

COVER LETTER

Tuesday, August 25, 2009

Rick Beauheim
Sandia National Lab
4100 National Parks Hwy.
MS1395
Carlsbad, NM 88220
TEL: (505) 234-0006
FAX (505) 234-0061

RE: WIPP/H-4bR

Order No.: 0908237

Dear Rick Beauheim:

Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 8/14/2009 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. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,



Andy Freeman, Laboratory Manager

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



Hall Environmental Analysis Laboratory, Inc.

Date: 26-Aug-09

CLIENT: Sandia National Lab
Lab Order: 0908237
Project: WIPP/H-4bR
Lab ID: 0908237-01

Client Sample ID: H-4bR (C)_081309
Collection Date: 8/13/2009 9:10:00 AM
Date Received: 8/14/2009
Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: LJB
Fluoride	2.9	2.0		mg/L	20	8/14/2009 7:38:15 PM
Chloride	6100	50		mg/L	500	8/17/2009 9:21:44 PM
Bromide	24	2.0		mg/L	20	8/14/2009 7:38:15 PM
Nitrate (As N)+Nitrite (As N)	ND	20		mg/L	100	8/17/2009 9:39:09 PM
Phosphorus, Orthophosphate (As P)	ND	10		mg/L	20	8/14/2009 7:38:15 PM
Sulfate	4500	50		mg/L	100	8/17/2009 9:04:20 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: SNV
Calcium	660	50		mg/L	50	8/18/2009 11:12:27 AM
Magnesium	280	50		mg/L	50	8/18/2009 11:12:27 AM
Potassium	130	20		mg/L	20	8/17/2009 5:14:47 PM
Sodium	3800	50		mg/L	50	8/18/2009 11:12:27 AM
Strontium	12	0.30		mg/L	50	8/18/2009 11:12:27 AM
SM 2320B: ALKALINITY						Analyst: DAM
Alkalinity, Total (As CaCO3)	54	20		mg/L CaCO3	1	8/14/2009
Carbonate	ND	2.0		mg/L CaCO3	1	8/14/2009
Bicarbonate	54	20		mg/L CaCO3	1	8/14/2009
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: NSB
Specific Conductance	24000	0.10		µmhos/cm	10	8/19/2009
SM4500-H+B: PH						Analyst: DAM
pH	7.76	0.1		pH units	1	8/14/2009
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: MMS
Total Dissolved Solids	14900	20.0		mg/L	1	8/17/2009

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-4bR(C)_081309 0908237-1									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	3800	165.29								
Potassium	130	3.32								
Calcium	660	32.93								
Magnesium	280	23.05								
Total Cations		224.59								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	4500	93.69								
Chloride	6100	172.07								
Bicarbonate (CaCO3)	54	1.08								
Carbonate (CaCO3)	ND	*								
Phosphate (P)	ND	*								
Nitrite (N)	ND	*								
Nitrate (N)	ND	*								
Fluoride	2.9	0.15								
Bromide	24	0.30								
Total Anions		267.30								
Elect. Cond. (µMhos/cm)	24000									
CATION/ANION RATIO		0.84								
% Difference		9								
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	14900									
TDS (calculated)	15529									
Ratio meas TDS:calc TDS		1.0								
Ratio Meas. TDS:EC		0.62								
Ratio Calc. TDS:EC		0.65								
Ratio of anion sum:EC		1.1								
Ratio of cation sum:EC		0.9								

* 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-4bR

Work Order: 0908237

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: R34924		Analysis Date: 8/14/2009 8:54:06 AM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.10								
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: R34944		Analysis Date: 8/17/2009 8:53:05 AM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.10								
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: R34924		Analysis Date: 8/14/2009 9:11:31 AM					
Fluoride	0.5038	mg/L	0.10	0.5	0	101	90	110			
Chloride	4.778	mg/L	0.10	5	0	95.6	90	110			
Bromide	2.487	mg/L	0.10	2.5	0	99.5	90	110			
Nitrate (As N)+Nitrite (As N)	3.353	mg/L	0.20	3.5	0	95.8	90	110			
Phosphorus, Orthophosphate (As P)	4.885	mg/L	0.50	5	0	97.7	90	110			
Sulfate	9.849	mg/L	0.50	10	0	98.5	90	110			
Sample ID: LCS		LCS		Batch ID: R34944		Analysis Date: 8/17/2009 9:10:30 AM					
Fluoride	0.4744	mg/L	0.10	0.5	0	94.9	90	110			
Chloride	4.793	mg/L	0.10	5	0	95.9	90	110			
Bromide	2.508	mg/L	0.10	2.5	0	100	90	110			
Nitrate (As N)+Nitrite (As N)	3.355	mg/L	0.20	3.5	0	95.8	90	110			
Phosphorus, Orthophosphate (As P)	4.816	mg/L	0.50	5	0	96.3	90	110			
Sulfate	9.772	mg/L	0.50	10	0	97.7	90	110			

