# AP - 104

# 2012 AGWMR

# 06 / 27 / 2012

Chevron

**Luke Welch**
Project Manager

**Upstream Business Unit**
Environmental Management Company
1400 Smith Street
Room 07069B
Houston, Texas 77002
Tel 713-372-0292
Luke.Welch@chevron.com



June 27, 2013

Mr. Glenn von Gonten
Senior Hydrologist
New Mexico Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Re: Buckeye Compressor Station (Abatement Plan AP-104)
Buckeye Vacuum Field Unit (Abatement Plan AP-104)
Lovington Unit Water Plant
Lovington Paddock (Remediation Plan 1RP-272)

Dear Mr. Von Gonten,

I have recently taken over project management responsibilities from Kegan Boyer for four ongoing Chevron projects in southeastern New Mexico. These projects include groundwater monitoring/assessment/remediation at the following sites:

- Buckeye Compressor Station (Abatement Plan AP-104)
- Buckeye Vacuum Field Unit (Abatement Plan AP-104)
- Lovington Unit Water Plant
- Lovington Paddock (Remediation Plan 1RP-272)

Any future correspondence or inquiries regarding these projects can be directed to me at the above address or via e-mail at luke.welch@chevron.com.

Please find enclosed for your files copies of the following reports for the Lovington Paddock project site (Abatement Plan AP-104) and the Lovington Water Station project site (Abatement Plan AP-104):

- *2012 Annual Groundwater Monitoring Report, Lovington Paddock Groundwater Remediation Site, Section 1 – Township 17 South – Range 36 East, Lea County, NM*
- *2012 Annual Groundwater Monitoring Report, Lovington Unit Water Plant, Section 1 – Township 17 South – Range 36 East, Lea County, NM*

These reports were prepared by Conestoga-Rovers & Associates (CRA) on behalf of Chevron Environmental Management Company (CEMC) to document groundwater monitoring activities performed for CEMC during

calendar year 2012 at the above-referenced sites. Historical groundwater monitoring data are also included in the reports.

It is my understanding that we do not have a current abatement plan number for the Lovington Water Plant. If you have any insight, please feel free to advise me on any possible future actions.

Should you have any questions regarding the content of the report, please do not hesitate to contact me by phone at 713-372-0292 or via e-mail at luke.welch@chevron.com. I look forward to working with you in the future.

Sincerely,

Luke Welch

Luke Welch
Environmental Project Manager

www.CRAworld.com

**FINAL REPORT**

# 2012 ANNUAL GROUNDWATER ASSESSMENT AND MONITORING REPORT

Lovington Unit Water Plant

Section 1, Township 17 South, Range 36 East -- Lea County, New Mexico

Prepared for: Chevron Environmental Management Company

Conestoga-Rovers & Associates
2135 South Loop, 250 West Midland, Texas 79703



June 2013 • #073016(3)

TABLE OF CONTENTS

LIST OF FIGURES
(Following Text)

## LIST OF TABLES
(Following Text)



## LIST OF APPENDICES

## 1.0 INTRODUCTION

This annual report is a review of assessment and groundwater monitoring at the Lovington Unit Water Plant Site during 2012. Conestoga-Rovers & Associates, Inc. (CRA) prepared this report on behalf of Chevron Environmental Management Company (CEMC). Assessment data presented in this report were gathered during drilling activities which took place between February 28 and March 5, 2012. Groundwater monitoring activities referred to in this report took place during four quarterly groundwater monitoring events conducted on March 22-23, June 13-14, September 27-28, and December 19-20, 2012.

The Lovington Unit Water Plant Site is located in the northeast quarter of Section 1, Township 17 South, Range 36 East in Lea County, New Mexico. Latitudinal and longitudinal coordinates are 32°52'3.77" N and 103°18'20.39" W, respectively. The site lies on land owned by the City of Lovington, New Mexico. Chevron operates an active water injection facility on the site that is related to oil production. A map showing the general location of the site is in Figure 1.

## 2.0 HISTORY OF ACTIVITIES AT THE SITE

The City of Lovington requested that Chevron assess chloride concentrations in the groundwater between the Lovington Unit Water Plant and the location of a surface release from a salt water disposal pipeline operated by Rice Operating Company. That release occurred since 2000 and approximately 700 feet southeast of the Lovington Unit Water Plant Site. The potentiometric surface at that release site is downgradient with respect to that at the Lovington Water Plant. Details such as the date of the release; volume released; and volume recovered are not available.

