Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Date: December 2, 1998
In Reply Refer To: ESH-18/WQ&H:98-0426
Mail Stop: K497
Telephone: (505) 665-1859

ENTERED

DEC 1998
RECEIVED

Ms. Marcy Leavitt, Chief
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

SUBJECT: ANALYTICAL RESULTS FROM SAMPLING GROUND WATER DURING DRILLING OF MONITORING WELL R-25

Dear Ms. Leavitt:

In accordance with the requirements of your October 26, 1998, letter, the Laboratory has stored and analyzed the ground water produced during the drilling of Monitoring Well R-25. Enclosed are copies of the validated analytical reports for the following samples: CACV-98-0056 (filtered sample) and CACV-98-0057 (unfiltered sample) collected on September 30, 1998, at a depth of 747 feet; and, CACV-98-0066 (unfiltered sample) collected on October 28, 1998, at a depth of 1047 feet. Data validation was completed on November 28, 1998, and on December 1, 1998, respectively. Currently, approximately 100,000 gallons of produced ground water from Monitoring Well R-25 is in temporary storage at TA-16. The quality of this stored water is discussed below.

Analysis of CACV-98-0056 (filtered sample) from Monitoring Well R-25 shows that one contaminant, manganese (Mn), is present at concentrations greater than New Mexico Water Quality Control Commission (WQCC) Section 3103 Ground Water Standards which generally apply to filtered samples. Manganese concentrations in CACV-98-0056 are 1.5 mg/L while the ground water standard for manganese is 0.2 mg/L.

Analysis of CACV-98-0057 (unfiltered sample) from Monitoring Well R-25 shows the presence of two contaminants, acetone and 2-butanone, but the presence of these contaminants has been attributed to laboratory contamination. One contaminant from the NM WQCC Section 1101.TT list of toxic pollutants, di-n-butyl-phthalate, was detected at an estimated concentration of 3.4 µg/L (the reporting limit is 10 µg/L). The presence of di-n-butyl-phthalate in the sample is believed to be from either laboratory or field contamination however, the evidence for contamination is not conclusive.

In addition, analysis of CACV-98-0057 (unfiltered sample) shows the presence of three high-explosive contaminants not regulated by NM WQCC Regulations: RDX (12 µg/L); 4-amino-2,6-dinitrotoluene (0.38 µg/L); and, 2-amino-4,6-dinitrotolune (estimated at 0.51 µg/L). These results were previously discussed and reported to the NMED on November 9, 1998.

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Analysis of CACV-98-0066 (unfiltered sample) shows the presence of five high-explosive contaminants not regulated by NM WQCC Regulations: HMX (12 µg/L); RDX (84 µg/L); 2,4,6–trinitrotoluene (5.3 µg/L); 4-amino-2,6-DNT (4.6 µg/L); and, 2-amino-4,6-DNT (5.7 µg/L). Additional analytical results from sampling at Monitoring Well R-25 will be forthcoming as drilling operations continue and data is validated.

We propose to proceed with land application of this ground water onto the mesa top with a sprinkler system in accordance with our July 8, 1998, Notice of Intent to Discharge (NOI) for Monitoring Well R-25. All purge water to be land applied will not be allowed to pond or enter any surface water course in accordance with the NOI.

Please contact me at 667-1859, or Bob Beers at 667-7969, if you need any additional information regarding this data.

Sincerely,

Steven Rae
Group Leader
Water Quality and Hydrology Group

SR:RB/em

Enclosures: a/s

Cy: P. Bustamante, NMED/GWQB, Santa Fe, New Mexico, w/enc.
J. Keiling, NMED/HRMB, Santa Fe, New Mexico, w/enc.
J. Young, NMED/HRMB, Santa Fe, New Mexico, w/enc.
J. Davis, NMED/SWQB, Santa Fe, New Mexico, w/enc.
B. Hoditschek, NMED/SWQB, Santa Fe, New Mexico, w/enc.
S. Yanicek, NMED/DOE/OB, w/enc., MS J993
J. Vozella, DOE/LAAO, w/enc., MS A316
R. Burick, DIR, w/enc., MS A100
T. Baca, EM-DO, w/enc., MS J591
J. Canepa, EM/ER, w/enc., MS M992
T. George, EM/ER, w/enc., MS M992
A. Pratt, EES-13, w/enc., MS M992
D. Broxton, EES-1, w/enc., MS D462
D. McInroy, EM/ER, w/enc., MS M992
R. Bohn, EM/ER, w/enc., MS M992
D. Erickson, ESH-DO, w/enc., MS K491
S. Veenis, ER/ESH-18, w/enc., MS K497
M. Saladen, ESH-18, w/enc., MS K497
H. Decker, ESH-18, w/enc., MS K497
B. Beers, ESH-18, w/enc., MS K497
D. Woitte, LC-GEN, w/enc., MS A187
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Nitroaromatics And Nitramines

