GW - 31

GENERAL CORRESPONDENCE

YEAR(S):

1999 - 1997

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

September 30, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z 357 870 143

Mr. Bob Beers
Los Alamos National Laboratory
MS K497
Los Alamos, New Mexico 87545

Subject: Discharge Plan GW-031
Burns Swell Spill

Dear Mr. Beers:

The New Mexico Oil Conservation Division (NMOCD) is in receipt of Los Alamos National Laboratory's letter dated May 4, 1999 and subsequent information presented during a meeting on September 30, 1999 requesting closure for the Burns Swell Spill site. The NMOCD hereby approves of Los Alamos National Laboratory's request for closure.

Please be advised that NMOCD approval of this site does not relieve Los Alamos National Laboratory of liability should their closure activities have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Los Alamos National Laboratory of responsibility for compliance with any other federal, state, or local laws and/or regulations.

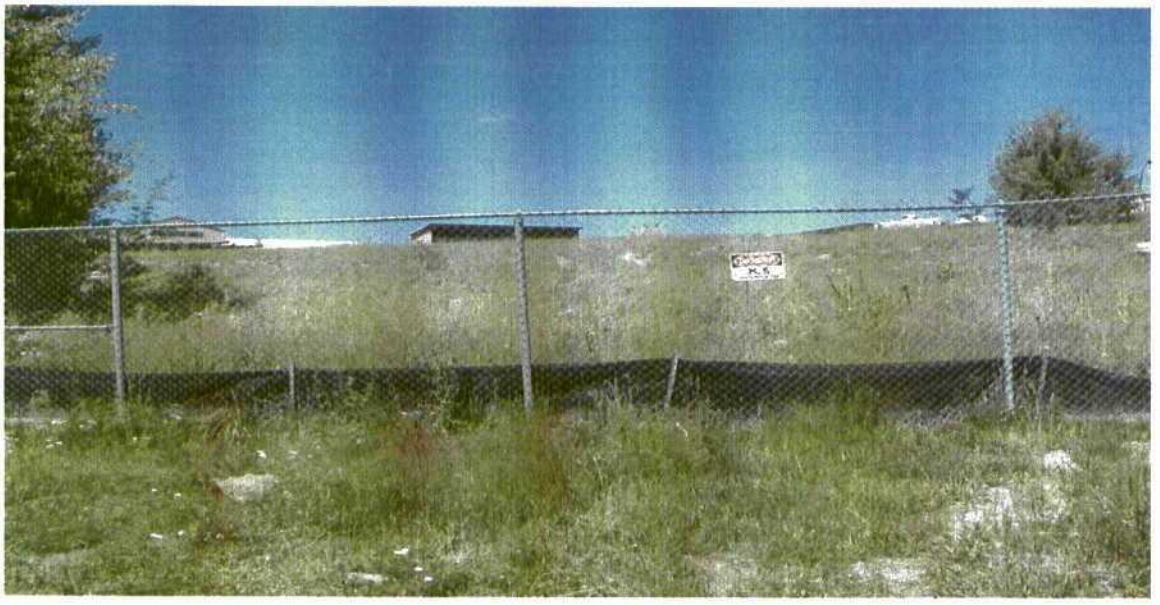
If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

cc: Roy Johnson-OCD District IV

Looking Down Burns Swale from the HDR Perimeter Fence



Looking Up Burns Swale at the HDR Perimeter Fence

Looking Up Burns Swale at the HDR Perimeter Fence

Burns Swale, New Grass Cover Behind Straw Bale BMP

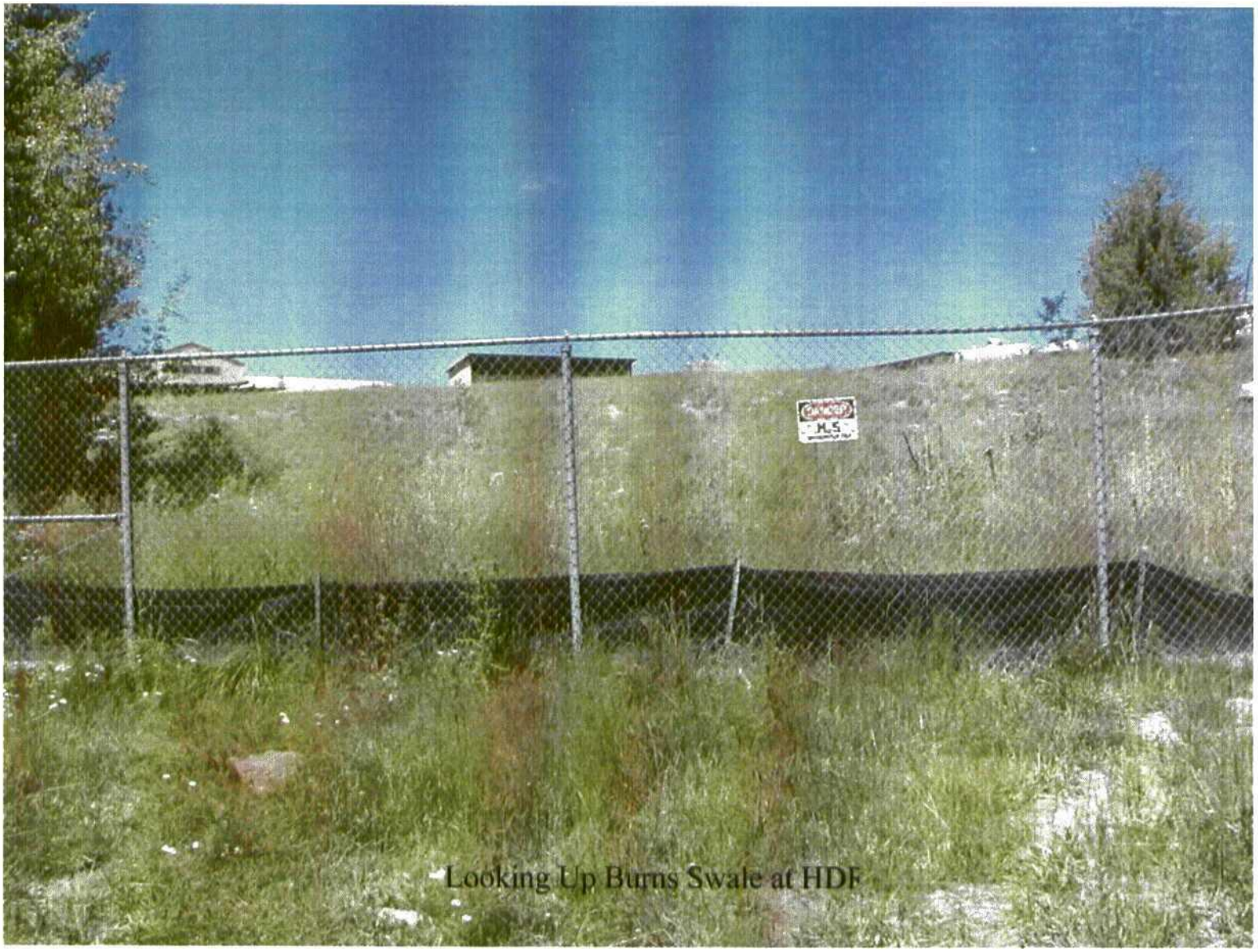
Looking Up Burns Swale at HDR Perimeter Fence

Looking Down Burns Swale Approximately 150 ft below HDR Fence

Burns Swale, Grass Cover Behind Straw Bale BMP

Burns Swale, Grass Cover Behind Straw Bale BMP

Looking Down Burns Swale @ HDR Perimeter Fenc



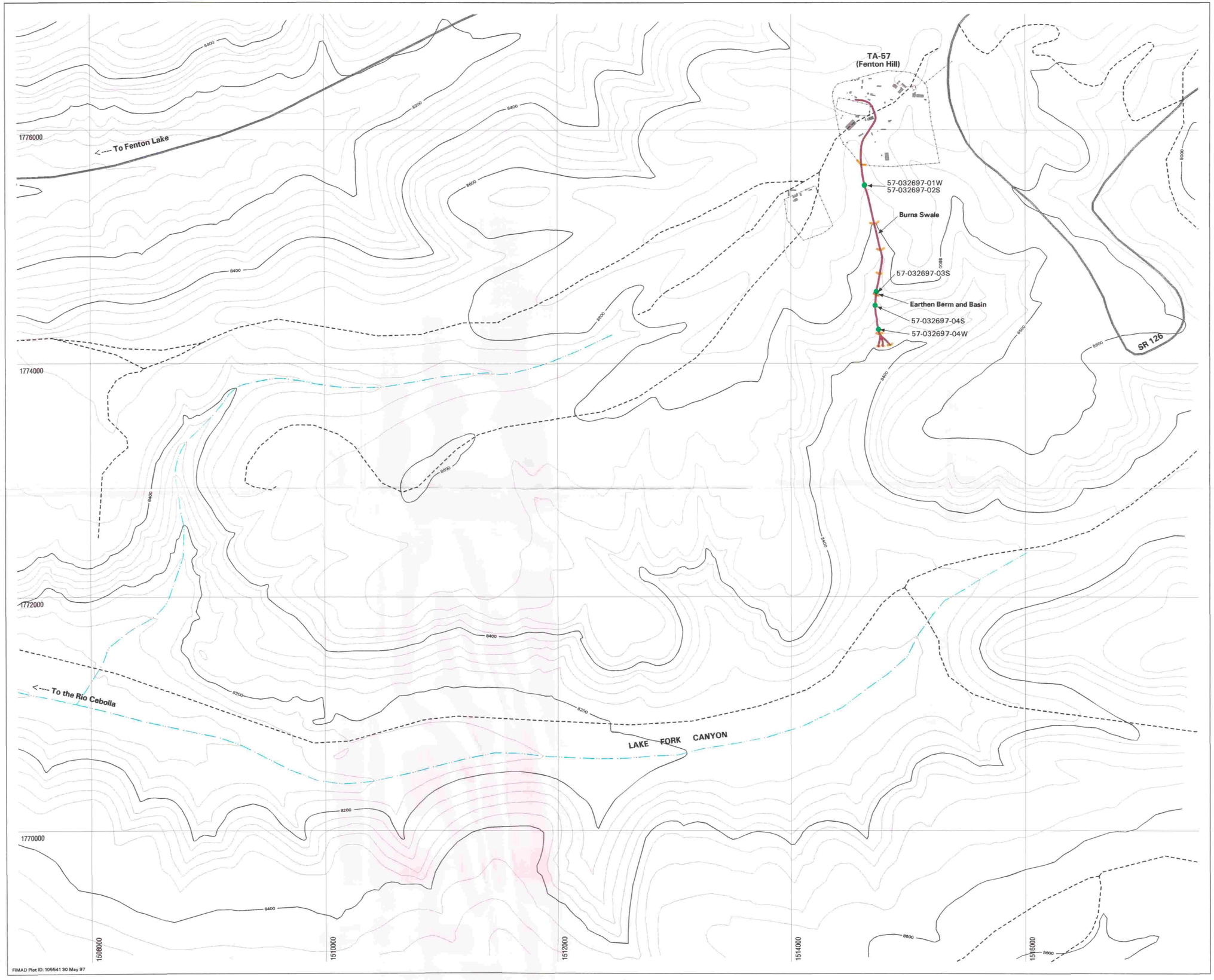
Looking Up Burns Swale at HDF

RECEIVED

SEP 30 1999

Environmental Bureau
Oil Conservation Division

MAP 1.0. Fenton Hill (TA-57) Hot Dry Rock Geothermal Facility Sampling Plan



- Drainage
- Earth Berm
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Spill Location
- Structure
- Sample Location

Table 1.0: Sampling Plan for Fenton Hill Spill Site

Sample ID	Sample Matrix	Analytes
57-032697-01W	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se
57-032697-02S	solid	Total Metals (2,3) and TCLP metals
57-032697-03S	solid	Total Metals (2,3) and TCLP metals
57-032697-04S	solid	Total Metals (2,3) and TCLP metals
57-032697-04W	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Co, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese

FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY
EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)
LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones
Date: May 30, 1997 FIMAD Plot ID: 105541

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000
Contour interval: 40 ft

0 122 244 366 488
METERS
0 400 800 1200 1600
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1996. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

FIMAD Plot ID: 105541 30 May 97

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: June 7, 1999
In Reply Refer To: ESH-18/WQ&H:99-0209
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Roger Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals & Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: MECHANICAL INTEGRITY TEST, FENTON HILL GEOTHERMAL FACILITY, GROUND WATER DISCHARGE PLAN GW-031

Dear Mr. Anderson:

In your May 10, 1999, letter you conditionally approved the Laboratory's request for a minor modification to the existing ground water discharge plan (GW-031) for the Fenton Hill Geothermal Facility. Approval was conditioned upon the successful completion of a mechanical integrity test for the eight inch buried cast iron pipeline used to convey wastewater from the Milagro Project's five million gallon (MG) pond and water treatment operations to the one million gallon (MG) service pond.

On June 1, 1999, the Laboratory successfully completed the mechanical integrity test. A 20.0 psi test pressure was applied to the line at 15:30 on June 1, 1999, using the submersible pump in the domestic water well. The line was isolated by closing the block valve at Bldg.41, the pump house at the Milagro site. A high accuracy 0-100 psi Heise Gauge was installed downstream of the block valve and used for pressure measurement. At 17:00 the measured pressure remained 20.0 psi. The test successfully demonstrated the integrity of the buried pipeline.

Please contact Bob Beers of my staff at 667-7969 if you have questions or concerns regarding these test results.

Sincerely,

Steven Rae
Group Leader
Water Quality and Hydrology Group

SR:RB/rj

Cy: W. Price, OCD, Santa Fe, New Mexico
J. Peterson, District Ranger, Jemez Springs, New Mexico
J. Davis, NMED/SWQB, Santa Fe, New Mexico
S. Yanicak, NMED DOE/OB, Santa Fe, New Mexico
T. Gunderson, DLD-OPS, MS A100
J. Vozella, DOE/LAAO, MS A316
B. Enz, DOE/LAAO, MS A316
J. Albright, EES-4, MS D443
D. Thomas, EES-DO, MS P946
J. Thomson, EES-4/CON, MS D443
G. Sinnis, P-23, MS H803
B. Beers, ESH-18, MS K497
M. Saladen, ESH-18, MS K497
WQ&H File, MS K497
CIC-10, MS A150

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: May 4, 1999
In Reply Refer To: ESH-18/WQ&H:99-0158
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Wayne Price
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: BURNS SWALE SPILL, REQUEST FOR NO FURTHER ACTION

Dear Mr. Price:

On September 10, 1998, Mr. Roger C. Anderson, Environmental Bureau Chief, Oil Conservation Division (OCD), recommended that Los Alamos National Laboratory (Laboratory) conduct post-cleanup sampling at the Burns Swale spill site in order to further characterize the site and assess the effectiveness of the Laboratory's cleanup efforts (personal communication). On September 14, 1998, the Laboratory collected two five-point composite samples from a detention basin in Burns Swale. On December 14, 1998, the Laboratory submitted to your agency the analytical results from this sampling along with a detailed discussion of the findings (ESH-18/WQ&H:98-0388). Based upon the information submitted, the Laboratory requests that the cleanup of the Burns Swale spill be accepted as complete by the OCD and find that no further action be required.

Please contact me at 667-7969 if you have questions about the cleanup effort.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mm

Cy: J. Peterson, District Ranger, Jemez Springs, New Mexico
R. Anderson, OCD, Santa Fe, New Mexico
J. Davis, NMED/SWQB, Santa Fe, New Mexico
T. Rust, CST-7/ER, MS M992
T. Gunderson, DLD-OPS, MS A100
J. Vozella, DOE/LAAO, MS A316
S. Yanicak, NMED DOE/OB, MS J993
D. Thomas, EES-DO, MS C305
J. Thomson, EES-4/CON, MS D443
S. Rae, ESH-18, MS K497
M. Saladen, ESH-18, MS K497
WQ&H File, MS K497
CIC-10, MS A150

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

May 10, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z 559 573 595

Mr. Steven Rae
Los Alamos National Laboratory
MS K497
Los Alamos, NM 87545

Subject: Minor Modification of Ground Water Discharge Plan GW-031

Dear Mr. Rae:

The New Mexico Oil Conservation Division (NMOCD) is receipt of Los Alamos National Laboratory's (LANL) letter dated July 20, 1998 requesting a minor modification to the existing discharge plan GW-031. The NMOCD hereby approves of the minor modification subject to the following conditions:

1. All waste will be disposed of at an OCD approved facility.

2. The 8" (inch) buried cast iron pipe using to convey the wastewater from the 5 (mmgal) pond to the 1 (mmgal) pond shall be tested to demonstrate mechanical integrity at present and then every 5 years thereafter, or prior to discharge plan renewal. Permittees may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing. **LANL shall perform this mechanical integrity test and submit the results by June 15, 1999.**

Please be advised that NMOCD approval of this minor modification does not relieve LANL of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve LANL of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions, please contact Wayne Price of my staff at (505-827-7155). On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

Roger Anderson
Environmental Bureau Chief

xc: Roy Johnson

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

Jennifer A. Salisbury
CABINET SECRETARY

Oil Conservation Div.
Environmental Bureau
2040 S. Pacheco
Santa Fe, NM 87505

Field Inspection Report

Time: 1:30pm-3:30pm
Date: 4/21/99

Re: **Site/Location:** Los Alamos NL Fenton Hill Geothermal Site GW-031

Subject: Site Inspection

Originating Party: Wayne Price-NMOCD

Other Parties: Bob Beers, Jim Thomson- LANL

Findings: Toured Facility: One Geothermal well #(EE2A) is still active with casing pressure of 165 psig noted, there are two lined ponds with leak detection, the 1mm gal pond near Well #(EE2A) and the Milagro 5mm gal pond presently being used as a Cosmic ray observatory. Reject & filter water presently is being discharged via an underground line from the Milagro pond site to the 1mm gal pond where it is evaporated.

Toured Burns swell spill area. Drainage area has no visual evidence of contamination and there appreas to be sustained native plant growth.

Toured the two landfarm application areas, took pictures. These landfarm sites have no active discharges but are being monitored. The Milagro application #1 located SW of the site was geothermal & fresh water discharge out of the 5 mm gal pond. The second application located north & west of the geothermal well area was treated water discarded into a wooded area, some pipe remains.

According to LANL personnel, groundwater is at a depth of approximately 400 feet.

The geothermal site is in a scaled down mode but still active.

Photos Taken: Yes- Sony file O/Envr....pic cam album called Los Alamos

CC: Roy Johnson

wp file

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: January 22, 1999
In Reply Refer To: ESH-18/WQ&H:99-0024
Mail Stop: K497
Telephone: (505) 665-1859

Ms. Lori Wrotenbery, Director
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: GROUND WATER DISCHARGE PLAN (GW-31) ANNUAL REPORT FOR THE FENTON HILL GEOTHERMAL FACILITY, 1998

Dear Ms. Wrotenbery:

This letter is being submitted as Los Alamos National Laboratory's Ground Water Discharge Plan (GW-31) Annual Report for the Fenton Hill Geothermal Facility (facility) for CY1998.

The following is a summary of the relevant information for 1998.

1. No water was injected into EE2 in 1998 (It should be noted that EE2 is the only remaining geothermal well. All other geothermal wells were plugged and abandoned in 1996).

2. No plugging and abandonment (P&A) activities were conducted during 1998.

3. No decommissioning activities were conducted at the facility during 1998.

4. Beginning in May 1998, experiments using microborehole drilling techniques were conducted at the facility. A description of the microborehole drilling project was provided to your agency in the Laboratory's April 6, 1998, letter (ESH-18/WQ&H:98-0118) to Mr. Mark Ashley (OCD).

Please call Bob Beers of my staff at (505) 667-7969 if you have any questions concerning this information.

Sincerely,

Steven R. Rae
Group Leader
Water Quality and Hydrology Group

BB:SR/md

Cy: J. Peterson, District Ranger, Jemez Springs, New Mexico
J. Vozella, DOE/LAAO, MS A316
D. Erickson, ESH-DO, MS K491
T. Gunderson, DIR, MS A100
D. Thomas, P-FM, MS D459
J. Albright, EES-4, MS D443
J. Thomson, EES-4, MS D4433
B. Beers, ESH-18, MS K497
WQ&H File, MS K497
CIC-10, MS A150

wp Sect

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: January 4, 1999
In Reply Refer To: ESH-18/WQ&H:98-0444
Mail Stop: K497
Telephone: (505) 667 - 7969

Mr. Roger C. Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals & Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: MILAGRO PROJECT LAND APPLICATION SITE, POST-APPLICATION SOIL SAMPLING FOR 1998

Dear Mr. Anderson:

On April 10, 1995, your Division conditionally approved Los Alamos National Laboratory's Notice of Intent to Discharge (NOI) for the land application of water from the Milagro Project's 5-million gallon pond at Fenton Hill. Approval of the NOI was conditioned upon the Laboratory collecting down-gradient soil samples annually for five years following land application activities. From 1995-1997, the Laboratory conducted three rounds of soil sampling at the Fenton Hill land application site and down-gradient locations: (1) post-application 1995; (2) post-application 1996; and (3) post-application 1997.

On November 26, 1997, the Laboratory requested a waiver from future sampling for the eleven metals (Ag, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, and Hg) which post-application monitoring demonstrated were not contaminants of concern. Arsenic, however, was excluded from the waiver list due to its presence at concentrations greater than background at the two sampling locations within the application site (See Table 1.0). The Laboratory's waiver request was approved by your Division on April 23, 1998. As a result, the post-application samples collected in 1998 were analyzed for arsenic only.

A copy of the analytical report for post-application sampling in 1998 has been enclosed. In addition, I have enclosed a table (Table 1.0) which summarizes all analytical results for arsenic. In 1998, all of the down-gradient surface and sub-surface sampling locations (SS1, SBS1, SS2, SBS2, SS3, and SBS3) continued to show arsenic concentrations equivalent to pre-application or background conditions (See Table 1.0 and the enclosed map). These stable arsenic concentrations strongly indicate that the arsenic is remaining within the application site and is not migrating down-gradient into the watercourse. Also in 1998, the two surface sampling locations within the application site (SS4, SS5) showed a reduction in arsenic concentrations from the 1997 results (See Table 1.0). The sub-surface sampling locations within the application site (SBS4, SBS5) did not show any change from the four previous sampling rounds (See Table 1.0).

The Laboratory will repeat arsenic sampling at the applicational site and down gradient locations in 1999. It is my understanding that the sampling conducted in 1999 will represent the fifth and final round of sampling required by the April 10, 1995, NOI.

Please contact me at 667-7969 if you have any questions regarding the enclosed analytical results.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mm

Enclosures: a/s

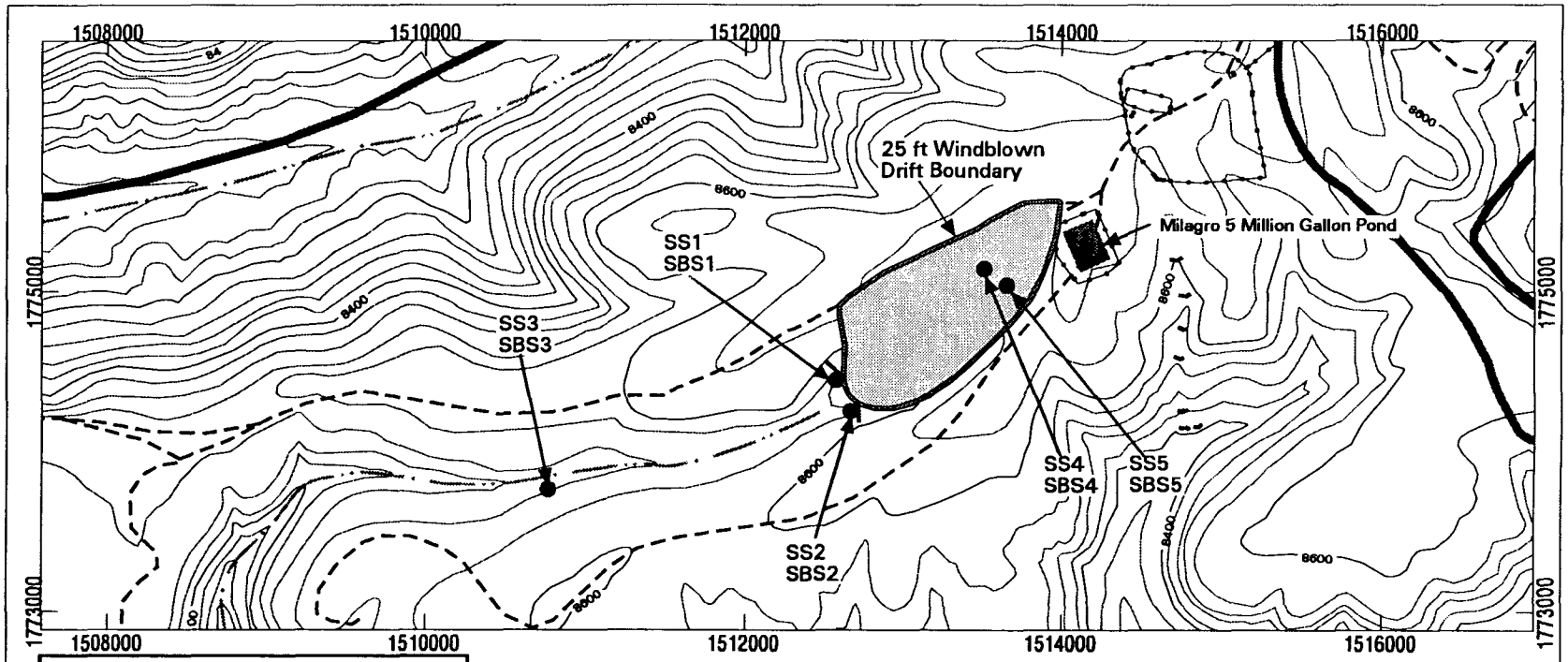
Cy: J. Peterson, District Ranger, Santa Fe National Forest, Jemez Springs, w/enc.
J. Davis, NMED SWQB, Santa Fe, New Mexico, w/enc.
S. Rae, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
B. Koch, DOE/LAAAO, w/enc., MS A316
G. Sinnis, P-23, w/enc., MS H803
D. Thomas, P-FM, MS D459
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Pre- and Post-Land Application Monitoring
Arsenic Concentrations in Soil (ppm)

TABLE 1.

Sample Location	Pre-Application 5/17/95	Post-Application 10/24/95	Post-Application 10/18/96	Post-Application 10/09/97	Post-Application 10/14/98
SS-1: soil, surface	3.	3.	<3.	<3.	<3.0
SBS-1: soil, sub-surface	1.	2.	<3.	<3.	<3.0
SS-2: soil, surface	3.	3.	<3.	<3.	<3.0
SBS-2: soil, sub-surface	2.	3.	<3.	<3.	<3.0
SS-3: soil, surface	2.	3.	<3.	<3.	<3.0
SBS-3: soil, sub-surface	2.	4.	<3.	<3.	<3.0
SS-4: soil, surface	3.	24.	3.9	8.6	3.4
SBS-4: soil, sub-surface	4.	4.	<3.	<3.	<3.0
SS-5: soil, surface	2.	18.	<3.	10.7*	4.3
SBS-5: soil, sub-surface	2.	3.	<3.	<3.	<3.0

* A duplicate sample at this location showed an arsenic concentration of 8.7 ppm.



Fenton Hill (TA-57)
Milagro Project Sampling Plan

- Application Area (22.327 acres)
- Application Area Buffer (25 ft)
- Drainage
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Sample Location

Contour Interval: 40 ft

0 500 1000 1500
FEET

MILAGRO PROJECT SAMPLING PLAN

ANALYTE: Arsenic

OBJECTIVE	TYPE	LOCATION
Post-Application Sampling		
soil-application area	soil: surface	SS4, SS5
soil-application area	soil: sub-surface	SBS4, SBS5
soil-adjacent down gradient	soil: surface	SS2, SS1
soil-adjacent down gradient	soil: sub-surface	SBS2, SBS1
soil-distant down gradient	soil: surface	SS3
soil-distant down gradient	soil: sub-surface	SBS3

EES-5 GIS Team
Los Alamos National Laboratory
Los Alamos, New Mexico

1983 North American Datum
Projection and Grid Ticks:
New Mexico State Plane Coordinate System,
Central Zone (Transverse Mercator)

Notice: Information on this map is provisional and has not been checked for accuracy.

Produced by Marcia Jones

FIMAD G107274 17 Dec 98

ASSAIGAI ANALYTICAL LABORATORIES, INC.
7300 Jefferson, NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820
127 Eastgate Drive, 212-C • Los Alamos, New Mexico 87544 • (505) 662-2558

* explanation of codes	
B	analyte detected in Method Blank
E	result is estimated
H	analyzed out of hold time
N	tentatively identified compound
S	subcontracted
1-9	see footnote

LOS ALAMOS NATIONAL LABS
attn: **BOB BEERS**
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9810145 MILAGRO PROJ.8K23E30300030000**

William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Client Sample ID: ***SS5.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 09:40:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-01A	M98774	7440-38-2	Arsenic	4.3	mg / Kg	1	3		MW.1998.1487-19	11/16/98

Client Sample ID: ***SBS5.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 09:45:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-02A	M98774	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1487-20	11/16/98

Client Sample ID: ***SS4.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 09:50:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-03A	M98774	7440-38-2	Arsenic	3.4	mg / Kg	1	3		MW.1998.1487-21	11/16/98

ACCREDITED

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9810145 MILAGRO PROJ.8K23E30300030000**

Client Sample ID: ***SBS4.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 10:00:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-04A	M98774	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1487-22	11/16/98

Client Sample ID: ***SS1.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 10:25:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-05A	M98774	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1487-23	11/16/98

Client Sample ID: ***SBS1.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 10:50:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-06A	M98774	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1487-24	11/16/98

Client Sample ID: ***SS1.98-DUP*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 10:25:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-07A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-38	11/10/98

Client Sample ID: ***SBS1.98-DUP*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 10:50:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-08A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-39	11/10/98

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9810145 MILAGRO PROJ.8K23E30300030000**

Client Sample ID: ***SS2.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 11:05:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-09A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-40	11/10/98

Client Sample ID: ***SBS2.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 11:20:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-10A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-41	11/10/98

Client Sample ID: ***SS3.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 11:40:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-11A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-42	11/10/98

Client Sample ID: ***SBS3.98*** Sample Matrix: ***SOIL*** Sample Collected: ***10/14/98 11:45:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9810145-12A	M98817	7440-38-2	Arsenic	ND	mg / Kg	1	3		MW.1998.1460-43	11/10/98

**** Sample specific analytical Detection Limit is determined by multiplying the sample Dilution Factor by the listed method Detection Limit. ****

**** Results relate only to the items tested. ****

Quality Control Summary

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9810145** **MILAGRO PROJ.8K23E30300030000**

* explanation of codes	
D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

QC Type: LCS: Lab Control Spike — QC Matrix: SOLID

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-002	Arsenic	102	(%) Recov		MW.1998.1426-38	11/01/98
M98817	M98817-002	Arsenic	93	(%) Recov		MW.1998.1460-27	11/10/98

QC Type: LCSD: Lab Control Spike Duplicate Accuracy — QC Matrix: SOLID

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-003	Arsenic	100	(%) Recov		MW.1998.1426-39	11/01/98
M98817	M98817-003	Arsenic	96	(%) Recov		MW.1998.1460-28	11/10/98

QC Type: LCSD: Lab Control Spike Duplicate Precision — QC Matrix: SOLID

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-003	Arsenic	2	(%) RPD		MW.1998.1426-39	11/01/98
M98817	M98817-003	Arsenic	3	(%) RPD		MW.1998.1460-28	11/10/98

QC Type: MB: Method Blank — QC Matrix: SOLID

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-001	Arsenic	ND	mg / Kg		MW.1998.1426-37	11/01/98
M98817	M98817-001	Arsenic	ND	mg / Kg		MW.1998.1460-26	11/10/98

QC Type: MS: Matrix Spike — QC Matrix: SOLID

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-005	Arsenic	103	(%) Recov		MW.1998.1426-41	11/01/98
M98817	M98817-005	Arsenic	73	(%) Recov		MW.1998.1460-30	11/10/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9810145 MILAGRO PROJ.8K23E30300030000**

* explanation of codes	
D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

QC Type **MSD: Matrix Spike Duplicate Accuracy** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-006	Arsenic	105	(%) Recov		MW.1998.1426-42	11/01/98
M98817	M98817-006	Arsenic	76	(%) Recov		MW.1998.1460-31	11/10/98

QC Type **MSD: Matrix Spike Duplicate Precision** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98774	M98774-006	Arsenic	1	(%) RPD		MW.1998.1426-42	11/01/98
M98817	M98817-006	Arsenic	4	(%) RPD		MW.1998.1460-31	11/10/98

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: December 14, 1998
In Reply Refer To: ESH-18/WQ&H:98-0388
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Roger C. Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

DEC 16

SUBJECT: POST-CLEANUP SAMPLING OF BURNS SWALE SPILL SITE, FENTON HILL

Dear Mr. Anderson:

During our September 10, 1998, meeting at your Santa Fe office, we discussed the status of the November 22, 1996, spill at Fenton Hill's Burns Swale. You recommended that the Laboratory collect a post-cleanup soil sample from Burns Swale as the final step towards closing out the spill. Additionally, you recommended that the sample be a five-point composite sample from the detention basin in Burns Swale. The detention basin was selected because the majority of the spilled material was deposited at that location.

On September 14, 1998, the Laboratory collected a five-point composite sample, and a duplicate, from the surface soils/sediments in the detention basin. These samples were submitted to Assaigai Analytical, Inc. for total metals analysis. Attachment 1 is a copy of the analytical report submitted by Assaigai for this work.

Attachment 2 is a table which presents the results of the September 14, 1998, post-cleanup sampling (Columns #1 and #2) in addition to the following:

1. Columns #3, #4, and #5: Background values from 1995 sampling at the Milagro Project's land application site (adjacent to Burns Swale) prior to the commencement of land application activities;

2. Column #6: Background values which the Laboratory's Environmental Restoration (ER) Project has established for evaluating project sites during 1998;

3. Column #7: Pre-cleanup analytical results from the March 26, 1997, sampling at the detention basin in Burns Swale;

4. Column #8: Analytical results from the 1994 ER Project sampling at Burns Swale. This sampling was conducted as part of the ER Project's investigation and characterization of potential release sites (PRSs) at the Laboratory. Sampling was conducted upgradient of the detention basin near the facility's perimeter fence; and

5. Column #9: Preliminary Remediation Goals (PRGs) are published by Region 9 of the EPA as a tool for evaluating and cleaning up contaminated site. The PRGs presented here were developed for a residential exposure scenario. The residential exposure scenario represents the most conservative approach to evaluating the potential health risks of a spill. Alternately, the less conservative recreational or industrial exposure scenarios could be used.

Evaluation of 1998 Post-Cleanup Analytical Results

The following comparisons have been made between the 1998 post-cleanup analytical results (Columns #1 and #2) and the other values presented in Attachment 2:

1. **Comparison with Background Values.** Post-cleanup concentrations of arsenic (As), barium (Ba), and antimony (Sb) (Columns #1 and #2) are greater than the background values determined by the 1995 Milagro Project sampling (Columns #3, #4, and #5) and those established by the ER Project (Column #6).

2. **Comparison with Pre-Cleanup Results.** Post-cleanup concentrations of arsenic and barium (Columns #1 and #2) are less than the 1996 pre-cleanup concentrations (Column #7) found in the detention basin before cleanup of the spilled material.

   No pre-cleanup sampling was conducted for antimony since it is not included under the NM WQCC Regulations.

3. **Comparison with 1994 ER Project Sampling Results.** Post-cleanup concentrations of barium (1,480/1,420 mg/Kg) are greater than the maximum barium concentrations found during the 1994 ER Project sampling (525 mg/Kg) in Burns Swale.

   Post-cleanup concentrations of arsenic (18.8/16.5 mg/Kg) are less than the maximum arsenic concentrations found during the 1994 ER Project sampling (30 mg/Kg).

   It cannot be determined if post-cleanup concentrations of antimony (<1.5/1.6 mg/Kg) are greater than the 1994 ER Project results (<5.3 mg/Kg) due to the difference in laboratory detection limits.

4. **Comparison with RCRA TCLP Limits.** Dividing the post-cleanup concentrations of arsenic and barium (Columns #1 and #2) by 20 (the 20X rule is used to estimate TCLP concentrations) shows that neither arsenic nor barium are present at hazardous concentrations (RCRA TCLP limits: As = 5 ppm, Ba = 100 ppm). No RCRA TCLP limit exists for antimony.

5. Comparison with EPA Region 9 Preliminary Remediation Guidelines (PRGs). Post-cleanup concentrations of barium (1,480/1,420 mg/Kg) are less than the PRG for barium of 5200 mg/Kg established by the EPA (Column #9) for residential soils.

Post-cleanup concentrations of antimony (<1.5/1.6 mg/Kg) are less than the PRG for antimony of 30 mg/Kg established by the EPA (Column #9) for residential soils.

Post-cleanup concentrations of arsenic (18.8/16.5 mg/Kg) are greater than the residential soil, cancer endpoint, PRG of 0.38 mg/Kg, but are less than the residential soil, noncancer endpoint, of 22.0 mg/Kg established by the EPA (Column #9).

It should be noted that both the Milagro Project and ER Project background values for arsenic exceed the EPA PRG of 0.38 mg/Kg. The EPA has addressed the problem of background values greater than PRGs in the following guidance document published on their web site (http://www.epa.gov/region09/waste/sfund/prg/intro.htm).

SECTION 3.2 Background Levels Evaluation

Generally EPA does not clean up below natural background. In some cases, the predictive risk-based models generate PRG levels that lie within or even below typical background. If natural background concentrations are higher than the risk-based PRGs, an adjustment of the PRG is probably needed. Exhibit 3-2 presents' summary statistics for selected elements in soils that have background levels that may exceed risk-based PRGs. An illustrative example of this is naturally occurring arsenic in soils which frequently is higher than the risk-based PRG set at a one-in-one-million cancer risk (PRG for residential soils is 0.38 mg/kg). After considering background concentrations in a local area, EPA Region 9 has at times used the non-cancer PRG (22 mg/kg) to evaluate sites recognizing that this value tends to be above background levels yet still falls within the range of soil concentrations (0.38-38 mg/kg) that equate to EPA's "permissible" cancer risk range (10E-6 to 10E-4).

EXHIBIT 3-2
BACKGROUND CONCENTRATIONS OF SELECTED ELEMENTS IN SOILS

TRACE	U.S. STUDY DATA[1]			CALIFORNIA DATA[2]		
ELEMENT	Range	GeoMean	ArMean	Range	GeoMean	ArMean
Arsenic	<.1-97	5.2 mg/Kg	7.2 mg/Kg	0.59-11	2.75 mg/Kg	3.54 mg/Kg
Beryllium	<1-15	0.63 "	0.92 "	0.10-2.7	1.14 "	1.28 "
Cadmium	<1-10	--	<1	0.05-1.7	0.26	0.36
Chromium	1-2000	37	54	23-1579	76.25	122.08
Nickel	<5-700	13	19	9.0-509	35.75	56.60

[1] Shacklette and Hansford, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United Stated", USGS Professional Paper 1270, 1984.

[2] Bradford et. al, "Background Concentrations of Trace Metals and Major Elements in California Soils", Kearney Foundation Special Report, UC-Riverside and CAL-EPA DTSC, March 1996.

Site Assessment

As recommended by your agency's publication, *Guidelines for Remediation of Leaks, Spills, and Releases* (New Mexico Oil Conservation Division, August 13, 1993), a site assessment was conducted for the Burns Swale spill site. The following general site characteristics were determined.

1. *Depth to Ground Water*: Approximately 450 feet.
2. *Wellhead Protection Area*: The distance to FH-1, the facility's water supply well, is approximately 500 feet from the upper reach of Burns Swale and approximately 1400 feet from the detention basin.
3. *Distance to Nearest Surface Water Body:* It is approximately 2500 feet to Lake Fork Canyon.

In closing, the post-cleanup sampling in Burns Swale identified the following:

- Arsenic, barium, and antimony are potential contaminants of concern because they were detected at concentrations greater than background;
- None of these contaminants are present at concentrations greater than RCRA TCLP limits;
- Post-cleanup concentrations indicate that the cleanup conducted in June, 1997, was effective at reducing arsenic concentrations by 67 percent and barium concentrations by 89 percent;
- Post-cleanup concentrations of barium and antimony are greater than background values but neither exceeds the residential PRGs established by the EPA; and
- Post-cleanup arsenic concentrations are greater than background values and the residential soil, cancer endpoint, PRG. The EPA has indicated, however, that when arsenic background values are greater than the PRG, as occurs at this site, then some adjustment of the PRG is probably needed. When such an adjustment is made, the post-cleanup arsenic concentrations (18.8/16.5 mg/Kg) fall within the range of soil concentrations (0.38-38 mg/Kg) that equate to EPAs permissible cancer risk range of 10E-6 to 10E-4. Arsenic concentrations of 18.8/16.5 mg/Kg equate to a cancer risk of approximately 5E-5.

Please call me at 667-7969 if you have questions or require additional information on this matter.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mm

Enclosures: a/s

Cy: J. Peterson, District Ranger, Jemez Springs, New Mexico, w/enc.
J. Davis, NMED/SWQB, Santa Fe, New Mexico, w/enc.
D. Thomas, EES-DO, w/enc., MS D446
J. Thomson, EES-4/CON, w/enc., MS D443
B. Koch, DOE/LAAO, w/enc., MS A316
T. Rust, CST-7/ER, w/enc., MS M992
B. Kopp, ESH-19/ER, w/enc., MS M992
S. Rae, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
H. Decker, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Attachment 1

Analytical Report

Soil Sampling at Fenton Hill-Burns Swale Spill Site

Assaigai Analytical Laboratories, Inc

Sample Collection Date: September 14, 1998

Sample Type: Soils/Sediments

Sample ID Nos.: TA57.091498, TA57.091498A

ASSAIGAI ANALYTICAL LABORATORIES, INC.

7300 Jefferson, NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820
127 Eastgate Drive, 212-C • Los Alamos, New Mexico 87544 • (505) 662-2558

LOS ALAMOS NATIONAL LABS
attn: **BOB BEERS**
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

* explanation of codes	
B	analyte detected in Method Blank
E	result is estimated
H	analyzed out of hold time
N	tentatively identified compound
S	subcontracted
1-9	see footnote

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9809213 FENTON HILL-BURNS SWALE**

William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Client Sample ID: ***TA57.091498*** Sample Matrix: ***SOIL*** Sample Collected: ***09/14/98 13:50:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9809213-01A	M98681	7429-90-5	Aluminum	5250	mg / Kg	1	25		MW.1998.1325-66	10/07/98
	M98681	7440-36-0	Antimony	ND	mg / Kg	1	1.5		MW.1998.1325-66	
	M98681	7440-38-2	Arsenic	18.8	mg / Kg	1	3		MW.1998.1325-66	
	M98681	7440-39-3	Barium	1480	mg / Kg	1	0.5		MW.1998.1325-66	
	M98681	7440-41-7	Beryllium	0.52	mg / Kg	1	0.5		MW.1998.1325-66	
	M98681	7440-43-9	Cadmium	0.22	mg / Kg	1	0.2		MW.1998.1325-66	
	M98681	7440-70-2	Calcium	4930	mg / Kg	1	15		MW.1998.1325-66	
	M98681	7440-47-3	Chromium	4.3	mg / Kg	1	1	B	MW.1998.1325-66	
	M98681	7440-48-4	Cobalt	2.6	mg / Kg	1	0.5		MW.1998.1325-66	
	M98681	7440-50-8	Copper	9.4	mg / Kg	1	0.5		MW.1998.1325-66	
	M98681	7439-89-6	Iron	9600	mg / Kg	1	15		MW.1998.1325-66	
	M98681	7439-95-4	Magnesium	857	mg / Kg	1	10		MW.1998.1325-66	
	M98681	7439-96-5	Manganese	456	mg / Kg	1	0.25		MW.1998.1325-66	
	M98681	7440-02-0	Nickel	4.0	mg / Kg	1	2	B	MW.1998.1325-66	
	M98681	7440-09-7	Potassium	778	mg / Kg	1	10		MW.1998.1325-66	
	M98681	7782-49-2	Selenium	ND	mg / Kg	1	2.5		MW.1998.1325-66	
	M98681	7440-22-4	Silver	ND	mg / Kg	1	1		MW.1998.1325-66	
	M98681	7440-23-5	Sodium	131	mg / Kg	1	15	B	MW.1998.1325-66	
	M98681	7440-62-2	Vanadium	7.91	mg / Kg	1	0.15		MW.1998.1325-66	
	M98681	7440-66-6	Zinc	66.1	mg / Kg	1	5		MW.1998.1325-66	
			Test: SW846-7000 series AA-FL							
9809213-01A	M98681	7439-92-1	Lead	20.1	mg / Kg	1	5		MW.1998.1347-35	10/12/98

ACCREDITED

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9809213 FENTON HILL-BURNS SWALE**

			Test: SW846-7000 series AA-GF						
9809213-01A	M98759	7440-28-0	Thallium	ND	mg / Kg	1	0.1	MW.1998.1379-11	10/20/98
			Test: SW846-7471						
9809213-01A	M98732	7439-97-6	Mercury	ND	mg / Kg	1	0.15	MW.1998.1337-24	10/08/98

Client Sample ID ***TA57.091498A*** Sample Matrix ***SOIL*** Sample Collected ***09/14/98 13:55:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit	*	Sequence	Run Date
			Test: SW846-6010 ICP							
9809213-02A	M98681	7429-90-5	Aluminum	5550	mg / Kg	1	25		MW.1998.1325-67	10/07/98
	M98681	7440-36-0	Antimony	1.6	mg / Kg	1	1.5		MW.1998.1325-67	
	M98681	7440-38-2	Arsenic	16.5	mg / Kg	1	3		MW.1998.1325-67	
	M98681	7440-39-3	Barium	1420	mg / Kg	1	0.5		MW.1998.1325-67	
	M98681	7440-41-7	Beryllium	ND	mg / Kg	1	0.5		MW.1998.1325-67	
	M98681	7440-43-9	Cadmium	ND	mg / Kg	1	0.2		MW.1998.1325-67	
	M98681	7440-70-2	Calcium	4660	mg / Kg	1	15		MW.1998.1325-67	
	M98681	7440-47-3	Chromium	4.6	mg / Kg	1	1	B	MW.1998.1325-67	
	M98681	7440-48-4	Cobalt	2.5	mg / Kg	1	0.5		MW.1998.1325-67	
	M98681	7440-50-8	Copper	9.1	mg / Kg	1	0.5		MW.1998.1325-67	
	M98681	7439-89-6	Iron	8600	mg / Kg	1	15		MW.1998.1325-67	
	M98681	7439-95-4	Magnesium	860	mg / Kg	1	10		MW.1998.1325-67	
	M98681	7439-96-5	Manganese	366	mg / Kg	1	0.25		MW.1998.1325-67	
	M98681	7440-02-0	Nickel	5.1	mg / Kg	1	2	B	MW.1998.1325-67	
	M98681	7440-09-7	Potassium	783	mg / Kg	1	10		MW.1998.1325-67	
	M98681	7782-49-2	Selenium	ND	mg / Kg	1	2.5		MW.1998.1325-67	
	M98681	7440-22-4	Silver	ND	mg / Kg	1	1		MW.1998.1325-67	
	M98681	7440-23-5	Sodium	160	mg / Kg	1	15	B	MW.1998.1325-67	
	M98681	7440-62-2	Vanadium	7.50	mg / Kg	1	0.15		MW.1998.1325-67	
	M98681	7440-66-6	Zinc	60.8	mg / Kg	1	5		MW.1998.1325-67	
			Test: SW846-7000 series AA-FL							
9809213-02A	M98681	7439-92-1	Lead	20.8	mg / Kg	1	5		MW.1998.1347-36	10/12/98
			Test: SW846-7000 series AA-GF							
9809213-02A	M98759	7440-28-0	Thallium	ND	mg / Kg	1	0.1		MW.1998.1379-14	10/20/98
			Test: SW846-7471							
9809213-02A	M98732	7439-97-6	Mercury	ND	mg / Kg	1	0.15		MW.1998.1337-25	10/08/98

**** Sample specific analytical Detection Limit is determined by multiplying the sample Dilution Factor by the listed method Detection Limit. ****
**** Results relate only to the items tested. ****

Quality Control Summary

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9809213 FENTON HILL-BURNS SWALE**

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

QC Type **LCS: Lab Control Spike** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-002	Aluminum	97	(%) Recov		MW.1998.1325-41	10/07/98
	M98681-002	Antimony	97	(%) Recov		MW.1998.1325-41	
	M98681-002	Arsenic	95	(%) Recov		MW.1998.1325-41	
	M98681-002	Barium	95	(%) Recov		MW.1998.1325-41	
	M98681-002	Beryllium	96	(%) Recov		MW.1998.1325-41	
	M98681-002	Cadmium	100	(%) Recov		MW.1998.1325-41	
	M98681-002	Calcium	101	(%) Recov		MW.1998.1325-41	
	M98681-002	Chromium	98	(%) Recov		MW.1998.1325-41	
	M98681-002	Cobalt	97	(%) Recov		MW.1998.1325-41	
	M98681-002	Copper	98	(%) Recov		MW.1998.1325-41	
	M98681-002	Iron	100	(%) Recov		MW.1998.1325-41	
	M98681-002	Magnesium	102	(%) Recov		MW.1998.1325-41	
	M98681-002	Manganese	99	(%) Recov		MW.1998.1325-41	
	M98681-002	Nickel	98	(%) Recov		MW.1998.1325-41	
	M98681-002	Potassium	98	(%) Recov		MW.1998.1325-41	
	M98681-002	Selenium	103	(%) Recov		MW.1998.1325-41	
	M98681-002	Silver	97	(%) Recov		MW.1998.1325-41	
	M98681-002	Sodium	101	(%) Recov		MW.1998.1325-41	
	M98681-002	Vanadium	100	(%) Recov		MW.1998.1325-41	
	M98681-002	Zinc	98	(%) Recov		MW.1998.1325-41	
		Test: SW846-7000 series AA-FL					
M98681	M98681-002	Lead	102	(%) Recov		MW.1998.1347-9	10/12/98
		Test: SW846-7000 series AA-GF					
M98759	M98759-002	Thallium	90	(%) Recov		MW.1998.1379-9	10/20/98
		Test: SW846-7471					
M98732	M98732-002	Mercury	111	(%) Recov		MW.1998.1337-9	10/08/98

QC Type **LCSD: Lab Control Spike Duplicate Accuracy** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-003	Aluminum	97	(%) Recov		MW.1998.1325-42	10/07/98
	M98681-003	Antimony	97	(%) Recov		MW.1998.1325-42	
	M98681-003	Arsenic	96	(%) Recov		MW.1998.1325-42	
	M98681-003	Barium	95	(%) Recov		MW.1998.1325-42	
	M98681-003	Beryllium	96	(%) Recov		MW.1998.1325-42	
	M98681-003	Cadmium	101	(%) Recov		MW.1998.1325-42	
	M98681-003	Calcium	102	(%) Recov		MW.1998.1325-42	
	M98681-003	Chromium	98	(%) Recov		MW.1998.1325-42	

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

M98681	M98681-003	Cobalt	97	(%) Recov	MW.1998.1325-42	10/07/98
	M98681-003	Copper	98	(%) Recov	MW.1998.1325-42	
	M98681-003	Iron	101	(%) Recov	MW.1998.1325-42	
	M98681-003	Magnesium	102	(%) Recov	MW.1998.1325-42	
	M98681-003	Manganese	100	(%) Recov	MW.1998.1325-42	
	M98681-003	Nickel	98	(%) Recov	MW.1998.1325-42	
	M98681-003	Potassium	98	(%) Recov	MW.1998.1325-42	
	M98681-003	Selenium	102	(%) Recov	MW.1998.1325-42	
	M98681-003	Silver	96	(%) Recov	MW.1998.1325-42	
	M98681-003	Sodium	102	(%) Recov	MW.1998.1325-42	
	M98681-003	Vanadium	100	(%) Recov	MW.1998.1325-42	
	M98681-003	Zinc	99	(%) Recov	MW.1998.1325-42	
		Test: SW846-7000 series AA-FL				
M98681	M98681-003	Lead	105	(%) Recov	MW.1998.1347-10	10/12/98
		Test: SW846-7000 series AA-GF				
M98759	M98759-003	Thallium	88	(%) Recov	MW.1998.1379-10	10/20/98
		Test: SW846-7471				
M98732	M98732-003	Mercury	115	(%) Recov	MW.1998.1337-10	10/08/98

QC Type **LCSD: Lab Control Spike Duplicate Precision** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-003	Aluminum	< 1	(%) RPD		MW.1998.1325-42	10/07/98
	M98681-003	Antimony	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Arsenic	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Barium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Beryllium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Cadmium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Calcium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Chromium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Cobalt	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Copper	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Iron	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Magnesium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Manganese	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Nickel	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Potassium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Selenium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Silver	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Sodium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Vanadium	< 1	(%) RPD		MW.1998.1325-42	
	M98681-003	Zinc	< 1	(%) RPD		MW.1998.1325-42	
		Test: SW846-7000 series AA-FL					
M98681	M98681-003	Lead	2	(%) RPD		MW.1998.1347-10	10/12/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9809213 FENTON HILL-BURNS SWALE**

