

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

Holloman AAFB
1999
Permit File

PL I.D. 909062



November 18, 1999

NMED HRMB
2044 A Galisteo Street
Santa Fe, NM 87505

Project Name/Number: LOST RIVER

Attention: Kirby Olson

On 09/22/99, Pinnacle Laboratories Inc., (ADHS License No. AZ0592 pending), received a request to analyze **aqueous and non-aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

All analyses were performed by ATEL, Tucson, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Kimberly D. McNeill
Project Manager

MR:jt

Enclosure

H. Mitchell Rubenstein, Ph.D.
General Manager



2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

CLIENT :NMED HRMB
PROJECT # :(NONE)
PROJECT NAME :LOST RIVER

DATE RECEIVED :09/22/99
REPORT DATE :11/18/99

PL ID: 909062

	<u>PINNACLE ID #</u>	<u>CLIENT DESCRIPTION</u>	<u>MATRIX</u>	<u>DATE COLLECTED</u>
01	909062-01	LR-1	AQUEOUS	09/21/99
02	909062-02	LR-2	AQUEOUS	09/21/99
03	909062-03	MW-39-02-1	AQUEOUS	09/21/99
04	909062-04	MW-39-03	AQUEOUS	09/21/99
05	909062-05	A-1 AND A-2	NON-AQUEOUS	09/21/99
06	909062-06	E CHANNEL	NON-AQUEOUS	09/21/99
07	909062-07	C PLAYA BOTTOM	NON-AQUEOUS	09/21/99
08	909062-08	B RUNOFF CHANNEL	NON-AQUEOUS	09/21/99
09	909062-09	F ROCKET RESIDUE	NON-AQUEOUS	09/21/99
10	909062-10	D PAD DRAIN	NON-AQUEOUS	09/21/99

—TOTALS—

<u>MATRIX</u>	<u>#SAMPLES</u>
AQUEOUS	4
NON-AQUEOUS	6



ATEL

Aqua Tech Environmental Laboratories, Inc.

CASE NARRATIVE

Client: Pinnacle Laboratories

Laboratory ID Numbers: 092399-38 thru 092399-47

Client's Sample I.D.: 909062-01 thru 909062-10

The above referenced samples were received in our laboratory on September 23 of this year. They comprised 4 aqueous and 6 nonaqueous samples to be analyzed for perchlorate. It was known from discussions with the client that the aqueous samples possessed very high conductivities and that high sulfate levels were potentially present. The nonaqueous samples were extracted with reagent water using standard protocols. Initial analyses of both the aqueous samples and the extracts showed that the background levels of anions in the samples precluded any meaningful data being acquired without some sort of pretreatment or dilution. Believing the problem to be due to high levels of sulfate, we attempted to use a Dionex product, the OnGuard-Ba pretreatment cartridges, to remove excess sulfate. Many approaches based on these cartridges were tried with no success. They did, in fact, seem to add to the problem. We were aware that EPA in Cincinnati had some experience with samples from a similar source and placed a call to Dan Hautman, who is currently developing a method for perchlorate analysis. He said that the samples were extremely high in chloride rather than sulfate, which explained why we could not get the OnGuard-Ba cartridges to work. We also discussed the impact of sample conductivity on perchlorate analysis. Mr. Hautman said that he considered the upper limit of sample conductivity for perchlorate analysis was about 3000 mS/cm and that the similar samples he had dealt with had conductivities of over 30,000 mS/cm. His suggestion was to dilute the samples. We measured the conductivities of the aqueous samples and confirmed they were in excess of 30,000 mS/cm. A ten fold dilution did not however, seem to sufficiently reduce the background. The chromatogram was still one big peak and it seems that Mr. Hautman's method is better able to handle high backgrounds than is ours. Being reluctant to spend much more time on these samples we then diluted them 100 fold, analyzed them and reported the results. Our detection limit is 500 ppb for the aqueous samples, which is much higher than we had hoped. All of the appropriate quality control samples were analyzed and were within specifications.