Method SW8330

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810042
Client Name: Los Alamos National Laboratory
ClientProject ID: 4771R

Reported on: Wednesday, October 21, 1998

Field ID: CACV-98-0057
Lab ID: 9810042-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 13-Oct-98
Prep Batch: EX981007-4

Sample Aliquot: 350
Final Volume: 3
Dilution: 1

CASNO	Target Analyte	Result	Units	Reporting Limit	Result Qualifier	Result Footnote
2691-41-0	HMX	1	ug/L	1	U	
121-82-4	RDX	12	ug/L	0.84		
99-35-4	1,3,5-TRINITROBENZENE	0.26	ug/L	0.26	U	
99-65-0	1,3-DINITROBENZENE	0.25	ug/L	0.25	U	
479-45-8	TETRYL	1	ug/L	1	U	
98-95-3	NITROBENZENE	1	ug/L	1	U	
118-96-7	2,4,6-TRINITROTOLUENE	0.25	ug/L	0.25	U	
1946-51-0	4-AMINO-2,6-DNT	0.38	ug/L	0.25		
35572-78-2	2-AMINO-4,6-DNT	0.51	ug/L	0.25		
606-20-2	2,6-DINITROTOLUENE	0.25	ug/L	0.25	U	
121-14-2	2,4-DINITROTOLUENE	0.25	ug/L	0.25	U	
88-72-2	2-NITROTOLUENE	1	ug/L	1	U	
99-99-0	4-NITROTOLUENE	1	ug/L	1	U	
99-08-1	3-NITROTOLUENE	1	ug/L	1	U	

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Units	Spike Amount	Percent Recovery	Control Limits
100-25-4	1,4-DINITROBENZENE	3.77	ug/l	4.29	88	34 - 106

U = Less than the Reporting Limit

TOTAL URANIUM ANALYSIS RESULTS SUMMARY

By Laser-Induced Kinetic Phosphorimetry

Lab Name: Paragon Analytics, Inc. Date Collected: 09/30/98

Client Name: Los Alamos Natl' Lab. Date Analyzed : 10/27/98

Client Project ID: 4772R

Lab Sample ID Series: 98-10-041 Sample Matrix : Water

Client Sample ID	Lab Sample ID	Total Uranium (ug/L)	Reporting Limit	Flag
CACV-98-0056	10-041-01	0.39 ± 0.06	0.10	
CACV-98-0057	10-041-02	0.86 ± 0.14	0.10	
Blank	10-041-B1	BDL	0.10	U
Duplicate	10-041-D1	0.41 ± 0.07	0.10	

Reported Uncertainties are the Estimated Total Propagated Uncertainties (2σ).
See PAI SOP 743FC for details of TPU determinations.

FLAGS = J - 'Estimated Value' - result between Method Detection Limit and Reporting Limit.
U - 'Not Detected' - result less than Method Detection Limit.

BDL = Below Detection Limit; see method for DL determination.

Remarks:

Sample 98-10-041-D1 is a duplicate of 98-10-041-01.

11/28/98 BP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CACV-98-0056

Lab Name: PARAGON_ANALYTICS_____ Contract: _____

Lab Code: NA____ Case No.: _____ SAS No.: _____ SDG No.: 4772R_

Matrix (soil/water): WATER

Lab Sample ID: 9810041-1

Level (low/med): LOW__

Date Received: 10/03/98

% Solids: __0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Focused Validation qualifiers
7429-90-5	Aluminum	10.5	B	E	P	~~J~~ UJ 4/2
7440-36-0	Antimony	2.7	U		P	U
7440-38-2	Arsenic	3.0	U		P	U
7440-39-3	Barium	37.6	B		P	J ppb
7440-41-7	Beryllium	0.30	U		P	U
7440-43-9	Cadmium	0.20	U		P	U
7440-70-2	Calcium	16700			P	
7440-47-3	Chromium	0.66	B		P	U
7440-48-4	Cobalt	2.6	B		P	J
7440-50-8	Copper	0.59	B		P	J
7439-89-6	Iron	71.3	B		P	~~J~~ UJ 4/2
7439-92-1	Lead	1.0	U		P	R
7439-95-4	Magnesium	6690			P	
7439-96-5	Manganese	1500			P	
7439-97-6	Mercury	0.02	U		AV	R
7440-02-0	Nickel	13.2	B		P	J
7440-09-7	Potassium	2740	B		P	J
7782-49-2	Selenium	2.6	U		P	U
7440-22-4	Silver	0.80	U		P	U
7440-23-5	Sodium	10600			P	
7440-28-0	Thallium	3.1	U		P	U
7440-62-2	Vanadium	0.70	U		P	U
7440-66-6	Zinc	1.7	B		P	J

