HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Wednesday, May 12, 2010

Rick Beauheim
Sandia National Lab
4100 National Parks Hwy.
MS1395
Carlsbad, NM 88220

TEL: (505) 234-0006
FAX (505) 234-0061

RE: WIPP/H-6c (M)

Order No.: 1004666

Dear Rick Beauheim:

Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 4/28/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901
AZ license # AZ0682
ORELAP Lab # NM100001
Texas Lab# T104704424-08-TX

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

Date: *12-May-10*

CLIENT:	Sandia National Lab	**Client Sample ID:**	H-6c(M)_042710
Lab Order:	1004666	**Collection Date:**	4/27/2010 1:22:00 PM
Project:	WIPP/H-6c (M)	**Date Received:**	4/28/2010
Lab ID:	1004666-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **MMS**
Fluoride	1.5	0.10		mg/L	1	5/8/2010 6:03:59 AM
Chloride	890	50		mg/L	100	5/8/2010 6:21:24 AM
Bromide	1.2	0.10		mg/L	1	5/8/2010 6:03:59 AM
Nitrate (As N)+Nitrite (As N)	12	2.0		mg/L	10	5/10/2010 4:35:20 AM
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	4/28/2010 3:56:36 PM
Sulfate	2800	50		mg/L	100	5/8/2010 6:21:24 AM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: **SNV**
Calcium	560	10		mg/L	10	4/30/2010 11:33:30 AM
Magnesium	140	10		mg/L	10	4/30/2010 11:33:30 AM
Potassium	60	1.0		mg/L	1	4/30/2010 12:17:00 PM
Sodium	780	10		mg/L	10	4/30/2010 11:33:30 AM
Strontium	9.0	0.30		mg/L	50	4/30/2010 10:58:51 AM
SM 2320B: ALKALINITY						Analyst: **NSB**
Alkalinity, Total (As CaCO3)	ND	20		mg/L CaCO3	1	4/29/2010 10:41:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	4/29/2010 10:41:00 PM
Bicarbonate	ND	20		mg/L CaCO3	1	4/29/2010 10:41:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **NSB**
Specific Conductance	5100	0.010		µmhos/cm	1	4/29/2010 10:41:00 PM
SM4500-H+B: PH						Analyst: **NSB**
pH	7.74	0.1		pH units	1	4/29/2010 10:41:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	5180	40.0		mg/L	1	5/5/2010 4:41:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-6c (M)_042710 1004666-1											
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	780	33.93										
Potassium	60	1.53										
Calcium	560	27.94										
Magnesium	140	11.52										
Total Cations		74.93										
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	2800	58.30										
Chloride	890	25.11										
Bicarbonate (CaCO3)	ND	*										
Carbonate (CaCO3)	ND	*										
Phosphate (P)	ND	*										
Nitrite (N)	ND	*										
Nitrate (N)	12	0.86										
Fluoride	1.5	0.08										
Bromide	1.2	0.02										
Total Anions		84.35										
Elect. Cond. (µMhos/cm)	5100											
CATION/ANION RATIO		0.89										
% Difference		6										
TOTAL DISSOLVED SOLIDS RATIOS												
TDS (measured)	5180											
TDS (calculated)	5286											
Ratio meas TDS:calc TDS		1.0										
Ratio Meas. TDS:EC		1.02										
Ratio Calc. TDS:EC		1.04										
Ratio of anion sum:EC		1.7										
Ratio of cation sum:EC		1.5										

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC -- 0.9-1.1

QA/QC SUMMARY REPORT

Client: Sandia National Lab
Project: WIPP/H-6c (M) **Work Order:** 1004666

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	**R38452**	Analysis Date:	4/28/2010 11:18:02 AM		
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Bromide	ND	mg/L	0.10								
Nitrate (As N)+Nitrite (As N)	ND	mg/L	0.20								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	**R38601**	Analysis Date:	5/7/2010 2:06:28 PM		
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Bromide	ND	mg/L	0.10								
Nitrate (As N)+Nitrite (As N)	ND	mg/L	0.20								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	**R38601**	Analysis Date:	5/8/2010 8:05:51 AM		
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Bromide	ND	mg/L	0.10								
Nitrate (As N)+Nitrite (As N)	ND	mg/L	0.20								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	**R38618**	Analysis Date:	5/9/2010 9:37:31 PM		
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Bromide	ND	mg/L	0.10								
Nitrate (As N)+Nitrite (As N)	ND	mg/L	0.20								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		*LCS*				Batch ID:	**R38452**	Analysis Date:	4/28/2010 11:35:27 AM		
Fluoride	0.4857	mg/L	0.10	0.5	0	97.1	90	110			
Chloride	4.682	mg/L	0.50	5	0	93.6	90	110			
Bromide	2.380	mg/L	0.10	2.5	0	95.2	90	110			
Nitrate (As N)+Nitrite (As N)	3.346	mg/L	0.20	3.5	0	95.6	90	110			
Phosphorus, Orthophosphate (As P)	4.680	mg/L	0.50	5	0	93.6	90	110			
Sulfate	9.664	mg/L	0.50	10	0	96.6	90	110			
Sample ID: LCS		*LCS*				Batch ID:	**R38601**	Analysis Date:	5/7/2010 2:23:53 PM		
Fluoride	0.5214	mg/L	0.10	0.5	0	104	90	110			
Chloride	4.835	mg/L	0.50	5	0	96.7	90	110			
Bromide	2.433	mg/L	0.10	2.5	0	97.3	90	110			
Nitrate (As N)+Nitrite (As N)	3.438	mg/L	0.20	3.5	0	98.2	90	110			
Phosphorus, Orthophosphate (As P)	4.897	mg/L	0.50	5	0	97.9	90	110			
Sulfate	9.934	mg/L	0.50	10	0	99.3	90	110			
Sample ID: LCS		*LCS*				Batch ID:	**R38601**	Analysis Date:	5/8/2010 8:23:16 AM		
Fluoride	0.5032	mg/L	0.10	0.5	0	101	90	110			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Sandia National Lab
Project: WIPP/H-6c (M)
Work Order: 1004666