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

		Test: SW846-7000 series AA-GF				
M98759	M98759-003	Thallium	3	(%) RPD	MW.1998.1379-10	10/20/98
		Test: SW846-7471				
M98732	M98732-003	Mercury	3	(%) RPD	MW.1998.1337-10	10/08/98

QC Type **MB: Method Blank** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-001	Aluminum	ND	mg / Kg		MW.1998.1325-40	10/07/98
	M98681-001	Antimony	2.2	mg / Kg		MW.1998.1325-40	
	M98681-021	Antimony	2.0	mg / Kg		MW.1998.1325-64	
	M98681-001	Arsenic	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Barium	2.2	mg / Kg		MW.1998.1325-40	
	M98681-001	Beryllium	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Cadmium	0.96	mg / Kg		MW.1998.1325-40	
	M98681-001	Calcium	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Chromium	ND	mg / Kg		MW.1998.1325-40	
	M98681-021	Chromium	1.0	mg / Kg		MW.1998.1325-64	
	M98681-001	Cobalt	ND	mg / Kg		MW.1998.1325-40	
	M98681-021	Cobalt	0.5	mg / Kg		MW.1998.1325-64	
	M98681-001	Copper	38.0	mg / Kg		MW.1998.1325-40	
	M98681-021	Copper	0.6	mg / Kg		MW.1998.1325-64	
	M98681-001	Iron	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Magnesium	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Manganese	0.35	mg / Kg		MW.1998.1325-40	
	M98681-021	Manganese	0.63	mg / Kg		MW.1998.1325-64	
	M98681-001	Nickel	2.4	mg / Kg		MW.1998.1325-40	
	M98681-021	Nickel	ND	mg / Kg		MW.1998.1332-17	10/08/98
	M98681-001	Potassium	18.1	mg / Kg		MW.1998.1325-40	10/07/98
	M98681-001	Selenium	ND	mg / Kg		MW.1998.1325-40	
	M98681-001	Silver	ND	mg / Kg		MW.1998.1325-40	
	M98681-021	Silver	1.2	mg / Kg		MW.1998.1325-64	
	M98681-001	Sodium	53.3	mg / Kg		MW.1998.1325-40	
	M98681-021	Sodium	79.8	mg / Kg		MW.1998.1325-64	
	M98681-001	Vanadium	ND	mg / Kg		MW.1998.1325-40	
	M98681-021	Vanadium	0.26	mg / Kg		MW.1998.1325-64	
	M98681-001	Zinc	49.4	mg / Kg		MW.1998.1325-40	
		Test: SW846-7000 series AA-FL					
M98681	M98681-001	Lead	ND	mg / Kg		MW.1998.1347-8	10/12/98
		Test: SW846-7000 series AA-GF					
M98759	M98759-001	Thallium	ND	mg / Kg		MW.1998.1379-8	10/20/98
		Test: SW846-7471					
M98732	M98732-001	Mercury	ND	mg / Kg		MW.1998.1337-8	10/08/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9809213 FENTON HILL-BURNS SWALE**

* explanation of codes	
D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

QC Type **MS: Matrix Spike** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-006	Aluminum	1470	(%) Recov		MW.1998.1325-45	10/07/98
	M98681-006	Antimony	20	(%) Recov		MW.1998.1325-45	
	M98681-006	Arsenic	86	(%) Recov		MW.1998.1325-45	
	M98681-006	Barium	101	(%) Recov		MW.1998.1325-45	
	M98681-006	Beryllium	90	(%) Recov		MW.1998.1325-45	
	M98681-006	Cadmium	93	(%) Recov		MW.1998.1325-45	
	M98681-006	Calcium	6280	(%) Recov		MW.1998.1325-45	
	M98681-006	Chromium	90	(%) Recov		MW.1998.1325-45	
	M98681-006	Cobalt	88	(%) Recov		MW.1998.1325-45	
	M98681-006	Copper	95	(%) Recov		MW.1998.1325-45	
	M98681-006	Iron	2180	(%) Recov		MW.1998.1325-45	
	M98681-006	Magnesium	328	(%) Recov		MW.1998.1325-45	
	M98681-006	Manganese	167	(%) Recov		MW.1998.1325-45	
	M98681-006	Nickel	86	(%) Recov		MW.1998.1325-45	
	M98681-006	Potassium	274	(%) Recov		MW.1998.1325-45	
	M98681-006	Selenium	98	(%) Recov		MW.1998.1325-45	
	M98681-006	Silver	84	(%) Recov		MW.1998.1325-45	
	M98681-006	Sodium	93	(%) Recov		MW.1998.1325-45	
	M98681-006	Vanadium	95	(%) Recov		MW.1998.1325-45	
	M98681-006	Zinc	92	(%) Recov		MW.1998.1325-45	
		Test: SW846-7000 series AA-FL					
M98681	M98681-006	Lead	100	(%) Recov		MW.1998.1347-13	10/12/98
		Test: SW846-7000 series AA-GF					
M98759	M98759-005	Thallium	91	(%) Recov		MW.1998.1379-12	10/20/98

QC Type **MSD: Matrix Spike Duplicate Accuracy** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-007	Aluminum	933	(%) Recov		MW.1998.1325-46	10/07/98
	M98681-007	Antimony	25	(%) Recov		MW.1998.1325-46	
	M98681-007	Arsenic	78	(%) Recov		MW.1998.1325-46	
	M98681-007	Barium	82	(%) Recov		MW.1998.1325-46	
	M98681-007	Beryllium	84	(%) Recov		MW.1998.1325-46	
	M98681-007	Cadmium	85	(%) Recov		MW.1998.1325-46	
	M98681-007	Calcium	703	(%) Recov		MW.1998.1325-46	
	M98681-007	Chromium	85	(%) Recov		MW.1998.1325-46	
	M98681-007	Cobalt	82	(%) Recov		MW.1998.1325-46	
	M98681-007	Copper	85	(%) Recov		MW.1998.1325-46	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9809213 FENTON HILL-BURNS SWALE**

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

M98681	M98681-007	Iron	323	(%) Recov		MW.1998.1325-46	10/07/98
	M98681-007	Magnesium	188	(%) Recov		MW.1998.1325-46	
	M98681-007	Manganese	120	(%) Recov		MW.1998.1325-46	
	M98681-007	Nickel	81	(%) Recov		MW.1998.1325-46	
	M98681-007	Potassium	155	(%) Recov		MW.1998.1325-46	
	M98681-007	Selenium	83	(%) Recov		MW.1998.1325-46	
	M98681-007	Silver	79	(%) Recov		MW.1998.1325-46	
	M98681-007	Sodium	83	(%) Recov		MW.1998.1325-46	
	M98681-007	Vanadium	90	(%) Recov		MW.1998.1325-46	
	M98681-007	Zinc	76	(%) Recov		MW.1998.1325-46	
		Test: SW846-7000 series AA-FL					
M98681	M98681-007	Lead	84	(%) Recov		MW.1998.1347-14	10/12/98
		Test: SW846-7000 series AA-GF					
M98759	M98759-006	Thallium	88	(%) Recov		MW.1998.1379-13	10/20/98

QC Type **MSD: Matrix Spike Duplicate Precision** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Sequence	Run Date
		Test: SW846-6010 ICP					
M98681	M98681-007	Aluminum	45	(%) RPD		MW.1998.1325-46	10/07/98
	M98681-007	Antimony	22	(%) RPD		MW.1998.1325-46	
	M98681-007	Arsenic	9	(%) RPD		MW.1998.1325-46	
	M98681-007	Barium	20	(%) RPD		MW.1998.1325-46	
	M98681-007	Beryllium	7	(%) RPD		MW.1998.1325-46	
	M98681-007	Cadmium	9	(%) RPD		MW.1998.1325-46	
	M98681-007	Calcium	160	(%) RPD		MW.1998.1325-46	
	M98681-007	Chromium	6	(%) RPD		MW.1998.1325-46	
	M98681-007	Cobalt	7	(%) RPD		MW.1998.1325-46	
	M98681-007	Copper	11	(%) RPD		MW.1998.1325-46	
	M98681-007	Iron	148	(%) RPD		MW.1998.1325-46	
	M98681-007	Magnesium	54	(%) RPD		MW.1998.1325-46	
	M98681-007	Manganese	32	(%) RPD		MW.1998.1325-46	
	M98681-007	Nickel	6	(%) RPD		MW.1998.1325-46	
	M98681-007	Potassium	55	(%) RPD		MW.1998.1325-46	
	M98681-007	Selenium	16	(%) RPD		MW.1998.1325-46	
	M98681-007	Silver	6	(%) RPD		MW.1998.1325-46	
	M98681-007	Sodium	12	(%) RPD		MW.1998.1325-46	
	M98681-007	Vanadium	6	(%) RPD		MW.1998.1325-46	
	M98681-007	Zinc	18	(%) RPD		MW.1998.1325-46	
		Test: SW846-7000 series AA-FL					
M98681	M98681-007	Lead	18	(%) RPD		MW.1998.1347-14	10/12/98
		Test: SW846-7000 series AA-GF					
M98759	M98759-006	Thallium	3	(%) RPD		MW.1998.1379-13	10/20/98

Chain of Custody Record

ASSAIGAI ANALYTICAL LABORATORIES, INC.

7300 JEFFERSON, N.E.
ALBUQUERQUE, NEW MEXICO 87109
(505) 345-8964

3332 WEDGEWOOD
EL PASO, TEXAS 79925
(915) 593-6000

Lab job no.: 3213 Date 9/14/98

Page 1 of 1

Client LANL - EES4/ESH-18 Project Manager / Contact BOB BEERS

Address 1115 K1147 Telephone No. 667-7969

City / State / Zip LOS ALAMOS, NM Fax No. 665-9344

Project Name / Number FENTON HILL - BURNS SWALE Samplers: (Signature)

Contract / Purchase Order / Quote 56C4 AC53 CCCC-CCCC

AAL FRACTION NUMBER	Field Sample Number / Location	Date	Time	Sample Type	Type / Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	Analysis Required: TOTAL METALS* 5W846	Remarks
1A	TA57.091498	9/14/98	1350	soil	GLASS/ 125 mL		N/A	1		
2A	TA57.091498A	9/14/98	1355	soil	GLASS/ 125 mL		N/A	1		

Relinquished by:
Signature
Printed ROBERT EVANS
Company LANL
Reason FENTON HILL Spill

Date 9/16/98
Time 12:55

Received by:
Signature
Printed ELVIN J. CHAVEZ
Company AAIL
Reason

Relinquished by:
Signature
Printed ELVIN J. CHAVEZ
Company AAIL
Reason

Date 9/17/98
Time 7:00AM

Received by:
Signature
Printed
Company
Reason

Method of Shipment:
Shipment No.
Special Instructions:

Comments: * TOTAL METALS: Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, K, Pb, Mg, Mn, Na, Ni, Sb, Se, Tl, V, Zn

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☑ Stored (30 days max)
- ☐ Stored over 30 days (additional fee)
- ☐ Returned to customer

COURIER

Burns Swale Spill Site Post-Cleanup Analytical Results

Sample Date: September 14, 1998
Sample Type: Soil, Total Metals
Method: EPA SW846
Units: mg/Kg

	1	2	3	4	5	6	7	8	9
	1998 Post-Cleanup Analytical Results		**Milagro Land Application Site Background Values**			**ER Project Background Values**	**1996 Pre-Cleanup Analytical Results**	**1994 ER Project Analytical Results**	**EPA Preliminary Remediation Goals (PRGs)**
Ag	<1	<1	<1	<1	<1	1	<5.0	<0.86	370[2]
Al	5,250	5,550	7,500	7,300	7,100	29,200	2,260	6,930	75,000[2]
As	18.8	16.5	3	2	2	8.17	57.6	30[1]	0.38[1]-22.0[2]
Ba	1,480	1,420	180	130	120	295	13,000	525	5,200[2]
Be	0.52	<0.5	0.45	0.59	0.33	1.83	NA	<0.96	150[2]
Ca	4,930	4,660	3,300	2,700	2,000	6,120	NA	NA	N/A
Cd	0.22	<0.2	<0.4	<0.04	<0.4	0.4	<1.0	3.1	37[2]
Co	2.6	2.5	3.1	2.7	2.6	8.64	<2.5	<3.3	3,300[2]
Cr	4.3	4.6	5.9	6.4	6.5	19.3	<5.0	3.9	30-210[3]
Cu	9.4	9.1	7	6.4	7.4	14.7	9.6	7.2	2,800[2]
Fe	9,600	8,600	8,500	7,700	8,100	21,500	NA	NA	22,000[2]
Hg	<0.15	<0.15	0.02	0.01	0.04	0.1	0.34	<0.03	N/A
K	778	783	1,300	1,100	1,100	3,460	NA	1,400	N/A
Mg	857	860	1,200	1,100	1,100	4,610	NA	1,270	N/A
Mn	456	366	1,100	650	510	671	NA	862	3,100[2]
Na	131	160	110	120	140	915	NA	<237	N/A
Ni	4.0	5.1	3.9	4.8	6.8	15.4	NA	<6.2	1,500[2]
Pb	20.1	20.8	18	<20	14	22.3	15.2	18.4	400[2]
Sb	<1.5	1.6	0.25	<0.25	<0.25	0.83	NA	<5.3	30[2]
Se	<2.5	<2.5	0.5	0.6	0.5	1.52	<12.5	<0.56	370[2]
Tl	<0.1	<0.1	0.37	0.37	0.25	0.73	NA	<0.5	5.2[2]
V	7.91	7.5	11	10	12	39.6	2.82	NA	520[2]
Zn	66.1	60.8	67	51	45	48.8	27.7	37.7	22,000[2]

Notes:
[1]Residential soil, cancer endpoint.
[2]Residential soil, non-cancer endpoint.
[3]Total chromium, residential soil, cancer endpoint.
Column #1: Sample ID No. TA57.091498
Column #2: Sample ID No. TA57.091498A
NA means that no sample was collected for this analyte.
N/A means that no PRG is available for this analyte.

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: July 20, 1998
In Reply Refer To: ESH-18/WQ&H:98-0232
Mail Stop: K497
Telephone: (505) 667-7969

MIPOR Approval

RECEIVED
JUL 27 1998
Environmental Bureau
Oil Conservation Division

Mr. Roger C. Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco St.
Santa Fe, New Mexico 87505

SUBJECT: MINOR MODIFICATION OF GROUND WATER DISCHARGE PLAN GW-031

Dear Mr. Anderson:

Enclosed please find Los Alamos National Laboratory's Minor Modification of Ground Water Discharge Plan GW-031 for the Fenton Hill Geothermal Facility, Sandoval County, New Mexico. Also enclosed is the required $50.00 filing fee. This minor modification is being submitted to your agency in accordance with Section 3107.C of the Water Quality Control Commission Regulations due to the following operational changes which have been implemented, or are being proposed, at the facility:

1) Discontinuation of the Fenton Hill NPDES Permit No. NM0028576,
2) Installation of an enhanced evaporation system on the 1 MG pond, and
3) The proposed mixing of exempt and nonexempt wastes in the 1 MG pond in accordance with N.M. Oil Conservation Division's mixture policy.

If you have any questions concerning this submittal, please feel free to call Bob Beers of my staff at (505) 667-7969.

WASTE DISPOSAL

Sincerely,

Steven R. Rae
Group Leader
Water Quality and Hydrology Group

RB/rj

Enclosures: a/s

Cy: J. Peterson, Jemez Ranger District, U.S. Forest Service, Jemez Springs, New Mexico, w/enc.
W. Whatley, Jemez Pueblo, New Mexico, w/enc.
G. Suazo, CIO, w/enc., MS A117
P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/enc.
G. Saums, NMED/SWQB, Santa Fe, New Mexico, w/enc.
B. Koch, DOE/LAAO, w/enc., MS A316
J. Albright, EES-4, w/enc., MS D443
G. Sinnis, P-23, w/enc., MS H803
D. Thomas, P-FM, w/enc., MS D459
J. Thomson, EES-4, w/enc. MS D443
S. Rae, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

ENCLOSURES

1) Minor Modification of Ground Water Discharge Plan (GW-031)

2) Letter from EPA Approving the Discontinuation of NPDES Permit No. NM0028576

3) Figure 1.0. Schematic of 1 MG Pond Enhanced Evaporation System

4) Table 1.0. Water Quality Data: GAC Filter Backwash Water

5) Table 2.0. Water Quality Data: Softener Regeneration Water

6) Assaigai Analytical Laboratories, Inc. Report: Sample ID Nos. MGRO 5A-11C

7) Figure 2.0. Schematic of Proposed Mixing of Exempt and Nonexempt Wastes

8) Figure 3.0. Schematic of 5 MG Pond to 1 MG Pond Piping

9) Table 3.0. Final Mixture Summary and Estimated Volumes of Exempt and Nonexempt Wastes

Discontinuation of NPDES Permit No. NM0028576

On December 29, 1997, the EPA approved a request by the U.S. Department of Energy and Los Alamos National Laboratory to discontinue the Fenton Hill Geothermal Site NPDES Permit No. NM0028576. Please find the enclosed copy of the EPA approval letter. The Fenton Hill Geothermal Facility had not discharged through the NPDES outfall since June 1988.

Enhanced Evaporation System

The Fenton Hill Geothermal Facility's 1 million gallon (MG) pond has been outfitted with an enhanced evaporation system. Figure 1.0 illustrates the system's basic configuration. The evaporation system consists of two segments of 2" PVC pipe, each running the length of the pond, one on the north side and the other on the south. Adjustable hose nozzles are installed at 10 ft. intervals on the 2" lines; a total of 25 nozzles on each side, 50 in all. The spray from each nozzle is directed towards the center of the pond at a 45 degree angle. The nozzles are adjusted to produce a fine mist, maximizing evaporation. All piping and nozzles are contained within the perimeter of the pond's liner. A pressure switch has been installed in the pump control circuitry to shut off the system in the event of a line break or plug. A large duplex basket strainer is installed near the pump to remove solids. The estimated volume being spayed is approximately 2 gallons per minute (gpm) per nozzle or approximately 100 gpm for the entire system.

The enhanced evaporation system is managed to ensure that wind blown drift does not travel beyond the perimeter of the pond's liner. The system is monitored twice daily and as wind conditions change the nozzles are adjusted to confine any drift to within the pond's liner. Under severe wind conditions, the evaporation system will be shut off.

Mixing of Exempt and Nonexempt Wastes

Exempt Wastes. Since 1989, the Fenton Hill Geothermal Facility has retained exclusive use of the 1 MG pond for the containment of geothermal production fluids. These fluids are exempt from Resource Conservation and Recovery Act (RCRA) regulation due to a specific exclusion for geothermal exploration, development, or the production of produced waters and other associated wastes [40 CFR 261.4(b)(5)]. In September 1997, approximately 675,000 gallons of geothermal fluids and sludge were removed from the pond and transported off-site for disposal. The pond had not been cleaned since its construction in 1989.

Currently, geothermal well EE-2 is the only remaining source of geothermal fluids discharging to the 1 MG pond. All of the facility's other geothermal wells were plugged and abandoned in 1996. Fluids vented from EE-2 originate from the Phase II geothermal reservoir. Annual venting volumes from EE-2 have been estimated at approximately 100,000 gallons per year.

Mixing of Exempt and Nonexempt Wastes (con't)

Nonexempt Wastes. Since 1995, the Milagro Project has been using the 5 MG pond at Fenton Hill for astrophysical research. In December 1995, the Laboratory submitted to the OCD a Notice of Changed Conditions for Discharge Plan GW-031 (ESH-18/WQ&H:95-0574) which detailed the modifications made to the 5 MG pond by the Milagro Project. Due to the nature of the Milagro Project's research, it is necessary for the water in the pond to be ultra-pure. Fill and make-up water for the 5 MG pond come from the Fenton Hill facility's potable water supply well. In addition, the Milagro Project installed a water treatment system with the following components: (1) granular activated carbon (GAC) filtration, (2) ion exchange (water softener), and (3) ultraviolet (UV) disinfection. Maintenance of both the GAC filter and the water softener result in the generation of wastewater discharges.

The GAC filter requires periodic backwashing to maintain efficient operation. Table 1.0 presents the analytical results from sampling of the GAC filter backwash water in December 1997. The sample results show that the GAC filter backwash water is nonhazardous and, with the exception of boron (B), contains no contaminants at concentrations greater than NM WQCC ground water standards. The GAC filter is used during both the filling of the pond and during the routine circulation of pond water. It is estimated that approximately 62,500 gallons of backwash wastewater (25 backwash cycles @ 2500 gallons per cycle) will be generated when the 5 MG pond is filled in 1998 and approximately 4,000 gallons per month during subsequent routine circulation.

The water softener requires periodic regeneration with sodium chloride to maintain efficient operation. Table 2.0 presents the analytical results from sampling of the softener regeneration water in December 1997. As expected, the sample results show that the softener regeneration water contains elevated total dissolved solids (TDS). Softener regeneration is required only during the filling of the pond. It is estimated that approximately 75,000 gallons of regeneration wastewater (30 regeneration cycles @ 2500 gallons per cycle) will be generated when the pond is filled in 1998.

Mixing. As illustrated in Figure 2.0, the Laboratory proposes to mix the Milagro Project's nonexempt wastes (softener regeneration wastewater and GAC filter backwash wastewater) with the Geothermal Project's exempt wastes (geothermal production fluids). Mixing would occur in the Geothermal Project's 1 MG pond. Figure 3.0 illustrates how an existing 8" buried cast iron pipe would be used to convey the nonexempt wastes to the 1 MG pond (Note: To control corrosion, after the discharge of high TDS water the pipe will be flushed with fresh water).

PASS TDS?

Mixing of Exempt and Nonexempt Wastes (con't)

The Laboratory's proposal to mix nonexempt and exempt waste meets the following two requirements of the New Mexico Oil Conservation Division's mixture policy (rev. 9/97):

First, sampling and analysis of the nonexempt portion of the waste, the softener regeneration wastewater and the GAC filter backwash wastewater, shows that the waste is nonhazardous (See Table 1.0 and 2.0); and

Second, the total nonexempt portion of the waste constitutes no more than five (5) percent by volume of the final mixture. Table 3.0 presents an estimate of the volume of exempt and nonexempt solids that would accumulate in the 1 MG pond if mixing were to occur for nine years of operation. Using the best information available, the Laboratory estimates that the final mixture will be 3 percent nonexempt wastes.

(Note: A final mixture based upon the volume of solids in the 1 MG pond, rather than the combined volume of solids and liquid, is being proposed due to the facility's capability to evaporate off the liquid fraction.)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

December 29, 1997

REPLY TO: 6WQ-CA

Mr. G. Thomas Todd
Area Manager
Department of Energy
Los Alamos Area Office
Los Alamos, New Mexico 87544

Re: NPDES Permit No. NM0028576-Dept. Of Energy-Los Alamos National Laboratory, Fenton Hill Geothermal Site

Dear Mr. Todd:

In accordance with your request on file in this office that the referenced NPDES Permit No. NM0028576 be discontinued, you are hereby notified that the permit has been discontinued.

Any resumption of the discharge without a permit will be unlawful. Should you again propose to discharge any pollutant from this facility to waters of the United States, it will be necessary to file a new application at least 180 days in advance of the proposed discharge. Any permit issued as a result of such reapplication will contain conditions and limitations consistent with the situation, and the law and the regulations in effect at the time of reissuance, irrespective of any previously issued permit.

If you have any questions, please contact Wilma Turner at the above address or telephone (214) 665-7516.

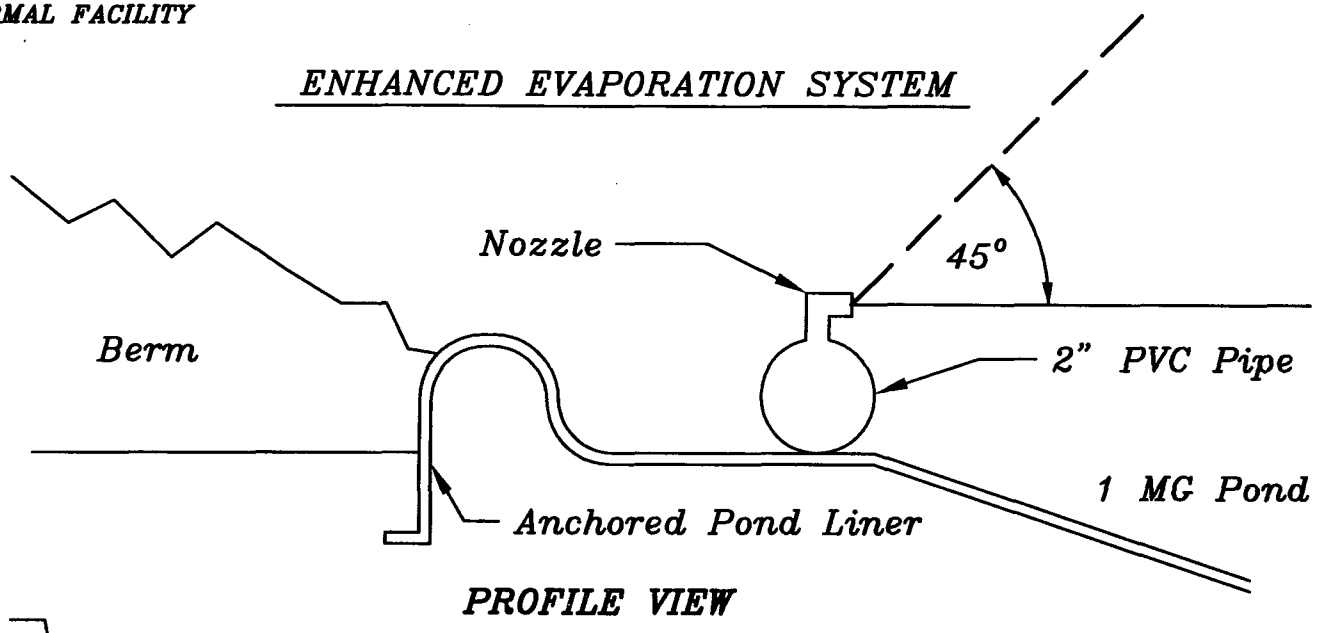
Sincerely yours,

Jack V. Ferguson, P.E.
Chief
NPDES Branch (6WQ-P)

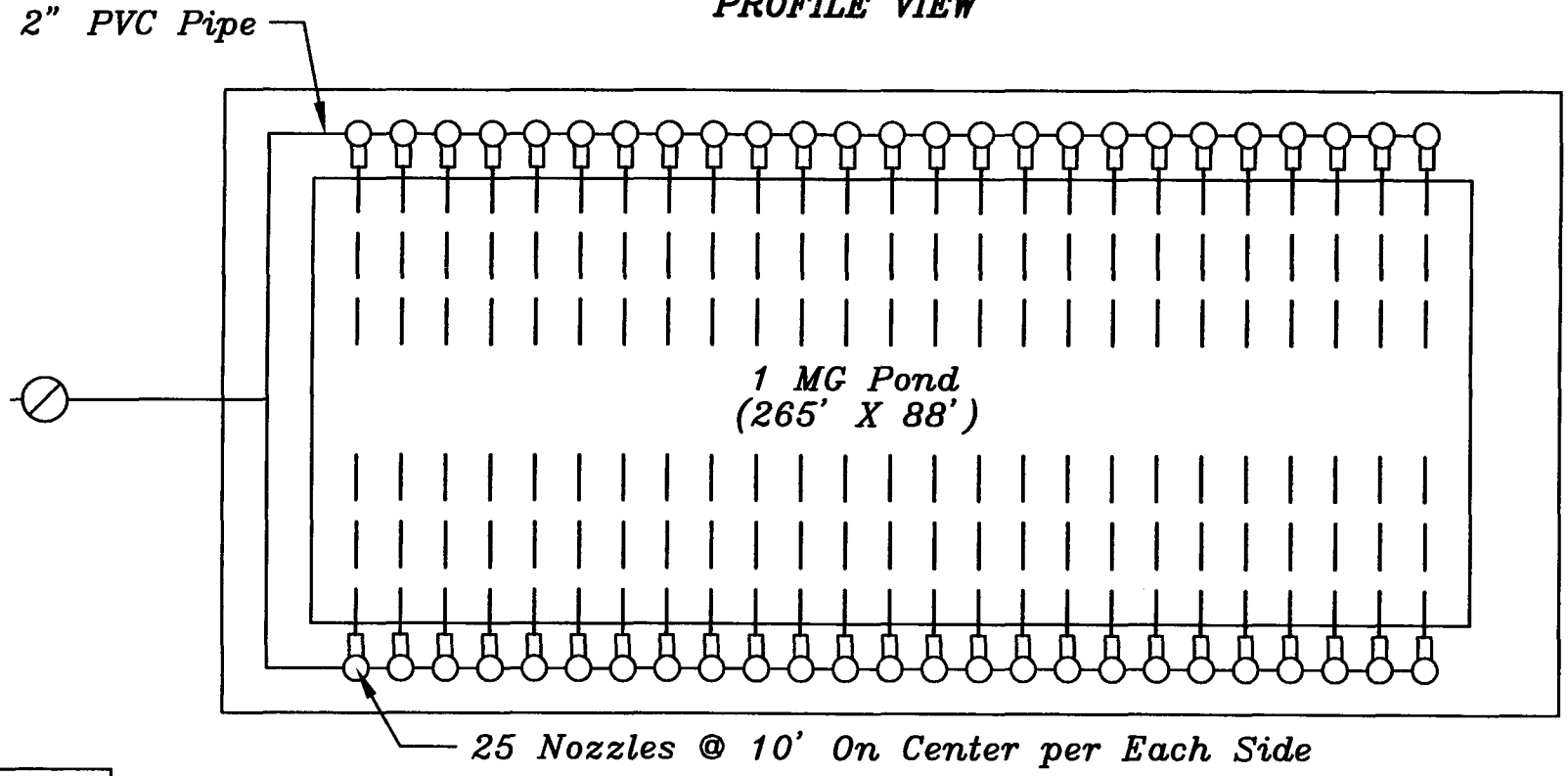
cc: New Mexico Environment Department

Mr. Mike Saladen
University of California
Management Contractor for Operation
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

ENHANCED EVAPORATION SYSTEM



PROFILE VIEW



PLAN VIEW

Milagro Project at Fenton Hill

Water Quality Data: GAC Filter Backwash Water

Sample Date: 12/12/97

Sample Type: total, unfiltered

Sample ID No.: MGRO-5A, 7A, 8A, 9A, 9B, 10A, and 10B

Analyte	Results (mg/L)	40 CFR 261 TCLP Concentration Limits (mg/L)	NM WQCC 3103. Ground Water Standards (mg/L)
Al	<0.5		5.0
As	<0.06	5.0	0.1
Ba	0.06	100.0	1.0
Be	<0.004		
B	1.2		0.75
Cd	<0.008	1.0	0.01
CN	<0.02		0.2
Cr	<0.04	5.0	0.05
Co	<0.01		0.05
Cu	<0.04		1.0
Fe	0.6		1.0
Hg	<0.0002	0.2	0.002
Pb	<0.06	0.4	0.05
Mn	<0.01		0.2
Mo	<0.02		1.0
Ni	<0.04		0.2
Se	<0.005	1.0	0.05
Ag	<0.02	5.0	0.05
Tl	<0.3		
U	0.0049		5.0
Zn	0.3		10.0
Nitrate-N	<0.2		10.0
pH (standard units)	7.4		between 6 and 9
TDS	422		1000.0
TSS	9		
Chloride	67.7		250.0
Fluoride	<0.5		1.6
Sulfate	12.7		600.0
Semi-volatiles			
SW846-8270	Non-detect		
Volatiles			
SW846-8240	Non-detect		

Milagro Project at Fenton Hill

Water Quality Data: Softener Regeneration Water

Sample Date: 12/12/97

Sample Type: total, unfiltered

Sample ID Nos.: MGRO-11A, 11B, and 11C

Analyte (Sample ID No.)	Results (mg/L)	40 CFR 261 TCLP Concentration Limits (mg/L)	NM WQCC 3103 Ground Water Standards (mg/L)
TDS (11A)	422	NA	1,000
TDS (11B)	9,930	NA	1,000
TDS (11C)	12,550	NA	1,000

NOTES:

Softner backwash cycle took 85 minutes to complete. Sample 11A was collected 3 minutes into the cycle, 11B was collected 25 minutes in the cycle, and 11C was collected 55 minutes into the cycle.

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO-2A,2B** — Sample Matrix: **WATER_COMP**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-335 / SM-4500						
12/12/97	9712126-02A	W97547	Cyanide	< 0.02	mg / L	0.02		MW.1997.1027 - 10	12/17/97

Client Sample ID: **MGRO-3A,3B** — Sample Matrix: **WATER_COMP**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-300 series						
12/12/97	9712126-03A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997.1025 - 16	12/16/97

Client Sample ID: **MGRO-4A,4B** — Sample Matrix: **WATER_COMP**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-150.1						
12/12/97	9712126-04A	WPH-573	pH	7.4	units	0.1		MT.1997.446 - 4	12/13/97
			EPA-160 series						
12/12/97	9712126-04A	WTDS-435	Total Dissolved Solids	406	mg / L	10		MT.1997.476 - 6	12/16/97
		WTSS-404	Total Suspended Solids	< 4.0	mg / L	4		MT.1997.469 - 7	12/17/97
			EPA-300 series						
12/12/97	9712126-04A	W97543	Chloride	71.4	mg / L	0.5		MW.1997.1025 - 22	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5		MW.1997.1025 - 13	
		W97543	Sulfate	13.0	mg / L	0.5		MW.1997.1025 - 13	

Client Sample ID: **MGRO 5A** GAC Filter Backwash — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM V 11.01/02						
12/12/97	9712126-05A	MT.1998.91	Uranium, total	0.0049	mg/L	0.0001		MT.1998.91 - 2	01/09/98
			EPA-200 series AA-GF						
12/12/97	9712126-05A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 12	12/23/97
		M97914	Selenium	< 0.005	mg / L	0.005		MW.1998.6 - 15	01/05/98
			EPA-200.7 ICP						
12/12/97	9712126-05A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998.1 - 23	12/31/97
		M97927	Arsenic	< 0.06	mg / L	0.06		MW.1998.1 - 23	
		M97927	Barium	0.06	mg / L	0.01		MW.1998.1 - 23	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 23	
		M97927	Boron	1.2	mg / L	0.1		MW.1998.21 - 23	01/06/98
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 23	12/31/97
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 23	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 23	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 23	
		M97927	Iron	0.6	mg / L	0.2		MW.1998.21 - 23	01/06/98
		M97927	Lead	< 0.06	mg / L	0.06		MW.1998.1 - 23	12/31/97
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 23	
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 23	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 23	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 23	
		M97927	Zinc	0.3	mg / L	0.1	B	MW.1998.21 - 23	01/06/98

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

			EPA-300 series					
12/12/97	9712126-05A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2	MW.1997.1025 - 8	12/16/97
			SW846-7470 / EPA-245.1					
12/12/97	9712126-05A	M97925	Mercury	< 0.0002	mg / L	0.0002	MW.1997.1051 - 14	12/24/97

Client Sample ID **MGRO 7A** GAC FILTER BACKWASH Sample Matrix **WATER**

Collect	*Fraction*	*QC Group*	*Analyte*	*Result*	*Units*	*Limit* *	*Run Group - #*	*Run Date*
			EPA-335 / SM-4500					
12/12/97	9712126-07A	W97547	Cyanide	< 0.02	mg / L	0.02	MW.1997.1027 - 11	12/17/97

Client Sample ID **MGRO 8A** GAC FILTER BACKWASH Sample Matrix **WATER**

Collect	*Fraction*	*QC Group*	*Analyte*	*Result*	*Units*	*Limit* *	*Run Group - #*	*Run Date*
			EPA-150.1					
12/12/97	9712126-08A	WPH-573	pH	7.4	units	0.1	MT.1997.446 - 1	12/13/97
			EPA-160 series					
12/12/97	9712126-08A	WTDS-435	Total Dissolved Solids	422	mg / L	10	MT.1997.476 - 7	12/16/97
		WTSS-494	Total Suspended Solids	9.0	mg / L	4	MT.1997.469 - 8	12/17/97
			EPA-300 series					
12/12/97	9712126-08A	W97543	Chloride	67.7	mg / L	0.5	MW.1997.1025 - 23	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5	MW.1997.1025 - 7	
		W97543	Sulfate	12.7	mg / L	0.5	MW.1997.1025 - 7	

Client Sample ID **MGRO 9A** GAC FILTER BACKWASH Sample Matrix **WATER**

Collect	*Fraction*	*QC Group*	*Analyte*	*Result*	*Units*	*Limit* *	*Run Group - #*	*Run Date*
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-09A	X97468	1,2,4-Trichlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	1,3-Dichlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	1,4-Dichlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	1-Methylnaphthalene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2,3,4,6-Tetrachlorophenol	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	2,4,5-Trichlorophenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2,4,6-Trichlorophenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2,4-Dichlorophenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2,4-Dimethylphenol	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2,4-Dinitrophenol	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	2,4-Dinitrotoluene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2,6-Dinitrotoluene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2-Chloronaphthalene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2-Chlorophenol	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2-Methylnaphthalene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2-Methylphenol	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	2-Nitroaniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	2-Nitrophenol ccc	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	3+4 Methylphenol	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	3,3'-Dichlorobenzidine	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	3-Nitroaniline	< 22	ug / L	10	XG.1997.373 - 10	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-09A	X97468	4,6-Dinitro-2-methylphenol	< 22	ug / L	10	XG.1997.373 - 10	12/19/97
		X97468	4-Bromophenyl-phenylether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	4-Chloro-3-methylphenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Chloroaniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Chlorophenyl-phenylether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	4-Nitroaniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Nitrophenol	< 44	ug / L	20	XG.1997.373 - 10	
		X97468	Acenaphthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Acenaphthylene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Aniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Anthracene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo (a) anthracene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(a)pyrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(b & k)fluoranthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(g,h,i)perylene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Benzoic acid	< 220	ug / L	100	XG.1997.373 - 10	
		X97468	Benzyl alcohol	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	bis (2-Chloroethyl) ether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Chloroethoxy)methane	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Chloroisopropyl)ether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Ethylhexyl)phthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Butylbenzylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Chrysene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	di-n-Butylphthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	di-n-Octylpthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Dibenz(a,h)anthracene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Dibenzofuran	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Diethylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Dimethylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Fluoranthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Fluorene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorobutadiene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorocyclopentadiene	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	Hexachloroethane	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Indeno(1,2,3-cd)pyrene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Isophorone	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	n-Nitroso-di-n-propylamine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	n-Nitroso-dimethyl-amine	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	n-Nitrosodiphenylamine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Naphthalene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Nitrobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Pentachlorophenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Phenanthrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Phenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Pyrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Pyridine	< 22	ug / L	10	XG.1997.373 - 10	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 9B** GAC FILTER BACKWASH Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-10A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG.1997.373 - 11	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG.1997.373 - 11	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG.1997.373 - 11	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Aniline	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Anthracene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Benzoic acid	< 200	ug / L	100	XG.1997.373 - 11	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG.1997.373 - 11	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG.1997.373 - 11	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-10A	X97468	Chrysene	< 2.0	ug / L	1	XG.1997.373 - 11	12/19/97
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Fluorene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997.373 - 11	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Naphthalene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Phenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Pyridine	< 20	ug / L	10	XG.1997.373 - 11	

Client Sample ID **MGRO 10A** GAC FILTER BACKWASH Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8240 Volatiles					
12/12/97	9712126-11A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 7	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-11A	X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 7	12/24/97
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 7	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 7	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 7	

Client Sample ID **MGRO 10B** GAC FILTER BACKWASH Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8240 Volatiles					
12/12/97	9712126-12A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 8	

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-12A	X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 8	12/24/97
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 8	
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 8	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 8	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 8	

Client Sample ID **MGRO-11A** SOFTENER REGEN. WATER Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA-160 series					
12/12/97	9712126-13A	WTDS-435	Total Dissolved Solids	426	mg / L	10	MT.1997.476 - 8	12/16/97

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 11B** SOFTENER REGEN. WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-14A	WTDS-435	Total Dissolved Solids	9930	mg / L	10		MT.1997.476 - 9	12/16/97

Client Sample ID: **MGRO 11C** SOFTENER REGEN, WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-15A	WTDS-435	Total Dissolved Solids	12550	mg / L	10		MT.1997.476 - 10	12/16/97

Client Sample ID: **MGRO 12** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM V 11.01/02						
12/12/97	9712126-16A	MT.1998.91	Uranium, total	0.0029	mg/L	0.0001		MT.1998.91 - 3	01/09/98
			EPA-200 series AA-GF						
12/12/97	9712126-16A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 13	12/23/97
		M97914	Selenium	< 0.005	mg / L	0.005		MW.1998.6 - 16	01/05/98
			EPA-200.7 ICP						
12/12/97	9712126-16A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998.1 - 26	12/31/97
		M97927	Arsenic	< 0.06	mg / L	0.06		MW.1998.1 - 26	
		M97927	Barium	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 26	
		M97927	Boron	1.4	mg / L	0.1		MW.1998.21 - 26	01/06/98
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 26	12/31/97
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Iron	< 0.2	mg / L	0.2		MW.1998.21 - 26	01/06/98
		M97927	Lead	< 0.06	mg / L	0.06		MW.1998.21 - 26	
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 26	12/31/97
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 26	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 26	
		M97927	Zinc	0.7	mg / L	0.1	B	MW.1998.21 - 26	01/06/98
			SW846-7470 / EPA-245.1						
12/12/97	9712126-16A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW.1997.1051 - 17	12/24/97

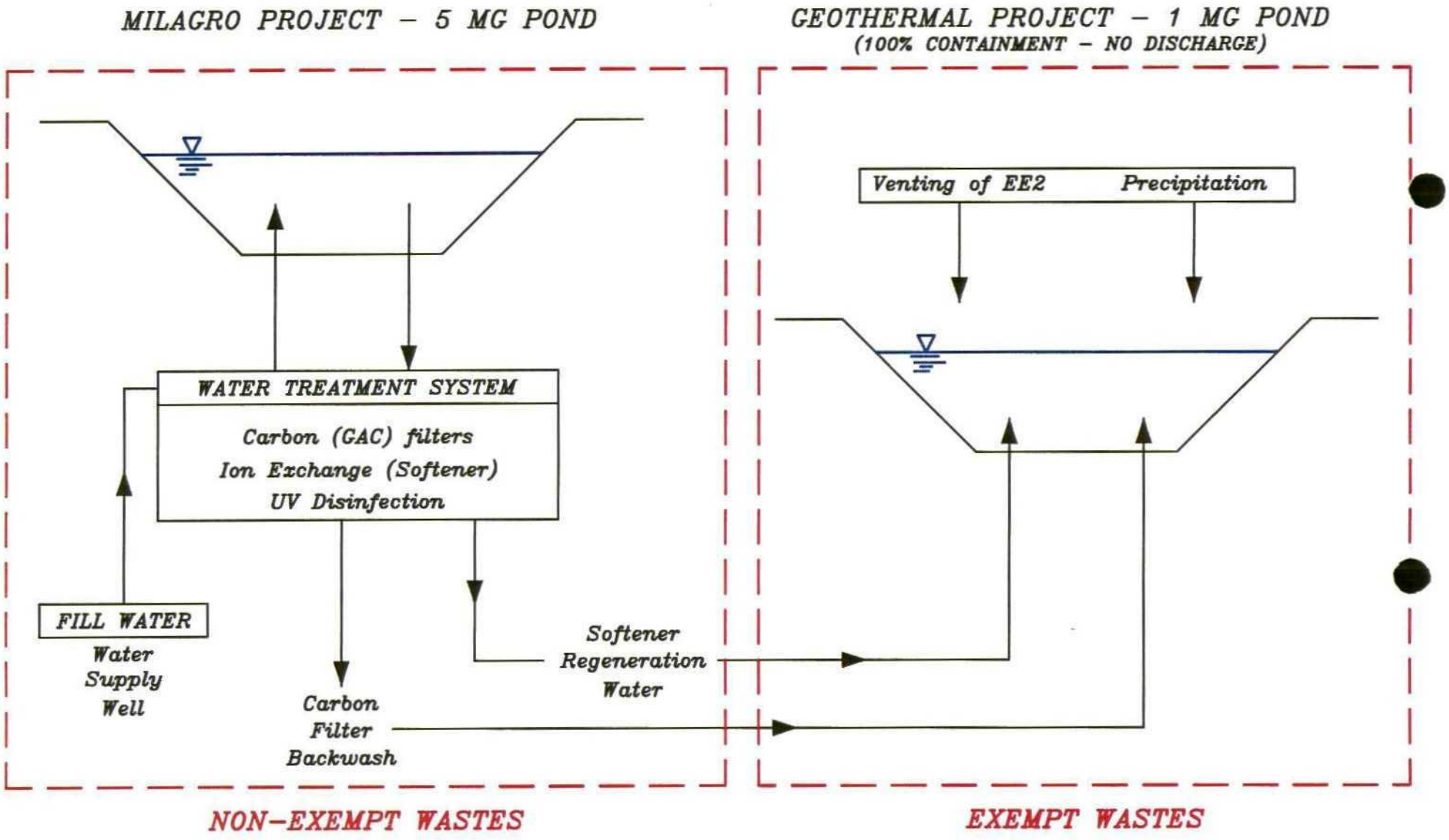
Client Sample ID: **MGRO 13** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-335 / SM-4500						
12/12/97	9712126-17A	W97547	Cyanide	< 0.02	mg / L	0.02		MW.1997.1027 - 13	12/17/97

Client Sample ID: **MGRO 14** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-300 series						
12/12/97	9712126-18A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997.1025 - 18	12/16/97

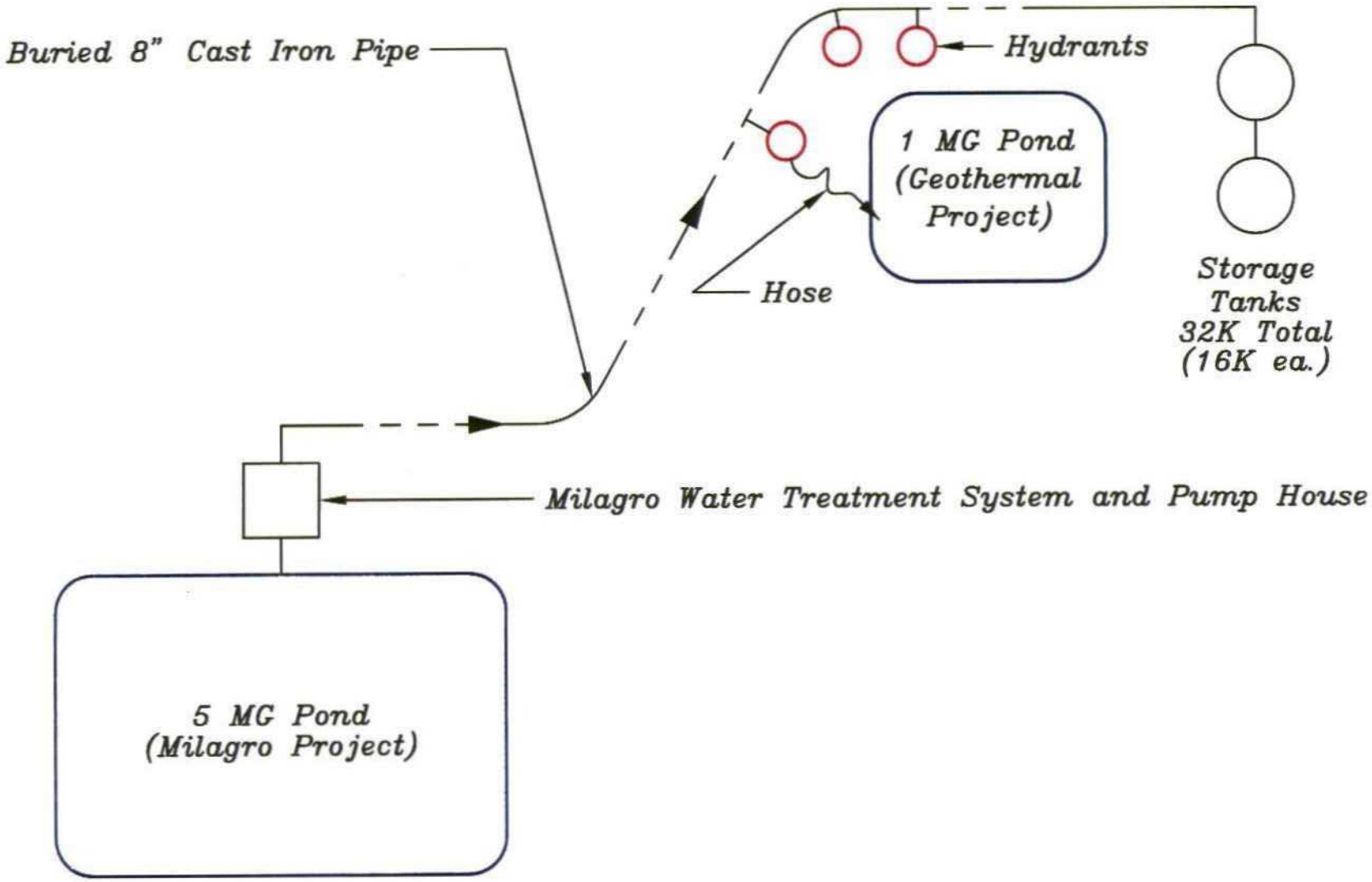
MIXING OF EXEMPT AND NON-EXEMPT WASTES



07/01/98

Figure 2.0

5 MG POND to 1 MG POND PIPING SCHEMATIC



07/01/98

Figure 3.0

FINAL MIXTURE SUMMARY: 1 MG Pond: 1998-2006[1]	
Total Estimated Nonexempt Solids (ft^3)	**106**
Total Estimated Exempt Solids (ft^3)	**4,184**
Percent of Final Mixture that is Nonexempt	**3%**

Milagro Project Nonexempt Wastes: Softener Regeneration & GAC Filter Backwash Wastewater

Years	Source	Wastewater Volume (gal)	Wastewater Volume (liters)	TDS (mg/L)	TDS (kg)	TSS (mg/L)	TSS (kg)	Total Solids TSS+TDS (kg)	Total Solids Volume (ft^3)[2]
1998	GAC Filter	78,500	297,123	422	125	9	3	134	3
1998	Softener	75,000	283,875	12,550	3,563	9	3	3,572	88
1999	GAC Filter	48,000	181,680	422	77	9	2	78	2
2000	GAC Filter	48,000	181,680	422	77	9	2	78	2
2001	GAC Filter	48,000	181,680	422	77	9	2	78	2
2002	GAC Filter	48,000	181,680	422	77	9	2	78	2
2003	GAC Filter	48,000	181,680	422	77	9	2	78	2
2004	GAC Filter	48,000	181,680	422	77	9	2	78	2
2005	GAC Filter	48,000	181,680	422	77	9	2	78	2
2006	GAC Filter	48,000	181,680	422	77	9	2	78	2
					Estimated volume of nonexempt solids after 9 years of operation (ft^3)				**106**

Geothermal Project Exempt Wastes: 1 MG Pond[4]

Year	Source	Wastewater Volume (gal)	Wastewater Volume (liters)	% Solids	Solids Volume (gal)	Solids Volume (ft^3)
2006	Geothermal	25,000	94,625	20	18,925	2,536
	Geothermal	650,000	2,460,250	0.5[3]	12,301	1,648
			Estimated volume of exempt solids after 9 years of operation (ft^3)			**4,184**

NOTES:
[1] Final mixture is based upon nine years of operation.
[2] Weight-to-volume conversions are based upon an estimated solids weight of 90 lbs/ft^3.
[3] A percent solids of 0.5% is equivalent to a TDS/TSS concentration of 5,000 ppm. Analysis of the 1 MG pond water on 5/5/97 showed a TDS concentration of 5,034 ppm.
[4] The estimated volume of solids in the 1 MG pond in the year 2006 are based upon the volume of solids removed during pond cleaning in Sept., 1997, after 9 years of operation.

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. 828576 dated 7/20/98,
or cash received on _____ in the amount of $ 50.00
from LANL
for Fenton Hill (Facility Name) GW031 (DP No.)
Submitted by: _____ Date: _____
Submitted to ASD by: R Anderson Date: 8/10/98
Received in ASD by: _____ Date: _____
Filing Fee X New Facility ___ Renewal ___
Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 98

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

LOS ALAMOS NATIONAL LABORATORY
UNIVERSITY OF CALIFORNIA
P.O. BOX 1663, MS P240
LOS ALAMOS, NEW MEXICO 87545

828576

95-101
1070

Check No. 828576

MO.	DAY	YR.
07	20	98

Pay FIFTY AND NO/100 DOLLARS ********** $**********50.00

PLEASE CASH PROMPTLY
SUBJECT TO CANCELLATION
NINETY (90) DAYS AFTER DATE

To The Order Of NM OIL CONSERVATION DIV
2040 S PACHECO ST
SANTA FE NM 87505

Allan Johnston

LOS ALAMOS NATIONAL BANK
LOS ALAMOS, NEW MEXICO 87544

⑈828576⑈ ⑆107001012⑆ 00 685259⑈01

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☐ Telephone ☒ Personal	Time 2:00PM	Date 6-18-98

Originating Party	Other Parties
BOB BEERS - LOS ALAMOS	MARK ASHLEY, ROGER ANDERSON

Subject: FENTON HILL - BURN SWALE

Discussion: BOB WANTS TO KNOW WHAT HE NEEDS TO DO TO CLOSE OUT THE SPILL SITE.

