

AP - 27

# STAGE 2 WORKPLANS

Date:  
4-17-12



**TETRA TECH**

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April 17, 2012

Mr. Edward Hansen  
New Mexico Energy, Minerals, & Natural Resources Dept.  
Oil Conservation Division, Environmental Bureau  
1220 S. St. Francis Drive  
Santa Fe, New Mexico 87505

**Re: Proposed Groundwater Chloride Remediation, Rice Operating Company, E-15 Release, BD SWD System, Unit D&E, Section 15, T-22-S, R-37-E, Lea County, New Mexico, NMOCD CASE #AP-027.**

Mr. Hansen:

Tetra Tech Inc. (Tetra Tech) submits the following Proposed Groundwater Chloride Remediation Plan for the Rice Operating Company (ROC), E-15 Release, located in the BD Salt Water Disposal System. ROC is the service provider (agent) for the BD Salt Water Disposal System and has no ownership of any portion of the pipeline, well or facility. The BD SWD system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

### **Background**

On March 29, 2000, a leak was discovered on the pipeline adjacent to the E-15 junction box. According to the form C-141 (Initial) filed with the NMOCD, the spill was due to a rupture in a steel dresser sleeve. An unknown volume of produced water was discharged with 300 barrels of fluid recovered. Regional groundwater information indicates that the depth to groundwater is approximately 75 feet below ground surface (bgs). See Figures 1 and 2 for site location.

**Tetra Tech**

1910 North Big Spring, Midland, TX 79705

Tel 432.682.4559 Fax 432.682.3946 [www.tetrattech.com](http://www.tetrattech.com)



During March 2000, approximately 2,000 cubic yards of soil were excavated and transported offsite for disposal. The site was backfilled with clean soil and brought up to grade. Initial soil sampling indicated the site was impacted with chlorides. In order to delineate the site, between January 22, 2001 and February 11, 2005, six monitor wells, two recovery wells and six borings were installed at the site. Initial testing indicated the groundwater was impacted with chlorides.

On January 26, 2001, a Notice of Groundwater Impact was submitted to Mr. Wayne Price of the NMOCD in Santa Fe, New Mexico. A Stage 1/Stage 2 Abatement Plan was requested by the NMOCD and was submitted to the state on June 5, 2001. The abatement plan requested additional soil borings and monitor wells at the site to complete vertical and horizontal delineation.

To complete delineation and remediation of the vadose zone, in January 2002, the release area was excavated to dimensions of 140 feet x 160 feet x 35 feet below ground surface (bgs). Sidewall samples were collected and confirmed that TPH and BTEX RRAL's had been achieved and chloride concentrations were at or below 250 mg/Kg. A clay barrier compacted to a minimum of 12 inches was constructed at the bottom of the excavation and tested for density. A 20 mil high density polyethylene (HDPE) liner was placed on top of the clay barrier and brought up the sides of the excavation to the surface. The excavated soils were placed back into the excavation up to a depth of 5 feet bgs. A top liner of 20 mil HDPE was placed into the excavation at that point and the remainder of the excavation was backfilled with clean topsoil and contoured to match the surrounding surface.

In September 2006, the NMOCD requested further expansion of the abatement plan to address chloride impacts under Mr. Boyd's property. The amended Stage 1/Stage 2 plan was resubmitted in November 2006.

In 2005, a groundwater remediation system was installed at the site to address the chloride impacts to the groundwater. Due to low volumes, silting, and equipment problems, the system was discontinued in 2007. Several of the silted or dry monitor wells were permanently abandoned (MW-5, MW-6 and RW-2). Since 2005, the four active monitor wells (MW-1 through MW-4) have been sampled on a quarterly basis. On January 7, 2011, ROC submitted a work plan detailing the installation of three additional monitor wells at the site in order to further delineate groundwater quality and to determine if groundwater exists throughout the entire site. The work plan was approved via email by the NMOCD on February 17, 2011.

**Monitor Well Installation**

As approved, three monitor wells MW-6R, MW-7 and MW-8 were installed on March 21-22, 2011. The monitor well locations are shown on the attached Figure 3. The total depths of the monitor wells ranged from 86 feet to 95 feet below ground surface (bgs).

A *Project Status Report* was submitted to the NMOCD on June 17, 2011 with proposed replacement of the monitor well with the highest chloride concentration (MW-2) with a 4-inch recovery well. NMOCD approved the plan on August 22, 2011. Based on the NMOCD approval, MW-2 was plugged and replaced with a 4-inch well (MW-2R) in October 2011. Monitor well MW-2R was developed in November 2011 with sampling initiated in January 2012. Initial sampling results were 6,800 mg/L chlorides. See Figure 3 for most recent analytical results.

**Proposed Groundwater Remediation**

Since the soils have already been previously removed at the site, ROC proposes to remediate the groundwater based on a set volume located within the original soils excavation. Based on groundwater sampling results, it appears that the up-gradient monitor well MW-1 is impacted from an up-gradient offsite source. This also applies to monitor well MW-8, which is outside the original junction box release area. As such, monitor well MW-8 was not utilized for determination of volume removal at the site.

The foot print of the original soils excavation at the former junction box (140 feet by 160 feet) encompasses the area of monitor well MW-2R (Figure 4). As such, monitor well MW-2R will be utilized as the recovery well for the calculated volume of impacted groundwater from the former junction box. If we take the surface area footprint of the excavation (rectangle) we end up with a release area of approximately 22,400 ft<sup>2</sup>. If we assume the aquifer thickness is 10 feet and the porosity of the underlying formation (very fine grain sugar sand) is 0.2, then the volume of impacted groundwater in the rectangular area underlying the site is calculated as follows:

$$22,400 \text{ ft}^2 \times 10 \text{ ft} \times 0.2 = 44,800 \text{ ft}^3$$

Assuming there is 7.48 gallons of water per cubic feet we end up with the following amount to be removed from monitor well MW-2R:

$$44,800 \text{ ft}^3 \times 7.48 \text{ gallons/ft}^3 = 335,104 \text{ gallons}$$

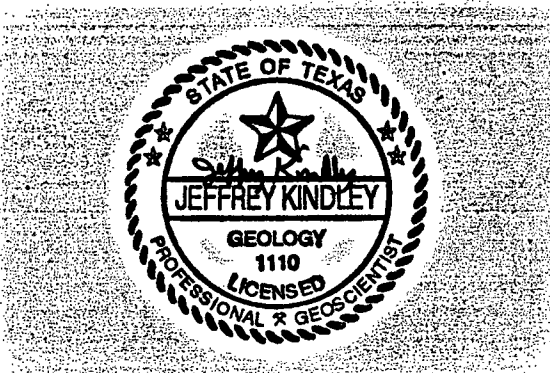
Therefore, ROC proposes to remove 335,104 gallons of chloride impacted groundwater from 4-inch recover well MW-2R. Removed groundwater will be



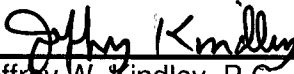
**TETRA TECH**

utilized for pipeline and well maintenance. A recovery system was previously installed in 2005, but was discontinued in 2007 due to low volumes, silting, and equipment problems. If groundwater can not sufficiently be removed from MW-2R, a report will be submitted to the NMOCD with recommendations.

If you have any questions or comments regarding the above proposed remediation methods for the onsite groundwater, please do not hesitate to contact me at (432) 682-4559 or Hack Conder of ROC at (575) 393-9174.



Respectfully Submitted,  
Tetra Tech, Inc.