Four monitor wells, MW-1, MW-2, MW-3 and MW-4 shown on Figure 2 were installed in January 2010 as part of the assessment. Screening of soils during drilling and analyses conducted by a laboratory indicated low chloride concentrations in soil penetrated by MW-1, MW-2 and MW-3, while higher concentrations of chlorides were present in soil penetrated by MW-4. Groundwater in all four wells was sampled in January and February 2010. Concentrations of chlorides and TDS in all samples groundwater collected from MW-1, MW-2, and MW-3 exceeded groundwater standards set by the New Mexico Water Quality Control Commission (NMWQCC). Both chlorides and total dissolved solids (TDS) in groundwater from MW-4 were below the same standards in both samples collected. Results of the investigation were reported to CEMC by Stantec in June 2010. CRA was retained by CEMC to manage monitoring activities of this site in November 2010. Quarterly monitoring was conducted similarly through 2011. Four additional monitor wells, MW-5, MW-6, MW-7 and MW-8 were installed in February and March 2012 to further assess the dissolved chloride plume. All eight monitor wells were gauged and sampled on a quarterly basis during 2012.

## 3.0 REGULATORY FRAMEWORK

The New Mexico Oil Conservation Division of the New Mexico Energy, Minerals and Natural Resources Department (NMOCD) has regulatory jurisdiction over corrective actions conducted at the Lovington Unit Water Plant Site. Corrective actions follow guidance given by the NMOCD in *Guidelines for Remediation of Leaks, Spills, and Releases (August 13, 1993)*. These guidelines require remediation of groundwater to the human health standards of the New Mexico Water Quality Control Commission (NMWQCC**)** set forth in New Mexico Administrative Code (NMAC) 20.6.2.3103B that are in the following table.

| ***Analyte*** | ***NMWQCC Standard for Domestic Water Supply (mg/L)*** |
|---|---|
| Chloride | 250 |
| Total Dissolved Solids | 1000 |

## 4.0 ADDITIONAL ASSESSMENT ACTIVITIES

Four groundwater monitoring wells, MW-5, MW-6, MW-7 and MW-8 were installed between February 28 and March 6 to further evaluate the nature and extent of the plume of elevated chlorides and total dissolved solids (TDS). Locations for these wells are shown on the attached Figure 2. Prior to mobilizing drilling equipment to the Lovington Unit Water Plant, the boring locations were marked and utility notifications were made at least 48-hours prior to mobilization. A post-hole digger was used to clear each boring location to a depth of approximately 5-feet below ground surface (bgs) or refusal. An air-rotary rig operated by White Drilling Company, a water well driller licensed State of New Mexico, advanced the proposed borings to depths between 133 and 135 feet bgs. Mud-rotary drilling methods were used below 5-feet bgs to maintain borehole stability in the sandy soil profile. Subsurface lithology data were recorded on boring logs. They are in Appendix A. Monitor wells MW-5, MW-6, MW-7, AND MW-8 were completed with the following general specifications: four-inch diameter, schedule 40 PVC casing from top of screen to surface; thirty-five feet of 4-inch, schedule 40, PVC casing with 0.020" slots below blank casing; 8/16 sand filter packs; bentonite seals above filter packs; and above-ground vaults with concrete pads. The wells were developed by bailing and pumping. Development volumes were between 135 and 215 gallons. Well Instrumentation (Construction) Logs and State Well Records and Logs filed at the New Mexico Office of the State Engineer are also shown in Appendix A. Drill cuttings and fluids were held in roll off boxes for transportation to disposal sites. Drilling fluids were vacuumed off drill cuttings by Nabors Well Services, LTD and disposed at a Chevron-approved facility. Drill cuttings were transported by Gandy Corporation and disposed at R360 Environmental Solutions in Hobbs, New Mexico and Gandy-Marley, Inc. in Roswell, New Mexico. Documentation of transportation and disposal of wastes are shown in Appendix B. Elevations of the ground surface, pad surfaces and tops of casings at MW-5, MW-6, MW-7, and MW-8 were surveyed by West Company of Midland, Texas. Results of those surveying activities are shown in Appendix A.

## 5.0 GROUNDWATER MONITORING

The Lovington Unit Water Plant Site includes eight active monitor wells, MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7 and MW-8. Their locations are shown on Figure 2. These eight monitor wells were gauged and sampled quarterly during 2012. Those monitoring events took place on March 22-23, June 13-14, September 27-28 and December 19-20, 2012.

### 5.1 FIELD METHODOLOGY

Fluid levels were measured and conductivity profiles were determined in each well before sampling activities began. Fluid levels were measured to the nearest hundredth of a foot with an electronic water level meter with a built-in conductivity sensor. Fluid levels were measured from the permanent reference point on the top of the casing in each well or from the north side of the top of the casing where no permanent reference point had been marked.

