

1R - 2627

## REPORTS

DATE:

7-30-13

# Rice Environmental Consulting & Safety

P.O. Box 2948, Hobbs, NM 88241

Phone 575.393.2967

RECEIVED OCD

**July 30<sup>th</sup>, 2013**

2013 AUG -1 P 3: 00

**Mr. Edward Hansen**

New Mexico Energy, Minerals, & Natural Resources

Oil Conservation Division, Environmental Bureau

1220 S. St. Francis Drive

Santa Fe, New Mexico 87505

**RE: CAP Report for Groundwater**

**Apache Corporation**

**NMGSAU 1631 (1R-2627): UL/J sec. 32 T19S R37E**

Mr. Hansen:

Apache Corporation (Apache) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site.

## **Background and Previous Work**

The site is located approximately 1 mile southwest of Monument at UL/J, Sec. 32, T19S, R37E in Lea County, NM (Figure 1). A leak was discovered at the site on September 28<sup>th</sup>, 2010. An unknown amount of produced water was released from the injection line collar. According to monitor well sampling data at the site, groundwater is located at approximately 14 ft below ground surface (bgs).

Excavation of the site began on September 28<sup>th</sup>, 2010. The site was excavated to 38 ft x 96 ft x 18 ft deep to remove the saturated soils to a NMOCD approved disposal facility. The depth of saturated soils reached 14 ft 8 inches bgs at which point the capillary fringe of the aquifer was encountered. On October 7<sup>th</sup>, 2010, three (3) soil bores were drilled at the site to determine the extent of impact. RECS personnel field tested the soil for chloride and tested for hydrocarbons using a photo-ionization detector (PID). Representative samples were submitted to a commercial laboratory for chloride and TPH analyses. The site was backfilled to 4.5 ft bgs, where a 20-mil, reinforced liner was installed with 6 inches of blow sand placed below and above the liner for padding.

On October 12<sup>th</sup>, 2010, the initial C-141 was submitted to NMOCD-District 1 and was approved. Subsequently, the remaining excavation at the site was backfilled with clean, imported soil, and the site was contoured to the surrounding landscape. On October 16<sup>th</sup>, 2010, amendments were incorporated into the soil surface, and the site was seeded.

On October 25<sup>th</sup>, 2010, MW-1 was installed 45 ft southeast of the line break. On December 21<sup>st</sup>, 2010, MW-2 was installed 56 ft NNW of the line break, and on April 13<sup>th</sup>, 2011, MW-3 was installed 199 ft SE of the line break (Figure 2). The monitor wells have been sampled quarterly since their installation (Appendix A).

On October 11<sup>th</sup>, 2011, a Corrective Action Plan (CAP) was submitted to NMOCD. The CAP was approved by NMOCD on October 17<sup>th</sup>, 2011. RECS recommended that a three month groundwater source removal and test pumping program be conducted to determine if groundwater remediation could be achieved quickly. The pumping program would also assist in the evaluation of groundwater restoration methods. Water retrieved from the existing 4-inch monitoring well (MW-1) would be used for production operations. Based on the program results, a remedy for the site would be determined.

On August 14<sup>th</sup>, 2012, a Corrective Action Plan for Groundwater was submitted to NMOCD. The CAP was approved by NMOCD on August 15<sup>th</sup>, 2012. RECS detailed the groundwater and chloride extraction totals of the test pumping program. RECS recommended that, as a groundwater remedy, the test pumping program remain in use until groundwater reaches near-background levels of chloride.

Since the groundwater source removal and pumping program began on April 10<sup>th</sup>, 2012, a total of 3,965 barrels of groundwater have been removed from the site. Given the most recent laboratory chloride readings 352 mg/L in MW-1, the volume of groundwater removal indicates that 221 kg of chloride have been removed. The pumping program will remain in operation until the winter months arrived. In order to maintain integrity of the system and avoid possible utility and/or environmental damages, the pumping system at the site will be shut in throughout the winter months and will resume in the spring of 2014. As stated in the CAP for Groundwater, approved in August 2012, Apache will continue the pumping program until the chloride concentrations decrease to near-background levels.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lara Weinheimer', with a stylized flourish at the end.