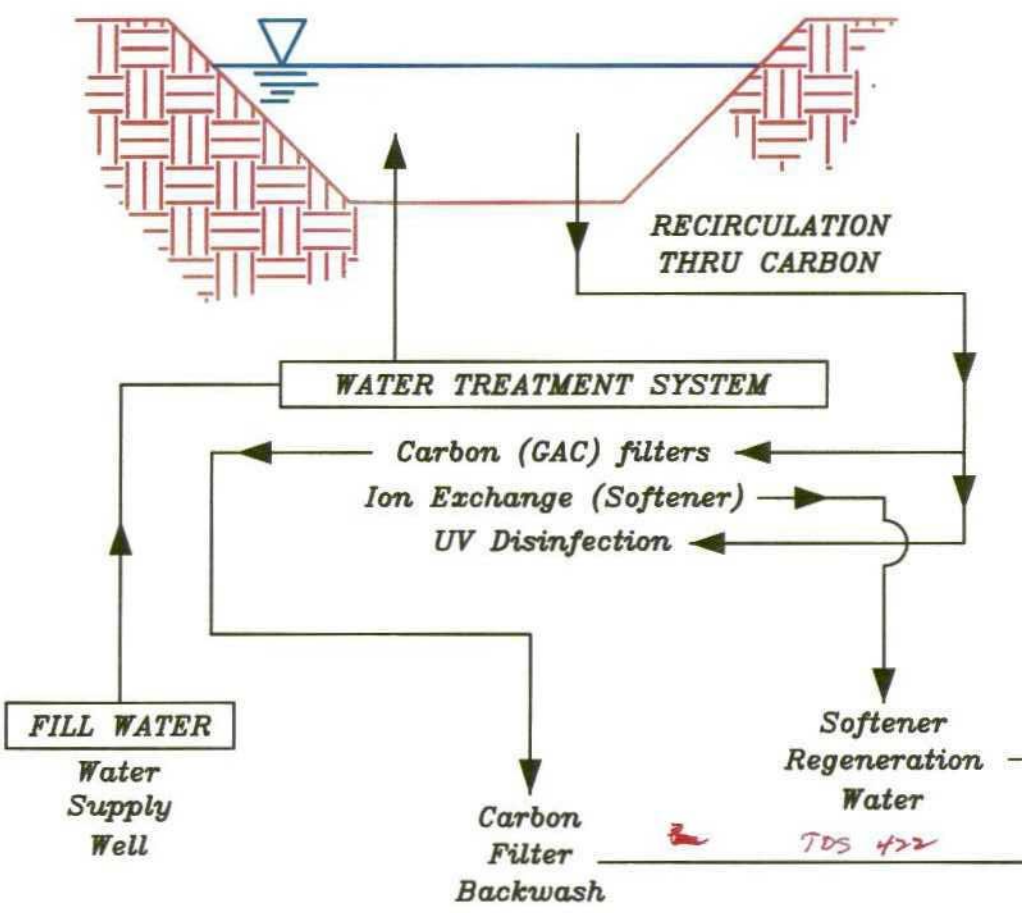
Conclusions or Agreements: ROGER GAVE HIM VERBAL TO REMOVE SILT FENCES, ETC., THEN SUBMIT A FINAL CLOSURE TO OCD.

Distribution

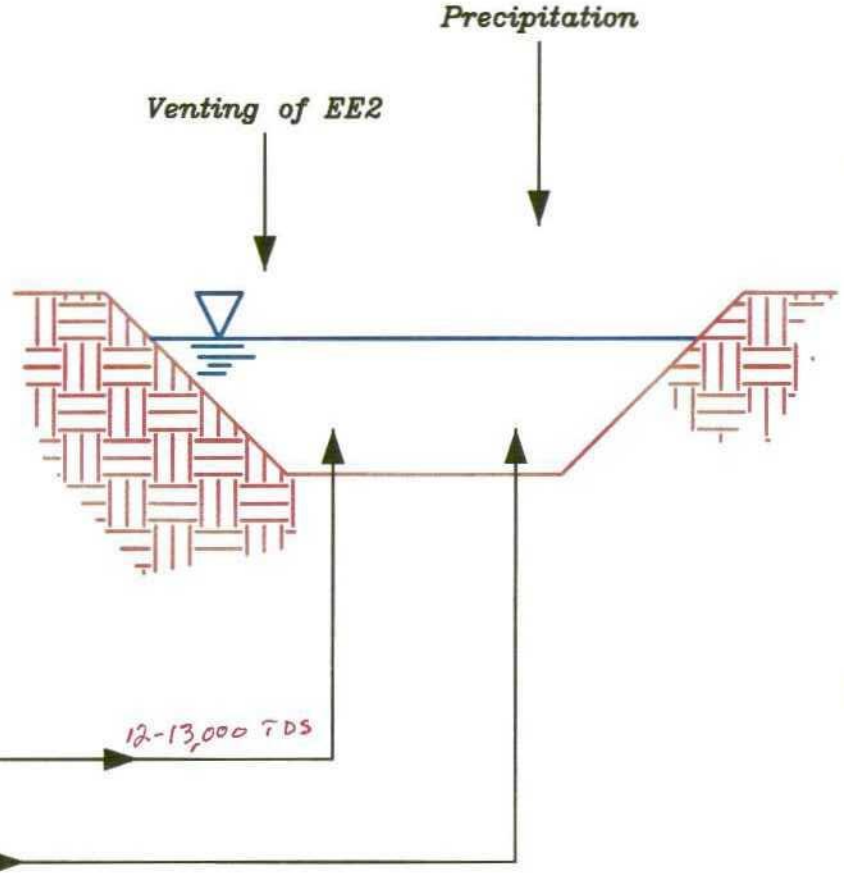
Signed: Mark Ashley

LOS ALAMOS NATIONAL LABORATORY @ FENTON HILL

MILAGRO PROJECT – 5 MG POND



HDR GEOTHERMAL PROJECT – 1 MG POND
100% CONTAINMENT – NO DISCHARGE

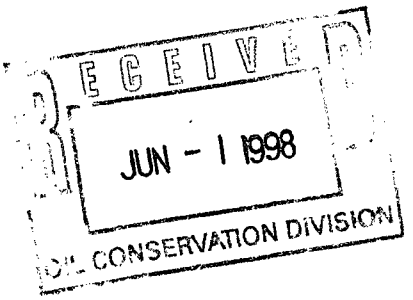


RSB/MV

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: May 28, 1998
In Reply Refer To: ESH-18/WQ&H:98-0187
Mail Stop: K497
Telephone: (505) 667-7969



Mr. Roger C. Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals &
Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: BACKGROUND SOIL SAMPLING, MILAGRO PROJECT AT FENTON HILL

Dear Mr. Anderson:

On April 16, 1998, your agency conditionally approved Los Alamos National Laboratory's Notice of Intent to Discharge (NOI) approximately 2.5 million gallons of purified water from the Milagro Project's five-million gallon pond at Fenton Hill. One condition of your agency's approval was the collection of a background soil sample from the land application site prior to discharging. Attachment 1.0 presents the analytical results from two soil samples (Sample ID No. 57-BK-LAS1 and 57-BK-LAS2) collected from the Milagro Project land application site on April 21, 1998. In addition, a copy of the analytical report has been enclosed.

On April 28, 1998, the Milagro Project began land applying purified water on the approved land application site. Based upon the present schedule, land application activities should be concluded by May 30, 1998.

I appreciate the time and effort which you have provided the Laboratory on Milagro Project activities. If you have any questions regarding the enclosed analytical results please call me at 667-7969.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

RB/rj

Enclosures: a/s

Cy: J. Peterson, Jemez Ranger District, U.S. Forest Service, Jemez Springs, New Mexico, w/enc.
W. Whatley, Jemez Pueblo, New Mexico, w/enc.
G. Suazo, CIO, w/enc., MS A117
P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/enc.
B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico, w/enc.
J. Keiling, NMED/HRMB, Santa Fe, New Mexico, w/enc.
B. Koch, DOE/LAAO, w/enc., MS A316
D. Thomas, P-FM, w/enc., MS D459
G. Sinnis, P-23, w/enc., MS H803
S. Rae, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Milagro Project
Fenton Hill Land Application Site
Background Soil Sampling
Sample Date: April 21, 1998
Units: mg/Kg

Analyte	57-BK-LAS1	57-BK-LAS2
Bromide	<1	<1
Chloride	2.3	<1
Fluoride	<1	<1
Nitrate, as N	<0.4	<0.4
Nitrite, as N	<0.4	<0.4
Orthophosphate	<0.8	<0.8
Sulfate	<1	<1
Aluminum	8810	5510
Antimony	<1.5	<1.5
Arsenic	<3	<3
Barium	218	279
Beryllium	0.51	<0.5
Boron	<15	<15
Cadmium	<0.2	<0.2
Calcium	2930	4050
Chromium	6.5	4.5
Iron	8810	5560
Lead	8.5	12.8
Manganese	1380	1160
Nickel	5.6	4.3
Selenium	<2.5	<2.5
Silicon	784	928
Silver	<1	<1
Potassium	2870	1230
Sodium	799	108
Thallium	<5	<5
Titanium	162	152
Mercury	<0.15	<0.15

ASSAIGAI ANALYTICAL LABORATORIES, INC.
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820

LOS ALAMOS NATIONAL LABS
attn: **BOB BEERS**
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

*** explanation of codes**

B	analyte detected in Method Blank
E	result is estimated
H	analyzed out of hold time
N	tentatively identified compound
S	subcontracted
1-9	see footnote

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206** .

William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Client Sample ID: ***57-BK-LAS1*** Sample Matrix: ***SOIL*** Sample Collected: ***04/21/98 11:25:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit *	Sequence	Run Date
			EPA-300.0 anions						
9804206-01A	W98150		Bromide	ND	mg / Kg	2	0.5	MW.1998.645-51	05/05/98
	W98150		Chloride	2.3	mg / Kg	2	0.5	MW.1998.645-51	
	W98150		Fluoride	ND	mg / Kg	2	0.5	MW.1998.645-51	
	W98150		Nitrate, as N	ND	mg / Kg	2	0.2	MW.1998.645-51	
	W98150		Nitrite, as N	ND	mg / Kg	2	0.2	MW.1998.645-51	
	W98150		Orthophosphorus, as P	ND	mg / Kg	2	0.4	MW.1998.645-51	
	W98150		Sulfate	ND	mg / Kg	2	0.5	MW.1998.645-51	
			SW846-6010 ICP						
9804206-01A	M98343	7429-90-5	Aluminum	8810	mg / Kg	1	25	MW.1998.606-46	05/07/98
	M98343	7440-36-0	Antimony	ND	mg / Kg	1	1.5	MW.1998.606-46	
	M98343	7440-38-2	Arsenic	ND	mg / Kg	1	3	MW.1998.606-46	
	M98343	7440-39-3	Barium	218	mg / Kg	1	0.5	MW.1998.606-46	
	M98343	7440-41-7	Beryllium	0.51	mg / Kg	1	0.5	MW.1998.606-46	
	M98343	7440-42-8	Boron	ND	mg / Kg	1	15	MW.1998.606-46	
	M98343	7440-43-9	Cadmium	ND	mg / Kg	1	0.2	MW.1998.606-46	
	M98343	7440-70-2	Calcium	2930	mg / Kg	1	15	MW.1998.606-46	
	M98343	7440-47-3	Chromium	6.5	mg / Kg	1	1	MW.1998.606-46	
	M98343	7439-89-6	Iron	8810	mg / Kg	1	15	MW.1998.606-46	
	M98343	7439-92-1	Lead	8.5	mg / Kg	1	2	MW.1998.606-46	
	M98343	7439-95-4	Magnesium	1380	mg / Kg	1	10	MW.1998.606-46	
	M98343	7440-02-0	Nickel	5.6	mg / Kg	1	2	MW.1998.606-46	
	M98343	7782-49-2	Selenium	ND	mg / Kg	1	2.5	MW.1998.606-46	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9804206**

9804206-01A	M98343	7440-21-3	Silicon	784	mg / Kg	1	25	MW.1998.655-32	05/13/98
	M98343	7440-22-4	Silver	ND	mg / Kg	1	1	MW.1998.606-46	05/07/98
			SW846-7000 series AA-FL						
9804206-01A	M98343	7440-09-7	Potassium	2870	mg / Kg	8	50	MW.1998.669-11	05/15/98
	M98343	7440-23-5	Sodium	799	mg / Kg	2	50	MW.1998.671-13	
	M98343	7440-28-0	Thallium	ND	mg / Kg	1	5	MW.1998.670-11	
			SW846-7000 series AA-GF						
9804206-01A	M98377	7440-32-6	Titanium	162	mg / Kg	50	1.5	MW.1998.666-14	05/14/98
			SW846-7471						
9804206-01A	M98365	7439-97-6	Mercury	ND	mg / Kg	1	0.15	MW.1998.621-13	05/09/98

Client Sample ID: ***57-BK-LAS2*** Sample Matrix: ***SOIL*** Sample Collected: ***04/21/98 11:44:00***

Fraction	QC Group	CAS #		Result	Units	Dilution Factor	Detection Limit *	Sequence	Run Date
			EPA-300.0 anions						
9804206-02A	W98150		Bromide	ND	mg / Kg	2	0.5	MW.1998.645-55	05/05/98
	W98150		Chloride	ND	mg / Kg	2	0.5	MW.1998.645-55	
	W98150		Fluoride	ND	mg / Kg	2	0.5	MW.1998.645-55	
	W98150		Nitrate, as N	ND	mg / Kg	2	0.2	MW.1998.645-55	
	W98150		Nitrite, as N	ND	mg / Kg	2	0.2	MW.1998.645-55	
	W98150		Orthophosphorus, as P	ND	mg / Kg	2	0.4	MW.1998.645-55	
	W98150		Sulfate	ND	mg / Kg	2	0.5	MW.1998.645-55	
			SW846-6010 ICP						
9804206-02A	M98343	7429-90-5	Aluminum	5510	mg / Kg	1	25	MW.1998.606-47	05/07/98
	M98343	7440-36-0	Antimony	ND	mg / Kg	1	1.5	MW.1998.606-47	
	M98343	7440-38-2	Arsenic	ND	mg / Kg	1	3	MW.1998.606-47	
	M98343	7440-39-3	Barium	279	mg / Kg	1	0.5	MW.1998.606-47	
	M98343	7440-41-7	Beryllium	ND	mg / Kg	1	0.5	MW.1998.606-47	
	M98343	7440-42-8	Boron	ND	mg / Kg	1	15	MW.1998.606-47	
	M98343	7440-43-9	Cadmium	ND	mg / Kg	1	0.2	MW.1998.606-47	
	M98343	7440-70-2	Calcium	4050	mg / Kg	1	15	MW.1998.606-47	
	M98343	7440-47-3	Chromium	4.5	mg / Kg	1	1	MW.1998.606-47	
	M98343	7439-89-6	Iron	5560	mg / Kg	1	15	MW.1998.606-47	
	M98343	7439-92-1	Lead	12.8	mg / Kg	1	2	MW.1998.606-47	
	M98343	7439-95-4	Magnesium	1160	mg / Kg	1	10	MW.1998.606-47	
	M98343	7440-02-0	Nickel	4.3	mg / Kg	1	2	MW.1998.606-47	
	M98343	7782-49-2	Selenium	ND	mg / Kg	1	2.5	MW.1998.606-47	
	M98343	7440-21-3	Silicon	928	mg / Kg	1	25	MW.1998.660-21	05/14/98
	M98343	7440-22-4	Silver	ND	mg / Kg	1	1	MW.1998.606-47	05/07/98
			SW846-7000 series AA-FL						
9804206-02A	M98343	7440-09-7	Potassium	1230	mg / Kg	10	50	MW.1998.669-12	05/15/98
	M98343	7440-23-5	Sodium	108	mg / Kg	1	50	MW.1998.671-14	
	M98343	7440-28-0	Thallium	ND	mg / Kg	1	5	MW.1998.670-12	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9804206** .

			SW846-7000 series AA-GF							
9804206-02A	M98377	7440-32-6	Titanium	152	mg / Kg	50	1.5		MW.1998 666-19	05/14/98
			SW846-7471							
9804206-02A	M98365	7439-97-6	Mercury	ND	mg / Kg	1	0.15	1	MW.1998.621-14	05/09/98

**** Sample specific analytical Detection Limit is determined by multiplying the sample Dilution Factor by the listed method Detection Limit. ****

footnote 1 This sample was utilized for the matrix spike and duplicate. Please note that the recoveries were outside of QC criteria, suggesting matrix interference problems. This should be taken into account when reviewing the data.

Quality Control Summary

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9804206**

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

QC Type **LCS: Lab Control Spike**

QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		EPA-300.0 anions					
W98150	W98150-002	Bromide	97	% Recovery		MW.1998.645 - 49	05/05/98
	W98150-002	Chloride	96	% Recovery		MW.1998.645 - 49	
	W98150-002	Fluoride	94	% Recovery		MW.1998.645 - 49	
	W98150-002	Nitrate, as N	96	% Recovery		MW.1998.645 - 49	
	W98150-002	Nitrite, as N	96	% Recovery		MW.1998.645 - 49	
	W98150-002	Orthophosphorus, as P	102	% Recovery		MW.1998.645 - 49	
	W98150-002	Sulfate	96	% Recovery		MW.1998.645 - 49	
		SW846-6010 ICP					
M98343	M98343-002	Aluminum	89	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Aluminum	108	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Antimony	89	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Arsenic	90	(%) Recov		MW.1998.606 - 36	
	M98343-002	Barium	91	(%) Recov		MW.1998.606 - 36	
	M98343-002	Beryllium	90	(%) Recov		MW.1998.606 - 36	
	M98343-002	Boron	94	(%) Recov		MW.1998.606 - 36	
	M98343-002	Boron	101	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Cadmium	95	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Calcium	95	(%) Recov		MW.1998.606 - 36	
	M98343-002	Calcium	112	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Chromium	87	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Iron	93	(%) Recov		MW.1998.606 - 36	
	M98343-002	Iron	106	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Lead	98	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Lead	103	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Magnesium	92	(%) Recov		MW.1998.606 - 36	05/07/98
	M98343-002	Nickel	89	(%) Recov		MW.1998.606 - 36	
	M98343-002	Selenium	95	(%) Recov		MW.1998.606 - 36	
	M98343-002	Silicon	90	(%) Recov		MW.1998.615 - 65	05/08/98
	M98343-002	Silicon	101	(%) Recov		MW.1998.655 - 28	05/13/98
	M98343-002	Silicon	104	(%) Recov		MW.1998.660 - 17	05/14/98
	M98343-002	Silver	103	(%) Recov		MW.1998.606 - 36	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-002	Potassium	82	(%) Recov		MW.1998.636 - 10	05/12/98
	M98343-002	Potassium	89	(%) Recov		MW.1998.665 - 18	05/14/98
	M98343-002	Potassium	87	(%) Recov		MW.1998.669 - 9	05/15/98
	M98343-002	Sodium	94	(%) Recov		MW.1998.634 - 17	05/11/98
	M98343-002	Sodium	95	(%) Recov		MW.1998.653 - 9	05/13/98
	M98343-002	Sodium	97	(%) Recov		MW.1998.671 - 9	05/15/98
	M98343-002	Thallium	109	(%) Recov		MW.1998.642 - 9	05/12/98
	M98343-002	Thallium	104	(%) Recov		MW.1998.670 - 9	05/15/98
	M98343-002	Thallium	90	(%) Recov		MW.1998.675 - 9	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206** .

*** explanation of codes**
D Not applicable due to sample dilution
L Not applicable due to MDL proximity

		SW846-7000 series AA-GF				
M98377	M98377-002	Titanium	103	(%) Recov	MW.1998.666 - 9	05/14/98
		SW846-7471				
M98365	M98365-002	Mercury	91	(%) Recov	MW.1998.621 - 9	05/09/98

QC Type **LCSD: Lab Control Spike Duplicate Accuracy** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		EPA-300.0 anions					
W98150	W98150-003	Bromide	96	% Recovery		MW.1998.645 - 50	05/05/98
	W98150-003	Chloride	97	% Recovery		MW.1998.645 - 50	
	W98150-003	Fluoride	94	% Recovery		MW.1998.645 - 50	
	W98150-003	Nitrate, as N	95	% Recovery		MW.1998.645 - 50	
	W98150-003	Nitrite, as N	97	% Recovery		MW.1998.645 - 50	
	W98150-003	Orthophosphorus, as P	101	% Recovery		MW.1998.645 - 50	
	W98150-003	Sulfate	96	% Recovery		MW.1998.645 - 50	
		SW846-6010 ICP					
M98343	M98343-003	Aluminum	95	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Aluminum	116	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Antimony	92	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Arsenic	98	(%) Recov		MW.1998.606 - 37	
	M98343-003	Barium	97	(%) Recov		MW.1998.606 - 37	
	M98343-003	Beryllium	96	(%) Recov		MW.1998.606 - 37	
	M98343-003	Boron	97	(%) Recov		MW.1998.606 - 37	
	M98343-003	Boron	110	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Cadmium	96	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Calcium	101	(%) Recov		MW.1998.606 - 37	
	M98343-003	Calcium	120	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Chromium	94	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Iron	100	(%) Recov		MW.1998.606 - 37	
	M98343-003	Iron	115	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Lead	102	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Lead	111	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Magnesium	98	(%) Recov		MW.1998.606 - 37	05/07/98
	M98343-003	Nickel	94	(%) Recov		MW.1998.606 - 37	
	M98343-003	Selenium	98	(%) Recov		MW.1998.606 - 37	
	M98343-003	Silicon	98	(%) Recov		MW.1998.615 - 66	05/08/98
	M98343-003	Silicon	102	(%) Recov		MW.1998.655 - 29	05/13/98
	M98343-003	Silicon	102	(%) Recov		MW.1998.660 - 18	05/14/98
	M98343-003	Silver	96	(%) Recov		MW.1998.606 - 37	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-003	Potassium	81	(%) Recov		MW.1998.636 - 11	05/12/98
	M98343-003	Potassium	88	(%) Recov		MW.1998.665 - 19	05/14/98
	M98343-003	Potassium	86	(%) Recov		MW.1998.669 - 10	05/15/98
	M98343-003	Sodium	94	(%) Recov		MW.1998.634 - 18	05/11/98
	M98343-003	Sodium	95	(%) Recov		MW.1998.653 - 10	05/13/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206** .

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

M98343	M98343-003	Sodium	101	(%) Recov	MW.1998.671 - 10	05/15/98
	M98343-003	Thallium	103	(%) Recov	MW.1998.642 - 10	05/12/98
	M98343-003	Thallium	102	(%) Recov	MW.1998.670 - 10	05/15/98
	M98343-003	Thallium	90	(%) Recov	MW.1998.675 - 11	
		SW846-7000 series AA-GF				
M98377	M98377-003	Titanium	101	(%) Recov	MW.1998.666 - 10	05/14/98
		SW846-7471				
M98365	M98365-003	Mercury	95	(%) Recov	MW.1998.621 - 10	05/09/98

QC Type **LCSD: Lab Control Spike Duplicate Precision** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		EPA-300.0 anions					
W98150	W98150-003	Bromide	< 1	RPD		MW.1998.645 - 50	05/05/98
	W98150-003	Chloride	1	RPD		MW.1998.645 - 50	
	W98150-003	Fluoride	< 1	RPD		MW.1998.645 - 50	
	W98150-003	Nitrate, as N	< 1	RPD		MW.1998.645 - 50	
	W98150-003	Nitrite, as N	1	RPD		MW.1998.645 - 50	
	W98150-003	Orthophosphorus, as P	< 1	RPD		MW.1998.645 - 50	
	W98150-003	Sulfate	< 1	RPD		MW.1998.645 - 50	
		SW846-6010 ICP					
M98343	M98343-003	Aluminum	7	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Aluminum	7	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Antimony	3	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Arsenic	9	(%) RPD		MW.1998.606 - 37	
	M98343-003	Barium	6	(%) RPD		MW.1998.606 - 37	
	M98343-003	Beryllium	7	(%) RPD		MW.1998.606 - 37	
	M98343-003	Boron	3	(%) RPD		MW.1998.606 - 37	
	M98343-003	Boron	9	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Cadmium	1	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Calcium	6	(%) RPD		MW.1998.606 - 37	
	M98343-003	Calcium	7	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Chromium	8	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Iron	7	(%) RPD		MW.1998.606 - 37	
	M98343-003	Iron	8	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Lead	4	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Lead	8	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Magnesium	6	(%) RPD		MW.1998.606 - 37	05/07/98
	M98343-003	Nickel	5	(%) RPD		MW.1998.606 - 37	
	M98343-003	Selenium	4	(%) RPD		MW.1998.606 - 37	
	M98343-003	Silicon	9	(%) RPD		MW.1998.615 - 66	05/08/98
	M98343-003	Silicon	< 1	(%) RPD		MW.1998.655 - 29	05/13/98
	M98343-003	Silicon	2	(%) RPD		MW.1998.660 - 18	05/14/98
	M98343-003	Silver	7	(%) RPD		MW.1998.606 - 37	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-003	Potassium	1	(%) RPD		MW.1998.636 - 11	05/12/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206**

*** explanation of codes**
D Not applicable due to sample dilution
L Not applicable due to MDL proximity

M98343	M98343-003	Potassium	< 1	(%) RPD	MW.1998.665 - 19	05/14/98
	M98343-003	Potassium	2	(%) RPD	MW.1998.669 - 10	05/15/98
	M98343-003	Sodium	< 1	(%) RPD	MW.1998.634 - 18	05/11/98
	M98343-003	Sodium	< 1	(%) RPD	MW.1998.653 - 10	05/13/98
	M98343-003	Sodium	4	(%) RPD	MW.1998.671 - 10	05/15/98
	M98343-003	Thallium	5	(%) RPD	MW.1998.642 - 10	05/12/98
	M98343-003	Thallium	2	(%) RPD	MW.1998.670 - 10	05/15/98
	M98343-003	Thallium	< 1	(%) RPD	MW.1998.675 - 11	
		SW846-7000 series AA-GF				
M98377	M98377-003	Titanium	2	(%) RPD	MW.1998.666 - 10	05/14/98
		SW846-7471				
M98365	M98365-003	Mercury	5	(%) RPD	MW.1998.621 - 10	05/09/98

QC Type **MB: Method Blank** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		EPA-300.0 anions					
W98150	W98150-001	Bromide	< 0.5	mg / Kg		MW.1998.645 - 48	05/05/98
	W98150-001	Chloride	< 0.5	mg / Kg		MW.1998.645 - 48	
	W98150-001	Fluoride	< 0.5	mg / Kg		MW.1998.645 - 48	
	W98150-001	Nitrate, as N	< 0.2	mg / Kg		MW.1998.645 - 48	
	W98150-001	Nitrite, as N	< 0.2	mg / Kg		MW.1998.645 - 48	
	W98150-001	Orthophosphorus, as P	< 0.4	mg / Kg		MW.1998.645 - 48	
	W98150-001	Sulfate	< 0.5	mg / Kg		MW.1998.645 - 48	
		SW846-6010 ICP					
M98343	M98343-001	Aluminum	< 25.0	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Aluminum	< 25.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Antimony	< 1.5	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Arsenic	< 3.0	mg / Kg		MW.1998.606 - 35	
	M98343-001	Barium	< 0.5	mg / Kg		MW.1998.606 - 35	
	M98343-001	Beryllium	< 0.50	mg / Kg		MW.1998.606 - 35	
	M98343-001	Boron	< 15.0	mg / Kg		MW.1998.606 - 35	
	M98343-001	Boron	< 15.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Cadmium	< 0.20	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Calcium	34.1	mg / Kg		MW.1998.606 - 35	
	M98343-001	Calcium	< 15.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Chromium	< 1.0	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Iron	< 15.0	mg / Kg		MW.1998.606 - 35	
	M98343-001	Iron	< 15.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Lead	2.8	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Lead	< 2.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Magnesium	< 10.0	mg / Kg		MW.1998.606 - 35	05/06/98
	M98343-001	Nickel	< 2.0	mg / Kg		MW.1998.606 - 35	
	M98343-001	Selenium	< 2.5	mg / Kg		MW.1998.606 - 35	
	M98343-001	Silicon	< 25.0	mg / Kg		MW.1998.615 - 64	05/08/98
	M98343-001	Silicon	< 25.0	mg / Kg		MW.1998.655 - 27	05/13/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206**

*** explanation of codes**
D Not applicable due to sample dilution
L Not applicable due to MDL proximity

M98343	M98343-001	Silicon	< 25.0	mg / Kg	MW.1998.660 - 16	05/14/98
	M98343-001	Silver	< 1.0	mg / Kg	MW.1998.606 - 35	05/06/98
		SW846-7000 series AA-FL				
M98343	M98343-001	Potassium	< 50.0	mg / Kg	MW.1998.636 - 9	05/12/98
	M98343-001	Potassium	< 50.0	mg / Kg	MW.1998.665 - 17	05/14/98
	M98343-001	Potassium	< 50.0	mg / Kg	MW.1998.669 - 8	05/15/98
	M98343-001	Sodium	< 50.0	mg / Kg	MW.1998.634 - 16	05/11/98
	M98343-001	Sodium	< 50.0	mg / Kg	MW.1998.653 - 8	05/13/98
	M98343-001	Sodium	< 50.0	mg / Kg	MW.1998.671 - 8	05/15/98
	M98343-001	Thallium	< 5.0	mg / Kg	MW.1998.642 - 8	05/12/98
	M98343-001	Thallium	< 5.0	mg / Kg	MW.1998.670 - 8	05/15/98
	M98343-001	Thallium	< 5.0	mg / Kg	MW.1998.675 - 8	
		SW846-7000 series AA-GF				
M98377	M98377-001	Titanium	< 1.50	mg / Kg	MW.1998.666 - 8	05/14/98
		SW846-7471				
M98365	M98365-001	Mercury	< 0.15	mg / Kg	MW.1998.621 - 8	05/09/98

QC Type **MS: Matrix Spike** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		SW846-6010 ICP					
M98343	M98343-007	Aluminum	1530	(%) Recov	D	MW.1998.606 - 41	05/07/98
	M98343-007	Aluminum	1720	(%) Recov	D	MW.1998.615 - 69	05/08/98
	M98343-007	Antimony	48	(%) Recov		MW.1998.606 - 41	05/07/98
	M98343-007	Arsenic	94	(%) Recov		MW.1998.606 - 41	
	M98343-007	Barium	51	(%) Recov	D	MW.1998.606 - 41	
	M98343-007	Beryllium	102	(%) Recov		MW.1998.606 - 41	
	M98343-007	Boron	96	(%) Recov		MW.1998.606 - 41	
	M98343-007	Boron	97	(%) Recov		MW.1998.615 - 69	05/08/98
	M98343-007	Cadmium	102	(%) Recov		MW.1998.606 - 41	05/07/98
	M98343-007	Calcium	< 1	(%) Recov	D	MW.1998.606 - 41	
	M98343-007	Calcium	< 1	(%) Recov		MW.1998.615 - 69	05/08/98
	M98343-007	Chromium	22	(%) Recov	D	MW.1998.606 - 41	05/07/98
	M98343-007	Iron	376	(%) Recov	D	MW.1998.606 - 41	
	M98343-007	Iron	399	(%) Recov		MW.1998.615 - 69	05/08/98
	M98343-007	Lead	< 1	(%) Recov	D	MW.1998.606 - 41	05/07/98
	M98343-007	Lead	< 1	(%) Recov	D	MW.1998.615 - 69	05/08/98
	M98343-007	Magnesium	91	(%) Recov		MW.1998.606 - 41	05/07/98
	M98343-007	Nickel	135	(%) Recov		MW.1998.606 - 41	
	M98343-007	Selenium	94	(%) Recov		MW.1998.606 - 41	
	M98343-007	Silicon	64	(%) Recov		MW.1998.615 - 69	05/08/98
	M98343-007	Silver	88	(%) Recov		MW.1998.606 - 41	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-007	Potassium	105	(%) Recov		MW.1998.636 - 14	05/12/98
	M98343-007	Potassium	102	(%) Recov		MW.1998.665 - 21	05/14/98
	M98343-007	Sodium	103	(%) Recov		MW.1998.634 - 20	05/11/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206** .

*** explanation of codes**

D	Not applicable due to sample dilution
L	Not applicable due to MDL proximity

M98343	M98343-007	Sodium	107	(%) Recov		MW.1998.653 - 12	05/13/98
	M98343-007	Thallium	86	(%) Recov		MW.1998.642 - 12	05/12/98
	M98343-007	Thallium	< 1	(%) Recov		MW.1998.675 - 14	05/15/98
		SW846-7000 series AA-GF					
M98377	M98377-005	Titanium	11	(%) Recov	D	MW.1998.666 - 12	05/14/98
		SW846-7471					
M98365	M98365-008	Mercury	74	(%) Recov		MW.1998.621 - 15	05/09/98

QC Type **MSD: Matrix Spike Duplicate Accuracy** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		SW846-6010 ICP					
M98343	M98343-008	Aluminum	2090	(%) Recov	D	MW.1998.606 - 42	05/07/98
	M98343-008	Aluminum	2350	(%) Recov	D	MW.1998.615 - 70	05/08/98
	M98343-008	Antimony	59	(%) Recov		MW.1998.606 - 42	05/07/98
	M98343-008	Arsenic	101	(%) Recov		MW.1998.606 - 42	
	M98343-008	Barium	49	(%) Recov	D	MW.1998.606 - 42	
	M98343-008	Beryllium	110	(%) Recov		MW.1998.606 - 42	
	M98343-008	Boron	105	(%) Recov		MW.1998.606 - 42	
	M98343-008	Boron	101	(%) Recov		MW.1998.615 - 70	05/08/98
	M98343-008	Cadmium	110	(%) Recov		MW.1998.606 - 42	05/07/98
	M98343-008	Calcium	< 1	(%) Recov	D	MW.1998.606 - 42	
	M98343-008	Calcium	< 1	(%) Recov		MW.1998.615 - 70	05/08/98
	M98343-008	Chromium	< 1	(%) Recov	D	MW.1998.606 - 42	05/07/98
	M98343-008	Iron	489	(%) Recov	D	MW.1998.606 - 42	
	M98343-008	Iron	480	(%) Recov		MW.1998.615 - 70	05/08/98
	M98343-008	Lead	< 1	(%) Recov	D	MW.1998.606 - 42	05/07/98
	M98343-008	Lead	< 1	(%) Recov	D	MW.1998.615 - 70	05/08/98
	M98343-008	Magnesium	102	(%) Recov		MW.1998.606 - 42	05/07/98
	M98343-008	Nickel	141	(%) Recov		MW.1998.606 - 42	
	M98343-008	Selenium	102	(%) Recov		MW.1998.606 - 42	
	M98343-008	Silicon	46	(%) Recov		MW.1998.615 - 70	05/08/98
	M98343-008	Silver	96	(%) Recov		MW.1998.606 - 42	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-008	Potassium	126	(%) Recov		MW.1998.636 - 15	05/12/98
	M98343-008	Potassium	101	(%) Recov		MW.1998.665 - 22	05/14/98
	M98343-008	Sodium	134	(%) Recov		MW.1998.634 - 21	05/11/98
	M98343-008	Sodium	124	(%) Recov		MW.1998.653 - 13	05/13/98
	M98343-008	Thallium	86	(%) Recov		MW.1998.642 - 13	05/12/98
	M98343-008	Thallium	58	(%) Recov		MW.1998.675 - 13	05/15/98
		SW846-7471					
M98365	M98365-009	Mercury	76	(%) Recov		MW.1998.621 - 16	05/09/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9804206**

*** explanation of codes**

D — Not applicable due to sample dilution
L — Not applicable due to MDL proximity

QC Type **MSD: Matrix Spike Duplicate Precision** QC Matrix **SOLID**

QC Group	Run ID		Result	Units	*	Run Group - #	Run Date
		SW846-6010 ICP					
M98343	M98343-008	Aluminum	31	(%) RPD	D	MW.1998.606 - 42	05/07/98
	M98343-008	Aluminum	31	(%) RPD		MW.1998.615 - 70	05/08/98
	M98343-008	Antimony	21	(%) RPD	D	MW.1998.606 - 42	05/07/98
	M98343-008	Arsenic	8	(%) RPD		MW.1998.606 - 42	
	M98343-008	Barium	4	(%) RPD		MW.1998.606 - 42	
	M98343-008	Beryllium	8	(%) RPD		MW.1998.606 - 42	
	M98343-008	Boron	10	(%) RPD		MW.1998.606 - 42	
	M98343-008	Boron	5	(%) RPD		MW.1998.615 - 70	05/08/98
	M98343-008	Cadmium	7	(%) RPD		MW.1998.606 - 42	05/07/98
	M98343-008	Calcium	3	(%) RPD		MW.1998.606 - 42	
	M98343-008	Calcium	3	(%) RPD		MW.1998.615 - 70	05/08/98
	M98343-008	Chromium	234	(%) RPD	D	MW.1998.606 - 42	05/07/98
	M98343-008	Iron	26	(%) RPD	D	MW.1998.606 - 42	
	M98343-008	Iron	18	(%) RPD		MW.1998.615 - 70	05/08/98
	M98343-008	Lead	< 1	(%) RPD		MW.1998.606 - 42	05/07/98
	M98343-008	Lead	37	(%) RPD	D	MW.1998.615 - 70	05/08/98
	M98343-008	Magnesium	11	(%) RPD		MW.1998.606 - 42	05/07/98
	M98343-008	Nickel	5	(%) RPD		MW.1998.606 - 42	
	M98343-008	Selenium	8	(%) RPD		MW.1998.606 - 42	
	M98343-008	Silicon	33	(%) RPD		MW.1998.615 - 70	05/08/98
	M98343-008	Silver	9	(%) RPD		MW.1998.606 - 42	05/07/98
		SW846-7000 series AA-FL					
M98343	M98343-008	Potassium	18	(%) RPD		MW.1998.636 - 15	05/12/98
	M98343-008	Potassium	1	(%) RPD		MW.1998.665 - 22	05/14/98
	M98343-008	Sodium	26	(%) RPD		MW.1998.634 - 21	05/11/98
	M98343-008	Sodium	14	(%) RPD		MW.1998.653 - 13	05/13/98
	M98343-008	Thallium	< 1	(%) RPD		MW.1998.642 - 13	05/12/98
	M98343-008	Thallium	200	(%) RPD		MW.1998.675 - 13	05/15/98
		SW846-7471					
M98365	M98365-009	Mercury	3	(%) RPD		MW.1998.621 - 16	05/09/98

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 16, 1998
In Reply Refer To: ESH-18/WQ&H:98-0127
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Roger Anderson
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, MILAGRO PROJECT AT FENTON HILL, REVISED NOTICE OF INTENT TO DISCHARGE

Dear Mr. Anderson:

Per your April 14, 1998, recommendation (personal communication with Bob Beers, Water Quality and Hydrology Group), Los Alamos National Laboratory (Laboratory) is submitting for your approval a revised Milagro Project Notice of Intent to Discharge (NOI) which contains a new land application site. The new land application site is approximately seven acres of undisturbed Forest Service land. As you know, the water to be applied is treated water from the facility's water supply well. Please see the enclosed site map and revised NOI.

At the request of Ms. Barbara Hoditschek, New Mexico Environment Department, Surface Water Quality Bureau, the Laboratory conducted a surface water site assessment of the new land application site on April 15, 1998 (See the enclosed LANL-ER-AP-4.5). The assessor, Mr. Terrill Lempke, Merrick & Company, determined that the potential for soil erosion is very low due to the extensive vegetative cover, low slopes, and the presence of natural BMPs. The matrix score assigned to the site was 8.8 out of 100. Sites with scores below 40 are considered to have low potential for erosion and surface water quality concerns.

Due to programmatic deadlines, the Milagro Project needs to begin draining the treated water from five-million gallon pond as soon as possible. Please notify the Laboratory at your earliest convenience if this NOI meets with your approval.

Please call Bob Beers at 667-7969 if you need additional information regarding this NOI.

Sincerely,

Steven Rae
Group Leader
Water Quality and Hydrology Group

BB:SR/mv

Enclosures: a/s

Cy: J. Peterson, Jemez Ranger District, Jemez Springs, New Mexico, w/enc.
W. Whatley, Jemez Pueblo, New Mexico, w/enc.
G. Suazo, CIO, w/enc., MS A117
P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/enc.
B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico, w/enc.
J. Keiling, NMED/HRMB, Santa Fe, New Mexico, w/enc.
B. Koch, DOE/LAAO, w/enc., MS A316
G. Sinnis, P-23, w/enc., MS H803
L. Rowton, P-FM, w/enc., MS D459
D. Thomas, P-FM, w/enc., MS D459
B. Beers, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

NOTICE OF INTENT TO DISCHARGE
(Revised: April 16, 1998)

1. Name and address of the facility making the discharge.

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

2. Location of discharge.

Milagro Project at Fenton Hill
Sandoval County, New Mexico
NE 1/4 Section 13, T19N, R2E (New Mexico Principal Meridian)
1,776,000 N, 374,000 E (New Mexico State Plane Grid)

3. Project description.

Since 1995, Los Alamos National Laboratory and a number of academic institutions have operated an astrophysical observatory, called the Milagro Project, at Fenton Hill. Using light sensitive detectors submerged in a five-million gallon pond (lined and covered), the observatory records signals from high-energy cosmic emissions. In order to minimize interference, the water in the pond has been filtered (carbon and media filters), and softened through ion exchange. Fill and make-up water for the Milagro Project is provided by the facility's water supply well. Currently, the pond contains approximately 2.5 million gallons of purified water.

In April 1998, it will be necessary for the Milagro Project to drain the pond. The Laboratory proposes to drain the pond by applying the water to approximately 7 acres of Forest Service land adjacent to the facility. A map has been attached showing the location of the proposed application area. The U.S. Forest Service, Jemez Ranger District, has approved the discharge, contingent upon NMED approval (See attached letter from Mr. John F. Peterson, Jemez Ranger District, to Mr. Steven Rae, Los Alamos National Laboratory, April 6, 1998).

4. The means of discharge (to lagoon, flowing stream, water course, arroyo, septic tank, other).

The discharge will be applied to the surface of approximately 7 acres of land within the boundaries of the Santa Fe National Forest. The method of land application is described below.

1. PVC pipes will serve as headers to deliver water from the pond throughout the application area.
2. Along each header, standard garden hoses will be attached.
3. At the end of each garden hose an impact-type (Rain Bird) sprayer will be installed. The sprayer will be set to maximum fog (to maximize evaporation) with a discharge rate of approximately 2-4 gallons per minute (gpm).
4. Sprayer locations and application rates will be chosen so as to minimize ponding and to prevent runoff from entering a water course.
5. The rate of application will be 100 gpm. Land application will be conducted 24 hours per day. The estimated duration of land application will be 18 days.
6. The land application site will be monitored during working hours. If ponding or runoff occurs, the offending sprayers will be turned off or moved.

5. The estimated concentration of contaminants in the discharge.

Six (6) samples of Milagro Project pond water, MGRO-12, MGRO-13, MGRO-14, MGRO-15, MGRO-16, and MGRO-17, were collected on December 12, 1997, and submitted to Assaigai Analytical Laboratories, Inc. for analysis for total metals, cyanide, nitrate, general chemistry, semi-volatile organic compounds, and volatile organic compounds, respectively. The enclosed Table 1.0 summarizes the analytical results. In addition, a copy of Assaigai's analytical report has been enclosed.

The Milagro Project pond water does not exceed any of the NMWQCC 3101. Surface Water Standards (See Table 1.0).

Two contaminants, boron (B) and chloride (Cl), are present in Milagro Project pond water at concentrations exceeding NMWQCC Ground Water Standards (See Table 1.0). Boron concentrations in the pond water (1.4 mg/L) can be attributed to the facility's water supply well since none of the Milagro Project's treatment operations introduce boron.

Chloride concentrations in the pond water (266 mg/L) marginally exceed the NMWQCC 3103. Ground Water Standard of 250 mg/L (See Table 1.0). The source of the chloride is presumed to be the water softener since testing of the facility's water supply well in 1995 showed chloride (Cl) concentrations at 36 mg/L.

6. The type of operation from which the discharge derived.

Astrophysical observatory (See #3-Project Description).

7. The estimated flow to be discharged per day.

Approximately 144,000 gallons per day. The total volume of water to be discharged is approximately 2.5 million gallons.

The proposed discharge of approximately 2.5 million gallons of water is equal to approximately 7.67 acre-feet of water. Since water is being land applied to 7 acres of land, the Laboratory will be applying approximate 13.1 inches of water over an 18-day period (minus evaporation), or approximately 0.73 inches of water per day (minus evaporation).

8. The estimated depth to ground water (if available).

The depth to the top of the aquifer at the site is approximately 370 ft (113m). Water level measurements in observation wells in the immediate area of the site indicate that the water table is nearly flat.

Signed_____ **Date** April 16, 1998

Steven Rae
Group Leader
Water Quality and Hydrology Group

Table 1.0

Milagro Project at Fenton Hill
Water Quality Data
5 MG Pond Water
Sample Date: 12/12/97
Sample Type: total, unfiltered

Analyte	Results (mg/L)	NM WQCC 3103 Ground Water Standards (mg/L)	NM WQCC 3101 Surface Water Standards (mg/L)
Al	<0.5	5.0	5.0
As	<0.06	0.1	0.2
Ba	<0.01	1.0	
Be	<0.004		0.1
B	**1.4**	**0.75**	**5.0**
Cd	<0.008	0.01	0.05
CN	<0.02	0.2	0.22
Cr	<0.04	0.05	1.0
Co	<0.01	0.05	1.0
Cu	<0.04	1.0	0.5
Fe	<0.2	1.0	
Total Hg	<0.0002	0.002	0.000012
Pb	<0.06	0.05	0.1
Mn	<0.01	0.2	
Mo	<0.02	1.0	
Ni	<0.04	0.2	
Total Recoverable Se	<0.005	0.05	0.002
Ag	<0.02	0.05	
Tl	<0.3		
U	0.0029	5.0	
Zn	0.7	10.0	25.0
Nitrate-N	<0.2	10.0	
pH (standard units)	7.8	between 6 and 9	between 6 and 9
TDS	770	1000.0	
TSS	<4.0		
Chloride	**266**	**250.0**	
Fluoride	<0.5	1.6	
Sulfate	14.7	600.0	
Semi-volatiles			
SW846-8270	Non-detect		
Volatiles			
SW846-8240	Non-detect		

Los Alamos
National Laboratory

1/22/98

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 11B** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-14A	WTDS-435	Total Dissolved Solids	9930	mg / L	10		MT 1997 476 - 9	12/16/97

Client Sample ID: **MGRO 11C** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-15A	WTDS-435	Total Dissolved Solids	12550	mg / L	10		MT.1997.476 - 10	12/16/97

Client Sample ID: **MGRO 12** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM V 11.01/02						
12/12/97	9712126-16A	MT.1998.91	Uranium, total	0.0029	mg/L	0.0001		MT.1998.91 - 3	01/09/98
			EPA-200 series AA-GF						
12/12/97	9712126-16A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 13	12/23/97
		M97914	Selenium	< 0.005	mg / L	0.005		MW.1998.6 - 16	01/05/98
			EPA-200.7 ICP						
12/12/97	9712126-16A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998.1 - 26	12/31/97
		M97927	Arsenic	< 0.06	mg / L	0.06		MW.1998.1 - 26	
		M97927	Barium	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 26	
		M97927	Boron	1.4	mg / L	0.1		MW.1998.21 - 26	01/06/98
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 26	12/31/97
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Iron	< 0.2	mg / L	0.2		MW.1998.21 - 26	01/06/98
		M97927	Lead	< 0.06	mg / L	0.06		MW.1998.21 - 26	
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 26	12/31/97
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 26	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 26	
		M97927	Zinc	0.7	mg / L	0.1	B	MW 1998.21 - 26	01/06/98
			SW846-7470 / EPA-245.1						
12/12/97	9712126-16A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW.1997.1051 - 17	12/24/97

Client Sample ID: **MGRO 13** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-335 / SM-4500						
12/12/97	9712126-17A	W97547	Cyanide	< 0.02	mg / L	0.02		MW 1997 1027 - 13	12/17/97

Client Sample ID: **MGRO 14** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-300 series						
12/12/97	9712126-18A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997.1025 - 18	12/16/97

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

Client Sample ID **MGRO 15** Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA-150.1					
12/12/97	9712126-19A	WPH-573	pH	7.8	units	0.1	MT.1997.446 - 3	12/13/97
			EPA-160 series					
12/12/97	9712126-19A	WTDS-435	Total Dissolved Solids	770	mg / L	10	MT.1997.476 - 11	12/16/97
		WTSS-494	Total Suspended Solids	< 4.0	mg / L	4	MT.1997.469 - 9	12/17/97
			EPA-300 series					
12/12/97	9712126-19A	W97543	Chloride	266	mg / L	0.5	MW.1997.1025 - 24	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5	MW.1997.1025 - 15	
		W97543	Sulfate	14.7	mg / L	0.5	MW.1997.1025 - 15	

Client Sample ID **MGRO 16** Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-20A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG.1997.373 - 12	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Aniline	< 20	ug / L	10	XG.1997.373 - 12	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

12/12/97	9712126-20A	X97468	Anthracene	< 2.0	ug / L	1	XG 1997 373 - 12	12/19/97
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Benzoic acid	< 200	ug / L	100	XG.1997.373 - 12	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Chrysene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Fluorene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG 1997.373 - 12	
		X97468	Naphthalene	< 2.0	ug / L	1	XG 1997.373 - 12	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Phenol	< 20	ug / L	10	XG 1997.373 - 12	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Pyridine	< 20	ug / L	10	XG.1997.373 - 12	

Client Sample ID **MGRO 17** Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			SW846-8240 Volatiles						
12/12/97	9712126-21A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1		XG.1997.380 - 9	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1		XG.1997 380 - 9	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1		XG.1997.380 - 9	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1		XG.1997.380 - 9	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1		XG.1997.380 - 9	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-21A	X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 9	12/24/97
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 9	
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 9	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 9	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 9	

UNITED STATES
DEPARTMENT OF
AGRICULTURE

FOREST
SERVICE

JEMEZ RANGER DISTRICT
P.O. BOX 150
JEMEZ SPRINGS, N.M. 87025
505-829-3535

Reply: 2720

Date: April 6, 1998

Steven Rae
Group Leader
Water Quality and Hydrology Group
ESH-18/WQ&H Mail Stop K497

Re: LANL Notice of Intent to Discharge, Milagro Project, Fenton Hill
Jemez Ranger District, Santa Fe National Forest

Dear Mr. Rae,

This letter is in reference to LANL's proposal for a one-time water discharge at Fenton Hill of approximately 2.5 million gallons of purified water from the Milagro Project's five million gallon pond. The water is to be land applied to National Forest System Land by a temporary sprinkler irrigation system. The State of New Mexico is delegated the authority to administer the Federal laws in regard to clean water. I therefore approve the proposed water discharge provided that the discharged water quality meets all applicable State and Federal laws, as indicated by an approved Notice of Intent by the New Mexico Environmental Department, Surface Water Quality Bureau.

I trust that this will meet your needs. Please call Diane Tafoya or Dennis Trujillo at (505) 829-3535, if you have any questions.
Sincerely,

FOR JOHN F. PETERSON
District Ranger

Los Alamos National Laboratory

Environment, Safety and Health Division
ESH-18 Water Quality and Hydrology Group

AP 4.5 Surface Water Assessment
Erosion Matrix for [redacted].

Land application site for water from Milagro Facility (Fenton Hill)

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low	Medium	High	Calculated Score
		0.1	0.5	1.0	
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	1.3
Slope	13	0-10%	10-30%	>30%	6.5
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**	**Total Score**			8.8

Report Printed 4/15/98 3:59:26 PM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

SITE INFORMATION Land application site for water from Milagro Facility (Fenton Hill)

1a) PRS Number **1b) Structure Number** **1c) FMU Number** 68

2. Date/Time (M/D/Y H:M am/pm) 4/15/98 10:00:00 AM

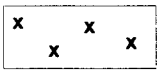
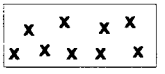
SITE SETTING (check all that apply)

3. ● **On mesa top (a).** ○ **In the canyon floor, but not in an established channel (c).**

○ **Within a bench of a canyon (b).** ○ **Within established channel in the canyon floor (d).**

Explanation: The proposed application site is a small bowl on the mountain top on the north side of the TA-57 Fenton Hill facility. The area is relatively flat and there is no evidence of concentrated runoff other than sheetflow.

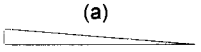
4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees, structures, asphalt, etc.)

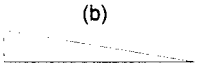
(illustration) (a)  (b)  (c) 

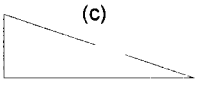
Estimated % of ground/canopy cover: ○ 0% to 25% ○ 25% to 75% ● 75% to 100%

Explanation: Significant ground and canopy cover. Canopy cover consists of pine trees and multiple thick stands of aspen trees. There is significant ground cover on site consisting of grasses, low growing shrubs, aspen leaves, and downed wood.