The conductivity profile of each well was determined by recording measurements of conductivity of the water column at 5-feet intervals from the top of the water column to the total depth of each well. The purging and sampling pump was set at the depth of the highest conductivity reading in each well. Purging continued until temperature, conductivity and pH were within 10 percent of previous measurements made with a multi-function meter. Samples were collected, labeled and recorded on a chain-of-custody form and placed on ice in a cooler to maintain a temperature of 40°F (4°C) or lower. Field equipment was decontaminated with Alconox™ wash and distilled water rinse before beginning field activities and between wells. Samples of groundwater were analyzed by Xenco Laboratories in Odessa, Texas. Proper chain-of-custody documentation was maintained throughout sampling and analytical processes and analyses were completed within required holding times.

Samples collected during 2012 were analyzed for dissolved chloride according to method EPA300.0 and for total dissolved solids (TDS) by method SM2540C.

### 5.2 POTENTIOMETRIC SURFACE AND GRADIENT

Table 1 is a cumulative record of fluid level measurements from all monitor wells at Lovington Unit Water Plant. Elevations of tops of casings are shown in feet above mean sea level (famsl). Calculated elevations of the potentiometric surface are also shown in famsl. The range of calculated elevations of the potentiometric surface measured on March 22 was from 3727.69 (MW-8) to 3730.45 (MW-4) famsl. The map of elevations of

the potentiometric surface during that event is shown in Figure 3. It indicates that the direction of flow of groundwater at that time was east-northeast. The calculated magnitude of the gradient was 0.0032 ft./ft.

The range of elevations of the potentiometric surface measured on June 13 was from 3727.56 (MW-8) to 3730.40 (MW-4) famsl. The map of elevations of the potentiometric surface during the second monitoring event on June 13 is shown in Figure 4. This map indicates that the direction of flow of groundwater was east-northeast. The calculated magnitude of the gradient was 0.0035 ft./ft.

The range of elevations of the potentiometric surface measured on September 27 was from 3727.19 (MW-8) to 3729.88 (MW-4) famsl. The potentiometric surface on September 27 is depicted in Figure 5. This map indicates that the direction of flow of groundwater was east-northeast. The calculated magnitude of its gradient was 0.0030 ft./ft.

The range of elevations of the potentiometric surface measured on December 19 was from 3726.58 (MW-8) to 3729.11 (MW-4) famsl. The potentiometric surface on December 19 is depicted in Figure 6. This map indicates that the direction of flow of groundwater was northeast. Its calculated magnitude was 0.0031 ft./ft.

Elevations of the potentiometric surface declined in all wells between March 22 and December 19, 2012. The range of decline was 1.08 feet to 1.55 feet between March and December 2012. The average decline among those wells was 1.22 feet.

## 5.3 RESULTS OF ANALYSES OF DISSOLVED-PHASE CONTAMINANTS IN GROUNDWATER

Samples of groundwater were collected from wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7 and MW-8 during all four quarterly monitoring events 2012. A cumulative table of all available results of analyses of groundwater samples collected at the Lovington Unit Water Plant Site is shown in Table 2. Chemicals of Concern (COCs) are in columns across the top of the table. Appropriate standards are below names of analytes. Analytical results for monitoring events in March, April, July and December 2012 are in map form on Figures 7, 8, 9, and 10, respectively.

Trends of concentrations of chemicals of concern over time are shown in Appendix C. Copies of signed analytical reports and chains-of-custody are in Appendix D. Dissolved chloride and TDS were present in groundwater from monitor wells MW-1, MW-2, MW-3 and MW-6 in concentrations consistently above the NMWQCC standards of 250 mg/L and mg/L, respectively. The increasing trends in MW-6 may indicate

movement of groundwater from the area around MW-3 northward by pumping from the water flood supply well, which is shown on Figure 2 and subsequent figures.

Levels of dissolved chloride and TDS in MW-7 were slightly above or below NMWQCC standards. Levels of dissolved chlorides and TDS in MW-5 were below NMWQCC standards throughout 2012 except for the concentration of 1100 mg/L TDS on March 22. Levels of dissolved chloride and TDS in MW-4 and MW-8 were consistently below the NMWQCC standards during 2012.

