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Los Alamos
NATIONAL LABORATORY
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MAR 2008
NMED Hazardous Waste Bureau

Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: March 11, 2008
Refer To: ENV-RCRA-08-054
LAUR: 08-1417

Mr. William Olson, Bureau Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2261
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Ms. Marcy Leavitt, Bureau Chief
Surface Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2050
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Dear Mr. Olson and Ms. Leavitt:

SUBJECT: NOTICE OF INTENT TO DISCHARGE, MILAGRO ASTROPHYSICAL OBSERVATORY, FENTON HILL

Enclosed is a Notice of Intent to Discharge (NOI) for the proposed land application of approximately 5 million gallons of purified drinking water from Los Alamos National Laboratory's Milagro Astrophysical Observatory. The proposed discharge will be conducted on forested land within the Santa Fe National Forest, Jemez Ranger District. Approval by the Jemez District Ranger will be obtained prior to any discharge.

In 1995, Los Alamos National Laboratory constructed an astrophysical observatory at Fenton Hill in the Jemez Mountains. The observatory, called Milagro, consists of a 5-million gallon synthetically lined pond, purified water, hundreds of photomultiplier tubes, and a light-tight cover. The observatory detects cosmic rays when they interact with the water producing faint trails of light. The water in the pond, originally pumped from the site's water supply well, is continuously circulated through a filtration system to ensure proper operation of the observatory.

The Milagro observatory needs to be upgraded and this requires removing the water from the pond. The Laboratory proposes to land apply the purified drinking water to the forested land surrounding the pond using irrigation sprinklers. The proposed discharge will be conducted as soon as the snow has melted from the site and the surface soils have dried to maximize infiltration.

Please contact me at (505) 667-7969 or at bbeers@lanl.gov if you have any questions or concerns about this NOI.

Sincerely,

Bob Beers
Water Quality & RCRA Group (ENV-RCRA)

BB/lm

Enclosures: a/s

Cy: Linda Riddle, Santa Fe National Forest, District Ranger, Jemez Springs, NM, w/enc.
Gerald Knutson, NMED/GWQB, Santa Fe, New Mexico, w/enc.
Robert George, NMED/GWQB, Santa Fe, New Mexico, w/enc.
James Bearzi, NMED/HWB, Santa Fe, New Mexico, w/enc.
Rich Powell, NMED/SWQB, Santa Fe, New Mexico, w/enc.
Gene Turner, LASO-EO, w/enc., A316
Steve Yanicak, LASO-GOV, w/enc., J993
Michael B. Mallory, PADOPS, w/o enc., A102
Richard S. Watkins, ADESHQ, w/o enc., K491
Tori George, ENV-DO, w/o enc., J978
Mike Saladen, ENV-RCRA, w/o enc., K490
Brenda L. Dingus, P-23, w/enc., H803
Paul A. Blumberg, FMO-STO, w/enc., B244
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

1. Name and Address of person making discharge:

Bob Beers, ENV-RCRA **Email:** bbeers@lanl.gov **Phone:** 505-667-7969
PO Box 1663, Mail Stop K490
Los Alamos National Laboratory
Los Alamos, NM 87544

2. Location of discharge (give township, range, section, ¼ section, miles from closest town and street address, if applicable):

Los Alamos National Laboratory's Milagro Observatory at Fenton Hill is located on NM 126 approximately 5 miles west of La Cueva where NM 126 intersects NM 4. See attached aerial photo of the Milagro pond and application site.

3. Type of operation generating the discharge:

Astrophysical Observatory

4. Description of the source of the discharge:

The source of the discharge is the water within the covered, 5-million gallon Milagro pond. The original source of the water in the pond was the Fenton Hill site's drinking water supply well.

5. Estimated concentration of contaminants in the discharge:

The original source of the water in the pond was the Fenton Hill site's water supply well. The water in the pond is continuously circulated at 200 gallons/minute through a filtration system that includes a charcoal filter, a UV lamp, and a 1-micron filter. The water must be kept very clean as required for the proper operation of the observatory.

