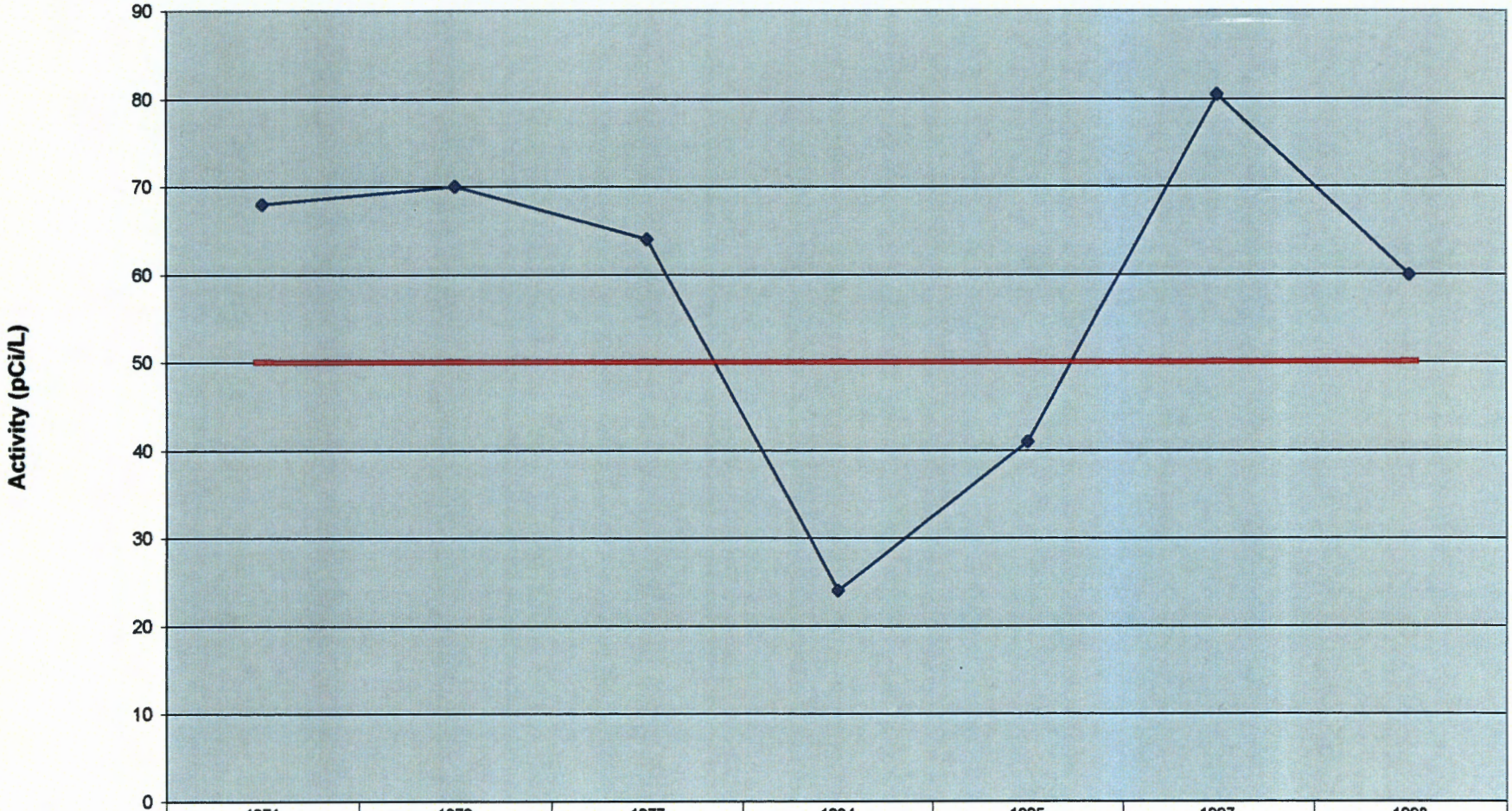
## Gross Beta Activity for Well MCO-7




| | 1971 | 1972 | 1994 | 1995 | 1996 | 1998 |
|---|---|---|---|---|---|---|
| MCO-7 | 105 | 73 | 54 | 58 | 254 | 40 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

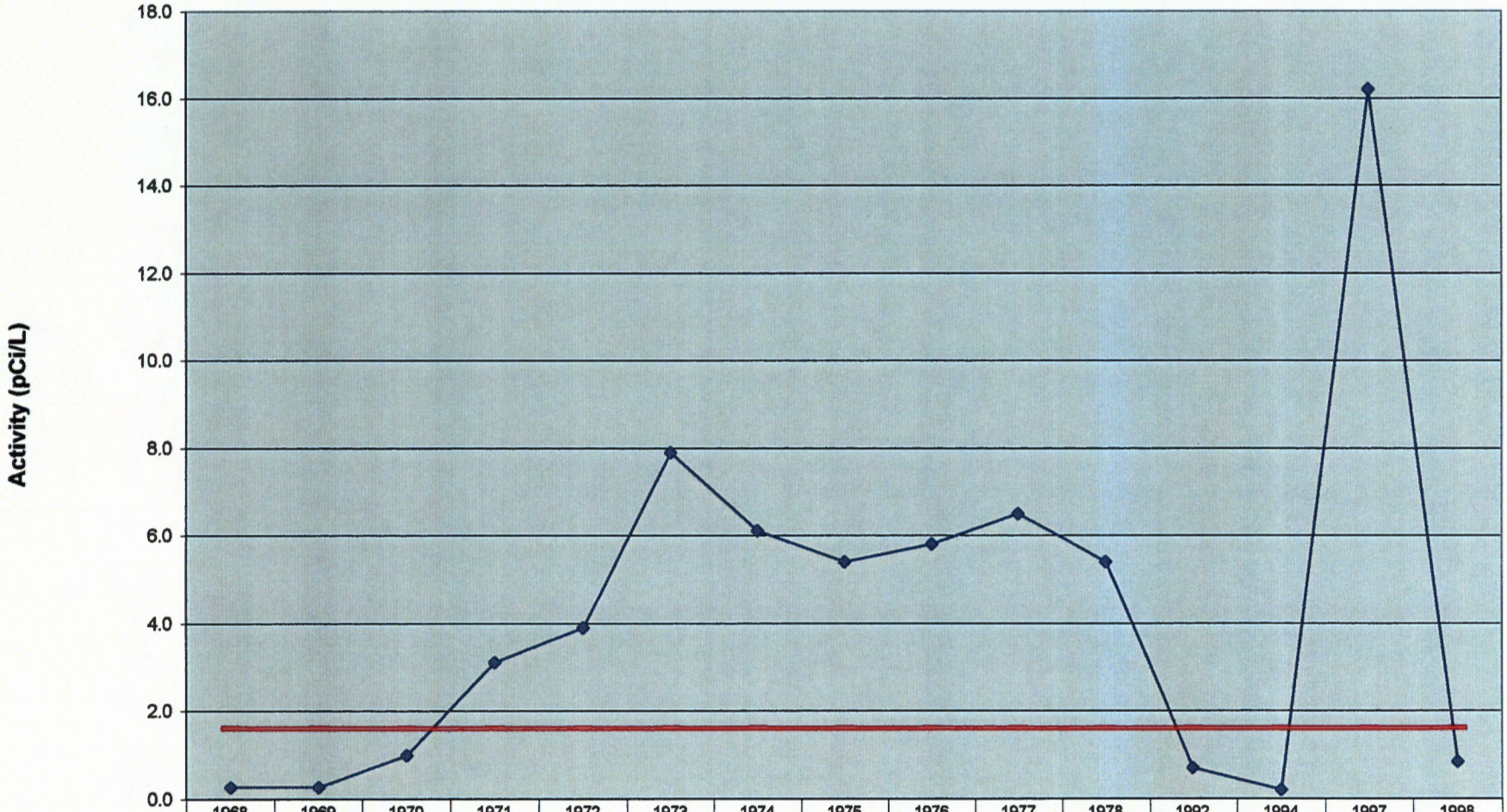
## Gross Beta Activity for MCO- 7.5




| | 1971 | 1972 | 1977 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|
| MCO-7.5 | 68 | 70 | 64 | 24 | 41 | 81 | 60 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

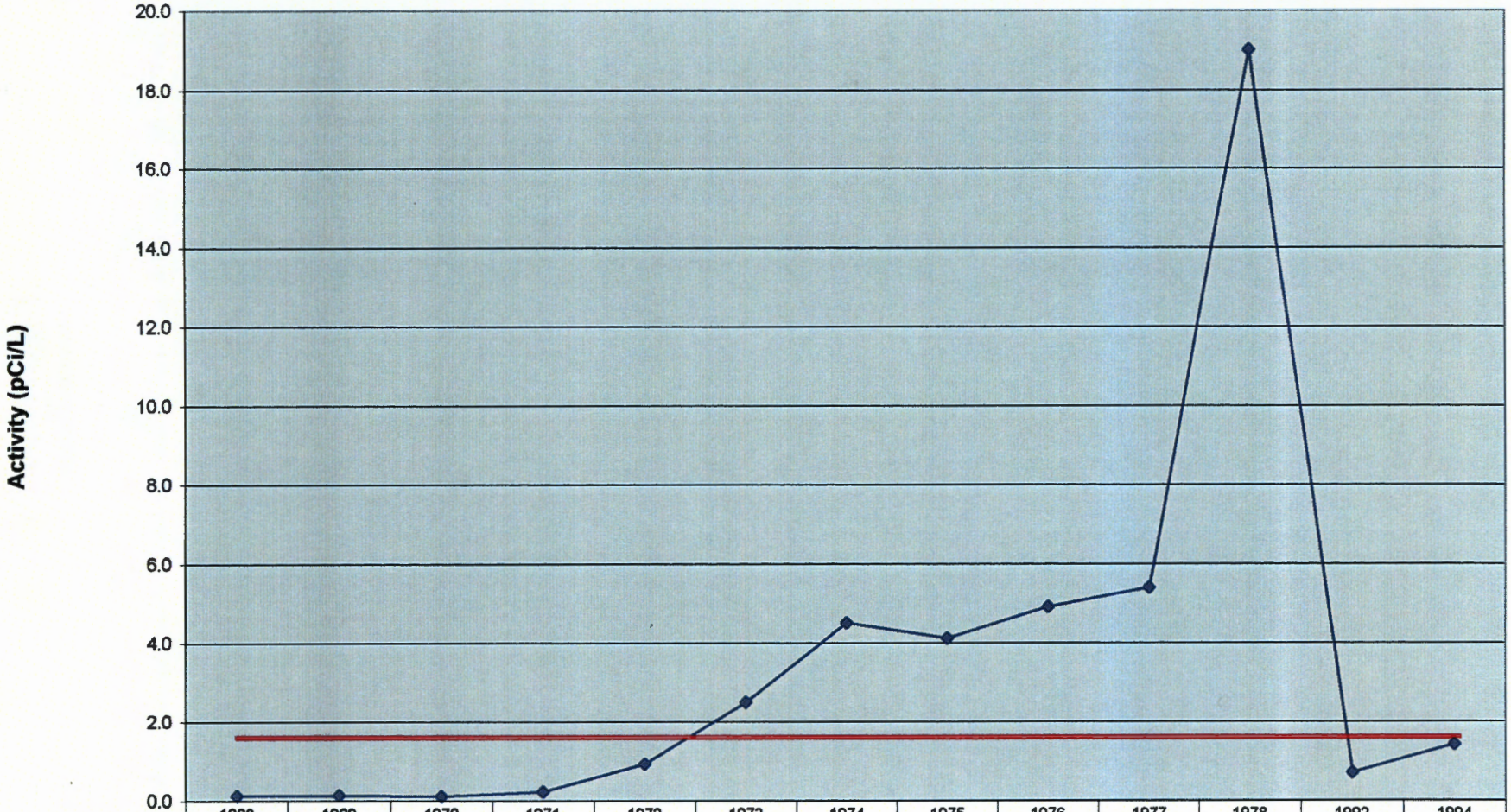
## Plutonium-238 Activity for Well MCO-3




| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-3 | 0.3 | 0.3 | 1 | 3.1 | 3.9 | 7.9 | 6.1 | 5.4 | 5.8 | 6.5 | 5.4 | 0.7 | 0.2 | 16.2 | 0.8 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Years Sampled

