

COVER LETTER

Wednesday, March 16, 2011

Michael Schuhen
Sandia National Lab
4100 National Parks Hwy.
MS1395
Carlsbad, NM 88220

TEL: (505) 234-0006

FAX (505) 234-0061

RE: WIPP/H-4c (M)

Order No.: 1103085

Dear Michael Schuhen:

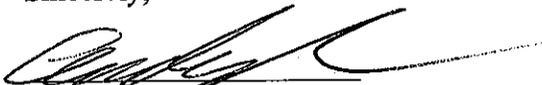
Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 3/2/2011 for the analyses presented in the following report.

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



Hall Environmental Analysis Laboratory, Inc.

Date: 16-Mar-11

CLIENT: Sandia National Lab
Lab Order: 1103085
Project: WIPP/H-4c (M)
Lab ID: 1103085-01

Client Sample ID: H-4c(M)_030111
Collection Date: 3/1/2011 1:13:00 PM
Date Received: 3/2/2011
Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: SRM
Fluoride	1.9	0.50		mg/L	5	3/2/2011 8:41:04 PM
Chloride	8500	500		mg/L	1000	3/11/2011 11:17:21 PM
Nitrogen, Nitrite (As N)	ND	2.0		mg/L	20	3/2/2011 8:52:18 PM
Bromide	6.1	0.50		mg/L	5	3/2/2011 8:41:04 PM
Nitrogen, Nitrate (As N)	ND	0.50		mg/L	5	3/2/2011 8:41:04 PM
Phosphorus, Orthophosphate (As P)	ND	10		mg/L	20	3/2/2011 8:52:18 PM
Sulfate	6800	250		mg/L	500	3/11/2011 11:06:08 PM
EPA METHOD 6010B: DISSOLVED METALS						Analyst: RAGS
Calcium	660	50		mg/L	50	3/8/2011 1:48:22 PM
Magnesium	420	50		mg/L	50	3/8/2011 1:48:22 PM
Potassium	82	50		mg/L	50	3/8/2011 1:48:22 PM
Sodium	6800	100		mg/L	100	3/8/2011 2:19:21 PM
Strontium	12	0.30		mg/L	50	3/8/2011 1:48:22 PM
SM 2320B: ALKALINITY						Analyst: LJB
Alkalinity, Total (As CaCO ₃)	63	20		mg/L CaCO ₃	1	3/3/2011 12:16:00 PM
Carbonate	57	2.0		mg/L CaCO ₃	1	3/3/2011 12:16:00 PM
Bicarbonate	ND	20		mg/L CaCO ₃	1	3/3/2011 12:16:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: LJB
Specific Conductance	42000	0.50		µmhos/cm	50	3/3/2011 2:37:00 PM
SM4500-H+B: PH						Analyst: LJB
pH	9.14	0.100		pH units	1	3/3/2011 12:16:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: KS
Total Dissolved Solids	23400	1000		mg/L	1	3/5/2011 6:45:00 PM

Qualifiers:

* Value exceeds Maximum Contaminant Level
 E Estimated value
 J Analyte detected below quantitation limits
 NC Non-Chlorinated
 PQL Practical Quantitation Limit

B Analyte detected in the associated Method Blank
 H Holding times for preparation or analysis exceeded
 MCL Maximum Contaminant Level
 ND Not Detected at the Reporting Limit
 S Spike recovery outside accepted recovery limits

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	H-4c(M)_030111 1103085-01									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	6800	295.78								
Potassium	82	2.10								
Calcium	660	32.93								
Magnesium	420	34.57								
Total Cations		365.38								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	6800	141.58								
Chloride	8500	239.77								
Bicarbonate (CaCO3)										
Carbonate (CaCO3)	57	1.14								
Phosphate (P)										
Nitrite (N)										
Nitrate (N)										
Fluoride	1.9	0.10								
Bromide	6.1	0.08								
Total Anions		382.67								
Elect. Cond. (µMhos/cm)	42000									
CATION/ANION RATIO		0.95								
% Difference		2								
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	23400									
TDS (calculated)	23304									
Ratio meas TDS:calc TDS		1.0								
Ratio Meas. TDS:EC		0.56								
Ratio Calc. TDS:EC		0.55								
Ratio of anion sum:EC		0.9								
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-4c (M)