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: N/A___

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

11/28/98

FORM I - IN

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CACV-98-0057

Lab Name: PARAGON_ANALYTICS_____ Contract: _____

Lab Code: NA____ Case No.: _____ SAS No.: _____ SDG No.: 4772R_

Matrix (soil/water): WATER Lab Sample ID: 9810041-2

Level (low/med): LOW__ Date Received: 10/03/98

% Solids: __0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Focused Validation Qualifiers
7429-90-5	Aluminum_	4230	_	E	P_	J
7440-36-0	Antimony_	2.7	U		P_	U
7440-38-2	Arsenic__	3.0	U		P_	U
7440-39-3	Barium__	25.7	B		P_	J
7440-41-7	Beryllium	2.3	B		P_	U
7440-43-9	Cadmium__	0.39	B		P_	U
7440-70-2	Calcium__	17500			P_	
7440-47-3	Chromium_	2.7	B		P_	U
7440-48-4	Cobalt___	3.4	B		P_	J
7440-50-8	Copper___	5.0	B		P_	J
7439-89-6	Iron____	5060	_		P_	J
7439-92-1	Lead____	6.1	_		P_	
7439-95-4	Magnesium	7200	_		P_	
7439-96-5	Manganese	1670	_		P_	
7439-97-6	Mercury__	0.02	U		AV	R
7440-02-0	Nickel___	16.3	B		P_	J
7440-09-7	Potassium	4040	B		P_	J
7782-49-2	Selenium_	2.6	U		P_	U
7440-22-4	Silver___	0.80	U		P_	U
7440-23-5	Sodium___	11700			P_	
7440-28-0	Thallium_	3.1	U		P_	U
7440-62-2	Vanadium_	1.6	B		P_	U
7440-66-6	Zinc____	33.4	_		P_	
			_			
			_			

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Color Before: BROWN____ Clarity Before: CLOUDY Texture: N/A___

Color After: LT_BROWN_ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FORM I - IN

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Bicarbonate as Calcium Carbonate

Method EPA310.1M

Sample Results

Lab Name: Paragon Analytics, Inc.
Client Name: Los Alamos National Laboratory SMO
Client Project ID: 4772R
Work Order Number: 9810041 **Final Volume:** 35 ML
Reporting Basis: As Received **Matrix:** Water

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Units	Detection Limit	Flag	Sample Aliquot
CACV-98-0056	9810041-1	9/30/98	10/14/98	10/14/98	N/A	1	72	MG/L	14		35 ML
CACV-98-0057	9810041-2	9/30/98	10/14/98	10/14/98	N/A	1	72	MG/L	14		35 ML

HC 11/28/98

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Ammonia as N

Method EPA350.3

Sample Results

Lab Name: Paragon Analytics, Inc.
Client Name: Los Alamos National Laboratory SMO
Client Project ID: 4772R
Work Order Number: 9810041
Reporting Basis: As Received
Final Volume: 20 ML
Matrix: Water

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Units	Detection Limit	Flag	Sample Aliquot
CACV-98-0056	9810041-1	9/30/98	10/14/98	10/14/98	N/A	1	0.5	MG/L	0.5	U	20 ML
CACV-98-0057	9810041-2	9/30/98	10/14/98	10/14/98	N/A	1	0.5	MG/L	0.5	U	20 ML

RW 11/28/98

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Total Cyanide

Method SW9010

Sample Results

Lab Name: Paragon Analytics, Inc.
Client Name: Los Alamos National Laboratory SMO
Client Project ID: 4772R
Work Order Number: 9810041
Reporting Basis: As Received

Final Volume: 50 ML
Matrix: Water

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	Units	Detection Limit	Flag	Sample Aliquot
CACV-98-0057	9810041-2	9/30/98	10/6/98	10/7/98	N/A	1	0.01	MG/L	0.01	U	50 ML

VGJ 11/24/98

Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Ion Chromatography

Method EPA300.0

Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810041
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 4772R