Richard A. Mosher, Ph.D.
Laboratory Director

ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:

Attn:

FAX: (505) 344-4413

Our Lab #: 092399038

Your Sample ID: 909062-01

Date Logged-In: 9/23/99

Sample Source: Other/Undefined

Matrix: Other/ Undefine

Client Project #:

PO#: 092338

Project #:

Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 9:26 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER	SM4110B	Perchlorate, aq	< 500	ug/L	10/27/1999	RAM	1930

End of Report

Report Approved By: R Mosher

Arizona Lab License No. AZ0009

Lab Number 092399038:Page 1

2700 E. BILBY ROAD • BUILDING A • TUCSON, AZ 85706
PHONE 520-573-6565 • 1-800-879-2835 • FAX 520-573-6550



ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499
Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Report Date: 29-Oct-99

Attn:

Phone: (505) 344-3777 **Ext:**
FAX: (505) 344-4413

Our Lab #: 092399039
Date Logged-In: 9/23/99
Matrix: Other/ Undefine
Project #:

Your Sample ID: 909062-02
Sample Source: Other/Undefined
Client Project #: PO#: 092338
Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 9:20 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER	SM4110B	Perchlorate, aq	< 500	ug/L	10/27/1999	RAM	1930

End of Report

Report Approved By: R Meshu

ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:
FAX: (505) 344-4413

Attn:

Our Lab #: 092399040
Date Logged-In: 9/23/99
Matrix: Other/ Undefine
Project #:

Your Sample ID: 909062-03
Sample Source: Other/Undefined
Client Project #: PO#: 092338
Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 10:35 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER	SM4110B	Perchlorate, aq	< 500	ug/L	10/27/1999	RAM	1930

End of Report

Report Approved By: RMastur

Arizona Lab License No. AZ0009

Lab Number 092399040:Page 1

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ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:
FAX: (505) 344-4413

Attn:

Our Lab #: 092399041

Your Sample ID: 909062-04

Date Logged-In: 9/23/99

Sample Source: Other/Undefined

Matrix: Other/ Undefine

Client Project #:

PO#: 092338

Project #:

Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 11:50 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER	SM4110B	Perchlorate, aq	< 500	ug/L	10/27/1999	RAM	1930

End of Report

Report Approved By: R Mosher

ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.

2709-D Pan American Freeway, NE

Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:

FAX: (505) 344-4413

Attn:

Our Lab #: 092399042

Your Sample ID: 909062-05

Date Logged-In: 9/23/99

Sample Source: Other/Undefined

Matrix: Soil/Sludge

Client Project #:

PO#: 092338

Project #:

Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 10:15 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	W
PER-S	SM4110B	Perchlorate, soil	< 1000	ug/Kg	10/28/1999	RAM	1931

End of Report

Report Approved By: R Mosher

Arizona Lab License No. AZ0009

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Lab Number 092399042: Page 1

ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499
Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Report Date: 29-Oct-99

Attn:

Phone: (505) 344-3777 **Ext:**
FAX: (505) 344-4413

Our Lab #: 092399043
Date Logged-In: 9/23/99
Matrix: Soil/Sludge
Project #:

Your Sample ID: 909062-06
Sample Source: Other/Undefined
Client Project #: **PO#:** 092338
Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 9:00 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER-S	SM4110B	Perchlorate, soil	< 1000	ug/Kg	10/28/1999	RAM	1931

End of Report

Report Approved By: *R. Moshier*

Arizona Lab License No. AZ0009

Lab Number 092399043:Page 1

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ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.

2709-D Pan American Freeway, NE

Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:

FAX: (505) 344-4413

Attn:

Our Lab #: 092399044

Your Sample ID: 909062-07

Date Logged-In: 9/23/99

Sample Source: Other/Undefined

Matrix: Soil/Sludge

Client Project #:

PO#: 092338

Project #:

Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 11:30 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst W/
PER-S	SM4110B	Perchlorate, soil	< 1000	ug/Kg	10/28/1999	RAM 1931

End of Report

Report Approved By: R Mosher

Arizona Lab License No. AZ0009

2700 E. BILBY ROAD • BUILDING A • TUCSON, AZ 85706
PHONE 520-573-6565 • 1-800-879-2835 • FAX 520-573-6550

Lab Number 092399044:Page 1



Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499
Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Report Date: 29-Oct-99

Attn:

Phone: (505) 344-3777 **Ext:**
FAX: (505) 344-4413

Our Lab #: 092399045 **Your Sample ID:** 909062-08
Date Logged-In: 9/23/99 **Sample Source:** Other/Undefined
Matrix: Soil/Sludge **Client Project #:** **PO#:** 092338
Project #: **Date Submitted to Lab:** 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 11:15 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER-S	SM4110B	Perchlorate, soil	< 1000	ug/Kg	10/28/1999	RAM	1931

End of Report

Report Approved By: R. Masher

Arizona Lab License No. AZ0009

Lab Number 092399045:Page 1

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Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499
Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107-

Report Date: 02-Nov-99

Attn:

Phone: (505) 344-3777 **Ext:**

FAX: (505) 344-4413

Our Lab #: 092399046 **Your Sample ID:** 909062-09
Date Logged-In: 9/23/99 **Sample Source:** Other/Undefined
Matrix: Soil/Sludge **Client Project #:** **PO#:** 092338
Project #: **Date Submitted to Lab:** 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 10:20 AM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	WS#
PER-S	SM4110B	Perchlorate, soil	65300	ug/Kg	10/27/1999	RAM	1931

End of Report

Report Approved By: YR Mosher

Arizona Lab License No. AZ0009

Lab Number 092399046:Page 1

2700 E. BILBY ROAD • BUILDING A • TUCSON, AZ 85706
PHONE 520-573-6565 • 1-800-878-2835 • FAX 520-573-6550

Network Project Manager: Kimberly D. McNeill					ANALYSIS REQUEST																						
Pinnacle Laboratories, Inc. 2709-D Pan American Freeway, NE Albuquerque, New Mexico 87107 (505) 344-3777 Fax (505) 344-4413					TO 499																						
Sample - 09 is a rocket residue. Please treat as a soil. Analyze for Perchlorate but be aware that rocket fuel may remain in sample.					Metals (6) RCRA	RCRA TCLP METALS	Metals-13 PP List	Metals-TAL	TOX	TOC	Gen Chemistry	Perchlorate	Oil and Grease	Volatile Organics GC/MS (8260)	BOD	COD	PESTICIDES/PCB (608/8080)	8270 BY GC/MS	PNA (8310)	8240 (TCLP 1311) ZHE	Herbicides (615/8150)	Base/Neutral Acid Compounds GC/MS (625/8270)	URANIUM	RADIUM 226+228	Gross Alpha/Beta	TO-14	NUMBER OF CONTAINERS
SAMPLE ID	DATE	TIME	MATRIX	LAB ID																							
909062-01	9/21	0926	AQ	092399	-38						X																
-02		0920		092399	-39						X																
-03		1035		092399	-40						X																
-04		1150	↓	092399	-41						X																
-05		1015	NAQ	092399	-42						X																
-06		0900		092399	-43						X																
-07		1130		092399	-44						X																
-08		1115		092399	-45						X																
-09		1020		092399	-46						X																
-10	↓	1500	↓	092399	-47						X																

PROJECT INFORMATION		SAMPLE RECEIPT		SAMPLES SENT TO:		RELINQUISHED BY: 1		RELINQUISHED BY: 2	
PROJECT #:	909062	Total Number of Containers		PENSACOLA - STL-FL	Signature:	Time:	Signature:	Time:	
PROJ. NAME:	NMHR	Chain of Custody Seals		PORTLAND - ESL-OR	Francine Trino	1100	AAA	1045	
QC LEVEL:	STD. IV	Received Intact?		STL - CT	Printed Name:	Date:	Printed Name:	Date:	
QC REQUIRED:	MS MSD BLANK	Received Good Cond./Cold		STL - NEW JERSEY	Francine Trino	9/22/99	L. SUTER	09/23/99	
TAT:	STANDARD	LAB NUMBER:		N. CREEK	Pinnacle Laboratories, Inc.		Company	ATEL	
				BARRINGER	RECEIVED BY: 1		RECEIVED BY: 2		
DUE DATE:	10/4	COMMENTS:		SEQUOIA	Signature:	Time:	Signature:	Time:	
RUSH SURCHARGE:	=		ATEL	X	Francine Trino	1045			
CLIENT DISCOUNT:	=				Printed Name:	Date:	Printed Name:	Date:	
SPECIAL CER REQUIRED:	Y/N				L. SUTER	09/23/99			
					Company	ATEL	Company		

ATEL

Aqua Tech Environmental Laboratories, Inc.

- CERTIFICATE OF ANALYSIS -

Client #: T0499

Report Date: 29-Oct-99

Pinnacle Laboratories, Inc.