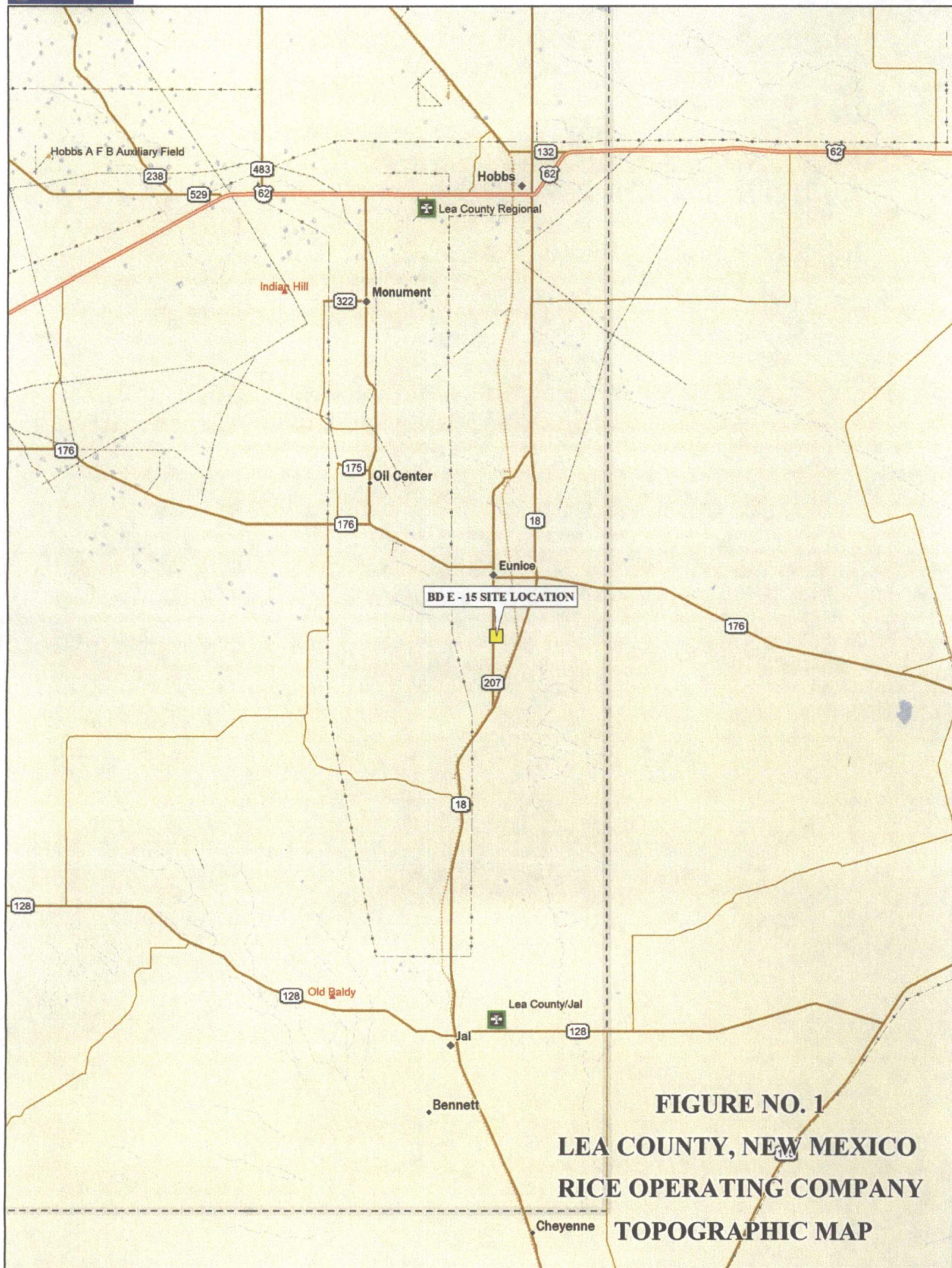
  
\_\_\_\_\_  
Jeffrey W. Kindley, P.G.  
Senior Project Manager

cc: Hack Conder –ROC  
Enclosures: Figures, Tables

## FIGURES

08



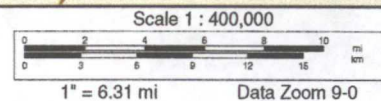


**FIGURE NO. 1**  
**LEA COUNTY, NEW MEXICO**  
**RICE OPERATING COMPANY**  
**TOPOGRAPHIC MAP**

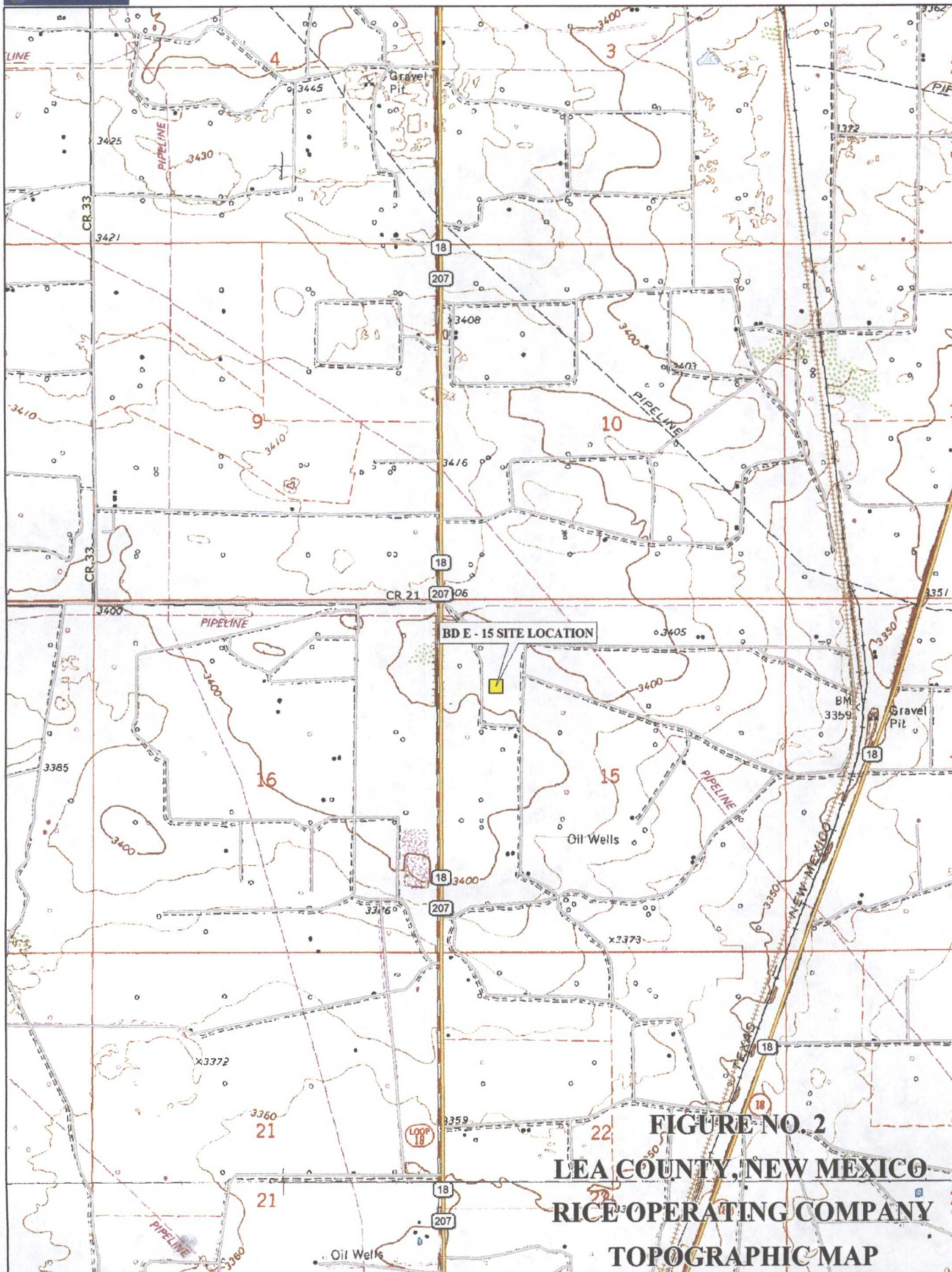
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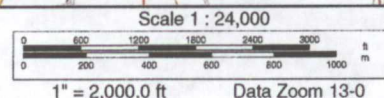




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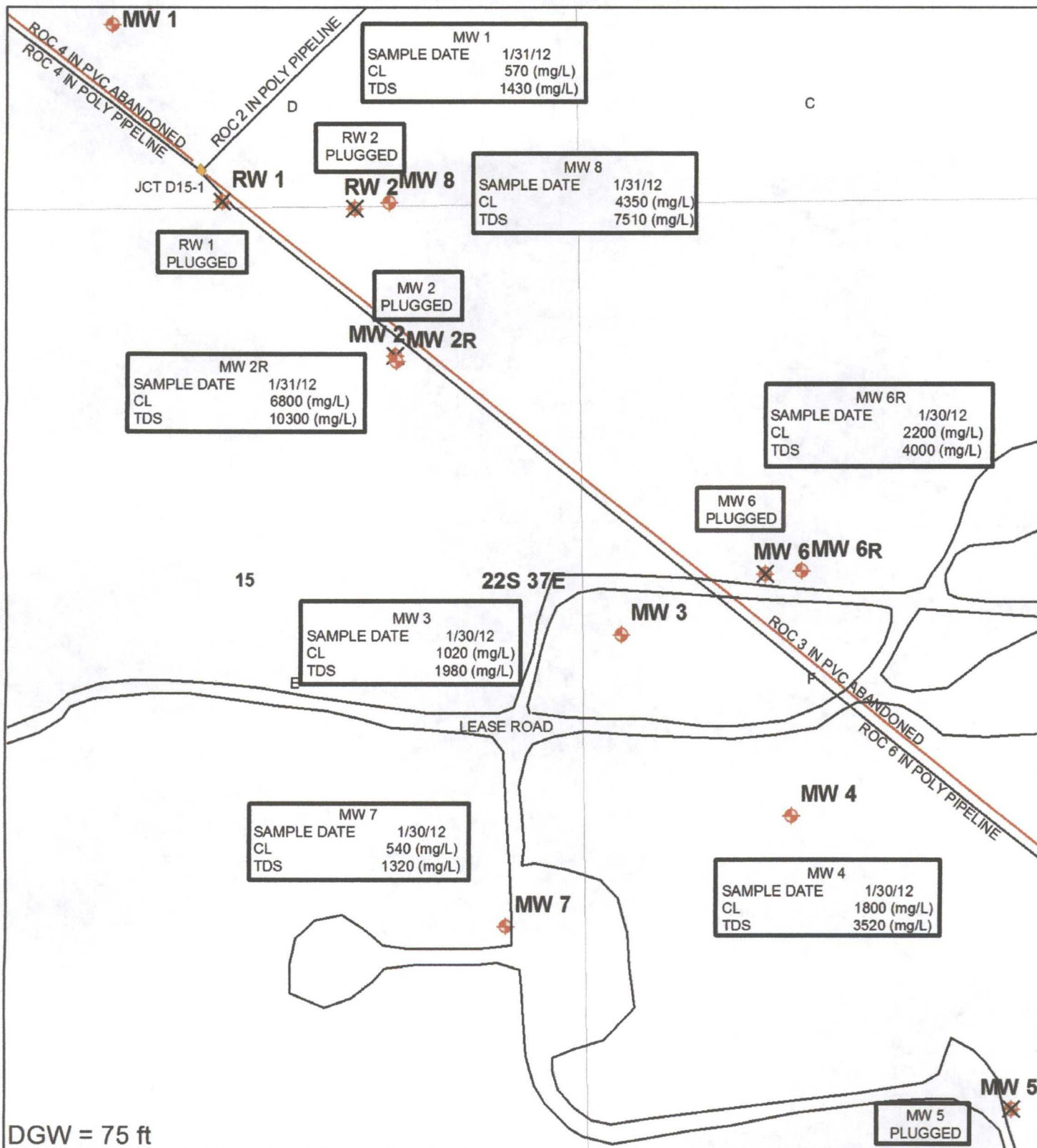
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# MW SAMPLING DATA

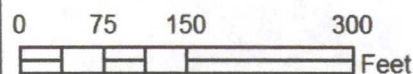


## BD E-15 LEAK

Legals: UL E SEC 15  
T-22-S R-37-E

Case #: AP 27

Figure 3



Drawing date: 4/16/12  
Drafted by: L. Weinheimer





**RICE OPERATING  
COMPANY**

FIGURE 4

BD E-15 SITE LOCATION

LEA COUNTY, NEW MEXICO

Project : 115-6403630

Date : 4/10/2012

File : H:\GIS\6403630



## TABLES



Table 1  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments     |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|--------------|
| 1  | xxx            | xxx         | xxx         | xxx           | 12/30/04    | 762     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx          |
| 1  | xxx            | xxx         | xxx         | xxx           | 02/11/05    | 663     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx          |
| 1  | xxx            | xxx         | xxx         | xxx           | 05/01/05    | 512     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx          |
| 1  | xxx            | xxx         | xxx         | xxx           | 08/30/05    | 1,760   | 3,350    | <0.001       | <0.001       | <0.001            | <0.001             | 215          | xxx          |
| 1  | 73.65          | 92.25       | 3.00        | 10            | 11/08/05    | 438     | 1,400    | <0.001       | <0.001       | <0.001            | <0.001             | 183          | xxx          |
| 1  | 73.41          | 92.25       | 3.00        | 9             | 02/07/06    | 387     | 1,270    | <0.001       | <0.001       | <0.001            | <0.001             | 181          | xxx          |
| 1  | 73.57          | 92.25       | 3.00        | 10            | 05/09/06    | 367     | 1,320    | <0.001       | <0.001       | <0.001            | <0.001             | 162          | xxx          |
| 1  | 73.62          | 92.25       | 3.00        | 10            | 08/29/06    | 501     | 1,410    | <0.001       | <0.001       | <0.001            | <0.001             | 249          | xxx          |
| 1  | 73.56          | 92.25       | 3.00        | 10            | 10/26/06    | 396     | 1,340    | <0.001       | <0.001       | <0.001            | <0.001             | 208          | xxx          |
| 1  | xxx            | xxx         | xxx         | xxx           | 02/12/07    | 587     | 1,460    | <0.001       | <0.001       | <0.001            | <0.001             | 249          | Red          |
| 1  | 73.60          | 91.96       | 2.90        | 10            | 04/24/07    | 480     | 1,470    | <0.001       | <0.001       | <0.001            | <0.001             | 221          | No odor      |
| 1  | 73.62          | 91.96       | 2.90        | 10            | 09/24/07    | 528     | 1,382    | <0.002       | <0.002       | <0.002            | <0.006             | 337          | No odor      |
| 1  | 73.63          | 91.96       | 2.90        | 10            | 11/30/07    | 430     | 1,423    | <0.002       | <0.002       | <0.002            | <0.006             | 190          | No odor      |
| 1  | 73.73          | 91.97       | 2.90        | 12            | 03/07/08    | 496     | 1,600    | <0.001       | <0.001       | <0.001            | <0.003             | 271          | No odor      |
| 1  | 73.70          | 91.97       | 2.90        | 12            | 05/30/08    | 464     | 1,360    | <0.002       | <0.002       | <0.002            | <0.006             | 240          | No odor      |
| 1  | 73.76          | 91.97       | 2.90        | 12            | 08/11/08    | 530     | 1,810    | <0.001       | <0.001       | <0.001            | <0.003             | 259          | No odor      |
| 1  | 73.90          | 91.97       | 2.90        | 12            | 11/14/08    | 700     | 1,870    | <0.001       | <0.001       | <0.001            | <0.003             | 177          | No odor      |
| 1  | 73.79          | 92.90       | 3.10        | 12            | 01/22/09    | 550     | 1,760    | <0.001       | <0.001       | <0.001            | <0.003             | 258          | No odor      |
| 1  | 73.84          | 94.76       | 3.30        | 12            | 04/23/09    | 460     | 1,450    | <0.001       | <0.001       | <0.001            | <0.003             | 210          | No odor      |
| 1  | 73.89          | 94.76       | 3.30        | 12            | 07/17/09    | 510     | 1,430    | <0.001       | <0.001       | <0.001            | <0.003             | 243          | No odor      |
| 1  | 73.91          | 94.76       | 3.30        | 12            | 10/14/09    | 550     | 1,520    | <0.001       | <0.001       | <0.001            | <0.003             | 212          | No odor      |
| 1  | 73.90          | 95.15       | 3.40        | 12            | 01/21/10    | 550     | 1,410    | <0.001       | <0.001       | <0.001            | <0.003             | 265          | No odor      |
| 1  | 73.93          | 95.15       | 3.40        | 12            | 04/14/10    | 500     | 1,300    | <0.001       | <0.001       | <0.001            | <0.003             | 256          | Silt/sand    |
| 1  | 73.88          | 95.15       | 3.40        | 12            | 07/19/10    | 570     | 1,400    | <0.001       | <0.001       | <0.001            | <0.003             | 242          | No odor      |
| 1  | 73.96          | 95.15       | 3.40        | 12            | 10/14/10    | 500     | 1,300    | <0.001       | <0.001       | <0.001            | <0.003             | 243          | Silt/no odor |
| 1  | 73.95          | 95.15       | 3.40        | 12            | 01/21/11    | 560     | 1,410    | <0.001       | <0.001       | <0.001            | <0.003             | 265          | Silt/no odor |
| 1  | 73.94          | 95.15       | 3.40        | 12            | 04/22/11    | 560     | 1,440    | <0.001       | <0.001       | <0.001            | <0.003             | 268          | Silt/no odor |
| 1  | 73.96          | 95.15       | 3.40        | 12            | 08/05/11    | 660     | 1,580    | <0.001       | <0.001       | <0.001            | <0.003             | 262          | Silt/no odor |
| 1  | 73.96          | 95.15       | 3.40        | 12            | 10/31/11    | 550     | 1,420    | <0.001       | <0.001       | <0.001            | <0.003             | 237          | Silt/no odor |
| 1  | 74.01          | 95.15       | 3.40        | 12            | 01/31/12    | 570     | 1,430    | <0.001       | <0.001       | <0.001            | <0.003             | 232          | Silt/no odor |