5. Steepest slope at the area impacted:

(a)  ● Less than 10%

(b)  ● 10% to 30%

(c)  ○ 30% and greater

Explanation: The slope around the perimeter of the bowl is approximately 10-15%. The area within the bowl that is to be used for the water application has a slope of no more than 10% across the entire area.

RUNOFF FACTORS

Y / N

☐ ☑ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☐ ☑ 6a) Is runoff channelized? If yes, describe: ○ Man-made channel. ○ Natural channel.

Explanation: No visible evidence of runoff at the site.

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

Drainage or wetland (name)

Within bench of canyon setting (name)

Other (i.e., retention pond, meadow, mesa top)

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below: Sheet Rill Gully

Explanation: No evidence of erosion.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: This site is not located near any man-made structures or outfalls.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation:

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: No visible evidence of this area being a natural drainage.

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Terrill Lemke

11. Signature of Water Quality/Hydrology Representative

_____ Initials of independent reviewer.

Check here when information is entered in database: ✔

15: Report Printed 4/15/98 3:59:28 PM

This page is for ESH-18 notes, recommendations, and photos.

Y / N

12. a) • Is there visible trash/debris on the site?

b) • Is there visible trash/debris in a watercourse?

Description of existing BMPs:

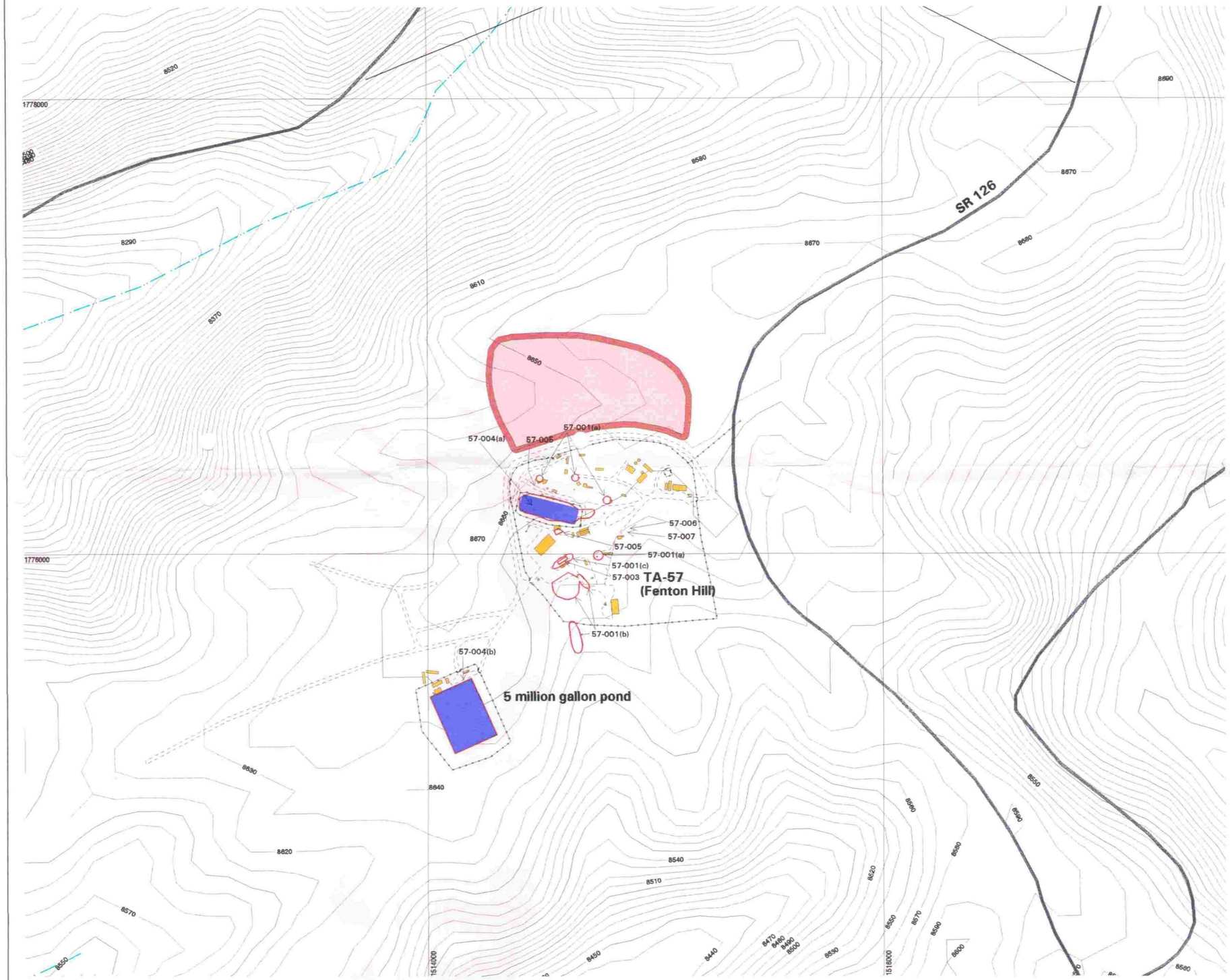
Are BMPs being properly maintained? If no, describe in "Other Internal Notes."

Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES:

The site has significant ground cover consisting of vegetation, forest litter, and downed wood. These item acct as natural BMPs. In the event of a concentrated flow of runoff, the large amount and extensive coverage of downed wood will dissipate energy in the flow and spread the flow over a larger area.

Milagro Project Land Application Site



FIMAD Plot ID: 106405 15 Apr 98

Milagro Project Land Application Site

- Contour, 50 ft
- Contour, 10 ft
- Drainage
- Fence, Industrial
- PRS
- Road, Dirt
- Road, Paved
- Application Area (7.0 acres)
- Application Area Buffer (25 ft)
- Pond
- Structure

FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY

EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)

LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones

Date: April 15, 1998 FIMAD Plot ID: 106405

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000

Contour interval: 10 ft

0 91 182 273 364
METERS

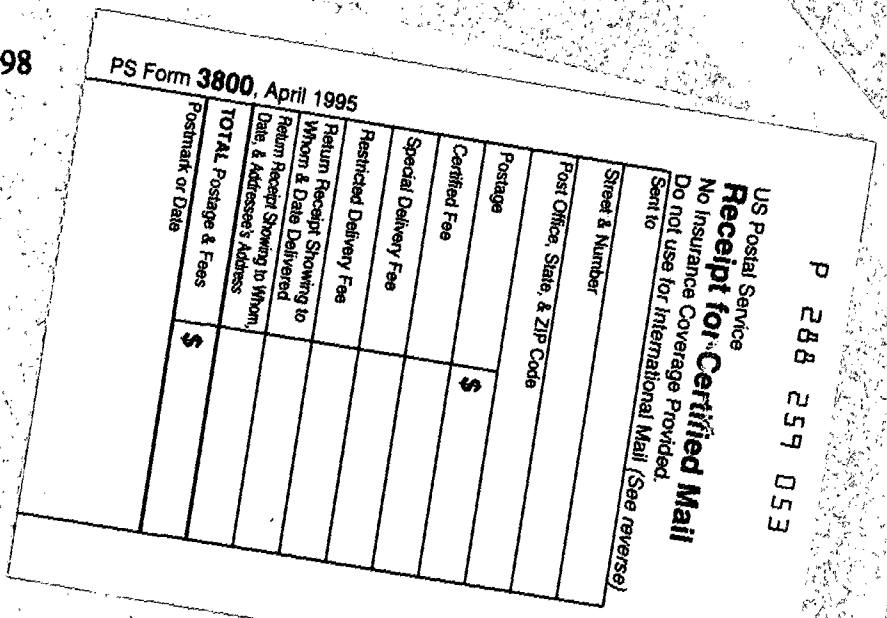
0 300 600 900 1200
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

EXICO ENERGY, MINERALS
JRAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVI
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 23, 1998



Mail
Receipt No. P-288-259-053

) Beers
umos National Laboratory
97
lamos, NM 87545

Post-Application Soil Sampling Waiver
Milagro Project at Fenton Hill
Los Alamos, NM

ar Mr. Beers:

ne New Mexico Oil Conservation Division (OCD) has completed a review of the Los Alamos lational Laboratory (LANL) "Milagro Project Land Application Site: Post-Application Soil Sampling For 1997" dated November 26, 1997. In addition to the post-application sampling requirement, LANL is requesting a waiver from the OCD from future sampling for the following metals: Ag, Ba, Be, Cd, Cr, Ni, Pb, Se, Tl, and Hg. Based on the information provided, the waiver is approved with the following condition:

1. LANL will continue to monitor arsenic concentrations at the approved sample locations in 1998.

Please be advised that OCD approval does not relieve LANL of liability should it later be found that contamination exists which could pose a threat to surface water, ground water, human health or the environment. In addition, OCD approval does not relieve LANL of liability for compliance with other federal, state or local laws and/or regulations.

If you have any questions, please contact Mark Ashley at (505) 827-7155.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/mwa

xc: Barbara Hoditschek, Surface Water Quality Bureau, NMED

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 13, 1998
In Reply Refer To: ESH-18/WQ&H:98-0124
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Roger Anderson
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NOTICE OF INTENT TO DISCHARGE, MILAGRO PROJECT AT FENTON HILL

Dear Mr. Anderson:

Enclosed is a Notice of Intent to Discharge (NOI) for the Milagro Project at Fenton Hill. This NOI is being submitted for the proposed land application of approximately 2.5 million gallons of purified water from the Milagro Project's five-million gallon pond. The water will be land applied to Forest Service land by a temporary sprinkler irrigation system. This will be a one-time discharge. Please see the attached NOI, site map, and analytical data for further information.

Please call Bob Beers at 667-7969 if you need additional information regarding this NOI.

Sincerely,

Steven Rae
Group Leader
Water Quality and Hydrology Group

BB:SR/mv

Enclosures: a/s

Cy: B. Hoditschek, NMED, Santa Fe, New Mexico, w/o enc.
P. Bustamante, NMED, Santa Fe, New Mexico, w/o enc.
B. Koch, DOE/LAAO, w/enc., MS A316
B. Beers, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
G. Sinnis, P-23, w/o enc., MS H803
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

NOTICE OF INTENT TO DISCHARGE

1. Name and address of the facility making the discharge.

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

2. Location of discharge.

Milagro Project at Fenton Hill
Sandoval County, New Mexico
NE 1/4 Section 13, T19N, R2E (New Mexico Principal Meridian)
1,776,000 N, 374,000 E (New Mexico State Plane Grid)

3. Project description.

Since 1995, Los Alamos National Laboratory and a number of academic institutions have operated an astrophysical observatory, called the Milagro Project, at Fenton Hill. Using light sensitive detectors submerged in a five-million gallon pond (lined and covered), the observatory records signals from high-energy cosmic emissions. In order to minimize interference, the water in the pond has been filtered (carbon and media filters), and softened through ion exchange. Fill and make-up water for the Milagro Project is provided by the facility's water supply well. Currently, the pond contains approximately 2.5 million gallons of purified water.

In April 1998, it will be necessary for the Milagro Project to drain the pond. The Laboratory proposes to drain the pond by applying the water to approximately 22 acres of Forest Service land adjacent to the facility. A map has been attached showing the location of the proposed application area. The U.S. Forest Service, Jemez Ranger District, has approved the discharge, contingent upon NMED approval.

4. The means of discharge (to lagoon, flowing stream, water course, arroyo, septic tank, other).

The discharge will be applied to the surface of approximately 22 acres of land within the boundaries of the Santa Fe National Forest. The method of land application is described below.

1. PVC pipes will serve as headers to deliver water from the pond throughout the application area.
2. Along each header, standard garden hoses will be attached.
3. At the end of each garden hose an impact-type (Rain Bird) sprayer will be installed. The sprayer will be set to maximum fog (to maximize evaporation) with a discharge rate of approximately 2-4 gallons per minute (gpm).
4. Sprayer locations and application rates will be chosen so as to minimize ponding and to prevent runoff from entering a water course.
5. The rate of application will be 100 gpm. Land application will be conducted 24 hours per day. The estimated duration of land application will be 18 days.
6. The land application site will be monitored during working hours. If ponding or runoff occurs, the offending sprayers will be turned off or moved.

The proposed discharge of approximately 2.5 million gallons of water is equal to approximately 7.67 acre-feet of water. Since water is being land applied to 22 acres of land, the Laboratory will be applying approximate 4.2 inches of water over an 18-day period (minus evaporation), or approximately 0.23 inches of water per day (minus evaporation).

5. The estimated concentration of contaminants in the discharge.

Six (6) samples of Milagro Project pond water, MGRO-12, MGRO-13, MGRO-14, MGRO-15, MGRO-16, and MGRO-17, were collected on December 12, 1997, and submitted to Assaigai Analytical Laboratories, Inc. for analysis for total metals, cyanide, nitrate, general chemistry, semi-volatile organic compounds, and volatile organic compounds, respectively. The enclosed Table 1.0 summarizes the analytical results. In addition, a copy of Assaigai's analytical report has been enclosed.

The Milagro Project pond water does not exceed any of the NMWQCC 3101. Surface Water Standards (See Table 1.0).

Two contaminants, boron (B) and chloride (Cl), are present in Milagro Project pond water at concentrations exceeding NMWQCC Ground Water Standards (See Table 1.0). Boron concentrations in the pond water (1.4 mg/L) can be attributed to the facility's water supply well since none of the Milagro Project's treatment operations introduce boron.

Chloride concentrations in the pond water (266 mg/L) marginally exceed the NMWQCC 3103. Ground Water Standard of 250 mg/L (See Table 1.0). The source of the chloride is presumed to be the water softener since testing of the facility's water supply well in 1995 showed chloride (Cl) concentrations at 36 mg/L.

6. The type of operation from which the discharge derived.

Astrophysical observatory (See #3-Project Description).

7. The estimated flow to be discharged per day.

Approximately 144,000 gallons per day. The total volume of water to be discharged is approximately 2.5 million gallons.

8. The estimated depth to ground water (if available).

The depth to the top of the aquifer at the site is approximately 370 ft (113m). Water level measurements in observation wells in the immediate area of the site indicate that the water table is nearly flat.

Signed Steven Rae **Date** Jan. 27, 1998

Steven Rae
Group Leader
Water Quality and Hydrology Group

Table 1.0

Milagro Project at Fenton Hill
Water Quality Data
5 MG Pond Water
Sample Date: 12/12/97
Sample Type: total, unfiltered

Analyte	Results (mg/L)	NM WQCC 3103 Ground Water Standards (mg/L)	NM WQCC 3101 Surface Water Standards (mg/L)
Al	<0.5	5.0	5.0
As	<0.06	0.1	0.2
Ba	<0.01	1.0	
Be	<0.004		0.1
B	**1.4**	**0.75**	**5.0**
Cd	<0.008	0.01	0.05
CN	<0.02	0.2	0.22
Cr	<0.04	0.05	1.0
Co	<0.01	0.05	1.0
Cu	<0.04	1.0	0.5
Fe	<0.2	1.0	
Total Hg	<0.0002	0.002	0.000012
Pb	<0.06	0.05	0.1
Mn	<0.01	0.2	
Mo	<0.02	1.0	
Ni	<0.04	0.2	
Total Recoverable Se	<0.005	0.05	0.002
Ag	<0.02	0.05	
Tl	<0.3		
U	0.0029	5.0	
Zn	0.7	10.0	25.0
Nitrate-N	<0.2	10.0	
pH (standard units)	7.8	between 6 and 9	between 6 and 9
TDS	770	1000.0	
TSS	<4.0		
Chloride	**266**	**250.0**	
Fluoride	<0.5	1.6	
Sulfate	14.7	600.0	
Semi-volatiles			
SW846-8270	Non-detect		
Volatiles			
SW846-8240	Non-detect		

Certificate of Analysis

Client: LOS ALAMOS NATIONAL LABS
Project: 9712126 FENTON HILL

Client Sample ID: **MGRO 11B** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-14A	WTDS-435	Total Dissolved Solids	9930	mg / L	10		MT 1997 476 - 9	12/16/97

Client Sample ID: **MGRO 11C** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-15A	WTDS-435	Total Dissolved Solids	12550	mg / L	10		MT 1997 476 - 10	12/16/97

Client Sample ID: **MGRO 12** 5-MG FOLD WATER Sample Matrix: **WATER**
11 to 20 Control Spike Duplicate Accuracy

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM-V-11.01/02						
12/12/97	9712126-16A	MT.1998.91	Uranium, total	0.0029	mg/L	0.0001		MT.1998.91 - 3	01/09/9
			EPA-200 series AA-GF						
12/12/97	9712126-16A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 13	12/23/9
		M97914	Selenium	< 0.005	mg / L	0.005		MW 1998 6 - 16	01/05/9
			EPA-200.7 ICP						
12/12/97	9712126-16A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998 1 - 26	12/31/9
		M97927	Arsenic	< 0.06	mg / L	0.06		MW 1998 1 - 26	
		M97927	Barium	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 26	
		M97927	Boron	1.4	mg / L	0.1		MW 1998 21 - 26	01/06/
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 26	12/31/
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Iron	< 0.2	mg / L	0.2		MW.1998.21 - 26	01/06/
		M97927	Lead	< 0.06	mg / L	0.06		MW 1998.21 - 26	
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 26	12/31/
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 26	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 26	
		M97927	Zinc	0.7	mg / L	0.1	B	MW 1998.21 - 26	01/06
			SW846-7470 / EPA-245.1						
12/12/97	9712126-16A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW.1997.1051 - 17	12/24

Client Sample ID: **MGRO 13** 5-MG FOLD WATER Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run D
			EPA-335 / SM-4500						
12/12/97	9712126-17A	W97547	Cyanide	< 0.02	mg / L	0.02		MW 1997 1027 - 13	12/17

Client Sample ID: **MGRO 14** 5-MG FOLD WATER Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run D
			EPA-300 series						
12/12/97	9712126-18A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997 1025 - 18	12/1

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 15** 5-MG POND WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA-150.1					
12/12/97	9712126-19A	WPH-573	pH	7.8	units	0.1	MT.1997 446 - 3	12/13/97
			EPA-160 series					
12/12/97	9712126-19A	WTDS-435	Total Dissolved Solids	770	mg / L	10	MT 1997 476 - 11	12/16/97
		WTSS-494	Total Suspended Solids	< 4.0	mg / L	4	MT 1997 469 - 9	12/17/97
			EPA-300 series					
12/12/97	9712126-19A	W97543	Chloride	266	mg / L	0.5	MW.1997 1025 - 24	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5	MW.1997.1025 - 15	
		W97543	Sulfate	14.7	mg / L	0.5	MW 1997 1025 - 15	

Client Sample ID: **MGRO 16** 5-MG POND WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Dat
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-20A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	12/19/9
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG.1997 373 - 12	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Aniline	< 20	ug / L	10	XG.1997 373 - 12	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-20A	X97468	Anthracene	< 2.0	ug / L	1	XG.1997 373 - 12	12/19/97
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Benzoic acid	< 200	ug / L	100	XG.1997 373 - 12	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Chrysene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Fluorene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Naphthalene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Phenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Pyridine	< 20	ug / L	10	XG.1997 373 - 12	

Client Sample ID: **MGRO-17** MG FEND WATER Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Da
			SW846-8240 Volatiles						
12/12/97	9712126-21A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	12/24/
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-21A	X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG 1997 380 - 9	12.24.97
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Acetone	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Acrolein	< 20	ug / L	20	XG 1997 380 - 9	
		X97483	Acrylonitrile	< 20	ug / L	20	XG 1997 380 - 9	
		X97483	Benzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromoform	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromomethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chloroethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Chloroform	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chloromethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Freon 113	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Freon 12	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	Iodomethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Methylene chloride	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	o-Xylene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG 1997 380 - 9	
		X97483	Styrene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Toluene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG 1997 380 - 9	

OCD FILES

35MM DRAWINGS

GW-31

FILE NUMBER

General Correspondence

DOCUMENT TYPE

1999-1997.

1 C

NO OF DWGS

6 L

BOX

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 13, 1998
In Reply Refer To: ESH-18/WQ&H:98-0126
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Roger Anderson
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION, LOS ALAMOS NATIONAL LABORATORY, NOTICE OF INTENT TO DISCHARGE, MILAGRO PROJECT AT FENTON HILL

Dear Mr. Anderson:

At the February 13, 1998, monthly NMED-Laboratory water quality meeting Ms. Barbara Hoditschek (NMED/SWQB) and Ms. Phyllis Bustamante (NMED/GWQB) verbally requested the following additional information on the Laboratory's Notice of Intent (NOI) for the Milagro Project at Fenton Hill:

1. A revised map of the land application site which shows the location of potential release sites (PRSs) at Fenton Hill (TA-57);

2. The disposal fate of sludge removed from the 5-million gallon (MG) pond in1995;

3. A copy of the complete analytical report, including QAQC information, for the analytical results submitted with the NOI; and

4. Written approval of the NOI from the Santa Fe National Forest, Jemez Ranger District.

Please consider the following information and the enclosed attachments as the Laboratory's response to your request:

1. Attachment 1.0 is a revised map of the land application site. No PRSs are located within or down gradient of the application site;

2. In July 1995 six loads of sludge from the Milagro Project's 5-MG pond were shipped to Controlled Recovery Inc., Halfway (near Hobbs), New Mexico, for disposal. Transportation of the sludge was by Chemical Waste Management;

3. Attachment 2.0 is a copy of the complete analytical report for Milagro Project samples MGRO-12 through MGRO-17. Please note that samples MGRO-1 through MGRO-11 do not pertain to this NOI and were collected for other purposes; and

4. Attachment 3.0 is a copy of an approval letter from Mr. John F. Peterson, Jemez Ranger

Please call me at 667-7969 if you need any additional information regarding this NOI.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

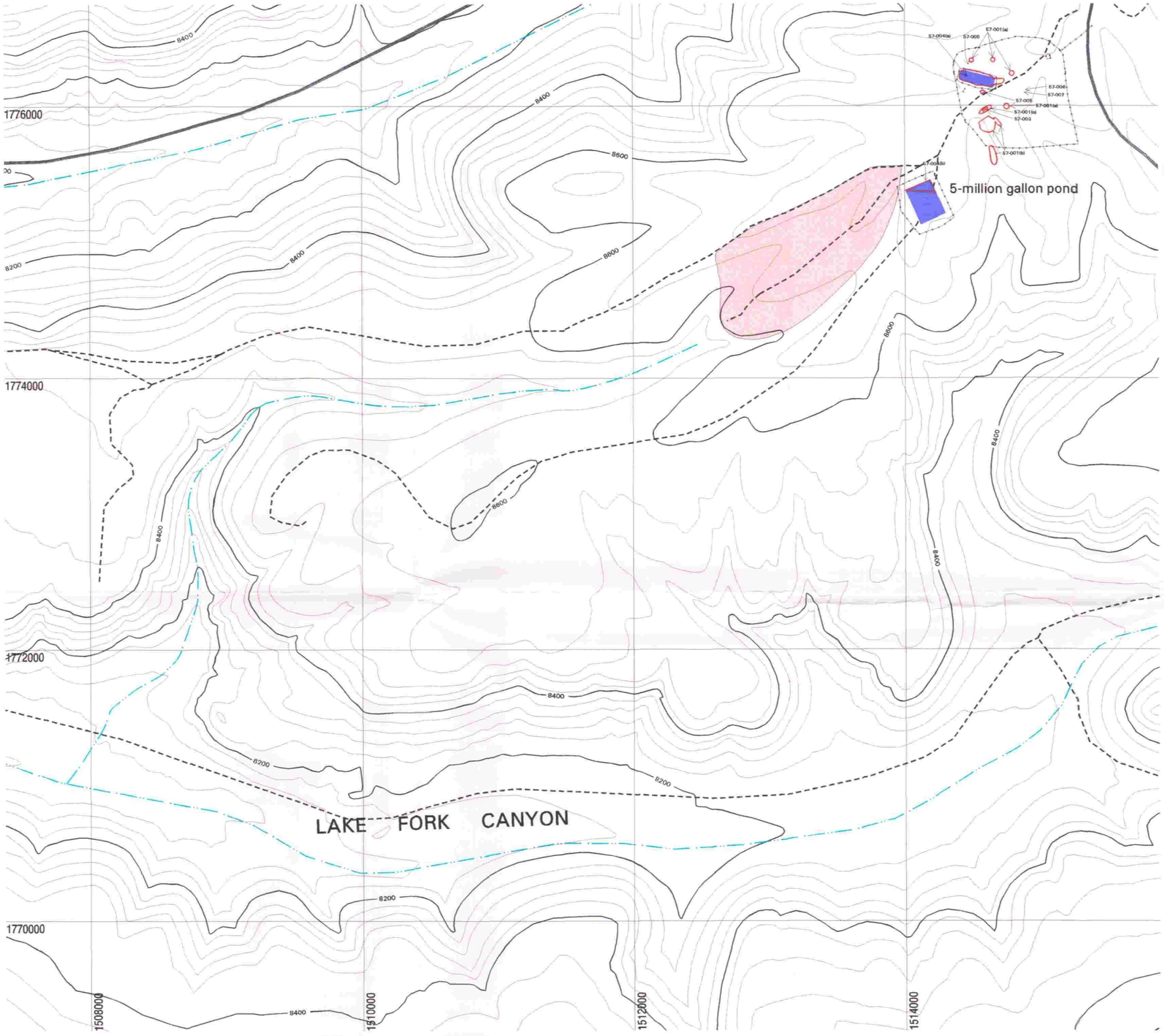
BB/mv

Enclosures: a/s

Cy: B. Koch, DOE/LAAO, w/o enc., MS A316
S. Rae, ESH-18, w/o enc., MS K497
N. Williams, ESH-18, w/o enc., MS K497
P. Bustamante, NMED, Santa Fe, New Mexico, w/o enc.
B. Hoditschek, NMED, Santa Fe, New Mexico, w/o enc.
G. Sinnis, P-23, w/o enc., MS H803
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Attachment 1.0

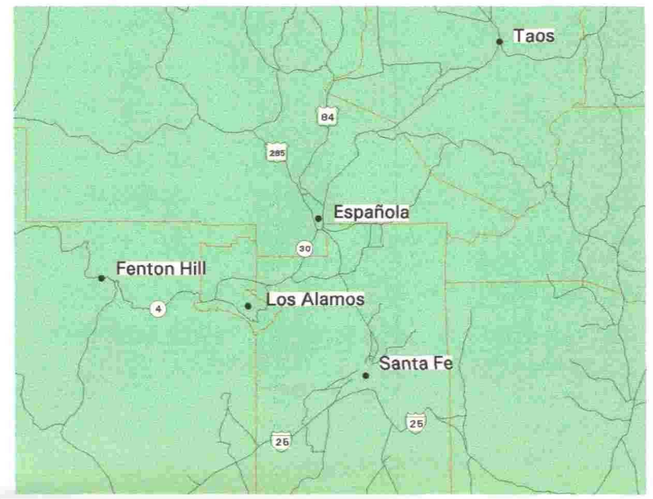
Milagro Project Land Application Site Map



FIMAD Plot ID: 106326 17 Mar 98

Milagro Project Land Application Site Map

- County Boundary
- Drainage
- Fence, Industrial
- PRS
- Road, Dirt
- Road, Paved
- Application Area (22.327 acres)



FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY

EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)

LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones

Date: March 17, 1998 FIMAD Plot ID: 106326

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000
Contour Interval: 40 ft

0 152 304 456 608
METERS
0 500 1000 1500 2000
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

Attachment 2.0

ASSAIGAI ANALYTICAL LABORATORIES, INC.
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820

LOS ALAMOS NATIONAL LABS
attn: BOB BEERS
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

* explanation of codes	
B	Analyte detected in Method Blank
E	Result is estimated
M	See explanatory memo

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

William P. Beaver, President of Assaigai Analytical Laboratories, Inc.

Client Sample ID: **MGRO-1A,1B** Sample Matrix: **WATER COMP**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM-V 1.01/02						
12/12/97	9712126-01A	MT.1998.91	Uranium, total	0.0045	mg/L	0.0001		MT.1998.91 - 1	01/09/98
			EPA-200 series AA-GF						
12/12/97	9712126-01A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 11	12/23/97
		M97914	Selenium	< 0.005	mg / L	0.005		MW.1998.6 - 14	01/05/98
			EPA-200.7 ICP						
12/12/97	9712126-01A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998.1 - 22	12/31/97
		M97927	Arsenic	< 0.06	mg / L	0.06		MW.1998.1 - 22	
		M97927	Barium	0.13	mg / L	0.01		MW.1998.1 - 22	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 22	
		M97927	Boron	1.2	mg / L	0.1		MW.1998.21 - 22	01/06/98
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 22	12/31/97
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 22	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 22	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 22	
		M97927	Iron	1.3	mg / L	0.2		MW.1998.21 - 22	01/06/98
		M97927	Lead	< 0.06	mg / L	0.06		MW.1998.1 - 22	12/31/97
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 22	
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 22	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 22	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 22	
		M97927	Zinc	0.2	mg / L	0.1	B	MW.1998.21 - 22	01/06/98
			SW846-7470,EPA-245						
12/12/97	9712126-01A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW.1997.1051 - 11	12/24/97

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

12/12/97	9712126-09A	X97468	4,6-Dinitro-2-methylphenol	< 22	ug / L	10	XG.1997.373 - 10	12/19/97
		X97468	4-Bromophenyl-phenylether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	4-Chloro-3-methylphenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Chloroaniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Chlorophenyl-phenylether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	4-Nitroaniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	4-Nitrophenol	< 44	ug / L	20	XG.1997.373 - 10	
		X97468	Acenaphthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Acenaphthylene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Aniline	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Anthracene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo (a) anthracene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(a)pyrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(b & k)fluoranthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Benzo(g,h,i)perylene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Benzoic acid	< 220	ug / L	100	XG.1997.373 - 10	
		X97468	Benzyl alcohol	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	bis (2-Chloroethyl) ether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Chloroethoxy)methane	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Chloroisopropyl)ether	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	bis(2-Ethylhexyl)phthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Butylbenzylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Chrysene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	di-n-Butylphthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	di-n-Octylpthalate	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Dibenz(a,h)anthracene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Dibenzofuran	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Diethylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Dimethylphthalate	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Fluoranthene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Fluorene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorobutadiene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Hexachlorocyclopentadiene	< 110	ug / L	50	XG.1997.373 - 10	
		X97468	Hexachloroethane	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Indeno(1,2,3-cd)pyrene	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Isophorone	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	n-Nitroso-di-n-propylamine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	n-Nitroso-dimethyl-amine	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	n-Nitrosodiphenylamine	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Naphthalene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Nitrobenzene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Pentachlorophenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Phenanthrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Phenol	< 22	ug / L	10	XG.1997.373 - 10	
		X97468	Pyrene	< 2.2	ug / L	1	XG.1997.373 - 10	
		X97468	Pyridine	< 22	ug / L	10	XG.1997.373 - 10	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 9B** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-10A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 11	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 11	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 11	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG.1997 373 - 11	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG.1997 373 - 11	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG 1997 373 - 11	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG 1997 373 - 11	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG 1997 373 - 11	
		X97468	Aniline	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	Anthracene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	Benzoic acid	< 200	ug / L	100	XG 1997 373 - 11	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG 1997 373 - 11	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG 1997 373 - 11	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997 373 - 11	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG 1997 373 - 11	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997 373 - 11	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG 1997 373 - 11	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-10A	X97468	Chrysene	< 2.0	ug / L	1	XG.1997.373 - 11	12/19/97
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Fluorene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997.373 - 11	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Naphthalene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Phenol	< 20	ug / L	10	XG.1997.373 - 11	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997.373 - 11	
		X97468	Pyridine	< 20	ug / L	10	XG.1997.373 - 11	

Client Sample ID: **MGRO 10A** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8240 Volatiles					
12/12/97	9712126-11A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 7	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

12/12/97	9712126-11A	X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 7	12/24/97
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 7	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 7	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 7	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 7	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 7	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 7	

Client Sample ID **MGRO 10B** Sample Matrix **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8240 Volatiles					
12/12/97	9712126-12A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 8	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

12/12/97	9712126-12A	X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 8	12/24/97
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 8	
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 8	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 8	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 8	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 8	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 8	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 8	

Client Sample ID: **MGRO-11A** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA 160 Series					
12/12/97	9712126-13A	WTDS-435	Total Dissolved Solids	426	mg / L	10	MT.1997.476 - 8	12/16/97

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 11B** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-14A	WTDS-435	Total Dissolved Solids	9930	mg / L	10		MT.1997.476 - 9	12/16/97

Client Sample ID: **MGRO 11C** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-15A	WTDS-435	Total Dissolved Solids	12550	mg / L	10		MT.1997.476 - 10	12/16/97

Client Sample ID: **MGRO 12** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM V 11.01/02						
12/12/97	9712126-16A	MT.1998.91	Uranium, total	0.0029	mg/L	0.0001		MT.1998.91 - 3	01/09/98
			EPA-200 series AA-GF						
12/12/97	9712126-16A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW.1997.1044 - 13	12/23/97
		M97914	Selenium	< 0.005	mg / L	0.005		MW.1998.6 - 16	01/05/98
			EPA-200.7 ICP						
12/12/97	9712126-16A	M97927	Aluminum	< 0.5	mg / L	0.5		MW.1998.1 - 26	12/31/97
		M97927	Arsenic	< 0.06	mg / L	0.06		MW.1998.1 - 26	
		M97927	Barium	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW.1998.1 - 26	
		M97927	Boron	1.4	mg / L	0.1		MW.1998.21 - 26	01/06/98
		M97927	Cadmium	< 0.008	mg / L	0.008		MW.1998.1 - 26	12/31/97
		M97927	Chromium	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW.1998.1 - 26	
		M97927	Copper	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Iron	< 0.2	mg / L	0.2		MW.1998.21 - 26	01/06/98
		M97927	Lead	< 0.06	mg / L	0.06		MW.1998.21 - 26	
		M97927	Manganese	< 0.010	mg / L	0.01		MW.1998.1 - 26	12/31/97
		M97927	Nickel	< 0.04	mg / L	0.04		MW.1998.1 - 26	
		M97927	Silver	< 0.02	mg / L	0.02		MW.1998.1 - 26	
		M97927	Thallium	< 0.3	mg / L	0.3		MW.1998.1 - 26	
		M97927	Zinc	0.7	mg / L	0.1	B	MW.1998.21 - 26	01/06/98
			SW846-7470 / EPA-245.1						
12/12/97	9712126-16A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW.1997.1051 - 17	12/24/97

Client Sample ID: **MGRO 13** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-335 / SM-4500						
12/12/97	9712126-17A	W97547	Cyanide	< 0.02	mg / L	0.02		MW.1997.1027 - 13	12/17/97

Client Sample ID: **MGRO 14** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-300 series						
12/12/97	9712126-18A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997.1025 - 18	12/16/97

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 15** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA-150.1					
12/12/97	9712126-19A	WPH-573	pH	7.8	units	0.1	MT.1997.446 - 3	12/13/97
			EPA-160 series					
12/12/97	9712126-19A	WTDS-435	Total Dissolved Solids	770	mg / L	10	MT.1997.476 - 11	12/16/97
		WTSS-494	Total Suspended Solids	< 4.0	mg / L	4	MT.1997.469 - 9	12/17/97
			EPA-300 series					
12/12/97	9712126-19A	W97543	Chloride	266	mg / L	0.5	MW.1997.1025 - 24	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5	MW.1997.1025 - 15	
		W97543	Sulfate	14.7	mg / L	0.5	MW.1997.1025 - 15	

Client Sample ID: **MGRO 16** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-20A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG.1997.373 - 12	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Aniline	< 20	ug / L	10	XG.1997.373 - 12	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-20A	X97468	Anthracene	< 2.0	ug / L	1	XG.1997.373 - 12	12/19/97
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Benzoic acid	< 200	ug / L	100	XG.1997.373 - 12	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Chrysene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Fluorene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997.373 - 12	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Naphthalene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Phenol	< 20	ug / L	10	XG.1997.373 - 12	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997.373 - 12	
		X97468	Pyridine	< 20	ug / L	10	XG.1997.373 - 12	

Client Sample ID: **MGRO 17** Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8240 Volatiles					
12/12/97	9712126-21A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	12/24/97
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-21A	X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG.1997.380 - 9	12.24.97
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Acetone	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Acrolein	< 20	ug / L	20	XG.1997.380 - 9	
		X97483	Acrylonitrile	< 20	ug / L	20	XG.1997.380 - 9	
		X97483	Benzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromoform	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Bromomethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chloroethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Chloroform	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Chloromethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Freon 113	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Freon 12	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	Iodomethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Methylene chloride	< 10	ug / L	10	XG.1997.380 - 9	
		X97483	o-Xylene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG.1997.380 - 9	
		X97483	Styrene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Toluene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG.1997.380 - 9	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG.1997.380 - 9	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG.1997.380 - 9	

Quality Control Summary

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

QC Type **LCS: Lab Control Spike** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-160 series				
WTDS-435	WTDS-435(2)	Total Dissolved Solids	96	% Recovery	MT 1997 476 - 2	12/16/97
WTSS-494	WTSS-494(2)	Total Suspended Solids	79	% Recovery	MT 1997 469 - 2	12/17/97
		EPA-200 series AA-GF				
M97914	M97914-002	Molybdenum	98	(%) Recov	MW 1997 1044 - 9	12/23/97
	M97914-002	Selenium	89	(%) Recov	MW.1998 6 - 9	01/05/98
		EPA-200.7 ICP				
M97927	M97927-002	Aluminum	104	(%) Recov	MW 1998.1 - 17	12/31/97
	M97927-002	Aluminum	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Arsenic	97	(%) Recov	MW.1998.1 - 17	12/31/97
	M97927-002	Arsenic	101	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Barium	100	(%) Recov	MW.1998.1 - 17	12/31/97
	M97927-002	Barium	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Beryllium	101	(%) Recov	MW.1998.21 - 17	
	M97927-002	Boron	99	(%) Recov	MW 1998.1 - 17	12/31/97
	M97927-002	Cadmium	105	(%) Recov	MW 1998.1 - 17	
	M97927-002	Cadmium	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Chromium	103	(%) Recov	MW.1998.1 - 17	12/31/97
	M97927-002	Chromium	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Cobalt	101	(%) Recov	MW.1998.1 - 17	12/31/97
	M97927-002	Cobalt	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Copper	101	(%) Recov	MW.1998.21 - 17	
	M97927-002	Iron	106	(%) Recov	MW.1998.21 - 17	
	M97927-002	Lead	104	(%) Recov	MW 1998.1 - 17	12/31/97
	M97927-002	Lead	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Manganese	102	(%) Recov	MW.1998.21 - 17	
	M97927-002	Nickel	101	(%) Recov	MW 1998.1 - 17	12/31/97
	M97927-002	Nickel	103	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Silver	102	(%) Recov	MW 1998.1 - 17	12/31/97
	M97927-002	Silver	102	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Thallium	102	(%) Recov	MW.1998.1 - 17	12/31/97
	M97927-002	Thallium	101	(%) Recov	MW.1998.21 - 17	01/06/98
	M97927-002	Zinc	103	(%) Recov	MW 1998.21 - 17	
		EPA-300 series				
W97543	W97543-002	Chloride	95	% Recovery	MW 1997 1025 - 4	12/16/97
	W97543-002	Fluoride	96	% Recovery	MW.1997 1025 - 4	
	W97543-002	Nitrate, Nitrogen	98	% Recovery	MW 1997.1025 - 4	
	W97543-002	Sulfate	98	% Recovery	MW.1997.1025 - 4	
		EPA-335 / SM-4500				
W97547	W97547-002	Cyanide	96	(%) Recov	MW 1997 1027 - 3	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-002	Mercury	92	(%) Recov	MW.1997.1051 - 9	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-001	1,1 Dichloroethene	111	% Recovery	XG.1997.380 - 1	12/24/97
	X97483-001	Benzene	108	% Recovery	XG 1997.380 - 1	
	X97483-001	Chlorobenzene	108	% Recovery	XG.1997.380 - 1	
	X97483-001	Toluene	108	% Recovery	XG.1997.380 - 1	
	X97483-001	Trichloroethene	108	% Recovery	XG 1997.380 - 1	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

		SW846-8270 / EPA-625 Semi-Volatiles				
X97468	X97468-002	1,2,4-Trichlorobenzene	81	% Recovery	XG.1997.373 - 1	12/19/97
	X97468-002	1,4-Dichlorobenzene	78	% Recovery	XG.1997.373 - 1	
	X97468-002	2,4-Dinitrotoluene	98	% Recovery	XG.1997.373 - 1	
	X97468-002	2-Chlorophenol	92	% Recovery	XG.1997.373 - 1	
	X97468-002	4-Chloro-3-methylphenol	91	% Recovery	XG.1997.373 - 1	
	X97468-002	4-Nitrophenol	37	% Recovery	XG.1997.373 - 1	
	X97468-002	Acenaphthene	93	% Recovery	XG.1997.373 - 1	
	X97468-002	n-Nitroso-di-n-propylamine	92	% Recovery	XG.1997.373 - 1	
	X97468-002	Pentachlorophenol	96	% Recovery	XG.1997.373 - 1	
	X97468-002	Phenol	37	% Recovery	XG.1997.373 - 1	
	X97468-002	Pyrene	110	% Recovery	XG.1997.373 - 1	

QC Type **LCSD: Lab Control Spike Duplicate Accuracy** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-160 series				
WTDS-435	WTDS-435(3)	Total Dissolved Solids	99	% Recovery	MT.1997.476 - 3	12/16/97
WTSS-494	WTSS-494(3)	Total Suspended Solids	85	% Recovery	MT.1997.469 - 3	12/17/97
		EPA-200 series AA-GF				
M97914	M97914-003	Molybdenum	100	(%) Recov	MW.1997.1044 - 10	12/23/97
	M97914-003	Selenium	90	(%) Recov	MW.1998.6 - 10	01/05/98
		EPA-200.7 ICP				
M97927	M97927-003	Aluminum	102	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Aluminum	100	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Arsenic	104	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Arsenic	101	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Barium	100	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Barium	100	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Beryllium	102	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Beryllium	101	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Boron	101	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Cadmium	105	(%) Recov	MW.1998.1 - 18	
	M97927-003	Cadmium	102	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Chromium	104	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Chromium	102	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Cobalt	102	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Cobalt	102	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Copper	104	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Copper	100	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Iron	105	(%) Recov	MW.1998.21 - 18	
	M97927-003	Lead	107	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Lead	103	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Manganese	105	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Manganese	102	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Nickel	103	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Nickel	102	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Silver	103	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Silver	101	(%) Recov	MW.1998.21 - 18	01/06/98
	M97927-003	Thallium	102	(%) Recov	MW.1998.1 - 18	12/31/97
	M97927-003	Thallium	105	(%) Recov	MW.1998.21 - 18	01/06/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

M97927	M97927-003	Zinc	103	(%) Recov	MW.1998.21 - 18	01/06/98
		EPA-300 series				
W97543	W97543-003	Chloride	94	% Recovery	MW 1997 1025 - 5	12/16/97
	W97543-003	Fluoride	95	% Recovery	MW.1997.1025 - 5	
	W97543-003	Nitrate, Nitrogen	96	% Recovery	MW 1997.1025 - 5	
	W97543-003	Sulfate	98	% Recovery	MW 1997 1025 - 5	
		EPA-335 / SM-4500				
W97547	W97547-003	Cyanide	95	(%) Recov	MW 1997 1027 - 4	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-003	Mercury	92	(%) Recov	MW 1997 1051 - 10	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-002	1,1 Dichloroethene	110	% Recovery	XG.1997.380 - 2	12/24/97
	X97483-002	Benzene	108	% Recovery	XG.1997.380 - 2	
	X97483-002	Chlorobenzene	106	% Recovery	XG 1997 380 - 2	
	X97483-002	Toluene	114	% Recovery	XG.1997.380 - 2	
	X97483-002	Trichloroethene	106	% Recovery	XG.1997.380 - 2	
		SW846-8270 / EPA-625 Semi-Volatiles				
X97468	X97468-003	1,2,4-Trichlorobenzene	81	% Recovery	XG.1997.373 - 2	12/19/97
	X97468-003	1,4-Dichlorobenzene	77	% Recovery	XG.1997.373 - 2	
	X97468-003	2,4-Dinitrotoluene	97	% Recovery	XG.1997.373 - 2	
	X97468-003	2-Chlorophenol	90	% Recovery	XG.1997.373 - 2	
	X97468-003	4-Chloro-3-methylphenol	90	% Recovery	XG.1997.373 - 2	
	X97468-003	4-Nitrophenol	36	% Recovery	XG.1997.373 - 2	
	X97468-003	Acenaphthene	92	% Recovery	XG.1997.373 - 2	
	X97468-003	n-Nitroso-di-n-propylamine	98	% Recovery	XG 1997 373 - 2	
	X97468-003	Pentachlorophenol	87	% Recovery	XG.1997.373 - 2	
	X97468-003	Phenol	38	% Recovery	XG.1997.373 - 2	
	X97468-003	Pyrene	110	% Recovery	XG.1997.373 - 2	

QC Type **LCSD: Lab Control Spike Duplicate Precision** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-160 series				
WTDS-435	WTDS-435(3)	Total Dissolved Solids	1	PFA	MT 1997 476 - 3	12/16/97
WTSS-494	WTSS-494(3)	Total Suspended Solids	3	PFA	MT 1997.469 - 3	12/17/97
		EPA-200 series AA-GF				
M97914	M97914-003	Molybdenum	2	(%) RPD	MW 1997 1044 - 10	12/23/97
	M97914-003	Selenium	1	(%) RPD	MW 1998 6 - 10	01/05 98
		EPA-200.7 ICP				
M97927	M97927-003	Aluminum	2	(%) RPD	MW 1998.1 - 18	12/31/97
	M97927-003	Aluminum	2	(%) RPD	MW 1998.21 - 18	01/06/98
	M97927-003	Arsenic	7	(%) RPD	MW 1998.1 - 18	12/31/97
	M97927-003	Arsenic	< 1	(%) RPD	MW 1998.21 - 18	01/06/98
	M97927-003	Barium	< 1	(%) RPD	MW 1998.1 - 18	12/31/97
	M97927-003	Barium	2	(%) RPD	MW 1998.21 - 18	01/06/98
	M97927-003	Beryllium	< 1	(%) RPD	MW 1998.1 - 18	12/31/97
	M97927-003	Beryllium	< 1	(%) RPD	MW 1998.21 - 18	01/06/98
	M97927-003	Boron	2	(%) RPD	MW 1998.1 - 18	12/31/97
	M97927-003	Cadmium	< 1	(%) RPD	MW 1998.1 - 18	
	M97927-003	Cadmium	< 1	(%) RPD	MW 1998.21 - 18	01/06/98
	M97927-003	Chromium	2	(%) RPD	MW 1998.1 - 18	12/31/97

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

M97927	M97927-003	Chromium	< 1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Cobalt	1	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Cobalt	< 1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Copper	< 1	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Copper	1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Iron	< 1	(%) RPD	MW.1998.21 - 18	
	M97927-003	Lead	2	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Lead	1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Manganese	< 1	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Manganese	< 1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Nickel	2	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Nickel	< 1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Silver	< 1	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Silver	< 1	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Thallium	< 1	(%) RPD	MW.1998.1 - 18	12/31/97
	M97927-003	Thallium	3	(%) RPD	MW.1998.21 - 18	01/06/98
	M97927-003	Zinc	< 1	(%) RPD	MW.1998.21 - 18	
		EPA-300 series				
W97543	W97543-003	Chloride	1	RPD	MW.1997.1025 - 5	12/16/97
	W97543-003	Fluoride	2	RPD	MW.1997.1025 - 5	
	W97543-003	Nitrate, Nitrogen	2	RPD	MW.1997.1025 - 5	
	W97543-003	Sulfate	< 1	RPD	MW.1997.1025 - 5	
		EPA-335 / SM-4500				
W97547	W97547-003	Cyanide	< 1	(%) RPD	MW.1997.1027 - 4	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-003	Mercury	< 1	(%) RPD	MW.1997.1051 - 10	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-002	1,1 Dichloroethene	< 1	RPD	XG.1997.380 - 2	12/24/97
	X97483-002	Benzene	< 1	RPD	XG.1997.380 - 2	
	X97483-002	Chlorobenzene	1	RPD	XG.1997.380 - 2	
	X97483-002	Toluene	5	RPD	XG.1997.380 - 2	
	X97483-002	Trichloroethene	2	RPD	XG.1997.380 - 2	
		SW846-8270 / EPA-625 Semi-Volatiles				
X97468	X97468-003	1,2,4-Trichlorobenzene	< 1	RPD	XG.1997.373 - 2	12/19/97
	X97468-003	1,4-Dichlorobenzene	< 1	RPD	XG.1997.373 - 2	
	X97468-003	2,4-Dinitrotoluene	< 1	RPD	XG.1997.373 - 2	
	X97468-003	2-Chlorophenol	2	RPD	XG.1997.373 - 2	
	X97468-003	4-Chloro-3-methylphenol	1	RPD	XG.1997.373 - 2	
	X97468-003	4-Nitrophenol	5	RPD	XG.1997.373 - 2	
	X97468-003	Acenaphthene	< 1	RPD	XG.1997.373 - 2	
	X97468-003	n-Nitroso-di-n-propylamine	6	RPD	XG.1997.373 - 2	
	X97468-003	Pentachlorophenol	10	RPD	XG.1997.373 - 2	
	X97468-003	Phenol	3	RPD	XG.1997.373 - 2	
	X97468-003	Pyrene	< 1	RPD	XG.1997.373 - 2	

QC Type **MB: Method Blank** QC Matrix: **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-160 series				
WTDS-435	WTDS-435(1)	Total Dissolved Solids	< 10.0	mg / L	MT.1997.476 - 1	12/16/97
WTSS-494	WTSS-494(1)	Total Suspended Solids	< 4.0	mg / L	MT.1997.469 - 1	12/17/97

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

		EPA-200 series AA-GF				
M97914	M97914-001	Molybdenum	< 0.02	mg / L	MW.1997.1044 - 8	12/23/97
	M97914-001	Selenium	< 0.005	mg / L	MW.1998.6 - 8	01/05/98
		EPA-200.7 ICP				
M97927	M97927-001	Aluminum	< 0.5	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Aluminum	< 0.5	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Arsenic	< 0.06	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Arsenic	< 0.06	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Barium	< 0.01	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Barium	< 0.01	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Beryllium	< 0.004	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Beryllium	< 0.004	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Boron	< 0.1	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Cadmium	< 0.008	mg / L	MW.1998.1 - 16	
	M97927-001	Cadmium	< 0.008	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Chromium	< 0.04	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Chromium	< 0.04	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Cobalt	< 0.01	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Cobalt	< 0.01	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Copper	< 0.04	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Copper	< 0.04	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Iron	< 0.2	mg / L	MW.1998.21 - 16	
	M97927-001	Lead	< 0.06	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Lead	< 0.06	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Manganese	< 0.010	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Manganese	< 0.010	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Nickel	< 0.04	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Nickel	< 0.04	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Silver	< 0.02	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Silver	< 0.02	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Thallium	< 0.3	mg / L	MW.1998.1 - 16	12/31/97
	M97927-001	Thallium	< 0.3	mg / L	MW.1998.21 - 16	01/06/98
	M97927-001	Zinc	0.5	mg / L	MW.1998.21 - 16	
		EPA-300 series				
W97543	W97543-001	Chloride	< 0.5	mg / L	MW.1997.1025 - 3	12/16/97
	W97543-001	Fluoride	< 0.5	mg / L	MW.1997.1025 - 3	
	W97543-001	Nitrate, Nitrogen	< 0.2	mg N/ L	MW.1997.1025 - 3	
	W97543-001	Sulfate	< 0.5	mg / L	MW.1997.1025 - 3	
		EPA-335 / SM-4500				
W97547	W97547-001	Cyanide	< 0.02	mg / L	MW.1997.1027 - 2	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-001	Mercury	< 0.0002	mg / L	MW.1997.1051 - 8	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-003	1,1 Dichloroethane	< 1.0	ug / L	XG.1997.380 - 3	12/24/97
	X97483-003	1,1 Dichloroethene	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,1,1 Trichloroethane	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,1,2 Trichloroethane	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,2 Dibromoethane (EDB)	< 1.0	ug / L	XG.1997.380 - 3	
	X97483-003	1,2 Dichlorobenzene	< 1.0	ug / L	XG.1997.380 - 3	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

