



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

July 25, 2012

Mike Schuhen

Sandia National Lab
4100 National Parks Hwy.
MS1395

Carlsbad, NM 88220
TEL: (575) 234-0100
FAX (575) 234-0061

RE: WIPP/H-11b4R (C)

OrderNo.: 1206571

Dear Mike Schuhen:

Hall Environmental Analysis Laboratory received 1 sample(s) on 6/13/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued July 07, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written in a cursive style.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1206571

Date Reported: 7/25/2012

CLIENT: Sandia National Lab

Client Sample ID: H-11b4R(C)_061112

Project: WIPP/H-11b4R (C)

Collection Date: 6/11/2012 2:35:00 PM

Lab ID: 1206571-001

Matrix: AQUEOUS

Received Date: 6/13/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: BRM
Fluoride	ND	10		mg/L	100	6/14/2012 4:34:10 PM
Chloride	61000	2500		mg/L	5000	6/15/2012 8:14:06 PM
Bromide	48	10		mg/L	100	6/14/2012 4:34:10 PM
Nitrate+Nitrite as N	ND	100		mg/L	500	6/15/2012 10:05:47 PM
Phosphorus, Orthophosphate (As P)	ND	50	H	mg/L	100	6/14/2012 4:34:10 PM
Sulfate	6900	500		mg/L	1000	6/14/2012 4:46:34 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: JLF
Calcium	1700	100		mg/L	100	7/2/2012 5:34:38 PM
Magnesium	1400	100		mg/L	100	7/2/2012 5:34:38 PM
Potassium	840	100		mg/L	100	7/2/2012 5:34:38 PM
Sodium	41000	500		mg/L	500	7/2/2012 5:37:12 PM
Strontium	29	3.0		mg/L	500	7/2/2012 5:37:12 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: DBD
Conductivity	180000	0.50		µmhos/cm	50	6/14/2012 3:26:04 PM
SM4500-H+B: PH						Analyst: DBD
pH	7.24	1.68	H	pH units	1	6/14/2012 12:42:50 PM
SM2320B: ALKALINITY						Analyst: DBD
Bicarbonate (As CaCO3)	45	20		mg/L CaCO3	1	6/14/2012 12:42:50 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/14/2012 12:42:50 PM
Total Alkalinity (as CaCO3)	45	20		mg/L CaCO3	1	6/14/2012 12:42:50 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: KS
Total Dissolved Solids	111000	1000		mg/L	1	6/19/2012 6:04:00 PM

Qualifiers: */X Value exceeds Maximum Contaminant Level.
 E Value above quantitation range
 J Analyte detected below quantitation limits
 R RPD outside accepted recovery limits
 S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank
 H Holding times for preparation or analysis exceeded
 ND Not Detected at the Reporting Limit
 RL Reporting Detection Limit
 U Samples with CalcVal < MDL

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-11b4R(C)_061112 1206571-01									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	41000	1783.38								
Potassium	840.0	21.48								
Calcium	1700	84.83								
Magnesium	1400	115.23								
Total Cations		2004.92								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	6900	143.66								
Chloride	61000	1720.73								
Bicarbonate (CaCO3)	45	0.90	-							
Carbonate (CaCO3)										
Phosphate (P)										
Nitrite (N)										
Nitrate (N)										
Fluoride										
Bromide	48	0.60								
Total Anions		1865.89								
Elect. Cond. (µMhos/cm)	180000									
CATION/ANION RATIO		1.07								
% Difference		4								
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	111000									
TDS (calculated)	112915									
Ratio meas TDS:calc TDS		1.0								
Ratio Meas. TDS:EC		0.62								
Ratio Calc. TDS:EC		0.63								
Ratio of anion sum:EC		1.0								
Ratio of cation sum:EC		1.1								

* 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1206571

25-Jul-12

Client: Sandia National Lab
Project: WIPP/H-11b4R (C)

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R3480		RunNo: 3480							
Prep Date:	Analysis Date: 6/15/2012		SeqNo: 97695		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R3480		RunNo: 3480							
Prep Date:	Analysis Date: 6/15/2012		SeqNo: 97696		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.8	0.50	5.000	0	95.4	90	110			
Nitrate+Nitrite as N	3.4	0.20	3.500	0	97.0	90	110			