Graph 1  
Rice Operating Company  
MW-1  
BD E-15  
Lea County, New Mexico

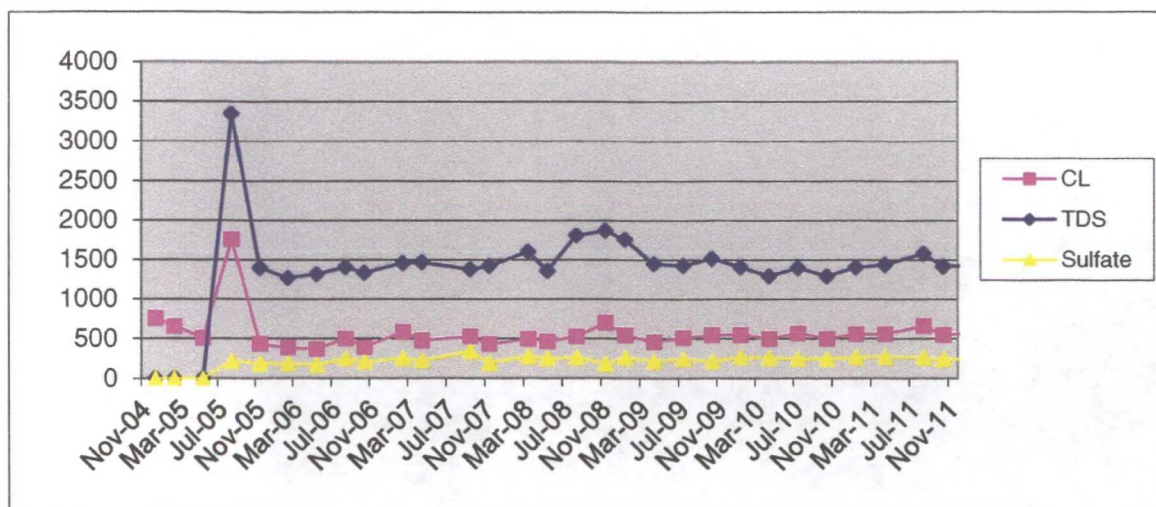


Table 2  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments      |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|---------------|
| 2  | xxx            | xxx         | xxx         | xxx           | 12/30/04    | 25,400  | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 2  | xxx            | xxx         | xxx         | xxx           | 02/11/05    | 18,000  | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 2  | xxx            | xxx         | xxx         | xxx           | 05/01/05    | 23,900  | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 2  | xxx            | xxx         | xxx         | xxx           | 08/30/05    | 676     | 1,810    | <0.001       | <0.001       | <0.001            | <0.001             | 229          | xxx           |
| 2  | 76.45          | 86.75       | 1.60        | 6             | 11/08/05    | 17,200  | 28,600   | 0.00116      | <0.001       | <0.001            | <0.001             | 1140         | xxx           |
| 2  | 76.33          | 86.57       | 1.70        | 6             | 02/07/06    | 17,700  | 29,700   | <0.001       | <0.001       | <0.001            | <0.001             | 1140         | xxx           |
| 2  | 76.38          | 86.75       | 1.70        | 10            | 05/09/06    | 16,200  | 26,600   | <0.001       | <0.001       | <0.001            | <0.001             | 1380         | xxx           |
| 2  | 76.44          | 86.75       | 1.60        | 10            | 08/29/06    | 15,500  | 25,100   | <0.001       | <0.001       | <0.001            | <0.001             | 986          | Red color     |
| 2  | 76.45          | 86.75       | 1.60        | 69            | 10/26/06    | 14,300  | 29,600   | <0.001       | <0.001       | <0.001            | <0.001             | 801          | Red color     |
| 2  | xxx            | xxx         | xxx         | xxx           | 02/12/07    | 12,800  | 19,500   | <0.001       | <0.001       | <0.001            | <0.001             | 691          | xxx           |
| 2  | 76.44          | 87.40       | 1.80        | 7             | 04/24/07    | 11,300  | 23,500   | <0.001       | <0.001       | <0.001            | <0.001             | 588          | Clear/no odor |
| 2  | xxx            | xxx         | xxx         | xxx           | 09/24/07    | 9,497   | 16,202   | <0.002       | <0.002       | <0.002            | <0.006             | 605          | Clear/no odor |
| 2  | xxx            | xxx         | xxx         | xxx           | 11/30/07    | 9,500   | 17,709   | <0.002       | <0.002       | <0.002            | <0.006             | 484          | Clear/no odor |
| 2  | xxx            | xxx         | xxx         | xxx           | 03/07/08    | 8,900   | 16,800   | <0.001       | <0.001       | <0.001            | <0.003             | 483          | Clear/no odor |
| 2  | 76.62          | 86.41       | 1.60        | 8             | 05/30/08    | 8,800   | 15,600   | <0.002       | <0.002       | <0.002            | <0.006             | 464          | Clear/no odor |
| 2  | 76.59          | 86.41       | 1.60        | 8             | 08/11/08    | 9,400   | 17,100   | <0.001       | <0.001       | <0.001            | <0.003             | 440          | Clear/no odor |
| 2  | 76.72          | 86.41       | 1.60        | 8             | 11/14/08    | 8,200   | 15,700   | <0.001       | <0.001       | <0.001            | <0.003             | 475          | Clear/no odor |
| 2  | 76.59          | 86.42       | 1.60        | 8             | 01/22/09    | 8,700   | 16,700   | <0.001       | <0.001       | <0.001            | <0.003             | 481          | Clear/no odor |
| 2  | 76.63          | 86.42       | 1.60        | 8             | 04/23/09    | 7,400   | 15,500   | <0.001       | <0.001       | <0.001            | <0.003             | 436          | Clear/no odor |
| 2  | 76.68          | 86.42       | 1.60        | 8             | 07/17/09    | 7,700   | 13,600   | <0.001       | <0.001       | <0.001            | <0.003             | 384          | Clear/no odor |
| 2  | 76.91          | 86.42       | 1.50        | 8             | 10/14/09    | 7,500   | 13,300   | <0.001       | <0.001       | <0.001            | <0.003             | 380          | Clear/no odor |
| 2  | 76.63          | 86.85       | 1.60        | 8             | 01/21/10    | 7,300   | 13,700   | <0.001       | <0.001       | <0.001            | <0.003             | 456          | Clear/no odor |
| 2  | 76.66          | 86.85       | 1.60        | 8             | 04/14/10    | 7,100   | 12,100   | <0.001       | <0.001       | <0.001            | <0.003             | 445          | Clear/no odor |
| 2  | 76.67          | 86.85       | 1.60        | 8             | 07/19/10    | 6,200   | 10,500   | <0.001       | <0.001       | <0.001            | <0.003             | 320          | Clear/no odor |
| 2  | 76.65          | 86.85       | 1.60        | 8             | 10/14/10    | 6,500   | 10,900   | <0.001       | <0.001       | <0.001            | <0.003             | 385          | Clear/no odor |
| 2  | 76.69          | 86.87       | 1.60        | 8             | 01/21/11    | 6,100   | 10,100   | <0.001       | <0.001       | <0.001            | <0.003             | 351          | Clear/no odor |
| 2  | 76.68          | 86.87       | 1.60        | 8             | 04/21/11    | 7,000   | 12,700   | <0.001       | <0.001       | <0.001            | <0.003             | 387          | Clear/no odor |
| 2  | 76.72          | 86.87       | 1.60        | 8             | 08/05/11    | 7,100   | 11,600   | <0.001       | <0.001       | <0.001            | <0.003             | 369          | Clear/no odor |

Graph 2  
Rice Operating Company  
MW-2  
BD E-15  
Lea County, New Mexico

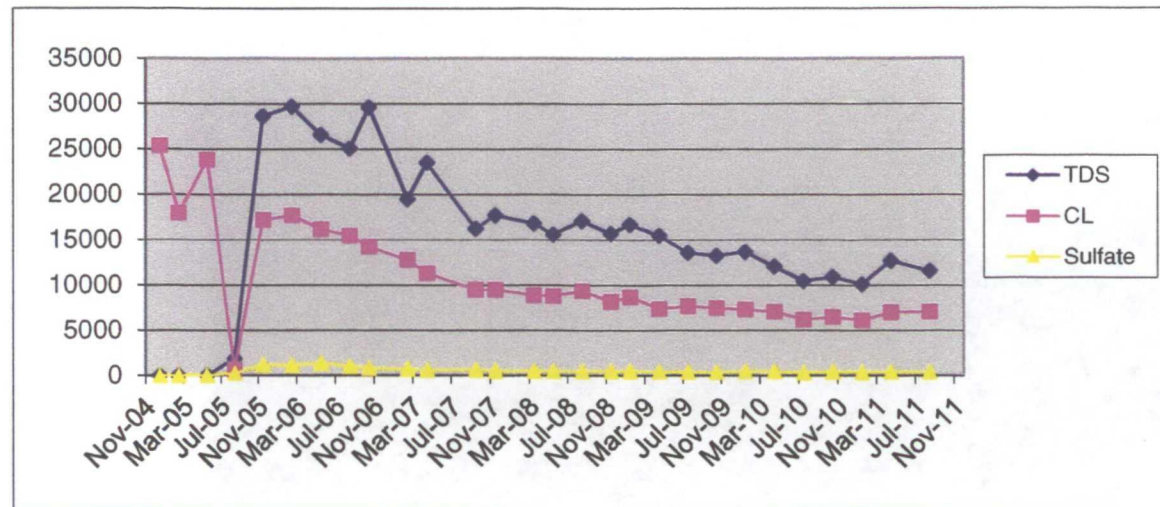




Table 3  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments      |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|---------------|
| 2R | 76.94          | 120.28      | 28.20       | 90            | 11/01/11    | ***     | ***      | ***          | ***          | ***               | ***                | ***          | Clear/no odor |
| 2R | 76.87          | 120.28      | 28.20       | 90            | 01/30/12    | 6800    | 10300    | <0.001       | <0.001       | <0.001            | <0.001             | 362          | Clear/no odor |