2709-D Pan American Freeway, NE

Albuquerque, NM 87107-

Phone: (505) 344-3777 Ext:

FAX: (505) 344-4413

Attn:

Our Lab #: 092399047

Your Sample ID: 909062-10

Date Logged-In: 9/23/99

Sample Source: Other/Undefined

Matrix: Soil/Sludge

Client Project #:

PO#: 092338

Project #:

Date Submitted to Lab: 09/23/1999

- COLLECTION INFORMATION -

Date/Time/By: 09/21/1999 3:00 PM

Test Group	EPA Method	Test	Result	Units	Analysis Date	Analyst	W
PER-S	SM4110B	Perchlorate, soil	< 1000	ug/Kg	10/28/1999	RAM	1931

End of Report

Report Approved By: R Mosher

PROJECT MANAGER: Dr. Kirby Olson

COMPANY: Hazardous Materials Bureau, New Mexico Environment Dept.
 ADDRESS: 2044 Calistoga St. Santa Fe NM 87505

PHONE: (505) 827-1561 x1034
 FAX: (505) 827-1544

BILL TO: Hazardous and Radioactive Materials Bureau
 COMPANY: New Mexico Environment Dept.
 ADDRESS: 2044 Calistoga St. Santa Fe NM 87505

SAMPLE ID	DATE	TIME	MATRIX	LAB	Petroleum Hydrocarbons (418.1) TRPH (MOD.8015) Diesel/Direct Inject	(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) MTBE	8021 (BTEX) <input type="checkbox"/> MTBE <input type="checkbox"/> TMB <input type="checkbox"/> PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB <input type="checkbox"/> /DBCIP <input type="checkbox"/>	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides /PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry: TDS	Perchlorate (ClO4)	Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311) Metals:		
LR-1	9/21/99	9:26am	Surface Water																			X	X						
LR-2	9/21/99	9:20am	Surface Water																				X	X					
MW-39-02-1	9/21/99	10:35am	ground water																				X	X					
MW-39-03	9/21/99	11:50am	ground water																				X	X					
A-1 and A-2	9/21/99	10:15	Soil																						X				
E channel	9/21/99	9am	Soil																						X				
C playa bottom	9/21/99	11:30	Soil																						X				
B runoff channel	9/21/99	11:5am	Soil																						X				
F rocket residue	9/21/99	10:20	rocket residue																						X				
D road Drain	9/21/99	3pm	Soil																					X					

PLEASE FILL THIS FORM IN COMPLETELY.

<p>PROJECT INFORMATION</p> <p>PROJ. NO.: <u>N/A</u></p> <p>PROJ. NAME: <u>Lost River</u></p> <p>P.O. NO.:</p> <p>SHIPPED VIA: <u>delivered to lab</u></p>	<p>PREPARE/ANALYSIS REQUIRED FOR RUSH PROJECTS</p> <p>(RUSH) <input type="checkbox"/> 24hr <input type="checkbox"/> 48hr <input type="checkbox"/> 72hr <input type="checkbox"/> 1 WEEK (NORMAL) <input type="checkbox"/></p> <p>CERTIFICATION REQUIRED: <input type="checkbox"/> NM <input type="checkbox"/> SDWA <input type="checkbox"/> OTHER</p> <p>METHANOL PRESERVATION <input type="checkbox"/></p> <p>COMMENTS: <input type="checkbox"/> FIXED FEE</p> <p>Sample F is a rocket residue. please treat as a soil. analyze for perchlorate (ClO4-) but be aware that rocket fuel (solid) may remain in sample</p>	<p>REQUISITIONED BY</p> <p>Signature: <u>Kirby S. Olson</u> Time: <u>9:40pm</u></p> <p>Printed Name: <u>Kirby Olson</u> Date: <u>9/21/99</u></p> <p>Company: <u>NMED</u> See reverse side (Force Majeure)</p>	<p>REQUISITIONED BY</p> <p>Signature: <u>[Signature]</u> Time: <u>8:18am</u></p> <p>Printed Name: <u>CORNELIUS Amindyaop</u> Date: <u>9/22/99</u></p> <p>Company: <u>NMED</u></p>
<p>SAMPLE PREP</p> <p>ANALYSIS</p> <p>LABORATORY</p>	<p>RECEIVED BY</p> <p>Signature: <u>[Signature]</u> Time: <u>9:20</u></p> <p>Printed Name: <u>CORNELIUS Amindyaop</u> Date: <u>9/21/99</u></p> <p>Company: <u>NMED</u></p>	<p>RECEIVED BY</p> <p>Signature: <u>[Signature]</u> Time: <u>[Time]</u></p> <p>Printed Name: <u>[Name]</u> Date: <u>[Date]</u></p> <p>Company: <u>[Company]</u></p>	<p>RECEIVED BY</p> <p>Signature: <u>[Signature]</u> Time: <u>[Time]</u></p> <p>Printed Name: <u>[Name]</u> Date: <u>[Date]</u></p> <p>Company: <u>[Company]</u></p>



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

10 DEC 1999

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT

Attn: Hazardous and Radioactive Materials Bureau
Ms. Kirby Olsen
2044 Galisteo
P.O. Box 26110
Santa Fe, NM 87502

DEC 1999
RECEIVED

FROM: 49 CES/CEV
550 Tabosa Avenue
Holloman AFB NM 88330-8458

SUBJECT: Perchlorate Sampling Report, Holloman AFB

1. Attached is the report on the Perchlorate Sampling conducted this summer at Holloman AFB.
2. If you have any questions, please contact Mr. Court Fesmire or Mr. Jose Gallegos at (505) 572-5395.