Lara Weinheimer  
Project Scientist  
RECS  
(575) 441-0431

Attachments:

- Figure 1 – Site Map
- Figure 2 – Monitor Well Sampling Data
- Appendix A – Laboratory Analyses



# Figures

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948, Hobbs, NM 88241  
Phone 575.393.2967

# Site Location Map



## APACHE NMGSAU 1631

LEGALS:UL/J sec. 32  
T19S R37E

Case #: 1R-2627

Figure 1

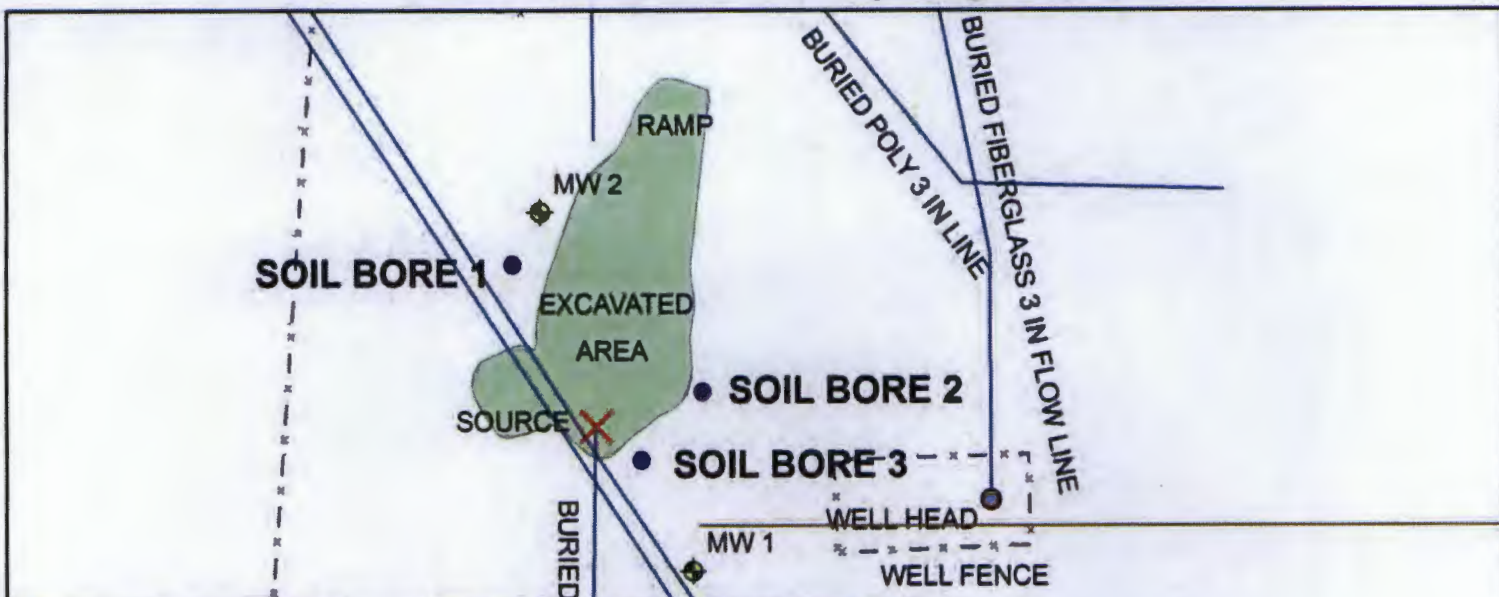


0 0.25 0.5  
Miles

Drawing date: 7/19/13  
Drafted by: L. Weinheimer



# Monitor Well Sampling Data



| MW | Depth to Water | Total Depth | Sample Date | CI   | TDS   | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Sulfate |
|----|----------------|-------------|-------------|------|-------|---------|---------|---------------|---------------|---------|
| 1  | 13.84          | 50.35       | 11/3/2010   | 6400 | 12700 | 0.015   | 0.001   | 0.004         | 0.01          | 1120    |
|    | 13.83          | 50.35       | 1/6/2011    | 3250 | 6600  | 0.007   | <0.001  | 0.002         | 0.006         | 697     |
|    | 13.86          | 50.36       | 5/19/2011   | 2420 | 4770  | <0.001  | <0.001  | <0.001        | <0.003        | 531     |
|    | 13.81          | 50.35       | 9/1/2011    | 860  | 2060  | <0.001  | <0.001  | <0.001        | <0.003        | 232     |
|    | 13.99          | 50.35       | 11/18/2011  | 1480 | 3150  | <0.001  | <0.001  | <0.001        | <0.003        | 344     |
|    | 13.87          | 50.35       | 3/6/2012    | 1280 | 2730  | <0.001  | <0.001  | <0.001        | <0.003        | 363     |
|    | XXX            | 50.35       | 6/20/2012   | 540  | 1420  | <0.001  | <0.001  | <0.001        | <0.003        | 116     |
|    | XXX            | 50.35       | 9/25/2012   | 970  | 2190  | <0.001  | <0.001  | <0.001        | <0.003        | 190     |