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: LCS		*LCS*				Batch ID:	**R38601**	Analysis Date:	5/8/2010 8:23:16 AM		
Chloride	4.730	mg/L	0.50	5	0	94.6	90	110			
Bromide	2.403	mg/L	0.10	2.5	0	96.1	90	110			
Nitrate (As N)+Nitrite (As N)	3.366	mg/L	0.20	3.5	0	96.2	90	110			
Phosphorus, Orthophosphate (As P)	4.785	mg/L	0.50	5	0	95.7	90	110			
Sulfate	9.760	mg/L	0.50	10	0	97.8	90	110			
Sample ID: LCS		*LCS*				Batch ID:	**R38618**	Analysis Date:	5/9/2010 9:54:55 PM		
Fluoride	0.5080	mg/L	0.10	0.5	0	102	90	110			
Chloride	4.734	mg/L	0.50	5	0	94.7	90	110			
Bromide	2.396	mg/L	0.10	2.5	0	95.8	90	110			
Nitrate (As N)+Nitrite (As N)	3.372	mg/L	0.20	3.5	0	96.4	90	110			
Phosphorus, Orthophosphate (As P)	4.723	mg/L	0.50	5	0	94.5	90	110			
Sulfate	9.807	mg/L	0.50	10	0	98.1	90	110			
Method: SM 2320B: Alkalinity											
Sample ID: MB		*MBLK*				Batch ID:	**R38461**	Analysis Date:	4/29/2010 1:17:00 PM		
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0								
Bicarbonate	ND	mg/L Ca	20								
Sample ID: 80PPM LCS		*LCS*				Batch ID:	**R38481**	Analysis Date:	4/29/2010 1:23:00 PM		
Alkalinity, Total (As CaCO3)	79.84	mg/L Ca	20	80	0	99.6	96.5	104			
Sample ID: 80PPM LCSD		*LCSD*				Batch ID:	**R38461**	Analysis Date:	4/29/2010 1:32:00 PM		
Alkalinity, Total (As CaCO3)	79.44	mg/L Ca	20	80	0	99.3	96.5	104	0.502	3.77	
Method: EPA Method 6010B: Dissolved Metals											
Sample ID: MB		*MBLK*				Batch ID:	**R38479**	Analysis Date:	4/30/2010 10:08:09 AM		
Calcium	ND	mg/L	1.0								
Magnesium	ND	mg/L	1.0								
Potassium	ND	mg/L	1.0								
Sodium	ND	mg/L	1.0								
Strontium	ND	mg/L	0.0060								
Sample ID: LCS		*LCS*				Batch ID:	**R38479**	Analysis Date:	4/30/2010 10:10:39 AM		
Calcium	52.61	mg/L	1.0	50.5	0	104	80	120			
Magnesium	52.73	mg/L	1.0	50.5	0	104	80	120			
Potassium	55.16	mg/L	1.0	55	0	100	80	120			
Sodium	51.64	mg/L	1.0	50.5	0	102	80	120			
Strontium	0.09193	mg/L	0.0060	0.1	0	91.9	80	120			
Sample ID: LCS		*LCS*				Batch ID:	**R38479**	Analysis Date:	4/30/2010 10:13:15 AM		
Calcium	50.28	mg/L	1.0	50.5	0	99.6	80	120			
Magnesium	49.65	mg/L	1.0	50.5	0	98.3	80	120			
Potassium	52.30	mg/L	1.0	55	0	95.1	80	120			
Sodium	48.37	mg/L	1.0	50.5	0	95.8	80	120			
Strontium	0.09788	mg/L	0.0060	0.1	0	97.9	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Sandia National Lab
Project: WIPP/H-6c (M) **Work Order:** 1004666