Graph 3  
Rice Operating Company  
MW-2R  
BD E-15  
Lea County, New Mexico

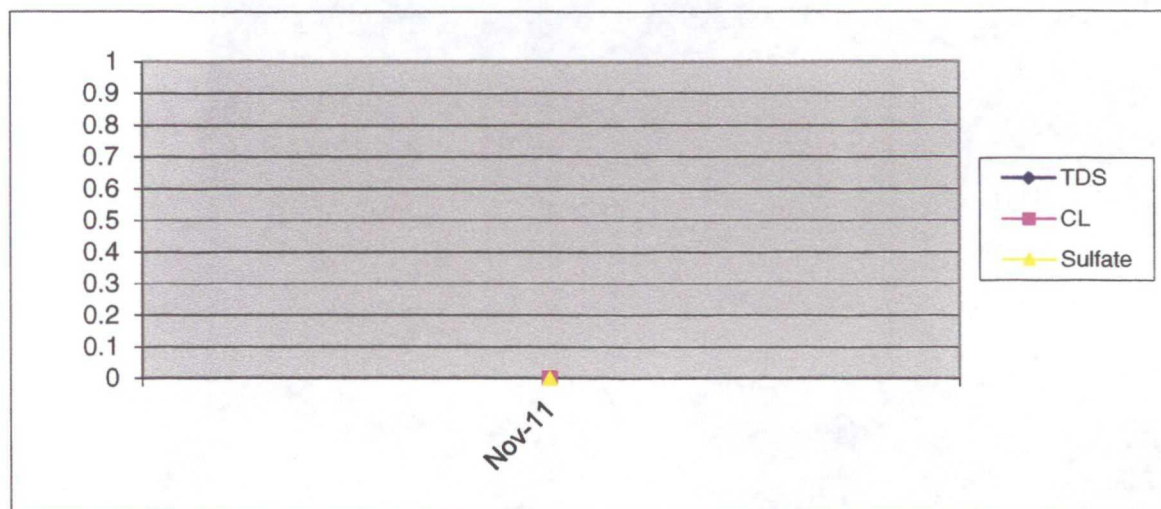


Table 3  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments      |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|---------------|
| 3  | xxx            | xxx         | xxx         | xxx           | 06/01/04    | 1,790   | 5,700    | <0.001       | <0.001       | <0.001            | <0.001             | 1250         | xxx           |
| 3  | xxx            | xxx         | xxx         | xxx           | 12/30/04    | 993     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 3  | xxx            | xxx         | xxx         | xxx           | 02/11/05    | 797     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 3  | xxx            | xxx         | xxx         | xxx           | 05/01/05    | 909     | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx           |
| 3  | 79.52          | 99.20       | 3.10        | 10            | 11/08/05    | 845     | 1,920    | <0.001       | <0.001       | <0.001            | <0.001             | 161          | xxx           |
| 3  | 78.83          | 99.20       | 3.30        | 10            | 02/07/06    | 769     | 1,750    | <0.001       | <0.001       | <0.001            | <0.001             | 157          | xxx           |
| 3  | 78.89          | 99.20       | 3.20        | 15            | 05/09/06    | 907     | 1,780    | <0.001       | <0.001       | <0.001            | <0.001             | 181          | xxx           |
| 3  | 78.95          | 99.20       | 3.20        | 15            | 08/29/06    | 728     | 1,730    | <0.001       | <0.001       | <0.001            | <0.001             | 191          | Clear         |
| 3  | 79.01          | 99.20       | 3.20        | 10            | 10/26/06    | 719     | 1,910    | <0.001       | <0.001       | <0.001            | <0.001             | 171          | Clear         |
| 3  | xxx            | xxx         | xxx         | xxx           | 02/12/07    | 768     | 1,830    | <0.001       | <0.001       | <0.001            | <0.001             | 175          | xxx           |
| 3  | 78.92          | 99.20       | 3.20        | 10            | 04/24/07    | 664     | 1,730    | <0.001       | <0.001       | <0.001            | <0.001             | 161          | Clear/no odor |
| 3  | 78.98          | 99.20       | 3.20        | 10            | 09/24/07    | 750     | 2,265    | <0.002       | <0.002       | <0.002            | <0.006             | 261          | Clear/no odor |
| 3  | 78.95          | 99.20       | 3.20        | 10            | 11/30/07    | 740     | 1,833    | <0.002       | <0.002       | <0.002            | <0.006             | 158          | Clear/no odor |
| 3  | 78.98          | 99.28       | 3.20        | 12            | 03/07/08    | 750     | 1,790    | <0.001       | <0.001       | <0.001            | <0.003             | 207          | Clear/no odor |
| 3  | 78.99          | 99.28       | 3.20        | 12            | 05/30/08    | 790     | 2,010    | <0.002       | <0.002       | <0.002            | <0.006             | 213          | Clear/no odor |
| 3  | 79.07          | 99.28       | 3.20        | 12            | 08/11/08    | 760     | 2,080    | <0.001       | <0.001       | <0.001            | <0.003             | 205          | Clear/no odor |
| 3  | 79.19          | 99.28       | 3.20        | 12            | 11/14/08    | 780     | 2,140    | <0.001       | <0.001       | <0.001            | <0.003             | 193          | Clear/no odor |
| 3  | 79.04          | 99.31       | 3.20        | 12            | 01/22/09    | 810     | 2,190    | <0.001       | <0.001       | <0.001            | <0.003             | 194          | Clear/no odor |
| 3  | 79.12          | 99.31       | 3.20        | 12            | 04/23/09    | 880     | 2,100    | <0.001       | <0.001       | <0.001            | <0.003             | 203          | Clear/no odor |
| 3  | 79.17          | 99.31       | 3.20        | 12            | 07/17/09    | 880     | 1,890    | <0.001       | <0.001       | <0.001            | <0.003             | 181          | Clear/no odor |
| 3  | 79.10          | 99.31       | 3.20        | 12            | 10/14/09    | 890     | 2,430    | <0.001       | <0.001       | <0.001            | <0.003             | 165          | Clear/no odor |
| 3  | 79.05          | 99.29       | 3.20        | 12            | 01/21/10    | 950     | 2,270    | <0.001       | <0.001       | <0.001            | <0.003             | 216          | Clear/no odor |
| 3  | 79.08          | 99.29       | 3.20        | 12            | 04/14/10    | 900     | 1,890    | <0.001       | <0.001       | <0.001            | <0.003             | 206          | Clear/no odor |
| 3  | 79.07          | 99.29       | 3.20        | 12            | 07/19/10    | 1,060   | 2,150    | <0.001       | <0.001       | <0.001            | <0.003             | 204          | Clear/no odor |
| 3  | 79.08          | 99.29       | 3.20        | 12            | 10/14/10    | 950     | 2,500    | <0.001       | <0.001       | <0.001            | <0.003             | 193          | Clear/no odor |
| 3  | 79.09          | 99.29       | 3.20        | 12            | 01/21/11    | 1,060   | 2,100    | <0.001       | <0.001       | <0.001            | <0.003             | 216          | Clear/no odor |
| 3  | 79.07          | 99.29       | 3.20        | 12            | 04/21/11    | 1,020   | 2,330    | <0.001       | <0.001       | <0.001            | <0.003             | 194          | Clear/no odor |
| 3  | 79.14          | 99.29       | 3.20        | 12            | 08/05/11    | 1,060   | 2,410    | <0.001       | <0.001       | <0.001            | <0.003             | 159          | Clear/no odor |
| 3  | 79.19          | 99.29       | 3.20        | 12            | 10/31/11    | 1,040   | 2,090    | <0.001       | <0.001       | <0.001            | <0.003             | 189          | Clear/no odor |
| 3  | 79.22          | 99.29       | 3.20        | 12            | 01/30/12    | 1,020   | 1,980    | <0.001       | <0.001       | <0.001            | <0.003             | 218          | Clear/no odor |

Graph 3  
Rice Operating Company  
MW-3  
BD E-15  
Lea County, New Mexico

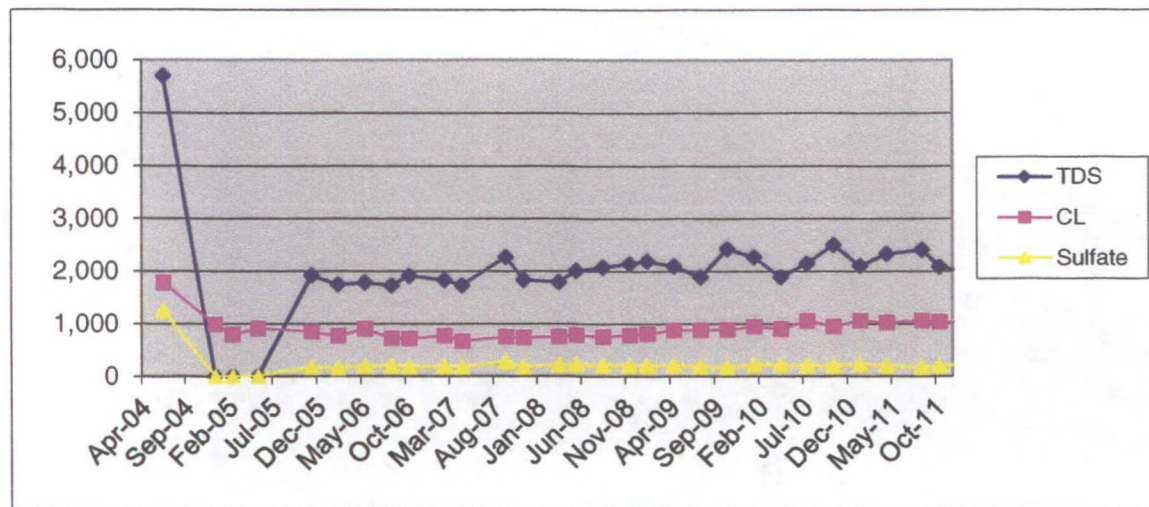


Table 4  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments       |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|----------------|
| 4  | xxx            | xxx         | xxx         | xxx           | 05/08/04    | 1,880   | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx            |
| 4  | xxx            | xxx         | xxx         | xxx           | 10/01/04    | 1,840   | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx            |
| 4  | xxx            | xxx         | xxx         | xxx           | 12/30/04    | 1,840   | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx            |
| 4  | xxx            | xxx         | xxx         | xxx           | 02/11/05    | 1,400   | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx            |
| 4  | xxx            | xxx         | xxx         | xxx           | 05/01/05    | 1,970   | xxx      | xxx          | xxx          | xxx               | xxx                | xxx          | xxx            |
| 4  | xxx            | xxx         | xxx         | xxx           | 08/30/05    | 1,000   | 2,430    | <0.001       | <0.001       | <0.001            | <0.001             | 328          | xxx            |
| 4  | 86.21          | 98.55       | 2.00        | 7             | 11/08/05    | 1,510   | 4,020    | <0.001       | <0.001       | <0.001            | <0.001             | 413          | xxx            |
| 4  | 85.67          | 98.55       | 2.10        | 7             | 02/07/06    | 1,550   | 3,950    | <0.001       | <0.001       | <0.001            | <0.001             | 425          | xxx            |
| 4  | 86.13          | 98.55       | 2.00        | 10            | 05/09/06    | 1,820   | 3,720    | <0.001       | <0.001       | <0.001            | <0.001             | 474          | xxx            |
| 4  | 86.24          | 98.55       | 2.00        | 10            | 08/29/06    | 1,580   | 3,400    | <0.001       | <0.001       | <0.001            | <0.001             | 520          | Red color      |
| 4  | 85.99          | 98.55       | 2.00        | 10            | 10/26/06    | 1,530   | 3,840    | <0.001       | <0.001       | <0.001            | <0.001             | 482          | Red color      |
| 4  | xxx            | xxx         | xxx         | xxx           | 02/12/07    | 1,850   | 3,710    | <0.001       | <0.001       | <0.001            | <0.001             | 561          | xxx            |
| 4  | 85.58          | 98.50       | 2.10        | 8             | 04/24/07    | 1,360   | 3,010    | <0.001       | <0.001       | <0.001            | <0.001             | 376          | Clear/no odor  |
| 4  | 85.78          | 98.50       | 2.00        | 8             | 09/24/07    | 1,600   | 3,924    | <0.002       | <0.002       | <0.002            | <0.006             | 535          | Clear/no odor  |
| 4  | 86.30          | 98.50       | 2.00        | 9             | 11/30/07    | 1,720   | 3,906    | <0.002       | <0.002       | <0.002            | <0.006             | 468          | Clear/no odor  |
| 4  | 85.49          | 98.50       | 2.10        | 8             | 03/07/08    | 1,720   | 3,700    | <0.001       | <0.001       | <0.001            | <0.003             | 462          | Clear/no odor  |
| 4  | 86.18          | 98.50       | 2.00        | 8             | 05/30/08    | 1,640   | 4,300    | <0.002       | <0.002       | <0.002            | <0.006             | 450          | Clear/no odor  |
| 4  | 87.57          | 98.50       | 1.70        | 8             | 08/11/08    | 1,620   | 4,590    | <0.001       | <0.001       | <0.001            | <0.003             | 543          | Clear/no odor  |
| 4  | 86.45          | 98.50       | 1.90        | 8             | 11/14/08    | 1,780   | 4,390    | <0.001       | <0.001       | <0.001            | <0.003             | 623          | Clear/no odor  |
| 4  | 85.85          | 98.26       | 2.00        | 8             | 01/22/09    | 1,780   | 4,610    | <0.001       | <0.001       | <0.001            | <0.003             | 527          | Clear/no odor  |
| 4  | 86.35          | 98.26       | 1.90        | 8             | 04/23/09    | 1,660   | 4,570    | <0.001       | <0.001       | <0.001            | <0.003             | 501          | Clear/no odor  |
| 4  | 86.11          | 98.26       | 1.90        | 8             | 07/17/09    | 1,700   | 3,720    | <0.001       | <0.001       | <0.001            | <0.003             | 490          | Clear/no odor  |
| 4  | 85.65          | 98.26       | 2.00        | 8             | 10/14/09    | 1,640   | 3,440    | <0.001       | <0.001       | <0.001            | <0.003             | 416          | Clear/no odor  |
| 4  | 85.33          | 98.18       | 2.10        | 8             | 01/21/10    | 1,800   | 3,960    | <0.001       | <0.001       | <0.001            | <0.003             | 513          | Red silt/clear |
| 4  | 85.48          | 98.18       | 2.00        | 8             | 04/14/10    | 1,660   | 3,570    | <0.001       | <0.001       | <0.001            | <0.003             | 453          | Red silt/clear |
| 4  | 85.47          | 98.18       | 2.00        | 8             | 07/19/10    | 1,840   | 3,700    | <0.001       | <0.001       | <0.001            | <0.003             | 483          | Red silt/clear |
| 4  | 85.77          | 98.18       | 2.00        | 8             | 10/14/10    | 1,880   | 4,740    | <0.001       | <0.001       | <0.001            | <0.003             | 536          | Red silt/clear |
| 4  | 85.54          | 98.24       | 2.00        | 8             | 01/21/11    | 1,780   | 3,650    | <0.001       | <0.001       | <0.001            | <0.003             | 556          | Red silt/clear |
| 4  | 85.50          | 98.24       | 2.00        | 8             | 04/21/11    | 1,860   | 3,560    | <0.001       | <0.001       | <0.001            | <0.003             | 590          | Red silt/clear |
| 4  | 85.71          | 98.24       | 2.00        | 8             | 08/05/11    | 1,640   | 3,590    | <0.001       | <0.001       | <0.001            | <0.003             | 478          | Red silt/clear |
| 4  | 87.17          | 98.24       | 1.80        | 8             | 10/31/11    | 1,880   | 3,690    | <0.001       | <0.001       | <0.001            | <0.003             | 508          | Red silt/clear |
| 4  | 86.06          | 98.24       | 1.90        | 8             | 01/30/12    | 1,800   | 3,520    | <0.001       | <0.001       | <0.001            | <0.003             | 474          | Red silt/clear |