|    | XXX            | 50.35       | 12/13/2012  | 1040 | 1970  | <0.001  | <0.001  | <0.001        | <0.003        | 223     |
|    | XXX            | 50.35       | 3/27/2013   | 480  | 1040  | <0.001  | <0.001  | <0.001        | <0.003        | 84      |
|    | XXX            | 50.35       | 6/26/2013   | 352  | 1010  | <0.001  | <0.001  | <0.001        | <0.003        | 81      |

XXX: Not gauged due to pump in well.

| MW | Depth to Water | Total Depth | Sample Date | CI  | TDS | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Sulfate |
|----|----------------|-------------|-------------|-----|-----|---------|---------|---------------|---------------|---------|
| 2  | 13.47          | 61.15       | 1/6/2011    | 320 | 878 | <0.001  | <0.001  | <0.001        | <0.003        | 81.1    |
|    | 13.52          | 61.15       | 5/19/2011   | 296 | 907 | <0.001  | <0.001  | <0.001        | <0.003        | 67.1    |
|    | 13.68          | 61.15       | 9/1/2011    | 284 | 785 | <0.001  | <0.001  | <0.001        | <0.003        | 75.7    |
|    | 13.69          | 61.15       | 11/18/2011  | 308 | 860 | <0.001  | <0.001  | <0.001        | <0.003        | 64.1    |
|    | 13.58          | 61.15       | 3/6/2012    | 280 | 907 | <0.001  | <0.001  | <0.001        | <0.003        | 68.8    |
|    | 13.78          | 61.15       | 6/20/2012   | 280 | 920 | <0.001  | <0.001  | <0.001        | <0.003        | 64      |
|    | 13.81          | 61.15       | 9/25/2012   | 268 | 853 | <0.001  | <0.001  | <0.001        | <0.003        | 63.8    |
|    | 13.64          | 61.15       | 12/13/2012  | 280 | 847 | <0.001  | <0.001  | <0.001        | <0.003        | 57.7    |
|    | 13.72          | 61.15       | 3/27/2013   | 264 | 854 | <0.001  | <0.001  | <0.001        | <0.003        | 67.8    |
|    | 13.88          | 61.15       | 6/26/2013   | 268 | 868 | <0.001  | <0.001  | <0.001        | <0.003        | 69.7    |