## 6.0 SUMMARY OF FINDINGS

Based on activities conducted at the Lovington Unit Water Plant Site in 2012, CRA presents the following summary of findings:

- Groundwater monitoring was conducted by CRA on a quarterly basis in 2012. Monitoring events were conducted on March 22-23, June 13-14, September 27-28, and December 19-20, 2012, during which calculated gradients of the potentiometric surface were 0.0032 ft./ft., 0.0035 ft./ft., 0.0030 ft./ft., and 0.0031 ft./ft., respectively. The directions of the gradients were east-northeast during the first three monitoring events, while the direction was northeast during the fourth quarterly monitoring event.
- Elevations of the potentiometric surface declined in all wells between March 22 and December 19, 2012. The range of decline was 1.08 feet to 1.55 feet between March and December 2012. The average decline among those wells was 1.22 feet.
- Dissolved chloride and TDS were present in groundwater from monitor wells MW-1, MW-2, MW-3 and MW-6 in concentrations consistently above the NMWQCC standards of 250 mg/L and  mg/L, respectively. Increasing trends of dissolved chloride and TDS in MW-6 may indicate movement of groundwater from the area around MW-3 northward by pumping from the water flood supply well.
- Levels of dissolved chloride and TDS in MW-7 were slightly above or below NMWQCC standards.
- Levels of dissolved chlorides and TDS in MW-5 were below NMWQCC standards throughout 2012 except for the concentration of 1100 mg/L TDS on March 22. Levels of dissolved chloride and TDS in MW-4 and MW-8 were consistently below the NMWQCC standards during 2012.

## 7.0 PLANNED ACTIVITIES

Quarterly gauging and sampling events were conducted in January and April 2013. Two additional quarterly monitoring events have been scheduled for July and October of this year. All eight monitor wells have been included in the quarterly monitoring plan. Monitoring will include measurements of fluid levels and collection of samples of groundwater. Dissolved chloride and total dissolved solids continue to be chemicals of concern at the Lovington Unit Water Plant Site, and samples will be analyzed for them according to analytical methods EPA300.0 and SM2540C, respectively.

Results of activities of four quarterly groundwater monitoring events at the Lovington Unit Water Plant Site during 2013 will be summarized in the annual report for submission to the NMOCD. The report will include tabulated data from gauging activities; tabulated results of chemical analyses; maps of groundwater gradients and maps of constituents of concern for each monitoring event; and recommendations to expedite the site toward closure.

All of which is Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES, INC.