In 2003, water from the drinking water supply well was analyzed for nitrates, metals, fluoride, cyanide, radon, uranium, gross alpha, gross beta, and volatile organic compounds (VOCs). See the attached Drinking Water Quality Report. All results were less than the Maximum Contaminant Levels (MCLs) established by the Safe Drinking Water Act and the New Mexico ground water standards in 20.6.2.3103 NMAC.

Concentrations of contaminants in the pond water are expected to be equal to or less than those in the original well water due to the continuous treatment.

6. Means of the discharge (to a lagoon, watercourse, septic tank/leachfield, etc.):

The water will be pumped via hoses to sprinklers. An aerial photo of the area is attached. The sprinklers will be placed greater than 100' apart. The total area is approximately 1000' x 1000', or approximately 23 acres. Each Rain Bird sprinkler head will discharge between 3 gallons per minute (gpm) and 5 gpm (see attached technical specs).

7. Estimated daily flow rate of the discharge:

The Laboratory proposes to discharge approximately 50,000 gallons per day for approximately 100 days (non-consecutive, weekdays only). The rate of discharge will be approximately 3-5 gpm per sprinkler head (4 gpm * 60 min/hr * 10 hrs/day * 20 sprinkler heads = 48,000 gal/day). The discharge will be conducted between 8-10 hours per day and will be monitored for leaks, line breaks, ponding, and runoff to surface water. The objective of the discharge is to maximize infiltration and evaporation.

8. Estimated depth to ground water: Approximately 300 ft.

Signature: _____ **Title:** _____

Printed name: Paul Blumberg_____ **Date:** _____

Providing additional information such as maps, plans and specifications, laboratory analyses, and/or a detailed description of the discharge will help NMED to process this NOI in a more timely manner. Please return this form to:

NMED Ground Water Quality Bureau
P.O. Box 26110
Santa Fe, New Mexico 87502

Telephone: 505-827-2900
Fax: 505-827-2965

Aerial view of the Milagro pond is shown below with the location and lengths of the hoses indicated. The hoses are 1.5" woven fire hose and there will be approximately 20 sprinklers distributed at the ends of the hoses and at junctions at least 100' apart. A description of the sprinklers is also attached below.

RAIN BIRD®

TECH SPECS

Maxi-Paw™ Rotor

The Maxi-Paw's powerful throw permits maximum spacing and offers superior close-in watering and uniform water distribution. Low pressure loss and an efficient, straight-through flow design conserve energy and are ideal for dirty water applications. The optional Seal-A-Matic™ prevents run-off, puddling, and erosion caused by low head drainage. And most important, it's rugged and dependable, popping up on schedule again and again because of the multi-function wiper seal.

The Maxi-Paw™ Rotor–a tradition of excellence.

Features

- Five interchangeable, color-coded MPR nozzles.
- Two interchangeable low-angle (LA) nozzles.
- No tools required to change nozzles.
- Heavy-duty plastic case with sturdy, reinforced ribbed design.
- Double-weighted arm for slower rotation and increased distance of throw.
- Self-flushing inner trip with improved inner trip lever.
- Powerful reverse action.
- Adjustable arm spring for low-pressure and low-gallonage operation.
- Energy efficient, low-pressure and low-gallonage operation.
- Proven impact drive.
- Straight-through flow.
- Full-circle or adjustable arc 20° to 340°.
- Precision Jet Tube (PJ™).
- Hooded bearing.
- Distance controller diffuser pin.
- Multi-function, pressure-activated wiper seal.
- FP trip for full- or part-circle operation.
- Inlet filter screen.
- Combination ½" (15/21) or ¾" (20/27) bottom inlet.
- Serviceable through the top of the case.
- Optional internal Seal-A-Matic™ (SAM) prevents puddling and erosion caused by low head drainage and saves water.