| MW | Depth to Water | Total Depth | Sample Date | CI  | TDS | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Sulfate |
|----|----------------|-------------|-------------|-----|-----|---------|---------|---------------|---------------|---------|
| 3  | 18.69          | 30.05       | 5/19/2011   | 300 | 903 | <0.001  | <0.001  | <0.001        | <0.003        | 69.6    |
|    | 18.7           | 30.05       | 9/1/2011    | 308 | 845 | <0.001  | <0.001  | <0.001        | <0.003        | 84.8    |
|    | 17.93          | 30.05       | 11/18/2011  | 380 | 954 | <0.001  | <0.001  | <0.001        | <0.003        | 78.6    |
|    | 18.06          | 30.05       | 3/6/2012    | 324 | 989 | <0.001  | <0.001  | <0.001        | <0.003        | 77.3    |
|    | 18.43          | 30.05       | 6/20/2012   | 296 | 922 | <0.001  | <0.001  | <0.001        | <0.003        | 70      |
|    | 18.58          | 30.05       | 9/25/2012   | 288 | 938 | <0.001  | <0.001  | <0.001        | <0.003        | 70.5    |
|    | 18.26          | 30.05       | 12/13/2012  | 288 | 818 | <0.001  | <0.001  | <0.001        | <0.003        | 77      |
|    | 18.26          | 30.05       | 3/27/2013   | 292 | 881 | <0.001  | <0.001  | <0.001        | <0.003        | 77.3    |
|    | 18.57          | 30.05       | 6/26/2013   | 280 | 915 | <0.001  | <0.001  | <0.001        | <0.003        | 75.4    |



**NMGSAU 1631**

Legals: UL/J sec. 32  
T19S R37E

Case #: 1R-2627

**Figure 2**



0 35 70  
Feet

Projection: NAD 83/STATE PLANE  
Drawing date: 7/19/13  
Drafted by: L. Weinheimer



# Appendix A

Laboratory Analyses

**RICE Environmental Consulting and Safety (RECS)**  
P.O. Box 2948 Hobbs, NM 88241  
Phone 575.393.2967

July 05, 2013

HACK CONDER

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: APACHE NMGSAU 1631-ACCIDENTAL DISCHARGE

Enclosed are the results of analyses for samples received by the laboratory on 06/27/13 8:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

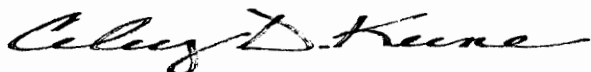
Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

|                  |                              |
|------------------|------------------------------|
| Method EPA 552.2 | Haloacetic Acids (HAA-5)     |
| Method EPA 524.2 | Total Trihalomethanes (TTHM) |
| Method EPA 524.4 | Regulated VOCs (V1, V2, V3)  |

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Celey D. Keene

Lab Director/Quality Manager



**Analytical Results For:**

APACHE - EUNICE  
HACK CONDER  
P. O. BOX 1849  
EUNICE NM, 88231  
Fax To: 394-2425

Received: 06/27/2013  
Reported: 07/05/2013  
Project Name: APACHE NMCSAU 1631-ACCIDENTAL DIS  
Project Number: NOT GIVEN  
Project Location: T19S-R37E-SEC32 J-LEA CTY., NM

Sampling Date: 06/26/2013  
Sampling Type: Water  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: MONITOR WELL #1 (H301519-01)**

| BTX 8260B      |        | mg/L            |            | Analyzed By: MS |       |            |               |       |           |
|----------------|--------|-----------------|------------|-----------------|-------|------------|---------------|-------|-----------|
| Analyte        | Result | Reporting Limit | Analyzed   | Method Blank    | BS    | % Recovery | True Value QC | RPD   | Qualifier |
| Benzene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.054 | 108        | 0.0500        | 0.922 |           |
| Toluene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.050 | 99.6       | 0.0500        | 1.95  |           |
| Ethylbenzene*  | <0.001 | 0.001           | 07/03/2013 | ND              | 0.049 | 98.7       | 0.0500        | 3.68  |           |
| Total Xylenes* | <0.003 | 0.003           | 07/03/2013 | ND              | 0.153 | 102        | 0.150         | 1.74  |           |