Qualifiers:

- | | |
|--|--|
| *X Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| J Analyte detected below quantitation limits | ND Not Detected at the Reporting Limit |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1206571

25-Jul-12

Client: Sandia National Lab
Project: WIPP/H-11b4R (C)

Sample ID MB	SampType: MBLK		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: PBW	Batch ID: R3830		RunNo: 3830							
Prep Date:	Analysis Date: 7/2/2012		SeqNo: 110733		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								
Strontium	ND	0.0060								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: LCSW	Batch ID: R3830		RunNo: 3830							
Prep Date:	Analysis Date: 7/2/2012		SeqNo: 110734		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	52	1.0	50.00	0	104	80	120			
Magnesium	52	1.0	50.00	0	103	80	120			
Potassium	49	1.0	50.00	0.1116	98.3	80	120			
Sodium	51	1.0	50.00	0.02904	102	80	120			
Strontium	0.10	0.0060	0.1000	0	104	80	120			

Qualifiers:

- | | |
|--|--|
| *X Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| J Analyte detected below quantitation limits | ND Not Detected at the Reporting Limit |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1206571

25-Jul-12

Client: Sandia National Lab
Project: WIPP/H-11b4R (C)

Sample ID mb-1	SampType: MBLK		TestCode: SM2320B: Alkalinity							
Client ID: PBW	Batch ID: R3451		RunNo: 3451							
Prep Date:	Analysis Date: 6/14/2012		SeqNo: 96515		Units: mg/L CaCO3					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID ics-1	SampType: LCS		TestCode: SM2320B: Alkalinity							
Client ID: LCSW	Batch ID: R3451		RunNo: 3451							
Prep Date:	Analysis Date: 6/14/2012		SeqNo: 96516		Units: mg/L CaCO3					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	102	88.1	104			

Qualifiers:

- | | |
|--|--|
| *X Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| J Analyte detected below quantitation limits | ND Not Detected at the Reporting Limit |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1206571

25-Jul-12

Client: Sandia National Lab
Project: WIPP/H-11b4R (C)

Sample ID MB-2445	SampType: MBLK		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: PBW	Batch ID: 2445		RunNo: 3533							
Prep Date: 6/18/2012	Analysis Date: 6/19/2012		SeqNo: 99436		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID LCS-2445	SampType: LCS		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: LCSW	Batch ID: 2445		RunNo: 3533							
Prep Date: 6/18/2012	Analysis Date: 6/19/2012		SeqNo: 99437		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Qualifiers:

- | | |
|--|--|
| *X Value exceeds Maximum Contaminant Level. | B Analyte detected in the associated Method Blank |
| E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| J Analyte detected below quantitation limits | ND Not Detected at the Reporting Limit |
| R RPD outside accepted recovery limits | RL Reporting Detection Limit |

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-11b4R (C)

Project #:

98806 / 1.4.2.3

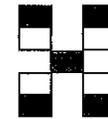
Project Manager:

Mike Schuhen

Sampler: Wesley DeYonge

On Ice: Yes No

Sample Temperature: 10



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	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)
6/11/12	14:35	H ₂ O	H-11b4R(C)_061112	#1: 500 mL	NONE	206571												X	X			
6/11/12	14:35	H ₂ O	H-11b4R(C)_061112	#2: 125 mL	H ₂ SO ₄	206571														X		
6/11/12	14:35	H ₂ O	H-11b4R(C)_061112	#3: 500 mL	HNO ₃	206571															X	
END OF SAMPLE LIST																						

Date: 6/12/12 Time: 12:10 PM Relinquished by: Wesley F. DeYonge
Wesley F. DeYonge

Received by: *[Signature]* Date: 6/12/12 Time: 09:30

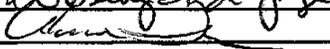
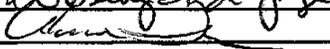
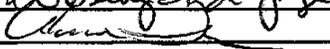
Date: _____ Time: _____ Relinquished by: _____

Received by: _____ Date: _____ Time: _____

Remarks: Container #3 was filtered. Samples may contain high levels of salts.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly noted on the analytical report.