X97483	X97483-003	1,2 Dichloroethane	< 1.0	ug / L	XG.1997 380 - 3	12/24/97
	X97483-003	1,2 Dichloropropane	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	1,2,3 Trichloropropane	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	1,3 Dichlorobenzene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	1,4 Dichloro-2-butene	< 10	ug / L	XG.1997 380 - 3	
	X97483-003	1,4 Dichlorobenzene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	2-Butanone (MEK)	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	2-Chloroethylvinylether	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	2-Hexanone (MBK)	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Acetone	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Acrolein	< 20	ug / L	XG.1997 380 - 3	
	X97483-003	Acrylonitrile	< 20	ug / L	XG.1997 380 - 3	
	X97483-003	Benzene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Bromodichloromethane	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Bromoform	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Bromomethane	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Carbon disulfide	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Carbon tetrachloride	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Chlorobenzene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Chlorodibromomethane	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Chloroethane	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Chloroform	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Chloromethane	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	cis-1,2 dichloroethene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	cis-1,3 dichloropropene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Dibromomethane	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Ethyl methacrylate	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Ethylbenzene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Freon 113	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Freon 12	< 10	ug / L	XG.1997 380 - 3	
	X97483-003	Iodomethane	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Methylene chloride	< 10	ug / L	XG.1997 380 - 3	
	X97483-003	o-Xylene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	p/m Xylenes	< 2.0	ug / L	XG.1997 380 - 3	
	X97483-003	Styrene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	t-1,2 Dichloroethene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	t-1,3 Dichloropropene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Tetrachloroethene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Toluene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Trichloroethene	< 1.0	ug / L	XG.1997 380 - 3	
	X97483-003	Trichlorofluoromethane	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Vinyl acetate	< 5.0	ug / L	XG.1997 380 - 3	
	X97483-003	Vinyl chloride	< 5.0	ug / L	XG.1997 380 - 3	
		SW846-8270 / EPA-625 Semi-Volatiles				
X97468	X97468-001	1,2,4-Trichlorobenzene	< 1.9	ug / L	XG.1997 373 - 3	12/19/97
	X97468-001	1,2-Dichlorobenzene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	1,3-Dichlorobenzene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	1,4-Dichlorobenzene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	1-Methylnaphthalene	< 1.9	ug / L	XG.1997 373 - 3	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

X97468	X97468-001	2,3,4,6-Tetrachlorophenol	< 93	ug / L	XG.1997 373 - 3	12/19/97
	X97468-001	2,4,5-Trichlorophenol	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2,4,6-Trichlorophenol	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2,4-Dichlorophenol	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2,4-Dimethylphenol	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	2,4-Dinitrophenol	< 93	ug / L	XG.1997 373 - 3	
	X97468-001	2,4-Dinitrotoluene	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2,6-Dinitrotoluene	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2-Chloronaphthalene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	2-Chlorophenol	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	2-Methylnaphthalene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	2-Methylphenol	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	2-Nitroaniline	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	2-Nitrophenol ccc	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	3+4 Methylphenol	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	3,3'-Dichlorobenzidine	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	3-Nitroaniline	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	4,6-Dinitro-2-methylphenol	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	4-Bromophenyl-phenylether	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	4-Chloro-3-methylphenol	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	4-Chloroaniline	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	4-Chlorophenyl-phenylether	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	4-Nitroaniline	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	4-Nitrophenol	< 37	ug / L	XG.1997 373 - 3	
	X97468-001	Acenaphthene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Acenaphthylene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Aniline	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	Anthracene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Azobenzene&1,2-Diphenylhydrazine	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Benzo (a) anthracene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Benzo(a)pyrene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Benzo(b & k)fluoranthene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Benzo(g,h,i)perylene	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	Benzoic acid	< 190	ug / L	XG.1997 373 - 3	
	X97468-001	Benzyl alcohol	< 93	ug / L	XG.1997 373 - 3	
	X97468-001	bis (2-Chloroethyl) ether	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	bis(2-Chloroethoxy)methane	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	bis(2-Chloroisopropyl)ether	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	bis(2-Ethylhexyl)phthalate	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	Butylbenzylphthalate	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Chrysene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	di-n-Butylphthalate	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	di-n-Octylpthalate	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	Dibenz(a,h)anthracene	< 19	ug / L	XG.1997 373 - 3	
	X97468-001	Dibenzofuran	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Diethylphthalate	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Dimethylphthalate	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Fluoranthene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Fluorene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Hexachlorobenzene	< 1.9	ug / L	XG.1997 373 - 3	
	X97468-001	Hexachlorobutadiene	< 1.9	ug / L	XG.1997 373 - 3	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

X97468	X97468-001	Hexachlorocyclopentadiene	< 93	ug / L	XG.1997.373 - 3	12/19/97
	X97468-001	Hexachloroethane	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Indeno(1,2,3-cd)pyrene	< 19	ug / L	XG.1997.373 - 3	
	X97468-001	Isophorone	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	n-Nitroso-di-n-propylamine	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	n-Nitroso-dimethyl-amine	< 19	ug / L	XG.1997.373 - 3	
	X97468-001	n-Nitrosodiphenylamine	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Naphthalene	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Nitrobenzene	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Pentachlorophenol	< 19	ug / L	XG.1997.373 - 3	
	X97468-001	Phenanthrene	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Phenol	< 19	ug / L	XG.1997.373 - 3	
	X97468-001	Pyrene	< 1.9	ug / L	XG.1997.373 - 3	
	X97468-001	Pyridine	< 19	ug / L	XG.1997.373 - 3	

QC Type **MD: Matrix Duplicate** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-150.1				
WPH-573	WPH-573(2)	pH	0.06	DIFF	MT.1997.446 - 2	12/13/97
		EPA-160 series				
WTDS-435	WTDS-435(13)	Total Dissolved Solids	< 1	PFA	MT.1997.476 - 13	12/16/97
WTSS-494	WTSS-494(13)	Total Suspended Solids	2	PFA	MT.1997.469 - 13	12/17/97

QC Type **MS: Matrix Spike** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-200 series AA-GF				
M97914	M97914-010	Molybdenum	102	(%) Recov	MW.1997.1044 - 15	12/23/97
	M97914-010	Selenium	64	(%) Recov	MW.1998.6 - 12	01/05/98
		EPA-200.7 ICP				
M97927	M97927-015	Aluminum	105	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Aluminum	104	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Arsenic	108	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Arsenic	101	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Barium	101	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Barium	100	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Beryllium	105	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Beryllium	102	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Boron	101	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Boron	99	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Cadmium	109	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Cadmium	105	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Chromium	108	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Chromium	104	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Cobalt	106	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Cobalt	102	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Copper	105	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Copper	103	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Iron	125	(%) Recov	MW.1998.21 - 32	
	M97927-015	Lead	111	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Lead	104	(%) Recov	MW.1998.21 - 32	01/06/98

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

M97927	M97927-015	Manganese	107	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Manganese	104	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Nickel	106	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Nickel	102	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Silver	102	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Silver	100	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Thallium	104	(%) Recov	MW.1998.1 - 32	12/31/97
	M97927-015	Thallium	100	(%) Recov	MW.1998.21 - 32	01/06/98
	M97927-015	Zinc	111	(%) Recov	MW.1998.21 - 32	
		EPA-300 series				
W97543	W97543-018	Chloride	101	% Recovery	MW.1997.1025 - 25	12/16/97
	W97543-018	Fluoride	94	% Recovery	MW.1997.1025 - 25	
	W97543-018	Nitrate, Nitrogen	95	% Recovery	MW.1997.1025 - 25	
	W97543-018	Sulfate	97	% Recovery	MW.1997.1025 - 25	
		EPA-335 / SM-4500				
W97547	W97547-007	Cyanide	87	(%) Recov	MW.1997.1027 - 8	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-005	Mercury	85	(%) Recov	MW.1997.1051 - 12	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-005	1,1 Dichloroethene	110	% Recovery	XG.1997.380 - 5	12/24/97
	X97483-005	Benzene	108	% Recovery	XG.1997.380 - 5	
	X97483-005	Chlorobenzene	106	% Recovery	XG.1997.380 - 5	
	X97483-005	Toluene	107	% Recovery	XG.1997.380 - 5	
	X97483-005	Trichloroethene	106	% Recovery	XG.1997.380 - 5	

QC Type **MSD: Matrix Spike Duplicate Accuracy** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-200 series AA-GF				
M97914	M97914-011	Molybdenum	107	(%) Recov	MW.1997.1044 - 16	12/23/97
	M97914-011	Selenium	70	(%) Recov	MW.1998.6 - 13	01/05/98
		EPA-200.7 ICP				
M97927	M97927-016	Aluminum	103	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Aluminum	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Arsenic	107	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Arsenic	101	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Barium	100	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Barium	100	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Beryllium	104	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Beryllium	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Boron	100	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Boron	98	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Cadmium	108	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Cadmium	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Chromium	106	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Chromium	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Cobalt	104	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Cobalt	100	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Copper	105	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Copper	103	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Iron	104	(%) Recov	MW.1998.21 - 33	

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

M97927	M97927-016	Lead	110	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Lead	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Manganese	106	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Manganese	102	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Nickel	106	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Nickel	101	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Silver	101	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Silver	99	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Thallium	105	(%) Recov	MW.1998.1 - 33	12/31/97
	M97927-016	Thallium	97	(%) Recov	MW.1998.21 - 33	01/06/98
	M97927-016	Zinc	105	(%) Recov	MW.1998.21 - 33	
		EPA-300 series				
W97543	W97543-019	Chloride	101	% Recovery	MW.1997.1025 - 26	12/16/97
	W97543-019	Fluoride	94	% Recovery	MW.1997.1025 - 26	
	W97543-019	Nitrate, Nitrogen	95	% Recovery	MW.1997.1025 - 26	
	W97543-019	Sulfate	98	% Recovery	MW.1997.1025 - 26	
		EPA-335 / SM-4500				
W97547	W97547-008	Cyanide	81	(%) Recov	MW.1997.1027 - 9	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-006	Mercury	92	(%) Recov	MW.1997.1051 - 13	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-006	1,1 Dichloroethene	110	% Recovery	XG.1997.380 - 6	12/24/97
	X97483-006	Benzene	106	% Recovery	XG.1997.380 - 6	
	X97483-006	Chlorobenzene	105	% Recovery	XG.1997.380 - 6	
	X97483-006	Toluene	105	% Recovery	XG.1997.380 - 6	
	X97483-006	Trichloroethene	105	% Recovery	XG.1997.380 - 6	

QC Type **MSD: Matrix Spike Duplicate Precision** QC Matrix **WATER**

QC Group	Run ID	Analyte	Result	Units	Run Group - #	Run Date
		EPA-200 series AA-GF				
M97914	M97914-011	Molybdenum	5	(%) RPD	MW.1997.1044 - 16	12/23/97
	M97914-011	Selenium	9	(%) RPD	MW.1998.6 - 13	01/05/98
		EPA-200.7 ICP				
M97927	M97927-016	Aluminum	2	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Aluminum	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Arsenic	< 1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Arsenic	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Barium	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Barium	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Beryllium	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Beryllium	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Boron	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Boron	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Cadmium	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Cadmium	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Chromium	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Chromium	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Cobalt	1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Cobalt	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Copper	< 1	(%) RPD	MW.1998.1 - 33	12/31/97

Client: **LOS ALAMOS NATIONAL LABS**
Project: **9712126 FENTON HILL**

M97927	M97927-016	Copper	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Iron	19	(%) RPD	MW.1998.21 - 33	
	M97927-016	Lead	< 1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Lead	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Manganese	2	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Manganese	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Nickel	< 1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Nickel	2	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Silver	< 1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Silver	< 1	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Thallium	< 1	(%) RPD	MW.1998.1 - 33	12/31/97
	M97927-016	Thallium	4	(%) RPD	MW.1998.21 - 33	01/06/98
	M97927-016	Zinc	5	(%) RPD	MW.1998.21 - 33	
		EPA-300 series				
W97543	W97543-019	Chloride	< 1	RPD	MW.1997.1025 - 26	12/16/97
	W97543-019	Fluoride	< 1	RPD	MW.1997.1025 - 26	
	W97543-019	Nitrate, Nitrogen	< 1	RPD	MW.1997.1025 - 26	
	W97543-019	Sulfate	< 1	RPD	MW.1997.1025 - 26	
		EPA-335 / SM-4500				
W97547	W97547-008	Cyanide	7	(%) RPD	MW.1997.1027 - 9	12/17/97
		SW846-7470 / EPA-245.1				
M97925	M97925-006	Mercury	8	(%) RPD	MW.1997.1051 - 13	12/24/97
		SW846-8240 Volatiles				
X97483	X97483-006	1,1 Dichloroethene	< 1	RPD	XG.1997.380 - 6	12/24/97
	X97483-006	Benzene	1	RPD	XG.1997.380 - 6	
	X97483-006	Chlorobenzene	< 1	RPD	XG.1997.380 - 6	
	X97483-006	Toluene	1	RPD	XG.1997.380 - 6	
	X97483-006	Trichloroethene	2	RPD	XG.1997.380 - 6	

Surrogate Summary: Fraction

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 9A** Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles			
9712126-09A	X97468	X97468-010	2,4,6-Tribromophenol	106	XG 1997 373 - 10	12/19/97
		X97468-010	2-Fluorobiphenyl	95	XG 1997 373 - 10	
		X97468-010	2-Fluorophenol	68	XG.1997 373 - 10	
		X97468-010	Nitrobenzene-D5	96	XG 1997 373 - 10	
		X97468-010	Phenol-D6	46	XG 1997 373 - 10	
		X97468-010	Terphenyl-D14	101	XG.1997.373 - 10	

Client Sample ID: **MGRO 9B** Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles			
9712126-10A	X97468	X97468-011	2,4,6-Tribromophenol	102	XG.1997.373 - 11	12/19/97
		X97468-011	2-Fluorobiphenyl	95	XG.1997.373 - 11	
		X97468-011	2-Fluorophenol	67	XG.1997.373 - 11	
		X97468-011	Nitrobenzene-D5	98	XG.1997.373 - 11	
		X97468-011	Phenol-D6	43	XG.1997.373 - 11	
		X97468-011	Terphenyl-D14	100	XG.1997.373 - 11	

Client Sample ID: **MGRO 10A** Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8240 Volatiles			
9712126-11A	X97483	X97483-007	1,2 Dichloroethane-D4	104	XG.1997.380 - 7	12/24/97
		X97483-007	Bromofluorobenzene	93	XG 1997.380 - 7	
		X97483-007	Toluene-D8	101	XG.1997.380 - 7	

Client Sample ID: **MGRO 10B** Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8240 Volatiles			
9712126-12A	X97483	X97483-008	1,2 Dichloroethane-D4	104	XG 1997 380 - 8	12/24/97
		X97483-008	Bromofluorobenzene	88	XG.1997.380 - 8	
		X97483-008	Toluene-D8	102	XG.1997.380 - 8	

Client Sample ID: **MGRO 16** Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles			
9712126-20A	X97468	X97468-012	2,4,6-Tribromophenol	104	XG.1997 373 - 12	12/19/97
		X97468-012	2-Fluorobiphenyl	96	XG.1997 373 - 12	
		X97468-012	2-Fluorophenol	66	XG.1997.373 - 12	
		X97468-012	Nitrobenzene-D5	95	XG.1997 373 - 12	
		X97468-012	Phenol-D6	43	XG 1997 373 - 12	
		X97468-012	Terphenyl-D14	103	XG.1997.373 - 12	

Surrogate Summary: Fraction

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 17**

Sample Matrix: **WATER**

Fraction	QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
			SW846-8240 Volatiles			
9712126-21A	X97483	X97483-009	1,2 Dichloroethane-D4	103	XG 1997 380 - 9	12/24 97
		X97483-009	Bromofluorobenzene	90	XG 1997 380 - 9	
		X97483-009	Toluene-D8	101	XG 1997 380 - 9	

Surrogate Summary: QC

Client: LOS ALAMOS NATIONAL LABS

Project: 9712126 FENTON HILL

QC Type **LCS: Lab Control Spike** QC Matrix **WATER**

QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
		SW846-8240 Volatiles			
X97483	X97483-001	1,2 Dichloroethane-D4	105	XG 1997 380 - 1	12/24/97
	X97483-001	Bromofluorobenzene	93	XG.1997.380 - 1	
	X97483-001	Toluene-D8	101	XG 1997 380 - 1	
		SW846-8270 / EPA-625 Semi-Volatiles			
X97468	X97468-002	2,4,6-Tribromophenol	108	XG 1997 373 - 1	12/19/97
	X97468-002	2-Fluorobiphenyl	96	XG.1997 373 - 1	
	X97468-002	2-Fluorophenol	64	XG.1997 373 - 1	
	X97468-002	Nitrobenzene-D5	95	XG.1997.373 - 1	
	X97468-002	Phenol-D6	41	XG.1997 373 - 1	
	X97468-002	Terphenyl-D14	102	XG.1997.373 - 1	

QC Type **LCSD: Lab Control Spike Duplicate Accuracy** QC Matrix **WATER**

QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
		SW846-8240 Volatiles			
X97483	X97483-002	1,2 Dichloroethane-D4	104	XG.1997.380 - 2	12/24/97
	X97483-002	Bromofluorobenzene	94	XG.1997.380 - 2	
	X97483-002	Toluene-D8	101	XG.1997.380 - 2	
		SW846-8270 / EPA-625 Semi-Volatiles			
X97468	X97468-003	2,4,6-Tribromophenol	106	XG.1997.373 - 2	12/19/97
	X97468-003	2-Fluorobiphenyl	96	XG.1997.373 - 2	
	X97468-003	2-Fluorophenol	66	XG.1997.373 - 2	
	X97468-003	Nitrobenzene-D5	95	XG.1997.373 - 2	
	X97468-003	Phenol-D6	43	XG.1997.373 - 2	
	X97468-003	Terphenyl-D14	103	XG.1997.373 - 2	

QC Type **LCSD: Lab Control Spike Duplicate Precision** QC Matrix **WATER**

QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
		SW846-8240 Volatiles			
X97483	X97483-002	1,2 Dichloroethane-D4	104	XG.1997.380 - 2	12/24/97
	X97483-002	Bromofluorobenzene	94	XG 1997 380 - 2	
	X97483-002	Toluene-D8	101	XG.1997.380 - 2	
		SW846-8270 / EPA-625 Semi-Volatiles			
X97468	X97468-003	2,4,6-Tribromophenol	106	XG.1997.373 - 2	12/19/97
	X97468-003	2-Fluorobiphenyl	96	XG.1997.373 - 2	
	X97468-003	2-Fluorophenol	66	XG.1997.373 - 2	
	X97468-003	Nitrobenzene-D5	95	XG.1997.373 - 2	
	X97468-003	Phenol-D6	43	XG.1997 373 - 2	
	X97468-003	Terphenyl-D14	103	XG.1997.373 - 2	

QC Type **MB: Method Blank** QC Matrix **WATER**

QC Group	Run ID	Surrogate	% Recovery	Run Group - #	Run Date
		SW846-8240 Volatiles			
X97483	X97483-003	1,2 Dichloroethane-D4	103	XG.1997 380 - 3	12/24/97
	X97483-003	Bromofluorobenzene	90	XG.1997.380 - 3	
	X97483-003	Toluene-D8	102	XG.1997.380 - 3	

ASSAIGAI ANALYTICAL LABORATORIES, INC.

Chain of Custody Record

Lab job no.: [illegible] Date 12/12/97

Page 1 of 2

(505) 345-8964
3332 WEDGEWOOD
EL PASO, TEXAS 79925
(915) 593-6000

Client LANL Geo

Project Manager / Contact Bob Beers

Address

Telephone No. 662-7269

City / State / Zip LA NM

Fax No.

Project Name / Number Fenton Hill

Samplers: *(Signature)*

Contract / Purchase Order / Quote GT#

Analysis Required

AAL Field Station Number	Field Sample Number / Location	Date	Time	Sample Type	Type / Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	Total Metals* (See attached)	Cyanide	Uranium	Cl, F, SO4, TDS, pH	SVOA (8270)	VOA (8240)			Remarks
1A	MGGD-1A, 1B *	12/12/97	10:30	H_2O	1L Cubic	4°C	HNO_3	2	✓								Composite fractions A & B
	2A, 2B *		10:30 10:40		1L Cubic		NaOH	2		✓							
	3A, 3B *		10:30 10:40		1L Cubic		H_2SO_4	2			✓						
	4A, 4B *		10:30 10:40		1L Cubic		—	2				✓					
	5A		10:55		1L Cubic		HNO_3	1	✓								
	6A		10:55		1L Cubic		H_2SO_4	1			✓						
	7A		10:55		1L Cubic		NaOH	1		✓							
	8A		10:55		1L Cubic		—	1				✓					
	9A		10:55		1L AG		—	2					✓				
	9B		11:10		1L AG		—	2					✓				
	10A		10:55		40ml VOA		HCl	2						✓			
	10B	✓	10:55	✓	40ml VOA	✓	HCl	2						✓			

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature [illegible]	[illegible]	Signature [illegible]	Signature [illegible]	12/13/97	Signature [illegible]
Printed Robert Beers	Time	Printed Elvin J Chavez	Printed Elvin J Chavez	Time	Printed
Company LANL	[illegible]	Company	Company AAL	9:00am	Company LANL
Reason Ship to Client		Reason	Reason		Reason

Method of Shipment: COURIER

Shipment No.

Special Instructions:

Comments:

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (30 days max)
- ☐ Stored over 30 days (additional fee)
- ☐ Returned to customer

Chain of Custody Record

ASSAIGAI ANALYTICAL LABORATORIES, INC.

(505) 345-8964
3332 WEDGEWOOD
EL PASO, TEXAS 79925
(915) 593-6000

Lab job no.: 17126 Date 12/12/97

Page 2 of 2

Client [illegible] Project Manager / Contact Bob Beers

Address _____ Telephone No. 667-7965

City / State / Zip _____ Fax No. _____

Project Name / Number _____ Samplers: *(Signature)* _____

Contract / Purchase Order / Quote _____

Analysis Required

Lab Number	Field Sample Number / Location	Date	Time	Sample Type	Type / Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	TDS	Total Metals	Cyanide	Nitrate	Cl, F, SO4	8015	VOA	Remarks
1	MCBG-11A	12/12/97	11:45	H_2O	1L Cubic	4°C	—	1	✓							
1	11B		12:05		1L Cubic		—	1	✓							
1	11C		12:15		1L Cubic		—	1	✓							
1	12		1:30		1L Cubic		HNO_3	1		✓						
1	13		1:30		1L Cubic		NaOH	1			✓					
1	14		1:30		1L Cubic		H_2SO_4	1				✓				
1	15		1:30		1L Cubic		—	1					✓			
2	16		1:30		1L AG		—	2						✓		
11	17		1:30	✓	40ml VOA		HCL	2							✓	

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature [illegible]	12/12/97	Signature [illegible]	Signature [illegible]	12/13/97	Signature [illegible]
Printed [illegible]	Time [illegible]	Printed Elvin J. Chavez	Printed Elvin J. Chavez	Time 9:00 AM	Printed [illegible]
Company [illegible]		Company AALI	Company		Company [illegible]
Reason [illegible]		Reason	Reason		Reason

Method of Shipment: _____

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (30 days max)
- ☐ Stored over 30 days (additional fee)
- ☐ Returned to customer

COURIER

Attachment 3.0

UNITED STATES
DEPARTMENT OF
AGRICULTURE

FOREST
SERVICE

JEMEZ RANGER DISTRICT
P.O. BOX 150
JEMEZ SPRINGS, N.M. 87025
505-829-3535

Reply: 2720

Date: April 6, 1998

Steven Rae
Group Leader
Water Quality and Hydrology Group
ESH-18/WQ&H Mail Stop K497

Re: LANL Notice of Intent to Discharge, Milagro Project, Fenton Hill
Jemez Ranger District, Santa Fe National Forest

Dear Mr. Rae,

This letter is in reference to LANL's proposal for a one-time water discharge at Fenton Hill of approximately 2.5 million gallons of purified water from the Milagro Project's five million gallon pond. The water is to be land applied to National Forest System Land by a temporary sprinkler irrigation system. The State of New Mexico is delegated the authority to administer the Federal laws in regard to clean water. I therefore approve the proposed water discharge provided that the discharged water quality meets all applicable State and Federal laws, as indicated by an approved Notice of Intent by the New Mexico Environmental Department, Surface Water Quality Bureau.

I trust that this will meet your needs. Please call Diane Tafoya or Dennis Trujillo at (505) 829-3535, if you have any questions.
Sincerely,

FOR JOHN F. PETERSON
District Ranger

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 7, 1998
In Reply Refer To: ESH-18/WQ&H:98-0120
Mail Stop: K497
Telephone: (505) 667-7969

Mr. John Keiling
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
1190 St. Francis Drive
Santa Fe, New Mexico 87502

SUBJECT: **NOTICE OF INTENT TO DISCHARGE, MILAGRO PROJECT AT FENTON HILL, LOS ALAMOS NATIONAL LABORATORY**

Dear Mr. Keiling:

Ms. Phyllis Bustamante (NMED/GWQB) has asked me to provide you with a copy of Los Alamos National Laboratory's Notice of Intent (NOI) to discharge for the Milagro Project at Fenton Hill. Please find the enclosed NOI, site map, and analytical data. This NOI was submitted for the proposed land application of approximately 2.5 million gallons of purified water from the Milagro Project's five-million gallon pond. The water will be land applied to Forest Service land by a temporary sprinkler irrigation system. This is a one-time discharge.

Please call me at 667-7969 if you need additional information on this NOI.

Sincerely,

Robert Beers
Water Quality and Hydrology Group

RB/em

Cy: B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico, w/o enc.
P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/o enc.
S. Rae, ESH-18, w/o enc., MS K497
G. Sinnis, P-23, w/o enc., MS H803
B. Koch, DOE/LAAO, w/o enc., MS A316
N. Williams, ESH-18, w/o enc., MS K497
WQ&H File, w/o enc., MS K497
CIC-10, w/o enc., MS A150

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: January 27, 1998
In Reply Refer To: ESH-18/WQ&H:98-0008
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Glenn Saums
Surface Water Quality Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

Ms. Dale Doremus
Ground Water Quality Bureau
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NOTICE OF INTENT TO DISCHARGE, MILAGRO PROJECT AT FENTON HILL

Dear Mr. Saums and Ms. Doremus:

Enclosed is a Notice of Intent to Discharge (NOI) for the Milagro Project at Fenton Hill. This NOI is being submitted for the proposed land application of approximately 2.5 million gallons of purified water from the Milagro Project's five-million gallon pond. The water will be land applied to Forest Service land by a temporary sprinkler irrigation system. This will be a one-time discharge. Please see the attached NOI, site map, and analytical data for further information.

Please call Bob Beers at 667-7969 if you need additional information regarding this NOI.

Sincerely,

Steven Rae
Group Leader
Water Quality and Hydrology Group

SR:RB/rj

Enclosures a/s:

Cy: D. Trujillo, U.S. Forest Service, Jemez Ranger District
B. Koch, DOE/LAAO, w/enc., MS A316
G. Sinnis, P-23, w/enc., MS H803
B. Beers, ESH-18, w/enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
M. Saladen, ESH-18, w/enc., MS K497
H. Decker, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

NOTICE OF INTENT TO DISCHARGE

1. Name and address of the facility making the discharge.

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

2. Location of discharge.

Milagro Project at Fenton Hill
Sandoval County, New Mexico
NE 1/4 Section 13, T19N, R2E (New Mexico Principal Meridian)
1,776,000 N, 374,000 E (New Mexico State Plane Grid)

3. Project description.

Since 1995, Los Alamos National Laboratory and a number of academic institutions have operated an astrophysical observatory, called the Milagro Project, at Fenton Hill. Using light sensitive detectors submerged in a five-million gallon pond (lined and covered), the observatory records signals from high-energy cosmic emissions. In order to minimize interference, the water in the pond has been filtered (carbon and media filters), and softened through ion exchange. Fill and make-up water for the Milagro Project is provided by the facility's water supply well. Currently, the pond contains approximately 2.5 million gallons of purified water.

In April 1998, it will be necessary for the Milagro Project to drain the pond. The Laboratory proposes to drain the pond by applying the water to approximately 22 acres of Forest Service land adjacent to the facility. A map has been attached showing the location of the proposed application area. The U.S. Forest Service, Jemez Ranger District, has approved the discharge, contingent upon NMED approval.

4. The means of discharge (to lagoon, flowing stream, water course, arroyo, septic tank, other).

The discharge will be applied to the surface of approximately 22 acres of land within the boundaries of the Santa Fe National Forest. The method of land application is described below.

1. PVC pipes will serve as headers to deliver water from the pond throughout the application area.
2. Along each header, standard garden hoses will be attached.
3. At the end of each garden hose an impact-type (Rain Bird) sprayer will be installed. The sprayer will be set to maximum fog (to maximize evaporation) with a discharge rate of approximately 2-4 gallons per minute (gpm).
4. Sprayer locations and application rates will be chosen so as to minimize ponding and to prevent runoff from entering a water course.
5. The rate of application will be 100 gpm. Land application will be conducted 24 hours per day. The estimated duration of land application will be 18 days.
6. The land application site will be monitored during working hours. If ponding or runoff occurs, the offending sprayers will be turned off or moved.

The proposed discharge of approximately 2.5 million gallons of water is equal to approximately 7.67 acre-feet of water. Since water is being land applied to 22 acres of land, the Laboratory will be applying approximate 4.2 inches of water over an 18-day period (minus evaporation), or approximately 0.23 inches of water per day (minus evaporation).

5. **The estimated concentration of contaminants in the discharge.**

Six (6) samples of Milagro Project pond water, MGRO-12, MGRO-13, MGRO-14, MGRO-15, MGRO-16, and MGRO-17, were collected on December 12, 1997, and submitted to Assaigai Analytical Laboratories, Inc. for analysis for total metals, cyanide, nitrate, general chemistry, semi-volatile organic compounds, and volatile organic compounds, respectively. The enclosed Table 1.0 summarizes the analytical results. In addition, a copy of Assaigai's analytical report has been enclosed.

The Milagro Project pond water does not exceed any of the NMWQCC 3101. Surface Water Standards (See Table 1.0).

Two contaminants, boron (B) and chloride (Cl), are present in Milagro Project pond water at concentrations exceeding NMWQCC Ground Water Standards (See Table 1.0). Boron concentrations in the pond water (1.4 mg/L) can be attributed to the facility's water supply well since none of the Milagro Project's treatment operations introduce boron.

Chloride concentrations in the pond water (266 mg/L) marginally exceed the NMWQCC 3103. Ground Water Standard of 250 mg/L (See Table 1.0). The source of the chloride is presumed to be the water softener since testing of the facility's water supply well in 1995 showed chloride (Cl) concentrations at 36 mg/L.

6. **The type of operation from which the discharge derived.**

Astrophysical observatory (See #3-Project Description).

7. **The estimated flow to be discharged per day.**

Approximately 144,000 gallons per day. The total volume of water to be discharged is approximately 2.5 million gallons.

8. **The estimated depth to ground water (if available).**

The depth to the top of the aquifer at the site is approximately 370 ft (113m). Water level measurements in observation wells in the immediate area of the site indicate that the water table is nearly flat.

Signed Steven Rae **Date** Jan. 27, 1998

Steven Rae
Group Leader
Water Quality and Hydrology Group

Table 1.0

Milagro Project at Fenton Hill
Water Quality Data
5 MG Pond Water
Sample Date: 12/12/97
Sample Type: total, unfiltered

Analyte	Results (mg/L)	NM WQCC 3103 Ground Water Standards (mg/L)	NM WQCC 3101 Surface Water Standards (mg/L)
Al	<0.5	5.0	5.0
As	<0.06	0.1	0.2
Ba	<0.01	1.0	
Be	<0.004		0.1
B	**1.4**	**0.75**	5.0
Cd	<0.008	0.01	0.05
CN	<0.02	0.2	0.22
Cr	<0.04	0.05	1.0
Co	<0.01	0.05	1.0
Cu	<0.04	1.0	0.5
Fe	<0.2	1.0	
Total Hg	<0.0002	0.002	0.000012
Pb	<0.06	0.05	0.1
Mn	<0.01	0.2	
Mo	<0.02	1.0	
Ni	<0.04	0.2	
Total Recoverable Se	<0.005	0.05	0.002
Ag	<0.02	0.05	
Tl	<0.3		
U	0.0029	5.0	
Zn	0.7	10.0	25.0
Nitrate-N	<0.2	10.0	
pH (standard units)	7.8	between 6 and 9	between 6 and 9
TDS	770	1000.0	
TSS	<4.0		
Chloride	**266**	**250.0**	
Fluoride	<0.5	1.6	
Sulfate	14.7	600.0	
Semi-volatiles			
SW846-8270	Non-detect		
Volatiles			
SW846-8240	Non-detect		

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 11B** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-14A	WTDS-435	Total Dissolved Solids	9930	mg / L	10		MT 1997 476 - 9	12/16/97

Client Sample ID: **MGRO 11C** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			EPA-160 series						
12/12/97	9712126-15A	WTDS-435	Total Dissolved Solids	12550	mg / L	10		MT 1997 476 - 10	12/16/97

Client Sample ID: **MGRO 12** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Date
			ASTM V-11.01/02						
12/12/97	9712126-16A	MT.1998.91	Uranium, total	0.0029	mg/L	0.0001		MT.1998.91 - 3	01/09/9
			EPA-200 series AA-GF						
12/12/97	9712126-16A	M97914	Molybdenum	< 0.02	mg / L	0.02		MW 1997 1044 - 13	12/23/9
		M97914	Selenium	< 0.005	mg / L	0.005		MW 1998 6 - 16	01/05/9
			EPA-200.7 ICP						
12/12/97	9712126-16A	M97927	Aluminum	< 0.5	mg / L	0.5		MW 1998.1 - 26	12/31/9
		M97927	Arsenic	< 0.06	mg / L	0.06		MW 1998.1 - 26	
		M97927	Barium	< 0.01	mg / L	0.01		MW 1998.1 - 26	
		M97927	Beryllium	< 0.004	mg / L	0.004		MW 1998.1 - 26	
		M97927	Boron	1.4	mg / L	0.1		MW 1998.21 - 26	01/06/9
		M97927	Cadmium	< 0.008	mg / L	0.008		MW 1998.1 - 26	12/31/9
		M97927	Chromium	< 0.04	mg / L	0.04		MW 1998.1 - 26	
		M97927	Cobalt	< 0.01	mg / L	0.01		MW 1998.1 - 26	
		M97927	Copper	< 0.04	mg / L	0.04		MW 1998.1 - 26	
		M97927	Iron	< 0.2	mg / L	0.2		MW 1998.21 - 26	01/06/
		M97927	Lead	< 0.06	mg / L	0.06		MW 1998.21 - 26	
		M97927	Manganese	< 0.010	mg / L	0.01		MW 1998.1 - 26	12/31
		M97927	Nickel	< 0.04	mg / L	0.04		MW 1998.1 - 26	
		M97927	Silver	< 0.02	mg / L	0.02		MW 1998.1 - 26	
		M97927	Thallium	< 0.3	mg / L	0.3		MW 1998.1 - 26	
		M97927	Zinc	0.7	mg / L	0.1	B	MW 1998.21 - 26	01/06/
			SW846-7470 / EPA-245.1						
12/12/97	9712126-16A	M97925	Mercury	< 0.0002	mg / L	0.0002		MW 1997.1051 - 17	12/24

Client Sample ID: **MGRO 13** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run D
			EPA-335 / SM-4500						
12/12/97	9712126-17A	W97547	Cyanide	< 0.02	mg / L	0.02		MW 1997 1027 - 13	12/17

Client Sample ID: **MGRO 14** — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run D
			EPA-300 series						
12/12/97	9712126-18A	W97543	Nitrate, Nitrogen	< 0.2	mg N/ L	0.2		MW.1997 1025 - 18	12/16

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

Client Sample ID: **MGRO 15** 5-MG POND WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			EPA-150.1					
12/12/97	9712126-19A	WPH-573	pH	7.8	units	0.1	MT 1997 446 - 3	12/13/97
			EPA-160 series					
12/12/97	9712126-19A	WTDS-435	Total Dissolved Solids	770	mg / L	10	MT 1997 476 - 11	12/16/97
		WTSS-494	Total Suspended Solids	< 4.0	mg / L	4	MT 1997 469 - 9	12/17/97
			EPA-300 series					
12/12/97	9712126-19A	W97543	Chloride	266	mg / L	0.5	MW 1997 1025 - 24	12/16/97
		W97543	Fluoride	< 0.5	mg / L	0.5	MW 1997 1025 - 15	
		W97543	Sulfate	14.7	mg / L	0.5	MW 1997 1025 - 15	

Client Sample ID: **MGRO 16** 5-MG POND WATER — Sample Matrix: **WATER**

Collect	Fraction	QC Group	Analyte	Result	Units	Limit *	Run Group - #	Run Date
			SW846-8270 / EPA-625 Semi-Volatiles					
12/12/97	9712126-20A	X97468	1,2,4-Trichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 12	12/19/97
		X97468	1,2-Dichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	1,3-Dichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	1,4-Dichlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	1-Methylnaphthalene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2,3,4,6-Tetrachlorophenol	< 100	ug / L	50	XG 1997 373 - 12	
		X97468	2,4,5-Trichlorophenol	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2,4,6-Trichlorophenol	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2,4-Dichlorophenol	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2,4-Dimethylphenol	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2,4-Dinitrophenol	< 100	ug / L	50	XG 1997 373 - 12	
		X97468	2,4-Dinitrotoluene	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2,6-Dinitrotoluene	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2-Chloronaphthalene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2-Chlorophenol	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2-Methylnaphthalene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2-Methylphenol	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	2-Nitroaniline	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	2-Nitrophenol ccc	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	3+4 Methylphenol	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	3,3'-Dichlorobenzidine	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	3-Nitroaniline	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	4,6-Dinitro-2-methylphenol	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	4-Bromophenyl-phenylether	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	4-Chloro-3-methylphenol	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	4-Chloroaniline	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	4-Chlorophenyl-phenylether	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	4-Nitroaniline	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	4-Nitrophenol	< 41	ug / L	20	XG 1997 373 - 12	
		X97468	Acenaphthene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Acenaphthylene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Aniline	< 20	ug / L	10	XG 1997 373 - 12	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-20A	X97468	Anthracene	< 2.0	ug / L	1	XG.1997 373 - 12	12/19/97
		X97468	Azobenzene&1,2-Diphenylhydrazine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo (a) anthracene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(a)pyrene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(b & k)fluoranthene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Benzo(g,h,i)perylene	< 20	ug / L	10	XG 1997 373 - 12	
		X97468	Benzoic acid	< 200	ug / L	100	XG.1997 373 - 12	
		X97468	Benzyl alcohol	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	bis (2-Chloroethyl) ether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroethoxy)methane	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Chloroisopropyl)ether	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	bis(2-Ethylhexyl)phthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Butylbenzylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Chrysene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	di-n-Butylphthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	di-n-Octylpthalate	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Dibenz(a,h)anthracene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Dibenzofuran	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Diethylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Dimethylphthalate	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Fluoranthene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Fluorene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Hexachlorobenzene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Hexachlorobutadiene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Hexachlorocyclopentadiene	< 100	ug / L	50	XG.1997 373 - 12	
		X97468	Hexachloroethane	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Indeno(1,2,3-cd)pyrene	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Isophorone	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	n-Nitroso-di-n-propylamine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	n-Nitroso-dimethyl-amine	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	n-Nitrosodiphenylamine	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Napnthalene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Nitrobenzene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Pentachlorophenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Phenanthrene	< 2.0	ug / L	1	XG 1997 373 - 12	
		X97468	Phenol	< 20	ug / L	10	XG.1997 373 - 12	
		X97468	Pyrene	< 2.0	ug / L	1	XG.1997 373 - 12	
		X97468	Pyridine	< 20	ug / L	10	XG.1997 373 - 12	

Client Sample ID: MGRO-17 FIELD WATER Sample Matrix: WATER

Collect	Fraction	QC Group	Analyte	Result	Units	Limit	*	Run Group - #	Run Da
			SW846-8240 Volatiles						
12/12/97	9712126-21A	X97483	1,1 Dichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	12/24/9
		X97483	1,1 Dichloroethene	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,1 Trichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,1,2 Tetrachloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,2 Trichloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	
		X97483	1,1,2,2 Tetrachloroethane	< 1.0	ug / L	1		XG 1997 380 - 9	

Certificate of Analysis

Client: **LOS ALAMOS NATIONAL LABS**

Project: **9712126 FENTON HILL**

12/12/97	9712126-21A	X97483	1,2 Dibromoethane (EDB)	< 1.0	ug / L	1	XG 1997 380 - 9	12.24.97
		X97483	1,2 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2 Dichloroethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2 Dichloropropane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,2,3 Trichloropropane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,3 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	1,4 Dichloro-2-butene	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	1,4 Dichlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	2-Butanone (MEK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	2-Chloroethylvinylether	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	2-Hexanone (MBK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	4-Methyl-2-pentanone (MIBK)	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Acetone	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Acrolein	< 20	ug / L	20	XG 1997 380 - 9	
		X97483	Acrylonitrile	< 20	ug / L	20	XG 1997 380 - 9	
		X97483	Benzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromodichloromethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromoform	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Bromomethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Carbon disulfide	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Carbon tetrachloride	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chlorobenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chlorodibromomethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chloroethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Chloroform	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Chloromethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	cis-1,2 dichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	cis-1,3 dichloropropene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Dibromomethane	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Ethyl methacrylate	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Ethylbenzene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Freon 113	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Freon 12	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	Iodomethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Methyl t-butyl ether (MTBE)	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Methylene chloride	< 10	ug / L	10	XG 1997 380 - 9	
		X97483	o-Xylene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	p/m Xylenes	< 2.0	ug / L	2	XG 1997 380 - 9	
		X97483	Styrene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	t-1,2 Dichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	t-1,3 Dichloropropene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Tetrachloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Toluene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Trichloroethene	< 1.0	ug / L	1	XG 1997 380 - 9	
		X97483	Trichlorofluoromethane	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Vinyl acetate	< 5.0	ug / L	5	XG 1997 380 - 9	
		X97483	Vinyl chloride	< 5.0	ug / L	5	XG 1997 380 - 9	

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 6, 1998
In Reply Refer To: ESH-18/WQ&H:98-0118
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Mark Ashley
Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: GROUND WATER DISCHARGE PLAN (GW-31), MICRO-BOREHOLE DRILLING EXPERIMENTS AT FENTON HILL

Dear Mr. Ashley:

As you requested during our March 31, 1998, telephone conversation, I am providing you with information on the micro-borehole drilling experiments that Los Alamos National Laboratory is proposing to conduct at Fenton Hill. Attached is a Draft Master Plan that provides an overview of this proposed project. There are two important aspects of the project which I would like to bring to your attention: First, hole depths will be limited to 350 ft to assure that the fresh water aquifer is not penetrated, and Second, all drilling fluids will be contained on-site in the facility's one million gallon service pond. The project is scheduled to begin in May 1998.

Please call me at 667-7969 if you would like additional information on this project.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mv

Enclosures: a/s

Cy: S. Boyce, Jemez Ranger District, Santa Fe National Forest, w/enc.
J. Albright, EES-4, w/enc., MS D443
J. Thomson, EES-4, w/enc., MS D443
D. Thomas, P-FM, w/enc., MS D459
L. Rowton, P-FM, w/enc., MS D459
P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/enc.
S. Salzman, BLM, Albuquerque, New Mexico, w/enc.
S. Rae, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

DRAFT
MASTER PLAN
Micro-Borehole Drilling Experiments at Fenton Hill
Los Alamos National Laboratory, EES-4, GeoEngineering Group
March 30, 1998

Purpose
Los Alamos National Laboratory (LANL) wishes to engage in a research and development project in the interest of the advancement of microborehole drilling technology. LANL has identified numerous uses for this technology, including geophysical instrumentation placement and resource exploration. Initial operations will be coordinated with efforts to develop technology for seismic imaging "ahead of the bit" which may also be used to determine the borehole trajectory as it is drilled.

Scope
The project will involve the drilling of a series of shallow, small diameter holes ranging in size from 1-1/2" to 4" in diameter and 10' to 350' in depth. It is estimated that it will be necessary to drill no more than 20 total holes. Hole depths will be limited to 350' to assure that the fresh water aquifer will not be penetrated. Previous drilling activities associated with the Hot Dry Rock Project have given us clear knowledge of the lithology underlying the site.

The drilling will be performed with a trailer mounted coiled tubing unit using downhole rotary and/or percussion motors powered by water, air, or mist. All drilling fluids will be contained and disposed of in accordance with LANL waste management practices.

Location
The Fenton Hill site has been selected for the initial experimentation because of it's 375-400' thick layer of welded tuff overlying the nearest aquifer, it's existing infrastructure to support operations, and the fact that the area has been previously disturbed. The site is located in the Santa Fe National Forest, Jemez District, which is managed by the U.S.Forest Service (USFS).

All microborehole drilling operations within the Santa Fe National Forest will be conducted within the fence perimeter of the Fenton Hill Hot Dry Rock Site.

Schedule
It is expected that initial operations will commence in May, 1998 and continue for up to three years. We expect that all wells will be plugged within five years of commencement of work.

Regulatory Compliance
There is currently an Interagency Agreement in place between the Department of Energy (DOE) and the USFS which has facilitated the previous LANL operations at Fenton Hill. This agreement is currently being re-written to more clearly define LANL's future activities, including microborehole drilling R&D.

Although the Fenton Hill site is managed by the USFS, they have indicated that the Bureau of Land Management (BLM) is the responsible for the oversight of subsurface use of National Forest Lands. The BLM has indicated that no formal permitting is required for drilled holes which do not penetrate ground water. The New Mexico Office of the State Engineer (OSE) has also been contacted and verbally notified of our intentions. The OSE has verbally informed the Laboratory that they do not require permitting for wells which do not appropriate ground water. It will be necessary for the Laboratory to inform the New Mexico Oil Conservation Division (OCD) of the microborehole drilling R&D since the Laboratory has a Ground Water Discharge Plan (GW-31) with OCD for Fenton Hill activities.

Remediation
Following completion of their usefulness, all wells drilled during these experiments will be plugged and abandoned in accordance with Bureau of Land Management (BLM) regulations and drill site returned to it's previous condition.

Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Los Alamos, New Mexico 87544

JAN 30 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Kathy A. Garland
Acting Director
Oil Conservation Division
New Mexico Energy, Minerals,
and Natural Resources Department
2040 South Pacheco Street
Santa Fe, NM 87505

Dear Ms. Garland:

Subject: Ground Water Discharge Plan (GW-31) Annual Report for the Fenton Hill Geothermal Facility, 1997.

This letter and enclosures are being submitted to your division as a Ground Water Discharge Plan (GW-31) Annual Report for the Fenton Hill Geothermal Facility (facility) for CY 1997.

The following is a summary of the relevant information for 1997.

1. Enclosure I shows that there were no National Pollutant Discharge Elimination System (NPDES) wastewater discharges from the 1 Million Gallon (MG) service pond in 1997.

2. Enclosure II shows that no water was injected into EE2 in 1997. (It should be noted that EE2 is the only remaining geothermal well. All other geothermal wells were plugged and abandoned in 1996.)

3. Enclosure III contains a list of the shallow test wells which were plugged and abandoned during 1997 as a result of the planned decommissioning of the facility by the Department of Energy (DOE). Form G-103, Sundry Notice and Report, was not submitted to your division for these wells since they were all less than 1,000 feet deep.

4. Enclosure IV is a letter from the Environmental Protection Agency (EPA) to DOE approving Los Alamos National Laboratory's (LANL) request to discontinue the Fenton Hill Geothermal Facility's NPDES Permit (Permit No. NM0028576).

5. Enclosure V contains a description of LANL's off-site disposal of approximately 650,000 gallons of geothermal water and 20,000 gallons of sludge from the 1 MG service pond. This disposal activity was conducted as part of the planned decommissioning of the facility.

6. Enclosure VI contains a description of LANL's efforts to clean up the cement/mud slurry which was spilled into Burns Swale in November 1996.

Please call Bonnie Koch of my staff at 665-7202, or Bob Beers of LANL's Water Quality and Hydrology Group (ESH-18) at 667-7969, if you have any questions concerning this information.

Sincerely,

G. Thomas Todd
Area Manager

LAAME:3BK-020

Enclosures

cc w/enclosures:
S. Boyce
Acting District Ranger
Santa Fe National Forest
Jemez Ranger District
P. O. Box 150
Jemez Springs, NM 87025
J. Vozella, AAME, LAAO
B. Koch, LAAME, LAAO
S. Rae, ESH-18, LANL, MS-K497
N. Williams, ESH-18, LANL, MS-K497
B. Beers, ESH-18, LANL, MS-K497
M. Saladen, ESH-18, LANL, MS-K497
D. Thomas, EES-DO, LANL, MS-D446
J. Albright, EES-4, LANL, MS-D443
J. Thomson, EES-4, LANL, MS-D443

cc w/o enclosures:
D. Erickson, ESH-DO, LANL, MS-K491

Enclosure I

NPDES Permitted Discharges from the 1 MG Service Pond During 1997

Fenton Hill Geothermal Facility
Sandoval County, N.M.

Date of Discharge	Gallons Discharged From Service Pond
1997	NONE

There were no accidental spills or leaks from the 1 MG service pond during 1997.

Enclosure II

Water Injected Into Geothermal Wells During 1997

Fenton Hill Geothermal Facility
Sandoval County, N.M.

Dates of Injection	Location	Injected Volume (Gallons)
1997	EE2*	NONE

*EE2 is the only remaining geothermal well.

Enclosure III

Wellbore Plugging and Abandonment Operations During 1997

Fenton Hill Geothermal Facility
Sandoval County, N.M.

Well No.	Date P&A Completed	Depth (ft)
TH1	September, 1997	450
TH2	September, 1997	450
TH4	September, 1997	450
TH5	September, 1997	450

Enclosure IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

December 29, 1997

REPLY TO: 6WQ-CA

Mr. G. Thomas Todd
Area Manager
Department of Energy
Los Alamos Area Office
Los Alamos, New Mexico 87544

Re: NPDES Permit No. NM0028576-Dept. Of Energy-Los Alamos National Laboratory, Fenton Hill Geothermal Site

Dear Mr. Todd:

In accordance with your request on file in this office that the referenced NPDES Permit No. NM0028576 be discontinued, you are hereby notified that the permit has been discontinued.

Any resumption of the discharge without a permit will be unlawful. Should you again propose to discharge any pollutant from this facility to waters of the United States, it will be necessary to file a new application at least 180 days in advance of the proposed discharge. Any permit issued as a result of such reapplication will contain conditions and limitations consistent with the situation, and the law and the regulations in effect at the time of reissuance, irrespective of any previously issued permit.

If you have any questions, please contact Wilma Turner at the above address or telephone (214) 665-7516.

Sincerely yours,

Jack V. Ferguson, P.E.
Chief
NPDES Branch (6WQ-P)

cc: New Mexico Environment Department

Mr. Mike Saladen
University of California
Management Contractor for Operation
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Enclosure V

Disposal of Geothermal Water and Sludge from 1 MG Service Pond

Fenton Hill Geothermal Facility

Sandoval County, N.M.

Under the direction of the Department of Energy, Los Alamos National Laboratory is continuing its efforts to decommission the Fenton Hill Hot Dry Rock Geothermal Facility. In September and October of 1997, Los Alamos National Laboratory disposed of approximately 650,000 gallons of water and approximately 20,000 gallons of sludge from the facility's 1 million gallon (MG) service pond. MP Environmental Services, Inc. was contracted to haul the wastewater and sludge to the Butterfield Landfill near Phoenix, Arizona, for treatment and disposal.

Currently, the 1 MG service pond contains approximately 15,000 gallons of water from precipitation and the venting of the facility's remaining geothermal well, EE-2. Los Alamos National Laboratory will continue to use the 1 MG pond until EE-2 has completely ceased venting the geothermal fluid trapped at the boundaries of the Phase II reservoir. Once venting has ceased, the pond's liner will be removed and the pond back-filled. OCD will be notified before any D&D activities are conducted.

Enclosure VI

Clean-up of Burns Swale Spill Site

Fenton Hill Geothermal Facility

Sandoval County, N.M.

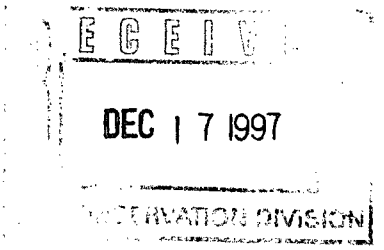
On June 16, 1997, Los Alamos National Laboratory and contract personnel conducted a clean-up of the Burns Swale spill site at Fenton Hill. The cement/mud material spilled into the water course in November, 1996, was collected using manual methods and then transported to the Fenton Hill facility using an all-terrain vehicle (ATV). Five 55-gallon drums of spill material were collected and subsequently disposed of at the Los Alamos County Landfill. TCLP analysis of the spill material determined that it was not a hazardous waste.

Following the clean-up, Laboratory and contract personnel re-entered Burns Swale to restore those areas of the water course which were disturbed by the ATV. Additionally, straw bales were placed in the water course at multiple locations as a Best Management Practice (BMP) to control erosion. The silt fences installed in November, 1996, as BMPs will be maintained until October, 1998. The straw bales will be left in the water course to naturally bio-degrade.

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: December 10, 1997
In Reply Refer To: ESH-18/WQ&H:97-0429
Mail Stop: K497
Telephone: (505) 667-7969



Mr. Mark Ashley
Oil Conservation Division
State of New Mexico Energy, Minerals, and
Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: DISPOSAL OF GEOTHERMAL WATER AND SLUDGE FROM LOS ALAMOS NATIONAL LABORATORY'S 1 MG POND AT FENTON HILL

Dear Mr. Ashley:

Under the direction of the Department of Energy, Los Alamos National Laboratory is continuing its efforts to decommission the Fenton Hill Hot Dry Rock Geothermal Facility. In September and October of 1997, Los Alamos National Laboratory disposed of approximately 650,000 gallons of water and approximately 20,000 gallons of sludge from the facility's 1 million gallon (MG) storage pond. MP Environmental Services, Inc. was contracted to haul the wastewater and sludge to the Butterfield Landfill near Phoenix, Arizona, for treatment and disposal.

