

COVER LETTER

Tuesday, August 26, 2008

Rick Beauheim
Sandia National Lab
4100 National Parks Hwy.
MS1395
Carlsbad, NM 88220

TEL: (505) 234-0006

FAX (505) 234-0061

RE: WIPP/LRL-7

Order No.: 0807449

Dear Rick Beauheim:

Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 7/31/2008 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425

AZ license # AZ0682

ORELAP Lab # NM100001



Hall Environmental Analysis Laboratory, Inc.

Date: 26-Aug-08

CLIENT: Sandia National Lab
 Lab Order: 0807449
 Project: WIPP/LRL-7
 Lab ID: 0807449-01

Client Sample ID: LRL-7-073008
 Collection Date: 7/30/2008 12:30:00 PM
 Date Received: 7/31/2008
 Matrix: AQUEOUS

| Analyses | Result | PQL | Qual | Units | DF | Date Analyzed |
|---|--------|------|------|------------------------|------|-----------------------|
| EPA METHOD 300.0: ANIONS | | | | | | Analyst: SLB |
| Fluoride | ND | 10 | | mg/L | 100 | 7/31/2008 8:28:35 PM |
| Chloride | 68000 | 200 | | mg/L | 2000 | 7/31/2008 9:03:25 PM |
| Nitrogen, Nitrite (As N) | ND | 50 | | mg/L | 500 | 7/31/2008 8:46:00 PM |
| Bromide | 68 | 10 | | mg/L | 100 | 7/31/2008 8:28:35 PM |
| Nitrogen, Nitrate (As N) | ND | 10 | | mg/L | 100 | 7/31/2008 8:28:35 PM |
| Phosphorus, Orthophosphate (As P) | ND | 50 | | mg/L | 100 | 7/31/2008 8:28:35 PM |
| Sulfate | 4900 | 50 | | mg/L | 100 | 7/31/2008 8:28:35 PM |
| EPA METHOD 6010B: DISSOLVED METALS | | | | | | Analyst: TES |
| Calcium | 440 | 50 | | mg/L | 50 | 8/20/2008 6:25:27 PM |
| Magnesium | ND | 50 | | mg/L | 50 | 8/20/2008 6:25:27 PM |
| Potassium | 1600 | 50 | | mg/L | 50 | 8/20/2008 6:25:27 PM |
| Sodium | 51000 | 1000 | | mg/L | 1000 | 8/21/2008 5:58:05 PM |
| Strontium | 16 | 0.60 | | mg/L | 100 | 8/23/2006 12:41:12 PM |
| SM 2320B: ALKALINITY | | | | | | Analyst: TAF |
| Alkalinity, Total (As CaCO ₃) | 310 | 20 | | mg/L CaCO ₃ | 1 | 8/6/2008 |
| Carbonate | 240 | 2.0 | | mg/L CaCO ₃ | 1 | 8/6/2008 |
| Bicarbonate | ND | 20 | | mg/L CaCO ₃ | 1 | 8/6/2008 |
| Hydroxide | 68 | 2.0 | | mg/L CaCO ₃ | 1 | 8/6/2008 |
| EPA 120.1: SPECIFIC CONDUCTANCE | | | | | | Analyst: KMS |
| Specific Conductance | 180000 | 0.10 | | µmhos/cm | 10 | 8/4/2008 |
| SM4500-H+B: PH | | | | | | Analyst: KMS |
| pH | 10.48 | 0.1 | | pH units | 1 | 8/1/2008 |
| SM 2540C TOTAL DISSOLVED SOLIDS | | | | | | Analyst: KMS |
| Total Dissolved Solids | 110000 | 100 | | mg/L | 1 | 8/4/2008 |