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-22148		*MBLK*				Batch ID:	**22148**	Analysis Date:	5/5/2010 4:41:00 PM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-22148		*LCS*				Batch ID:	**22148**	Analysis Date:	5/5/2010 4:41:00 PM		
Total Dissolved Solids	1017	mg/L	20.0	1000	0	102	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name SANDIA CARLSBAD | Date Received: 4/28/2010

Work Order Number 1004666 | Received by: TLS

Checklist completed by: Signature 4/28/10 Date | Sample ID labels checked by: Initials

Matrix: | Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace? No VOA vials submitted	☑	Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	

Number of preserved bottles checked for pH: 2

(<2 >12 unless noted below.)

Container/Temp Blank temperature? **1.0°** *<6° C Acceptable* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Sandia National Laboratories

Mailing Address: 4100 National Parks Highway
Carlsbad, NM 88220

Phone #: (575) 234-0107

email or Fax#: (575) 234-0061

QA/QC Package:
X Standard ☐ Level 4 (Full Validation)
☐ Other
☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush

Project Name:
WIPP / H-6c (M)

Project #:
98806 / 1.4.2.3

Project Manager:
Rick Beauheim / Mike Schuhen

Sampler: W. DeYonge, D. Bowman

On Ice: ☑ Yes ☐ No

Sample Temperature: 2.4 + 1.0 = 3.4 °C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1004166	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Cation / Anion Balance	pH, Cond, TDS, Alkalinity	NO_2 + NO_3	Metals / Strontium / Cations	Air Bubbles (Y or N)
4/27/10	13:22	H_20	H-6c(M)_042710	#1: 500 mL	NONE	-1												X	X			
4/27/10	13:22	H_20	H-6c(M)_042710	#2: 125 mL	H_2SO_4	-1														X		
4/27/10	13:22	H_20	H-6c(M)_042710	#3: 125 mL	HNO_3	-1															X	
			END OF SAMPLE LIST																			

Date	Time	Relinquished by	Received by	Date	Time
4/27/10	~~3:40 PM~~ 3:15 PM	Wesley F. DeYonge		4/28/10	845

Remarks:
Container #3 was filtered.
Samples may contain high levels of salts.
All samples were pre-filtered (50 micron) to remove sediment WDD 4/27/10

Appendix A 1004666-1 AT

ACTIVITY/ PROJECT SPECIFIC Sandia National Laboratories PROCEDURE

Chain of Custody

0.4

Form Number: SP 13-1-1

Page 1 **of** 1

Attach more forms as needed

1. Initial Sample Custodian Wesley F. DeYonge (Printed Name) Organization: 6712 Date: 04/27/2010

2. Sample Collection or Creation Information

Scientific Notebook ID: Magenta Hydrology #11

Test Plan ID: TP 03-01 Field Log ID: N/A

Sample Location: WIPP Monitoring Well H-6c (i.e. borehole/core no./lab bldg. no./etc.)

Sample Team Members/Organization.
Wes DeYonge/ 6712-RESPEC
Dale Bowman/ 6712
enter n/a if none

3. Sample Identification Sample/Sub-Sample #	Date Collected	Container Type	Container Volume	Preser-Vative	Analysis Request	Sample Description
H-6c(M) 042710	04/27/10	PE Bottle	500 ml	None	Anions, pH, TDS, Cond., Alk.	H-6c Magenta water unpreserved (1)
H-6c(M) 042710	04/27/10	PE Bottle	125 ml	H2SO4	NO2+NO3	H-6c Magenta water preserved w/ sulfuric acid
H-6c(M) 042710	04/27/10	PE Bottle	125 ml	HNO3	Cations, Metals Strontium	H-6c Magenta water filtered & preserved w/ nitric acid
--End of Sample List--						
						(1) All samples were filtered with a 50 micron filter to remove sediment. WDD 4/27/10

enter n/a if none

4. Sample Requirements

Handling:	Keep sealed until use
Storage & Preservation:	Keep chilled/refrigerated
Shipping:	Hand carry/Fed Ex
Archive:	N/A
Disposition:	Discard samples upon completion of testing
Expiration Date:	05/27/2010

5. Custody Transfer	Printed Name	Signature	Organization/Company	Date-Time	Sample Condition Containers intact & sealed
a. Relinquished by:	Wesley F. DeYonge	Wesley F. DeYonge	6712 / RESPEC	4/27/10 2:15PM	
a. Received by:	[illegible]	[illegible]	HEAL	4/28/10 845	
b. Relinquished by:					
b. Received by:					
c. Relinquished by:					
c. Received by:					

Upon sample receipt, note condition. This form (copy for your records) shall follow samples through its life, until final disposition, then send original to WIPP Records Center.
For samples that are potentially hazardous & require packaging and shipping, contact Center 6700 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.