Qualifiers:

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

QA/QC SUMMARY REPORT

Client: Sandia National Lab
 Project: WIPP/H-4bR

Work Order: 0908237

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM 2320B: Alkalinity											
Sample ID: MB		MBLK									
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0								
Bicarbonate	ND	mg/L Ca	20								
Sample ID: MB		MBLK									
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0								
Bicarbonate	ND	mg/L Ca	20								
Sample ID: MB-II		MBLK									
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0								
Bicarbonate	ND	mg/L Ca	20								
Sample ID: LCS		LCS									
Alkalinity, Total (As CaCO3)	80.56	mg/L Ca	20	80	0	101	80	120			
Sample ID: 80PPM LCS		LCS									
Alkalinity, Total (As CaCO3)	79.44	mg/L Ca	20	80	0	99.3	80	120			
Sample ID: 80PPM LCS-II		LCS									
Alkalinity, Total (As CaCO3)	80.48	mg/L Ca	20	80	10.36	87.6	80	120			

Method: EPA Method 6010B: Dissolved Metals											
Sample ID: MB		MBLK									
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									
Calcium	49.11	mg/L	1.0	50.5	0	97.3	80	120			
Magnesium	49.11	mg/L	1.0	50.5	0	97.3	80	120			
Potassium	52.25	mg/L	1.0	55	0	95.0	80	120			
Sodium	48.51	mg/L	1.0	50.5	0	96.1	80	120			
Strontium	0.09633	mg/L	0.0060	0.1	0	96.3	80	120			

Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-19891		MBLK									
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-19891		LCS									
Total Dissolved Solids	1033	mg/L	20.0	1000	0	103	80	120			

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **SANDIA CARLSBAD**

Date Received:

8/14/2009

Work Order Number **0908237**

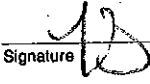
Received by: **TLS**

Sample ID labels checked by:

Initials

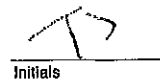
Checklist completed by:

Signature



Date

8/14/09



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
- Container/Temp Blank temperature? **3.6°** <6° C Acceptable
If given sufficient time to cool.

Number of preserved bottles checked for pH: _____
<2 >12 unless noted below.

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:

Standard Level 4 (Full Validation)

Other _____

EDD (Type) _____

Turn-Around Time:

Standard Rush

Project Name:

WIPP / H-4bR

Project #:

98806 / 1.4.2.3

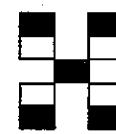
Project Manager:

Richard Beauheim

Sampler: M. Hillesheim

On Ice: Yes No

Sample Temperature: 30



HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No	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 8/18/09	Anions (F, Cl, NO ₃ , NO ₂ , PO ₄ , SO ₄)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	pH, Alk., TDS, Spec. Cond.	NO ₂ +NO ₃	Cations/Metals	Strontium	Air Bubbles (Y or N)	
8/13/09	9:10	H ₂ O	H-4bR(C)_081309	#1: 500 mL	NONE	09103-237 /								X					X				
8/13/09	9:10	H ₂ O	H-4bR(C)_081309	#2: 125 mL	H ₂ SO ₄	/														X			
8/13/09	9:10	H ₂ O	H-4bR(C)_081309	#3: 125 mL	HNO ₃	/															X	X	
			END OF SAMPLE LIST																				

Date: 08/13/09 Time: 13:00 Relinquished by: Michael B. Hillesheim

Received by: *[Signature]* Date: 8/14/09 Time: 911


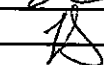

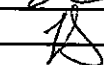

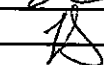
Remarks: (1) Sample 3 is filtered. (2) 48-hr hold time on P. (3) Samples may contain high salts