- Qualifiers:**
- * Value exceeds Maximum Contaminant Level
 - E Value above quantitation range
 - 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 | LRL-7-073008 | | | | | | | | | | | |
|--------------------------------------|--------------|---------|------|-------|------|-------|------|-------|------|-------|------|-------|
| | 0807449-1 | | | | | | | | | | | |
| CATIONS | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L |
| Sodium | 51000 | 2218.36 | | | | | | | | | | |
| Potassium | 1600 | 40.92 | | | | | | | | | | |
| Calcium | 440 | 21.96 | | | | | | | | | | |
| Magnesium | ND | * | | | | | | | | | | |
| Total Cations | 2281.23 | | | | | | | | | | | |
| ANIONS | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L |
| Sulfate | 4900 | 102.02 | | | | | | | | | | |
| Chloride | 68000 | 1918.19 | | | | | | | | | | |
| Bicarbonate (CaCO3) | ND | * | | | | | | | | | | |
| Carbonate (CaCO3) | 240 | 4.80 | | | | | | | | | | |
| Phosphate (P) | ND | * | | | | | | | | | | |
| Nitrite (N) | ND | * | | | | | | | | | | |
| Nitrate (N) | ND | * | | | | | | | | | | |
| Fluoride | ND | * | | | | | | | | | | |
| Bromide | 68 | 0.85 | | | | | | | | | | |
| Total Anions | 2025.86 | | | | | | | | | | | |
| Elect. Cond. (μMhos/cm) | 180000 | | | | | | | | | | | |
| CATION/ANION RATIO | 1.13 | | | | | | | | | | | |
| % Difference | 6 | | | | | | | | | | | |
| TOTAL DISSOLVED SOLIDS RATIOS | | | | | | | | | | | | |
| TDS (measured) | 110000 | | | | | | | | | | | |
| TDS (calculated) | 126152 | | | | | | | | | | | |
| Ratio meas TDS:calc TDS | 0.9 | | | | | | | | | | | |
| Ratio Meas. TDS:EC | 0.61 | | | | | | | | | | | |
| Ratio Calc. TDS:EC | 0.70 | | | | | | | | | | | |
| Ratio of anion sum:EC | 1.1 | | | | | | | | | | | |
| Ratio of cation sum:EC | 1.3 | | | | | | | | | | | |

* 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/LRL-7

Work Order: 0807449

| Analyte | Result | Units | PQL | %Rec | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---------|--------|-------|-----|------|----------|-----------|------|----------|------|
|---------|--------|-------|-----|------|----------|-----------|------|----------|------|

Method: EPA Method 300.0: Anions

| | | | | | | | | | |
|-----------------------------------|----|-------------|------|--|--|-------------------------|--|--|--|
| Sample ID: MB | | <i>MBLK</i> | | | | Batch ID: R29575 | Analysis Date: 7/31/2008 9:44:27 AM | | |
| Fluoride | ND | mg/L | 0.10 | | | | | | |
| Chloride | ND | mg/L | 0.10 | | | | | | |
| 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 | | <i>LCS</i> | | | | Batch ID: R29575 | Analysis Date: 7/31/2008 10:01:52 AM | | |
| Fluoride | 0.5480 | mg/L | 0.10 | 110 | 90 | 110 | | | |
| Chloride | 5.003 | mg/L | 0.10 | 100 | 90 | 110 | | | |
| Nitrogen, Nitrite (As N) | 1.059 | mg/L | 0.10 | 106 | 90 | 110 | | | |
| Bromide | 2.614 | mg/L | 0.10 | 105 | 90 | 110 | | | |
| Nitrogen, Nitrate (As N) | 2.508 | mg/L | 0.10 | 100 | 90 | 110 | | | |
| Phosphorus, Orthophosphate (As P) | 5.142 | mg/L | 0.50 | 103 | 90 | 110 | | | |
| Sulfate | 10.30 | mg/L | 0.50 | 103 | 90 | 110 | | | |

Method: SM 2320B: Alkalinity

| | | | | | | | | | |
|------------------------------|-------|-------------|-----|------|----|-------------------------|--------------------------------|--|--|
| Sample ID: MB | | <i>MBLK</i> | | | | Batch ID: R29640 | Analysis Date: 8/6/2008 | | |
| Alkalinity, Total (As CaCO3) | ND | mg/L CaC | 20 | | | | | | |
| Carbonate | ND | mg/L CaC | 2.0 | | | | | | |
| Bicarbonate | ND | mg/L CaC | 20 | | | | | | |
| Sample ID: LCS | | <i>LCS</i> | | | | Batch ID: R29640 | Analysis Date: 8/6/2008 | | |
| Alkalinity, Total (As CaCO3) | 81.00 | mg/L CaC | 20 | 98.8 | 80 | 120 | | | |

Qualifiers:

- | | | | |
|---|--|----|--|
| 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 | S | Spike recovery outside accepted recovery limits |

QA/QC SUMMARY REPORT

Client: Sandia National Lab
 Project: WIPP/LRL-7

Work Order: 0807449

| Analyte | Result | Units | PQL | %Rec | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---------|--------|-------|-----|------|----------|-----------|------|----------|------|
|---------|--------|-------|-----|------|----------|-----------|------|----------|------|