John P. Schnable
Project Manager

Thomas C. Larson
Senior Project Manager

# FIGURES

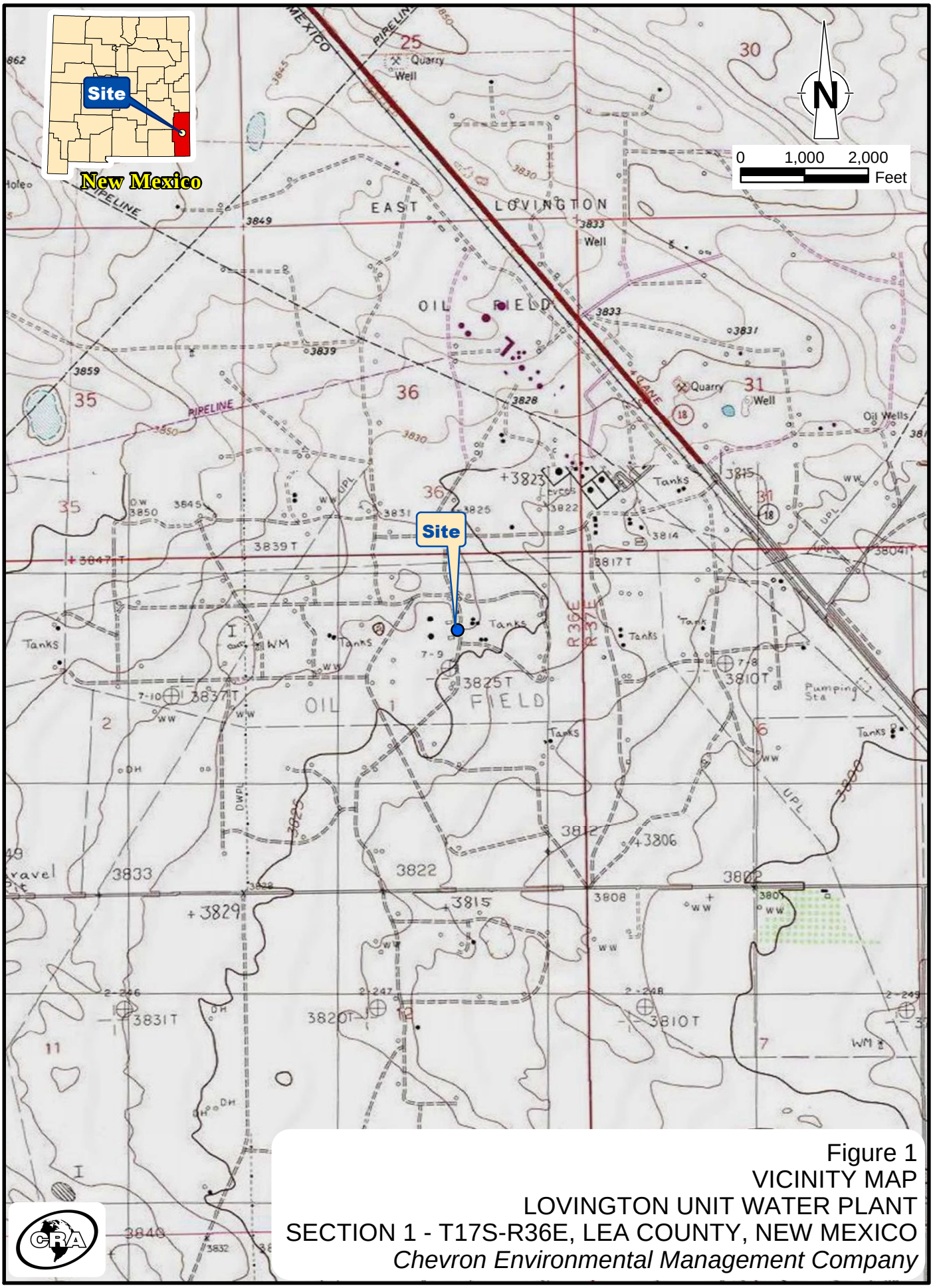
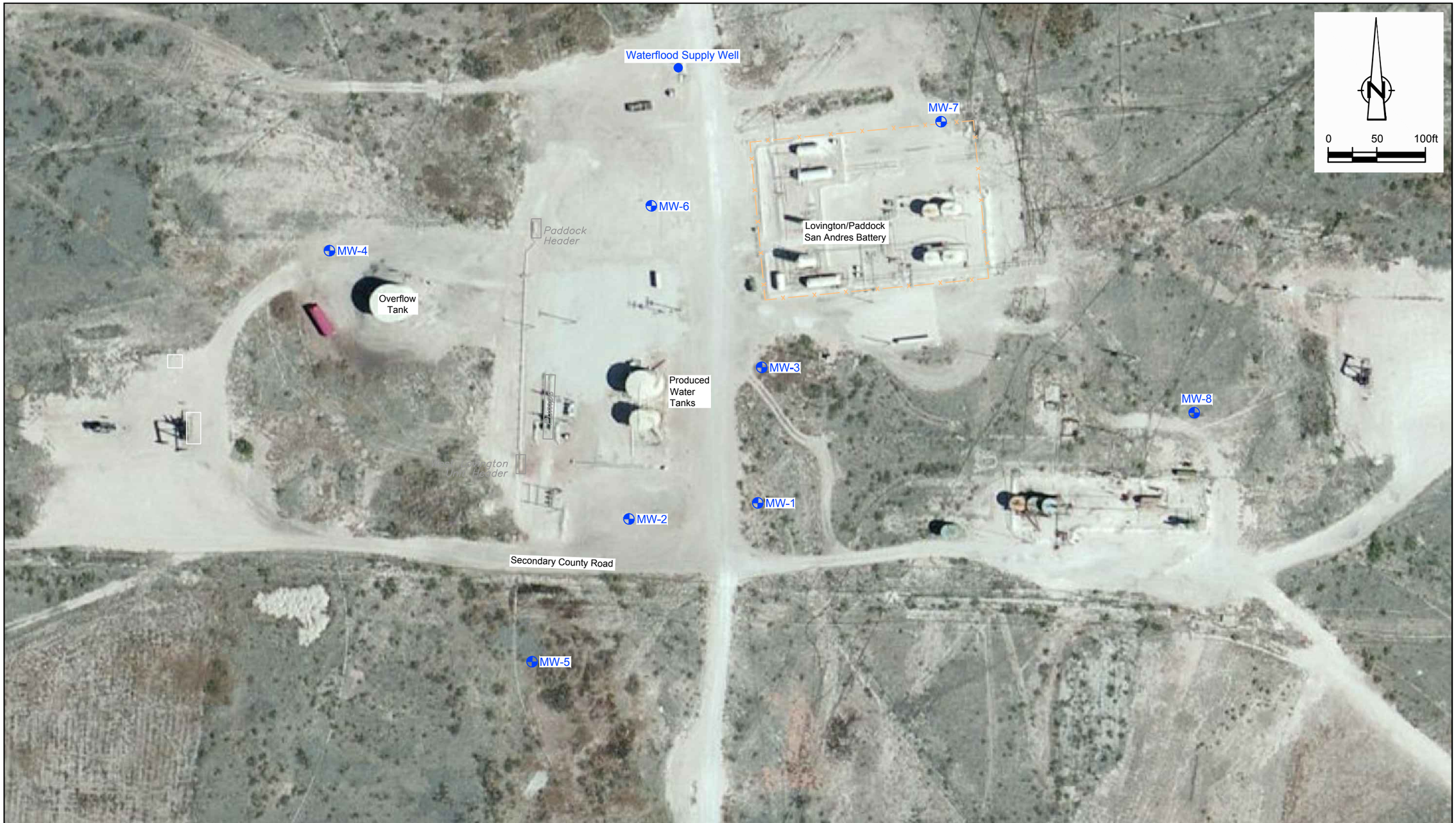



Figure 1
VICINITY MAP
LOVINGTON UNIT WATER PLANT
SECTION 1 - T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company*

RE: USGS 7.5 Minute Topographic Maps.