Appendix A

ACTIVITY/ PROJECT SPECIFIC PROCEDURE Sandia National Laboratories	<h2 style="margin: 0;">Chain of Custody</h2>					Form Number: SP 13-1-1 Page <u>1</u> of <u>1</u> Attach more forms as needed																																										
1. Initial Sample Custodian <u>Wesley F. DeYonge</u> Organization: <u>6212</u> Date: <u>6/11/2012</u> <small>Printed Name</small>																																																
2. Sample Collection or Creation Information Scientific Notebook ID: <u>WSWT-15</u> Test Plan ID: <u>TP 03-01</u> Field Log ID: <u>N/A</u> Sample Location: <u>WIPP Monitoring Well H-11b4R</u> <small>i.e. borehole/core no./lab bidd. no./etc.</small>					Sample Team Members/Organization. <u>Wes DeYonge/ 6212</u> <u>Dirk O'Daniel/ 6212</u> <small>enter n/a if none</small>																																											
3. Sample Identification <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:20%;">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:35%;">Sample Description</th> </tr> </thead> <tbody> <tr> <td>H-11b4R(C) 061112</td> <td>6/11/12</td> <td>PE Bottle</td> <td>500 ml</td> <td>None</td> <td>Anions, pH, TDS, Cond., Alk.</td> <td>H-11b4R Culebra Water: unpreserved</td> </tr> <tr> <td>H-11b4R(C) 061112</td> <td>6/11/12</td> <td>PE Bottle</td> <td>125 ml</td> <td>H2SO4</td> <td>NO2+NO3</td> <td>H-11b4R Culebra Water: preserved w/ sulfuric acid</td> </tr> <tr> <td>H-11b4R(C) 061112</td> <td>6/11/12</td> <td>PE Bottle</td> <td>500 ml</td> <td>HNO3</td> <td>Cations, Metals</td> <td>H-11b4R Culebra Water: filtered & preserved w/ nitric acid</td> </tr> <tr> <td>--End of Sample List--</td> <td></td> <td></td> <td></td> <td></td> <td>Strontium</td> <td></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-11b4R(C) 061112	6/11/12	PE Bottle	500 ml	None	Anions, pH, TDS, Cond., Alk.	H-11b4R Culebra Water: unpreserved	H-11b4R(C) 061112	6/11/12	PE Bottle	125 ml	H2SO4	NO2+NO3	H-11b4R Culebra Water: preserved w/ sulfuric acid	H-11b4R(C) 061112	6/11/12	PE Bottle	500 ml	HNO3	Cations, Metals	H-11b4R Culebra Water: filtered & preserved w/ nitric acid	--End of Sample List--					Strontium		<small>enter n/a if none</small>						
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<small>enter n/a if none</small>																																																
4. Sample Requirements Handling: <u>Keep sealed until use</u> Storage & Preservation: <u>Keep chilled/refrigerated</u> Shipping: <u>Hand carry/Fed Ex</u> Archive: <u>N/A</u> Disposition: <u>Discard samples upon completion of testing</u> Expiration Date: <u>7/11/2012</u>																																																
5. Custody Transfer <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;">Printed Name</th> <th style="width:20%;">Signature</th> <th style="width:20%;">Organization/Company</th> <th style="width:15%;">Date-Time</th> <th style="width:15%;">Sample Condition</th> </tr> </thead> <tbody> <tr> <td>a. Relinquished by: <u>Wesley F. DeYonge</u></td> <td></td> <td><u>6212 / RESPEC</u></td> <td><u>6/12/12 - 12:10 PM</u></td> <td><u>Containers intact & sealed</u></td> </tr> <tr> <td>a. Received by: <u>Anne Thorne</u></td> <td></td> <td><u>HEAL</u></td> <td><u>6/13/12 0730</u></td> <td><u>Good 1.0</u></td> </tr> <tr> <td>b. Relinquished by:</td> <td></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>Wesley F. DeYonge</u>		<u>6212 / RESPEC</u>	<u>6/12/12 - 12:10 PM</u>	<u>Containers intact & sealed</u>	a. Received by: <u>Anne Thorne</u>		<u>HEAL</u>	<u>6/13/12 0730</u>	<u>Good 1.0</u>	b. Relinquished by:					b. Received by:					c. Relinquished by:					c. Received by:											
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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 6200 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.																																																