



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

October 15, 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-9bR (C)

OrderNo.: 1208471

Dear Mike Schuhen:

Hall Environmental Analysis Laboratory received 1 sample(s) on 8/10/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued September 11, 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 over a white background.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1208471

Date Reported: 10/15/2012

CLIENT: Sandia National Lab

Client Sample ID: H-9bR(C)_080712

Project: WIPP/H-9bR (C)

Collection Date: 8/7/2012 10:55:00 PM

Lab ID: 1208471-001

Matrix: AQUEOUS

Received Date: 8/10/2012 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: SRM
Fluoride	3.0	1.0		mg/L	10	8/15/2012 5:16:00 AM
Chloride	160	50		mg/L	100	8/11/2012 4:14:54 AM
Bromide	ND	1.0		mg/L	10	8/15/2012 5:16:00 AM
Nitrate+Nitrite as N	ND	2.0		mg/L	10	8/15/2012 5:28:25 AM
Phosphorus, Orthophosphate (As P)	ND	5.0	H	mg/L	10	8/15/2012 5:16:00 AM
Sulfate	1900	50		mg/L	100	8/11/2012 4:14:54 AM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: JLF
Calcium	620	10		mg/L	10	8/14/2012 12:14:29 PM
Magnesium	140	10		mg/L	10	8/14/2012 12:14:29 PM
Potassium	8.3	1.0		mg/L	1	8/14/2012 12:47:21 PM
Sodium	130	10		mg/L	10	8/14/2012 12:14:29 PM
Strontium	7.7	0.30		mg/L	50	8/28/2012 9:55:25 AM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: IDC
Conductivity	3400	0.010		µmhos/cm	1	8/21/2012 11:39:44 AM
SM4500-H+B: PH						Analyst: IDC
pH	7.60	1.68	H	pH units	1	8/16/2012 1:09:09 PM
SM2320B: ALKALINITY						Analyst: IDC
Bicarbonate (As CaCO3)	94	20		mg/L CaCO3	1	8/16/2012 1:09:09 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	8/16/2012 1:09:09 PM
Total Alkalinity (as CaCO3)	94	20		mg/L CaCO3	1	8/16/2012 1:09:09 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: KS
Total Dissolved Solids	3350	40.0		mg/L	1	8/16/2012 10:50:00 AM

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-9bR(C)_080712 1208471-01									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	130	5.65								
Potassium	8.3	0.21								
Calcium	620	30.94								
Magnesium	140	11.52								
Total Cations		48.33								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	1900	39.56								
Chloride	160	4.51								
Bicarbonate (CaCO3)	94	1.88	-							
Carbonate (CaCO3)										
Phosphate (P)										
Nitrite (N)										
Nitrate (N)					-					
Fluoride	3.0	0.16								
Bromide										
Total Anions		46.11								
Elect. Cond. (µMhos/cm)	3400									
CATION/ANION RATIO		1.05								
% Difference		2								
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	3350									
TDS (calculated)	3018									
Ratio meas TDS:calc TDS		1.1								
Ratio Meas. TDS:EC		0.99								
Ratio Calc. TDS:EC		0.89								
Ratio of anion sum:EC		1.4								
Ratio of cation sum:EC		1.4								

* 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#: 1208471

15-Oct-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R4818		RunNo: 4818							
Prep Date:	Analysis Date: 8/10/2012		SeqNo: 136024		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	93.0	90	110			
Sulfate	9.5	0.50	10.00	0	94.6	90	110			

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R4818		RunNo: 4818							
Prep Date:	Analysis Date: 8/10/2012		SeqNo: 136029		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R4867		RunNo: 4867							
Prep Date:	Analysis Date: 8/14/2012		SeqNo: 137440		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Bromide	ND	0.10								
Phosphorus, Orthophosphate (As P	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: R4867		RunNo: 4867							
Prep Date:	Analysis Date: 8/14/2012		SeqNo: 137441		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.48	0.10	0.5000	0	95.1	90	110			
Bromide	2.4	0.10	2.500	0	95.7	90	110			
Phosphorus, Orthophosphate (As P	4.9	0.50	5.000	0	98.4	90	110			
Nitrate+Nitrite as N	3.4	0.20	3.500	0	98.5	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208471

15-Oct-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID MB	SampType: MBLK		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: PBW	Batch ID: R5141		RunNo: 5141							
Prep Date:	Analysis Date: 8/28/2012		SeqNo: 146095		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Strontium	ND	0.0060								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: LCSW	Batch ID: R5141		RunNo: 5141							
Prep Date:	Analysis Date: 8/28/2012		SeqNo: 146096		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Strontium	0.10	0.0060	0.1000	0	99.8	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208471

15-Oct-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID	1208471-001a dup	SampType:	dup	TestCode:	SM4500-H+B: pH					
Client ID:	H-9bR(C)_080712	Batch ID:	R4929	RunNo:	4929					
Prep Date:		Analysis Date:	8/16/2012	SeqNo:	139617	Units:	pH units			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.61	1.68								H

Qualifiers:

* Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH greater than 2

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208471

15-Oct-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID mb	SampType: mblk		TestCode: SM2320B: Alkalinity							
Client ID: PBW	Batch ID: R4929		RunNo: 4929							
Prep Date:	Analysis Date: 8/16/2012		SeqNo: 139434		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	SampType: ics		TestCode: SM2320B: Alkalinity							
Client ID: LCSW	Batch ID: R4929		RunNo: 4929							
Prep Date:	Analysis Date: 8/16/2012		SeqNo: 139435		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	101	88.1	104			