Operating Range

- Precipitation Rate: 0.18 to 0.79 inches per hour (5 to 20 mm/h)
- Spacing: 22 to 50 feet (6.7 to 12.2 m)
- Flow rate: 1.5 to 8.4 GPM (0.01 to 0.52 l/s; 0.36 to 1.86 m³/h)
- Radius: 22 to 45 feet (6.7 to 13.7 m)
- Pressure: 25 to 60 PSI (2.0 to 4.5 Bars)

Specifications

- Combination ½" (15/21) or ¾" (20/27) female bottom inlet
- ½" (15/21) female side inlet
- Nozzles: 06-red; 07-black; 08-blue; 10-yellow;12-beige
- LA nozzles: 07LA-black; 10LA-yellow
- Nozzle outlet trajectory is 23°.
- LA nozzle outlet trajectory is 11°.
- Side inlet installation is not recommended in freezing climates.
- Optional SAM feature holds back up to 10 feet (3.1 m) of elevation change.

Dimensions

- Overall height: 9⅜" (23.6 cm)
- Top diameter: 5" (12.7 cm)

Models

2045A Maxi-Paw™

2045A Maxi-Paw-SAM

Available Nozzles

- Standard trajectory
  - 06, 07, 08, 10, 12
- Low angle
  - 07LA, 10LA

How to Specify/Order:

2045A-SAM-10-LA

Model
2045A: Maxi-Paw™

Optional Feature
SAM: Seal-A-Matic™

Nozzle Size
06 10
07 12
08

Optional Feature
LA: Low Angle

Los Alamos
NATIONAL LABORATORY

Risk Reduction & Environmental Stewardship Division
Water Quality & Hydrology Group (RRES-WQH)
PO Box 1663, MS K497
Los Alamos, New Mexico 87545
(505) 667-7969/Fax: (505) 665-9344

Date: July 30, 2003
Refer to: RRES-WQH: 03-178

Mr. John F. Peterson
Jemez District Ranger
U.S. Forest Service
Jemez Ranger District
P.O. Box 150
Jemez Springs, New Mexico 87025

SUBJECT: DRINKING WATER QUALITY REPORT, FENTON HILL WATER SUPPLY SYSTEM

Dear Mr. Peterson:

During our December 18, 2002, meeting at Fenton Hill, you and your staff expressed concerns about the frequency of drinking water monitoring at the site and the need for routine Total Coliform (TC) monitoring during the summer season. The Laboratory was in full support of your agency's concerns and agreed to increase the frequency of drinking water monitoring during 2003. To-date, the Laboratory has conducted the following sampling events during 2003:

1. April sampling of water supply well FH-1 for nitrate, metals, fluoride, cyanide, radon, uranium, gross alpha, gross beta, and volatile organic compounds;

2. June sampling of water supply well FH-1 for radium-226 and radium-228;

3. June sampling of FH-1, the main operations building (TA-57-017), and the Forest Service fire camp for Total Coliform (TC) bacteria and Heterotrophic Plate Counts (HPC); and

4. July sampling of the main operations building (TA-57-017) and the Forest Service fire camp for Total Coliform (TC) bacteria and Heterotrophic Plate Counts (HPC).

Results from the above sampling events are presented below.

All samples complied with the microbiological requirements of the SDWA. Heterotrophic Plate Counts (HPC), an indicator of biofilm bacteria and stagnation, were below the SDWA recommended level of 500 colony-forming units (cfu) per ml.

July 2003 Total Coliform Sampling

On July 25, 2003, the Laboratory collected samples from the main operations building (TA-57-017) and the Forest Service fire camp for Total Coliform (TC) bacteria and Heterotrophic Plate Counts (HPC). Samples were submitted to the KSL Health and Environmental Laboratory for analysis. The July 2003 results are summarized below.