Field ID: CACV-98-0056
Lab ID: 9810041-1

Sample Matrix: Water
% Moisture: N/A
Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 07-Oct-98

Prep Batch: IC981007-1
QCBatchID: IC981007-1-1
Run ID: IC981007-1A
Cleanup: NONE
Basis: As Received

Sample Aliquot: 5 ML
Final Volume: 5 ML

CASNO	Target Analyte	DF	Result	Units	Reporting Limit	Result Qualifier	EPA Qualifier
24959-67-9	BROMIDE	1	0.2	MG/L	0.2	U	
16887-00-6	CHLORIDE	10	11	MG/L	2		
16984-48-8	FLUORIDE	1	0.22	MG/L	0.1		
14265-44-2	ORTHOPHOSPHATE	1	0.2	MG/L	0.2	U	
14808-79-8	SULFATE	1	9.8	MG/L	1		
14797-55-8	NITRATE	1	0.95	MG/L	0.2		
14797-65-0	NITRITE	1	0.1	MG/L	0.1	U	

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Ion Chromatography

Method EPA300.0

Sample Results

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810041
Client Name: Los Alamos National Laboratory SMO
ClientProject ID: 4772R

Field ID:	CACV-98-0057
Lab ID:	9810041-2

Sample Matrix: Water
% Moisture: N/A
Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 07-Oct-98

Prep Batch: IC981007-1
QCBatchID: IC981007-1-1
Run ID: IC981007-1A
Cleanup: NONE
Basis: As Received

Sample Aliquot: 5 ML
Final Volume: 5 ML

CASNO	Target Analyte	DF	Result	Units	Reporting Limit	Result Qualifier	EPA Qualifier
24959-67-9	BROMIDE	1	0.2	MG/L	0.2	U	
16887-00-6	CHLORIDE	10	11	MG/L	2		
16984-48-8	FLUORIDE	1	0.21	MG/L	0.1		
14265-44-2	ORTHOPHOSPHATE	1	0.2	MG/L	0.2	U	
14808-79-8	SULFATE	1	9.6	MG/L	1		
14797-55-8	NITRATE	1	0.88	MG/L	0.2		
14797-65-0	NITRITE	1	0.1	MG/L	0.1	U	

NJ 11/24/98

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Semi-volatile Organics by GC/MS

Method SW8270

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Tuesday, October 27, 1998

Field ID: CACV-98-0057
Lab ID: 9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 21-Oct-98
Prep Batch: EX981007-1

Sample Aliquot: 1000
Final Volume: 1
Dilution: 1

CASNO	Target Analyte	Result	Units	Reporting Limit	Result Qualifier	Result Footnote
110-86-1	PYRIDINE	10	ug/L	10	U	
62-75-9	N-NITROSODIMETHYLAMINE	10	ug/L	10	U	
62-53-3	ANILINE	20	ug/L	20	U	
108-95-2	PHENOL	10	ug/L	10	U	
111-44-4	BIS(2-CHLOROETHYL)ETHER	10	ug/L	10	U	
95-57-8	2-CHLOROPHENOL	10	ug/L	10	U	
541-73-1	1,3-DICHLOROBENZENE	10	ug/L	10	U	
106-46-7	1,4-DICHLOROBENZENE	10	ug/L	10	U	
95-50-1	1,2-DICHLOROBENZENE	10	ug/L	10	U	
100-51-6	BENZYL ALCOHOL	20	ug/L	20	U	
108-60-1	BIS(2-CHLOROISOPROPYL)ETHER	10	ug/L	10	U	
95-48-7	2-METHYLPHENOL	10	ug/L	10	U	
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	10	ug/L	10	U	
106-44-5	4-METHYLPHENOL	10	ug/L	10	U	
67-72-1	HEXACHLOROETHANE	10	ug/L	10	U	
98-95-3	NITROBENZENE	10	ug/L	10	U	
78-59-1	ISOPHORONE	10	ug/L	10	U	
88-75-5	2-NITROPHENOL	10	ug/L	10	U	
105-67-9	2,4-DIMETHYLPHENOL	10	ug/L	10	U	
111-91-1	BIS(2-CHLOROETHOXY)METHANE	10	ug/L	10	U	
120-83-2	2,4-DICHLOROPHENOL	10	ug/L	10	U	
65-85-0	BENZOIC ACID	50	ug/L	50	U	
120-82-1	1,2,4-TRICHLOROBENZENE	10	ug/L	10	U	
91-20-3	NAPHTHALENE	10	ug/L	10	U	
106-47-8	4-CHLOROANILINE	20	ug/L	20	U	
87-68-3	HEXACHLOROBUTADIENE	10	ug/L	10	U	
59-50-7	4-CHLORO-3-METHYLPHENOL	20	ug/L	20	U	
91-57-6	2-METHYLNAPHTHALENE	10	ug/L	10	U	
77-47-4	HEXACHLOROCYCLOPENTADIENE	10	ug/L	10	U	
88-06-2	2,4,6-TRICHLOROPHENOL	10	ug/L	10	U	
95-95-4	2,4,5-TRICHLOROPHENOL	50	ug/L	50	U	
91-58-7	2-CHLORONAPHTHALENE	10	ug/L	10	U	
88-74-4	2-NITROANILINE	50	ug/L	50	U	
131-11-3	DIMETHYL PHTHALATE	10	ug/L	10	U	