Surrogate: Dibromofluoromethane 97.7 % 59.8-161

Surrogate: Toluene-d8 97.2 % 75.2-115

Surrogate: 4-Bromofluorobenzene 106 % 53.7-120

| Chloride, SM4500Cl-B |        | mg/L            |            | Analyzed By: DW |     |            |               |      |           |
|----------------------|--------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte              | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD  | Qualifier |
| Chloride*            | 352    | 4.00            | 06/28/2013 | ND              | 108 | 108        | 100           | 0.00 |           |

| Sulfate 375.4 |        | mg/L            |            | Analyzed By: AP |      |            |               |      |           |
|---------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|
| Analyte       | Result | Reporting Limit | Analyzed   | Method Blank    | BS   | % Recovery | True Value QC | RPD  | Qualifier |
| Sulfate*      | 81.0   | 25.0            | 07/05/2013 | ND              | 21.0 | 105        | 20.0          | 7.55 |           |

| TDS 160.1 |        | mg/L            |            | Analyzed By: AP |     |            |               |       |           |
|-----------|--------|-----------------|------------|-----------------|-----|------------|---------------|-------|-----------|
| Analyte   | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD   | Qualifier |
| TDS*      | 1010   | 5.00            | 06/28/2013 | ND              | 244 | 102        | 240           | 0.157 |           |

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 APACHE - EUNICE  
 HACK CONDER  
 P. O. BOX 1849  
 EUNICE NM, 88231  
 Fax To: 394-2425

 Received: 06/27/2013  
 Reported: 07/05/2013  
 Project Name: APACHE NMGS AU 1631-ACCIDENTAL DISCHARGE  
 Project Number: NOT GIVEN  
 Project Location: T19S-R37E-SEC32 J-LEA CTY., NM

 Sampling Date: 06/26/2013  
 Sampling Type: Water  
 Sampling Condition: Cool & Intact  
 Sample Received By: Jodi Henson

**Sample ID: MONITOR WELL #2 (H301519-02)**

| BTX 8260B      |        | mg/L            |            | Analyzed By: MS |       |            |               |       |           |
|----------------|--------|-----------------|------------|-----------------|-------|------------|---------------|-------|-----------|
| Analyte        | Result | Reporting Limit | Analyzed   | Method Blank    | BS    | % Recovery | True Value QC | RPD   | Qualifier |
| Benzene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.054 | 108        | 0.0500        | 0.922 |           |
| Toluene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.050 | 99.6       | 0.0500        | 1.95  |           |
| Ethylbenzene*  | <0.001 | 0.001           | 07/03/2013 | ND              | 0.049 | 98.7       | 0.0500        | 3.68  |           |
| Total Xylenes* | <0.003 | 0.003           | 07/03/2013 | ND              | 0.153 | 102        | 0.150         | 1.74  |           |

Surrogate: Dibromofluoromethane 95.6 % 59.8-161

Surrogate: Toluene-d8 98.1 % 75.2-115

Surrogate: 4-Bromofluorobenzene 108 % 53.7-120

| Chloride, SM4500Cl-B |        | mg/L            |            | Analyzed By: DW |     |            |               |      |           |
|----------------------|--------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte              | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD  | Qualifier |
| Chloride*            | 268    | 4.00            | 06/28/2013 | ND              | 108 | 108        | 100           | 0.00 |           |

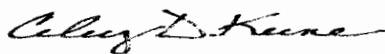
| Sulfate 375.4 |        | mg/L            |            | Analyzed By: AP |      |            |               |      |           |
|---------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|
| Analyte       | Result | Reporting Limit | Analyzed   | Method Blank    | BS   | % Recovery | True Value QC | RPD  | Qualifier |
| Sulfate*      | 69.7   | 10.0            | 07/05/2013 | ND              | 21.0 | 105        | 20.0          | 7.55 |           |

| TDS 160.1 |        | mg/L            |            | Analyzed By: AP |     |            |               |       |           |
|-----------|--------|-----------------|------------|-----------------|-----|------------|---------------|-------|-----------|
| Analyte   | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD   | Qualifier |
| TDS*      | 868    | 5.00            | 07/03/2013 | ND              | 244 | 102        | 240           | 0.157 |           |