Sample Location	Coliform Bacteria (per 100 ml)	HPC[1] (cfu per ml)
Operations Building (57-017)	Absent	2
Forest Service fire camp	Absent	24

[1]Heterotrophic Plate Count

All samples complied with the microbiological requirements of the SDWA. Heterotrophic Plate Counts were well below the SDWA recommended level of 500 colony-forming units (cfu) per ml.

The Laboratory will continue to conduct monthly microbiological sampling at the main operations building (TA-57-017) and the Forest Service fire camp through October 2003.

Please contact me at (505) 667-7969 should you have any questions regarding report.

Sincerely,

Bob Beers
Water Quality & Hydrology Group

BB/jr

Attachments: a/s

Cy: A. Ferrell, Forest Service, Jemez Ranger District, Jemez Springs, NM, w/att.
C. Linn, Forest Service, Santa Fe National Forest, Santa Fe, NM, w/att.
J. Vozella, DOE/OLASO, w/o att., MS A316
G. Turner, DOE/OLASO, w/o att., MS A316
J. Holt, ADO, w/o att., MS A104
C. Webster, ADSR, w/o att., MS A127
D. Riker, FWO-WEST, w/o att., MS D459
T. Bucholz, FWO-WEST, w/o att., MS D459
J. Hansen, EES-DO, w/o att., MS D446
D. Casperson, NIS-2, w/o att., MS B244

Table 1.0. Fenton Hill Water Supply Well (FH-1). Drinking Water Quality Data.

Sample Date: April 8, 2003. Analysis by: General Engineering Laboratories, Charleston, SC.

SDWA Primary Drinking Water Contaminants	Result	SDWA MCL	Units	Comments
Antimony	<0.0002	0.006	mg/L	
Arsenic	<0.00053	0.01	mg/L	
Barium	0.137	2	mg/L	
Beryllium	<0.00007	0.004	mg/L	
Cadmium	<0.00007	0.005	mg/L	
Chromium	0.00177	0.1	mg/L	
Mercury	<0.000047	0.002	mg/L	
Nickel	0.00958	0.1	mg/L	
Selenium	0.00143	0.05	mg/L	
Thallium	0.000076	0.002	mg/L	
Uranium	4.28	30	ug/L	
Nitrate/nitrite (as N)	0.31	10	mg/L	
Fluoride	0.0288	4	mg/L	
Total Cyanide	<0.00172	0.2	mg/L	
SDWA VOCs	ND			61 compounds
Radon (Rn-222)	84.7 (+/-39.0)	300	pCi/L	
Gross Alpha	6.34 (+/-1.08)	15	pCi/L	Screening Level: 5 pCi/L
Gross Beta	5.42 (+/-0.744)	4 mrem/yr	pCi/L	Screening Level: 50 pCi/L
Ra-226	2.45 (+/-0.475)	5[1]	pCi/L	Sample date: June 6, 2003
Ra-228	0.703 (+/-0.215)	5[1]	pCi/L	Sample date: June 6, 2003

Notes:
[1]Combined Ra-228 and Ra-228.
ND means nondetect.

Ra226

ATTACHMENT 1.0

FENTON HILL WATER SUPPLY WELL (FH-1)

ANALYTICAL REPORTS

GENERAL ENGINEERING LABORATORIES
CHARLESTON, SC

ANALYTES:

SDWA METALS
URANIUM
TOTAL CYANIDE
NITRATE
FLUORIDE
VOLATILE ORGANICS
RADON
GROSS ALPHA
GROSS BETA
RADIUM-226
RADIUM-228

SAMPLE DATES:
APRIL 8, 2003
JUNE 6, 2003

Fenton Hill

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA PACKAGE

SDG No.: 78166 **Method Type:** EPA 200 SERIES

Sample ID: 78166002 **Client ID:** GU03040GFEN01

Contract: ESHL001 **Lab Code:** GEL **Case No.:** GEL **SAS No.:**

Matrix: WATER **Date Received:** 04/10/2003 **Level:** LOW **% Solids:** 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7440-36-0	Antimony	0.200	µg/L	U		MS	0.200	PE ICPMS4	030416
7440-38-2	Arsenic	0.530	µg/L	U		MS	0.530	PE ICPMS4	030416
7440-39-3	Barium	137	µg/L			MS	0.250	PE ICPMS4	030416
7440-41-7	Beryllium	0.070	µg/L	U		MS	0.070	PE ICPMS4	030416
7440-43-9	Cadmium	0.070	µg/L	U		MS	0.070	PE ICPMS4	030416
7440-47-3	Chromium	1.770	µg/L	B		MS	0.300	PE ICPMS4	030416
7439-97-6	Mercury	0.047	µg/L	U		AV	0.047	PE CVAA2	041803w1Hg
7440-02-0	Nickel	9.580	µg/L			MS	0.070	PE ICPMS4	030416
7782-49-2	Selenium	1.430	µg/L	B		MS	1.000	PE ICPMS4	030416
7440-28-0	Thallium	0.076	µg/L	B		MS	0.020	PE ICPMS4	030416

Color Before: **Clarity Before:** **Texture:**

Color After: **Clarity After:** **Artifacts:**

Comments:

FENTON HILL

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA PACKAGE

SDG No.: 78166 **Method Type:** EPA 200 SERIES

Sample ID: 78166001 **Client ID:** GU03040GFEN01

Contract: ESHL001 **Lab Code:** GEL **Case No.:** GEL **SAS No.:**

Matrix: WATER **Date Received:** 04/10/2003 **Level:** LOW **% Solids:** 0.00

CAS No.	Analyte	Concentration	Units	C	Qual	M	DL	Instrument ID	Analytical Run
7440-61-1	Uranium	4.280	µg/L			MS	0.018	PE ICPMS4	030416

Color Before: **Clarity Before:** **Texture:**

Color After: **Clarity After:** **Artifacts:**

Comments:

FENTON Hill

Certificate of Analysis

Company : Los Alamos National Labs
Address : MS K497 ESH-18
Water Quality & Hydrology
Los Alamos, New Mexico 87545
Contact: Billy Turney
Project: Bob Beer II

Report Date: April 25, 2003

Client Sample ID: GU03040GFEN01
Sample ID: 78166002
Matrix: Water
Collect Date: 08-APR-03 11:50
Receive Date: 10-APR-03
Collector: Client

Project: ESHL01202
Client ID: ESHL001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rapid Flow Analysis Federal											
EPA 335.3 Cyanide, Total Federal											
Cyanide, Total	U	ND	1.72	5.00	ug/L	1	ADF	04/22/03	1150	246090	1
TRAACS Nutrient Analysis Fed											
Nitrogen, (NO3/NO2)											
Nitrogen, Nitrate/Nitrite		0.310	0.010	0.050	mg/L	1	THL	04/14/03	1611	245004	2
Wet Chemistry General Federal											
EPA 340.2 Fluoride Federal											
Fluoride	J	0.0288	0.0038	0.100	mg/L	1	BEP2	04/25/03	0813	247257	3

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	FGA	04/15/03	1000	245074
EPA 245.2 Prep	EPA 245.2 Mercury Federal	NOR1	04/17/03	1230	244919
EPA 335.3	EPA 335.3 Total Cyanide	ADF	04/22/03	0715	246089

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 335.3	
2	EPA 353.1	
3	EPA 340.2	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GU03040GFEN01

Lab Name: GENERAL ENGINEERING LABS Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 78166