Graph 4  
Rice Operating Company  
MW-4  
BD E-15  
Lea County, New Mexico

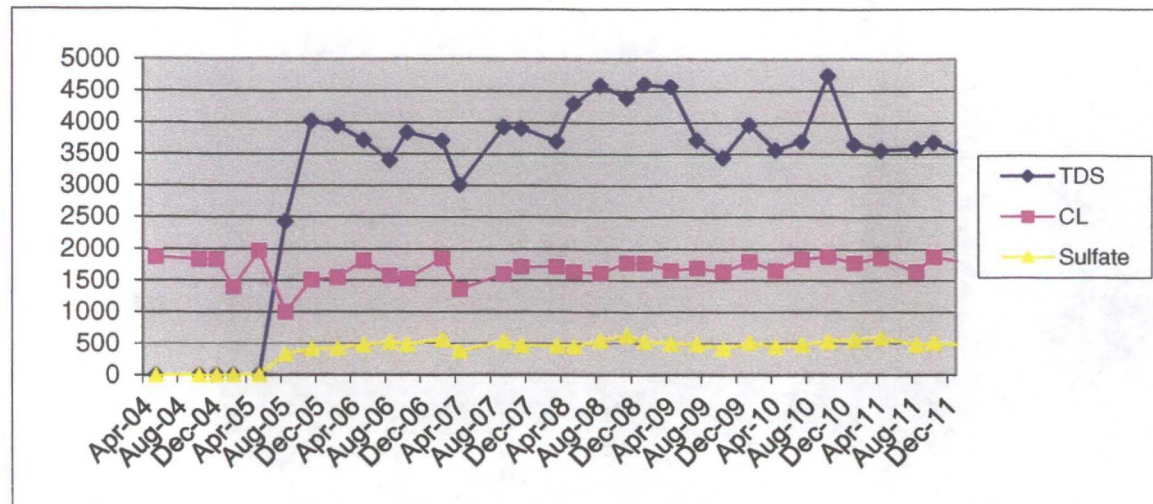


Table 5  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments     |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|--------------|
| 6R | 76.72          | 97.95       | 3.40        | 15            | 04/21/11    | 2,220   | 3,990    | <0.001       | <0.001       | <0.001            | <0.003             | 496          | Silt/no odor |
| 6R | 77.03          | 97.95       | 3.30        | 15            | 08/05/11    | 2,200   | 4,850    | <0.001       | <0.001       | <0.001            | <0.003             | 413          | Silt/no odor |
| 6R | 77.08          | 97.95       | 3.30        | 15            | 10/31/11    | 2,300   | 4,420    | <0.001       | <0.001       | <0.001            | <0.003             | 466          | Silt/no odor |
| 6R | 76.87          | 97.95       | 3.40        | 15            | 01/30/12    | 2,200   | 4,000    | <0.001       | <0.001       | <0.001            | <0.003             | 455          | Silt/no odor |

Graph 5  
Rice Operating Company  
MW-6R  
BD E-15  
Lea County, New Mexico

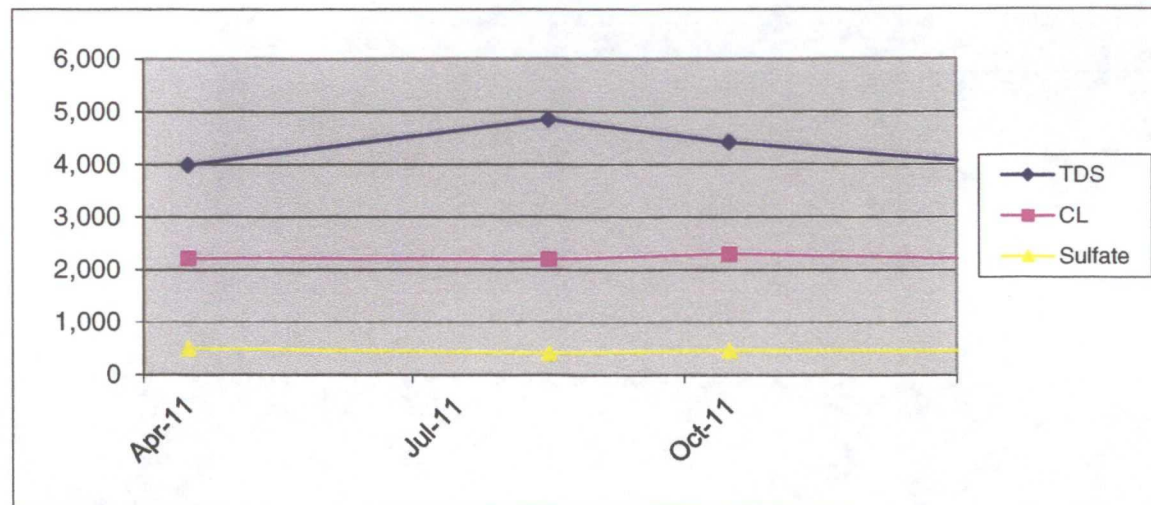


Table 6  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments     |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|--------------|
| 7  | 86.79          | 92.80       | 1.00        | 5             | 04/21/11    | 549     | 1,290    | <0.001       | <0.001       | <0.001            | <0.003             | 262          | Silt/no odor |
| 7  | 86.87          | 92.80       | 0.90        | 5             | 08/05/11    | 540     | 1,470    | <0.001       | <0.001       | <0.001            | <0.003             | 217          | Silt/no odor |
| 7  | 86.90          | 92.80       | 0.90        | 5             | 10/31/11    | 600     | 1,490    | <0.001       | <0.001       | <0.001            | <0.003             | 236          | Silt/no odor |
| 7  | 86.96          | 92.80       | 0.90        | 5             | 01/30/12    | 540     | 1,320    | <0.001       | <0.001       | <0.001            | <0.003             | 264          | Silt/no odor |

Graph 6  
Rice Operating Company  
MW-7  
BD E-15  
Lea County, New Mexico

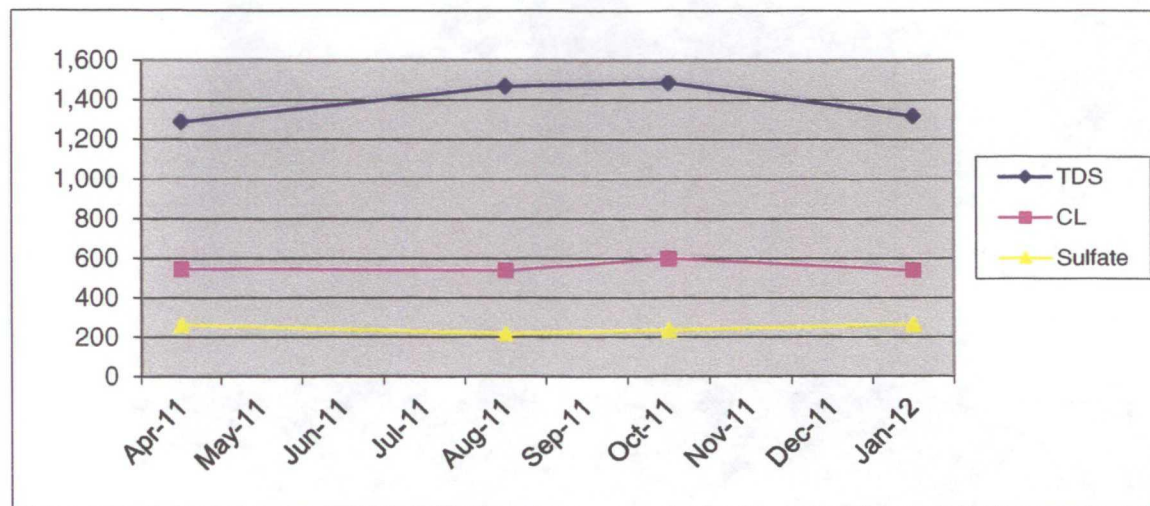
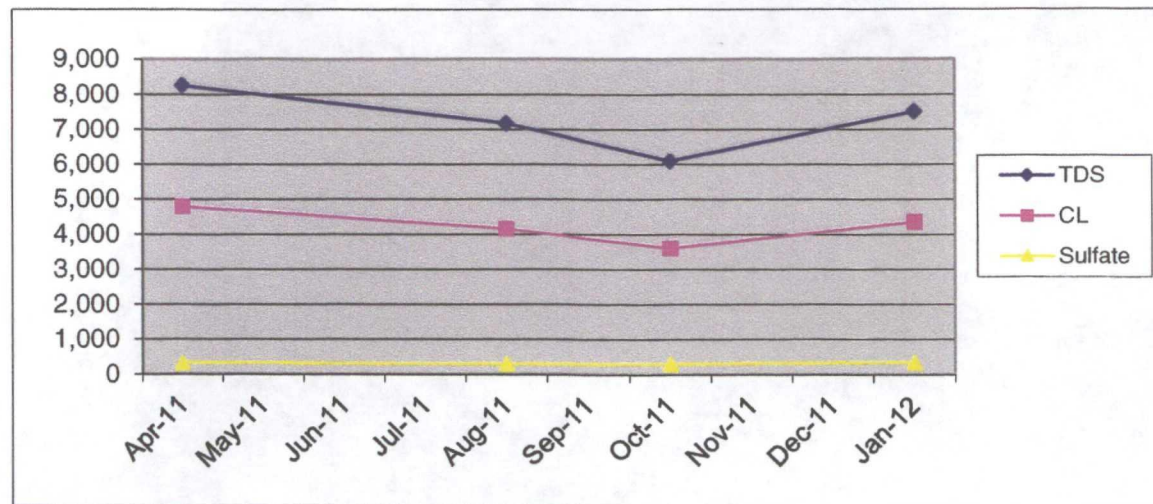