Currently, the 1 MG pond contains approximately 15,000 gallons of water from precipitation and the venting of the facility's remaining geothermal well, EE-2. Los Alamos National Laboratory will continue to use the 1 MG pond until EE-2 has completely ceased venting the geothermal fluid trapped at the boundaries of the Phase II reservoir. Once venting has ceased, the pond's liner will be removed and the pond back-filled. Your agency will be notified before any D&D activities are conducted.

Please contact me at 667-7969 if you have any questions regarding this information.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

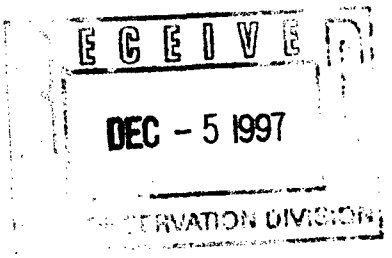
BB/mv

Cy: J. Plum, DOE/LAAAO, MS A316
S. Boyce, Forest Service, Jemez Springs
G. Saums, NMED SWQB, Santa Fe, NM
J. Albright, EES-4, MS D443
D. Thomas, EES-DO, MS D446
J. Thomson, EES-4, MS D443
S. Rae, ESH-18, MS K497
N. Williams, ESH-18, MS K497
WQ&H File, MS K497
CIC-10, MS A150

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: November 26, 1997
In Reply Refer To: ESH-18/WQ&H:97-0409
Mail Stop: K497
Telephone: (505) 667-7969



Mr. Mark Ashley
Oil Conservation Division
State of New Mexico Energy, Minerals, and
Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: MILAGRO PROJECT LAND APPLICATION SITE: POST-APPLICATION SOIL SAMPLING FOR 1997

Dear Mr. Ashley:

In April 1995 your Division conditionally approved Los Alamos National Laboratory's Notice of Intent to Discharge (NOI) for the Milagro Project at Fenton Hill. In accordance with the conditions of this approval, the Laboratory has conducted four rounds of soil sampling at Fenton Hill: (1) pre-application 1995; (2) post-application 1995; (3) post-application 1996; and (4) post-application 1997. The analytical report for post-application sampling in 1997 has been enclosed. In addition, I have enclosed two tables (Tables 1.0 and 2.0) which summarize all four sampling rounds. A map showing the sampling sites has also been enclosed.

In 1997 all of the down-gradient surface and sub-surface sampling locations (SS1, SBS1, SS2, SBS2, SS3, and SBS3) continued to show arsenic concentrations equivalent to pre-application or background conditions (See Tables 1.0 and 2.0). These stable arsenic concentrations strongly indicate that the arsenic is remaining within the application site and is not migrating down-gradient into the watercourse. In 1997 the two surface sampling locations within the application site (SS4, SS5) showed an increase in arsenic concentrations over the 1996 results (See Table 1.0). The sub-surface sampling locations within the application site (SBS4, SBS5) did not show any change from the three previous sampling rounds (See Table 2.0).

With the exception of arsenic, the total metals concentrations at all five sampling locations have shown to be stable throughout the four sampling rounds with no significant increases occurring as a result of the land application activities (See Tables 1.0 and 2.0). In view of these findings, the Laboratory is requesting a waiver from your Division from future sampling for the following metals: Ag, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, and Hg.

Due to the variability in the past three year's analytical results for arsenic at sampling locations SS4 and SS5, the Laboratory proposes to continue to monitor arsenic concentrations at the application site and down-gradient sampling locations in 1998.

If you have any questions regarding the enclosed analytical report or the Laboratory's request for a waiver, please contact me at 667-7969.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mv

Enclosures: a/s

Cy: S. Boyce, Forest Service, Jemez Springs, w/enc.
G. Saums, NMED SWQB, Santa Fe, NM, w/enc.
S. Rae, ESH-18, w/ enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
J. Plum, DOE/LAAO, w/enc., MS A316
G. Sinnis, P-23, w/enc., MS H803
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Milagro Project Land Application Site
Pre- and Post-Application Monitoring Data
Summary Table 1.0

Units: ppm

Analyte	Sampling Location: SS1				Sampling Location: SS2				Sampling Location: SS3				Sampling Location: SS4				Sampling Location: SS5			
	Pre-Application 1995	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	**3.0**	**3.0**	**<3**	**<3**	**3.0**	**3.0**	**<3**	**<3**	**2.0**	**3.0**	**<3**	**<3**	**3.0**	**24.0**	**3.9**	**8.6**	**2.0**	**18.0**	**<3**	**10.7**
Ba	180	170	191	181	180	150	157	89.8	130	170	111	159	190	160	127	142	120	100	84.8	97.8
Be	0.45	0.78	ND	ND	0.51	0.81	0.54	0.55	0.59	0.93	ND	ND	0.84	1.1	0.65	0.59	0.33	ND	ND	ND
Cd	ND	3.6	ND	ND	ND	4.3	ND	ND	ND	4.0	ND	ND	ND	4.0	ND	ND	ND	3.8	ND	ND
Cr	5.9	8.5	3.9	3.5	7.2	7.2	4.0	2.9	6.4	5.2	3.1	3.7	9.3	10.0	5.6	4.8	6.5	4.9	3.3	3.2
Ni	3.9	12.0	4.5	3.6	6.2	9.6	4.7	2.9	4.8	13.0	3.4	3.5	9.1	14.0	5.9	4.5	6.8	11.0	3.7	2.7
Pb	18.0	8.7	18.3	15.2	18	9.8	11.2	7.3	<20	13.0	11.1	8.7	15.0	ND	12.8	10.4	14.0	9.6	10.6	8.6
Sb	0.25	ND	ND	3.3	ND	ND	ND	3.3	ND	ND	ND	3.6	ND	ND	ND	4.0	ND	ND	ND	4.3
Se	0.5	0.6	ND	ND	0.6	0.4	ND	ND	0.6	0.5	NA	ND	0.6	0.5	ND	ND	0.5	0.3	ND	ND
Tl	0.37	0.37	ND	NA	0.25	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	0.25	ND	ND	NA
Hg	0.02	0.03	ND	NA	ND	0.03	ND	NA	0.01	0.03	ND	NA	ND	0.03	ND	NA	0.04	0.03	ND	NA

NOTE:
ND= Analyte not detected above Sample Detection Limit (SDL)
NA= No analysis conducted for this analyte.

Milagro Project Land Application Site
Pre- and Post-Application Monitoring of Sub-Surface Soils
Summary Table 2.0

Units: ppm

Analyte	Sampling Location: SBS1				Sampling Location: SBS2				Sampling Location: SBS3				Sampling Location: SBS4				Sampling Location: SBS5			
	Pre-Application 1995	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**	**Pre-Application 1995**	**Post-Application 1995**	**Post-Application 1996**	**Post-Application 1997**
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	**1.0**	**2.0**	**<3**	**<3**	**2.0**	**3.0**	**<3**	**<3**	**2.0**	**4.0**	**<3**	**<3**	**4.0**	**4.0**	**<3**	**<3**	**2.0**	**3.0**	**<3**	**<3**
Ba	38	44	43.2	38.4	110	57	39.1	31.2	82	83	78.5	110	78	56	47	53.9	51	32	24.7	49
Be	0.42	ND	0.65	0.76	0.74	1.3	0.82	0.72	0.79	1.1	0.68	0.82	1.2	0.98	0.54	0.56	0.18	ND	ND	ND
Cd	ND	4.7	ND	ND	ND	4.9	ND	ND	ND	3.6	ND	ND	ND	4.1	ND	ND	ND	3.8	ND	ND
Cr	3.2	4.9	4.2	2.9	8.3	7.7	2.9	2.9	7.6	8.8	4.2	6.5	9.4	6.3	4.2	5.5	3.7	4.9	4.6	2.6
Ni	4.8	8.6	3.5	2.2	8.0	<12	2.9	3.5	4.8	13.0	3.7	5.0	7.0	8.4	3.3	3.7	ND	11.0	3.3	2.0
Pb	9.1	9.9	9.4	7.3	11.0	<7.4	9.8	8.0	<17	<7.4	8.9	6.6	18.0	8.7	9.6	6.4	<13	<7.4	7.4	6.2
Sb	ND	ND	ND	3.2	ND	ND	ND	3.5	ND	ND	ND	5.0	ND	ND	ND	5.0	ND	ND	ND	3.9
Se	0.3	0.3	ND	ND	0.5	ND	ND	ND	0.4	0.4	ND	ND	0.6	0.3	ND	ND	0.3	ND	ND	ND
Tl	0.25	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	ND	ND	ND	NA
Hg	ND	0.01	ND	NA	ND	0.03	ND	NA	0.03	0.03	ND	NA	0.05	0.03	ND	NA	0.02	0.03	ND	NA

NOTE:
ND= Analyte not detected above Sample Detection Limit (SDL)
NA= No analysis conducted for this analyte.

ASSAIGAI ANALYTICAL LABORATORIES, INC.
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820

Report Generated:
October 23, 1997 09:40

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: LOS ALAMOS NATIONAL LABS
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

ATTN: BOB BEERS

WORKORDER # : 9710107
WORK ID : FENTON HILL LAND APP SITE
CLIENT CODE : LOS10
DATE RECEIVED : 10/10/97

Lab ID: 9710107-01A
Sample ID: 57-SS1-97
Collected: 10/09/97 10:40:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	181	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.6	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	15.2	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-02A
Sample ID: 57-SBS1-97
Collected: 10/09/97 11:05:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	38.4	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.76	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735

Lab ID: 9710107-02A
Sample ID: 57-SBS1-97
Collected: 10/09/97 11:05:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
METALS-ICP/SW846 6010						
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.2	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.3	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.2	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-03A
Sample ID: 57-SS2-97
Collected: 10/09/97 11:20:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	89.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.55	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.9	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.3	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-04A
Sample ID: 57-SBS2-97
Collected: 10/09/97 11:38:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735

Lab ID: 9710107-04A
Sample ID: 57-SBS2-97
Collected: 10/09/97 11:38:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
METALS-ICP/SW846 6010						
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	31.2	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.72	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.5	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.0	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.5	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-05A
Sample ID: 57-SS3-97
Collected: 10/09/97 13:25:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	159	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.7	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.5	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.7	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.6	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-06A
Sample ID: 57-SBS3-97

Collected: 10/09/97 13:40:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	110	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.82	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	6.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	5.0	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.6	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	5.0	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-07A
Sample ID: 57-SS4-97

Collected: 10/09/97 09:50:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	8.6	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	142	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.59	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	4.8	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	4.5	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	10.4	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	4.0	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-08A
Sample ID: 57-SBS4-97

Collected: 10/09/97 10:00:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	53.9	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.56	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	5.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.4	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	5.0	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-09A
Sample ID: 57-SS5-97

Collected: 10/09/97 10:10:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	8.7	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	79.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.2	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.4	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	4.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-10A
Sample ID: 57-SS5-DUP-97

Collected: 10/09/97 10:10:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	10.7	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	97.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.6	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.8	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-11A
Sample ID: 57-SBS5-97

Collected: 10/09/97 10:20:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	49.0	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.6	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.0	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.2	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.9	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

William P. Biava
President

WORKORDER COMMENTS

DATE : 10/23/97
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

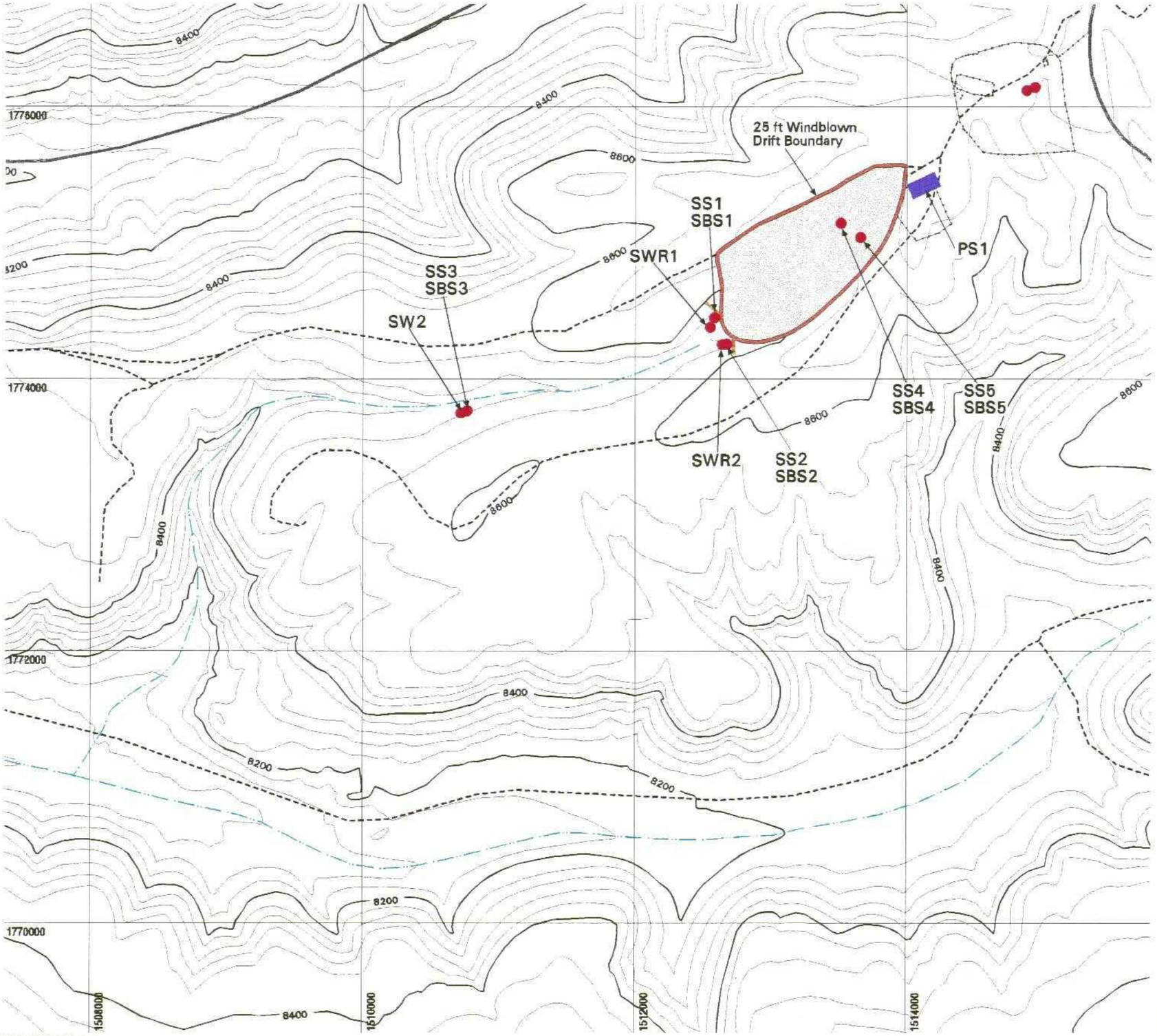
The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND	= Analyte "not detected" in analysis at the sample specific detection limit.
D_F	= Sample "dilution factor"
NT	= Analyte "not tested" per client request.
B	= Analyte was also detected in laboratory method QC blank.
E	= Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT	= The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

Fenton Hill (TA-57) Milagro Project Sampling Plan



FIMAD Plot ID: 103978 02 Nov 95

Fenton Hill (TA-57) Milagro Project Sampling Plan

- Drainage
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Application Area (22.327 acres)
- Application Area Buffer (25 ft)
- Sample Location

MILAGRO PROJECT SAMPLING PLAN

ANALYTES: Metals

OBJECTIVE	TYPE	LOCATION
Background Sampling		
pond sludge quality	sludge	PS1
soil-application area	soil: surface	SS4, SS5
soil-application area	soil: sub-surface	SBS4, SBS5
soil-adjacent down gradient	soil: surface	SS2, SS1
soil-adjacent down gradient	soil: sub-surface	SBS2, SBS1
soil-distant down gradient	soil: surface	SS3
soil-distant down gradient	soil: sub-surface	SBS3
surface water-distant down gradient	surface water	SW2
surface water-Lake Fork Canyon and Rio Cebolla (not on map)	surface water	SW3
Sampling During Application		
stormwater runoff-down gradient	stormwater runoff	SWR1, SWR2
Post-Application Sampling		
soil-application area	soil: surface	SS4, SS5
soil-application area	soil: sub-surface	SBS4, SBS5
soil-adjacent down gradient	soil: surface	SS2, SS1
soil-adjacent down gradient	soil: sub-surface	SBS2, SBS1
soil-distant down gradient	soil: surface	SS3
soil-distant down gradient	soil: sub-surface	SBS3
surface water-distant down gradient	surface water	SW2

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000

Contour Interval: 40 ft

METERS

FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and cartography and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal descriptions established in 1996. Other boundary, structure, and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data are from Los Alamos National Laboratory Environmental Restoration Project aerial survey, September 1991.

University of California
Los Alamos National Laboratory
Earth and Environmental Sciences Division
FIMAD Facility for Information Management, Analysis, and Display
FIMAD is the electronic data repository for the Environmental Restoration Project at Los Alamos National Laboratory.
Produced by: Marcia Jones

Date: November 02, 1995 FIMAD Plot ID: 103978

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: November 6, 1997
In Reply Refer To: ESH-18/WQ&H:97-0397
Mail Stop: K497
Telephone: (505) 667-7969

Mark Ashley
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION, FENTON HILL HOT DRY ROCK GEOTHERMAL FACILITY, BURNS SWALE CEMENT/MUD SLURRY SPILL

Dear Mr. Ashley:

Los Alamos National Laboratory has received your letter of October 23, 1997, requesting additional information on the following:

1. An upgradient soil sample, for total metals analysis, to determine background levels; and

2. Alternate stabilization measures to ensure that remaining contaminants will not migrate from the spill site and impact any watercourse.

With regards to your request for background soils data, I have enclosed an analytical report for pre-operational sampling conducted at the Milagro Project's land application site at Fenton Hill. I believe that this data best represents background levels in Burns Swale. The enclosed map shows the location of Burns Swale and the Milagro Project sampling sites.

I indicated to you in an August 13, 1997, letter (ESH-18/WQ&H:97-0261) that the Laboratory was planning to remove the silt fences in Burns Swale in October, 1997. Currently, all silt fences in Burns Swale remain in place, none have been removed. In consideration of your request for additional stabilization measures, the Laboratory will postpone the removal of Burns Swale silt fences until October, 1998, in order to provide additional time for the water course to naturally stabilize.

Please feel free to contact me at 667-7969 if you have questions or concerns regarding this information.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

RB/em

Enclosures: a/s

Cy: S. Boyce, Acting District Ranger , Santa Fe, New Mexico, w/enc.
G. Saums, NMED SWQB, Santa Fe, New Mexico, w/enc.
J. Thomson, EES-4, w/enc., MS D443
D. Thomas, EES-DO, w/enc., MS D446
J. Plum, DOE/LAAO, w/enc., MS A316
S. Rae, ESH-18, w/ enc., MS K497
N. Williams, ESH-18, w/enc, MS K497
H. Decker, ESH-18, w/enc., MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

MILAGRO PROJECT LAND APPLICATION SITE AT FENTON HILL
PRE-APPLICATION MONITORING OF SOILS
SAMPLE COLLECTION DATE: MAY 17, 1995

********** CST ANALYTICAL REPORT **********

Prepared by: PEC on 12-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: AAS PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: CST9002 PAGE: 58

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	AS	ETVAA	3.	0.6	UG/G	6/01/95	
57-SS1	95.09076	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SS1	95.09076	SE	ETVAA	0.5	0.1	UG/G	6/01/95	
57-SBS1	95.09077	AS	ETVAA	1.	0.2	UG/G	6/01/95	
57-SBS1	95.09077	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS1	95.09077	SE	ETVAA	0.3	0.1	UG/G	6/01/95	
57-SS2	95.09078	AS	ETVAA	3.	0.6	UG/G	6/01/95	
57-SS2	95.09078	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SS2	95.09078	SE	ETVAA	0.6	0.1	UG/G	6/01/95	
57-SBS2	95.09079	AS	ETVAA	2.	0.4	UG/G	6/01/95	
57-SBS2	95.09079	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS2	95.09079	SE	ETVAA	0.5	0.1	UG/G	6/01/95	
57-SS3	95.09080	AS	ETVAA	2.	0.4	UG/G	6/01/95	
57-SS3	95.09080	HG	CVAA	0.01	0.01	UG/G	6/01/95	
57-SS3	95.09080	SE	ETVAA	0.6	0.1	UG/G	6/01/95	
57-SBS3	95.09081	AS	ETVAA	2.	0.4	UG/G	6/01/95	
57-SBS3	95.09081	HG	CVAA	0.03	0.01	UG/G	6/01/95	
57-SBS3	95.09081	SE	ETVAA	0.4	0.1	UG/G	6/01/95	
57-SS4	95.09082	AS	ETVAA	3.	0.6	UG/G	6/01/95	
57-SS4	95.09082	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SS4	95.09082	SE	ETVAA	0.6	0.1	UG/G	6/01/95	
57-SBS4	95.09083	AS	ETVAA	4.	0.8	UG/G	6/01/95	
57-SBS4	95.09083	HG	CVAA	0.05	0.01	UG/G	6/01/95	
57-SBS4	95.09083	SE	ETVAA	0.6	0.1	UG/G	6/01/95	
57-SS5	95.09084	AS	ETVAA	2.	0.4	UG/G	6/01/95	
57-SS5	95.09084	HG	CVAA	0.04	0.01	UG/G	6/01/95	
57-SS5	95.09084	SE	ETVAA	0.5	0.1	UG/G	6/01/95	
57-SBS5	95.09085	AS	ETVAA	2.	0.4	UG/G	6/01/95	
57-SBS5	95.09085	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SBS5	95.09085	SE	ETVAA	0.3	0.1	UG/G	6/01/95	
SS2DUPLICATE	95.09095	AS	ETVAA	2.	0.4	UG/G	6/01/95	
SS2DUPLICATE	95.09095	HG	CVAA	0.01	0.01	UG/G	6/01/95	
SS2DUPLICATE	95.09095	SE	ETVAA	0.5	0.1	UG/G	6/01/95	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	AS	ETVAA	10.	9.	UG/G	6/01/95	
57-SS1	95.09076	AS	ETVAA	3.	0.6	UG/G	6/01/95	
57-SS1	95.09076	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SS1	95.09076	HG	CVAA	0.04	0.01	UG/G	6/01/95	
57-SS1	95.09076	SE	ETVAA	0.5	0.1	UG/G	6/01/95	
57-SBS1	95.09077	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS1	95.09077	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SS2	95.09078	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SS2	95.09078	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS2	95.09079	HG	CVAA	0.04	0.01	UG/G	6/01/95	
57-SBS2	95.09079	HG	CVAA	0.04	0.01	UG/G	6/01/95	
57-SS3	95.09080	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SS3	95.09080	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS3	95.09081	HG	CVAA	0.06	0.01	UG/G	6/01/95	
57-SBS3	95.09081	HG	CVAA	0.03	0.01	UG/G	6/01/95	
57-SS4	95.09082	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SS4	95.09082	HG	CVAA	< 0.01		UG/G	6/01/95	
57-SBS4	95.09083	HG	CVAA	0.07	0.01	UG/G	6/01/95	
57-SBS4	95.09083	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SS5	95.09084	HG	CVAA	0.02	0.01	UG/G	6/01/95	
57-SS5	95.09084	HG	CVAA	0.04	0.01	UG/G	6/01/95	
57-SBS5	95.09085	HG	CVAA	0.03	0.01	UG/G	6/01/95	
57-SBS5	95.09085	HG	CVAA	0.01	0.01	UG/G	6/01/95	
SS2DUPLICATE	95.09095	HG	CVAA	0.02	0.01	UG/G	6/01/95	
SS2DUPLICATE	95.09095	HG	CVAA	0.02	0.01	UG/G	6/01/95	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	HG	CVAA	2.	2.	UG/G	6/01/95	
57-SS1	95.09076	SE	ETVAA	10.	9.	UG/G	6/01/95	

****

REPORT NUMBER: 35532 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: PEC on 12-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: AAS PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: CST9002 PAGE: 58

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	AS	112.	22.	MG/KG	128.	71.	6/01/95	UNDER CONTROL
00.30469	HG	4.	0.4	MG/KG	4.85	2.4	6/01/95	UNDER CONTROL
00.30469	SE	75.	15.	MG/KG	101.	55.	6/01/95	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
95.09086	AS	596.	119.	UG/G	575.	25.	6/06/95	UNDER CONTROL
95.09086	SE	13.	3.	UG/G	2.4	2.2	6/01/95	WARNING 2-3 SIG
95.09087	HG	80.	10.	NG/G	140.	40.	6/01/95	UNDER CONTROL

REPORT NUMBER: 35532

Analyst	Reviewer	Team Leader	QA Officer
PEC	PEC	[signature]	mag
6/12/95	6/12/95	6/12/95	6/12/95
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

REPORT NUMBER: 35280

********** CST ANALYTICAL REPORT **********

Prepared by: MKOBY on 5-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: IMS PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: PAGE:

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	SB	ICPMS	0.25	0.25	UG/G	6/05/95	
57-SS1	95.09076	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SBS1	95.09077	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SBS1	95.09077	TL	ICPMS	0.25	0.25	UG/G	6/05/95	
57-SS2	95.09078	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SS2	95.09078	TL	ICPMS	0.25	0.25	UG/G	6/05/95	
57-SBS2	95.09079	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SBS2	95.09079	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SS3	95.09080	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SS3	95.09080	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SBS3	95.09081	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SBS3	95.09081	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SS4	95.09082	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SS4	95.09082	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SBS4	95.09083	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SBS4	95.09083	TL	ICPMS	0.37	0.25	UG/G	6/05/95	
57-SS5	95.09084	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SS5	95.09084	TL	ICPMS	0.25	0.25	UG/G	6/05/95	
57-SBS5	95.09085	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SBS5	95.09085	TL	ICPMS	< 0.25		UG/G	6/05/95	
SS2DUPLICATE	95.09095	SB	ICPMS	< 0.25		UG/G	6/05/95	
SS2DUPLICATE	95.09095	TL	ICPMS	0.25	0.25	UG/G	6/05/95	

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	SB	ICPMS	< 0.25		UG/G	6/05/95	
57-SS1	95.09076	TL	ICPMS	0.25	0.25	UG/G	6/05/95	

MATRIX SPIKES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	AMOUNT SPIKED	AMOUNT RECOVERED	UNITS	COMPLETION DATE	COMMENT

57-SS1	95.09076 SB	ICPMS	6.25	0.25	UG/G	6/05/95
57-SS1	95.09076 TL	ICPMS	6.25	4.75	UG/G	6/05/95

****

REPORT NUMBER: 35280 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: MKOBY on 5-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: IMS PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: PAGE:

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	SB	3.13	0.63	MG/KG	43.9	93.5	6/05/95	UNDER CONTROL
00.30469	TL	77.	5.	MG/KG	102.	50.5	6/05/95	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
95.09086	SB	0.25	0.25	UG/G	6.4	2.6	6/05/95	WARNING 2-3 SIG
95.09086	TL	0.5	0.3	UG/G	1.	1.	6/05/95	UNDER CONTROL

REPORT NUMBER: 35280

Analyst	Reviewer	Team Leader	QA Officer
6/6/95	6/6/95	6/12/95	6/12/95
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

REPORT NUMBER: 35215

********** CST ANALYTICAL REPORT **********

Prepared by: M. KOZUBAL on 2-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: OES PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: EMP0126 PAGE: 28

CUSTOMER SAMPLES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	AG	ICPES	< 1.		UG/G	6/01/95	
57-SS1	95.09076	AL	ICPES	7500.	750.	UG/G	6/01/95	
57-SS1	95.09076	BA	ICPES	180.	18.	UG/G	6/01/95	
57-SS1	95.09076	BE	ICPES	0.45	0.05	UG/G	6/01/95	
57-SS1	95.09076	CA	ICPES	3300.	330.	UG/G	6/01/95	
57-SS1	95.09076	CD	ICPES	< 0.4		UG/G	6/01/95	
57-SS1	95.09076	CO	ICPES	3.1	1.5	UG/G	6/01/95	
57-SS1	95.09076	CR	ICPES	5.9	1.	UG/G	6/01/95	
57-SS1	95.09076	CU	ICPES	7.	0.7	UG/G	6/01/95	
57-SS1	95.09076	FE	ICPES	8500.	850.	UG/G	6/01/95	
57-SS1	95.09076	K	ICPES	1300.	130.	UG/G	6/01/95	
57-SS1	95.09076	MG	ICPES	1200.	120.	UG/G	6/01/95	
57-SS1	95.09076	MN	ICPES	1100.	110.	UG/G	6/01/95	
57-SS1	95.09076	NA	ICPES	110.	11.	UG/G	6/01/95	
57-SS1	95.09076	NI	ICPES	3.9	2.5	UG/G	6/01/95	
57-SS1	95.09076	PB	ICPES	18.	8.	UG/G	6/01/95	
57-SS1	95.09076	V	ICPES	11.	1.	UG/G	6/01/95	
57-SS1	95.09076	ZN	ICPES	67.	7.	UG/G	6/01/95	
57-SBS1	95.09077	AG	ICPES	< 1.		UG/G	6/01/95	
57-SBS1	95.09077	AL	ICPES	3700.	370.	UG/G	6/02/95	
57-SBS1	95.09077	BA	ICPES	38.	4.	UG/G	6/02/95	
57-SBS1	95.09077	BE	ICPES	0.42	0.08	UG/G	6/02/95	
57-SBS1	95.09077	CA	ICPES	790.	79.	UG/G	6/02/95	
57-SBS1	95.09077	CD	ICPES	< 0.4		UG/G	6/02/95	
57-SBS1	95.09077	CO	ICPES	1.7	0.5	UG/G	6/02/95	
57-SBS1	95.09077	CR	ICPES	3.2	0.5	UG/G	6/02/95	
57-SBS1	95.09077	CU	ICPES	2.5	0.5	UG/G	6/02/95	
57-SBS1	95.09077	FE	ICPES	6800.	680.	UG/G	6/02/95	
57-SBS1	95.09077	K	ICPES	440.	200.	UG/G	6/02/95	
57-SBS1	95.09077	MG	ICPES	570.	57.	UG/G	6/02/95	
57-SBS1	95.09077	MN	ICPES	300.	30.	UG/G	6/02/95	
57-SBS1	95.09077	NA	ICPES	91.	9.	UG/G	6/02/95	
57-SBS1	95.09077	NI	ICPES	4.8	3.	UG/G	6/02/95	
57-SBS1	95.09077	PB	ICPES	9.1	4.6	UG/G	6/02/95	
57-SBS1	95.09077	V	ICPES	6.9	0.7	UG/G	6/02/95	
57-SBS1	95.09077	ZN	ICPES	32.	3.	UG/G	6/02/95	
57-SS2	95.09078	AG	ICPES	< 1.		UG/G	6/02/95	

57-SS2	95.09078	AL	ICPES	8100.	810.	UG/G	6/02/95
57-SS2	95.09078	BA	ICPES	180.	18.	UG/G	6/02/95
57-SS2	95.09078	BE	ICPES	0.51	0.05	UG/G	6/02/95
57-SS2	95.09078	CA	ICPES	3300.	330.	UG/G	6/02/95
57-SS2	95.09078	CD	ICPES	< 0.4		UG/G	6/02/95
57-SS2	95.09078	CO	ICPES	3.6	0.7	UG/G	6/02/95
57-SS2	95.09078	CR	ICPES	7.2	1.6	UG/G	6/02/95
57-SS2	95.09078	CU	ICPES	7.2	1.6	UG/G	6/02/95
57-SS2	95.09078	FE	ICPES	8500.	850.	UG/G	6/02/95
57-SS2	95.09078	K	ICPES	1600.	160.	UG/G	6/02/95
57-SS2	95.09078	MG	ICPES	1300.	130.	UG/G	6/02/95
57-SS2	95.09078	MN	ICPES	980.	98.	UG/G	6/02/95
57-SS2	95.09078	NA	ICPES	100.	10.	UG/G	6/02/95
57-SS2	95.09078	NI	ICPES	6.2	1.4	UG/G	6/02/95
57-SS2	95.09078	PB	ICPES	18.	4.	UG/G	6/02/95
57-SS2	95.09078	V	ICPES	12.	2.	UG/G	6/02/95
57-SS2	95.09078	ZN	ICPES	60.	6.	UG/G	6/02/95
57-SBS2	95.09079	AG	ICPES	< 1.		UG/G	6/02/95
57-SBS2	95.09079	AL	ICPES	10000.	1000.	UG/G	6/02/95
57-SBS2	95.09079	BA	ICPES	110.	11.	UG/G	6/02/95
57-SBS2	95.09079	BE	ICPES	0.74	0.08	UG/G	6/02/95
57-SBS2	95.09079	CA	ICPES	1400.	140.	UG/G	6/02/95
57-SBS2	95.09079	CD	ICPES	< 0.4		UG/G	6/02/95
57-SBS2	95.09079	CO	ICPES	3.9	0.8	UG/G	6/02/95
57-SBS2	95.09079	CR	ICPES	8.3	0.8	UG/G	6/02/95
57-SBS2	95.09079	CU	ICPES	5.4	0.7	UG/G	6/02/95
57-SBS2	95.09079	FE	ICPES	10000.	1000.	UG/G	6/02/95
57-SBS2	95.09079	K	ICPES	1200.	120.	UG/G	6/02/95
57-SBS2	95.09079	MG	ICPES	1200.	120.	UG/G	6/02/95
57-SBS2	95.09079	MN	ICPES	810.	81.	UG/G	6/02/95
57-SBS2	95.09079	NA	ICPES	150.	18.	UG/G	6/02/95
57-SBS2	95.09079	NI	ICPES	8.	4.	UG/G	6/02/95
57-SBS2	95.09079	PB	ICPES	11.	4.	UG/G	6/02/95
57-SBS2	95.09079	V	ICPES	13.	1.	UG/G	6/02/95
57-SBS2	95.09079	ZN	ICPES	54.	5.	UG/G	6/02/95
57-SS3	95.09080	AG	ICPES	< 1.		UG/G	6/02/95
57-SS3	95.09080	AL	ICPES	7300.	730.	UG/G	6/02/95
57-SS3	95.09080	BA	ICPES	130.	13.	UG/G	6/02/95
57-SS3	95.09080	BE	ICPES	0.59	0.08	UG/G	6/02/95
57-SS3	95.09080	CA	ICPES	2700.	270.	UG/G	6/02/95
57-SS3	95.09080	CD	ICPES	< 0.4		UG/G	6/02/95
57-SS3	95.09080	CO	ICPES	2.7	0.7	UG/G	6/02/95
57-SS3	95.09080	CR	ICPES	6.4	0.7	UG/G	6/02/95
57-SS3	95.09080	CU	ICPES	6.4	0.7	UG/G	6/02/95
57-SS3	95.09080	FE	ICPES	7700.	770.	UG/G	6/02/95
57-SS3	95.09080	K	ICPES	1100.	200.	UG/G	6/02/95
57-SS3	95.09080	MG	ICPES	1100.	110.	UG/G	6/02/95
57-SS3	95.09080	MN	ICPES	650.	65.	UG/G	6/02/95
57-SS3	95.09080	NA	ICPES	120.	12.	UG/G	6/02/95
57-SS3	95.09080	NI	ICPES	4.8	1.6	UG/G	6/02/95
57-SS3	95.09080	PB	ICPES	< 20.		UG/G	6/02/95
57-SS3	95.09080	V	ICPES	10.	2.	UG/G	6/02/95
57-SS3	95.09080	ZN	ICPES	51.	5.	UG/G	6/02/95
57-SBS3	95.09081	AG	ICPES	< 1.		UG/G	6/02/95
57-SBS3	95.09081	AL	ICPES	7600.	760.	UG/G	6/02/95
57-SBS3	95.09081	BA	ICPES	82.	8.	UG/G	6/02/95
57-SBS3	95.09081	BE	ICPES	0.79	0.08	UG/G	6/02/95
57-SBS3	95.09081	CA	ICPES	1400.	140.	UG/G	6/02/95
57-SBS3	95.09081	CD	ICPES	< 0.4		UG/G	6/02/95
57-SBS3	95.09081	CO	ICPES	3.3	0.6	UG/G	6/02/95

57-SBS3	95.09081	CR	ICPES	7.6	0.9	UG/G	6/02/95
57-SBS3	95.09081	CU	ICPES	3.6	0.7	UG/G	6/02/95
57-SBS3	95.09081	FE	ICPES	9700.	970.	UG/G	6/02/95
57-SBS3	95.09081	K	ICPES	820.	130.	UG/G	6/02/95
57-SBS3	95.09081	MG	ICPES	930.	93.	UG/G	6/02/95
57-SBS3	95.09081	MN	ICPES	600.	60.	UG/G	6/02/95
57-SBS3	95.09081	NA	ICPES	130.	13.	UG/G	6/02/95
57-SBS3	95.09081	NI	ICPES	4.8	3.6	UG/G	6/02/95
57-SBS3	95.09081	PB	ICPES	< 17.		UG/G	6/02/95
57-SBS3	95.09081	V	ICPES	11.	1.	UG/G	6/02/95
57-SBS3	95.09081	ZN	ICPES	43.	4.	UG/G	6/02/95
57-SS4	95.09082	AG	ICPES	< 1.		UG/G	6/02/95
57-SS4	95.09082	AL	ICPES	9900.	990.	UG/G	6/02/95
57-SS4	95.09082	BA	ICPES	190.	19.	UG/G	6/02/95
57-SS4	95.09082	BE	ICPES	0.84	0.08	UG/G	6/02/95
57-SS4	95.09082	CA	ICPES	2700.	270.	UG/G	6/02/95
57-SS4	95.09082	CD	ICPES	< 0.4		UG/G	6/02/95
57-SS4	95.09082	CO	ICPES	6.2	1.	UG/G	6/02/95
57-SS4	95.09082	CR	ICPES	9.3	1.1	UG/G	6/02/95
57-SS4	95.09082	CU	ICPES	6.4	0.6	UG/G	6/02/95
57-SS4	95.09082	FE	ICPES	11000.	1100.	UG/G	6/02/95
57-SS4	95.09082	K	ICPES	1300.	130.	UG/G	6/02/95
57-SS4	95.09082	MG	ICPES	1400.	140.	UG/G	6/02/95
57-SS4	95.09082	MN	ICPES	1300.	130.	UG/G	6/02/95
57-SS4	95.09082	NA	ICPES	140.	14.	UG/G	6/02/95
57-SS4	95.09082	NI	ICPES	9.1	2.	UG/G	6/02/95
57-SS4	95.09082	PB	ICPES	15.	12.	UG/G	6/02/95
57-SS4	95.09082	V	ICPES	18.	2.	UG/G	6/02/95
57-SS4	95.09082	ZN	ICPES	45.	5.	UG/G	6/02/95
57-SBS4	95.09083	AG	ICPES	< 1.		UG/G	6/02/95
57-SBS4	95.09083	AL	ICPES	15000.	1500.	UG/G	6/02/95
57-SBS4	95.09083	BA	ICPES	78.	8.	UG/G	6/02/95
57-SBS4	95.09083	BE	ICPES	1.2	0.1	UG/G	6/02/95
57-SBS4	95.09083	CA	ICPES	1800.	180.	UG/G	6/02/95
57-SBS4	95.09083	CD	ICPES	< 0.4		UG/G	6/02/95
57-SBS4	95.09083	CO	ICPES	4.5	2.	UG/G	6/02/95
57-SBS4	95.09083	CR	ICPES	9.4	0.9	UG/G	6/02/95
57-SBS4	95.09083	CU	ICPES	4.9	1.3	UG/G	6/02/95
57-SBS4	95.09083	FE	ICPES	14000.	1400.	UG/G	6/02/95
57-SBS4	95.09083	K	ICPES	1100.	110.	UG/G	6/02/95
57-SBS4	95.09083	MG	ICPES	1600.	160.	UG/G	6/02/95
57-SBS4	95.09083	MN	ICPES	380.	38.	UG/G	6/02/95
57-SBS4	95.09083	NA	ICPES	260.	26.	UG/G	6/02/95
57-SBS4	95.09083	NI	ICPES	7.	3.	UG/G	6/02/95
57-SBS4	95.09083	PB	ICPES	18.	10.	UG/G	6/02/95
57-SBS4	95.09083	V	ICPES	15.	2.	UG/G	6/02/95
57-SBS4	95.09083	ZN	ICPES	52.	5.	UG/G	6/02/95
57-SS5	95.09084	AG	ICPES	< 1.		UG/G	6/02/95
57-SS5	95.09084	AL	ICPES	7100.	710.	UG/G	6/02/95
57-SS5	95.09084	BA	ICPES	120.	12.	UG/G	6/02/95
57-SS5	95.09084	BE	ICPES	0.33	0.1	UG/G	6/02/95
57-SS5	95.09084	CA	ICPES	2000.	200.	UG/G	6/02/95
57-SS5	95.09084	CD	ICPES	< 0.4		UG/G	6/02/95
57-SS5	95.09084	CO	ICPES	2.6	1.4	UG/G	6/02/95
57-SS5	95.09084	CR	ICPES	6.5	1.2	UG/G	6/02/95
57-SS5	95.09084	CU	ICPES	7.4	0.8	UG/G	6/02/95
57-SS5	95.09084	FE	ICPES	8100.	810.	UG/G	6/02/95
57-SS5	95.09084	K	ICPES	1100.	150.	UG/G	6/02/95
57-SS5	95.09084	MG	ICPES	1100.	110.	UG/G	6/02/95
57-SS5	95.09084	MN	ICPES	510.	51.	UG/G	6/02/95

57-SS5	95.09084	NA	ICPES	140.	14.	UG/G	6/02/95
57-SS5	95.09084	NI	ICPES	6.8	4.3	UG/G	6/02/95
57-SS5	95.09084	PB	ICPES	14.	12.	UG/G	6/02/95
57-SS5	95.09084	V	ICPES	12.	1.	UG/G	6/02/95
57-SS5	95.09084	ZN	ICPES	45.	5.	UG/G	6/02/95
57-SBS5	95.09085	AG	ICPES	< 1.		UG/G	6/02/95
57-SBS5	95.09085	AL	ICPES	4100.	410.	UG/G	6/02/95
57-SBS5	95.09085	BA	ICPES	51.	5.	UG/G	6/02/95
57-SBS5	95.09085	BE	ICPES	0.18	0.08	UG/G	6/02/95
57-SBS5	95.09085	CA	ICPES	940.	94.	UG/G	6/02/95
57-SBS5	95.09085	CD	ICPES	< 0.4		UG/G	6/02/95
57-SBS5	95.09085	CO	ICPES	1.6	0.7	UG/G	6/02/95
57-SBS5	95.09085	CR	ICPES	3.7	0.4	UG/G	6/02/95
57-SBS5	95.09085	CU	ICPES	2.8	0.5	UG/G	6/02/95
57-SBS5	95.09085	FE	ICPES	5700.	570.	UG/G	6/02/95
57-SBS5	95.09085	K	ICPES	470.	47.	UG/G	6/02/95
57-SBS5	95.09085	MG	ICPES	550.	55.	UG/G	6/02/95
57-SBS5	95.09085	MN	ICPES	190.	19.	UG/G	6/02/95
57-SBS5	95.09085	NA	ICPES	120.	12.	UG/G	6/02/95
57-SBS5	95.09085	NI	ICPES	< 4.		UG/G	6/02/95
57-SBS5	95.09085	PB	ICPES	< 13.		UG/G	6/02/95
57-SBS5	95.09085	V	ICPES	7.2	0.7	UG/G	6/02/95
57-SBS5	95.09085	ZN	ICPES	24.	2.	UG/G	6/02/95
SS2DUPLICATE	95.09095	AG	ICPES	< 1.		UG/G	6/02/95
SS2DUPLICATE	95.09095	AL	ICPES	6400.	640.	UG/G	6/02/95
SS2DUPLICATE	95.09095	BA	ICPES	130.	13.	UG/G	6/02/95
SS2DUPLICATE	95.09095	BE	ICPES	0.39	0.08	UG/G	6/02/95
SS2DUPLICATE	95.09095	CA	ICPES	2200.	220.	UG/G	6/02/95
SS2DUPLICATE	95.09095	CD	ICPES	< 0.4		UG/G	6/02/95
SS2DUPLICATE	95.09095	CO	ICPES	2.6	1.2	UG/G	6/02/95
SS2DUPLICATE	95.09095	CR	ICPES	5.5	1.6	UG/G	6/02/95
SS2DUPLICATE	95.09095	CU	ICPES	5.2	0.9	UG/G	6/02/95
SS2DUPLICATE	95.09095	FE	ICPES	7100.	710.	UG/G	6/02/95
SS2DUPLICATE	95.09095	K	ICPES	1300.	130.	UG/G	6/02/95
SS2DUPLICATE	95.09095	MG	ICPES	1000.	100.	UG/G	6/02/95
SS2DUPLICATE	95.09095	MN	ICPES	710.	71.	UG/G	6/02/95
SS2DUPLICATE	95.09095	NA	ICPES	88.	9.	UG/G	6/02/95
SS2DUPLICATE	95.09095	NI	ICPES	5.4	2.2	UG/G	6/02/95
SS2DUPLICATE	95.09095	PB	ICPES	4.3	4.	UG/G	6/02/95
SS2DUPLICATE	95.09095	V	ICPES	9.2	0.9	UG/G	6/02/95
SS2DUPLICATE	95.09095	ZN	ICPES	47.	5.	UG/G	6/02/95

CUSTOMER SAMPLE DUPLICATES:

CUSTOMER NUM	SAMPLE NUM	ANALYSIS	ANALYTICAL TECHNIQUE	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
57-SS1	95.09076	AG	ICPES	< 1.		UG/G	6/01/95	
57-SS1	95.09076	AL	ICPES	5600.	560.	UG/G	6/01/95	
57-SS1	95.09076	BA	ICPES	170.	17.	UG/G	6/01/95	
57-SS1	95.09076	BE	ICPES	0.37	0.04	UG/G	6/01/95	
57-SS1	95.09076	CA	ICPES	3000.	300.	UG/G	6/01/95	
57-SS1	95.09076	CD	ICPES	< 0.4		UG/G	6/01/95	
57-SS1	95.09076	CO	ICPES	2.7	0.7	UG/G	6/01/95	
57-SS1	95.09076	CR	ICPES	4.7	1.1	UG/G	6/01/95	
57-SS1	95.09076	CU	ICPES	6.4	0.6	UG/G	6/01/95	
57-SS1	95.09076	FE	ICPES	6800.	680.	UG/G	6/01/95	
57-SS1	95.09076	K	ICPES	960.	96.	UG/G	6/01/95	
57-SS1	95.09076	MG	ICPES	1000.	100.	UG/G	6/01/95	

57-SS1	95.09076 MN	ICPES	1100.	110.	UG/G	6/01/95
57-SS1	95.09076 NA	ICPES	100.	10.	UG/G	6/01/95
57-SS1	95.09076 NI	ICPES	4.9	4.4	UG/G	6/01/95
57-SS1	95.09076 PB	ICPES	< 25.		UG/G	6/01/95
57-SS1	95.09076 V	ICPES	8.8	0.9	UG/G	6/01/95
57-SS1	95.09076 ZN	ICPES	65.	7.	UG/G	6/01/95

****

REPORT NUMBER: 35215 (continued)

********** CST QUALITY ASSURANCE REPORT *********

Prepared by: M. KOZUBAL on 2-Jun-1995

REQUEST NUMBER: 21968 MATRIX: SS ANALYST: OES PROGRAM CODE: E303

OWNER: Ron C. Conrad GROUP: ESH-19 MAIL-STOP: K490 PHONE: 7-0950

NOTEBOOK: EMP0126 PAGE: 28

SUMMARY OF CONTROL STATUS OF OPEN (NON-BLIND) QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
00.30469	AG	19.	2.	MG/KG	92.5	49.5	6/02/95	UNDER CONTROL
00.30469	AL	5300.	530.	MG/KG	4800.	2400.	6/02/95	UNDER CONTROL
00.30469	BA	250.	25.	MG/KG	276.	82.5	6/02/95	UNDER CONTROL
00.30469	BE	85.	9.	MG/KG	95.1	43.	6/02/95	UNDER CONTROL
00.30469	CA	3400.	340.	MG/KG	3680.	1285.	6/02/95	UNDER CONTROL
00.30469	CD	91.	9.	MG/KG	102.	56.5	6/02/95	UNDER CONTROL
00.30469	CO	88.	9.	MG/KG	95.8	45.5	6/02/95	UNDER CONTROL
00.30469	CR	150.	15.	MG/KG	154.	73.	6/02/95	UNDER CONTROL
00.30469	CU	100.	10.	MG/KG	119.	59.5	6/02/95	UNDER CONTROL
00.30469	FE	8300.	830.	MG/KG	8640.	3460.	6/02/95	UNDER CONTROL
00.30469	K	2100.	210.	MG/KG	2200.	805.	6/02/95	UNDER CONTROL
00.30469	MG	1700.	170.	MG/KG	1830.	870.	6/02/95	UNDER CONTROL
00.30469	MN	180.	18.	MG/KG	191.	66.5	6/02/95	UNDER CONTROL
00.30469	NA	500.	50.	MG/KG	594.	282.	6/02/95	UNDER CONTROL
00.30469	NI	140.	14.	MG/KG	163.	85.5	6/02/95	UNDER CONTROL
00.30469	PB	140.	14.	MG/KG	147.	73.5	6/02/95	UNDER CONTROL
00.30469	V	74.	8.	MG/KG	81.8	29.	6/02/95	UNDER CONTROL
00.30469	ZN	100.	10.	MG/KG	120.	63.	6/02/95	UNDER CONTROL

SUMMARY OF CONTROL STATUS OF BLIND QC SAMPLES RUN WITH THIS BATCH

SAMPLE NUM	ANALYSIS	ANALYTICAL RESULT	ANALYTICAL UNCERTAINTY	UNITS	QC VALUE	QC UNCERTAINTY	COMPLETION DATE	COMMENT
95.09086	AG	24.	2.	UG/G	28.9	7.3	6/02/95	UNDER CONTROL
95.09086	AL	18.	1.8	MG/G	19.	4.	6/02/95	UNDER CONTROL
95.09086	BA	300.	30.	UG/G	340.	60.	6/02/95	UNDER CONTROL
95.09086	BE	1.2	0.1	UG/G	1.13	0.12	6/02/95	UNDER CONTROL
95.09086	CA	4.4	0.44	MG/G	4.05	0.45	6/02/95	UNDER CONTROL
95.09086	CD	17.	2.	UG/G	17.9	3.9	6/02/95	UNDER CONTROL

95.09086 CO	8.3	1.4	UG/G	8.	[redacted]	6/02/95	UNDER CONTROL
95.09086 CR	18.	2.	UG/G	18.	2.	6/02/95	UNDER CONTROL
95.09086 CU	2600.	260.	UG/G	2900.	500.	6/02/95	UNDER CONTROL
95.09086 FE	26.	2.6	MG/G	27.5	3.5	6/02/95	UNDER CONTROL
95.09086 K	4.3	0.43	MG/G	4.5	0.5	6/02/95	UNDER CONTROL
95.09086 MG	4.9	0.49	MG/G	5.5	0.6	6/02/95	UNDER CONTROL
95.09086 MN	8100.	810.	UG/G	7750.	1150.	6/02/95	UNDER CONTROL
95.09086 NA	0.58	0.058	MG/G	0.53	0.03	6/02/95	UNDER CONTROL
95.09086 NI	12.	2.	UG/G	11.	2.	6/02/95	UNDER CONTROL
95.09086 PB	5500.	550.	UG/G	5150.	350.	6/02/95	UNDER CONTROL
95.09086 V	40.	4.	UG/G	45.	5.	6/02/95	UNDER CONTROL
95.09086 ZN	6000.	600.	UG/G	6100.	500.	6/02/95	UNDER CONTROL

REPORT NUMBER: 35215

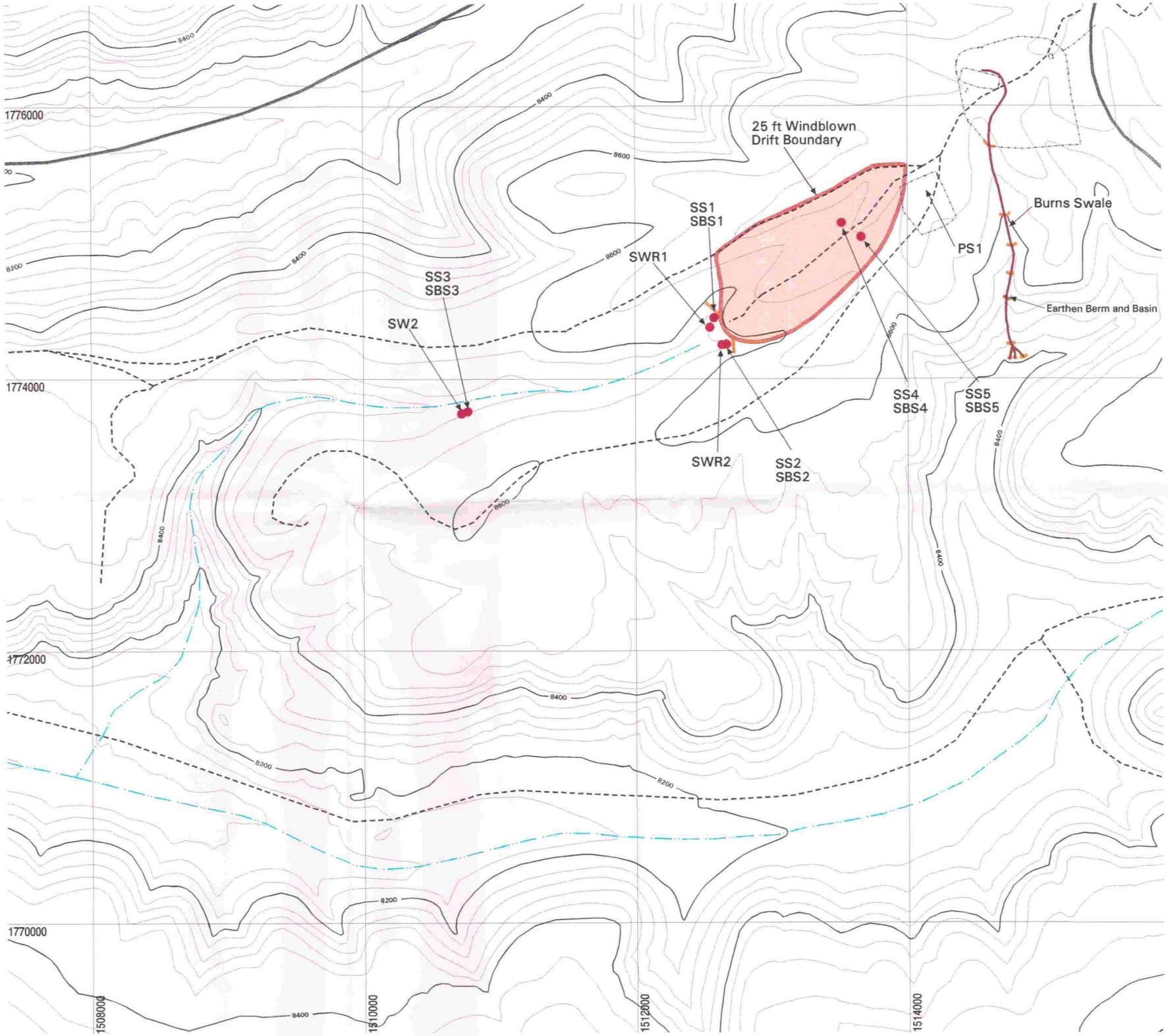
Analyst	Reviewer	Team Leader	QA Officer
6-5-95	6-5-95	6/12/95	6/12/95
Date	Date	Date	Date

No Sample Discrepancies Noted by Sample Management Section

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1992,' LA-12790-MS, Vol. I, pp. 19-20.