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\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

APACHE - EUNICE  
HACK CONDER  
P. O. BOX 1849  
EUNICE NM, 88231  
Fax To: 394-2425

Received: 06/27/2013  
Reported: 07/05/2013  
Project Name: APACHE NMGS AU 1631-ACCIDENTAL DIS  
Project Number: NOT GIVEN  
Project Location: T19S-R37E-SEC32 J-LEA CTY., NM

Sampling Date: 06/26/2013  
Sampling Type: Water  
Sampling Condition: Cool & Intact  
Sample Received By: Jodi Henson

**Sample ID: MONITOR WELL #3 (H301519-03)**

| BTX 8260B      |        | mg/L            |            | Analyzed By: MS |       |            |               |       |           |
|----------------|--------|-----------------|------------|-----------------|-------|------------|---------------|-------|-----------|
| Analyte        | Result | Reporting Limit | Analyzed   | Method Blank    | BS    | % Recovery | True Value QC | RPD   | Qualifier |
| Benzene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.054 | 108        | 0.0500        | 0.922 |           |
| Toluene*       | <0.001 | 0.001           | 07/03/2013 | ND              | 0.050 | 99.6       | 0.0500        | 1.95  |           |
| Ethylbenzene*  | <0.001 | 0.001           | 07/03/2013 | ND              | 0.049 | 98.7       | 0.0500        | 3.68  |           |
| Total Xylenes* | <0.003 | 0.003           | 07/03/2013 | ND              | 0.153 | 102        | 0.150         | 1.74  |           |

Surrogate: Dibromofluoromethane 98.6 % 59.8-161

Surrogate: Toluene-d8 97.0 % 75.2-115

Surrogate: 4-Bromofluorobenzene 108 % 53.7-120

| Chloride, SM4500Cl-B |        | mg/L            |            | Analyzed By: DW |     |            |               |      |           |
|----------------------|--------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte              | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD  | Qualifier |
| Chloride*            | 280    | 4.00            | 06/28/2013 | ND              | 108 | 108        | 100           | 0.00 |           |

| Sulfate 375.4 |        | mg/L            |            | Analyzed By: AP |      |            |               |      |           |
|---------------|--------|-----------------|------------|-----------------|------|------------|---------------|------|-----------|
| Analyte       | Result | Reporting Limit | Analyzed   | Method Blank    | BS   | % Recovery | True Value QC | RPD  | Qualifier |
| Sulfate*      | 75.4   | 10.0            | 07/05/2013 | ND              | 21.0 | 105        | 20.0          | 7.55 |           |

| TDS 160.1 |        | mg/L            |            | Analyzed By: AP |     |            |               |       |           |
|-----------|--------|-----------------|------------|-----------------|-----|------------|---------------|-------|-----------|
| Analyte   | Result | Reporting Limit | Analyzed   | Method Blank    | BS  | % Recovery | True Value QC | RPD   | Qualifier |
| TDS*      | 915    | 5.00            | 07/03/2013 | ND              | 244 | 102        | 240           | 0.157 |           |

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

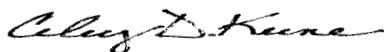
**Notes and Definitions**

|     |  |
|-----|--|
| ND  | Analyte NOT DETECTED at or above the reporting limit   |
| RPD | Relative Percent Difference  |
| **  | Samples not received at proper temperature of 6°C or below.  |
| *** | Insufficient time to reach temperature.  |
| -   | Chloride by SM4500Cl-B does not require samples be received at or below 6°C<br>Samples reported on an as received basis (wet) unless otherwise noted on report |

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Celey D. Keene, Lab Director/Quality Manager