HOWARD E. MOFFITT
Deputy Base Civil Engineer

Attachment
Report

1.0 INTRODUCTION

This report presents the results of the perchlorate sampling event conducted at Holloman Air Force Base (AFB), New Mexico, to determine if elevated levels of perchlorate, potentially associated with solid propellants for rockets and missiles, exist. In 1998, perchlorate was reported in a surface water sample the National Park Service collected at the White Sands Missile Range. As a result, the New Mexico Environment Department (NMED) collected a limited number of soil and water samples at Holloman AFB. Foster Wheeler Environmental Corporation (Foster Wheeler) collected split samples for Holloman AFB and submitted them to an independent laboratory for analysis. The following sections describe the sampling, analysis, and data evaluation performed for the project.

2.0 FIELD ACTIVITIES

Foster Wheeler and NMED personnel collected four water and six soil/solid samples for perchlorate analysis. In addition, Foster Wheeler collected one groundwater and two soil samples for background comparison, and one soil field duplicate sample to assess sampling and analysis precision. Samples were collected at Holloman AFB from the vicinity of the Missile Test Track, Lost River Pup Fish ponds, and Installation Restoration Program site SS-39, missile fuel spill area. The perchlorate sampling locations, which were identified by NMED, are presented in Figure 1 of this report.

3.0 ANALYTICAL RESULTS

Perchlorate analysis was performed by Montgomery Watson Laboratories, Pasadena, California, in accordance with a modified United States Environmental Protection Agency (EPA) Method 300.0, anions in water by ion chromatography. The modified method has been approved by the State of California for perchlorate analysis.

Low-level detections of perchlorate were reported in monitoring well samples 39-MW-02 and 39-MW-03 at concentrations of 15 micrograms per liter ($\mu\text{g/L}$) and 40 $\mu\text{g/L}$, respectively.

Perchlorate was also detected in the background well sample, 39-MW-01, at a concentration of 33 $\mu\text{g/L}$. Perchlorate was not detected in the two Lost River surface water samples, LR-1 and LR-2. The detection limit for perchlorate in water samples is 8 $\mu\text{g/L}$.

Perchlorate was detected in one soil sample, PC-B, at a concentration of 90 micrograms per kilogram ($\mu\text{g}/\text{kg}$). No perchlorate was detected in the two soil background samples, PC-BG-01 and PC-BG-02. The reporting limit for perchlorate in soil was 40 $\mu\text{g}/\text{kg}$; however, elevated levels of total dissolved solids inherent to Holloman AFB and surrounding areas, resulted in analytical matrix interference. As a result of the matrix interference, sample dilution and elevated reporting limits were required for samples PC-B, PC-C, PC-D, and SRF-1. The elevated reporting limits for these samples were 80 $\mu\text{g}/\text{kg}$, 80 $\mu\text{g}/\text{kg}$, 2000 $\mu\text{g}/\text{kg}$, 2000 $\mu\text{g}/\text{kg}$, respectively. Analytical results are provided in Attachment A.

4.0 DATA REVIEW

One hundred percent of the perchlorate data have undergone data review in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 1994). Data review included the following items:

- Chain-of-custody record
- Holding times
- Detection limits
- Method blanks
- Laboratory control sample recovery
- Matrix spike/matrix spike duplicate recovery
- Field duplicate sample precision

The perchlorate data review determined the following: (1) sample receipt requirements and holding times were met, (2) method-specific detection limits were achieved and required analytical methods were used, (3) method blank samples were nondetect for perchlorate, (4) spike sample recoveries were within method acceptance criteria for precision and accuracy, and (5) field duplicate sample data were comparable and within precision criteria.

Review of the quality control and field sample data indicates project measurement data are reliable and achieve project objectives. Precision and accuracy for the perchlorate sampling event are acceptable and valid conclusions may be drawn from the field sample data.

5.0 CONCLUSIONS

Based on the results of the September 21, 1999 perchlorate sampling event, Foster Wheeler recommends the following: 1) a confirmational sample be collected at well 39-MW-01, as a result of the low-level detection, and 2) an additional background well be identified for sampling and analysis.