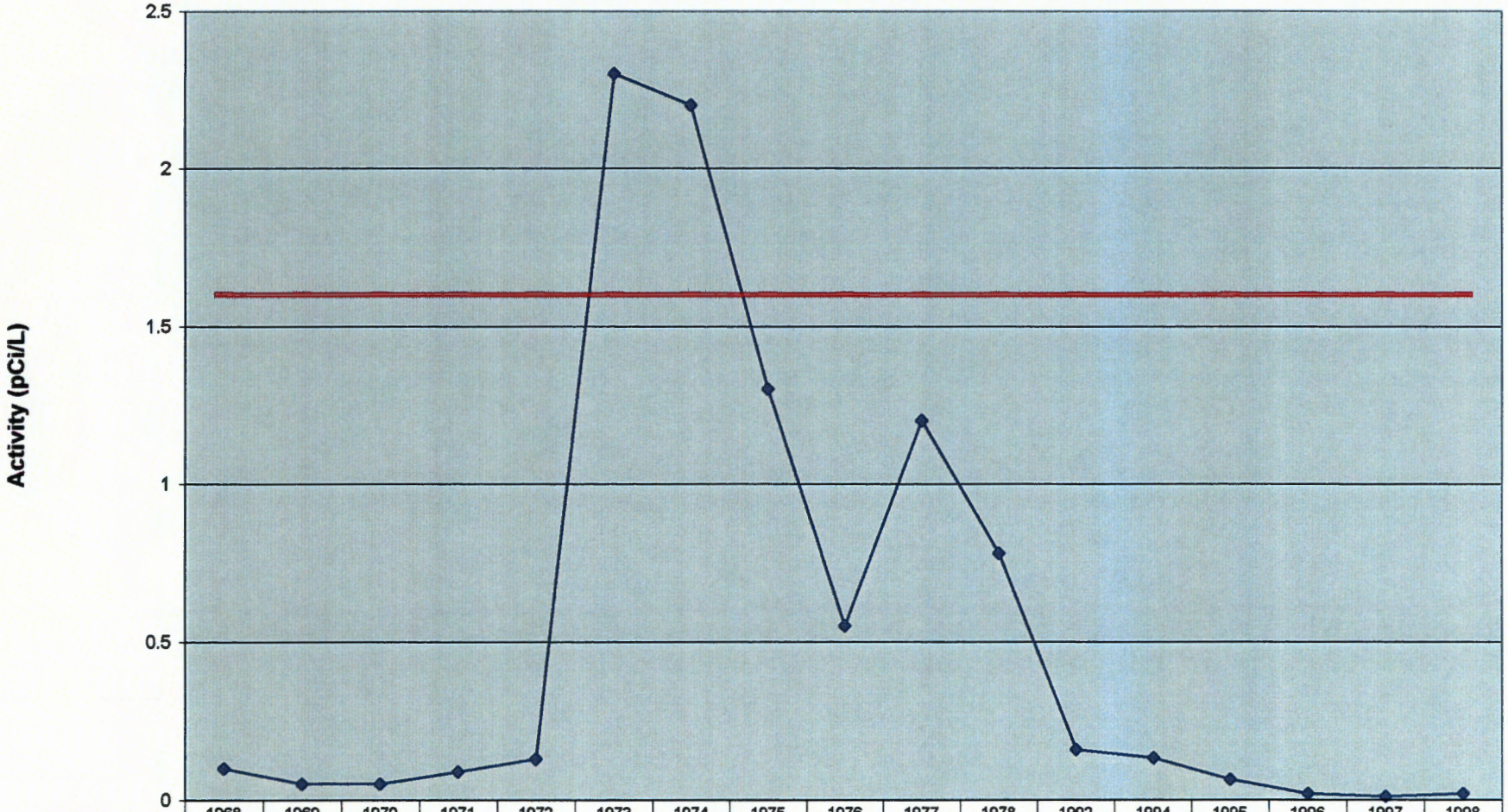
## Plutonium-238 Activity for Well MCO-4




| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-4 | 0.1 | 0.1 | 0.1 | 0.2 | 0.9 | 2.5 | 4.5 | 4.1 | 4.9 | 5.4 | 19 | 0.7 | 1.4 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Years Sampled

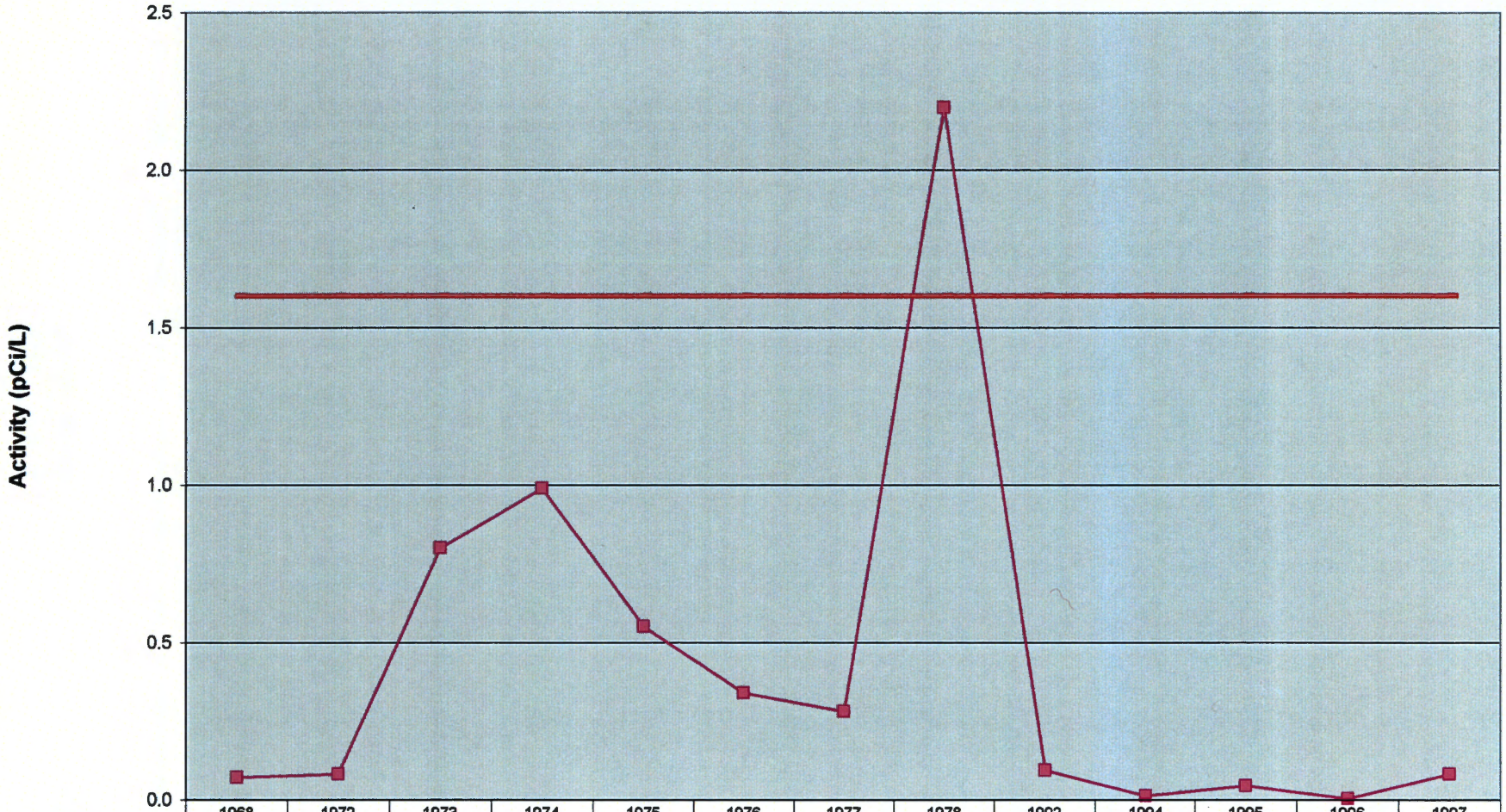
## Plutonium-238 Activity for Well MCO-5




| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 2.3 | 2.2 | 1.3 | 0.6 | 1.2 | 0.8 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Year Sampled

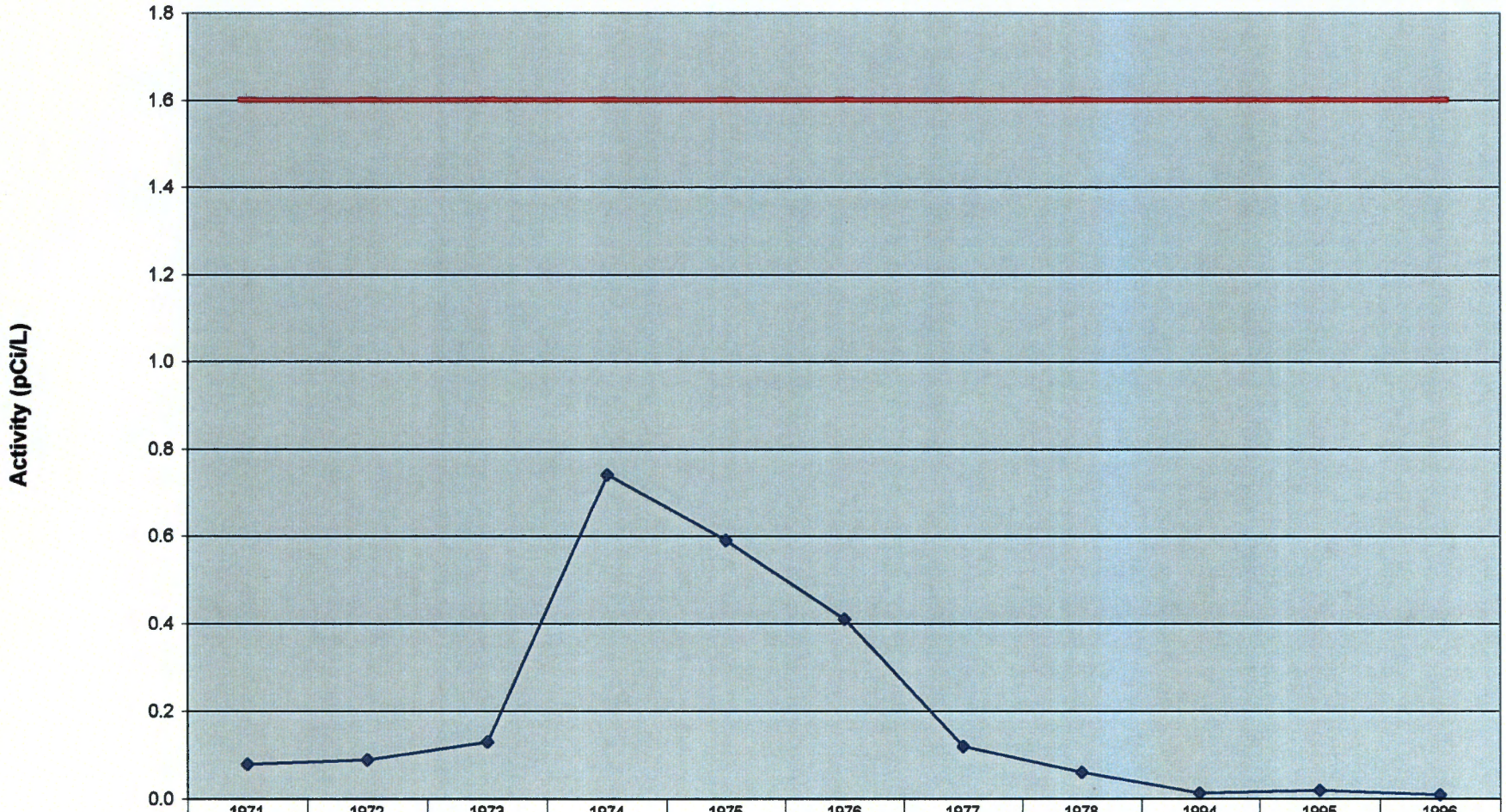
## Plutonium-238 Activity for Well MCO-6




| | 1968 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-6 | 0.1 | 0.1 | 1 | 1.0 | 0.6 | 0.3 | 0.3 | 2.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Year Sampled