Matrix: (soil/water) WATER Lab Sample ID: 78166001

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 8P2F542

Level: (low/med) LOW Date Received: 04/10/03

% Moisture: not dec. _____ Date Analyzed: 04/19/03

GC Column: RTX-VOLATILES ID: 0.25 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-97-5	Bromochloromethane	0.50	U
74-87-3	Chloromethane	0.50	U
74-83-9	Bromomethane	0.50	U
75-01-4	Vinyl chloride	0.50	U
75-00-3	Chloroethane	0.50	U
75-09-2	Methylene chloride	0.31	JB
75-35-4	1,1-Dichloroethylene	0.50	U
75-34-3	1,1-Dichloroethane	0.50	U
67-66-3	Chloroform	0.50	U
107-06-2	1,2-Dichloroethane	0.50	U
156-60-5	trans-1,2-Dichloroethylene	0.50	U
71-55-6	1,1,1-Trichloroethane	0.50	U
56-23-5	Carbon tetrachloride	0.50	U
75-27-4	Bromodichloromethane	0.50	U
78-87-5	1,2-Dichloropropane	0.50	U
10061-01-5	cis-1,3-Dichloropropylene	0.50	U
156-59-2	cis-1,2-Dichloroethylene	0.50	U
79-01-6	Trichloroethylene	0.50	U
124-48-1	Dibromochloromethane	0.50	U
79-00-5	1,1,2-Trichloroethane	0.50	U
71-43-2	Benzene	0.50	U
10061-02-6	trans-1,3-Dichloropropylene	0.50	U
75-25-2	Bromoform	0.50	U
127-18-4	Tetrachloroethylene	0.50	U
79-34-5	1,1,2,2-Tetrachloroethane	0.50	U
108-88-3	Toluene	0.50	U
108-90-7	Chlorobenzene	0.50	U
100-41-4	Ethylbenzene	0.50	U
100-42-5	Styrene	0.50	U
107-06-2	Dichlorodifluoromethane	0.50	U
75-69-4	Trichlorofluoromethane	0.50	U
541-73-1	1,3-Dichlorobenzene	0.50	U
106-46-7	1,4-Dichlorobenzene	0.50	U

FENTON HILL

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GU03040GFEN01

Lab Name: GENERAL ENGINEERING LABS Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 78166

Matrix: (soil/water) WATER Lab Sample ID: 78166001

Sample wt/vol: 10.00 (g/ml) ML Lab File ID: 8P2F542

Level: (low/med) LOW Date Received: 04/10/03

% Moisture: not dec. _____ Date Analyzed: 04/19/03

GC Column: RTX-VOLATILES ID: 0.25 (mm) Dilution Factor: 1.0

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
95-50-1	1,2-Dichlorobenzene	0.50	U
95-47-6	o-Xylene	0.50	U
	m,p-Xylenes	0.50	U
1330-20-1	Xylenes (total)	0.50	U
594-20-7	2,2-Dichloropropane	0.50	U
563-58-6	1,1-Dichloropropene	0.50	U
74-95-3	Dibromomethane	0.50	U
106-93-4	1,2-Dibromoethane	0.50	U
142-28-9	1,3-Dichloropropane	0.50	U
630-20-6	1,1,1,2-Tetrachloroethane	0.50	U
98-82-8	Isopropylbenzene	0.50	U
108-86-1	Bromobenzene	0.50	U
96-18-4	1,2,3-Trichloropropane	0.50	U
103-65-1	n-Propylbenzene	0.50	U
95-49-8	2-Chlorotoluene	0.50	U
108-67-8	1,3,5-Trimethylbenzene	0.50	U
106-43-4	4-Chlorotoluene	0.50	U
98-06-6	tert-Butylbenzene	0.50	U
95-63-6	1,2,4-Trimethylbenzene	0.50	U
135-98-8	sec-Butylbenzene	0.50	U
99-87-6	4-Isopropyltoluene	0.50	U
104-51-8	n-Butylbenzene	0.50	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	U
120-82-1	1,2,4-Trichlorobenzene	0.50	U
87-68-3	Hexachlorobutadiene	0.50	U
91-20-3	Naphthalene	0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	U
108-05-4	Vinyl acetate	1.0	U