Table 7  
Rice Operating Company  
BD E-15  
Lea County, New Mexico

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl mg/L | TDS mg/L | Benzene mg/L | Toluene mg/L | EthylBenzene mg/L | Total Xylenes mg/L | Sulfate mg/L | Comments     |
|----|----------------|-------------|-------------|---------------|-------------|---------|----------|--------------|--------------|-------------------|--------------------|--------------|--------------|
| 8  | 74.47          | 85.68       | 1.80        | 8             | 04/22/11    | 4,800   | 8,260    | <0.001       | <0.001       | <0.001            | <0.003             | 320          | Silt/no odor |
| 8  | 74.51          | 85.68       | 1.80        | 8             | 08/05/11    | 4,150   | 7,170    | <0.001       | <0.001       | <0.001            | <0.003             | 290          | Silt/no odor |
| 8  | 74.50          | 85.68       | 1.80        | 8             | 10/31/11    | 3,600   | 6,100    | <0.001       | <0.001       | <0.001            | <0.003             | 295          | Silt/no odor |
| 8  | 74.54          | 85.68       | 1.80        | 8             | 01/31/12    | 4,350   | 7,510    | <0.001       | <0.001       | <0.001            | <0.003             | 337          | Silt/no odor |

Graph 7  
Rice Operating Company  
MW-8  
BD E-15  
Lea County, New Mexico





## *Arc Environmental*

P. O. Box 1772

Lovington, New Mexico 88260

(575) 631-9310

Rozanne Johnson ~ rozanne@valornet.com

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June 12, 2012

### **NOTES**

The following summarizes the field activities at the RICE BD E-15, Lea County T22S, R37E, Sec 15 Unit Letter E:

- There are seven wells at the site, six 2-inch and one 4-inch. A Solinst Water Level Meter is used during each sampling event to check the depth to water prior to pumping and bailing the wells. The water level in the several of the wells (monitor well #1, #2R, #3, #7 and #8) does not change significantly between sampling events and the recharge rate of the wells after purging indicates there is little to no influence from an existing underground water flow or aquifer. Each well is pumped at 0.25 gallons per minute until the wells will no longer pump. The wells are then bailed dry with a bailer. The wells recover to within 10 percent of the original depth in 2 to 4 hours. Purging the well dry is done three times before allowing the well to recover. Following well recovery the wells are sampled with a bailer. The wells continue to produce some fine clay silt material during each sampling event.
- The site is located in the eastern Eunice Plain area of Lea County, which is underlain by a hard caliche surface and is covered by a thin layer of reddish-brown dune sand. The dominant vegetation is bear grass, mesquite and grama grass. Cattle ranchers and oil production activities currently use the area.
- In this arid region the rate of recharge is very slow due to small rainfall amounts, the porosity of the formation consisting of low permeable rock and a presence of clay, which leaves sediments that are thinly saturated or dry. There is little underground flow of water in the area, again due to the formation.

Sincerely,

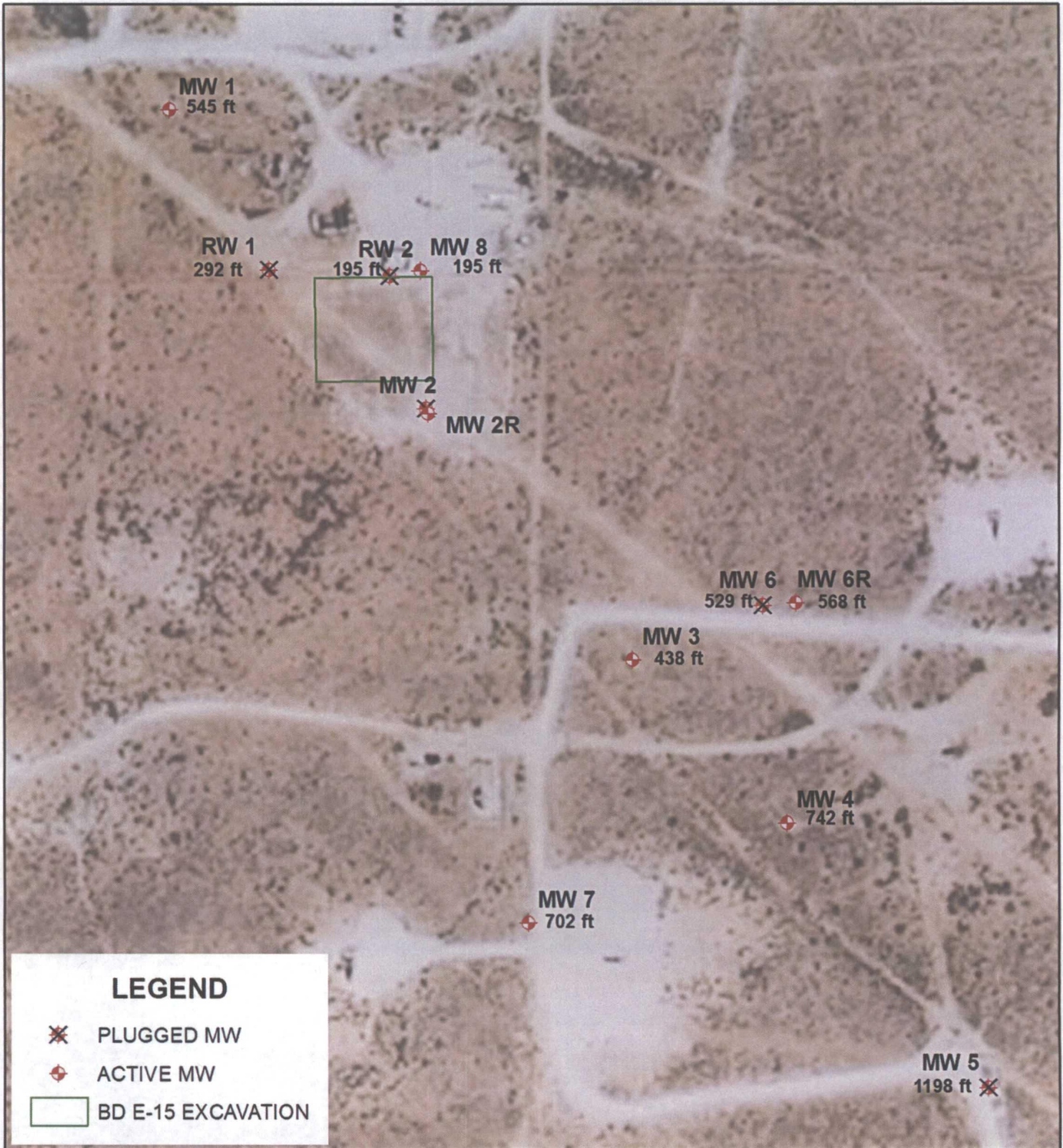
*Arc Environmental*

*Rozanne Johnson*

Rozanne Johnson

*Electronic Copy:*      Hack Conder  
                                 Laura Pena