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Semi-volatile Organics by GC/MS

Method SW8270

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Tuesday, October 27, 1998

Field ID: CACV-98-0057
Lab ID: 9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 21-Oct-98
Prep Batch: EX981007-1

Sample Aliquot: 1000
Final Volume: 1
Dilution: 1

606-20-2	2,6-DINITROTOLUENE	10	ug/L	10	U
208-96-8	ACENAPHTHYLENE	10	ug/L	10	U
99-09-2	3-NITROANILINE	50	ug/L	50	U
83-32-9	ACENAPHTHENE	10	ug/L	10	U
51-28-5	2,4-DINITROPHENOL	50	ug/L	50	U
100-02-7	4-NITROPHENOL	50	ug/L	50	U
132-64-9	DIBENZOFURAN	10	ug/L	10	U
121-14-2	2,4-DINITROTOLUENE	10	ug/L	10	U
84-66-2	DIETHYL PHTHALATE	10	ug/L	10	U
86-73-7	FLUORENE	10	ug/L	10	U
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	10	ug/L	10	U
100-01-6	4-NITROANILINE	20	ug/L	20	U
103-33-3	AZOBENZENE	20	ug/L	20	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	50	ug/L	50	U
86-30-6	N-NITROSODIPHENYLAMINE	10	ug/L	10	U
101-55-3	4-BROMOPHENYL PHENYL ETHER	10	ug/L	10	U
118-74-1	HEXACHLOROBENZENE	10	ug/L	10	U
87-86-5	PENTACHLOROPHENOL	50	ug/L	50	U
85-01-8	PHENANTHRENE	10	ug/L	10	U
120-12-7	ANTHRACENE	10	ug/L	10	U
86-74-8	CARBAZOLE	10	ug/L	10	U
84-74-2	DI-N-BUTYL PHTHALATE	3.4	ug/L	10	J
206-44-0	FLUORANTHENE	10	ug/L	10	U
92-87-5	BENZIDINE	10	ug/L	10	U
129-00-0	PYRENE	10	ug/L	10	U
85-68-7	BUTYL BENZYL PHTHALATE	10	ug/L	10	U
56-55-3	BENZO(A)ANTHRACENE	10	ug/L	10	U
91-94-1	3,3'-DICHLOROBENZIDINE	20	ug/L	20	U
218-01-9	CHRYSENE	10	ug/L	10	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	10	ug/L	10	U
117-84-0	DI-N-OCTYL PHTHALATE	10	ug/L	10	U
205-99-2	BENZO(B)FLUORANTHENE	10	ug/L	10	U
207-08-9	BENZO(K)FLUORANTHENE	10	ug/L	10	U
50-32-8	BENZO(A)PYRENE	10	ug/L	10	U
193-39-5	INDENO(1,2,3-CD)PYRENE	10	ug/L	10	U
53-70-3	DIBENZO(A,H)ANTHRACENE	10	ug/L	10	U

ppb

11/18

BBU 11/28/98

Semi-volatile Organics by GC/MS

Method SW8270

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Tuesday, October 27, 1998

Field ID: CACV-98-0057
Lab ID: 9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 21-Oct-98
Prep Batch: EX981007-1

Sample Aliquot: 1000
Final Volume: 1
Dilution: 1

191-24-2	BENZO(G,H,I)PERYLENE	10	ug/L	10	U	

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Units	Spike Amount	Percent Recovery	Control Limits
118-79-6	2,4,6-TRIBROMOPHENOL	61.4	ug/l	75	82	0 - 123
321-60-8	2-FLUOROBIPHENYL	42.6	ug/l	50	85	43 - 116
367-12-4	2-FLUOROPHENOL	55.5	ug/l	75	74	21 - 100
4165-60-0	NITROBENZENE-D5	38.9	ug/l	50	78	35 - 114
4165-62-2	PHENOL-D5	59.7	ug/l	75	80	10 - 94
1718-51-0	TERPHENYL-D14	14.8	ug/l	50	30	33 - 141