Date: _____ Time: _____ Relinquished by: _____

Received by: _____ Date: _____ Time: _____

Cl# Balance + pH + SP of 9/14

Appendix A

<p>ACTIVITY/ PROJECT SPECIFIC PROCEDURE</p> <p>Sandia National Laboratories</p>	<h2 style="margin: 0;">Chain of Custody</h2>	<p>Form Number: SP 13-1-1</p> <p>Page <u>1</u> of <u>1</u> Attach more forms as needed</p>																																										
<p>1. Initial Sample Custodian <u>Michael B. Hillesheim</u> Organization: <u>6712</u> Date: <u>08/13/09</u> <small>Printed Name</small></p>																																												
<p>2. Sample Collection or Creation Information</p> <p>Test Plan ID: <u>TP03-01</u> Scientific Notebook ID: <u>WSWT#13</u> Field Log ID: <u>N/A</u></p> <p>Sample Location: <u>WIPP / H-4bR</u> <small>i.e. borehole/core no./lab bldg. no./etc...</small></p>		<p>Sample Team Members/Organization: <u>Michael Hillesheim - SNL</u></p> <p style="text-align: right;"><u>0908237</u></p>																																										
<p>3. Sample Identification</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:15%;">Sample/Sub-Sample #</th> <th style="width:10%;">Date Collected</th> <th style="width:10%;">Container Type</th> <th style="width:10%;">Volume</th> <th style="width:10%;">Preservative</th> <th style="width:15%;">Analysis Request</th> <th style="width:30%;">Sample Description</th> </tr> </thead> <tbody> <tr> <td>H-4bR(C) 081309</td> <td>08/13/09</td> <td>PE Bottle</td> <td>500 mL</td> <td>n/a</td> <td>Anions, TDS, pH, cond., alk.</td> <td>H-4bR Culebra water unpreserved</td> </tr> <tr> <td>H-4bR(C) 081309</td> <td>08/13/09</td> <td>PE Bottle</td> <td>125 mL</td> <td>H2SO4</td> <td>NO2+NO3</td> <td>H-4bR Culebra water preserved w/ sulfuric acid</td> </tr> <tr> <td>H-4bR(C) 081309</td> <td>08/13/09</td> <td>PE Bottle</td> <td>125 mL</td> <td>HNO3</td> <td>Cations+Sr</td> <td>H-4bR Culebra water filtered & preserved w/ nitric acid</td> </tr> <tr> <td colspan="7">---End Sample List---</td> </tr> <tr> <td colspan="7" style="text-align: center;"><small>enter n/a if none</small></td> </tr> </tbody> </table>			Sample/Sub-Sample #	Date Collected	Container Type	Volume	Preservative	Analysis Request	Sample Description	H-4bR(C) 081309	08/13/09	PE Bottle	500 mL	n/a	Anions, TDS, pH, cond., alk.	H-4bR Culebra water unpreserved	H-4bR(C) 081309	08/13/09	PE Bottle	125 mL	H2SO4	NO2+NO3	H-4bR Culebra water preserved w/ sulfuric acid	H-4bR(C) 081309	08/13/09	PE Bottle	125 mL	HNO3	Cations+Sr	H-4bR Culebra water filtered & preserved w/ nitric acid	---End Sample List---							<small>enter n/a if none</small>						
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---End Sample List---																																												
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<p>4. Sample Requirements</p> <p>Handling: <u>Keep sealed until use</u></p> <p>Storage & Preservation: <u>Keep chilled/refrigerated</u></p> <p>Shipping: <u>Hand Carry/Fed Ex</u></p> <p>Archive: <u>N/A</u></p> <p>Disposition: <u>Discard samples upon completion of testing</u></p> <p>Expiration Date: <u>08/13/10</u></p>																																												
<p>5. Custody Transfer</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:40%;">Printed Name</th> <th style="width:15%;">Signature</th> <th style="width:20%;">Organization/Company</th> <th style="width:15%;">Date-Time</th> <th style="width:10%;">Sample Condition</th> </tr> </thead> <tbody> <tr> <td>a. Relinquished by: <u>Michael B. Hillesheim</u></td> <td></td> <td><u>SNL/6712</u></td> <td><u>08/13/09 13:00</u></td> <td rowspan="3"><u>Containers intact & sealed</u></td> </tr> <tr> <td>a. Received by: <u>Tanya Shomin</u></td> <td></td> <td><u>HEAL</u></td> <td><u>8/14/09 9:11</u></td> </tr> <tr> <td>b. Relinquished by:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. Received by:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Relinquished by:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Received by:</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Printed Name	Signature	Organization/Company	Date-Time	Sample Condition	a. Relinquished by: <u>Michael B. Hillesheim</u>		<u>SNL/6712</u>	<u>08/13/09 13:00</u>	<u>Containers intact & sealed</u>	a. Received by: <u>Tanya Shomin</u>		<u>HEAL</u>	<u>8/14/09 9:11</u>	b. Relinquished by:				b. Received by:					c. Relinquished by:					c. Received by:													
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<p>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 6800 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.</p>																																												