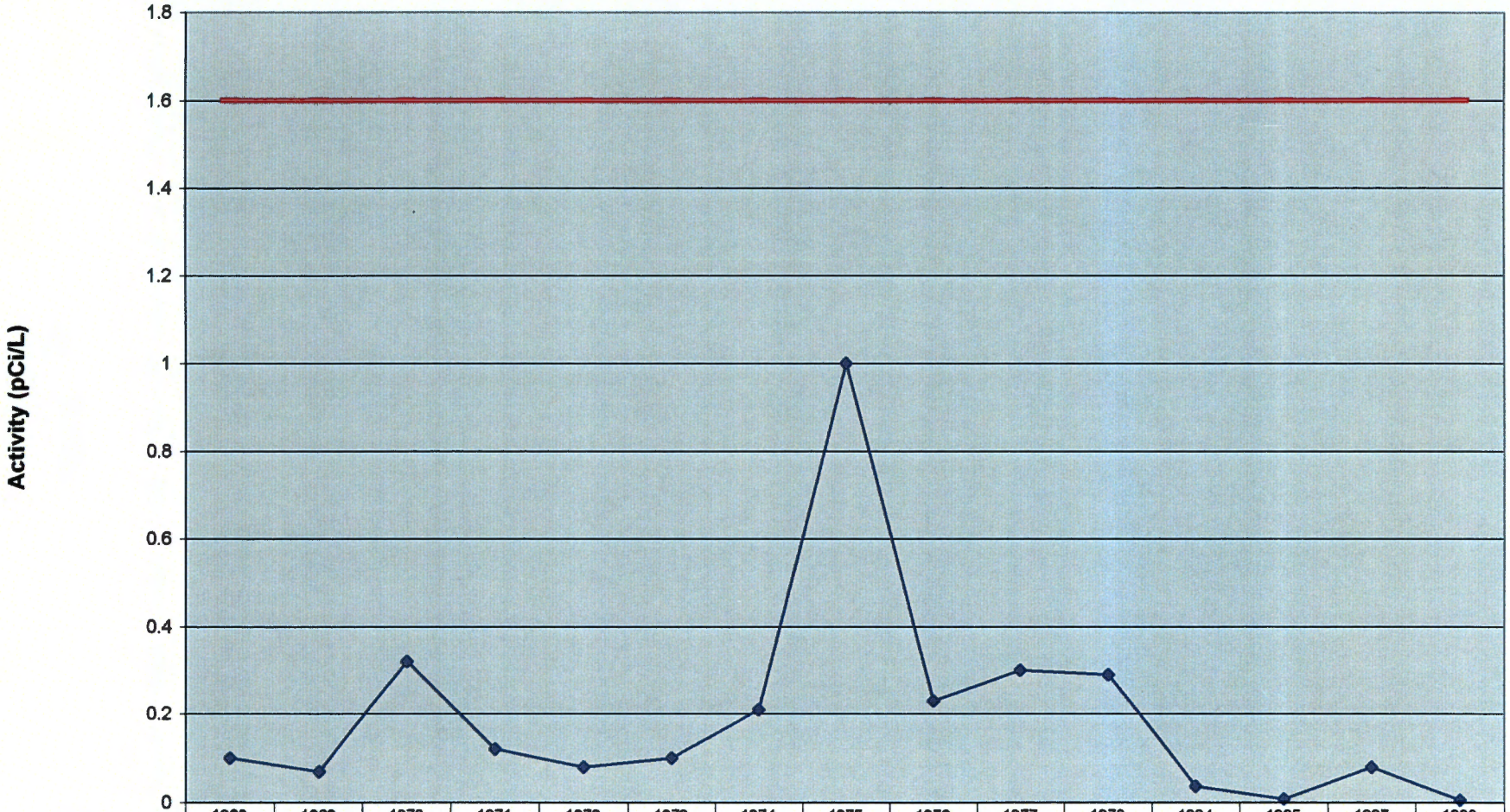
## Plutonium-238 Activity for Well MCO-7




| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7 | 0.1 | 0.1 | 0.1 | 0.7 | 0.6 | 0.4 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

Years Sampled

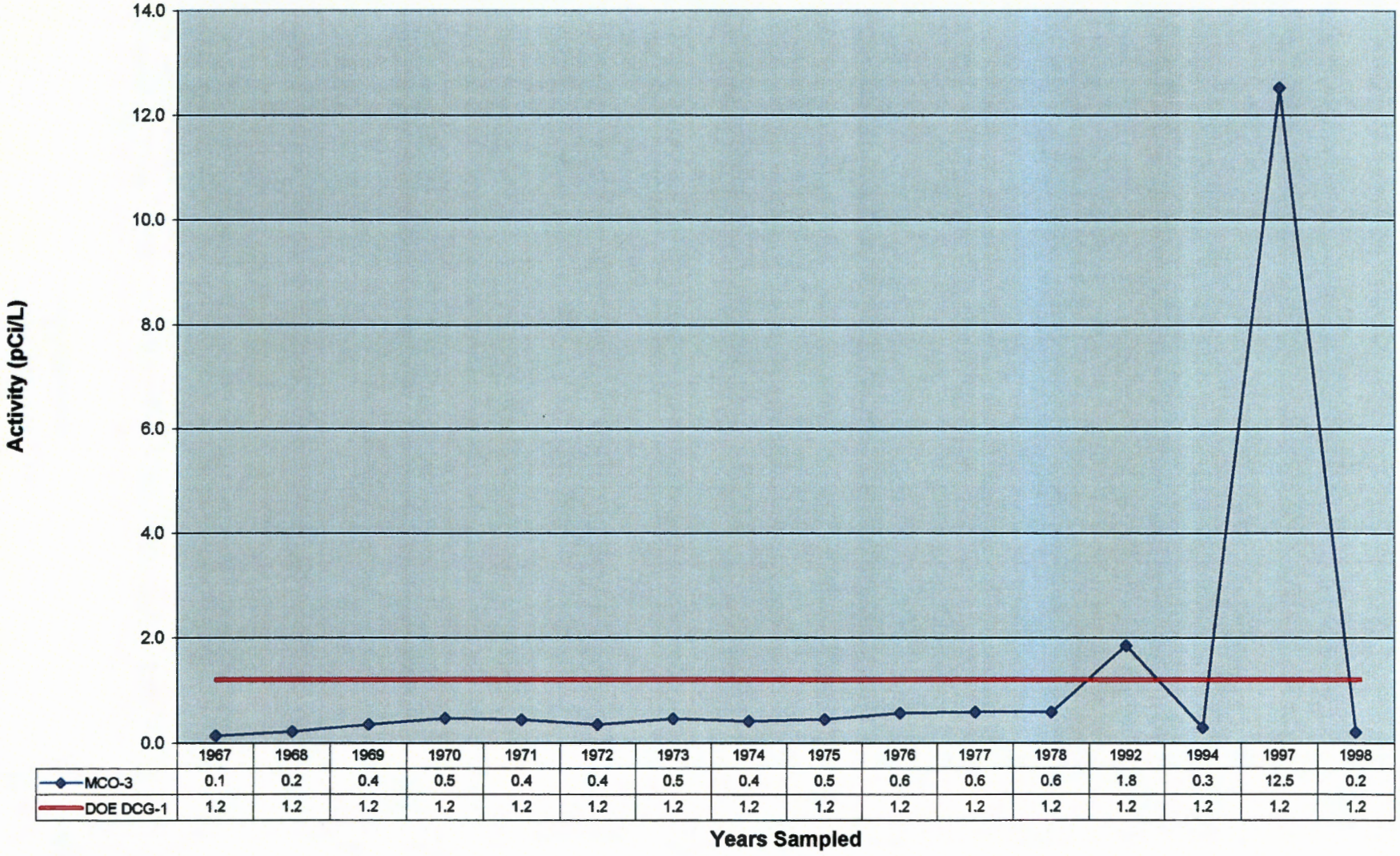
## Plutonium-238 Activity for Well MCO-7.5




| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7.5 | 0.1 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.2 | 1.0 | 0.2 | 0.3 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 |
| DOE DCG1 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |

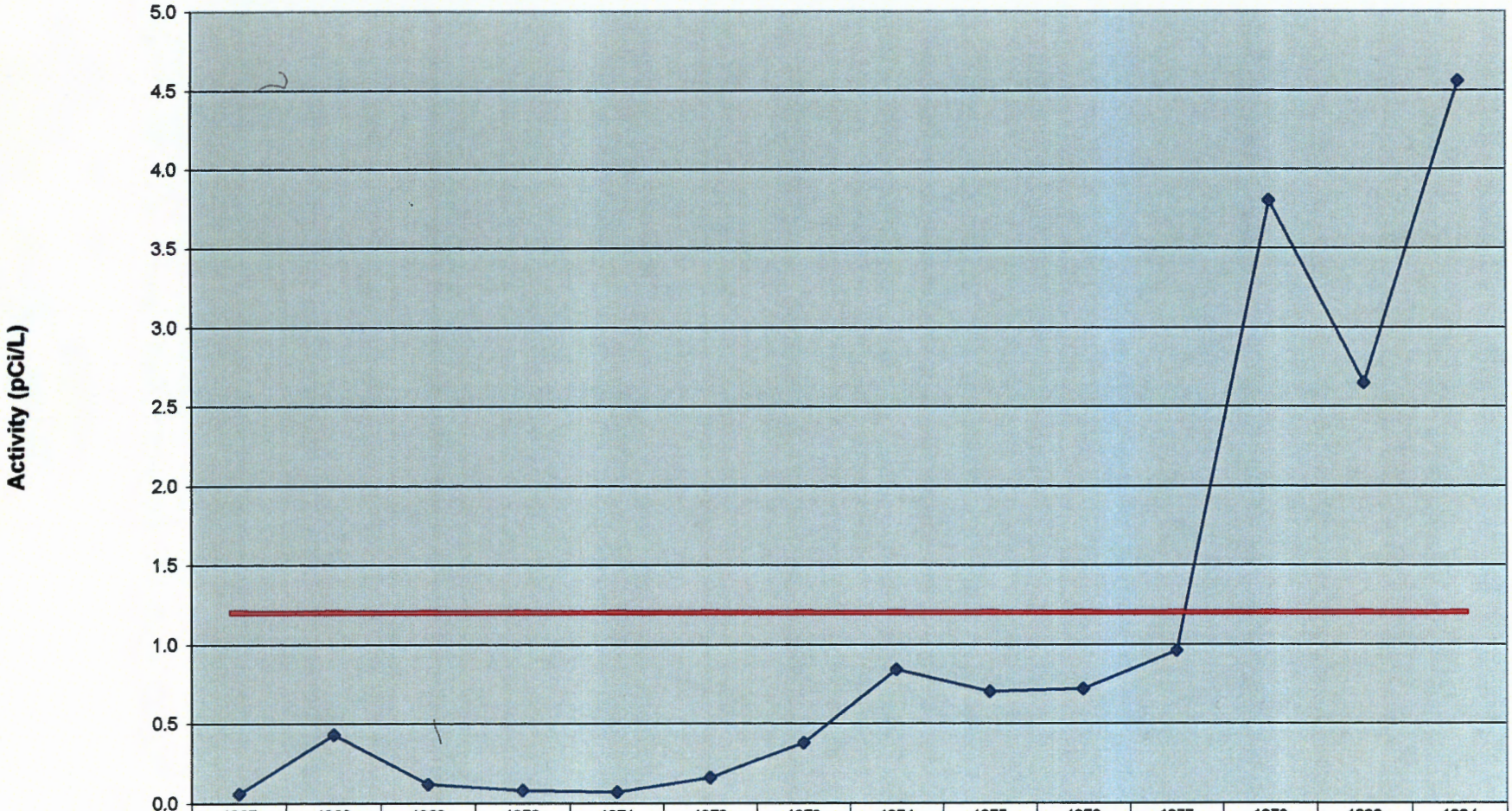
Years Sampled

## Plutonium-239/240 Activity for Well MCO-3




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-3 | 0.1 | 0.2 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 1.8 | 0.3 | 12.5 | 0.2 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