2/12/2013




LEGEND

- MONITORING WELL LOCATION
- WATERFLOOD SUPPLY WELL

Figure 2

SITE DETAILS MAP
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*

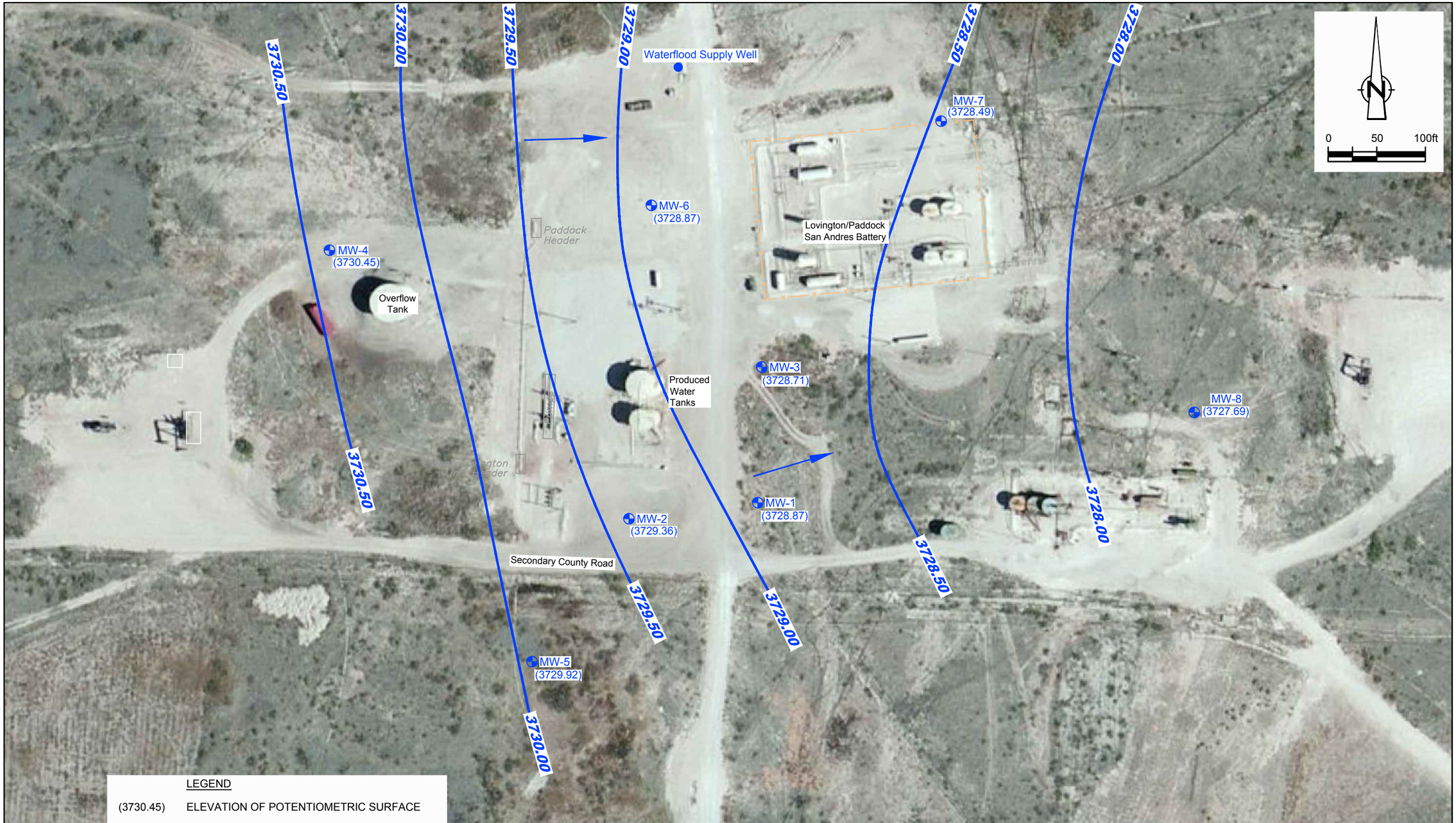
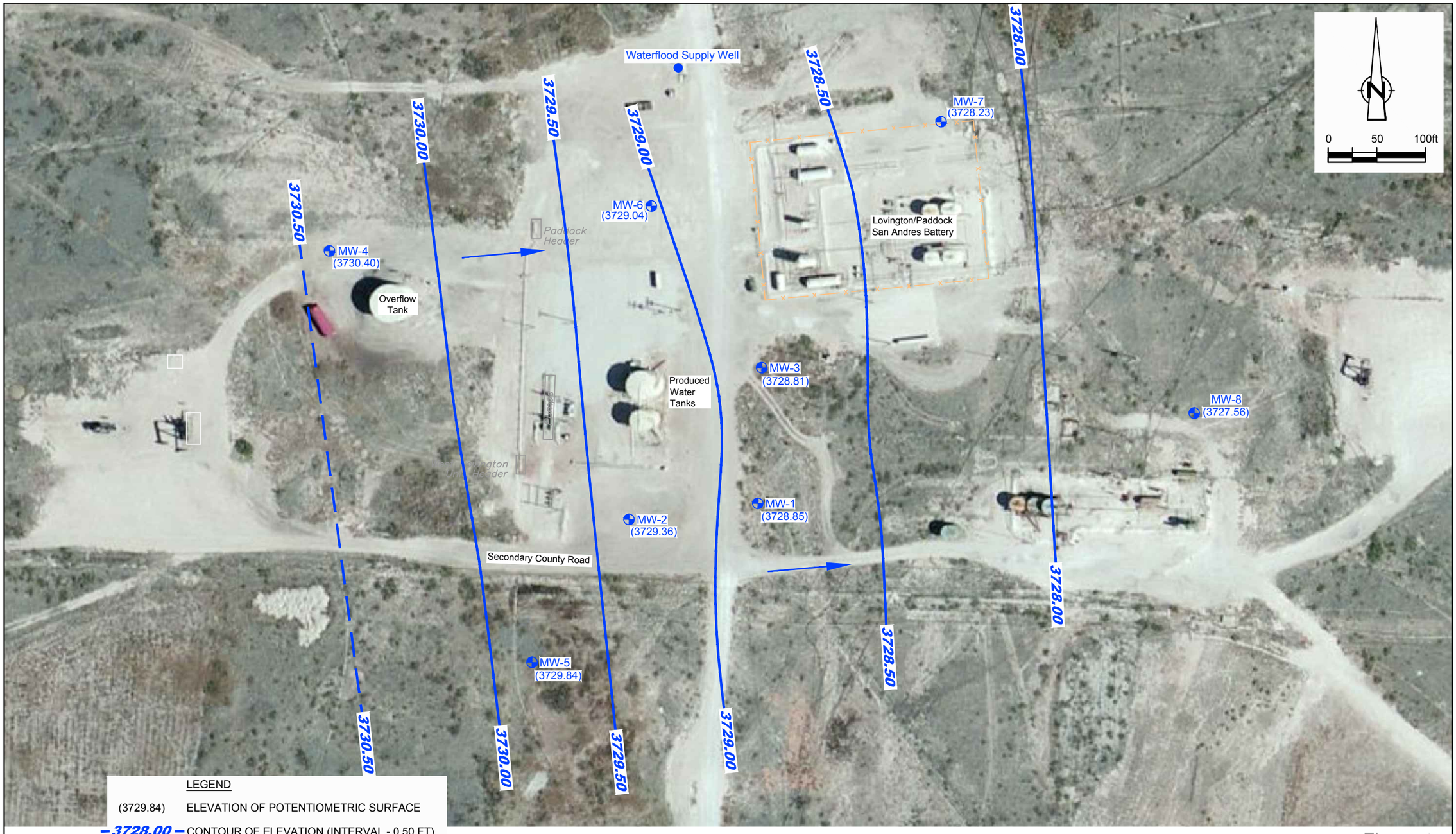



Figure 3

MAP OF THE POTENTIOMETRIC SURFACE - MARCH 22, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*