Work Order: 1103085

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		<i>MBLK</i>		Batch ID: R43922		Analysis Date: 3/2/2011 6:03:48 PM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Nitrogen, Nitrite (As N)	ND	mg/L	0.10								
Bromide	ND	mg/L	0.10								
Nitrogen, Nitrate (As N)	ND	mg/L	0.10								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		<i>MBLK</i>		Batch ID: R43935		Analysis Date: 3/3/2011 1:35:46 PM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Nitrogen, Nitrite (As N)	ND	mg/L	0.10								
Bromide	ND	mg/L	0.10								
Nitrogen, Nitrate (As N)	ND	mg/L	0.10								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		<i>MBLK</i>		Batch ID: R43935		Analysis Date: 3/3/2011 11:53:35 PM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Nitrogen, Nitrite (As N)	ND	mg/L	0.10								
Bromide	ND	mg/L	0.10								
Nitrogen, Nitrate (As N)	ND	mg/L	0.10								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		<i>MBLK</i>		Batch ID: R44085		Analysis Date: 3/11/2011 5:29:11 PM					
Fluoride	ND	mg/L	0.10								
Chloride	ND	mg/L	0.50								
Nitrogen, Nitrite (As N)	ND	mg/L	0.10								
Bromide	ND	mg/L	0.10								
Nitrogen, Nitrate (As N)	ND	mg/L	0.10								
Phosphorus, Orthophosphate (As P)	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS-b		<i>LCS</i>		Batch ID: R43922		Analysis Date: 3/2/2011 6:15:02 PM					
Fluoride	0.4988	mg/L	0.10	0.5	0	99.8	90	110			
Chloride	4.928	mg/L	0.50	5	0	98.6	90	110			
Nitrogen, Nitrite (As N)	0.9641	mg/L	0.10	1	0	96.4	90	110			
Bromide	2.521	mg/L	0.10	2.5	0	101	90	110			
Nitrogen, Nitrate (As N)	2.484	mg/L	0.10	2.5	0	99.4	90	110			
Phosphorus, Orthophosphate (As P)	4.911	mg/L	0.50	5	0	98.2	90	110			
Sulfate	9.977	mg/L	0.50	10	0	99.8	90	110			
Sample ID: LCS		<i>LCS</i>		Batch ID: R43935		Analysis Date: 3/3/2011 1:47:00 PM					
Fluoride	0.4958	mg/L	0.10	0.5	0	99.2	90	110			
Chloride	4.819	mg/L	0.50	5	0	96.4	90	110			
Nitrogen, Nitrite (As N)	0.9541	mg/L	0.10	1	0	95.4	90	110			

Qualifiers:

E Estimated value
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded
NC Non-Chlorinated
R RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Sandia National Lab
Project: WIPP/H-4c (M)

Work Order: 1103085

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: LCS		<i>LCS</i>				Batch ID: R43935	Analysis Date: 3/3/2011 1:47:00 PM				
Bromide	2.327	mg/L	0.10	2.5	0	93.1	90	110			
Nitrogen, Nitrate (As N)	2.453	mg/L	0.10	2.5	0	98.1	90	110			
Phosphorus, Orthophosphate (As P)	4.887	mg/L	0.50	5	0	97.7	90	110			
Sulfate	9.779	mg/L	0.50	10	0	97.8	90	110			
Sample ID: LCS		<i>LCS</i>				Batch ID: R43935	Analysis Date: 3/4/2011 12:04:49 AM				
Fluoride	0.5096	mg/L	0.10	0.5	0	102	90	110			
Chloride	4.982	mg/L	0.50	5	0	99.6	90	110			
Nitrogen, Nitrite (As N)	0.9791	mg/L	0.10	1	0	97.9	90	110			
Bromide	2.563	mg/L	0.10	2.5	0	103	90	110			
Nitrogen, Nitrate (As N)	2.517	mg/L	0.10	2.5	0	101	90	110			
Phosphorus, Orthophosphate (As P)	5.053	mg/L	0.50	5	0	101	90	110			
Sulfate	10.11	mg/L	0.50	10	0.1803	99.3	90	110			
Sample ID: LCS		<i>LCS</i>				Batch ID: R44085	Analysis Date: 3/11/2011 5:40:24 PM				
Fluoride	0.4862	mg/L	0.10	0.5	0	97.2	90	110			
Chloride	4.717	mg/L	0.50	5	0	94.3	90	110			
Nitrogen, Nitrite (As N)	0.9565	mg/L	0.10	1	0	95.6	90	110			
Bromide	2.428	mg/L	0.10	2.5	0	97.1	90	110			
Nitrogen, Nitrate (As N)	2.371	mg/L	0.10	2.5	0	94.9	90	110			
Phosphorus, Orthophosphate (As P)	4.799	mg/L	0.50	5	0	96.0	90	110			
Sulfate	9.580	mg/L	0.50	10	0	95.8	90	110			
Method: SM 2320B: Alkalinity											
Sample ID: 1103085-01AMSD		<i>MSD</i>				Batch ID: R43929	Analysis Date: 3/3/2011 1:09:00 PM				
Alkalinity, Total (As CaCO3)	140.8	mg/L Ca	20	80	62.84	97.5	37.1	121	0.627	7.21	
Sample ID: MB-1		<i>MBLK</i>				Batch ID: R43929	Analysis Date: 3/3/2011 11:51:00 AM				
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-1		<i>LCS</i>				Batch ID: R43929	Analysis Date: 3/3/2011 11:57:00 AM				
Alkalinity, Total (As CaCO3)	80.28	mg/L Ca	20	80	0	100	97.9	102			
Sample ID: 1103085-01AMS		<i>MS</i>				Batch ID: R43929	Analysis Date: 3/3/2011 12:47:00 PM				
Alkalinity, Total (As CaCO3)	139.9	mg/L Ca	20	80	62.84	96.4	37.1	121			