****

Fenton Hill (TA-57) Milagro Project Sampling Plan



FIMAD Plot ID: 106006 06 Nov 97

Fenton Hill (TA-57) Milagro Project Sampling Plan

- Drainage
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Application Area (22.327 acres)
- Application Area Buffer (25 ft)
- Spill Location
- Sample Location

MILAGRO PROJECT SAMPLING PLAN

ANALYTES: Metals

OBJECTIVE	TYPE	LOCATION
Background Sampling		
pond sludge quality	sludge	PS1
soil-application area	soil: surface	SS4, SS5
soil-application area	soil: sub-surface	SBS4, SBS5
soil-adjacent down gradient	soil: surface	SS2, SS1
soil-adjacent down gradient	soil: sub-surface	SBS2, SBS1
soil-distant down gradient	soil: surface	SS3
soil-distant down gradient	soil: sub-surface	SBS3
surface water-distant down gradient	surface water	SW2
surface water-Lake Fork Canyon and Rio Cebolla (not on map)	surface water	SW3
Sampling During Application		
stormwater runoff-down gradient	stormwater runoff	SWR1, SWR2
Post-Application Sampling		
soil-application area	soil: surface	SS4, SS5
soil-application area	soil: sub-surface	SBS4, SBS5
soil-adjacent down gradient	soil: surface	SS2, SS1
soil-adjacent down gradient	soil: sub-surface	SBS2, SBS1
soil-distant down gradient	soil: surface	SS3
soil-distant down gradient	soil: sub-surface	SBS3
surface water-distant down gradient	surface water	SW2

FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY

EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)

LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones

Date: November 06, 1997 FIMAD Plot ID: 106006

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000
Contour Interval: 40 ft

0 152 304 456 608
METERS

0 500 1000 1500 2000
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundery is based on legal description established in 1995. Contour data are from a September 1981 aerial survey. All other data are from various sources and are part of the FIMAD repository.

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

October 23, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-987

Mr. Bob Beers
Los Alamos National Laboratory
MS K497
Los Alamos, New Mexico 87545

RE: Fenton Hill Hot Dry Rock Facility GW-31
NE/4, Sec. 13, T19N, R2E
Burns Swale Cement/Mud Slurry Spill
Sandoval County, New Mexico

Dear Mr. Beers:

The New Mexico Oil Conservation Division (OCD) has reviewed the Los Alamos National Laboratory (LANL) letter dated August 13, 1997 requesting removal of the silt fences and no further action at the Burns Swale spill site. Based on the information received, and a September 22, 1997 inspection of the site with LANL personnel, the OCD is requesting the following information:

1. An upgradient soil sample, for total metals analysis, to determine background levels.

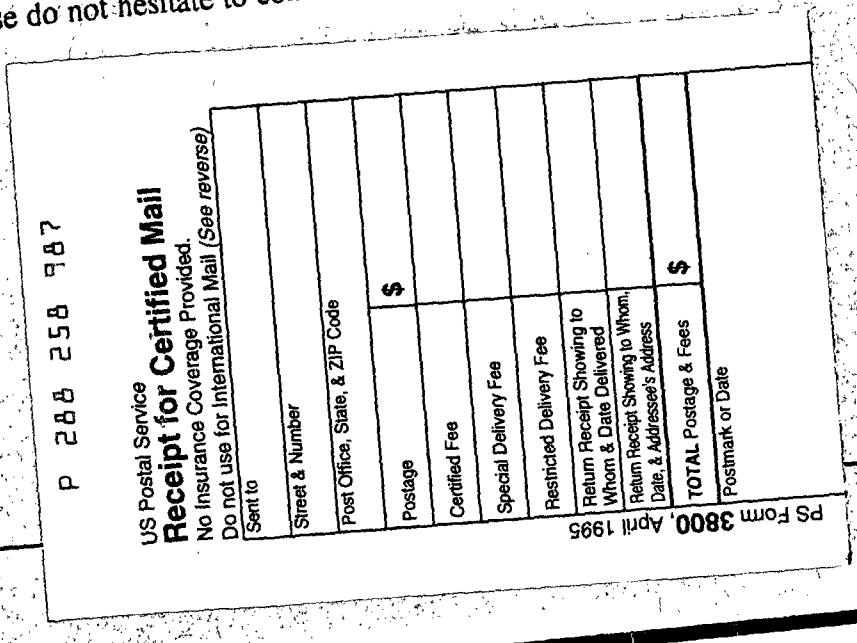
2. Alternate stabilization measures to ensure that remaining contaminants will not migrate from the spill site and impact any watercourse.

If you have any questions, please do not hesitate to contact me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: Glenn Saums



State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous & Radioactive Materials Bureau
2044 Galisteo
P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-1557
Fax (505) 827-1544

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

September 15, 1997

RE: Proposed Class III Permit Modification

Dear Concerned Citizen:

Enclosed is a fact sheet regarding the New Mexico Environment Department's intent to approve a Class III modification to the Resource Conservation and Recovery Act (RCRA) permit issued to the US Department of Energy/Los Alamos National Laboratories (DOE/LANL), New Mexico, Permit No. NM0890010515.

The proposed modification will remove 3 Solid Waste Management Units (SWMUs) from the HSWA Module of the permit. The enclosed fact sheet provides additional information regarding this proposed modification, including identification of the SWMUs to be removed from the permit, the basis for their removal, repositories where the administrative record for this action can be reviewed, and procedures for submitting comments and requesting a Public Hearing. Comments and requests for Public Hearing will be received through **November 12, 1997.**

If you have any questions or comments, please contact Mr. John Kieling of my staff at 827-1558.

Sincerely,

Robert S. (Stu) Dinwiddie, Manager
RCRA Permits Management Program
Hazardous and Radioactive Materials Bureau

RSD:jek

enclosure

cc: J. Kieling, NMED HRMB
File: HSWA LANL G/P '97
Track: LANL, 9/15/97, Public, HRMB/jek, RE, File

C:\DOCUMENT\LANL96-1\NFAS\CONCCITZ.

Availability of Additional Information:

A Statement of Basis has been prepared to provide additional information on site history, evaluation of relevant investigations, and basis for the decision to approve NFA status.

The administrative record for this proposed action consists of this fact sheet, the statement of basis, the legal notice, the proposed revised Tables A and C, and a summary of public involvement activities. The administrative record may be reviewed **from September 29 through November 12, 1997** at the following locations:

New Mexico Environment Department
Hazardous and Radioactive Materials Bureau
P.O. Box 26110
2044-A Galisteo Street
Santa Fe, New Mexico 87502
(505) 827-1561

Los Alamos National Laboratory Community Reading Room
1350 Central Avenue, Suite 101
Los Alamos, New Mexico 87544

To obtain a copy of the administrative record or any part thereof, please contact Mr. John Kieling at the New Mexico Environment Department at the above address. Any person who wishes to comment on this permit modification or to request a public hearing should submit written comments/requests, along with the commenter's/requestor's name and address, to John Kieling at the above address. Requests for hearing should include a statement of the nature of the issues proposed to be raised. Only comments/requests received **by November 12, 1997** will be considered. NMED will provide a 30-day notice of the public hearing, if scheduled.

Final Decision:

All written comments and issues raised at a Public Hearing, if held, will become part of the administrative record and will be considered in formulating the final decision. NMED may approve, or modify and approve, the requested permit modification based on the comments received. NMED will notify DOE/LANL and each person who submitted a written comment during the public comment period or testimony at a Public Hearing of the final decision, including any approved change to the proposed modification, and a detailed statement of reasons for any such change. The final decision will be made according to applicable State and Federal laws.

FACT SHEET
September 15, 1997

NOTICE OF INTENT
TO APPROVE A MODIFICATION TO
RCRA PERMIT NO. NM0890010515
US DEPARTMENT OF ENERGY/LOS ALAMOS NATIONAL LABORATORY
NEW MEXICO

Action: Approval, subject to public review and input, of a Class III permit modification to remove three (3) Solid Waste Management Units (SWMUs) from a RCRA permit.

Permittee: US Department of Energy/Los Alamos National Laboratory, New Mexico

Permit No.: NM0890010515

Reason for Action: The proposed modification will remove 3 SWMUs from **Table A** and **Table C** of the permit. Tables A and C list sites at LANL where Corrective Action to characterize and/or remediate past releases of hazardous waste or hazardous waste constituents may be necessary.

On September 30, 1996, DOE/LANL proposed 42 SWMUs for NFA. At this time, NMED has identified three (3) of these sites as appropriate for NFA. The three sites proposed for NFA in this action and justification for removal of these sites from LANL's permit are:

1. **Field Unit 1, SWMU 3-024, Tank and/or Associated Equipment** - NFA approved because there is no evidence that the site was used for the management of RCRA hazardous waste and/or hazardous waste constituents.

2. **Field Unit 1, SWMU 3-045(d), Storage Tank (Above Ground)** - NFA approved because the site was found to be a duplicate SWMU of SWMU 3-014(q).

3. **Field Unit 4, SWMU 52-002(e), Septic Tank and Seepage Pit (Active)** - NFA approved because it is a duplicate SWMU of SWMU 63-001(a).

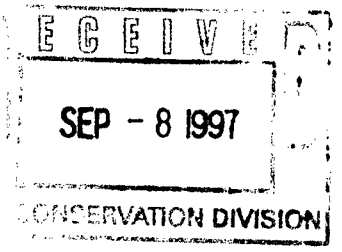
State of New Mexico
ENVIRONMENT DEPARTMENT
Surface Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-0187

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

Certified-Return Receipt Requested
P 332 409 098



September 5, 1997

Mr. Mark Ashley
State of New Mexico
Oil Conservation Division (OCD)
2040 South Pacheco Street
Santa Fe, New Mexico 87505

RE: Recommendations From The New Mexico Environment Department-Surface Water Quality Bureau (NMED-SWQB) Regarding The Clean-Up Of the Burn Swale Spill At TA-57 (Fenton Hill) which is part of Los Alamos National Laboratory (LANL)

Dear Mr. Ashley:

The NMED-SWQB has reviewed the August 11, 1997, report by Mr. Scott P. Anderson of the NMED-Dept. of Energy/Oversight Bureau (DOE/OB) regarding the clean up of cement/mud slurry spilled at TA-57, Fenton Hill Hot Dry Rock Facility GW-31.

Based on the information provided by Mr. Anderson, who conducted several on-site visits, the NMED-SWQB recommends that the OCD accept this clean-up as satisfactory with regard to surface water protection concerns. However, it was noted that LANL only remediated 90% of the spill material and chose to install stabilization measures to prevent further erosion and possible introduction into the watercourse of the 10% of the spill material left unremediated. NMED-SWQB therefore recommends that LANL provide OCD evidence of stabilization at this site before the silt fences are removed in October, 1997. This will assure NMED-SWQB that the site will not provide any potential for further impact to the watercourse.

If you have any questions concerning this letter feel free to call Ms. Barbara Hoditschek of my staff at 827-0596. Thank you for your cooperation in this matter, and for providing NMED-SWQB the opportunity of commenting on this matter.

Sincerely,

Glenn Saums, Manager
Point Source Regulation Section
Surface Water Quality Bureau

cc: E. Kelley, Ph.D., NMED-SWQB
T. Michael, NMED-DOE/OB
S. Dinwiddie, Ph.D., NMED-HRMB
S. Rae, ESH-18, MS K497
J. Plum, DOE/LAOO, MS A316
S. Boyce, Acting Dist. Ranger, Jemez Ranger Dist., SF Nat. Forest
File: LANL:TA-57:1203

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: August 13, 1997
In Reply Refer To: ESH-18/WQ&H:97-0261
Mail Stop: K497
Telephone: (505) 667-7969

AUG 15 1997

Mr. Mark Ashley
State of New Mexico
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: CLEAN-UP OF BURNS SWALE SPILL SITE AND REQUEST FOR NO FURTHER ACTION

Dear Mr. Ashley:

On June 16, 1997, Los Alamos National Laboratory and contract personnel conducted a clean-up of the Burns Swale spill site at Fenton Hill. The spill material was collected from the watercourse using manual methods and then transported to the Fenton Hill facility using an all-terrain vehicle (ATV). TCLP analysis of the spill material determined that it was not a hazardous waste. Five 55-gallon drums of spill material were collected and disposed of at the Los Alamos County Landfill.

Following the clean-up, Laboratory and contract personnel re-entered Burns Swale to restore those areas of the watercourse which were disturbed by the ATV. Additionally, straw bales were placed in the watercourse as a Best Management Practice (BMP) to control erosion. The silt fences installed in November, 1996, will be maintained until October, 1997. At that time they will be removed and properly disposed of. The straw bales will be left in the watercourse to naturally bio-degrade.

Based upon the successful characterization and clean-up of this spill, the Laboratory requests that your agency accept this clean-up as complete and find that no further action is required.

Please feel free to contact me at 667-7969 if you have questions or concerns regarding this request.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

RB/rj

Cy: S. Boyce, Acting District Ranger , Jemez Ranger District, Santa Fe National Forest
B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico
K. Hill, NMED/HRMB, Santa Fe, New Mexico
S. Anderson, DOE/OB, Santa Fe, New Mexico
J. Albright, EES-4, MS D443
J. Thomson, Lithos & Associates, MS D443
D. Thomas, EES-DO, MS D446
J. Plum, DOE/LAAO, MS A316
S. Rae, ESH-18, MS K497
N. Williams, ESH-18, MS K497
S. Veenis, ESH-18, MS K497
WQ&H File, MS K497
CIC-10, MS A150

MEMORANDUM

TO: Chris Hanlon-Meyer, NMED DOE OB, Technical Support Section

FROM: Scott P. Anderson, NMED DOE OB, Technical Support Section

DATE: August 11, 1997

SUBJECT: Field inspection of cement/mud slurry spill remediation at Los Alamos National Laboratories TA-57, Fenton Hill Hot Dry Rock Facility GW-31, Sandoval County, New Mexico.

A spill of approximately 5000 gallons of well-casing cement/mud slurry occurred at LANL's Fenton Hill Hot Dry Rock Facility during the evening of November 22, 1996. On March 26, 1997 the DOE Oversight Bureau attended a sampling event at the Fenton Hill Hot Dry Rock Facility to assess the extent of the spill and observe the sampling event. Remediation of the site occurred during the second week of June, 1997, and involved manual removal of approximately 70% of the dehydrated slurry from parts of the Burns Swale area (mainly from deposits in plunge-pools along the dry water-course). Scott Anderson of DOE OB staff attended a field inspection of the Burns Swale remediation on June 24, 1997. Bob Beers and Jim Thomson of LANL headed the inspection, which included the entire length of Burns Swale.

Photographs 1a)- 1c) show the excavation efforts in the plunge-pools, where much of the spill (approximately 80%) was contained and eventually dried-up. The buff-white dirt in these photographs is what's left of the spill material, and the dark gray dirt along the edges of the photographs is the natural soil. Probably 90% of the spill deposits contained in the plunge-pools was removed.

Photographs 2 and 3 are of the upper-reach of Burns Swale nearest the facility where the spill initially spread-out over a meadow (in photo 2) before localizing in the water course. The buff-

white dirt in these photographs is the spill material, and its thin cover in this area (usually less than 2.0 mm deep) made it more practical to leave it place, rather than scraping it up and denuding the meadow. Photograph 3 shows how well spring growth is incorporating and growing through the thin spill deposits in the meadow. Jim Thomson and the remediation crew were overall careful about denuding the upper reaches of Burns Swale in order to prevent a large degree of local erosion.

Photograph 4 shows the amount of spill material excavated. The total amount would probably fill 1.5 55 gallon drums (approximately 80 gallons volume of dirt). Appropriate disposal of the excavated material was pending at the time of the inspection.

I believe that the remediation was successful, regardless of the approximately 30% of the spill deposit that remains in Burns Swale. Removal of this remaining fraction of the spill would have denuded most of upper Burns Swale, likely causing massive erosion in the area, and greatly increasing the suspended sediment lode leaving Burns Swale and ultimately entering the Lake Fork canyon down-stream.

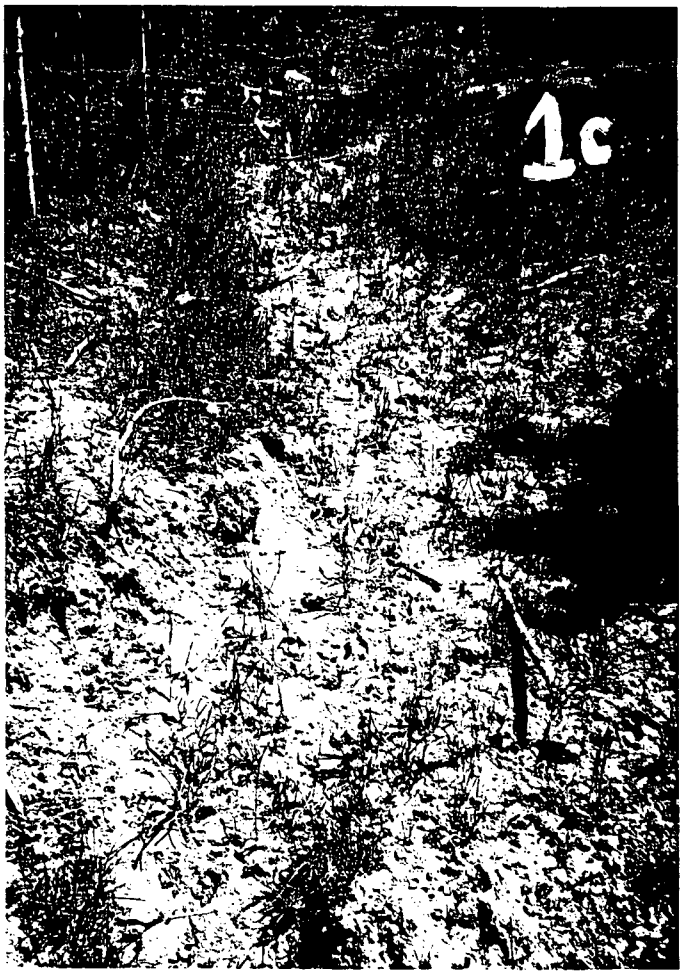
Attachments (2)

SPA:spa

cc: Barbara Hoditshek, NMED SWQB
Mark Ashley, NM OCD
Don Krier, LANL, FU-5 FPL, MS D462
Bob Beers, LANL, ESH-18, MS K497
Jim Thomson, LANL, EES-4, MS E443
Santa Fe Look

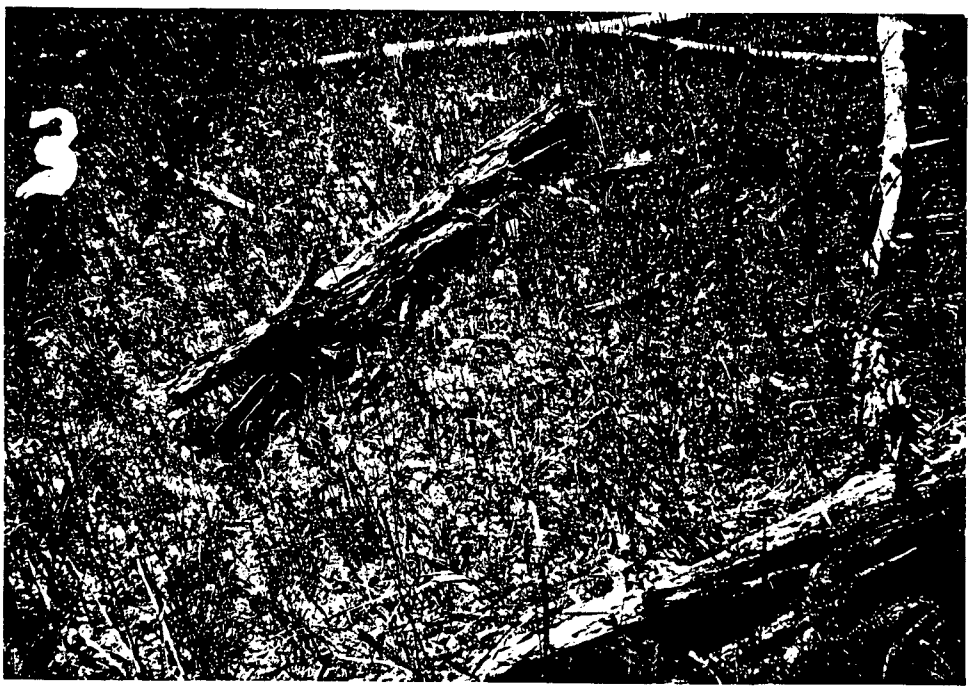
Attachment 1.

Photographs of remediation efforts in the water-course at Burns Swale (1a-1c).


1c

Attachment 2.

Photographs of Upper Burns Swale spill deposits, and the amount of spill material removed from Burns Swale (2, 3, 4).




4

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal	Time	Date
	10:30 AM	6-27-97

Originating Party	Other Parties
BOB BEERS - CALL	MARK ASHLEY

Subject: MILLAGRO POND & HOT DRY ROCKS POND

Discussion: CALL WANTS TO SEND GROUND WATER BACKWASH FROM MILLAGRO TO HOT DRY ROCKS. THE GROUNDWATER FOR BOTH PONDS IS FROM THE SAME SOURCE. THE BACKWASH HAS NO CHEMICALS ADDED & HAS NOT BEEN IN CONTACT WITH ANY OTHER STREAMS

Conclusions or Agreements: CALL CAN SEND BACKWASH FROM MILLAGRO TO HOT DRY ROCK, APPROXIMATELY 30,000 GALLONS.

Distribution

Signed: Mark Ashley

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: June 2, 1997
In Reply Refer To: ESH-18/WQ&H:97-0163
Mail Stop: K497
Telephone: (505) 667-7969

Mark Ashley
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: ANALYTICAL RESULTS FROM APRIL 1997 SAMPLING OF THE FENTON HILL SPILL SITE

Dear Mr. Ashley:

Enclosed for your review are the analytical results from the sampling of water and solids from the Burns Swale spill site on April 26, 1997. Also enclosed is summary table and a map of the spill site.

Three samples of the cement/mud solids deposited in Burns Swale during the spill were collected by Los Alamos National Laboratory (Laboratory) personnel and analyzed for total metals and TCLP metals (See Table 1.0). The TCLP analytical results show that the spill material does not meet the definition of a RCRA hazardous waste. This determination is consistent with the analytical results from the November 22, 1996, sampling of the spilled solids.

The analytical results of the total metals analysis identified elevated concentrations of barium in the spilled solids. Barium is the primary ingredient of barite, a mud weighting agent used during plugging and abandonment (P&A) operations at Fenton Hill. Due to the high pH of the spill material (pH=12.1), barium will be present as barium carbonate, a form that is highly insoluble and immobile.

Two water samples were collected from Burns Swale by Laboratory personnel on April 26, 1997. Aliquots of each sample were filtered through a 0.45 micron filter and submitted for analysis for NM WQCC Section 3103. regulate parameters. The analytical results show that neither sample exceed stream standards for dissolved parameters (See Table 1.0). Additionally, aliquots of each sample were submitted without filtering for total mercury and total recoverable selenium analysis. In both samples the concentrations of mercury and selenium were below laboratory detection limit (See Table 1.0).

Los Alamos National Laboratory remains committed to cleaning up the material spilled into Burns Swale. As presented in the Laboratory's Remedial Action and Sampling Plan, submitted to your agency in March, 1997, the Laboratory will collect by manual methods as much of the spilled material as is possible. Every effort will be made to minimize damage to the environment. The US Forest Service has given the Laboratory approval to use and "All Terrain Vehicle" (ATV) to transport spill material out of the water course. Clean-up activities for Burns Swale have been scheduled to begin on June 10, 1997.

On April 10, 1997, the Laboratory submitted, with copy to the OCD, an application to the NMED and the Department of the Army for New Mexico Water Quality Approval to Conduct Work Under a Nationwide 404 Permit. The application was submitted for the proposed removal of spilled solids from Burns Swale. Enclosed for your information are copies of the response letters which the Laboratory received from the NMED and the Department of the Army.

Once clean-up activities have been completed the Laboratory will request that your agency conduct a visual inspection of the spill site to determine if the spill can be administratively closed.

Please feel free to contact me at 667-7969 if you have further questions or concerns.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

RB/rj

Enclosures: a/s

Cy: S. Boyce, Acting District Ranger, w/enc., Jemez Ranger District, Santa Fe National Forest
B. Hoditscheck, NMED SWQB, w/enc., Santa Fe, New Mexico
K. Hill, NMED HRMB, w/enc., Santa Fe, New Mexico
J. Albright, w/enc., EES-4, MS D 443
J. Thomson, w/enc., Lithos & Associates, MS D443
D. Thomas, w/enc., EES-DO, MS D446
B. Koch, w/enc., DOE/LAAO, MS A316
S. Rae, w/enc., ESH-18, MS K497
N. Williams, w/enc., ESH-18, MS K497
S. Veenis, w/enc., ESH-18, MS K497
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Fenton Hill Hot Dry Rock Geothermal Facility
Burns Swale Sampling Data

Sample ID Number	Sample Date	Sample Type	pH	Solids: TCLP Metals Analysis (mg/L) As	Ba	Cd	Cr	Hg	Pb	Se	Ag
96-11-221-01A	11/21/96	solids	12.1	0.7	<0.5	0.011	0.05	<0.0020	<0.1	<0.05	<0.04
57-032697-02S	3/26/97	solids	NT	<0.40	1	<0.0050	<0.020	<0.0020	<0.050	<0.050	<0.040
57-032697-03S	3/26/97	solids	NT	0.9	5.2	<0.0050	<0.020	<0.0020	<0.050	<0.050	<0.040
57-032697-04S	3/26/97	solids	NT	<0.40	4.3	<0.0050	<0.020	<0.0020	<0.050	<0.050	<0.040
RCRA TCLP Limits			*12.5*	*5*	*100*	*1*	*6*	*0.2*	*5*	*0.7*	*0.5*

Sample ID Number	Sample Date	Sample Type	Solids: Total Metals Analysis (mg/Kg) Ag	Al	As	Ba	B	Cd	Co	Cr	Cu	Pb	Hg	Se	V	Zn
57-032697-02S	3/26/97	solids	<5.0	3,830	79.1	8040	<75	<1.0	<2.5	5	20.5	21.9	0.48	<12.5	6.12	37.8
57-032697-03S	3/26/97	solids	<5.0	2,260	57.6	13,000	<75	<1.0	<2.5	<5.0	9.6	15.2	0.34	<12.5	2.82	27.7
57-032697-04S	3/26/97	solids	<5.0	3,660	87.9	10,300	<75	<1.0	<2.5	<5.0	16.2	22	0.6	<12.5	4.2	40
Mean			<5.0	3,250	74.9	10,447	<75	<1.0	<2.5	<5.0	15.4	19.7	0.47	<12.5	4.38	35.2

Sample ID Number	Sample Date	Sample Type	Water: Dissolved Metals Analysis (mg/L) Al	As	B	Cd	Cr	Co	Cu	Pb	Hg(a)	Mn	Se(b)	V	Zn
57-032697-01WF, WNF	3/26/97	water	<0.5	<0.06	0.8	<0.004	<0.02	<0.01	<0.01	<0.04	<0.0002	0.03	<0.005	<0.003	<0.1
57-032697-04WF, WNF	3/26/97	water	<0.5	<0.06	<0.3	<0.004	<0.02	<0.01	<0.01	<0.04	<0.0002	<0.005	<0.005	<0.003	<0.1
NM WQCC Livestock Watering Standards			*5*	*0.2*	*5*	*0.05*	*1.0*	*1.0*	*0.5*	*0.1*		*NA*		*0.1*	*25*
NM WQCC Wildlife Habitat Standards											0.000012		0.002		

Notes:
(a) total mercury analysis
(b) total recoverable selenium analysis
NT: Not Tested

ASSAIGAI
ANALYTICAL
LABORATORIES, INC.
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820

Report Generated:
April 30, 1997 15:29

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: LOS ALAMOS NATIONAL LABS
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

ATTN: BOB BEERS

WORKORDER # : 9704211
WORK ID : OLD WO#9703281
CLIENT CODE : LOS10
DATE RECEIVED : 03/26/97

Lab ID: 9704211-01A
Sample ID: 57032697-02S
Collected: 03/26/97
Matrix: SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	31.00	% (Percent)				
TCLP (ICP) DIG/1311/3005	04/25/97	N/A				
TCLP EXTRACTION/TCLP 1311	04/23/97	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	ND	mg/L	0.40	1.0	04/29/97	M97296,M97299
Barium, Ba	1.0	mg/L	0.50	1.0	04/29/97	M97296,M97299
'mium, Cd	ND	mg/L	0.0050	1.0	04/29/97	M97296,M97299
mium, Cr	ND	mg/L	0.020	1.0	04/29/97	M97296,M97299
ı, Pb	ND	mg/L	0.050	1.0	04/29/97	M97296,M97299
Mercury, Hg	ND	mg/L	0.0020	1.0	04/25/97	M97296,M97299
Selenium, Se	ND	mg/L	0.050	1.0	04/29/97	M97296,M97299
Silver, Ag	ND	mg/L	0.040	1.0	04/29/97	M97296,M97299
TCLP(CVAA)Hg XT/SW846 7471	04/25/97	N/A				

Lab ID: 9704211-02A
Sample ID: 57032697-03S
Collected: 03/26/97
Matrix: SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	31.00	% (Percent)				
TCLP (ICP) DIG/1311/3005	04/25/97	N/A				
TCLP EXTRACTION/TCLP 1311	04/23/97	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	0.9	mg/L	0.40	2.0	04/29/97	M97296,M97299
Barium, Ba	5.2	mg/L	0.50	2.0	04/29/97	M97296,M97299
Cadmium, Cd	ND	mg/L	0.0050	2.0	04/29/97	M97296,M97299
Chromium, Cr	ND	mg/L	0.020	2.0	04/29/97	M97296,M97299
Lead, Pb	ND	mg/L	0.050	2.0	04/29/97	M97296,M97299
Mercury, Hg	ND	mg/L	0.0020	2.0	04/25/97	M97296,M97299
Selenium, Se	ND	mg/L	0.050	2.0	04/29/97	M97296,M97299
Silver, Ag	ND	mg/L	0.040	2.0	04/29/97	M97296,M97299
TCLP(CVAA)Hg XT/SW846 7471	04/25/97	N/A				

D: 9704211-03A
Sample ID: 57032697-04S

Collected: 03/26/97
Matrix: SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	50.00	% (Percent)				
TCLP (ICP) DIG/1311/3005	04/25/97	N/A				
TCLP EXTRACTION/TCLP 1311	04/23/97	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	ND	mg/L	0.40	1.0	04/29/97	M97296,M97299
Barium, Ba	4.3	mg/L	0.50	1.0	04/29/97	M97296,M97299
Cadmium, Cd	ND	mg/L	0.0050	1.0	04/29/97	M97296,M97299
Chromium, Cr	ND	mg/L	0.020	1.0	04/29/97	M97296,M97299
Lead, Pb	ND	mg/L	0.050	1.0	04/29/97	M97296,M97299
Mercury, Hg	ND	mg/L	0.0020	2.0	04/25/97	M97296,M97299
Selenium, Se	ND	mg/L	0.050	1.0	04/29/97	M97296,M97299
Silver, Ag	ND	mg/L	0.040	1.0	04/29/97	M97296,M97299
TCLP(CVAA)Hg XT/SW846 7471	04/25/97	N/A				

for William P. Biava
President

WORKORDER COMMENTS

DATE : 04/30/97
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND	= Analyte "not detected" in analysis at the sample specific detection limit.
D_F	= Sample "dilution factor"
NT	= Analyte "not tested" per client request.
B	= Analyte was also detected in laboratory method QC blank.
E	= Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT	= The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

ASSAIGAI ANALYTICAL LABORATORIES, INC.
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 • (915) 593-6000 • FAX (915) 593-7820

Report Generated:
April 10, 1997 13:13

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: LOS ALAMOS NATIONAL LABS
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

ATTN: BOB BEERS

WORKORDER # : 9703281
WORK ID : FENTON HILL HDR PROJECT
CLIENT CODE : LOS10
DATE RECEIVED : 03/28/97

Lab ID: 9703281-01A
Sample ID: 57-032697-01WNF
Collected: 03/26/97 13:50:00
Matrix: WATER

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
(GFAA)DIG WATER/SW846 3005	04/03/97	N/A				
CVAA Hg XT/EPA 245.1	03/31/97	N/A				
MERCURY (CVAA)/EPA 245.1						
Mercury	ND	mg/L	0.00020	1.0	04/01/97	M97234
SELENIUM (GFAA)/EPA 270.2						
ium, Se	ND	mg/L	0.0050	1.0	04/08/97	M97245

Lab ID: 9703281-02A
Sample ID: 57-032697-01WF
Collected: 03/26/97 13:50:00
Matrix: WATER

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Boron by EPA 200.7						
Boron, B	0.8	mg/L	0.30	1.0	04/07/97	M97244
Boron DIG EPA 4.1.3	04/03/97	N/A				
CVAA Hg XT/EPA 245.1	03/31/97	N/A				
MERCURY (CVAA)/EPA 245.1						
Mercury	ND	mg/L	0.00020	1.0	04/01/97	M97234
NPDES DIGESTION 4.1.3	04/03/97	N/A				
NPDES METALS-ICP/EPA 200.7						
Silver, Ag	NT	mg/L	0.020			M97244
Aluminum, Al	ND	mg/L	0.50	1.0	04/07/97	M97244
Arsenic, As	ND	mg/L	0.060	1.0	04/07/97	M97244
Barium, Ba	NT	mg/L	0.010			M97244
Beryllium, Be	NT	mg/L	0.0010			M97244
Calcium, Ca	NT	mg/L	0.30			M97244
Cadmium, Cd	ND	mg/L	0.0040	1.0	04/07/97	M97244
Cobalt, Co	ND	mg/L	0.010	1.0	04/07/97	M97244
Chromium, Cr	ND	mg/L	0.020	1.0	04/07/97	M97244
Copper, Cu	ND	mg/L	0.010	1.0	04/07/97	M97244
Iron, Fe	NT	mg/L	0.30			M97244
Potassium, K	NT	mg/L	0.20			M97244
Magnesium, Mg	NT	mg/L	0.20			M97244
Manganese, Mn	0.030	mg/L	0.0050	1.0	04/07/97	M97244
Sodium, Na	NT	mg/L	0.30			M97244
Nickel, Ni	NT	mg/L	0.040			M97244
Pb	ND	mg/L	0.040	1.0	04/07/97	M97244
ony, Sb	NT	mg/L	0.030			M97244
um, Se	ND	mg/L	0.050	1.0	04/07/97	M97244
Thallium, Tl	NT	mg/L	0.40			M97244

L. .D: 9703281-02A **Collected:** 03/26/97 13:50:00
Sample ID: 57-032697-01WF **Matrix:** WATER

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
NPDES METALS-ICP/EPA 200.7						
Vanadium, V	ND	mg/L	0.0030	1.0	04/07/97	M97244
Zinc, Zn	ND	mg/L	0.10	1.0	04/07/97	M97244

Lab ID: 9703281-03A **Collected:** 03/26/97 13:55:00
Sample ID: 57-032697-02S **Matrix:** SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Boron by EPA 6010						
Boron, B	ND	mg/Kg	15	5.0	04/04/97	M97240
Boron DIG SW846 3050	04/02/97	N/A				
CVAA Hg XT/SW846 7471	03/31/97	N/A				
MERCURY (CVAA)/SW846 7471						
Mercury	0.48	mg/Kg	0.15	1.0	04/01/97	M97235
Metal(ICP) DIG /SW846 3050	04/02/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	5.0	04/04/97	M97240
Aluminum, Al	3830	mg/Kg	25	5.0	04/04/97	M97240
' ·ic, As	79.1	mg/Kg	3.0	5.0	04/04/97	M97240
ı, Ba	8040	mg/Kg	0.50	5.0	04/04/97	M97240
ıum, Be	NT	mg/Kg	0.50			M97240
Calcium, Ca	NT	mg/Kg	15			M97240
Cadmium, Cd	ND	mg/Kg	0.20	5.0	04/04/97	M97240
Cobalt, Co	ND	mg/Kg	0.50	5.0	04/04/97	M97240
Chromium, Cr	5.0	mg/Kg	1.0	5.0	04/04/97	M97240
Copper, Cu	20.5	mg/Kg	0.50	5.0	04/04/97	M97240
Iron, Fe	NT	mg/Kg	15			M97240
Potassium, K	NT	mg/Kg	10			M97240
Magnesium, Mg	NT	mg/Kg	10			M97240
Manganese, Mn	NT	mg/Kg	0.25			M97240
Sodium, Na	NT	mg/Kg	15			M97240
Nickel, Ni	NT	mg/Kg	2.0			M97240
Lead, Pb	21.9	mg/Kg	2.0	5.0	04/04/97	M97240
Antimony, Sb	NT	mg/Kg	1.5			M97240
Selenium, Se	ND	mg/Kg	2.5	5.0	04/04/97	M97240
Thallium, Tl	NT	mg/Kg	20			M97240
Vanadium, V	6.12	mg/Kg	0.15	5.0	04/04/97	M97240
Zinc, Zn	37.8	mg/Kg	5.0	5.0	04/04/97	M97240

Lab ID: 9703281-04A **Collected:** 03/26/97 14:20:00
Sample ID: 57-032697-03S **Matrix:** SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Boron by EPA 6010						
Boron, B	ND	mg/Kg	15	5.0	04/04/97	M97240
Boron DIG SW846 3050	04/02/97	N/A				
CVAA Hg XT/SW846 7471	03/31/97	N/A				
MERCURY (CVAA)/SW846 7471						
' ·ıry	0.34	mg/Kg	0.15	1.0	04/01/97	M97235
! :P) DIG /SW846 3050	04/02/97	N/A				
N _S-ICP/SW846 6010						
Sıver, Ag	ND	mg/Kg	1.0	5.0	04/04/97	M97240

L. .D: 9703281-04A **Collected:** 03/26/97 14:20:00
Sample ID: 57-032697-03S **Matrix:** SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
METALS-ICP/SW846 6010						
Aluminum, Al	2260	mg/Kg	25	5.0	04/04/97	M97240
Arsenic, As	57.6	mg/Kg	3.0	5.0	04/04/97	M97240
Barium, Ba	13000	mg/Kg	0.50	5.0	04/04/97	M97240
Beryllium, Be	NT	mg/Kg	0.50			M97240
Calcium, Ca	NT	mg/Kg	15			M97240
Cadmium, Cd	ND	mg/Kg	0.20	5.0	04/04/97	M97240
Cobalt, Co	ND	mg/Kg	0.50	5.0	04/04/97	M97240
Chromium, Cr	ND	mg/Kg	1.0	5.0	04/04/97	M97240
Copper, Cu	9.6	mg/Kg	0.50	5.0	04/04/97	M97240
Iron, Fe	NT	mg/Kg	15			M97240
Potassium, K	NT	mg/Kg	10			M97240
Magnesium, Mg	NT	mg/Kg	10			M97240
Manganese, Mn	NT	mg/Kg	0.25			M97240
Sodium, Na	NT	mg/Kg	15			M97240
Nickel, Ni	NT	mg/Kg	2.0			M97240
Lead, Pb	15.2	mg/Kg	2.0	5.0	04/04/97	M97240
Antimony, Sb	NT	mg/Kg	1.5			M97240
Selenium, Se	ND	mg/Kg	2.5	5.0	04/04/97	M97240
Thallium, Tl	NT	mg/Kg	20			M97240
Vanadium, V	2.82	mg/Kg	0.15	5.0	04/04/97	M97240
Zinc, Zn	27.7	mg/Kg	5.0	5.0	04/04/97	M97240

D: 9703281-05A **Collected:** 03/26/97 14:35:00
S...ple ID: 57-032697-04S **Matrix:** SOLID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Boron by EPA 6010						
Boron, B	ND	mg/Kg	15	5.0	04/04/97	M97240
Boron DIG SW846 3050	04/02/97	N/A				
CVAA Hg XT/SW846 7471	03/31/97	N/A				
MERCURY (CVAA)/SW846 7471						
Mercury	0.60	mg/Kg	0.15	1.0	04/01/97	M97235
Metal(ICP) DIG /SW846 3050	04/02/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	5.0	04/04/97	M97240
Aluminum, Al	3660	mg/Kg	25	5.0	04/04/97	M97240
Arsenic, As	87.9	mg/Kg	3.0	5.0	04/04/97	M97240
Barium, Ba	10300	mg/Kg	0.50	5.0	04/04/97	M97240
Beryllium, Be	NT	mg/Kg	0.50			M97240
Calcium, Ca	NT	mg/Kg	15			M97240
Cadmium, Cd	ND	mg/Kg	0.20	5.0	04/04/97	M97240
Cobalt, Co	ND	mg/Kg	0.50	5.0	04/04/97	M97240
Chromium, Cr	ND	mg/Kg	1.0	5.0	04/04/97	M97240
Copper, Cu	16.2	mg/Kg	0.50	5.0	04/04/97	M97240
Iron, Fe	NT	mg/Kg	15			M97240
Potassium, K	NT	mg/Kg	10			M97240
Magnesium, Mg	NT	mg/Kg	10			M97240
Manganese, Mn	NT	mg/Kg	0.25			M97240
Sodium, Na	NT	mg/Kg	15			M97240
Nickel, Ni	NT	mg/Kg	2.0			M97240
Lead, Pb	22.0	mg/Kg	2.0	5.0	04/04/97	M97240
Antimony, Sb	NT	mg/Kg	1.5			M97240
Selenium, Se	ND	mg/Kg	2.5	5.0	04/04/97	M97240
...im, Tl	NT	mg/Kg	20			M97240
...um, V	4.20	mg/Kg	0.15	5.0	04/04/97	M97240
..., Zn	40.0	mg/Kg	5.0	5.0	04/04/97	M97240

L. .D: 9703281-06A **Collected:** 03/26/97 14:50:00
Sample ID: 57-032697-04WNF **Matrix:** WATER

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
CVAA Hg XT/EPA 245.1	03/31/97	N/A				
MERCURY (CVAA)/EPA 245.1						
Mercury	ND	mg/L	0.00020	1.0	04/01/97	M97234
SELENIUM (GFAA)/EPA 270.2						
Selenium, Se	ND	mg/L	0.0050	1.0	04/08/97	M97245

Lab ID: 9703281-06B **Collected:** 03/26/97 14:50:00
Sample ID: 57-032697-04WF **Matrix:** WATER

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Boron by EPA 200.7						
Boron, B	ND	mg/L	0.30	1.0	04/07/97	M97244
Boron DIG EPA 4.1.3	04/03/97	N/A				
CVAA Hg XT/EPA 245.1	03/31/97	N/A				
MERCURY (CVAA)/EPA 245.1						
Mercury	ND	mg/L	0.00020	1.0	04/01/97	M97234
NPDES DIGESTION 4.1.3	04/03/97	N/A				
NPDES METALS-ICP/EPA 200.7						
[illegible] Ag	NT	mg/L	0.020			M97244
[illegible]ium, Al	ND	mg/L	0.50	1.0	04/07/97	M97244
[illegible]c, As	ND	mg/L	0.060	1.0	04/07/97	M97244
Barium, Ba	NT	mg/L	0.010			M97244
Beryllium, Be	NT	mg/L	0.0010			M97244
Calcium, Ca	NT	mg/L	0.30			M97244
Cadmium, Cd	ND	mg/L	0.0040	1.0	04/07/97	M97244
Cobalt, Co	ND	mg/L	0.010	1.0	04/07/97	M97244
Chromium, Cr	ND	mg/L	0.020	1.0	04/07/97	M97244
Copper, Cu	ND	mg/L	0.010	1.0	04/07/97	M97244
Iron, Fe	NT	mg/L	0.30			M97244
Potassium, K	NT	mg/L	0.20			M97244
Magnesium, Mg	NT	mg/L	0.20			M97244
Manganese, Mn	ND	mg/L	0.0050	1.0	04/07/97	M97244
Sodium, Na	NT	mg/L	0.30			M97244
Nickel, Ni	NT	mg/L	0.040			M97244
Lead, Pb	ND	mg/L	0.040	1.0	04/07/97	M97244
Antimony, Sb	NT	mg/L	0.030			M97244
Selenium, Se	ND	mg/L	0.050	1.0	04/07/97	M97244
Thallium, Tl	NT	mg/L	0.40			M97244
Vanadium, V	ND	mg/L	0.0030	1.0	04/07/97	M97244
Zinc, Zn	ND	mg/L	0.10	1.0	04/07/97	M97244

Fred L. Shore, Ph.D.
VP of Laboratory Operations

WORKORDER COMMENTS

DATE : **04/10/97**
WORKORDER: **9703281**

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

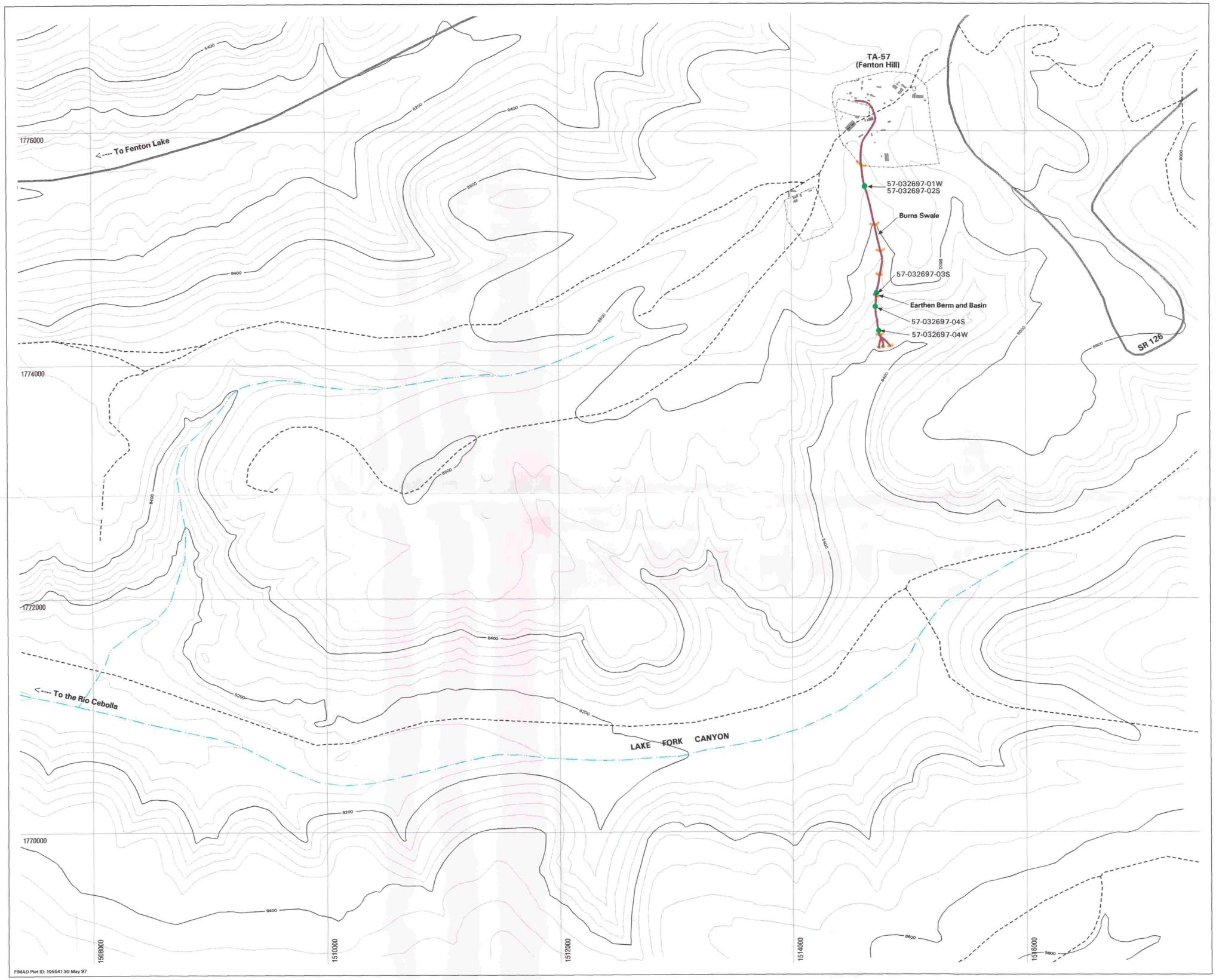
ND	= Analyte "not detected" in analysis at the sample specific detection limit.
D_F	= Sample "dilution factor"
NT	= Analyte "not tested" per client request.
B	= Analyte was also detected in laboratory method QC blank.
E	= Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT	= The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

*Please Note: The total recoverable selenium analysis was prepared and analyzed in accordance with 40 CFR 136. The digestion referenced in the analytical report (4.1.4 from EPA 600/4-79/020) is not vigorous enough for this element. Therefore, the preparation procedure in the selenium method (EPA 270.21) was used.

MAP 1.0. Fenton Hill (TA-57) Hot Dry Rock Geothermal Facility Sampling Plan



- Drainage
- Earth Berm
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Spill Location
- Structure
- Sample Location

Table 1.0: Sampling Plan for Fenton Hill Spill Site

Sample ID	Sample Matrix	Analytes
57-032697-01W	water	Dissolved metals (1,2,3); Total Hg; Total Recov able Se
57-032697-02S	solid	Total Metals (2,3) and TCLP metals
57-032697-03S	solid	Total Metals (2,3) and TCLP metals
57-032697-04S	solid	Total Metals (2,3) and TCLP metals
57-032697-04W	water	Dissolved metals (1,2,3); Total Hg; Total Recov able Se

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Co, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese

FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY

EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)
LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones
Date: May 30, 1997 FIMAD Plot ID: 105541

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000
Contour interval: 40 ft

0 122 244 366 488
METERS
0 400 800 1200 1600
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

FIMAD Plot ID: 105541 30 May 97

State of New Mexico
ENVIRONMENT DEPARTMENT
DOE OVERSIGHT BUREAU
2044 A Galisteo Street
P.O. Box 26110
Santa Fe, New Mexico 87502

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

MEMORANDUM

TO: Chris Hanlon-Meyer, NMED DOE OB, Technical Support Section

FROM: Scott P. Anderson, NMED DOE OB, Technical Support Section

DATE: April 26, 1997

SUBJECT: Field observation of solid and liquid sampling of cement/mud slurry spill at Los Alamos National Laboratories TA-57, Fenton Hill Hot Dry Rock Facility GW-31, Sandoval County, New Mexico.

A spill of approximately 5000 gallons of well-casing cement/mud slurry occurred at LANL's Fenton Hill Hot Dry Rock Facility during the evening of November 22, 1996. On March 26, 1997 the DOE Oversight Bureau attended a sampling event at the Fenton Hill Hot Dry Rock Facility to assess the extent of the spill and observe the sampling event. Bob Beers and Jim Thomson of LANL headed the sampling event, which started along the southwest boundary of the facility where the facility fence crosses the upper-reach of Burns Swale (refer to accompanying map). The constituents of concern (COC) for this sampling event were arsenic and manganese. Analysis for all liquid samples will follow WQCC parameters, 3101; K (Livestock Watering), 3101; L (Wildlife) for total recoverable selenium and total mercury. Manganese will also be analysed for, as it was a COC. Solids samples will undergo total metals analysis.