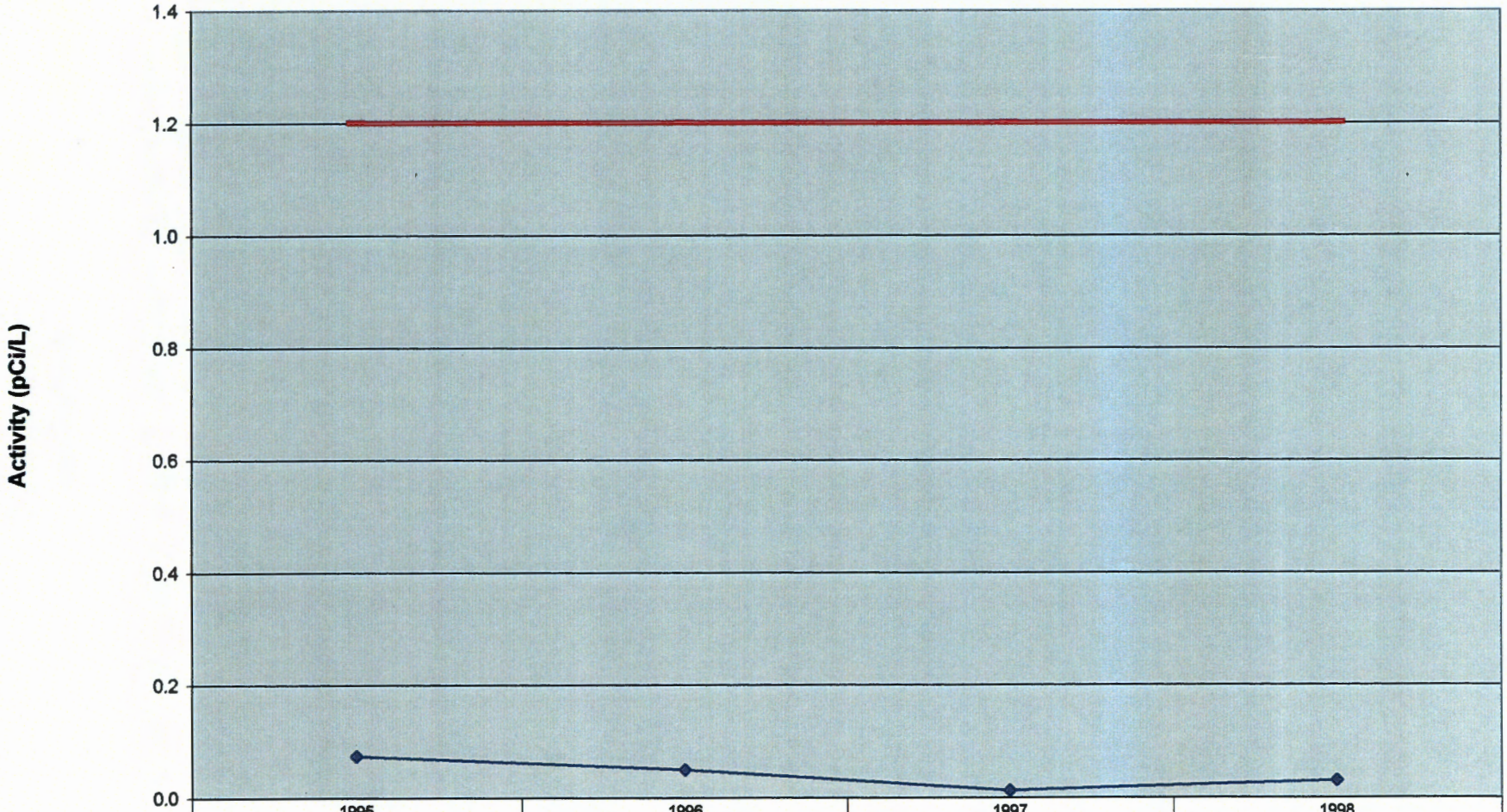
## Plutonium-239/240 Activity for Well MCO-4




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-4 | 0.1 | 0.4 | 0.1 | 0.1 | 0.1 | 0.2 | 0.4 | 0.8 | 0.7 | 0.7 | 1.0 | 3.8 | 2.7 | 4.6 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

Years Sampled

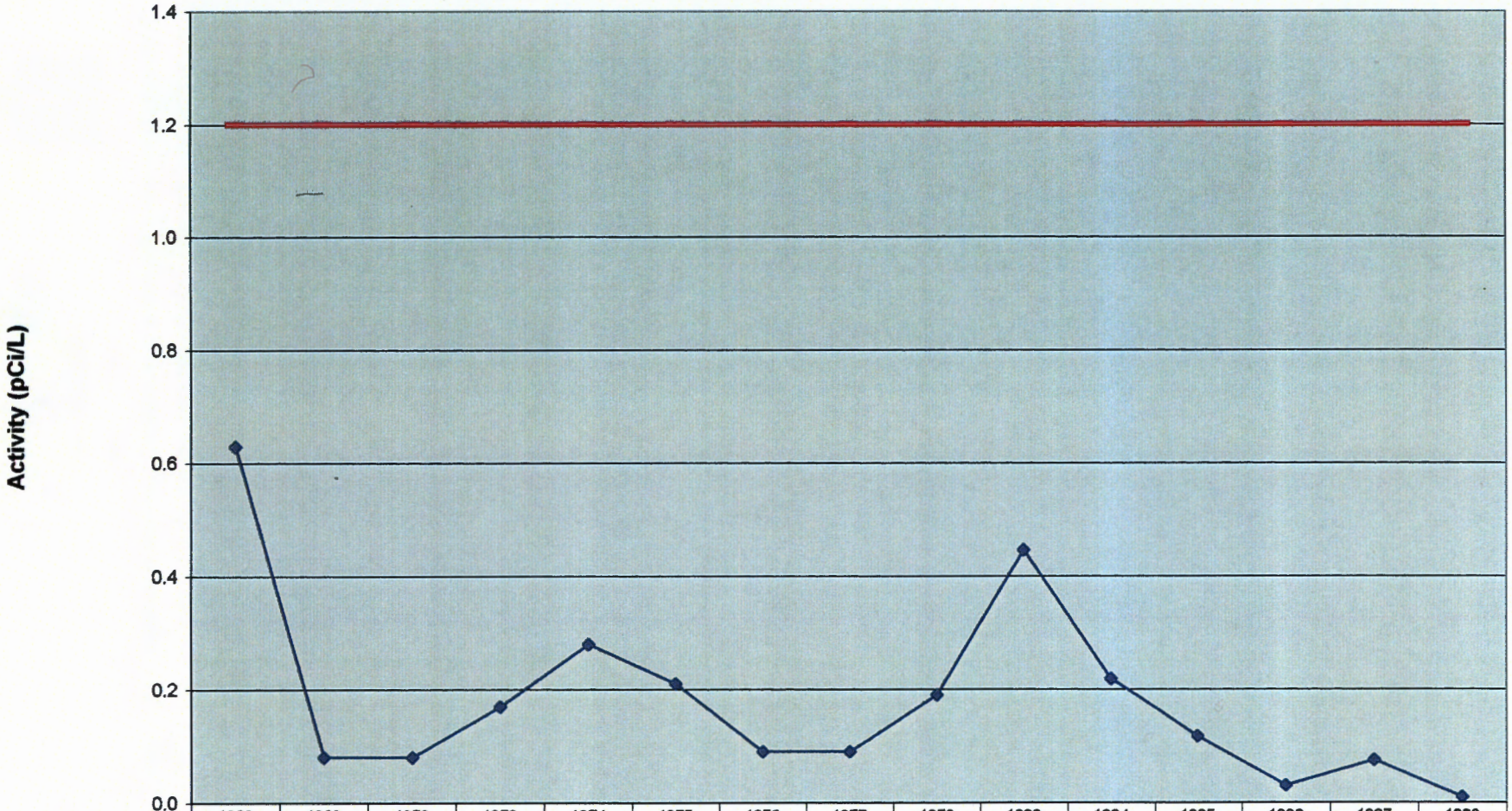
## Plutonium-239/240 Activity for Well MCO-4B




| | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| MCO-4B | 0.1 | 0.1 | 0.0 | 0.0 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 |

Years Sampled

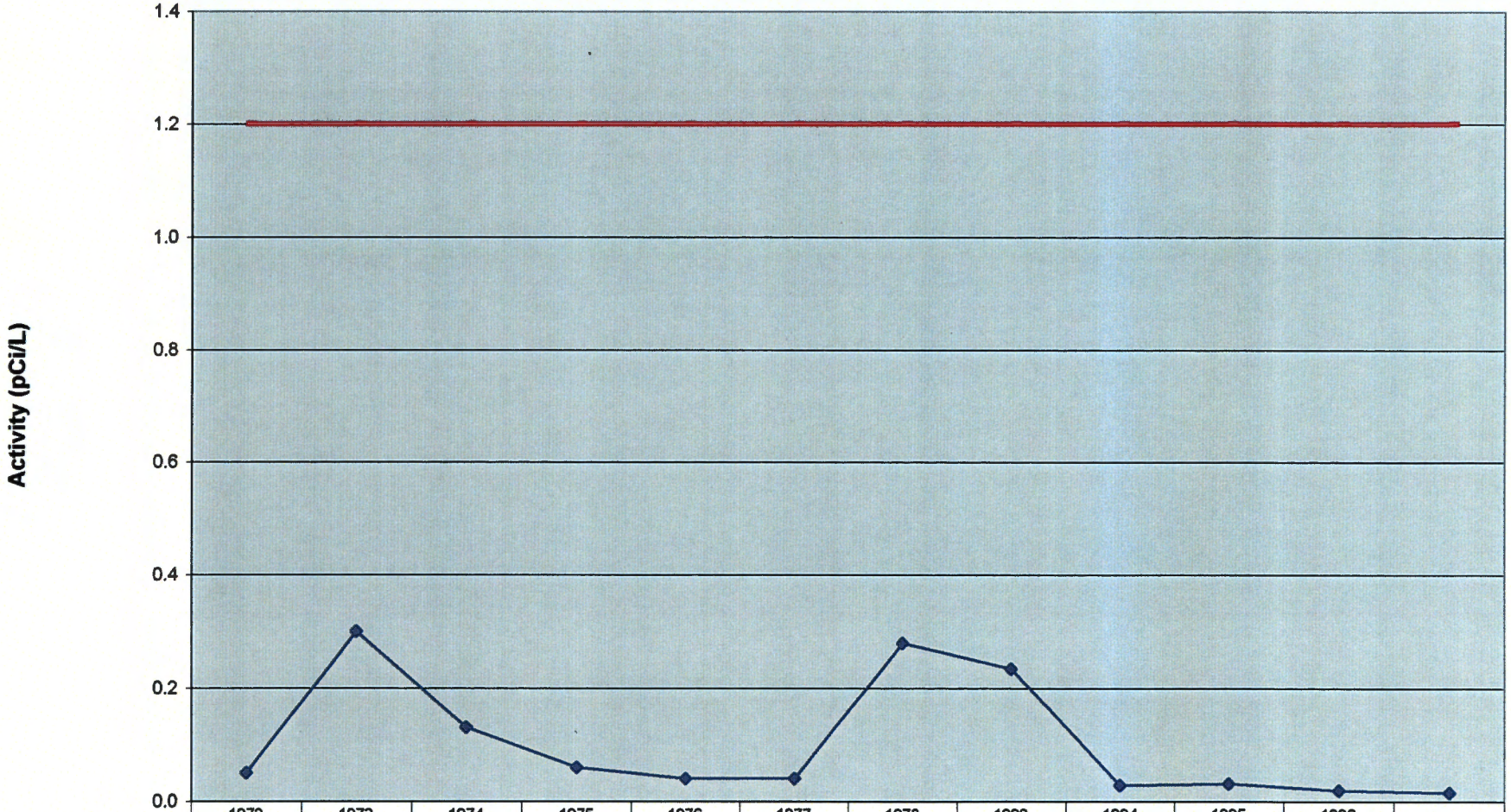
## Plutonium-239/240 Activity for Well MCO-5




| | 1968 | 1969 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-5 | 0.6 | 0.1 | 0.1 | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.4 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