Perchlorate data collected by Foster Wheeler and NMED at Holloman AFB during the September 1999 sampling event will be compared to evaluate sampling and analysis precision and accuracy. At present, EPA is in the process of developing an ecological toxicity standard for perchlorate. Ultimately, the perchlorate data will be compared to the toxicity standard to determine if elevated concentrations of perchlorate exist at the Base.

6.0 REFERENCES

EPA (United States Environmental Protection Agency)
1994 Contract Laboratory Program National Functional Guidelines for Inorganic Data
Review (February).

ATTACHMENT A
Laboratory Analytical Results



MONTGOMERY WATSON LABORATORIES

a Division of Montgomery Watson Americas, Inc.
555 East Walnut Street
Pasadena, California 91101
Tel: 626 568 6400 Fax: 626 568 6324
1 800 566 LABS (1 800 566 5227)

Laboratory Report

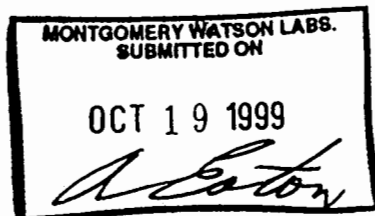
for

Foster Wheeler Environmental -
Denver
143 Union Blvd

Suite 1010

Lakewood , CO 80228

Attention: Pam Moss
Fax: 303-980-3713



ADE Andy Eaton

Report#: 58247
CLO4



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**Laboratory
 Report
 #58247**

Foster Wheeler Environmental -
 Denver
 Pam Moss
 143 Union Blvd
 Suite 1010
 Lakewood , CO 80228

Samples Received
 23-sep-1999 15:13:58

Prepared	Analyzed	QC Batch#	Method	Analyte	Result	Units	MRL	Diluti
LR-1 (990923078)	10/11/99	103295	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 ND	ug/l	8.0	2
LR-2 (990923079)	10/11/99	103295	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 ND	ug/l	8.0	2
89-MW-02 (990923080)	10/11/99	103295	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 15	ug/l	8.0	2
89-MW-03 (990923081)	10/11/99	103295	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 40	ug/l	8.0	2
89-MW-01 (990923082)	10/11/99	103295	(MOD/EPA 300)	Perchlorate	Sampled on 09/22/99 33	ug/l	8.0	2
PC-A-SOIL-A (990923083)	10/11/99	103297	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 ND	mg/kg	0.040	1
PC-A-SOIL-B (990923084)	10/11/99	103297	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 ND	mg/kg	0.040	1
PC-B-SOIL (990923085)	10/18/99	103297	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 0.09	mg/kg	0.080	2
PC-C-SOIL (990923086)	10/18/99	103297	(MOD/EPA 300)	Perchlorate	Sampled on 09/21/99 ND	mg/kg	0.080	2



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Laboratory
Report
#58247

Foster Wheeler Environmental -
Denver
(continued)

Prepared	Analyzed	QC Batch#	Method	Analyte	Result	Units	MRL	Dilution
PC-E-SOIL (990923087) Sampled on 09/21/99								
	10/11/99	103297	(MOD/EPA 300)	Perchlorate	ND	mg/kg	0.040	1
ERF-1 (990923088) Sampled on 09/21/99								
	10/11/99	103297	(MOD/EPA 300)	Perchlorate	ND	mg/kg	2.0	50
PC-D-SOIL (990923089) Sampled on 09/21/99								
	10/11/99	103297	(MOD/EPA 300)	Perchlorate	ND	mg/kg	2.0	50
PC-BG-01 (990923090) Sampled on 09/22/99								
	10/11/99	103297	(MOD/EPA 300)	Perchlorate	ND	mg/kg	0.040	1
PC-BG-02 (990923091) Sampled on 09/22/99								
	10/11/99	103297	(MOD/EPA 300)	Perchlorate	ND	mg/kg	0.040	1



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Report
Comments
#58247

Group Comments

(Perchlorate) Samples are pre treated with silver and H cartridges, prior to analysis, due to high EC levels.

(990923083)

CLO4

This sample was spiked for MS/MSD.

(990923086)

CLO4

Sample is diluted due to matrix interference. Sample contains a trace hit at 0.06mg/Kg.

(990923088)

CLO4

Sample is dilued due to matrix interference.

(990923089)

CLO4

Sample is diluted due to matrix interference.