U = Less than the Reporting Limit

MV
11/26/98

12/18

Semi-volatile Organics by GC/MS

Method SW8270

Tentatively Identified Compounds

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Tuesday, October 27, 1998

Field ID: CACV-98-0057
Lab ID: 9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 07-Oct-98
Date Analyzed: 21-Oct-98
Prep Batch: EX981007-1

Sample Aliquot: 1000
Final Volume: 1
Dilution: 1

Retention Time	TIC Analyte	Result	Units	TIC Qualifier
4.33	Oxygenated hydrocarbon	10	ug/l	J
4.45	Oxygenated hydrocarbon	9.6	ug/l	J
4.54	Oxygenated hydrocarbon	5.4	ug/l	J
4.61	Halogenated hydrocarbon	4.1	ug/l	J
4.95	Halogenated hydrocarbon	19	ug/l	J
10.18	Organic acid	11	ug/l	J
11.19	Nonanoic acid	12	ug/l	J
12.54	Organic acid	43	ug/l	J
12.88	Unknown	7.0	ug/l	J
13.65	Organic acid	5.0	ug/l	J
15.51	Unknown	4.7	ug/l	J

also seen in batch blank

11/28/98

13/18

Volatile Organics by GC/MS

Method SW8260

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Wednesday, October 14, 1998

[redacted]	CACV-98-0057
[redacted]	9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 13-Oct-98
Date Analyzed: 13-Oct-98
Prep Batch: v10043

Sample Aliquot: 5
Final Volume: 5
Dilution: 1

CASNO	Target Analyte	Result	Units	Reporting Limit	Result Qualifier	Result Footnote
75-71-8	DICHLORODIFLUOROMETHANE	10	ug/L	10	U	
74-87-3	CHLOROMETHANE	10	ug/L	10	U	
75-01-4	VINYL CHLORIDE	10	ug/L	10	U	
74-83-9	BROMOMETHANE	10	ug/L	10	U	
75-00-3	CHLOROETHANE	10	ug/L	10	U	
75-69-4	TRICHLOROFLUOROMETHANE	5	ug/L	5	U	
75-35-4	1,1-DICHLOROETHENE	5	ug/L	5	U	
76-13-1	TRICHLOROTRIFLUOROETHANE	5	ug/L	5	U	
67-64-1	ACETONE	20 ~~14~~	ug/L	20	~~J~~ U	
74-88-4	IODOMETHANE	5	ug/L	5	U	
75-15-0	CARBON DISULFIDE	5	ug/L	5	U	
75-09-2	METHYLENE CHLORIDE	5	ug/L	5	U	
156-60-5	TRANS-1,2-DICHLOROETHENE	5	ug/L	5	U	
75-34-3	1,1-DICHLOROETHANE	5	ug/L	5	U	
156-59-2	CIS-1,2-DICHLOROETHENE	5	ug/L	5	U	
78-93-3	2-BUTANONE	20 ~~25~~	ug/L	20	~~J~~ U	
74-97-5	BROMOCHLOROMETHANE	5	ug/L	5	U	
67-66-3	CHLOROFORM	5	ug/L	5	U	
71-55-6	1,1,1-TRICHLOROETHANE	5	ug/L	5	U	
594-20-7	2,2-DICHLOROPROPANE	5	ug/L	5	U	
56-23-5	CARBON TETRACHLORIDE	5	ug/L	5	U	
563-58-6	1,1-DICHLOROPROPENE	5	ug/L	5	U	
107-06-2	1,2-DICHLOROETHANE	5	ug/L	5	U	
71-43-2	BENZENE	5	ug/L	5	U	
79-01-6	TRICHLOROETHENE	5	ug/L	5	U	
78-87-5	1,2-DICHLOROPROPANE	5	ug/L	5	U	
74-95-3	DIBROMOMETHANE	5	ug/L	5	U	
75-27-4	BROMODICHLOROMETHANE	5	ug/L	5	U	
10061-01-5	CIS-1,3-DICHLOROPROPENE	5	ug/L	5	U	
108-10-1	4-METHYL-2-PENTANONE	20	ug/L	20	U	
108-88-3	TOLUENE	5	ug/L	5	U	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5	ug/L	5	U	
79-00-5	1,1,2-TRICHLOROETHANE	5	ug/L	5	U	
591-78-6	2-HEXANONE	20	ug/L	20	U	