Years Sampled

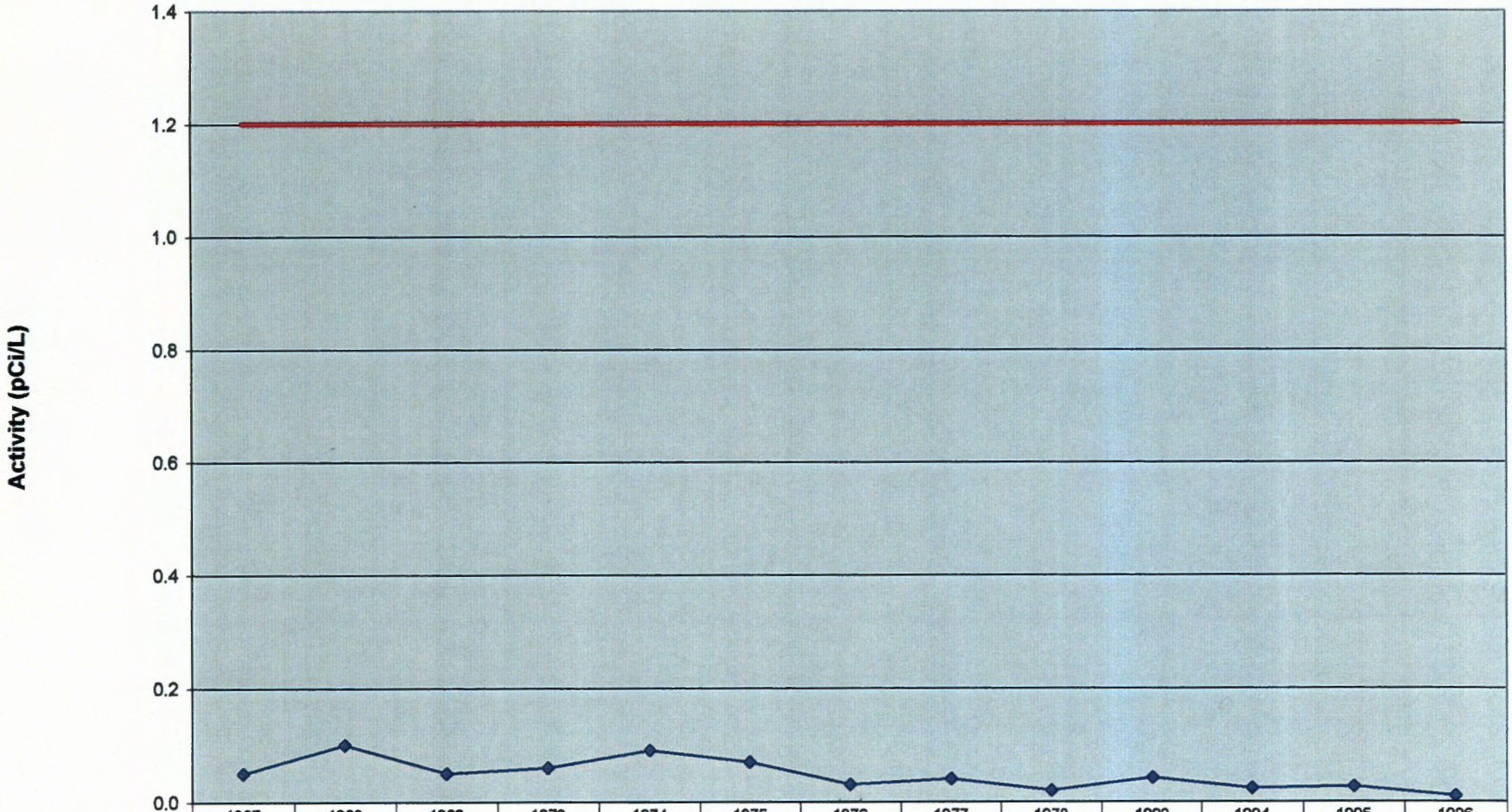
## Plutonium-239/240 Activity for Well MCO-6




| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-6 | 0.1 | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

Samples Collected

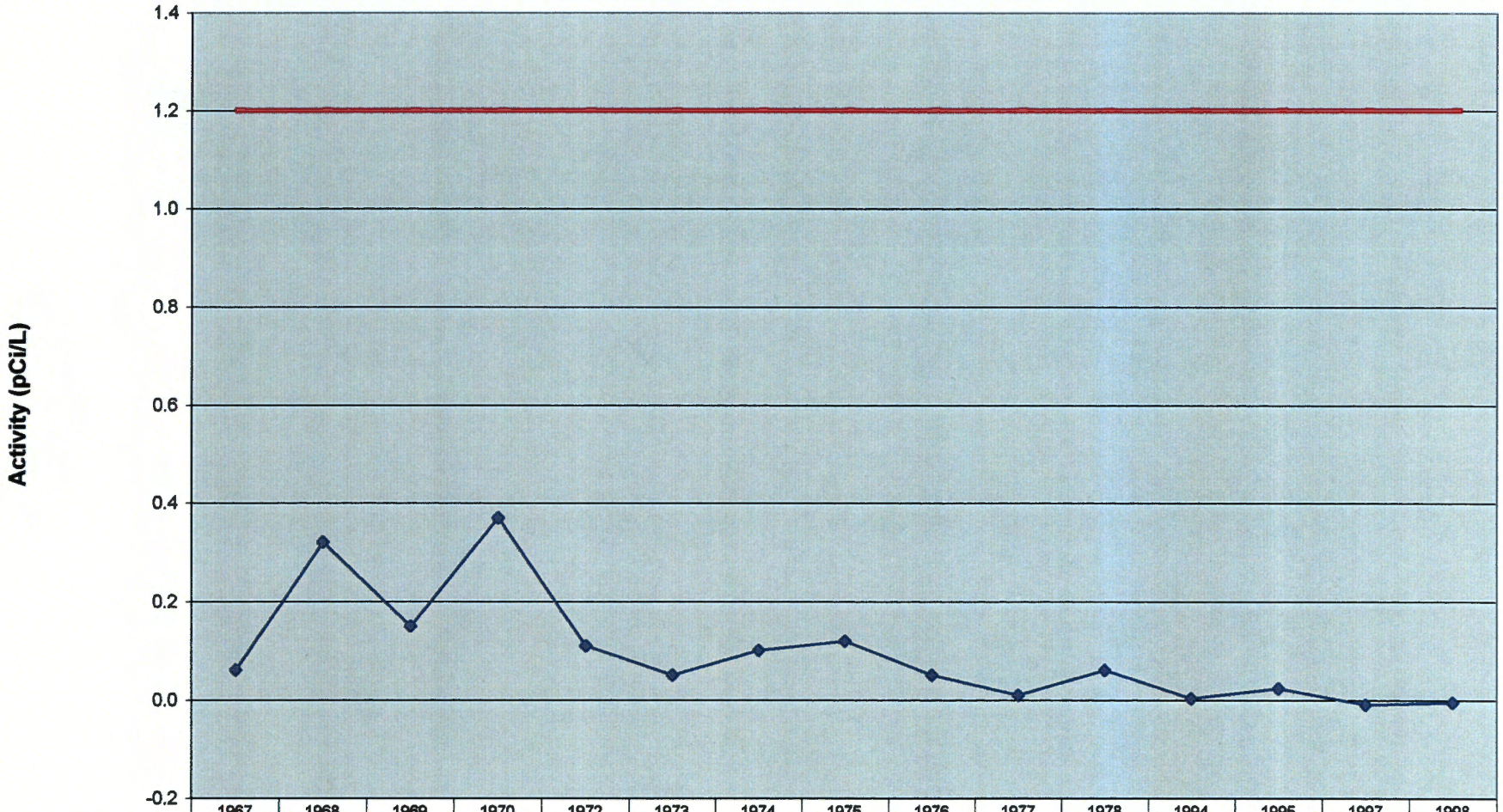
## Plutonium-239/240 Activity for Well MCO-7




| | 1967 | 1968 | 1969 | 1972 | 1974 | 1975 | 1976 | 1977 | 1978 | 1992 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

Samples Collected

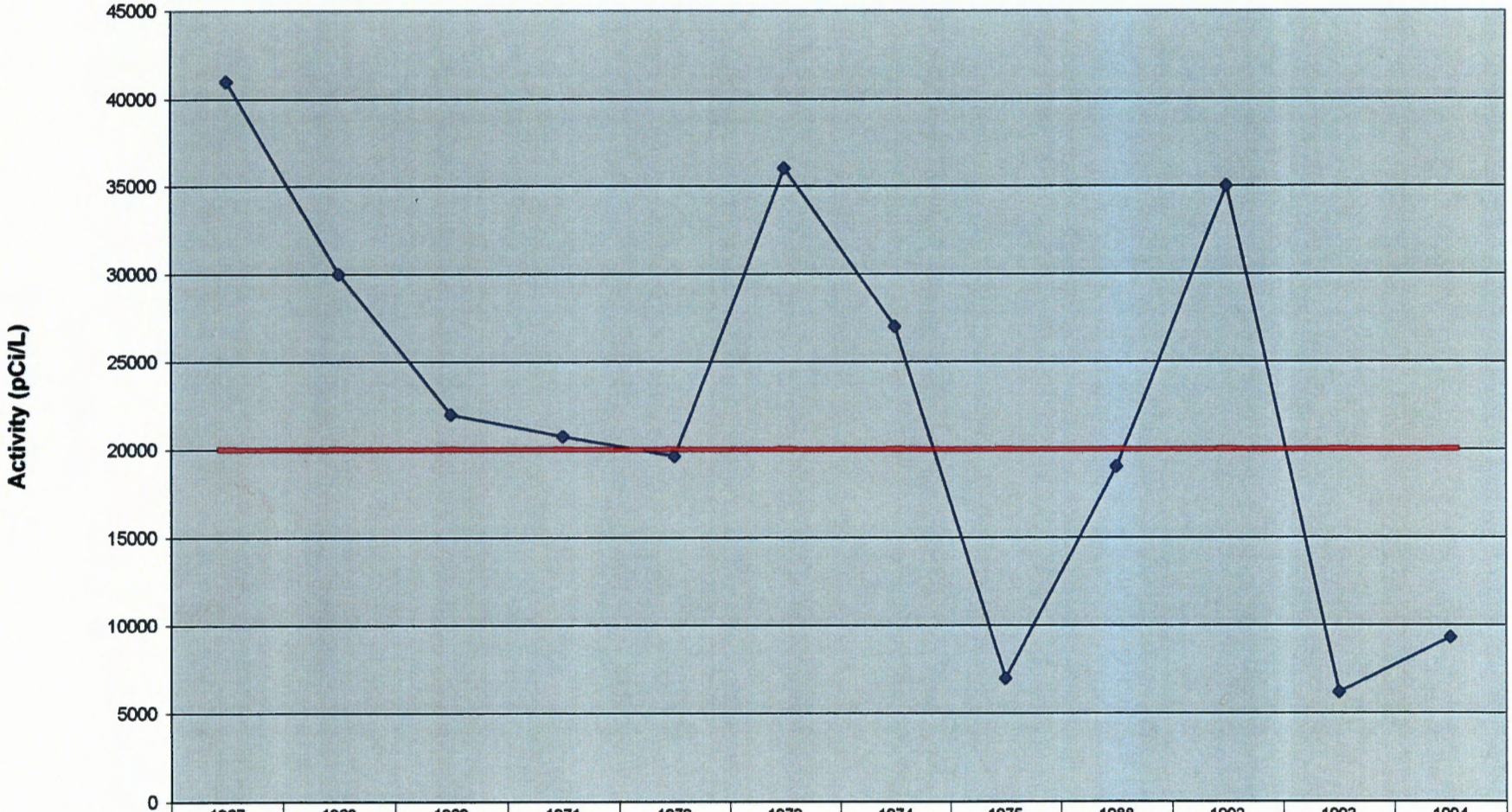
## Plutonium-239/240 Activity for Well MCO- 7.5




| | 1967 | 1968 | 1969 | 1970 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1994 | 1995 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MCO-7.5 | 0.1 | 0.3 | 0.2 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| DOE DCG-1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |

Year Sampled

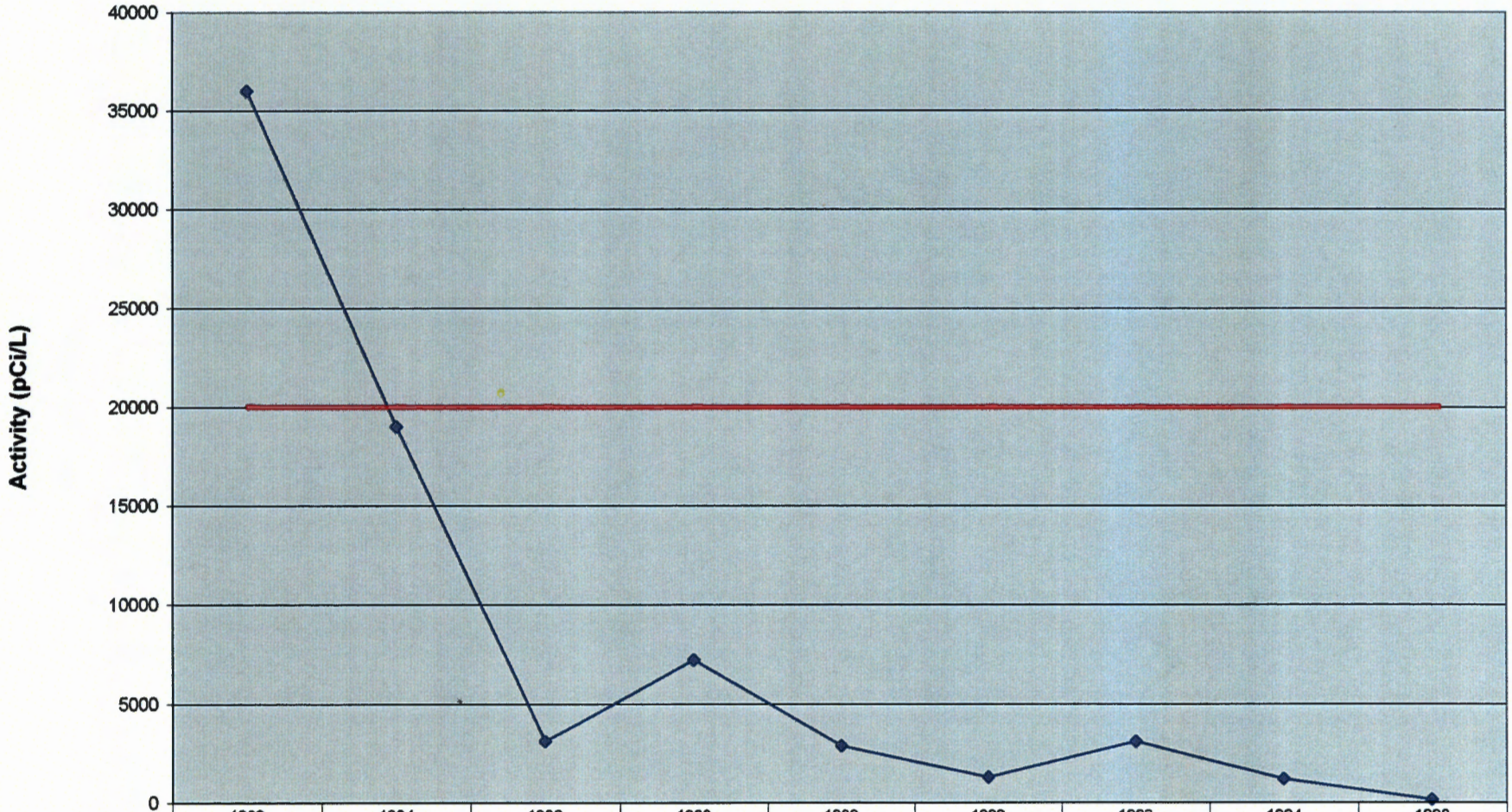
## Tritium Activity in Well LAO-1




| | 1967 | 1968 | 1969 | 1971 | 1972 | 1973 | 1974 | 1975 | 1988 | 1992 | 1993 | 1994 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAO-1 | 41000 | 30000 | 22000 | 20750 | 19600 | 36000 | 27000 | 7000 | 19000 | 35000 | 6200 | 9300 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |

Years Sampled

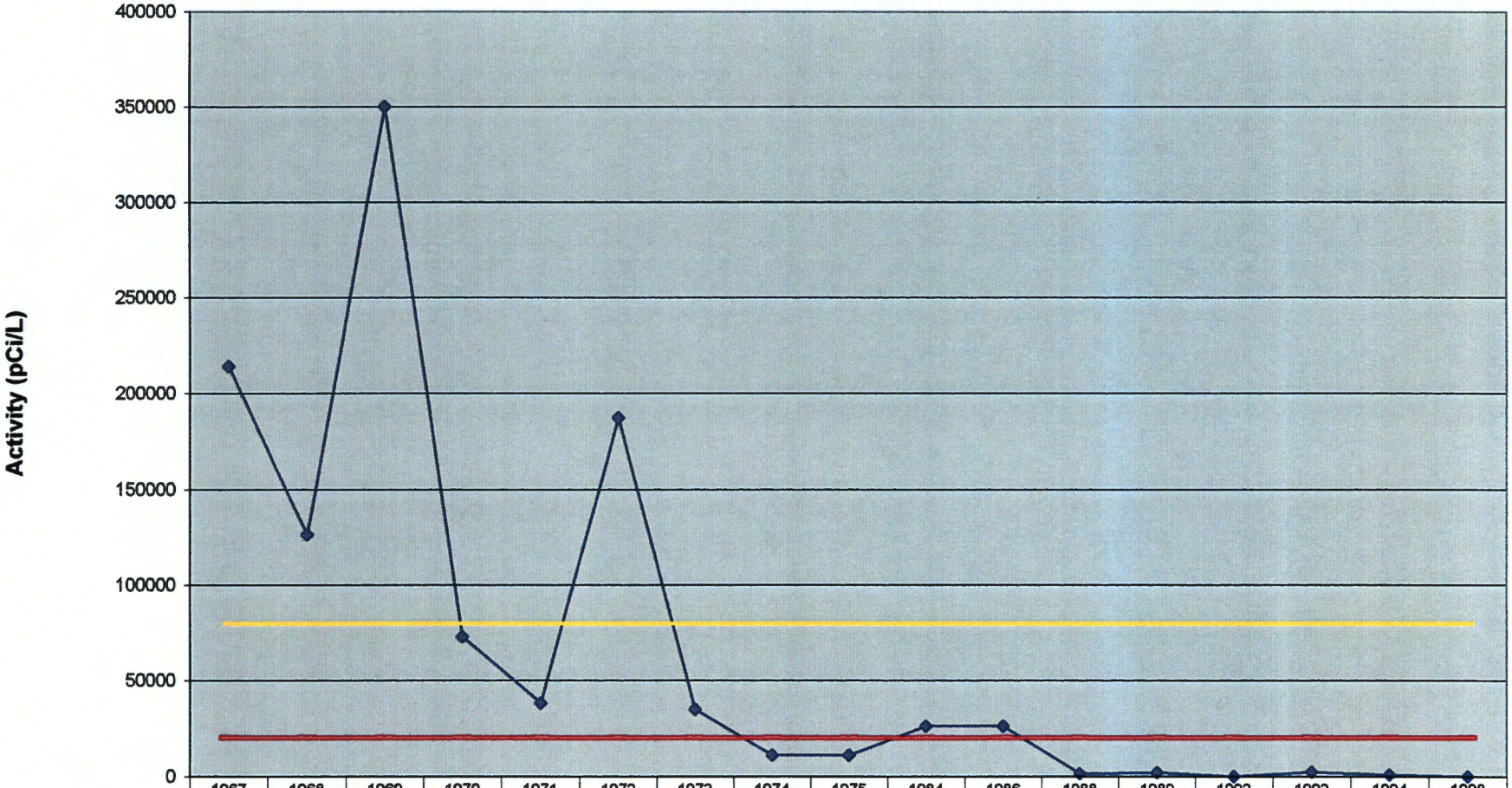
## Tritium Activity in Well LAO- 2




| | 1983 | 1984 | 1986 | 1988 | 1989 | 1992 | 1993 | 1994 | 1998 |
|---|---|---|---|---|---|---|---|---|---|
| LAO-2 | 36000 | 19000 | 3100 | 7200 | 2900 | 1300 | 3100 | 1200 | 134 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |

Years Sampled

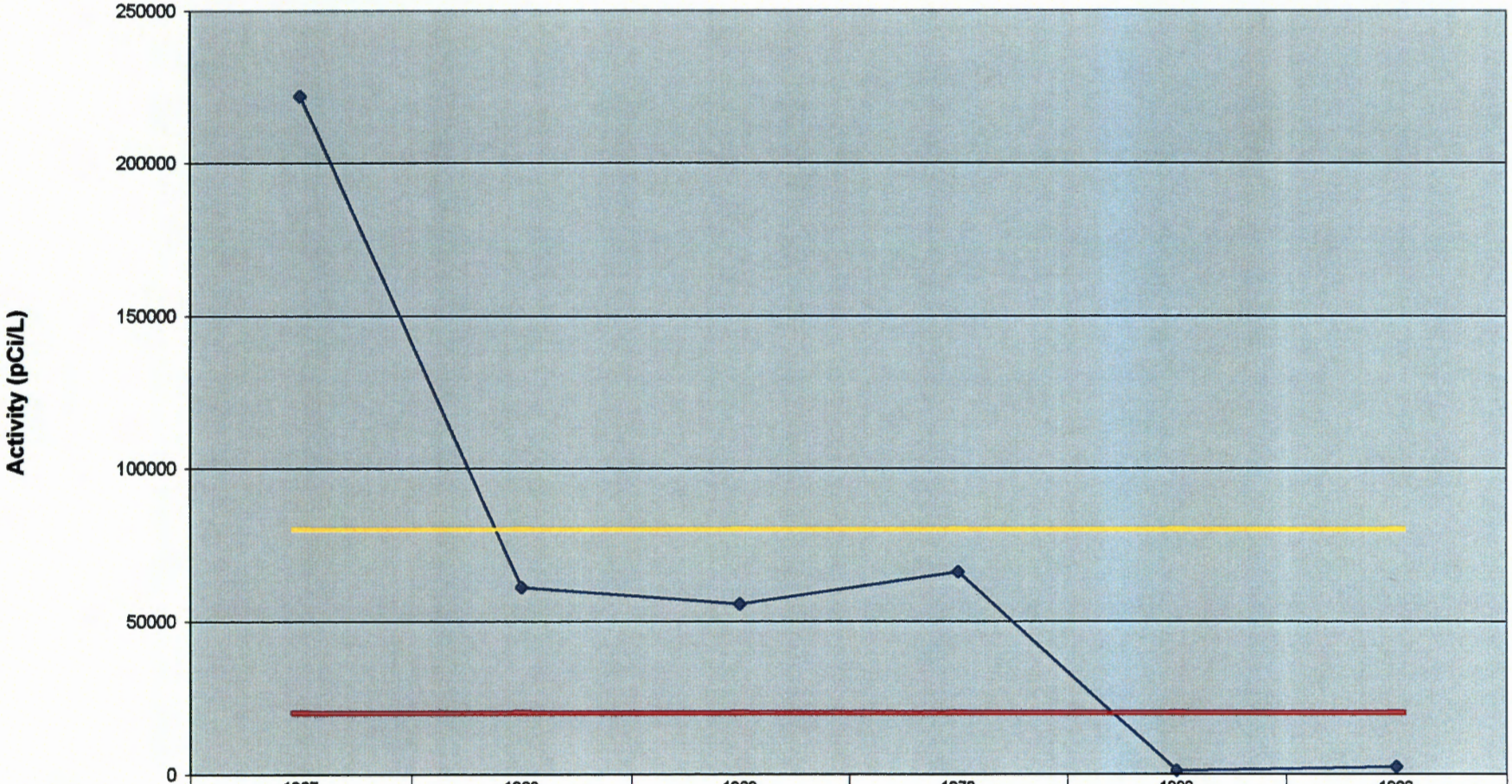
## Tritium Activity in Well LAO-3




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1984 | 1986 | 1988 | 1989 | 1992 | 1993 | 1994 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAO-3 | 214000 | 126000 | 350000 | 73000 | 38000 | 187000 | 35000 | 11000 | 11000 | 26000 | 26000 | 1500 | 2100 | 100 | 2400 | 1000 | 99 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG-1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Years Sampled