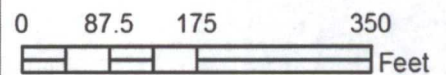
# MW Distances From MW-2



## *BD E-15 leak*

Legals: UL/E sec. 15  
T22S R37E

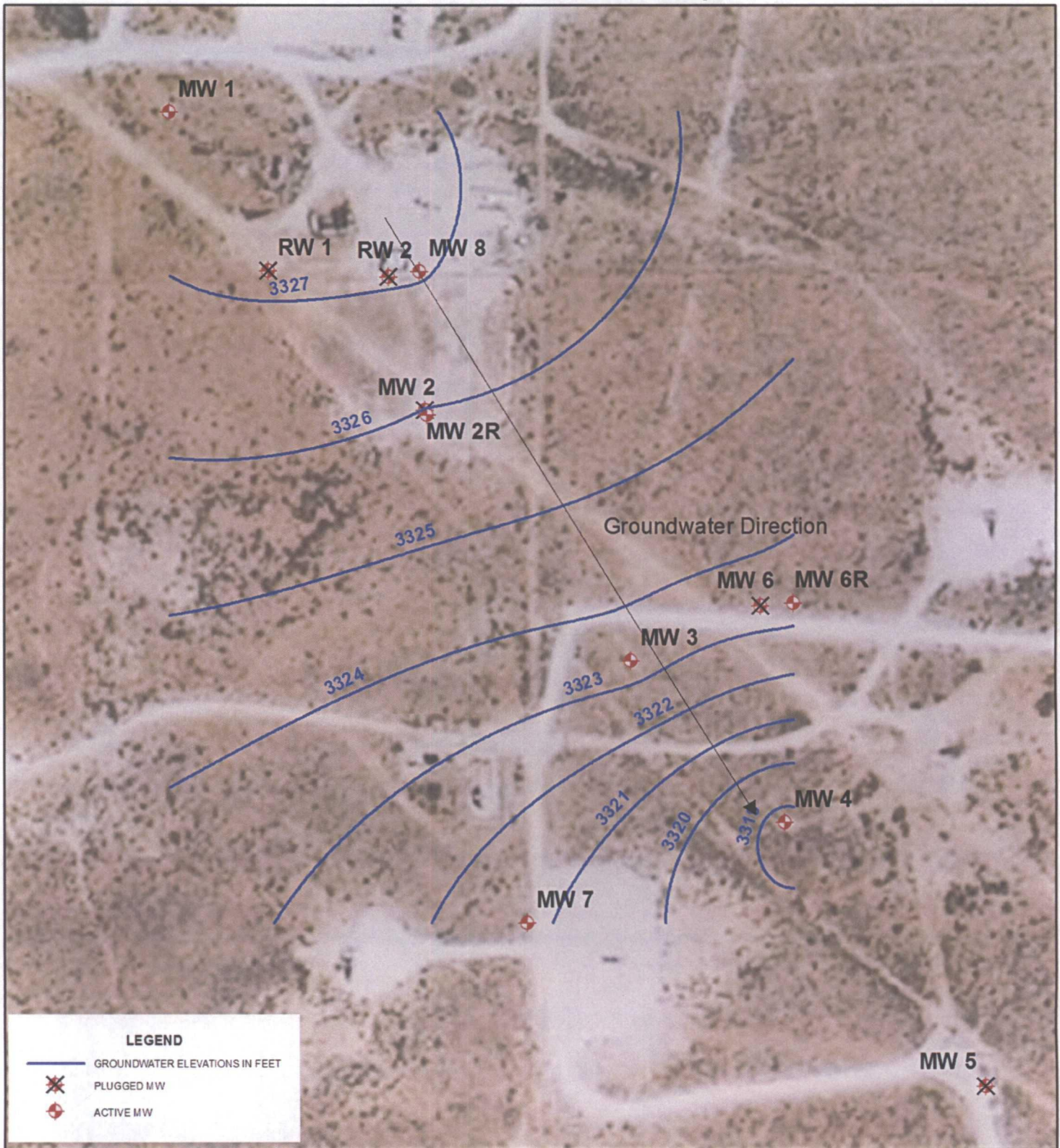
Case #: AP-027



Drawing date: 6-18-12  
Drafted by: L. Weinheimer



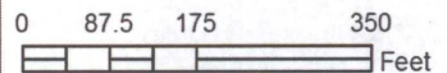
# Potentiometric Map



## ***BD E-15 leak***

Legals: UL/E sec. 15  
T22S R37E

Case #: AP-027



Drawing date: 6-18-12  
Drafted by: L. Weinheimer

# BD E-15 MW Data

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl    | TDS  | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Sulfate | Comments                  |
|----|----------------|-------------|-------------|---------------|-------------|-------|------|---------|---------|---------------|---------------|---------|---------------------------|
| 1  | XXX            | XXX         | XXX         | XXX           | 1/23/2001   | 19675 | XXX  | 0.001   | 0.001   | 0.001         | 0.001         | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 6/7/2002    | 28000 | XXX  | 0.002   | 0.006   | 0.003         | 0.055         | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 10/23/2002  | 39000 | XXX  | 0.013   | 0.011   | 0.016         | 0.084         | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 12/30/2004  | 762   | XXX  | XXX     | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 2/11/2005   | 663   | XXX  | XXX     | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 5/1/2005    | 512   | XXX  | XXX     | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 8/30/2005   | 1760  | 3350 | <0.001  | <0.001  | <0.001        | <0.001        | 215     | XXX                       |
| 1  | 73.65          | 92.25       | 3           | 10            | 11/8/2005   | 438   | 1400 | <0.001  | <0.001  | <0.001        | <0.001        | 183     | XXX                       |
| 1  | 73.41          | 92.25       | 3           | 9             | 2/7/2006    | 387   | 1270 | <0.001  | <0.001  | <0.001        | <0.001        | 181     | XXX                       |
| 1  | 73.57          | 92.25       | 3           | 10            | 5/9/2006    | 367   | 1320 | <0.001  | <0.001  | <0.001        | <0.001        | 162     | XXX                       |
| 1  | 73.62          | 92.25       | 3           | 10            | 8/29/2006   | 501   | 1410 | <0.001  | <0.001  | <0.001        | <0.001        | 249     | red                       |
| 1  | 73.56          | 92.25       | 3           | 10            | 10/26/2006  | 396   | 1340 | <0.001  | <0.001  | <0.001        | <0.001        | 208     | red                       |
| 1  | XXX            | XXX         | XXX         | XXX           | 2/12/2007   | 587   | 1460 | <0.001  | <0.001  | <0.001        | <0.001        | 249     | XXX                       |
| 1  | 73.6           | 91.96       | 2.9         | 10            | 4/24/2007   | 480   | 1470 | <0.001  | <0.001  | <0.001        | <0.001        | 221     | red silt and sand no odor |
| 1  | 73.62          | 91.96       | 2.9         | 10            | 9/24/2007   | 528   | 1382 | <0.002  | <0.002  | <0.002        | <0.006        | 337     | red silt and sand no odor |
| 1  | 73.63          | 91.96       | 2.9         | 10            | 11/30/2007  | 430   | 1423 | <0.002  | <0.002  | <0.002        | <0.006        | 190     | red silt and sand no odor |
| 1  | 73.73          | 91.97       | 2.9         | 12            | 3/7/2008    | 496   | 1600 | <0.001  | <0.001  | <0.001        | <0.003        | 271     | red silt and sand no odor |
| 1  | 73.7           | 91.97       | 2.9         | 12            | 5/30/2008   | 464   | 1360 | <0.002  | <0.002  | <0.002        | <0.006        | 240     | red silt and sand no odor |
| 1  | 73.89          | 94.76       | 3.3         | 12            | 7/17/2009   | 510   | 1430 | <0.001  | <0.001  | <0.001        | <0.003        | 243     | red silt and sand no odor |
| 1  | 73.76          | 91.97       | 2.9         | 12            | 8/11/2008   | 530   | 1810 | <0.001  | <0.001  | <0.001        | <0.003        | 259     | red silt and sand no odor |
| 1  | 73.9           | 91.97       | 2.9         | 12            | 11/14/2008  | 700   | 1870 | <0.001  | <0.001  | <0.001        | <0.003        | 177     | red silt and sand no odor |
| 1  | 73.79          | 92.9        | 3.1         | 12            | 1/22/2009   | 550   | 1760 | <0.001  | <0.001  | <0.001        | <0.003        | 258     | red silt and sand no odor |
| 1  | 73.84          | 94.76       | 3.3         | 12            | 4/23/2009   | 460   | 1450 | <0.001  | <0.001  | <0.001        | <0.003        | 210     | red silt and sand no odor |
| 1  | 73.91          | 94.76       | 3.3         | 12            | 10/14/2009  | 550   | 1520 | <0.001  | <0.001  | <0.001        | <0.003        | 212     | red silt and sand no odor |
| 1  | 73.9           | 95.15       | 3.4         | 12            | 1/21/2010   | 550   | 1410 | <0.001  | <0.001  | <0.001        | <0.003        | 265     | red silt and sand no odor |
| 1  | 73.93          | 95.15       | 3.4         | 12            | 4/14/2010   | 500   | 1300 | <0.001  | <0.001  | <0.001        | <0.003        | 256     | red silt and sand no odor |
| 1  | 73.88          | 95.15       | 3.4         | 12            | 7/19/2010   | 570   | 1400 | <0.001  | <0.001  | <0.001        | <0.003        | 242     | red silt and sand no odor |
| 1  | 73.96          | 95.15       | 3.4         | 12            | 10/14/2010  | 500   | 1300 | <0.001  | <0.001  | <0.001        | <0.003        | 243     | red silt and sand no odor |
| 1  | 73.95          | 95.15       | 3.4         | 12            | 1/21/2011   | 560   | 1410 | <0.001  | <0.001  | <0.001        | <0.003        | 265     | red silt and sand no odor |
| 1  | 73.94          | 95.15       | 3.4         | 12            | 4/22/2011   | 560   | 1440 | <0.001  | <0.001  | <0.001        | <0.003        | 268     | red silt and sand no odor |
| 1  | 73.96          | 95.15       | 3.4         | 12            | 8/5/2011    | 600   | 1580 | <0.001  | <0.001  | <0.001        | <0.003        | 262     | red silt and sand no odor |
| 1  | 73.96          | 95.15       | 3.4         | 12            | 10/31/2011  | 550   | 1420 | <0.001  | <0.001  | <0.001        | <0.003        | 237     | red silt and sand no odor |
| 1  | 74.01          | 95.15       | 3.4         | 12            | 1/31/2012   | 570   | 1430 | <0.001  | <0.001  | <0.001        | <0.003        | 232     | red silt and sand no odor |



| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl    | TDS   | Benzene     | Toluene     | Ethyl Benzene | Total Xylenes | Sulfate | Comments                        |
|----|----------------|-------------|-------------|---------------|-------------|-------|-------|-------------|-------------|---------------|---------------|---------|---------------------------------|
| 2  | XXX            | XXX         | XXX         | XXX           | 1/23/2001   | 780   | XXX   | <0.001      | <0.001      | <0.001        | <0.001        | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 2/27/2001   | 886   | XXX   | 0.001       | 0.001       | 0.001         | 0.001         | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 6/7/2002    | 857   | XXX   | 0.001       | 0.001       | 0.001         | 0.001         | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 10/23/2002  | 827   | XXX   | 0.017       | 0.026       | 0.029         | 0.21          | XXX     | XXX                             |
|    |                |             |             |               |             |       |       |             |             |               |               |         |                                 |
| 2  | XXX            | XXX         | XXX         | XXX           | 12/30/2004  | 25400 | XXX   | XXX         | XXX         | XXX           | XXX           | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 2/11/2005   | 18000 | XXX   | XXX         | XXX         | XXX           | XXX           | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 5/1/2005    | 23900 | XXX   | XXX         | XXX         | XXX           | XXX           | XXX     | XXX                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 8/30/2005   | 676   | 1810  | <0.001      | <0.001      | <0.001        | <0.001        | 229     | XXX                             |
| 2  | 76.45          | 86.75       | 1.6         | 6             | 11/8/2005   | 17200 | 28600 | 0.00116     | j[0.000814] | <0.001        | <0.001        | 1140    | XXX                             |
| 2  | 76.33          | 86.57       | 1.7         | 6             | 2/7/2006    | 17700 | 29700 | j[0.000610] | j[0.000414] | <0.001        | <0.001        | 1140    | XXX                             |
| 2  | 76.38          | 86.75       | 1.7         | 10            | 5/9/2006    | 16200 | 26600 | <0.001      | <0.001      | <0.001        | <0.001        | 1380    | XXX                             |
| 2  | 76.44          | 86.75       | 1.6         | 10            | 8/29/2006   | 15500 | 25100 | <0.001      | <0.001      | <0.001        | <0.001        | 986     | red                             |
| 2  | 76.45          | 86.75       | 1.6         | 69            | 10/26/2006  | 14300 | 29600 | <0.001      | <0.001      | <0.001        | <0.001        | 801     | red                             |
| 2  | XXX            | XXX         | XXX         | XXX           | 2/12/2007   | 12800 | 19500 | <0.001      | <0.001      | <0.001        | <0.001        | 691     | XXX                             |
| 2  | 76.44          | 87.4        | 1.8         | 7             | 4/24/2007   | 11300 | 23500 | <0.001      | <0.001      | <0.001        | <0.001        | 588     | red silt color to clear no odor |
| 2  | XXX            | XXX         | XXX         | XXX           | 9/24/2007   | 9497  | 16202 | <0.002      | <0.002      | <0.002        | <0.002        | 605     | clear no odor                   |
| 2  | XXX            | XXX         | XXX         | XXX           | 11/30/2007  | 9500  | 17709 | <0.002      | <0.002      | <0.002        | <0.002        | 484     | clear no odor                   |
| 2  | XXX            | XXX         | XXX         | XXX           | 3/7/2008    | 8900  | 16800 | <0.001      | <0.001      | <0.001        | <0.003        | 483     | clear no odor                   |
| 2  | 76.62          | 86.41       | 1.6         | 8             | 5/30/2008   | 8800  | 15600 | <0.002      | <0.002      | <0.002        | <0.006        | 464     | clear no odor                   |
| 2  | 76.59          | 86.41       | 1.6         | 8             | 8/11/2008   | 9400  | 17100 | <0.001      | <0.001      | <0.001        | <0.003        | 440     | clear no odor                   |
| 2  | 76.72          | 86.41       | 1.6         | 8             | 11/14/2008  | 8200  | 15700 | <0.001      | <0.001      | <0.001        | <0.003        | 475     | clear no odor                   |
| 2  | 76.59          | 86.42       | 1.6         | 8             | 1/22/2009   | 8700  | 16700 | <0.001      | <0.001      | <0.001        | <0.003        | 481     | clear no odor                   |
| 2  | 76.63          | 86.42       | 1.6         | 8             | 4/23/2009   | 7400  | 15500 | <0.001      | <0.001      | <0.001        | <0.003        | 436     | clear no odor                   |
| 2  | 76.68          | 86.42       | 1.6         | 8             | 7/17/2009   | 7700  | 13600 | <0.001      | <0.001      | <0.001        | <0.003        | 384     | clear no odor                   |
| 2  | 76.91          | 86.42       | 1.5         | 8             | 10/14/2009  | 7500  | 13300 | <0.001      | <0.001      | <0.001        | <0.003        | 380     | clear no odor                   |
| 2  | 76.63          | 86.85       | 1.6         | 8             | 1/21/2010   | 7300  | 13700 | <0.001      | <0.001      | <0.001        | <0.003        | 456     | clear no odor                   |
| 2  | 76.66          | 86.85       | 1.6         | 8             | 4/14/2010   | 7100  | 12100 | <0.001      | <0.001      | <0.001        | <0.003        | 445     | clear no odor                   |
| 2  | 76.67          | 86.85       | 1.6         | 8             | 7/19/2010   | 6200  | 10500 | <0.001      | <0.001      | <0.001        | <0.003        | 320     | clear no odor                   |
| 2  | 76.65          | 86.85       | 1.6         | 8             | 10/14/2010  | 6500  | 10900 | <0.001      | <0.001      | <0.001        | <0.003        | 385     | clear no odor                   |
| 2  | 76.69          | 86.87       | 1.6         | 8             | 1/21/2011   | 6100  | 10100 | <.001       | <.001       | <.001         | <.003         | 351     | clear no odor                   |
| 2  | 76.68          | 86.87       | 1.6         | 8             | 4/21/2011   | 7000  | 12700 | <0.001      | <0.001      | <0.001        | <0.003        | 387     | clear no odor                   |
| 2  | 76.72          | 86.87       | 1.6         | 8             | 8/5/2011    | 7100  | 11600 | <0.001      | <0.001      | <0.001        | <0.003        | 369     | clear no odor                   |