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Volatile Organics by GC/MS

Method SW8260

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Wednesday, October 14, 1998

[redacted]	CACV-98-0057
[redacted]	9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 13-Oct-98
Date Analyzed: 13-Oct-98
Prep Batch: v10043

Sample Aliquot: 5
Final Volume: 5
Dilution: 1

127-18-4	TETRACHLOROETHENE	5	ug/L	5	U	
142-28-9	1,3-DICHLOROPROPANE	5	ug/L	5	U	
124-48-1	DIBROMOCHLOROMETHANE	5	ug/L	5	U	
106-93-4	1,2-DIBROMOETHANE	5	ug/L	5	U	
108-90-7	CHLOROBENZENE	5	ug/L	5	U	
630-20-6	1,1,1,2-TETRACHLOROETHANE	5	ug/L	5	U	
100-41-4	ETHYLBENZENE	5	ug/L	5	U	
136777-61-	M+P-XYLENE	5	ug/L	5	U	
95-47-6	O-XYLENE	5	ug/L	5	U	
100-42-5	STYRENE	5	ug/L	5	U	
75-25-2	BROMOFORM	5	ug/L	5	U	
98-82-8	ISOPROPYLBENZENE	5	ug/L	5	U	
96-18-4	1,2,3-TRICHLOROPROPANE	5	ug/L	5	U	
79-34-5	1,1,2,2-TETRACHLOROETHANE	5	ug/L	5	U	
108-86-1	BROMOBENZENE	5	ug/L	5	U	
103-65-1	N-PROPYLBENZENE	5	ug/L	5	U	
95-49-8	2-CHLOROTOLUENE	5	ug/L	5	U	
108-67-8	1,3,5-TRIMETHYLBENZENE	5	ug/L	5	U	
106-43-4	4-CHLOROTOLUENE	5	ug/L	5	U	
98-06-6	TERT-BUTYLBENZENE	5	ug/L	5	U	
95-63-6	1,2,4-TRIMETHYLBENZENE	5	ug/L	5	U	
135-98-8	SEC-BUTYLBENZENE	5	ug/L	5	U	
541-73-1	1,3-DICHLOROBENZENE	5	ug/L	5	U	
99-87-6	P-ISOPROPYLTOLUENE	5	ug/L	5	U	
106-46-7	1,4-DICHLOROBENZENE	5	ug/L	5	U	
104-51-8	N-BUTYLBENZENE	5	ug/L	5	U	
95-50-1	1,2-DICHLOROBENZENE	5	ug/L	5	U	
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	10	ug/L	10	U	
120-82-1	1,2,4-TRICHLOROBENZENE	5	ug/L	5	U	
87-68-3	HEXACHLOROBUTADIENE	5	ug/L	5	U	
91-20-3	NAPHTHALENE	5	ug/L	5	U	
87-61-6	1,2,3-TRICHLOROBENZENE	5	ug/L	5	U	

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15/18

Volatile Organics by GC/MS

Method SW8260

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Wednesday, October 14, 1998

Field ID:	CACV-98-0057
Lab ID:	9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 13-Oct-98
Date Analyzed: 13-Oct-98
Prep Batch: v10043

Sample Aliquot: 5
Final Volume: 5
Dilution: 1

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Units	Spike Amount	Percent Recovery	Control Limits
460-00-4	4-BROMOFLUOROBENZENE	49.1	ug/l	50	98	86 - 115
1868-53-7	DIBROMOFLUOROMETHANE	44.9	ug/l	50	90	86 - 118
2037-26-5	TOLUENE-D8	53	ug/l	50	106	88 - 110

U = Less than the Reporting Limit

11/28/98

16/18

Volatile Organics by GC/MS

Method SW8260

Tentatively Identified Compounds

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9810043
Client Name: Los Alamos National Laboratory
ClientProject ID: 4770R

Reported on: Thursday, October 15, 1998

[redacted]	CACV-98-0057
[redacted]	9810043-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 30-Sep-98
Date Extracted: 13-Oct-98
Date Analyzed: 13-Oct-98
Prep Batch: v10043

Sample Aliquot: 5
Final Volume: 5
Dilution: 1

Retention Time	TIC Analyte	Result	Units	TIC Qualifier
5.53	MTBE	2.4	ug/l	J
8.88	oxygenated hydrocarbon	7.4	ug/l	J