Qualifiers:

E Estimated value
 J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded
 NC Non-Chlorinated
 R RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Sandia National Lab
 Project: WIPP/H-4c (M)

Work Order: 1103085

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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Method: EPA Method 6010B: Dissolved Metals

Sample ID: MB MBLK Batch ID: R43990 Analysis Date: 3/8/2011 11:57:26 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: R43990 Analysis Date: 3/8/2011 12:00:12 PM

Calcium	49.07	mg/L	1.0	50.5	0	97.2	80	120			
Magnesium	49.74	mg/L	1.0	50.5	0	98.5	80	120			
Potassium	52.40	mg/L	1.0	55	0	95.3	80	120			
Sodium	48.47	mg/L	1.0	50.5	0	96.0	80	120			
Strontium	0.09978	mg/L	0.0060	0.1	0	99.8	80	120			

Method: SM2540C MOD: Total Dissolved Solids

Sample ID: MB-25835 MBLK Batch ID: 25835 Analysis Date: 3/5/2011 6:45:00 PM

Total Dissolved Solids ND mg/L 20.0

Sample ID: LCS-25835 LCS Batch ID: 25835 Analysis Date: 3/5/2011 6:45:00 PM

Total Dissolved Solids 1017 mg/L 20.0 1000 6 101 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

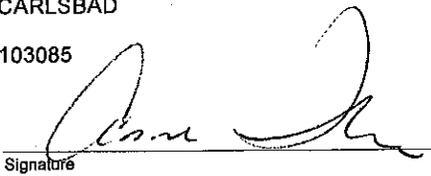
Date Received:

3/2/2011

Work Order Number 1103085

Received by: MMG

Checklist completed by:


Signature

03/02/11
Date

Sample ID labels checked by:


Initials

Matrix:

Carrier name: FedEx

- | | | | | |
|---|--|---|--------------------------------------|--------------------------------------|
| Shipping container/cooler in good condition? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/> | |
| Custody seals intact on shipping container/cooler? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/> | Not Shipped <input type="checkbox"/> |
| Custody seals intact on sample bottles? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | N/A <input type="checkbox"/> | |
| Chain of custody present? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Chain of custody agrees with sample labels? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Samples in proper container/bottle? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Sample containers intact? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Sufficient sample volume for indicated test? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| All samples received within holding time? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | | |
| Water - VOA vials have zero headspace? | No VOA vials submitted <input checked="" type="checkbox"/> | Yes <input type="checkbox"/> | No <input type="checkbox"/> | |
| Water - Preservation labels on bottle and cap match? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | N/A <input type="checkbox"/> | |
| Water - pH acceptable upon receipt? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | N/A <input type="checkbox"/> | |
| Container/Temp Blank temperature? | 1.1° | <6° C Acceptable
If given sufficient time to cool. | | |

Number of preserved bottles checked for pH:
2
<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-4c (M)

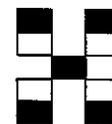
Project #:
98806 / 1.4.2.3

Project Manager:
Mike Schuhen

Sampler: W. DeYonge, D. Bowman

On Ice: Yes No

Sample Temperature: 1.1°



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)
3/1/11	13:13	H ₂ O	H-4c(M)_030111	#1: 500 mL	NONE	- /												X	X			
3/1/11	13:13	H ₂ O	H-4c(M)_030111	#2: 125 mL	H ₂ SO ₄	- /														X		
3/1/11	13:13	H ₂ O	H-4c(M)_030111	#3: 125 mL	HNO ₃	- /															X	
			END OF SAMPLE LIST																			

Date: 3/1/2011 Time: 2:50 PM Relinquished by: Wesley F. DeYonge
Wesley F. DeYonge

Received by: *Michelle Garcia* Date: 3/2/11 Time: 1040

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

Date: _____ Time: _____ Relinquished by: _____

Received by: _____ Date: _____ Time: _____