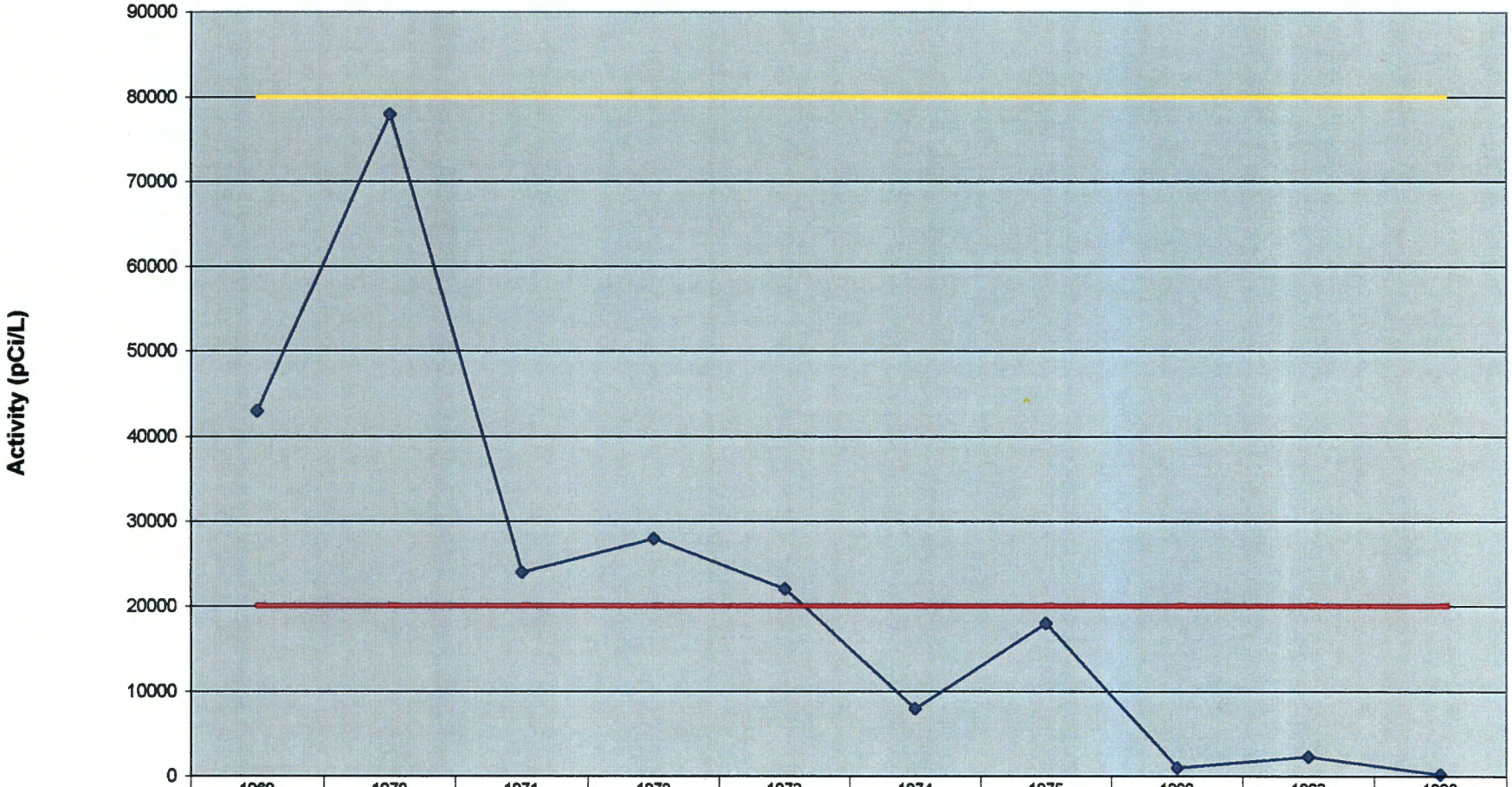
## Tritium Activity in Well LAO-4




| | 1967 | 1968 | 1969 | 1970 | 1992 | 1993 |
|---|---|---|---|---|---|---|
| LAO-4 | 222000 | 61000 | 55500 | 66000 | 1000 | 2300 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG-1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Years Sampled

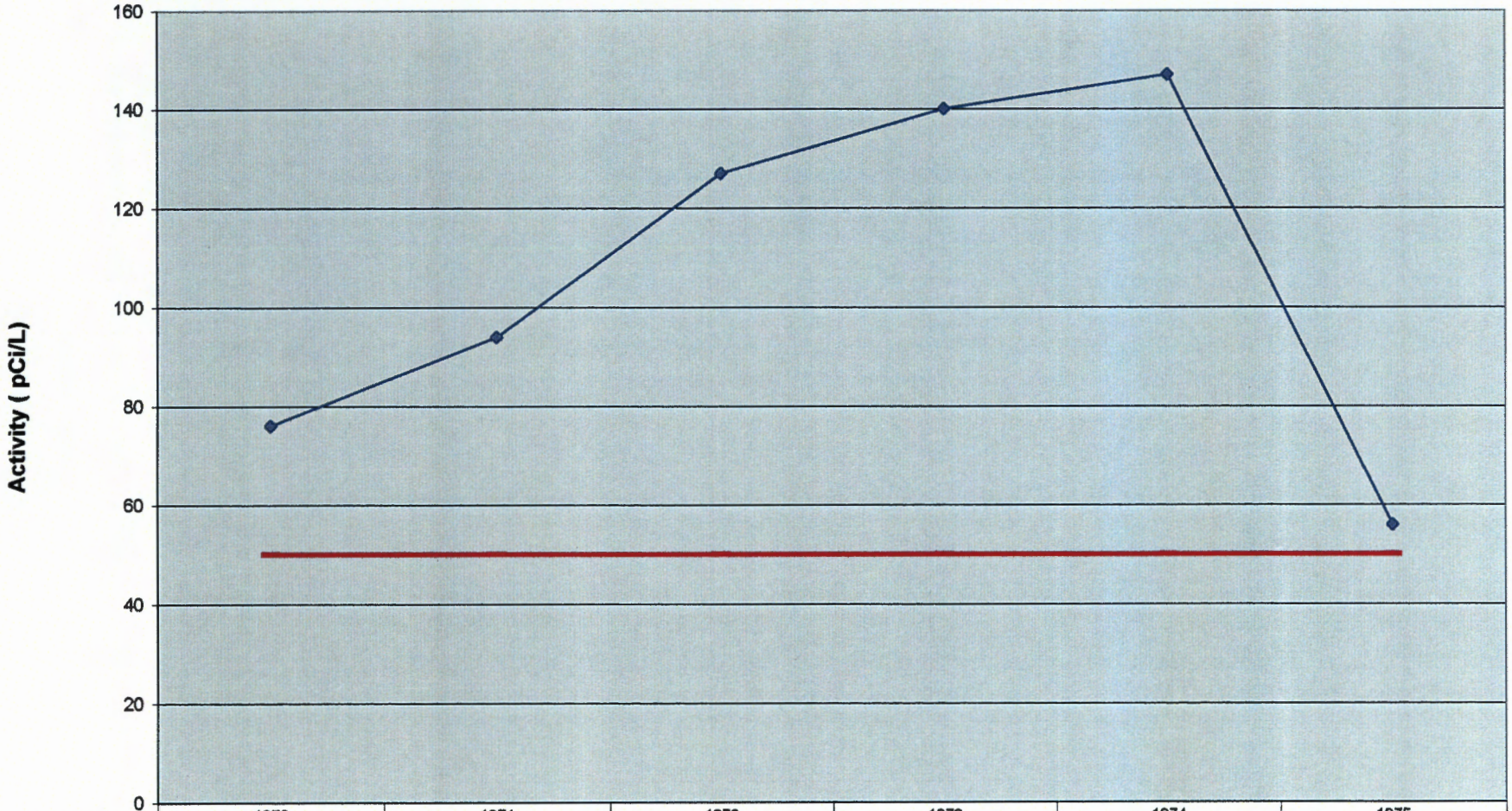
## Tritium Activity in Well LAO-4.5




| | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1992 | 1993 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|
| LAO-4.5 | 43000 | 78000 | 24000 | 28000 | 22000 | 8000 | 18000 | 1000 | 2300 | 169 |
| EPA MCL | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| DOE DCG-1 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 | 80000 |

Years Sampled

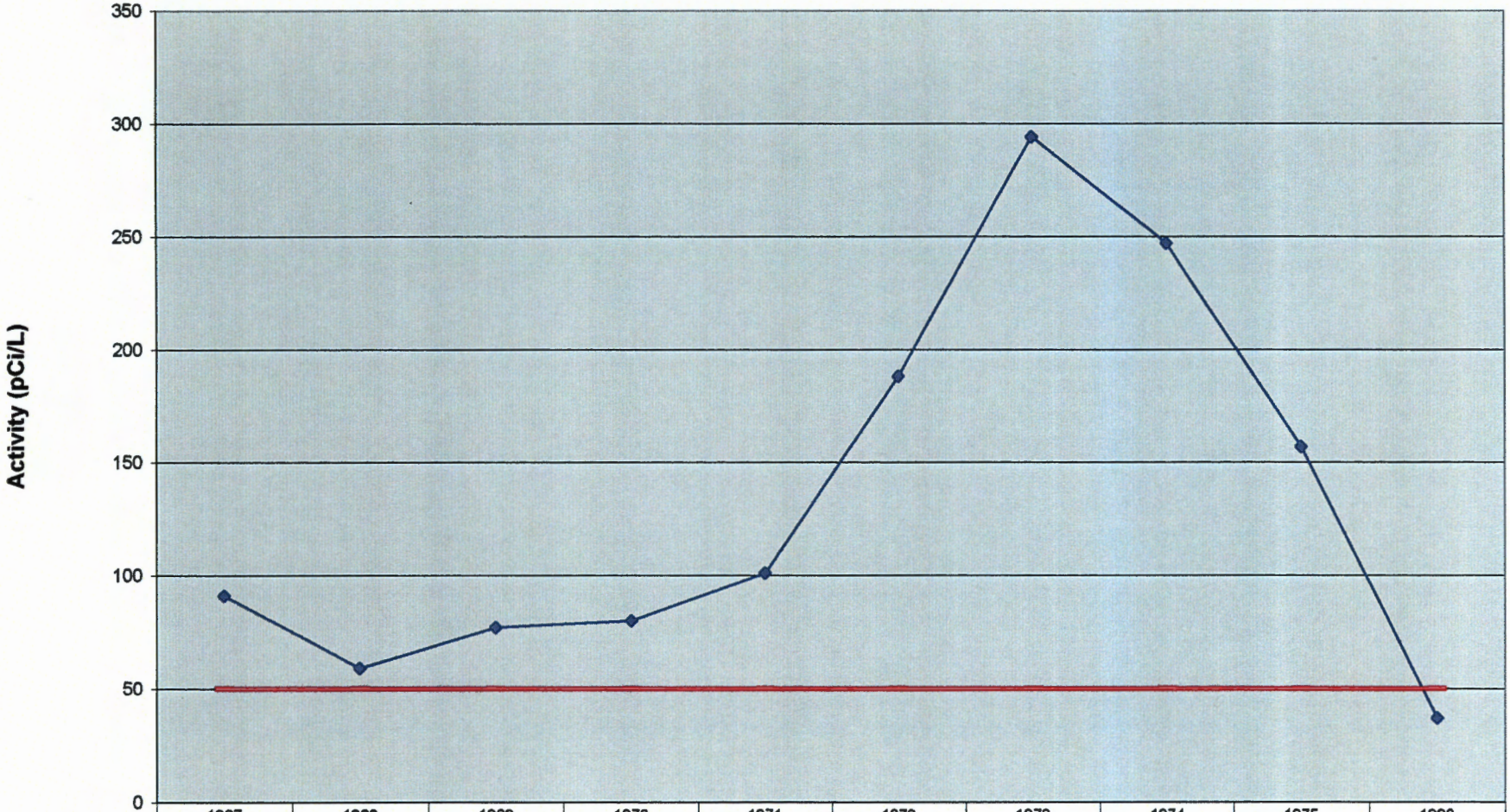
## Gross Beta Activity in Well LAO-1




| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|
| LAO-1 | 76 | 94 | 127 | 140 | 147 | 56 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