11/20/98

11/28/98

17/18

Nitroaromatics And Nitramines

Method SW8330

Lab Name: Paragon Analytics, Inc.
Work Order Number: 9811009
Client Name: Los Alamos National Laboratory
ClientProject ID: 4931R

Reported on: Friday, November 06, 1998

Field ID:	CACV-98-0066
Lab ID:	9811009-1

Sample Matrix: liquid
% Moisture: N/A
Cleanup Method: NONE
Report Basis: AS RECEIVED

Date Collected: 28-Oct-98
Date Extracted: 04-Nov-98
Date Analyzed: 04-Nov-98
Prep Batch: EX981104-6

Sample Aliquot: 350
Final Volume: 3
Dilution: 10

CASNO	Target Analyte	Result	Units	Reporting Limit	Result Qualifier	Result Footnote
2691-41-0	HMX	12	ug/L	10		
121-82-4	RDX	84	ug/L	8.4		
99-35-4	1,3,5-TRINITROBENZENE	2.6	ug/L	2.6	U	
99-65-0	1,3-DINITROBENZENE	2.5	ug/L	2.5	U	
479-45-8	TETRYL	10	ug/L	10	U	
98-95-3	NITROBENZENE	10	ug/L	10	U	
118-96-7	2,4,6-TRINITROTOLUENE	5.3	ug/L	2.5		
1946-51-0	4-AMINO-2,6-DNT	4.6	ug/L	2.5		
35572-78-2	2-AMINO-4,6-DNT	5.7	ug/L	2.5		
606-20-2	2,6-DINITROTOLUENE	2.5	ug/L	2.5	U	
121-14-2	2,4-DINITROTOLUENE	2.5	ug/L	2.5	U	
88-72-2	2-NITROTOLUENE	10	ug/L	10	U	
99-99-0	4-NITROTOLUENE	10	ug/L	10	U	
99-08-1	3-NITROTOLUENE	10	ug/L	10	U	

Surrogate Recovery

CASNO	Surrogate Analyte	Result	Units	Spike Amount	Percent Recovery	Control Limits
100-25-4	1,4-DINITROBENZENE	3	ug/l	4.29	70	34 - 106

U = Less than the Reporting Limit

18/18

HIGH EXPLOSIVE GROUNDWATER CHEMISTRY OF BOREHOLE R-25 (NONFILTERED SAMPLES) (COMPILED BY P. LONGMIRE, 11/18/98)

Saturated Zone (depth in ft)	RDX[1] (ug/L)	HMX[1] (ug/L)	4-A-DNT[1] (ug/L)	2-A-DNT[1] (ug/L)	TNB[1] (ug/L)	TNT[1] (ug/L)
res. soil (mg/kg)	4.0	2700			1600	15
SAL[2] (ug/L)	0.61	1,800	-	-	1.8	2.2
	2	400 lifetime HA				
Otowi Member						
747	12	<1 12	0.38	0.51	<0.26	<0.25
Puye Formation						
867	63	8.3 7.59	3.7	5.2	2.2	19
1,047	84	12 7	4.6	5.7	<2.5	5.3
1,132	50	9.2 5.4	4.3	2.9	<1.3	<1.3

RDX/HMX RATIO

RDX ↓ thru time

Mn ↓ Possibly Reflecting Natural Alternation

1. RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine), 4-A-DNT (4-amino-2,6-dinitrotoluene), 2-A-DNT (2-amino-4,6-dinitrotoluene), TNB (1,3,5-trinitrobenzene), and TNT (2,4,6-trinitrotoluene) analyzed by high pressure liquid chromatography (HPLC) (EPA Method 8330) at Paragon Analytics, Inc., Fort Collins, Colorado.

MCL

2. Water screening action level (SAL) (October 1995). The EPA (IRIS) risk values for RDX and TNT in drinking water (1 in 1,000,000) are 0.3 and 1 ug/L, respectively.

Field screening values (NF, nonfiltered except as noted) for RDX (in ug/L) are: 747 ft, 19.5 and 17.5; 867 ft, 24.[illegible], 17.5, 15.5, and 22.5 (F, filtered); 1047 ft, 23.0; and 1132 ft, 25.0. Field screening values (NF, nonfiltered except as noted) for TNT (in ug/L) are: 747 ft, 11.6 and 7.4; 867 ft, 11.9, 10.2, 8.1, and 11.2 (F, filtered); 1047 ft, 23.5; and 11[illegible] ft, 23.0.

Mn and Ba could be a problem