Method: EPA Method 6010B: Dissolved Metals

| | | | | | | | | | |
|----------------|---------|------|--------|------|------------------|--------------------------------------|--|--|--|
| Sample ID: MB | | MBLK | | | Batch ID: R29861 | Analysis Date: 8/20/2008 6:19:44 PM | | | |
| Calcium | ND | mg/L | 1.0 | | | | | | |
| Magnesium | ND | mg/L | 1.0 | | | | | | |
| Potassium | ND | mg/L | 1.0 | | | | | | |
| Sodium | ND | mg/L | 1.0 | | | | | | |
| Sample ID: MB | | MBLK | | | Batch ID: R29876 | Analysis Date: 8/21/2008 5:35:25 PM | | | |
| Calcium | ND | mg/L | 1.0 | | | | | | |
| Sample ID: MB | | MBLK | | | Batch ID: R29878 | Analysis Date: 8/21/2008 6:36:24 PM | | | |
| Calcium | ND | mg/L | 1.0 | | | | | | |
| Magnesium | ND | mg/L | 1.0 | | | | | | |
| Sodium | ND | mg/L | 1.0 | | | | | | |
| Sample ID: MB | | MBLK | | | Batch ID: R29890 | Analysis Date: 8/23/2008 12:29:27 PM | | | |
| Strontium | ND | mg/L | 0.0060 | | | | | | |
| Sample ID: LCS | | LCS | | | Batch ID: R29861 | Analysis Date: 8/20/2008 6:22:42 PM | | | |
| Calcium | 47.82 | mg/L | 1.0 | 94.7 | 80 | 120 | | | |
| Magnesium | 48.40 | mg/L | 1.0 | 95.8 | 80 | 120 | | | |
| Potassium | 51.99 | mg/L | 1.0 | 94.5 | 80 | 120 | | | |
| Sodium | 47.55 | mg/L | 1.0 | 94.1 | 80 | 120 | | | |
| Sample ID: LCS | | LCS | | | Batch ID: R29876 | Analysis Date: 8/21/2008 5:38:20 PM | | | |
| Calcium | 50.52 | mg/L | 1.0 | 100 | 80 | 120 | | | |
| Sample ID: LCS | | LCS | | | Batch ID: R29876 | Analysis Date: 8/21/2008 6:39:17 PM | | | |
| Calcium | 50.14 | mg/L | 1.0 | 99.3 | 80 | 120 | | | |
| Magnesium | 48.29 | mg/L | 1.0 | 95.6 | 80 | 120 | | | |
| Sodium | 47.44 | mg/L | 1.0 | 93.5 | 80 | 120 | | | |
| Sample ID: LCS | | LCS | | | Batch ID: R29890 | Analysis Date: 8/23/2008 12:31:37 PM | | | |
| Strontium | 0.09873 | mg/L | 0.0060 | 98.7 | 80 | 120 | | | |

Method: SM 2540C Total Dissolved Solids

| | | | | | | | | | |
|------------------------|------|------|----|-----|-----------------|-------------------------|--|--|--|
| Sample ID: MB-16678 | | MBLK | | | Batch ID: 16678 | Analysis Date: 8/4/2008 | | | |
| Total Dissolved Solids | ND | mg/L | 20 | | | | | | |
| Sample ID: LCS-16678 | | LCS | | | Batch ID: 16678 | Analysis Date: 8/4/2008 | | | |
| Total Dissolved Solids | 1018 | mg/L | 20 | 102 | 80 | 120 | | | |

Qualifiers:

| | | | |
|---|--|----|--|
| 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 | S | Spike recovery outside accepted recovery limits |

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name SANDIA CARLSBAD

Date Received: 7/31/2008

Work Order Number 0807449

Received by: AT

Checklist completed by:

[Handwritten Signature]
Signature

7/31/08
Date

Sample ID labels checked by:

AT
Initials

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? 1° <6° C Acceptable
If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: per RB cations + Sr for metals analysis / AT 7/31/08

added .25 ml's HNO₃ to 2 x 125 HNO₃ samples for acceptable pH
AT 7/31/08

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

Client: Sancta National Labs

Address: 4100 Natl Parks Hwy
Carlsbad, NM 88220

Phone #: (575) 234-0026

Fax #: (575) 234-0061

Accreditation Applied:
 NELAC USACE

Other: _____

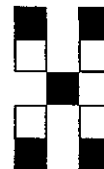
Project Name: WIPP | LRL-7

Project #: 98806 | 11.4c2-3

Project Manager: Richard Brauker

Sampler: Michael Hillesheim (mbh)

Sample Temperature: _____



**HALL ENVIRONMENTAL
ANALYSIS LABORATORY**
 4901 Hawkins NE, Suite D
 Albuquerque, New Mexico 87109
 Tel. 505.345.3975 Fax 505.345.4107
 www.hallenvironmental.com