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | Cl    | TDS   | Benzene | Toluene | Ethyl Benzene | Total Xylenes | Sulfate | Comments      |
|----|----------------|-------------|-------------|---------------|-------------|-------|-------|---------|---------|---------------|---------------|---------|---------------|
|    |                |             |             |               |             |       |       |         |         |               |               |         |               |
| 3  | XXX            | XXX         | XXX         | XXX           | 6/7/2002    | 657   | XXX   | 0.001   | 0.001   | 0.001         | 0.001         | XXX     | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 10/23/2002  | 620   | XXX   | 0.001   | 0.001   | 0.001         | 0.001         | XXX     | XXX           |
| 3  | 86.2           | 100.2       | 2.2         | 7             | 6/1/2004    | 1790  | 5700  | <0.001  | <0.001  | <0.001        | <0.001        | 1250    | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 10/1/2004   | 904   | XXX   | XXX     | XXX     | XXX           | XXX           | XXX     | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 12/30/2004  | 993   | XXX   | XXX     | XXX     | XXX           | XXX           | XXX     | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 2/11/2005   | 797   | XXX   | XXX     | XXX     | XXX           | XXX           | XXX     | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 5/1/2005    | 909   | XXX   | XXX     | XXX     | XXX           | XXX           | XXX     | XXX           |
| 3  | XXX            | XXX         | XXX         | XXX           | 8/30/2005   | 24400 | 39300 | <0.001  | <0.001  | <0.001        | <0.001        | 797     | XXX           |
| 3  | 79.52          | 99.2        | 3.1         | 10            | 11/8/2005   | 845   | 1920  | <0.001  | <0.001  | <0.001        | <0.001        | 161     | XXX           |
| 3  | 78.83          | 99.2        | 3.3         | 10            | 2/7/2006    | 769   | 1750  | <0.001  | <0.001  | <0.001        | <0.001        | 157     | XXX           |
| 3  | 78.89          | 99.2        | 3.2         | 15            | 5/9/2006    | 907   | 1780  | <0.001  | <0.001  | <0.001        | <0.001        | 181     | XXX           |
| 3  | 78.95          | 99.2        | 3.2         | 15            | 8/29/2006   | 728   | 1730  | <0.001  | <0.001  | <0.001        | <0.001        | 191     | clear         |
| 3  | 79.01          | 99.2        | 3.2         | 10            | 10/26/2006  | 719   | 1910  | <0.001  | <0.001  | <0.001        | <0.001        | 171     | clear         |
| 3  | XXX            | XXX         | XXX         | XXX           | 2/12/2007   | 768   | 1830  | <0.001  | <0.001  | <0.001        | <0.001        | 175     | XXX           |
| 3  | 78.92          | 99.2        | 3.2         | 10            | 4/24/2007   | 664   | 1730  | <0.001  | <0.001  | <0.001        | <0.001        | 161     | clear no odor |
| 3  | 78.98          | 99.2        | 3.2         | 10            | 9/24/2007   | 750   | 2265  | <0.002  | <0.002  | <0.002        | <0.006        | 261     | clear no odor |
| 3  | 78.95          | 99.2        | 3.2         | 10            | 11/30/2007  | 740   | 1833  | <0.002  | <0.002  | <0.002        | <0.006        | 158     | clear no odor |
| 3  | 78.98          | 99.28       | 3.2         | 12            | 3/7/2008    | 750   | 1790  | <0.001  | <0.001  | <0.001        | <0.003        | 207     | clear no odor |
| 3  | 78.99          | 99.28       | 3.2         | 12            | 5/30/2008   | 790   | 2010  | <0.002  | <0.002  | <0.002        | <0.006        | 213     | clear no odor |
| 3  | 79.07          | 99.28       | 3.2         | 12            | 8/11/2008   | 760   | 2080  | <0.001  | <0.001  | <0.001        | <0.003        | 205     | clear no odor |
| 3  | 79.19          | 99.28       | 3.2         | 12            | 11/14/2008  | 780   | 2140  | <0.001  | <0.001  | <0.001        | <0.003        | 193     | clear no odor |
| 3  | 79.04          | 99.31       | 3.2         | 12            | 1/22/2009   | 810   | 2190  | <0.001  | <0.001  | <0.001        | <0.003        | 194     | clear no odor |
| 3  | 79.12          | 99.31       | 3.2         | 12            | 4/23/2009   | 880   | 2100  | <0.001  | <0.001  | <0.001        | <0.003        | 203     | clear no odor |
| 3  | 79.17          | 99.31       | 3.2         | 12            | 7/17/2009   | 880   | 1890  | <0.001  | <0.001  | <0.001        | <0.003        | 181     | clear no odor |
| 3  | 79.1           | 99.31       | 3.2         | 12            | 10/14/2009  | 890   | 2430  | <0.001  | <0.001  | <0.001        | <0.003        | 165     | clear no odor |
| 3  | 79.05          | 99.29       | 3.2         | 12            | 1/21/2010   | 950   | 2270  | <0.001  | <0.001  | <0.001        | <0.003        | 216     | clear no odor |
| 3  | 79.08          | 99.29       | 3.2         | 12            | 4/14/2010   | 900   | 1890  | <0.001  | <0.001  | <0.001        | <0.003        | 206     | clear no odor |
| 3  | 79.07          | 99.29       | 3.2         | 12            | 7/19/2010   | 1060  | 2150  | <0.001  | <0.001  | <0.001        | <0.003        | 204     | clear no odor |
| 3  | 79.08          | 99.29       | 3.2         | 12            | 10/14/2010  | 950   | 2500  | <0.001  | <0.001  | <0.001        | <0.003        | 193     | clear no odor |
| 3  | 79.09          | 99.29       | 3.2         | 12            | 1/21/2011   | 1060  | 2100  | <0.001  | <0.001  | <0.001        | <0.003        | 216     | clear no odor |
| 3  | 79.07          | 99.29       | 3.2         | 12            | 4/21/2011   | 1020  | 2330  | <0.001  | <0.001  | <0.001        | <0.003        | 194     | clear no odor |
| 3  | 79.14          | 99.29       | 3.2         | 12            | 8/5/2011    | 1060  | 2410  | <0.001  | <0.001  | <0.001        | <0.003        | 159     | clear no odor |
| 3  | 79.19          | 99.29       | 3.2         | 12            | 10/31/2011  | 1040  | 2090  | <0.001  | <0.001  | <0.001        | <0.003        | 189     | clear no odor |
| 3  | 79.22          | 99.29       | 3.2         | 12            | 1/30/2012   | 1020  | 1980  | <0.001  | <0.001  | <0.001        | <0.003        | 218     | clear no odor |

| MW | Depth to Water | Total Depth | Well Volume | Volume Purged | Sample Date | CI   | TDS  | Benzene     | Toluene | Ethyl Benzene | Total Xylenes | Sulfate | Comments                  |
|----|----------------|-------------|-------------|---------------|-------------|------|------|-------------|---------|---------------|---------------|---------|---------------------------|
|    |                |             |             |               |             |      |      |             |         |               |               |         |                           |
|    |                |             |             |               |             |      |      |             |         |               |               |         |                           |
| 4  | XXX            | XXX         | XXX         | XXX           | 6/7/2002    | 1510 | XXX  | 0.004       | 0.008   | 0.004         | 0.053         | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 10/23/2002  | 1600 | XXX  | 0.004       | 0.004   | 0.006         | 0.106         | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 5/8/2004    | 1880 | XXX  | XXX         | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 10/1/2004   | 1840 | XXX  | XXX         | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 12/30/2004  | 1840 | XXX  | XXX         | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 2/11/2005   | 1400 | XXX  | XXX         | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 5/1/2005    | 1970 | XXX  | XXX         | XXX     | XXX           | XXX           | XXX     | XXX                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 8/30/2005   | 1000 | 2430 | <0.001      | <0.001  | <0.001        | <0.001        | 328     | XXX                       |
| 4  | 86.21          | 98.55       | 2           | 7             | 11/8/2005   | 1510 | 4020 | j[0.000774] | <0.001  | <0.001        | <0.001        | 413     | XXX                       |
| 4  | 85.67          | 98.55       | 2.1         | 7             | 2/7/2006    | 1550 | 3950 | <0.001      | <0.001  | <0.001        | <0.001        | 425     | XXX                       |
| 4  | 86.13          | 98.55       | 2           | 10            | 5/9/2006    | 1820 | 3720 | <0.001      | <0.001  | <0.001        | <0.001        | 474     | XXX                       |
| 4  | 86.24          | 98.55       | 2           | 10            | 8/29/2006   | 1580 | 3400 | <0.001      | <0.001  | <0.001        | <0.001        | 520     | red                       |
| 4  | 85.99          | 98.55       | 2           | 10            | 10/26/2006  | 1530 | 3840 | <0.001      | <0.001  | <0.001        | <0.001        | 482     | red                       |
| 4  | XXX            | XXX         | XXX         | XXX           | 2/12/2007   | 1850 | 3710 | <0.001      | <0.001  | <0.001        | <0.001        | 561     | XXX                       |
| 4  | 85.58          | 98.5        | 2.1         | 8             | 4/24/2007   | 1360 | 3010 | <0.001      | <0.001  | <0.001        | <0.001        | 376     | red silt to clear no odor |
| 4  | 85.78          | 98.5        | 2           | 8             | 9/24/2007   | 1600 | 3924 | <0.002      | <0.002  | <0.002        | <0.006        | 535     | red silt to clear no odor |
| 4  | 86.3           | 98.5        | 2           | 9             | 11/30/2007  | 1720 | 3906 | <0.002      | <0.002  | <0.002        | <0.006        | 468     | red silt to clear no odor |
| 4  | 85.49          | 98.5        | 2.1         | 8             | 3/7/2008    | 1720 | 3700 | <0.001      | <0.001  | <0.001        | <0.003        | 462     | red silt to clear no odor |
| 4  | 86.18          | 98.5        | 2           | 8             | 5/30/2008   | 1640 | 4300 | <0.002      | <0.002  | <0.002        | <0.006        | 450     | red silt to clear no odor |
| 4  | 87.57          | 98.5        | 1.7         | 8             | 8/11/2008   | 1620 | 4590 | <0.001      | <0.001  | <0.001        | <0.003        | 543     | red silt to clear no odor |
| 4  | 86.45          | 98.5        | 1.9         | 8             | 11/14/2008  | 1780 | 4390 | <0.001      | <0.001  | <0.001        | <0.003        | 623     | red silt to clear no odor |
| 4  | 85.85          | 98.26       | 2           | 8             | 1/22/2009   | 1780 | 4610 | <0.001      | <0.001  | <0.001        | <0.003        | 527     | red silt to clear no odor |
| 4  | 86.35          | 98.26       | 1.9         | 8             | 4/23/2009   | 1660 | 4570 | <0.001      | <0.001  | <0.001        | <0.003        | 501     | red silt to clear no odor |
| 4  | 86.11          | 98.26       | 1.9         | 8             | 7/17/2009   | 1700 | 3720 | <0.001      | <0.001  | <0.001        | <0.003        | 490     | red silt to clear no odor |
| 4  | 85.65          | 98.26       | 2           | 8             | 10/14/2009  | 1640 | 3440 | <0.001      | <0.001  | <0.001        | <0.003        | 416     | red silt to clear no odor |
| 4  | 85.33          | 98.18       | 2.1         | 8             | 1/21/2010   | 1800 | 3960 | <0.001      | <0.001  | <0.001        | <0.003        | 513     | red silt to clear no odor |
| 4  | 85.48          | 98.18       | 2           | 8             | 4/14/2010   | 1660 | 3570 | <0.001      | <0.001  | <0.001        | <0.003        | 453     | red silt to clear no odor |
| 4  | 85.47          | 98.18       | 2           | 8             | 7/19/2010   | 1840 | 3700 | <0.001      | <0.001  | <0.001        | <0.003        | 483     | red silt to clear no odor |
| 4  | 85.77          | 98.18       | 2           | 8             | 10/14/2010  | 1880 | 4740 | <0.001      | <0.001  | <0.001        | <0.003        | 536     | red silt to clear no odor |
| 4  | 85.54          | 98.24       | 2           | 8             | 1/21/2011   | 1780 | 3650 | <0.001      | <0.001  | <0.001        | <0.003        | 556     | red silt to clear no odor |
| 4  | 85.5           | 98.24       | 2           | 8             | 4/21/2011   | 1860 | 3560 | <0.001      | <0.001  | <0.001        | <0.003        | 590     | red silt to clear no odor |
| 4  | 85.71          | 98.24       | 2           | 8             | 8/5/2011    | 1640 | 3590 | <0.001      | <0.001  | <0.001        | <0.003        | 478     | red silt to clear no odor |
| 4  | 87.17          | 98.24       | 1.8         | 8             | 10/31/2011  | 1880 | 3690 | <0.001      | <0.001  | <0.001        | <0.003        | 508     | red silt to clear no odor |
| 4  | 86.06          | 98.24       | 1.9         | 8             | 1/30/2012   | 1800 | 3520 | <0.001      | <0.001  | <0.001        | <0.003        | 474     | red silt to clear no odor |



[illegible]

[illegible]

[illegible]

[illegible]