



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

September 07, 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.: 1208942

Dear Mike Schuhen:

Hall Environmental Analysis Laboratory received 1 sample(s) on 8/22/2012 for the analyses presented in the following report.

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. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

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

Sincerely,

A handwritten signature in black ink that reads "John Caldwell". The signature is written in a cursive, flowing style.

John Caldwell
Supervisor
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 1208942

Date Reported: 9/7/2012

CLIENT: Sandia National Lab

Client Sample ID: H-9bR(C)_082012

Project: WIPP/H-9bR (C)

Collection Date: 8/20/2012 1:26:00 PM

Lab ID: 1208942-001

Matrix: AQUEOUS

Received Date: 8/22/2012 8:20:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: SRM
Fluoride	3.4	1.0		mg/L	10	8/22/2012 11:27:23 AM
Chloride	180	50		mg/L	100	8/22/2012 11:39:47 AM
Nitrogen, Nitrite (As N)	ND	1.0		mg/L	10	8/22/2012 11:27:23 AM
Bromide	ND	1.0		mg/L	10	8/22/2012 11:27:23 AM
Nitrogen, Nitrate (As N)	ND	1.0		mg/L	10	8/22/2012 11:27:23 AM
Phosphorus, Orthophosphate (As P)	ND	5.0		mg/L	10	8/22/2012 11:27:23 AM
Sulfate	2000	50		mg/L	100	8/22/2012 11:39:47 AM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: JLF
Calcium	610	10		mg/L	10	8/28/2012 10:28:59 AM
Magnesium	140	5.0		mg/L	5	8/28/2012 10:09:13 AM
Potassium	7.4	1.0		mg/L	1	8/28/2012 9:57:53 AM
Sodium	150	5.0		mg/L	5	8/28/2012 10:09:13 AM
Strontium	8.0	0.30		mg/L	50	8/28/2012 10:31:33 AM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: IDC
Conductivity	3400	0.010		µmhos/cm	1	8/24/2012 6:58:35 PM
SM4500-H+B: PH						Analyst: IDC
pH	7.68	1.68	H	pH units	1	8/24/2012 6:58:35 PM
SM2320B: ALKALINITY						Analyst: IDC
Bicarbonate (As CaCO3)	94	20		mg/L CaCO3	1	8/24/2012 6:58:35 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	8/24/2012 6:58:35 PM
Total Alkalinity (as CaCO3)	94	20		mg/L CaCO3	1	8/24/2012 6:58:35 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: KS
Total Dissolved Solids	3380	20.0		mg/L	1	8/24/2012 9:28:00 PM

Qualifiers:

- * 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

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-9bR(C)_ 082012 1208942-01									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	150	6.52								
Potassium	7.4	0.19								
Calcium	610	30.44								
Magnesium	140	11.52								
Total Cations		48.68								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	2000	41.64								
Chloride	180	5.08								
Bicarbonate (CaCO3)	94	1.88	-							
Carbonate (CaCO3)										
Phosphate (P)										
Nitrite (N)										
Nitrate (N)					-					
Fluoride	3.4	0.18								
Bromide										
Total Anions		48.78								
Elect. Cond. (µMhos/cm)	3400									
CATION/ANION RATIO		1.00								
% Difference		0								
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	3380									
TDS (calculated)	3147									
Ratio meas TDS:calc TDS		1.1								
Ratio Meas. TDS:EC		0.99								
Ratio Calc. TDS:EC		0.93								
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#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID MB	SampType: MBLK		TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R5041		RunNo: 5041							
Prep Date:	Analysis Date: 8/22/2012		SeqNo: 142833		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P)	ND	0.50								
Sulfate	ND	0.50								

Sample ID LCS	SampType: LCS		TestCode: EPA Method 300.0: Anions							
Client ID: LCSW	Batch ID: R5041		RunNo: 5041							
Prep Date:	Analysis Date: 8/22/2012		SeqNo: 142834		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.51	0.10	0.5000	0	101	90	110			
Chloride	4.9	0.50	5.000	0	97.0	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	96.9	90	110			
Bromide	2.5	0.10	2.500	0	98.1	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	100	90	110			
Phosphorus, Orthophosphate (As P)	5.1	0.50	5.000	0	101	90	110			
Sulfate	9.7	0.50	10.00	0	97.3	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID	1208942-001a dup	SampType:	dup	TestCode:	EPA 120.1: Specific Conductance					
Client ID:	H-9bR(C)_082012	Batch ID:	R5115	RunNo:	5115					
Prep Date:		Analysis Date:	8/24/2012	SeqNo:	145240	Units:	µmhos/cm			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	3400	0.010						0.235	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-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
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: 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
Calcium	50	1.0	50.00	0	99.7	80	120			
Magnesium	50	1.0	50.00	0	99.6	80	120			
Potassium	48	1.0	50.00	0	96.4	80	120			
Sodium	49	1.0	50.00	0	97.4	80	120			
Strontium	0.10	0.0060	0.1000	0	99.8	80	120			