Sample ID mb-2	SampType: mblk		TestCode: SM2320B: Alkalinity							
Client ID: PBW	Batch ID: R4929		RunNo: 4929							
Prep Date:	Analysis Date: 8/16/2012		SeqNo: 139458		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-2	SampType: ics		TestCode: SM2320B: Alkalinity							
Client ID: LCSW	Batch ID: R4929		RunNo: 4929							
Prep Date:	Analysis Date: 8/16/2012		SeqNo: 139459		Units: mg/L CaCO3					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	88.1	104			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208471

15-Oct-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID MB-3313	SampType: MBLK		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: PBW	Batch ID: 3313		RunNo: 4900							
Prep Date: 8/14/2012	Analysis Date: 8/16/2012		SeqNo: 138619		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-3313	SampType: LCS		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: LCSW	Batch ID: 3313		RunNo: 4900							
Prep Date: 8/14/2012	Analysis Date: 8/16/2012		SeqNo: 138620		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	9.000	101	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Sample Log-In Check List

Client Name: Sandia Carlsbad Work Order Number: 1208471
 Received by/date: AG 08/10/12
 Logged By: Anne Thorne 8/10/2012 8:00:00 AM *Anne Thorne*
 Completed By: Anne Thorne 8/10/2012 *Anne Thorne*
 Reviewed By: AT 08/10/12

Chain of Custody

- 1. Were seals intact? Yes No Not Present
- 2. Is Chain of Custody complete? Yes No Not Present
- 3. How was the sample delivered? FedEx

Log In

- 4. Coolers are present? (see 19. for cooler specific information) Yes No NA
- 5. Was an attempt made to cool the samples? Yes No NA
- 6. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
- 7. Sample(s) in proper container(s)? Yes No
- 8. Sufficient sample volume for indicated test(s)? Yes No
- 9. Are samples (except VOA and ONG) properly preserved? Yes No
- 10. Was preservative added to bottles? Yes No NA
- 11. VOA vials have zero headspace? Yes No No VOA Vials
- 12. Were any sample containers received broken? Yes No
- 13. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes No
- 14. Are matrices correctly identified on Chain of Custody? Yes No
- 15. Is it clear what analyses were requested? Yes No
- 16. Were all holding times able to be met? (If no, notify customer for authorization.) Yes No

of preserved bottles checked for pH: 2
 Adjusted? (2) or >12 unless noted
 Checked by: AT 08/10/12

Special Handling (if applicable)

- 17. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____
 By Whom: _____ Via: eMail Phone Fax In Person
 Regarding: _____
 Client Instructions: _____

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.1	Good	Yes			

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-9bR (C)

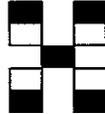
Project #:
98806 / 1.4.2.3

Project Manager:
Mike Schuhen

Sampler: W. DeYonge

On Ice: Yes No

Sample Temperature: 3.1



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)
8/7/12	22:55	H ₂ O	H-9bR(C)_080712	#1: 500 mL	NONE	1208471												X	X			
8/7/12	22:55	H ₂ O	H-9bR(C)_080712	#2: 125 mL	H ₂ SO ₄															X		
8/7/12	22:55	H ₂ O	H-9bR(C)_080712	#3: 125 mL	HNO ₃																X	
END OF SAMPLE LIST																						

Date: 8/09/12	Time: 11:45	Relinquished by: Wesley F. DeYonge	Received by: <i>[Signature]</i>	Date: 08/10/12	Time: 08:00	Remarks: Container #3 was filtered. Samples may contain high levels of salts.
Date:	Time:	Relinquished by:	Received by:	Date:	Time:	

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> <small>Attach more forms as needed</small>
1. Initial Sample Custodian <u>Wesley F. DeYonge</u> Organization: <u>6212</u> Date: <u>08/07/2012</u> <small>Printed Name</small>						
2. Sample Collection or Creation Information				Scientific Notebook ID: <u>WSWT-15</u>		Sample Team Members/Organization.
Test Plan ID: <u>TP 03-01</u>		Field Log ID: <u>N/A</u>		<u>Wes DeYonge/ 6212</u>		<u>Mike Chapin/ 6212</u>
Sample Location: <u>WIPP Monitoring Well H-9bR</u> <small>i.e. borehole/core no./lab bldg. no./etc.</small>				<small>enter n/a if none</small>		
3. Sample Identification	Date Collected	Container Type Volume		Preservative	Analysis Request	Sample Description
Sample/Sub-Sample #						
H-9bR(C)_080712	08/07/12	PE Bottle	500 ml	None	Anions, pH, TDS, Cond., Alk.	H-9bR Culebra Water: unpreserved -001
H-9bR(C)_080712	08/07/12	PE Bottle	125 ml	H2SO4	NO2+NO3	H-9bR Culebra Water: preserved w/ sulfuric acid -001
H-9bR(C)_080712	08/07/12	PE Bottle	500 ml	HNO3	Cations, Metals	H-9bR Culebra Water: filtered & preserved w/ nitric acid -001
--End of Sample List--					Strontium	
<small>enter n/a if none</small>						
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: 09/07/2012						
5. Custody Transfer	Printed Name	Signature		Organization/Company	Date-Time	Sample Condition
a. Relinquished by:	Wesley F. DeYonge	<i>Wesley F. DeYonge</i>		6212 / RESPEC	8/9/12- 11:45	Containers intact & sealed
a. Received by:	Ashley Gallegas	<i>Ashley Gallegas</i>		0 HEAL	08/10/12 8:00	Temp: 3.1
b. Relinquished by:						containers intact
b. Received by:						& Sealed
c. Relinquished by:						<i>AT 08/10/12</i>
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 6200 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.						