TEMION 17111

GENERAL ENGINEERING LABORATORIES, LLC
a Member of THE GEL GROUP, INC.
Meeting Today's Needs with a Vision for Tomorrow

Certificate of Analysis

Company : Los Alamos National Labs
Address : MS K497 ESH-18
Water Quality & Hydrology
Los Alamos, New Mexico 87545
Contact: Billy Turney
Project: Bob Beer II

Report Date: May 10, 2003

Client Sample ID:	GU03040GFEN01	Project:	ESHL01202
Sample ID:	78166001	Client ID:	ESHL001
Matrix:	Water		
Collect Date:	08-APR-03		
Receive Date:	10-APR-03		
Collector:	Client		

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Liquid Scintillation Analysis												
Liquid Scint Rn222, Liquid												
Radon-222		84.7	127	+/-39.0	200	pCi/L		JS1	04/14/03	1936	244930	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	FGA	04/15/03	1000	245074

The following Analytical Methods were performed

Method	Description
1	SM 7500 Rn B(Modified)

Notes:
TPU is calculated at the 67% confidence level (1-sigma).
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin.

Reviewed by

P.O. Box 30712 • Charleston, SC 29417 • 2040 Savage Road (29407)
Phone (843) 556-8171 • Fax (843) 766-1178 • www.gel.com

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GENERAL ENGINEERING LABORATORIES, LLC
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Meeting Today's Needs with a Vision for Tomorrow

Certificate of Analysis

Company : Los Alamos National Labs
Address : MS K497 ESH-18
Water Quality & Hydrology
Los Alamos, New Mexico 87545
Contact: Billy Turney
Project: Bob Beer II

Report Date: May 10, 2003

Client Sample ID:	GU03040GFEN01	Project:	ESHL01202
Sample ID:	78166002	Client ID:	ESHL001
Matrix:	Water		
Collect Date:	08-APR-03		
Receive Date:	10-APR-03		
Collector:	Client		

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	AnalystDate	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting											
GFPC, Gross A/B, liquid											
ALPHA		6.34	2.20	+/-1.08	3.00	pCi/L		LAG1 04/29/03	1303	246543	1
BETA		5.42	2.26	+/-0.744	3.00	pCi/L					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	FGA	04/15/03	1000	245074
EPA 245.2 Prep	EPA 245.2 Mercury Federal	NOR1	04/17/03	1230	244919
EPA 335.3	EPA 335.3 Total Cyanide	ADF	04/22/03	0715	246089

The following Analytical Methods were performed

Method	Description
1	EPA 900.0

Notes:
TPU is calculated at the 67% confidence level (1-sigma).
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin.

FENTON 77111

GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Los Alamos National Labs
Address : MS K497 ESH-18
Water Quality & Hydrology
Los Alamos, New Mexico 87545
Contact: Billy Turney
Project: Groundwater

Report Date: July 16, 2003

Client Sample ID:	GU03060GFEN01	Project:	ESHL00701
Sample ID:	82115001	Client ID:	ESHL001
Matrix:	Ground Water		
Collect Date:	06-JUN-03		
Receive Date:	12-JUN-03		
Collector:	Client		

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	AnalystDate	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting											
GFPC, Ra228, Liquid											
Radium-228		0.703	0.752	+/-0.215	1.00	pCi/L		NKC1 07/15/03	1642	259672	1
		Yield%		79.0							
Rad Radium-226											
Lucas Cell, Ra226, liquid											
Radium-226		2.54	0.943	+/-0.475	1.00	pCi/L		CAF1 07/03/03	1630	257881	2

The following Analytical Methods were performed

Method	Description
1	EPA 904.0 Modified
2	EPA 903.1 Modified

Notes:
TPU is calculated at the 67% confidence level (1-sigma).
The Qualifiers in this report are defined as follows :

< Result is less than amount reported.
> Result is greater than amount reported.
B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
Y QC Samples were not spiked with this compound.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on an "as received" basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Stacy Griffin.