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Laboratory
 QC Report
 #58247

Foster Wheeler Environmental -
 Denver

QC Batch #103295

Perchlorate

QC	Analyte	Spiked	Recovered	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 99	0923149		(0.00 - 0.00)	
LCS1	Perchlorate	20.0	20.8	104.0	(90.00 - 110.00)	
MBLK	Perchlorate	ND				
MS	Perchlorate	20.0	20.8	104.0	(75.00 - 125.00)	
MSD	Perchlorate	20.0	22.4	112.0	(75.00 - 125.00)	7.4

QC Batch #103297

Perchlorate

QC	Analyte	Spiked	Recovered	Yield (%)	Limits (%)	RPD (%)
LCS1	Perchlorate	0.10	0.107	107.0	(80.00 - 120.00)	
MBLK	Perchlorate	ND				
MS	Perchlorate	0.10	0.099	99.0	(80.00 - 120.00)	
MSD	Perchlorate	0.10	0.095	95.0	(80.00 - 120.00)	4.1

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
 Criteria for MS and DUP are advisory only and not applicable for ICR monitoring.

Special Sample 115 -

JAN 10 11 55 AM

T W E N T Y T W O

TEMP 21°C
REG 103 OK

59247

Fed Ex # 1870-3625-9

Cooler #



MONTGOMERY LABORATORIES

CHAIN OF CUSTODY RECORD

DESTINATION: MONTGOMERY LABORATORIES

OTHER:

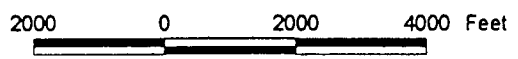
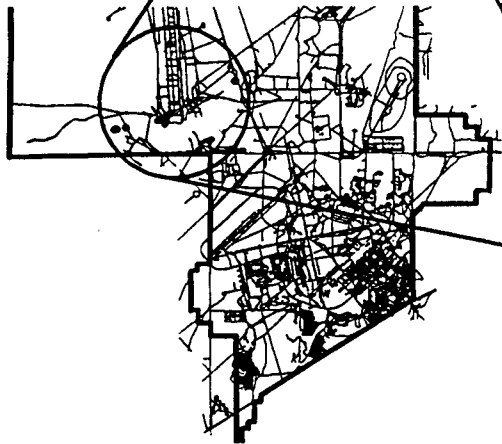
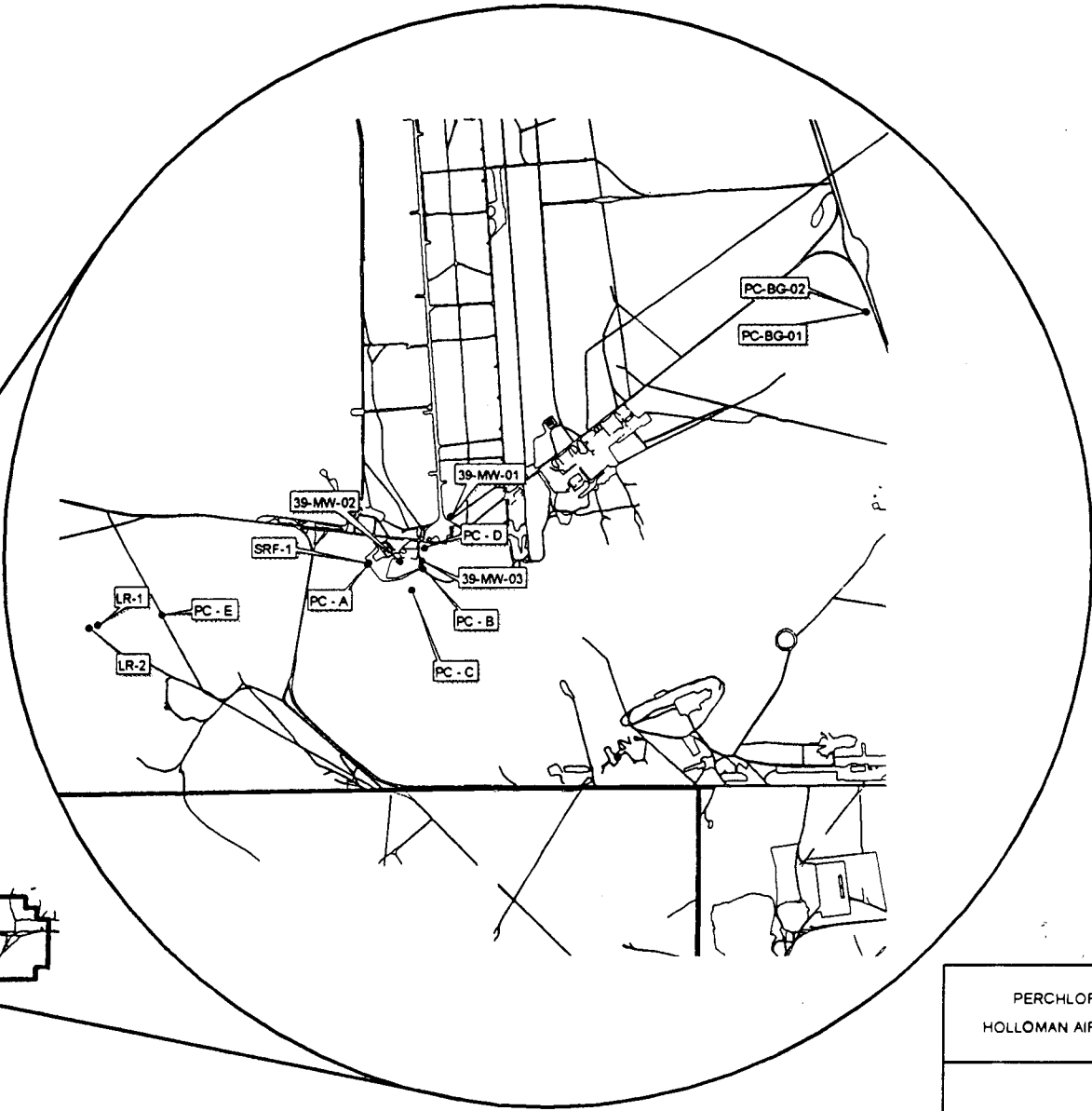
PROJECT NAME		PROJECT JOB #		ANALYSES REQUIRED															
Compliance - PC				CLO4 PC															
SAMPLER(S): PRINTED NAME AND SIGNATURE																			
David L. Rizzuto <i>David L. Rizzuto</i>																			
TIME	DATE	LOCATION	IDENTIFIER	QA/QC	GRAB	COMP	NUMBER/SIZE OF CONTAINERS	REMARKS											
09:29	09/21	Lost River	LR-1		X		1	X											
09:19	09/21	Lost River	LR-2		X		1	X											
10:35	09/21	SS 39	39-MW-02		X		1	X											
11:50	09/21	SS 39	39-MW-03		X		1	X											
10:25	09/21	RMDSA	PC-A-Soil-A		X		1	X											
10:25	09/21	RMDSA	PC-A-Soil-B		X		1	X											
11:15	09/21	Track Runoff	PC-B-Soil		X		1	X											
11:30	09/21	Playa RO	PC-C-Soil		X		1	X											
09:06	09/21	Playa	PC-E-Soil		X		1	X											
10:30	09/21	RMDSA	PC SRF-1		X		1	X											
15:00	09/21	TT Drain	PC-D-Soil		X		1	X											
08:31	09/22	SS39	39-MW-01		X		1	X											
08:40	09/22	Playa	PC-BG-01		X		1	X soil											
08:45	09/22	Playa	PC-BG-02		X		1	X											

SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
<i>David L. Rizzuto</i>	David L. Rizzuto	FWENR - ENV. SPC.	09/23/99	11:00
<i>M. DeWasa</i>	M. DEWASA	M.W.	9-23-99	9:40

FIGURE


LEGEND

- SAMPLE LOCATIONS
- ROADS
- WATER BODIES
- RUNWAY
- INSTALLATION BOUNDARY



PERCHLORATE SAMPLING EVENT
 HOLLOMAN AIR FORCE BASE, NEW MEXICO

FIGURE 1



FOSTER WHEELER
 ENVIRONMENTAL CORPORATION

M E M O R A N D U M

To: Dr. Richard Mosher, Aqua Tech Environmental Labs, Inc.

From: Dr. Kirby Olson, NMED (505) 827-1561 ext. 1034

Subject: perchlorate samples

Date: September 28, 1999

Dan at the EPA lab in Cincinnati called me with conductivities for the water samples we sent to Pinnacle labs on 9/22 to be sent to you. The surface water samples (which we designated LR-1 and LR-2, Pinnacle recorded these on our chain of custody as 01 and 02) have conductivities of 30,000 microsiemens. The groundwater samples (we designated them as MW-39-02-1 and MW-39-03, Pinnacle recorded these as 03 and 04) have conductivities of 15,000 microsiemens. I wanted to make sure I got these numbers to you since they may be higher than you were expecting (can you believe fish live in that surface water?). Please let me know if the samples are presenting problems for you in analysis.