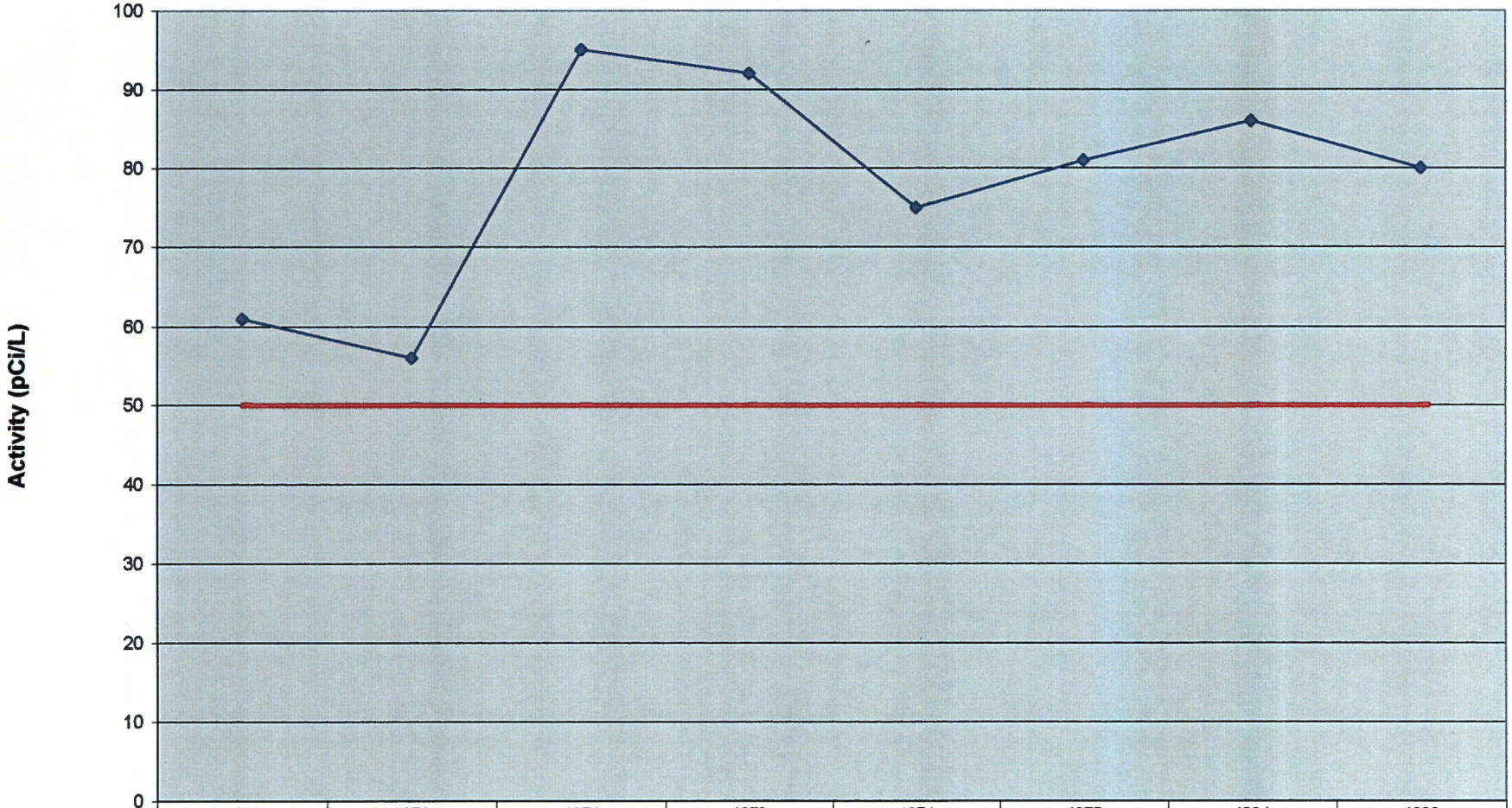
## Gross Beta Activity in Well LAO-2




| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1998 |
|---|---|---|---|---|---|---|---|---|---|---|
| LAO-2 | 91 | 59 | 77 | 80 | 101 | 188 | 294 | 247 | 157 | 37 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

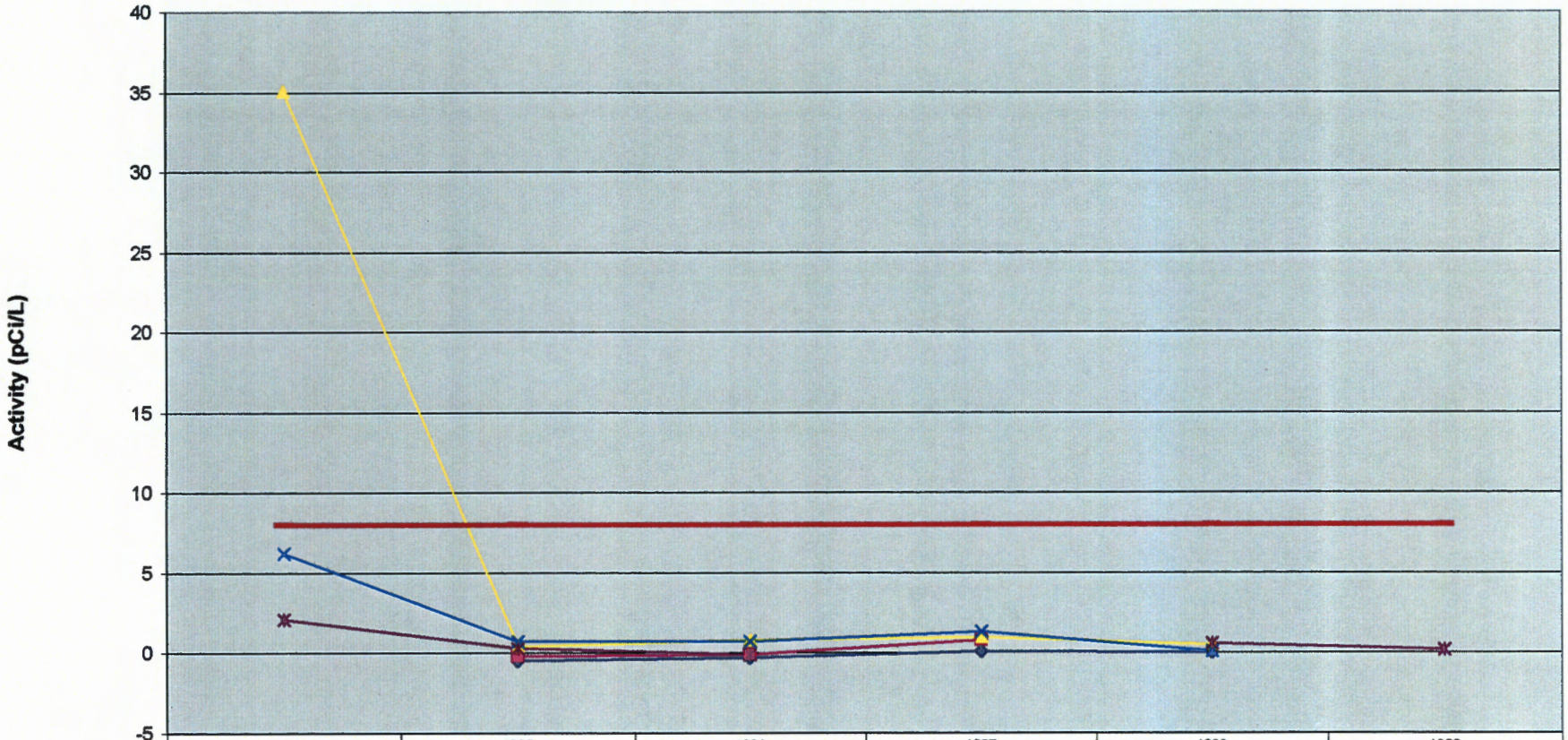
## Gross Beta Activity in Well LAO-3




| | 1968 | 1970 | 1971 | 1972 | 1974 | 1975 | 1994 | 1998 |
|---|---|---|---|---|---|---|---|---|
| LAO-3 | 61 | 56 | 95 | 92 | 75 | 81 | 86 | 80 |
| EPA SL | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

Years Sampled

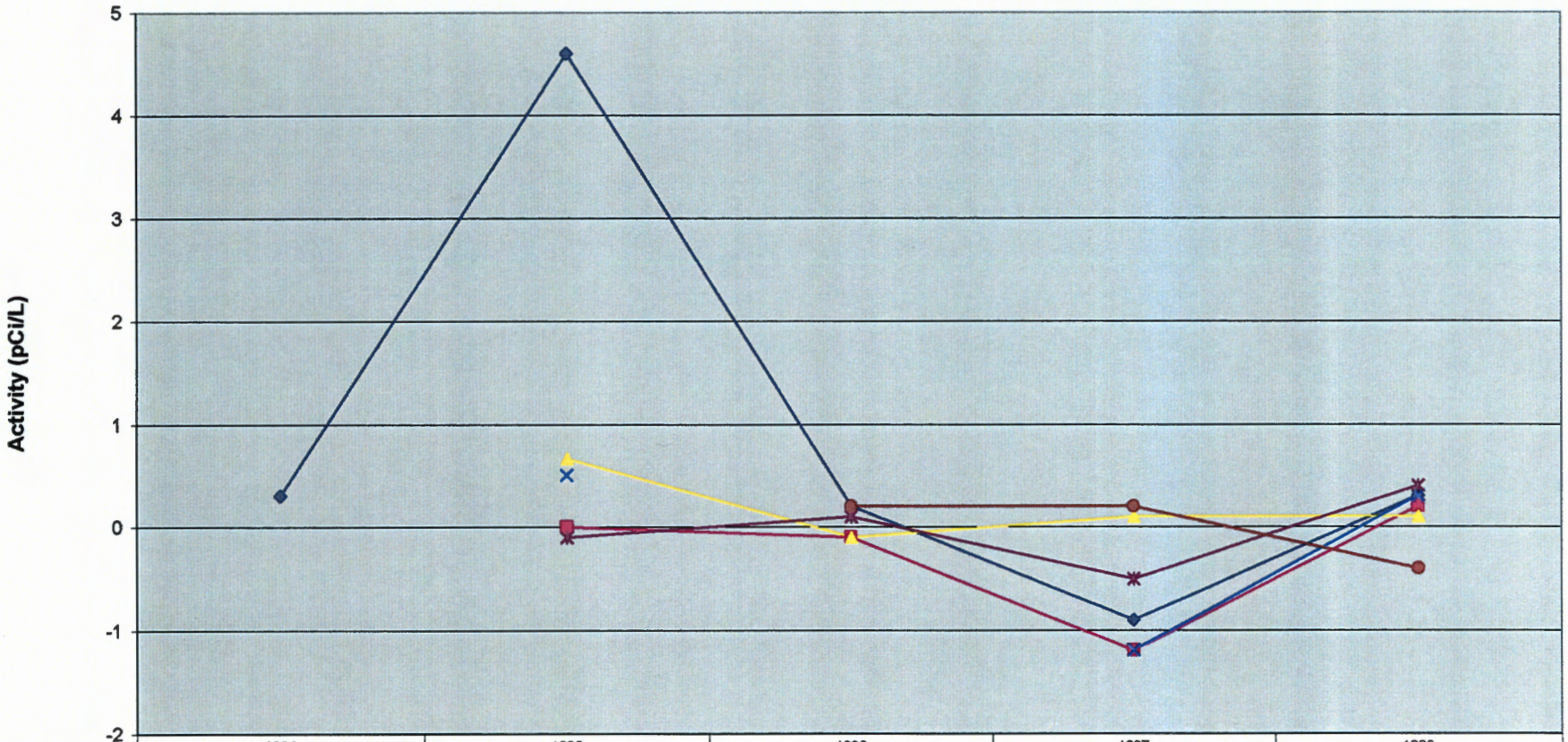
## Strontium-90 Activiity in TW Series Wells




| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|
| TW-1 | | -0.5 | -0.3 | 0.1 | 0 | |
| TW-2 | | -0.2 | -0.1 | 0.8 | | |
| TW-3 | 35.1 | 0.4 | 0.8 | 1 | 0.5 | |
| TW-4 | 6.2 | 0.7 | 0 7 | 1.3 | 0.1 | |
| TW-8 | 2.1 | 0.3 | -0.1 | | 0.6 | 0.2 |
| EPA MCL | 8 | 8 | 8 | 8 | 8 | 8 |

Year Sampled

## Strontium-90 Activity in Supply Wells




| | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|
| PM-1 | 0.3 | 4.6 | 0.2 | -0.9 | 0.3 |
| PM-2 | | 0 | -0.1 | -1.2 | 0.2 |
| PM-3 | | 0.67 | -0.1 | 0.1 | 0.1 |
| PM-4 | | 0.5 | | -1.2 | 0.3 |
| PM-5 | | -0.1 | 0.1 | -0.5 | 0.4 |
| O-4 | | | 0.2 | 0.2 | -0.4 |

Year Sampled