To contain the spill, a series of 9 silt-fences were installed along Burns Swale on November 23, 1996. The first of these silt fences is located on the boundary fence and was ineffective due to erosion and channel under-cutting. My estimated flow-rate for the channel was approximately 2 g.p.m., and Jim Thomson added that the present flow in this reach of Burns Swale was twice that of the prior week, and that snow-melt from a recent storm was the reason for the increased flow. During most of the year Burns Swale is dry. Channel flow was carrying a small amount of the spill-slurry off the facility and into upper Burns Swale.

As one views Burns Swale from the facility boundary, the presence of the spill and its extent are not obvious. Apparently the large initial volume of the spill has been greatly reduced by

slurry degassing and dehydration. What remains of the slurry today consists of a cream-colored mealy residue that has settled into the grass that covers Burns Swale, and is visible as a spotty cover with an approximate maximum depth of 1 cm. The same is true for the remnants of spill within the facility.

A liquid sample (57-032697-01) and a solids sample (57-032697-02) were collected by LANL approximately 60 m south of the facility fence (Samples 01 & 02 on map). Due to the spotty occurrence of the spill deposit, the solids sample was taken over a wide area of the swale (approximately 4 m^2) by scraping up the residual slurry meal. The liquid sample was obtained in the water-course. Both samples were taken at 13:50 pm.

From the first sample site we proceeded southward along the water-course of Burns Swale, to the second silt fence. Along this segment (approximately 70 m) occurrence of the slurry spill was not evident, spotty at best, and less than 1 cm thick. Remnants of the spill were most common near and within the channel, and consisted of thin (less than 1 cm) deposits of small extent (many less than 10 cm^2). The only large slurry deposit in this segment was located against the second silt fence, and occupied an area of approximately 12 m^2 in varying in thickness between 0.5 cm and 1.5 cm.

Between the second and third silt fences (approximately 90 m) spill deposits were scarce, and were seen usually along or near the channel. Deposits near the channel were thin and spotty in occurrence. Deposits within the channel were in the form of narrow and thin channel-bottom ribbons, and as thicker accumulations (3-5 cm) in channel scours/plunge-pool depressions. Only a few of these scour/plunge-pool deposits were seen along this segment. All surface water flow infiltrates underground approximately 20 m before the third silt fence.

Burns Swale ends at a large earthen berm between the third and fourth silt-fences, and the relief and water-course become much steeper past the fourth silt fence. Spill deposits along this segment were seen entirely within the channel, and concentrated in three elongate scour/plunge-pool depressions. The first two of these spill deposits are located approximately 15 m and 30 m from the third silt fence, and each deposit occupies approximately 3 m^2 with deposit thickness varying between 1 and 4 cm. The third and largest spill deposit is located approximately 20 m down-stream of the second silt fence, and 10 m before the large earthen berm. The deposit occupies an area of approximately 8 m^2, and varies between 1 and 7 cm in thickness.

Solids sample 2 (57-032697-03) was taken from the thickest accumulation of this spill deposit at 14:20 pm (Sample 03 on map). Snow cover prevented any spill observations between the earthen berm and the fourth silt fence.

Between the fourth and fifth silt fences (approximately 85 m) the water course becomes steep and rocky, and traces of the slurry spill are virtually non-existent except for a few very small spill deposits co-mingled Bandelier Formation sediment in the channel. Approximately 45 m from the fourth silt-fence a small seep issues in the water course, flows for 10 m at approximately 1 g.p.m., then infiltrates into the channel sediment. Liquids sample 2 (57-032697-05) was taken at this seep at 14:50 pm (Sample 05 on map). Solids sample 3 (57-032697-04) was taken from a scour/plunge-pool spill deposit, approximately 10 m above the fifth silt fence at 14:40 pm (Sample 04 on map).

Past the fifth silt-fence the Burns Swale water-course enters a large tributary of Lake Fork canyon. Here the relief shallows somewhat, and the water-course spreads-out across a broad fan shaped surface. The path of the slurry spill splits into three distinct lobes on this surface, with each lobe terminating approximately 50 m past the split. A silt fence was erected a few meters in front of each lobe terminus. Due to early spring growth it is difficult to locate any remnant slurry deposits in this area. The main channel of this tributary is approximately 60 m down-slope from the maximum extent of the slurry spill.

Attachments (1)

SPA:spa

cc: Barbara Hoditshek, NMED SWQB
Mark Ashley, NM OCD
Don Krier, LANL, FU-5 FPL, MS D462
Bob Beers, LANL, ESH-18, MS K497
Jim Thomson, LANL, EES-4, MS E443

State of New Mexico
ENVIRONMENT DEPARTMENT
Surface Water Quality Bureau
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-0187

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

23 April 1997

Bob Beers
Los Alamos National Laboratory
Mailstop K497
Los Alamos, NM 87544

Dear Mr. Beers:

The Surface Water Quality Bureau (Bureau) of the New Mexico Environment Department has reviewed your application for water quality approval to work in Burns Swale, Los Alamos County, New Mexico under a Nationwide Section 404 permit. We have assigned file number 97-037 to your application. The proposed work involves cleanup of a mud/cement slurry spill.

The work will be conducted in an ephemeral channel; therefore, written Section 401 water quality certification is not needed for this project. However, please be aware that you are subject to Section 1102 of the *State of New Mexico Standards for Interstate and Intrastate Streams* when water is flowing. Section 74-6-10.1 B of the New Mexico Water Quality Act states, "Any person who violates any provision of the Water Quality Act other than Section 74-6-5 NMSA 1978 or any person who violates any regulation, water quality standard or compliance order adopted pursuant to that act shall be assessed civil penalties up to the amount of ten thousand dollars ($10,000) per day for each violation."

To ensure that you do not violate water quality standards during periods when water is flowing, we recommend that you, at a minimum, implement the following Best Management Practices:

1. Install necessary erosion control devices such as hay bale check dams or silt curtains around excavated material. These measures will help prevent erosion of excavated material which could cause a violation of water quality standards.

2. Steam clean all heavy equipment periodically and inspect daily for leaks. Leaking equipment should not be used in or near any water course. Report all spills immediately to this office as required by the State of New Mexico Ground and Surface Water Quality Protection Regulations. Park equipment outside the channel when not in use.

3. Fuel, oil, hydraulic fluid, and other substances of this nature should not be stored within the normal floodplain and must have a secondary containment system to prevent spills if the primary storage container leaks.

Thank you for your application. If you have any questions, please contact Cecilia Brown at (505) 827-0106.

Sincerely,

Ed Kelley, Director
Surface Water Quality Bureau, WWMD

xc: District II Manager, Environment Department
District Engineer, U.S. Army Corps of Engineers, ATTN: Regulatory Branch
Jim Ratterree, Wetlands, Region 6, USEPA
John Pittenger, NM Department of Game and Fish
Jennifer Fowler-Propst, U.S. Fish and Wildlife Service

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE, NEW MEXICO 87109-3435
FAX (505) 342-3498

April 25, 1997

REPLY TO
ATTENTION OF:

Operations Division
Regulatory Branch

Mr. Bob Beers
LANL-Water Quality and Hydrology Group
ESH-18/WQ&H:97-0108
MS K497
Los Alamos, New Mexico 87545

Dear Mr. Beers:

This is in reference to your letter dated April 10, 1997, regarding your proposed removal of a hardened cement and mud slurry (approximately 5,000 gallons) which was accidently discharged into Burns Swale near La Cueva, Sandoval County, New Mexico, Action No. 1997 00130. The removal will be done by hand, although a small "Bobcat"-type loader may be used to transport the excavated material from Burns Swale to a centralized collection site.

On January 23, 1997, the U.S. District Court for the District of Columbia handed down a decision in American Mining Congress v. United States Army Corps of Engineers (Corps), a lawsuit challenging the Corps' and the U.S. Environmental Protection Agency's (EPA) revisions to the definition of discharge of dredged material. These revisions were jointly promulgated by the Corps and EPA on August 25, 1993 (58 FR 45008, known as the "Excavation Rule"). The District Court held that the rule was outside the agencies' statutory authority and contrary to the intent of Congress to the extent that it asserted Clean Water Act (CWA) jurisdiction over activities where the only discharge associated the activity is incidental fallback. The District Court defined incidental fallback as the incidental soil movement from excavation, such as the soil that is disturbed when dirt is shoveled or back-spill that comes off a bucket and falls into the same place from which it was removed.

The Corps' and the EPA are appealing the above decision. However, based on this decision, your proposed activity is not regulated under Section 404 of the CWA because it appears to involve only incidental discharges as defined above. In the absence of the January 23rd court decision, we believe that your proposed work could possibly be authorized by a Section 404

Nationwide Permit. The following information is provided on this Nationwide Permit for your future use.

The Corps of Engineers has published Nationwide Permits pursuant to Section 404 of the Clean Water Act (33 CFR 330). Nationwide Permit No. 18 authorizes discharges of dredged or fill materials into waters of the United States for minor discharges. A summary of Nationwide Permit No. 18 is enclosed for your information.

Projects can be constructed under authority of Nationwide Permit No. 18, provided the work complies with all conditions and provided that the work is not done for the purpose of stream diversion. No reports or statements of intent are required to use the nationwide permit up to the 10 cubic yard maximum (with no fills in wetlands). After completion of the work, the permittee must submit a Compliance Certification required by General Condition No. 14.

For discharges exceeding 10 cubic yards, or if the discharge is in a wetland, notification is required in accordance with General Condition No. 13. Discharges exceeding 25 cubic yards, or causing a loss of more than 1/10th of an acre of wetlands or special aquatic sites, will require an individual Section 404 permit. Notification is also required if you combine this nationwide permit with another nationwide permit No. 12 through 40 as part of a single complete project. You cannot combine this nationwide permit with No. 26 or 29.

For your future projects in waters of the United States, we recommend that you contact our office for a determination of permit requirements. We will notify you at that time if the above guidance pertaining to the excavation rule is still current or if your work will require Section 404 authorization.

If you have any questions regarding this determination and these regulations, please feel free to write or call me at (505) 342-3280.

Sincerely,

James A Wood

James A. Wood
Regulatory Project Manager

Enclosure

Copy furnished:

Ms. Cecilia Brown
New Mexico Environment Department
Surface Water Quality Bureau
P.O. Box 26110
Santa Fe, NM 87502-6110

Nationwide Permit Summary

U.S. Army Corps of Engineers
Albuquerque District

MINOR DISCHARGES
(NWP Final Notice, 61 FR 65915, para. 18)

Minor discharges of dredged or fill material into all waters of the United States provided that the activity meets all of the following criteria:

a. The quantity of discharged material and the volume of excavated area does not exceed 25 cubic yards below the plane of the ordinary high water mark or the high tide line;

b. The discharge, including any excavated area, will not cause the loss of more than 1/10 acre of a special aquatic site, including wetlands. For the purposes of this NWP, the acreage limitation includes the filled area and excavated area plus special aquatic sites that are adversely affected by flooding and special aquatic sites that are drained so that they would no longer be a water of the United States as a result of the project;

c. If the discharge, including any excavated area, exceeds 10 cubic yards below the plane of the ordinary high water mark or the high tide line or if the discharge is in a special aquatic site, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and

d. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project and is not placed for the purpose of a stream diversion.

e. This NWP can not be used in conjunction with NWP 26 for any single and complete project. (Sections 10 and 404)

NATIONWIDE PERMIT CONDITIONS

General Conditions: The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. **Navigation**. No activity may cause more than a minimal adverse effect on navigation.

2. **Proper Maintenance**. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. **Erosion and Siltation Controls**. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. **Aquatic Life Movements**. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

5. **Equipment**. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. **Regional and Case-by-Case Conditions**. The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification. **Note:** To date, one regional condition has been added to this permit (see condition #3, Section 404 only conditions).

7. **Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. **Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. **Water Quality Certification**. In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)). **Note for work in Albuquerque District:** Required water quality certification for non-tribal lands in Colorado was issued by the State of Colorado. The State of New Mexico, State of Texas, EPA Region 8, EPA Region 6, and tribal certifying authorities have variously issued, conditionally issued, or denied water quality certification for this nationwide

permit. An information summary sheet is enclosed. You must insure compliance with the applicable water quality certification requirements for your project.

10. **Coastal Zone Management**. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)). **Note:** Not applicable in Albuquerque District.

11. **Endangered Species**.

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at

http://www.fws.gov/~r9endspp/endspp.html and

http://kingfish.ssp.mnfs.gov/tmcintyr/prot_res.html

respectively.

12. **Historic Properties**. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR part 325, appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

13. **Notification**:

(a) ***Timing***. Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) ***Contents of Notification***. The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21--Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29--Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands

are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31--Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33--Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) ***Form of Notification***. The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) ***District Engineer's Decision***. In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) ***Agency Coordination***. The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

[Note: Paragraphs (e)(i), (ii), (iii) of the NWP Final Notice (61 FR 65921) are deleted here for brevity. These paragraphs provide specifics regarding the Corps' internal coordination with agencies.]

(f) ***Wetlands Delineations***. Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) ***Mitigation***. Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: Reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1 acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. **Compliance Certification**. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b. A statement that any required mitigation was completed in accordance with the permit conditions; c. The signature of the permittee certifying the completion of the work and mitigation.

15. **Multiple Use of Nationwide Permits**. In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification" General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

Section 404 Only Conditions: In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. **Water Supply Intakes**. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. **Shellfish Production**. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. **Suitable Material**. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.,) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

4. **Mitigation**. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

5. **Spawning Areas**. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. **Obstruction of High Flows**. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. **Adverse Effects From Impoundments**. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. **Waterfowl Breeding Areas**. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. **Removal of Temporary Fills**. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

[Excerpted from the December 13, 1996 Federal Register, Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits (61 FR 65874)].

CONDITIONS, LIMITATIONS, AND RESTRICTIONS
(Information from *33 CFR 330.4*)

1. **General.** A prospective permittee must satisfy all terms and conditions of an NWP for a valid authorization to occur. Some conditions identify a "threshold" that, if met, requires additional procedures or provisions contained in other paragraphs in this section. It is important to remember that the NWP's only authorize activities from the perspective of the Corps regulatory authorities and that other Federal, state, and local permits, approvals, or authorizations may also be required.

2. **Further Information**:

(a) District Engineers have authority to determine if an activity complies with the terms and conditions of a NWP.

(b) NWP's do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorization required by law.

(c) NWP's do not grant any property rights or exclusive privileges.

(d) NWP's do not authorize any injury to the property or rights of others.

(e) NWP's do not authorize interference with any existing or proposed Federal project.

ADDITIONAL INFORMATION

For additional information concerning the nationwide permits or for a written determination regarding a specific project, please contact the office below:

In New Mexico:
Chief, Regulatory Branch
Albuquerque District, US Army Corps of Engineers
4101 Jefferson Plaza, N.E., Room 313
Albuquerque, NM 87109-3435
Telephone: (505) 342-3283
E-Mail: ceswa-od-r@usace.army.mil

In southeastern Colorado:
Southern Colorado Project Office
720 North Main Street, Room 205
Pueblo, Colorado 81003-3046
Telephone: (719) 543-9459

In southern New Mexico and western Texas:
El Paso Regulatory Office
P.O. Box 6096
Ft. Bliss, Texas 79906-0096
Telephone: (915) 568-1359

Information about the U.S. Army Corps of Engineers regulatory program, including nationwide permits, may also be accessed on our Internet page:
http://www.swa.usace.army.mil/reg/

This nationwide permit is effective February 11, 1997 and expires on February 11, 2002, unless sooner modified, suspended, or revoked.

Summary Version: 2/20/97

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: April 10, 1997
In Reply Refer To: ESH-18/WQ&H:97-0108
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Ed Kelly
Director
Surface Water Quality Bureau
Environment Department
State of New Mexico
1190 St. Francis Dr.
Santa Fe, New Mexico 87502

Mr. James A. Wood
Regulatory Project Manager
Construction and Operations Division
Department of the Army
Albuquerque District, Corps of Engineers
P.O. Box 1580
Albuquerque, New Mexico 87502

SUBJECT: APPLICATION FOR NEW MEXICO WATER QUALITY APPROVAL

Dear Sirs:

Please find enclosed an Application for New Mexico Water Quality Approval to Conduct Work Under a Nationwide Section 404 Permit. This application is being submitted by Los Alamos National Laboratory (LANL) for the proposed removal of solids spilled into Burns Swale, an ephemeral tributary of Lake Fork Canyon. Please refer to the enclosed Burns Swale Remedial Action and Sampling Plan for further information on the spill event and the corrective actions which LANL is proposing to conduct.

Questions regarding this application should be submitted to Bob Beers of LANL's Water Quality and Hydrology Group at (505) 667-7969.

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/tp

Enclosures: a/s

Cy: S. Boyce, Acting District Ranger, Jemez Ranger District, Santa Fe National Forest, w/enc.
M. Ashley, OCD, Santa Fe, New Mexico, w/enc.
B. Koch, DOE/LAAO, w/enc., MS A316
J. Albright, EES-4, w/o enc., MS D443
D. Thomas, EES-DO, w/o enc., MS D446
J. Thomson, Lithos & Associates, w/o enc., MS D443
M. Alexander, ESH-18, w/o enc., MS K497
S. Rae, ESH-18, w/o enc., MS K497
S. Veenis, ESH-18, w/o enc., MS K497
M. Saladen, ESH-18, w/o enc., MS K497
N. Williams, ESH-18, w/o enc., MS K497
WQ&H File, w/enc., MS K497
CRM-4, w/enc., MS A150

APPLICATION FOR NEW MEXICO WATER QUALITY APPROVAL TO CONDUCT WORK UNDER A NATIONWIDE SECTION 404 PERMIT

New Mexico Environment Department
Water and Waste Management Division
Surface Water Quality Bureau
1190 St. Francis Drive, P.O. Box 26110, Santa Fe, New Mexico 87502

State of New Mexico water quality certification of nationwide permits requires that plans for any work in a perennial water course or work that disturbs more than ½ acre of wetlands must be approved by the Environment Department prior to conducting the work.

1. Applicant:
   Name: Los Alamos National Laboratory
   Address: Mailstop K497
   Los Alamos, New Mexico 87544

   Contact Person: Bob Beers, Water Quality and Hydrology Group
   Phone Number: (505) 667-7969

2. Describe the location of the proposed dredging or filling activity (include an area map) and river or waterbody affected. Be as specific as possible:

Uppermost head waters of Burns Swale, an ephemeral tributary of Lake Fork Canyon. See attached map.

3. Type of work: ___ Bank Stabilization ___ Road Crossing
   ___ Maintenance ___ Above Headwaters
   _x_ Other (describe) clean up spilled material (see attached)

4. Describe the work to be done and its purpose:

See attached Remedial Action & Sampling Plan

OVERVIEW

Introduction

Since 1972 Los Alamos National Laboratory (LANL) has operated the Fenton Hill Hot Dry Rock Geothermal Facility (facility) for the purpose of researching the feasibility of extracting heat from hot dry rocks deep within the earth. The Fenton Hill site is operated in cooperation with the U.S. Department of Agriculture, Santa Fe National Forest, Jemez Ranger District.

Problem Definition

On November 22, 1996, approximately 5,000 gallons of a cement/mud slurry were accidently discharged from the facility's EE-3 wellbore to Burns Swale, an ephemeral tributary of Lake Fork Canyon, when a retainer failed during plugging and abandonment operations. The spill traveled approximately 1500 feet down Burns Swale, less than one-half the distance to Lake Fork Canyon (See Map 1.0). A sample of the spill material collected from Burns Swale on November 22, 1996, and analyzed using EPA SW 846 methods (TCLP analysis) determined that the solids deposited in the watercourse do not meet the definition of a RCRA hazardous waste. Two water samples collected from Burns Swale on November 22, 1996, and analyzed for total metals using EPA SW 846 methods, produced conflicting results; one sample showed detectable quantities (0.0018 mg/L) of total mercury while the other sample was non-detect (>0.0002 mg/L) for total mercury. Further characterization of the spill material and surface runoff from Burns Swale has been requested by the New Mexico Oil Conservation Division (OCD).

Site Description

The majority of the Fenton Hill site slopes gently south towards Burns Swale, a small, intermittent, tributary of Lake Fork Canyon (See Map 1.0). Lake Fork Canyon is a tributary to the Rio Cebolla, a perennial stream below Fenton Lake. Stream flow in Burns Swale is generated by spring snowmelt and by brief, intense, thunderstorms which occur during the summer months (July through September). Approximately 1000 feet below the Fenton Hill site the natural stream channel is interrupted by a small earthen berm and detention basin (See Map 1.0). This berm and basin were constructed by the Fenton Hill Geothermal Facility in the early 1980's for the purpose of spill control.

Alluvium deposits in Burns Swale are 2-6 feet deep in the upper reaches and more than 40 feet deep at the confluence with Lake Fork Canyon. The depth to groundwater (perched on the Abo Formation) at this location is approximately 450 feet.

Historical Data

In 1996 the Laboratory's Environmental Restoration Project issued a RCRA Facility Investigation Report (RFI) for the Fenton Hill site. This report identified a Potential Release Sites (PRS) in the upper reach of Burns Swale: PRS 57-001(b). Phase I sampling showed elevated levels of arsenic and manganese in the surface soils. This contamination probably resulted from the discharge of fluids from a drilling mud settling pond (Pond GTP-3W). The proposed action for the Burns Swale portion of PRS 57-001(b) is for Phase II sampling. This will determine the extent of the arsenic and manganese contamination in the surface soils and will calculate the human health risk under the recreational land-use scenario. Phase II sampling has been scheduled for FY1997.

REMEDIAL ACTION AND SAMPLING PLAN FOR BURNS SWALE

Phase I: Burns Swale Monitoring
Burns Swale will be visually monitored by LANL twice weekly during the months of March, April, and early May to evaluate snow pack and spring runoff conditions. There are three (3) objectives to this monitoring:

1) Verify that the existing silt fences installed in Burns Swale are continuing to function as barriers to the migration of the spill material. Silt fences will be repaired as needed;

2) Determine when runoff conditions will permit the collection of representative surface water samples (snow melt): and

3) Determine when snow pack depths have been sufficiently reduced to permit the collection of representative samples of the spill material.

Phase II: Burns Swale Sampling
Once site conditions permit, three (3) samples of the cement/mud slurry deposited in Burns Swale will be collected from three (3) different locations (See Map 1.0). Three (3) grab samples of runoff from snow melt will be collected from three (3) different locations in Burns Swale (See Map 1.0). The sampling locations identified on Map 1.0 are only estimated since field conditions will determine the exact sample collection point. Map 1.0 will be updated following sample collection to reflect actual sampling locations. Sampling points will be marked with pin flags. Samples will be submitted to LANL's contract analytical laboratory for analysis using EPA SW-846 methods. The pH of all water samples will be field measured using a Beckman pH meter. Table 1.0 presents a sampling plan summary.

Table 1.0. Sampling Plan for Fenton Hill Spill Site.

Sample Location	Sample Matrix	Analytes
57-BS-001	solid	Total Metals (2,3)
57-BS-002	solid	"
57-BS-003	solid	"
57-BS-004	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-005	water	"
57-BS-006	water	"

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Bo, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese.
(4) pH will be field measured.

Sampling Schedule
Currently, Burns Swale is covered by a heavy snow pack. Sample collection cannot be scheduled until spring snow melt occurs and the solids deposited in channel become accessible. The OCD, NMED, and Forest Service will be notified in advance of sample collection so that representatives from their respective agencies can accompany LANL personnel during sample collection.

Report to Regulators
Analytical data generated from this sampling plan will be submitted to OCD, NMED, and the Forest Service in a summary report within 60 days of sample collection.

Phase III: Burns Swale Cleanup

1. Burns Swale will be visually monitored by LANL twice weekly during the months of April, May and June to evaluate snow pack, spring runoff, and site mud conditions. The objective of this monitoring will be to determine when site conditions will safely permit the cleanup of the spilled material.

2. Pursuant to Section 404 of the Clean Water Act, LANL will submit an application for a Nationwide Section 404 Permit with the NMED, Surface Water Quality Bureau, and the U.S. Army Corps of Engineers at least 30 days prior to the beginning of work. A copy of the permit application and approval letters will be forwarded to the OCD and the Forest Service.

3. As soon as conditions allow safe access to Burns Swale, LANL will deploy personnel to pick-up and collect as much of the spill material as is possible using manual methods. Machinery, such as a small "Bobcat" type loader, may be used to transport material from Burns Swale to centralized collection site. Under no circumstances will mechanized equipment be used to excavate spill material from the stream channel. All clean-up activities by LANL will be carefully planned to minimize the risk to personnel and to prevent further erosion and damage to the vegetation and terrain.

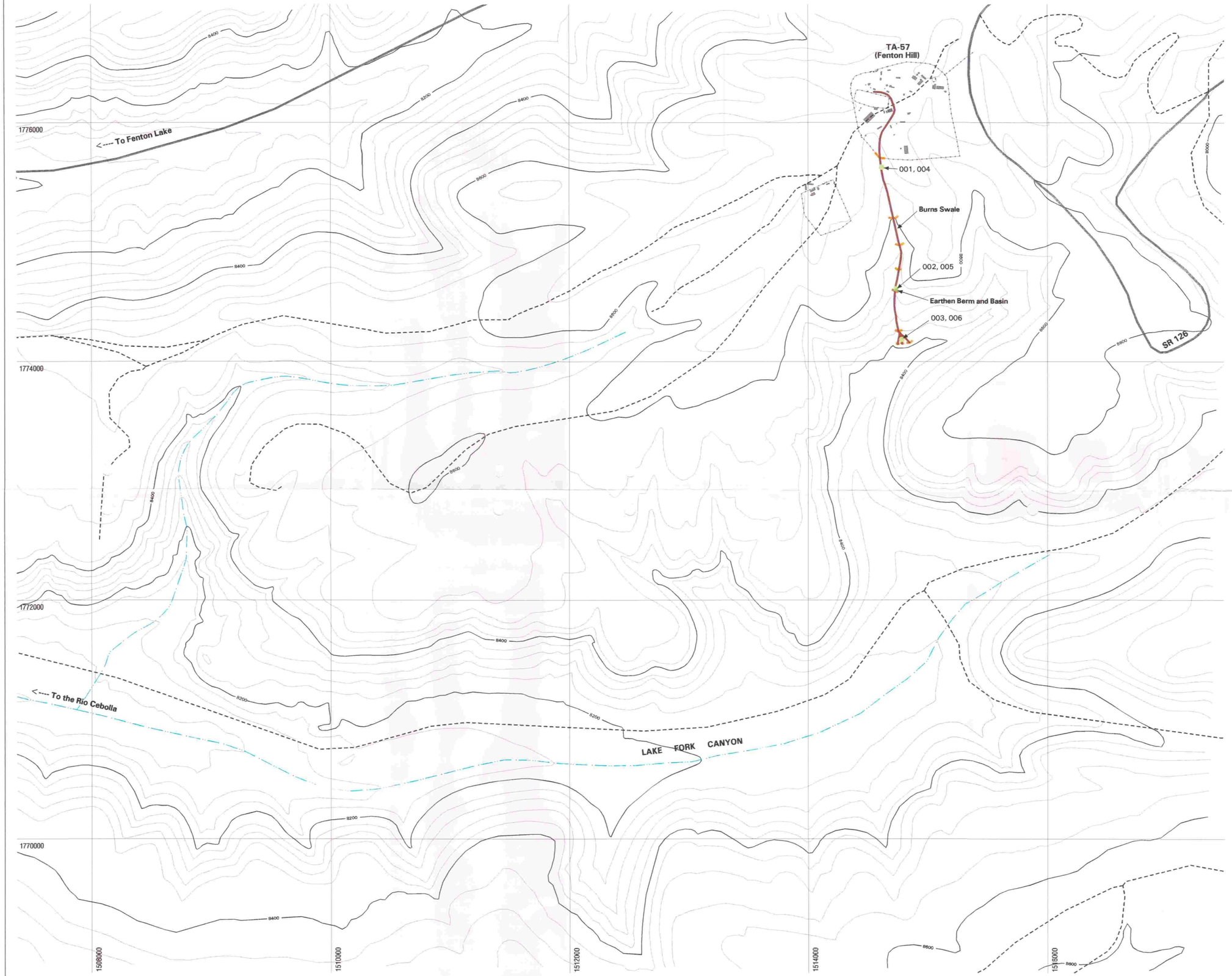
   The OCD, NMED, and Forest Service will be notified in advance of cleanup activities so that representatives from their respective agencies can be present.

   The total volume of spill material collected will be documented prior to off-site disposal.

4. Once cleanup activities are complete, LANL will request that OCD, NMED, and Forest Service personnel conduct a visual inspection of the spill site. If the cleanup is satisfactory, LANL will request verification from OCD, NMED, and the Forest Service that remediation of the spill site is administratively complete.

5. The silt fences installed in Burns Swale will be maintained through October, 1997, At that time they will be removed and any spill material that has been collected by the fences will be disposed of off-site.

MAP 1.0. Fenton Hill (TA-57) Hot Dry Rock Geothermal Facility Sampling Plan



- Drainage
- Earth Berm
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Spill Location
- Structure
- Sample Location

Table 1.0: Sampling Plan for Fenton Hill Spill Site

Sample Location	Sample Matrix	Analytes
57-BS-001	solid	Total Metals (2,3)
57-BS-002	solid	Total Metals (2,3)
57-BS-003	solid	Total Metals (2,3)
57-BS-004	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-005	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-006	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Co, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese
(4) pH will be field measured.

Contour Interval: 40 ft

FACILITY for INFORMATION MANAGEMENT, ANALYSIS and DISPLAY

EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)
LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones
Date: March 11, 1997
FIMAD Plot ID: 105440

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000

0 122 244 366 488
METERS
0 400 800 1200 1600
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

FIMAD Plot ID: 105440 11 Mar 97

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: March 12, 1997
In Reply Refer To: ESH-18/WQ&H:97-0084
Mail Stop: K497
Telephone: (505) 665-1859

Mr. Roger C. Anderson
Environmental Bureau Chief
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: REMEDIAL ACTION AND SAMPLING PLAN FOR THE CEMENT / MUD SPILL WHICH OCCURRED ON NOVEMBER 22, 1996

Dear Mr. Anderson:

Pursuant to your request, enclosed is a Remedial Action and Sampling Plan for the cement/mud spill which occurred on November 22, 1996, at the Fenton Hill Hot Dry Rock Geothermal Facility. This plan will be implemented in three (3) phases: Phase I, Monitoring; Phase II, Sampling; and Phase III, Cleanup. The remedial actions described in this plan are based upon existing information on the spill. If Phase II sampling indicates that additional remedial actions are necessary then the Phase III Cleanup Plan will be amended.

Before Phase II and III activities can be initiated, the heavy snow pack that currently exists at Fenton Hill must melt off. LANL will monitor the site until conditions permit safe access for Phase II and III activities. Your agency, NMED, and the Forest Service will be notified in advance of all sampling and cleanup activities.

In a January 9, 1997, letter to Mr. Mark Ashley (OCD), Mr. Glenn Saums (NMED SWQB) indicated that water samples collected from Burns Swale immediately following the spill (November 22, 1997) exceeded the Water Quality Control Commission (WQCC) Stream Standards for Al, As, Pb, and Se. It should be noted that analysis of these samples was conducted for total metals whereas the WQCC Stream Standards are based upon dissolved concentrations. This discrepancy between analytical methods precludes an accurate comparison between the data and the standards. All analyses conducted under the enclosed sampling plan will be consistent with the methods required under Section 3101.K of the New Mexico WQCC Stream Standards (20 NMAC 6.2).

Please contact me at 665-1859 or Bob Beers at 667-7969 if you have questions or concerns regarding the enclosed plan.

Sincerely,

Steven R. Rae
Group Leader, ESH-18
Water Quality and Hydrology Group

SR:RB/vc

Enclosures: a/s

Cy: G. Saums, NMED SWQB, Santa Fe, New Mexico, w/enc.
K. Hill, NMED HRMB, Santa Fe, New Mexico, w/enc.
B. Hoditchek, NMED SWQB, Santa Fe, New Mexico, w/enc.
S. Boyce, Acting District Ranger, Jemez Ranger District, Santa Fe National Forest, w/enc.
D. Thomas, EES-DO, w/enc., MS D 446
J. Albright, EES-4, w/enc., MS D443
J. Thomson, Lithos & Associates, w/enc., MS D443
B. Koch, DOE/LAAO, w/enc., MS A316
N. Williams, ESH-18, w/enc, MS K497
M. Saladen, ESH-18, w/enc., MS K497
M. Alexander, ESH-18, w/ enc., MS K497
B. Beers, ESH-18, w/ enc., MS K497
S. Veenis, ESH-18, w/enc., MS K497
K. Krier, EES-1, w/enc., MS D462
WQ&H File, w/enc., MS K497
CRM-4, w/enc., MS A150

OVERVIEW

Introduction

Since 1972 Los Alamos National Laboratory (LANL) has operated the Fenton Hill Hot Dry Rock Geothermal Facility (facility) for the purpose of researching the feasibility of extracting heat from hot dry rocks deep within the earth. The Fenton Hill site is operated in cooperation with the U.S. Department of Agriculture, Santa Fe National Forest, Jemez Ranger District.

Problem Definition

On November 22, 1996, approximately 5,000 gallons of a cement/mud slurry were accidently discharged from the facility's EE-3 wellbore to Burns Swale, an ephemeral tributary of Lake Fork Canyon, when a retainer failed during plugging and abandonment operations. The spill traveled approximately 1500 feet down Burns Swale, less than one-half the distance to Lake Fork Canyon (See Map 1.0). A sample of the spill material collected from Burns Swale on November 22, 1996, and analyzed using EPA SW 846 methods (TCLP analysis) determined that the solids deposited in the watercourse do not meet the definition of a RCRA hazardous waste. Two water samples collected from Burns Swale on November 22, 1996, and analyzed for total metals using EPA SW 846 methods, produced conflicting results; one sample showed detectable quantities (0.0018 mg/L) of total mercury while the other sample was non-detect (>0.0002 mg/L) for total mercury. Further characterization of the spill material and surface runoff from Burns Swale has been requested by the New Mexico Oil Conservation Division (OCD).

Site Description

The majority of the Fenton Hill site slopes gently south towards Burns Swale, a small, intermittent, tributary of Lake Fork Canyon (See Map 1.0). Lake Fork Canyon is a tributary to the Rio Cebolla, a perennial stream below Fenton Lake. Stream flow in Burns Swale is generated by spring snowmelt and by brief, intense, thunderstorms which occur during the summer months (July through September). Approximately 1000 feet below the Fenton Hill site the natural stream channel is interrupted by a small earthen berm and detention basin (See Map 1.0). This berm and basin were constructed by the Fenton Hill Geothermal Facility in the early 1980's for the purpose of spill control.

Alluvium deposits in Burns Swale are 2-6 feet deep in the upper reaches and more than 40 feet deep at the confluence with Lake Fork Canyon. The depth to groundwater (perched on the Abo Formation) at this location is approximately 450 feet.

Historical Data

In 1996 the Laboratory's Environmental Restoration Project issued a RCRA Facility Investigation Report (RFI) for the Fenton Hill site. This report identified a Potential Release Sites (PRS) in the upper reach of Burns Swale: PRS 57-001(b). Phase I sampling showed elevated levels of arsenic and manganese in the surface soils. This contamination probably resulted from the discharge of fluids from a drilling mud settling pond (Pond GTP-3W). The proposed action for the Burns Swale portion of PRS 57-001(b) is for Phase II sampling. This will determine the extent of the arsenic and manganese contamination in the surface soils and will calculate the human health risk under the recreational land-use scenario. Phase II sampling has been scheduled for FY1997.

REMEDIAL ACTION AND SAMPLING PLAN FOR BURNS SWALE

Phase I: Burns Swale Monitoring
Burns Swale will be visually monitored by LANL twice weekly during the months of March, April, and early May to evaluate snow pack and spring runoff conditions. There are three (3) objectives to this monitoring:

1) Verify that the existing silt fences installed in Burns Swale are continuing to function as barriers to the migration of the spill material. Silt fences will be repaired as needed;

2) Determine when runoff conditions will permit the collection of representative surface water samples (snow melt): and

3) Determine when snow pack depths have been sufficiently reduced to permit the collection of representative samples of the spill material.

Phase II: Burns Swale Sampling
Once site conditions permit, three (3) samples of the cement/mud slurry deposited in Burns Swale will be collected from three (3) different locations (See Map 1.0). Three (3) grab samples of runoff from snow melt will be collected from three (3) different locations in Burns Swale (See Map 1.0). The sampling locations identified on Map 1.0 are only estimated since field conditions will determine the exact sample collection point. Map 1.0 will be updated following sample collection to reflect actual sampling locations. Sampling points will be marked with pin flags. Samples will be submitted to LANL's contract analytical laboratory for analysis using EPA SW-846 methods. The pH of all water samples will be field measured using a Beckman pH meter. Table 1.0 presents a sampling plan summary.

Table 1.0. Sampling Plan for Fenton Hill Spill Site.

Sample Location	Sample Matrix	Analytes
57-BS-001	solid	Total Metals (2,3)
57-BS-002	solid	"
57-BS-003	solid	"
57-BS-004	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-005	water	"
57-BS-006	water	"

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Bo, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese.
(4) pH will be field measured.

Sampling Schedule
Currently, Burns Swale is covered by a heavy snow pack. Sample collection cannot be scheduled until spring snow melt occurs and the solids deposited in channel become accessible. The OCD, NMED, and Forest Service will be notified in advance of sample collection so that representatives from their respective agencies can accompany LANL personnel during sample collection.

Report to Regulators
Analytical data generated from this sampling plan will be submitted to OCD, NMED, and the Forest Service in a summary report within 60 days of sample collection.

Phase III: Burns Swale Cleanup

1. Burns Swale will be visually monitored by LANL twice weekly during the months of April, May and June to evaluate snow pack, spring runoff, and site mud conditions. The objective of this monitoring will be to determine when site conditions will safely permit the cleanup of the spilled material.

2. Pursuant to Section 404 of the Clean Water Act, LANL will submit an application for a Nationwide Section 404 Permit with the NMED, Surface Water Quality Bureau, and the U.S. Army Corps of Engineers at least 30 days prior to the beginning of work. A copy of the permit application and approval letters will be forwarded to the OCD and the Forest Service.

3. As soon as conditions allow safe access to Burns Swale, LANL will deploy personnel to pick-up and collect as much of the spill material as is possible using manual methods. Machinery, such as a small "Bobcat" type loader, may be used to transport material from Burns Swale to centralized collection site. Under no circumstances will mechanized equipment be used to excavate spill material from the stream channel. All clean-up activities by LANL will be carefully planned to minimize the risk to personnel and to prevent further erosion and damage to the vegetation and terrain.

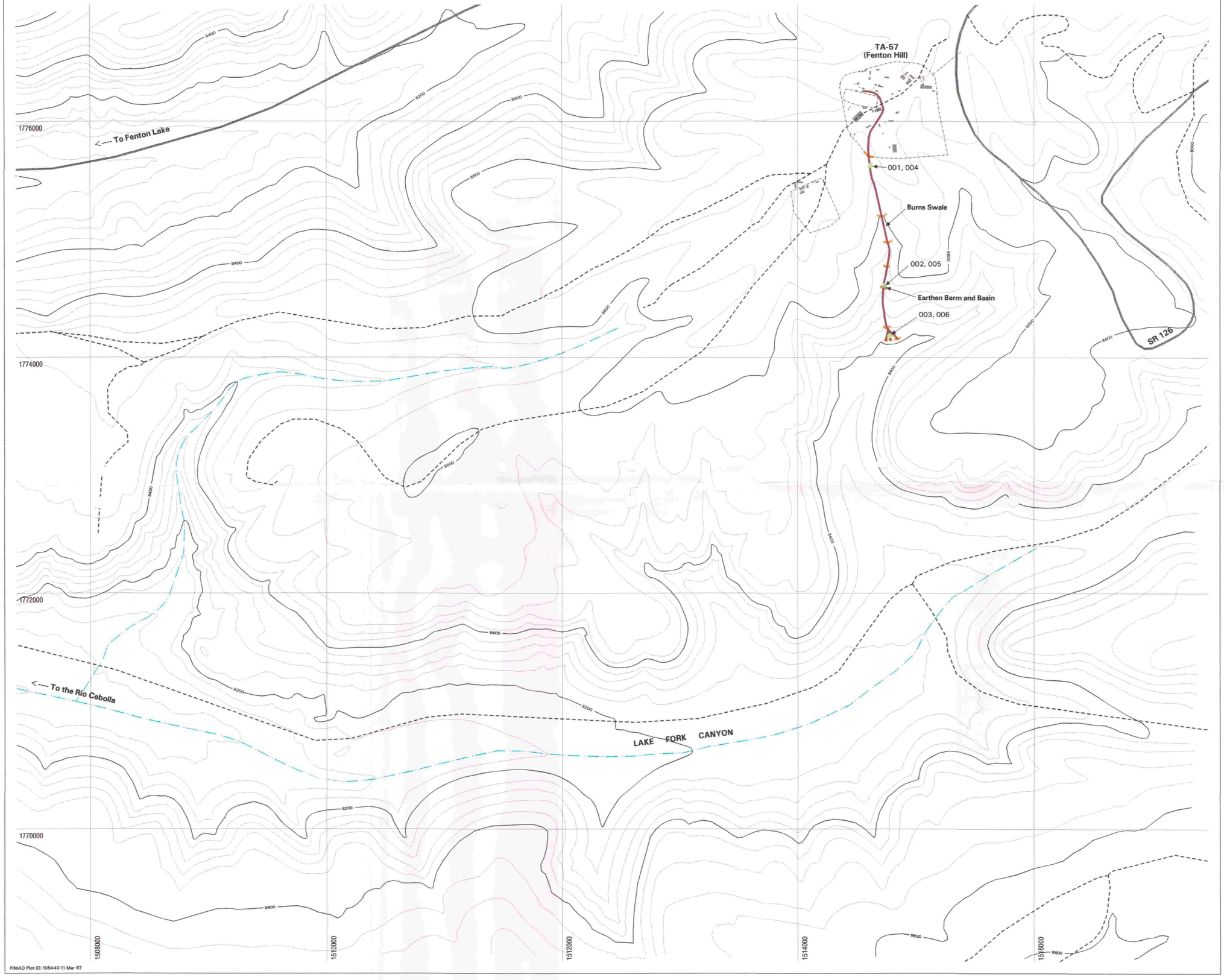
   The OCD, NMED, and Forest Service will be notified in advance of cleanup activities so that representatives from their respective agencies can be present.

   The total volume of spill material collected will be documented prior to off-site disposal.

4. Once cleanup activities are complete, LANL will request that OCD, NMED, and Forest Service personnel conduct a visual inspection of the spill site. If the cleanup is satisfactory, LANL will request verification from OCD, NMED, and the Forest Service that remediation of the spill site is administratively complete.

5. The silt fences installed in Burns Swale will be maintained through October, 1997, At that time they will be removed and any spill material that has been collected by the fences will be disposed of off-site.

MAP 1.0. Fenton Hill (TA-57) Hot Dry Rock Geothermal Facility Sampling Plan



- Drainage
- Earth Berm
- Fence, Industrial
- Road, Dirt
- Road, Paved
- Silt Fence
- Spill Location
- Structure
- Sample Location

Table 1.0: Sampling Plan for Fenton Hill Spill Site

Sample Location	Sample Matrix	Analytes
57-BS-001	solid	Total Metals (2,3)
57-BS-002	solid	Total Metals (2,3)
57-BS-003	solid	Total Metals (2,3)
57-BS-004	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-005	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)
57-BS-006	water	Dissolved metals (1,2,3); Total Hg; Total Recoverable Se; pH (4)

Notes:
(1) Filtered samples are prepared using a 0.45 micrometer pore-size membrane filter.
(2) WQCC Section 3101.(K)&(L) parameters: Al, As, Co, Cd, Cr, Co, Cu, Pb, Hg, Se, V, Zn.
(3) Manganese
(4) pH will be field measured.

Contour Interval: 40 ft

FACILITY for INFORMATION, MANAGEMENT, ANALYSIS and DISPLAY
EARTH & ENVIRONMENTAL SCIENCES DIVISION (EES-5)
LOS ALAMOS NATIONAL LABORATORY, Los Alamos, New Mexico

Produced by: Marcia Jones
Date: March 11, 1997
FIMAD Plot ID: 105440

N

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

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 2000

0 122 244 366 488
METERS
0 400 800 1200 1600
FEET

NOTICE: The information on this map is provisional. Feature locations are dependent on scale and symbology and their accuracy may not have been confirmed. Los Alamos National Laboratory boundary is based on legal description established in 1995. Contour data are from a September 1991 aerial survey. All other data are from various sources and are part of the FIMAD repository.

FIMAD Plot ID: 105440 11 Mar 97

Department of Energy
Albuquerque Operations Office
Los Alamos Area Office
Los Alamos, New Mexico 87544

MAR 6 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. William J. LeMay, Director
Oil Conservation Division
New Mexico Energy, Minerals, and Natural
Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Dear Mr. LeMay:

This information for calendar year 1996 is being submitted to your Division as a supplement to the Ground Water Discharge Plan (GW-31) for the Fenton Hill Geothermal Facility (Facility). The Discharge Plan was renewed by the Oil Conservation Division (OCD) on June 5, 1995, for a period of five years.

The following is a summary of the relevant data for 1996:

1. Enclosure I shows that there were no National Pollutant Discharge Elimination System (NPDES) wastewater discharges from the 1 Million Gallon (MG) Service Pond to surface waters;

2. Enclosure II contains a summary of Water Injected into Geothermal Wells during both routine, and plugging and abandonment operations;

3. Enclosure III contains a description of an accidental spill which occurred at the Facility on November 22, 1996. In accordance with Rule G-117, the spill report was submitted to your Division within ten (10) days of the incident.

4. Enclosure IV contains a list of the wells which were plugged and abandoned during 1996 as a result of the planned decommissioning of the Facility by the Department of Energy (DOE). In accordance with Rule G-203B, a completed Form G-103, Sundry Notice and Report, was submitted to your Division for the six (6) wells greater than 1,000 feet deep that were plugged and abandoned.

If you have any questions concerning this information, please call Bonnie Koch of my staff at (505) 665-7202, or Bob Beers of Los Alamos National Laboratory's Water Quality and Hydrology Group (ESH-18), at (505) 667-7969.

Sincerely,

Mathew P. Johansen

Mathew P. Johansen, P.E.
Acting Assistant Area Manager
Office of Environment and Projects

LAAMEP:2BK-016

Enclosures

cc:
See page 2

cc w/enclosures:
B. Koch, LAAMEP, LAAO
S. Rae, ESH-18, LANL, MS-K497
N. Williams, ESH-18, LANL, MS-K497
B. Beers, ESH-18, LANL, MS-K497
M. Saladen, ESH-18, LANL, MS-K497
D. Thomas, EES-DO, LANL, MS-D446
J. Albright, EES-4, LANL, MS-D443
J. Thomson, EE-4, LANL, MS-D443

cc w/o enclosures:
M. Johansen, Acting AAMEP, LAAO
D. Erickson, ESH-DO, LANL, MS-K491

Enclosure I

NPDES Permitted Discharges from the Service Pond During 1996

Fenton Hill Geothermal Site
Sandoval County, N.M.

Date of Discharge	Gallons Discharged From Service Pond
1996	NONE

There were no accidental spills or leaks from the 1 MG Service Pond during 1996.

Enclosure II

Water Injected Into Geothermal Wells During 1996

Fenton Hill Geothermal Site
Sandoval County, N.M.

A. Water Injected During Routine Geothermal Operations

Dates of Injection	Location	Injected Volume (Gallons)
1996	[all wells]	NONE

B. Water Injected During Plugging and Abandonment Operations

Dates of Injection	Location	Injected Volume (Gallons)
10/31/96-11/03/96	EE-1	680,000
11/20/96-11/21/96	EE-3	150,000
Total Water Injected in 1996		**830,000**

Enclosure III

Spills and Releases During 1996

Fenton Hill Geothermal Site
Sandoval County, N.M.

On November 22, 1996, approximately 5,000 gallons of a cement/mud slurry were accidently discharged from the Fenton Hill Geothermal Facility's EE-3 wellbore to Burns Swale, an ephemeral tributary of Lake Fork Canyon, when a retainer failed during plugging and abandonment operations. The spill traveled approximately 1500 feet down Burns Swale, less than one-half the distance to Lake Fork Canyon. Mr. Mark Ashley (OCD) was notified of the spill on November 22, 1996, and was provided with a written spill report on November 26, 1996. As a Best Management Practice (BMP) to prevent further migration of the spill material, Los Alamos National Laboratory installed silt fences in Burns Swale on November 22-25, 1996. A sample of the spill material collected from Burns Swale on November 22, 1996, and analyzed by a Los Alamos National Laboratory contract laboratory using Method SW 846 (TCLP analysis) determined that the solids deposited in the watercourse do not meet the definition of a RCRA hazardous waste.

No other spills or releases to the environment occurred during 1996.

Enclosure IV

Wellbore Plugging and Abandonment Operations During 1996

Fenton Hill Geothermal Site
Sandoval County, N.M.

A. Wells Less Than 1000 Feet Deep

Well No.	Date Operations Completed
THC	09/11/96
THB	09/12/96
WW-3	09/19/96
THA	09/23/96
THD	09/24/96
WW-2	09/30/96

B. Wells Greater Than 1000 Feet Deep

Well No.	Date Operations Completed
GT-1	09/27/96
PC-1	10/01/96
PC-2	10/02/96
GT-2	10/24/96
EE-1	11/08/96
EE-3	11/27/96

Sundry Notices and Reports for the above operations were submitted to the Oil Conservation Division's District IV Office on February 4, 1997.

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

February 11, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-903

Mr. Steven Rae
Los Alamos National Laboratory
MS K497
Los Alamos, New Mexico 87545

RE: Fenton Hill Hot Dry Rock Facility GW-31
NE/4, Sec. 13, T19N, R2E
Cement/Mud Slurry Spill
Sandoval County, New Mexico

Dear Mr. Rae:

On November 22, 1996 a spill of approximately 5,000 gallons of cement/mud slurry occurred at the Fenton Hill Dry Hot Rock Facility. Los Alamos National Laboratory (LANL) notified the New Mexico Oil Conservation Division (OCD) pursuant to OCD Rule 116 and Water Quality Control Commission (WQCC) Regulation 1203. LANL sampled the water course on November 22, 1996 following the spill.

The sample results submitted to the OCD indicate that pH, Al, As, Pb, and Se exceeded the WQCC standards of Section 3101 K. And Hg of Section 3101 L. Pursuant to WQCC Regulation 1203, the OCD requires that LANL submit a plan for sampling the affected area. The OCD also requires LANL to submit a remedial action plan for all contaminated materials which are in excess of WQCC standards. Please submit the required plan by March 17, 1997.

If you have any questions, please contact me at (505) 827-7152.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/mwa

xc: Glenn Saums, Health Program Manager, Surface Water Quality Bureau

P 288 258 903

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.

Do not use for International Mail *(See reverse)*

Sent to	
Street & Number	
Post Office, State, & ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form **3800**, April 1995

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-0187

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

Certified Mail

January 9, 1997

Mr. Mike Ashley
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, NM 87505

RE: Comments on the Analytical Results from the Spill at Fenton Hill (TA-57) on November 22, 1996

Dear Mr. Ashley:

The Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) has received a courtesy copy of the analytical results and a summary table for samples collected from the watercourse at Fenton Hill following the November 22, 1996, spill of a cement/mud slurry from Los Alamos National Laboratory's Hot Dry Rock (HDR) Geothermal Facility.

The data indicate that the following standards of Section 3101 K. of the New Mexico Water Quality Control Commission (WQCC) Stream Standards of (20 NMAC 6.1) were exceeded: pH, Al, As, Pb, and Se. Because these standards were exceeded, SWQB has several concerns: 1) LANL should immediately verify that the Best Management Practice (BMP) (silt fences) installed after the discharge are preventing any further migration of contaminants into the stream, and 2) LANL should evaluate whether additional control measures are necessary at the site, and if so, establish these immediately.

In addition, NMED recommends that LANL, as required by Section 1203(6) of 20 NMAC 6.2, submit plans and schedules concerning the removal and cleanup of the discharged material. Also, further sampling of the stream should be done to establish that further contamination is not occurring and to monitor stream quality until the remediation of the discharge is complete.

SWQB was unable to conduct the site visit scheduled for December 19, 1996. LANL personnel indicated that a site visit for that day would not be feasible because of snow accumulation. SWQB will reschedule the site visit to further assess the situation

and will inform OCD of any findings.

NMED appreciates the opportunity to cooperate with OCD in this matter. If you have any questions concerning this letter please feel free to contact Barbara Hoditschek of my staff at (505) 827-0596.

Sincerely,

Glenn Saums
Health Program Manager
Point Source Regulation Section
Surface Water Quality Bureau

cc: Ed Kelley, Ph.D., Director
Bob Beers, ESH-18/WQ&H
Harvey Decker, DOE Oversight
File