Sample ID 1208942-001BMS	SampType: MS		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: H-9bR(C)_082012	Batch ID: R5141		RunNo: 5141							
Prep Date:	Analysis Date: 8/28/2012		SeqNo: 146101		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	60	1.0	50.00	7.414	106	75	125			

Sample ID 1208942-001BMSD	SampType: MSD		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: H-9bR(C)_082012	Batch ID: R5141		RunNo: 5141							
Prep Date:	Analysis Date: 8/28/2012		SeqNo: 146102		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	61	1.0	50.00	7.414	107	75	125	1.27	20	

Sample ID 1208942-001BMS	SampType: MS		TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: H-9bR(C)_082012	Batch ID: R5141		RunNo: 5141							
Prep Date:	Analysis Date: 8/28/2012		SeqNo: 146108		Units: mg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	400	5.0	250.0	142.8	103	75	125			
Sodium	410	5.0	250.0	151.4	102	75	125			

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID	1208942-001BMSD	SampType:	MSD	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	H-9bR(C)_082012	Batch ID:	R5141	RunNo:	5141					
Prep Date:		Analysis Date:	8/28/2012	SeqNo:	146109	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	410	5.0	250.0	142.8	106	75	125	1.84	20	
Sodium	420	5.0	250.0	151.4	106	75	125	1.93	20	

Qualifiers:

* Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID	1208942-001a dup	SampType:	dup	TestCode:	SM4500-H+B: pH					
Client ID:	H-9bR(C)_082012	Batch ID:	R5115	RunNo:	5115					
Prep Date:		Analysis Date:	8/24/2012	SeqNo:	145278	Units:	pH units			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.66	1.68								H

Qualifiers:

* Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID mb-1	SampType: mblk		TestCode: SM2320B: Alkalinity							
Client ID: PBW	Batch ID: R5115		RunNo: 5115							
Prep Date:	Analysis Date: 8/24/2012		SeqNo: 145164		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: ics		TestCode: SM2320B: Alkalinity							
Client ID: LCSW	Batch ID: R5115		RunNo: 5115							
Prep Date:	Analysis Date: 8/24/2012		SeqNo: 145165		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: R5115		RunNo: 5115							
Prep Date:	Analysis Date: 8/24/2012		SeqNo: 145188		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 1208942-001a ms	SampType: ms		TestCode: SM2320B: Alkalinity							
Client ID: H-9bR(C)_082012	Batch ID: R5115		RunNo: 5115							
Prep Date:	Analysis Date: 8/24/2012		SeqNo: 145198		Units: mg/L CaCO3					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	150	20	80.00	93.60	76.2	62.6	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208942

07-Sep-12

Client: Sandia National Lab

Project: WIPP/H-9bR (C)

Sample ID MB-3465	SampType: MBLK		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: PBW	Batch ID: 3465		RunNo: 5096							
Prep Date: 8/23/2012	Analysis Date: 8/24/2012		SeqNo: 144377		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-3465	SampType: LCS		TestCode: SM2540C MOD: Total Dissolved Solids							
Client ID: LCSW	Batch ID: 3465		RunNo: 5096							
Prep Date: 8/23/2012	Analysis Date: 8/24/2012		SeqNo: 144378		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:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD 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



Hall Environmental Analysis Laboratory
 4901 Hawkins NE
 Albuquerque, NM 87105
 TEL: 505-345-3975 FAX: 505-345-4107
 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Sandia Carlsbad Work Order Number: 1208942
 Received by/date: AT 08/22/12
 Logged By: Anne Thorne 8/22/2012 8:20:00 AM *Ann Thorne*
 Completed By: Anne Thorne 8/22/2012 *Ann Thorne*
 Reviewed By: AT 08/22/12

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? Client

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
 (52 or >12 unless noted)
 Adjusted? _____
 Checked by: AT 08/22/12

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	1.0	Good	Not Present			

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

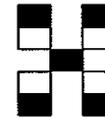
Project Manager:

Mike Schuhen

Sampler: W. DeYonge

On Ice: Yes No

Sample Temperature: 7.0



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)
8/20/12	13:26	H ₂ O	H-9bR(C)_082012	#1: 500 mL	NONE	1208942 -001												X	X			
8/20/12	13:26	H ₂ O	H-9bR(C)_082012	#2: 125 mL	H ₂ SO ₄	-001														X		
8/20/12	13:26	H ₂ O	H-9bR(C)_082012	#3: 125 mL	HNO ₃	-001															X	
END OF SAMPLE LIST																						

Date: 8/21/12	Time: 8:00A	Relinquished by: Wesley F. DeYonge <i>Wesley F. DeYonge</i>	Received by: <i>W. Schuhen</i>	Date: 8/21/12	Time: 16:00	Remarks: Container #3 was filtered. Samples may contain high levels of salts.
Date: 8/22/12	Time: 08:20A	Relinquished by: <i>W. Schuhen</i>	Received by: <i>W. Schuhen</i>	Date: 08/22/12	Time: 0820	

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 notated on the analytical report.

8/22/12