ANALYSIS REQUEST

| Date | Time (AZ) | Matrix | Sample I.D. No. | Number/Volume <small><i>with 2700</i></small> | Preservative | | | HEAL No. |
|------------------------------------|--------------|-----------------------|---------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|---------------|
| | | | | | H ₂ O ₂ | HNO ₃ | Asa | |
| <u>07/30/08</u> | <u>1230</u> | <u>H₂O</u> | <u>LRL-7-073003</u> | <u>4/500 mL</u> | <input checked="" type="checkbox"/> | | | <u>087449</u> |
| <u>07/30/08</u> | <u>1230</u> | <u>H₂O</u> | <u>LRL-7-073005</u> | <u>2/125 mL <small><i>with 2700</i></small></u> | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <u>-1</u> |
| <u>07/30/08</u> | <u>1230</u> | <u>H₂O</u> | <u>LRL-7-073006</u> | <u>3/125 mL</u> | | <input checked="" type="checkbox"/> | | <u>-1</u> |
| <u>07/30/08</u> | <u>1230</u> | <u>H₂O</u> | <u>LRL-7-073008</u> | <u>4/125 mL</u> | | <input checked="" type="checkbox"/> | | <u>-1</u> |
| <u>—— Last sample collected ——</u> | | | | | | | | |

| BTEX + MTBE + TMB's (8021) | BTEX + MTBE + TPH (Gasoline Only) | TPH Method 80158 MOD (Gas/Diesel) | TPH (Method 418.1) | EDB (Method 504.1) | EDC (Method 8021) | 8310 (PNA or PAH) | RCRA 8 Metals | Cations (Na, K, Ca, Mg) / Metals | Anions (F, Cl, NO ₃ , NO ₂ , PO ₄ , SO ₄) | 8081 Pesticides / PCB's (8082) | 8260 (VOA) | 8270 (Semi-VOA) | TDS, Alk., Cond., pH | NO ₂ + NO ₃ | Strontium | Air Bubbles or Headspace (Y or N) | |
|----------------------------|-----------------------------------|-----------------------------------|--------------------|--------------------|-------------------|-------------------|---------------|-------------------------------------|--|--------------------------------|------------|-----------------|-------------------------------------|-------------------------------------|-----------|-----------------------------------|-------------------------------------|
| | | | | | | | | | <input checked="" type="checkbox"/> | | | | <input checked="" type="checkbox"/> | | | | |
| | | | | | | | | | | | | | | <input checked="" type="checkbox"/> | | | |
| | | | | | | | | <input checked="" type="checkbox"/> | | | | | | | | | |
| | | | | | | | | | | | | | | | | | <input checked="" type="checkbox"/> |

Date: 7/31/08 Time: 2:46pm Relinquished By: (Signature) [Signature] Remarks: 7/31/08 0950

Date: _____ Time: _____ Relinquished By: (Signature) _____ Remarks: _____

Remarks:
 • Samples #3+4 are filtered
 • Samples may contain high salts
 • 48-hr hold time for P

Appendix A

0807449

| | | |
|--|------------------|--|
| ACTIVITY/ PROJECT SPECIFIC PROCEDURE <small>Sandia National Laboratories</small> | Chain of Custody | 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 Michael B. Hillesheim Organization: 6712 Date: 07/30/08
Printed Name

2. Sample Collection or Creation Information Scientific Notebook ID: LTM#3 Sample Team Members/Organization:
 Test Plan ID: TP 03-01 Field Log ID: N/A Michael B. Hillesheim/ SNL-6712
 Sample Location: Gnome Site well LRL-7
i.e. borehole/core no./lab bldg. no./etc... N/A
enter n/a if none

| 3. Sample Identification Sample/Sub-Sample # | Date Collected | Container Type | Volume | Preservative | Analysis Request | Sample Description |
|---|----------------|----------------|--------|--------------|------------------------------|---|
| LRL-7 073008 | 07/30/08 | PE Bottle | 500 ml | None | Anions, pH, TDS, Cond., Alk. | LRL-7 Culebra water unpreserved |
| LRL-7 073008 | 07/30/08 | PE Bottle | 125 ml | H2SO4 | NO2+NO3 | LRL-7 Culebra water preserved w/ sulfuric acid |
| LRL-7 073008 | 07/30/08 | PE Bottle | 125 ml | HNO3 | Cations, Metals | LRL-7 Culebra water filtered & preserved w/ nitric acid |
| LRL-7 073008 | 07/30/08 | PE Bottle | 125 ml | HNO3 | Strontium | LRL-7 Culebra water filtered & preserved w/ nitric acid |
| --End of Sample List-- | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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: 12/01/06

| 5. Custody Transfer | Organization/Company | Date-Time | Sample Condition |
|--|----------------------|---------------------|---------------------------------------|
| a. Relinquished by: <u>Michael B. Hillesheim</u> <u><i>[Signature]</i></u> | <u>SNL/6712</u> | <u>7/30/08 1446</u> | <u>Containers intact & sealed</u> |
| a. Received by: <u>Anne Thorne</u> <u><i>[Signature]</i></u> | <u>HEAL</u> | <u>7/31/08 0850</u> | <u>yes good /</u> |
| b. Relinquished by: | | | |
| b. Received by: | | | |
| c. Relinquished by: | | | |
| 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 6800 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.