073016-2013(003)GN-BR003 JUN 11/2013




LEGEND

(3729.84) ELEVATION OF POTENTIOMETRIC SURFACE

3728.00 CONTOUR OF ELEVATION (INTERVAL - 0.50 FT)

GROUNDWATER FLOW DIRECTION

MONITORING WELL LOCATION

WATERFLOOD SUPPLY WELL

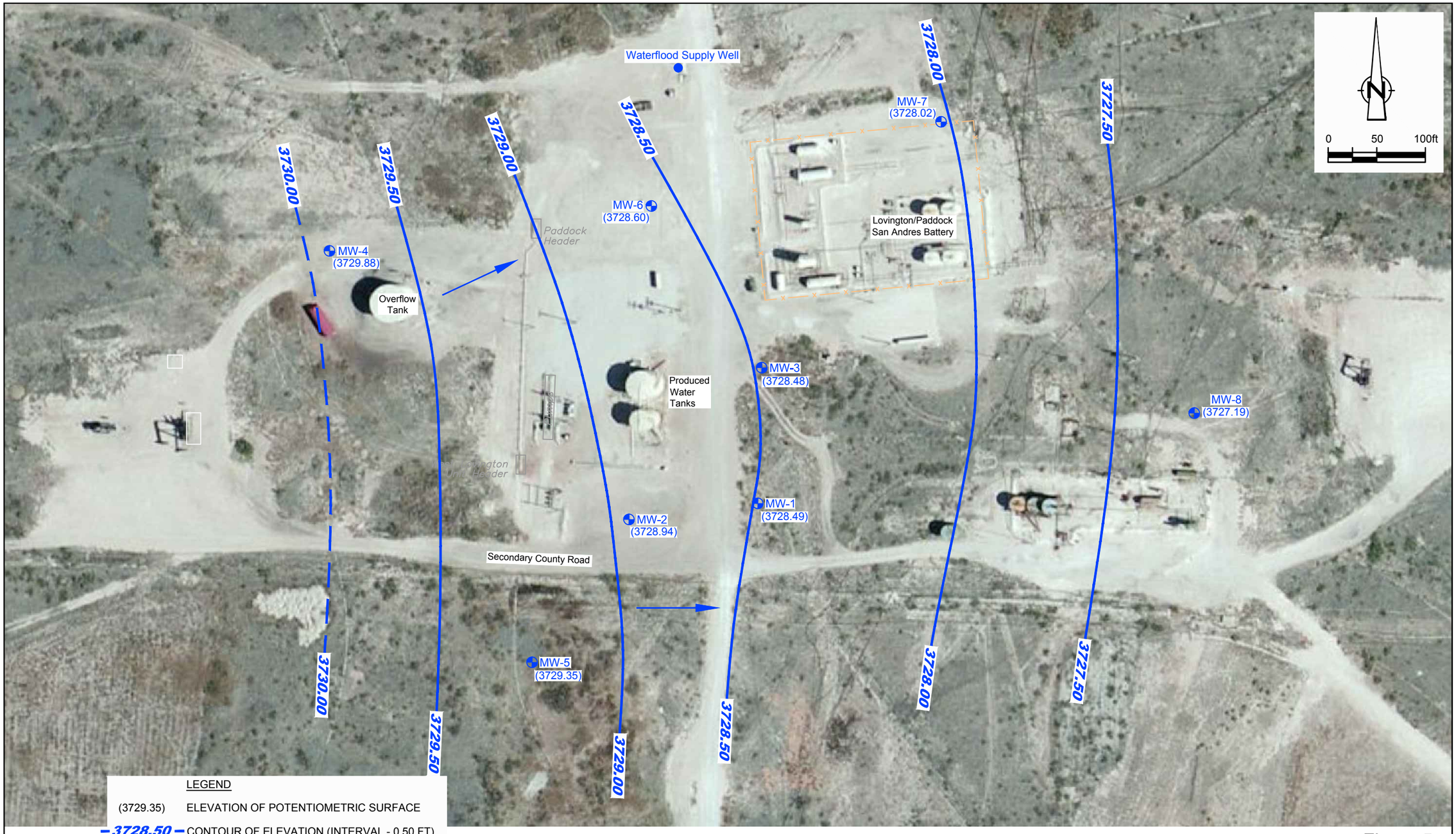
NOTE:

GROUNDWATER GRADIENT = 0.0035

Figure 4

MAP OF THE POTENTIOMETRIC SURFACE - JUNE 13, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*

073016-2013(003)GN-BR004 JUN 11/2013




LEGEND

(3729.35) ELEVATION OF POTENTIOMETRIC SURFACE

3728.50 CONTOUR OF ELEVATION (INTERVAL - 0.50 FT)

GROUNDWATER FLOW DIRECTION

MONITORING WELL LOCATION

WATERFLOOD SUPPLY WELL

NOTE:

GROUNDWATER GRADIENT = 0.0030

Figure 5

MAP OF THE POTENTIOMETRIC SURFACE - SEPTEMBER 27, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*


LEGEND

(3728.79) ELEVATION OF POTENTIOMETRIC SURFACE

3729.00 CONTOUR OF ELEVATION (INTERVAL - 0.50 FT)

GROUNDWATER FLOW DIRECTION

MONITORING WELL LOCATION

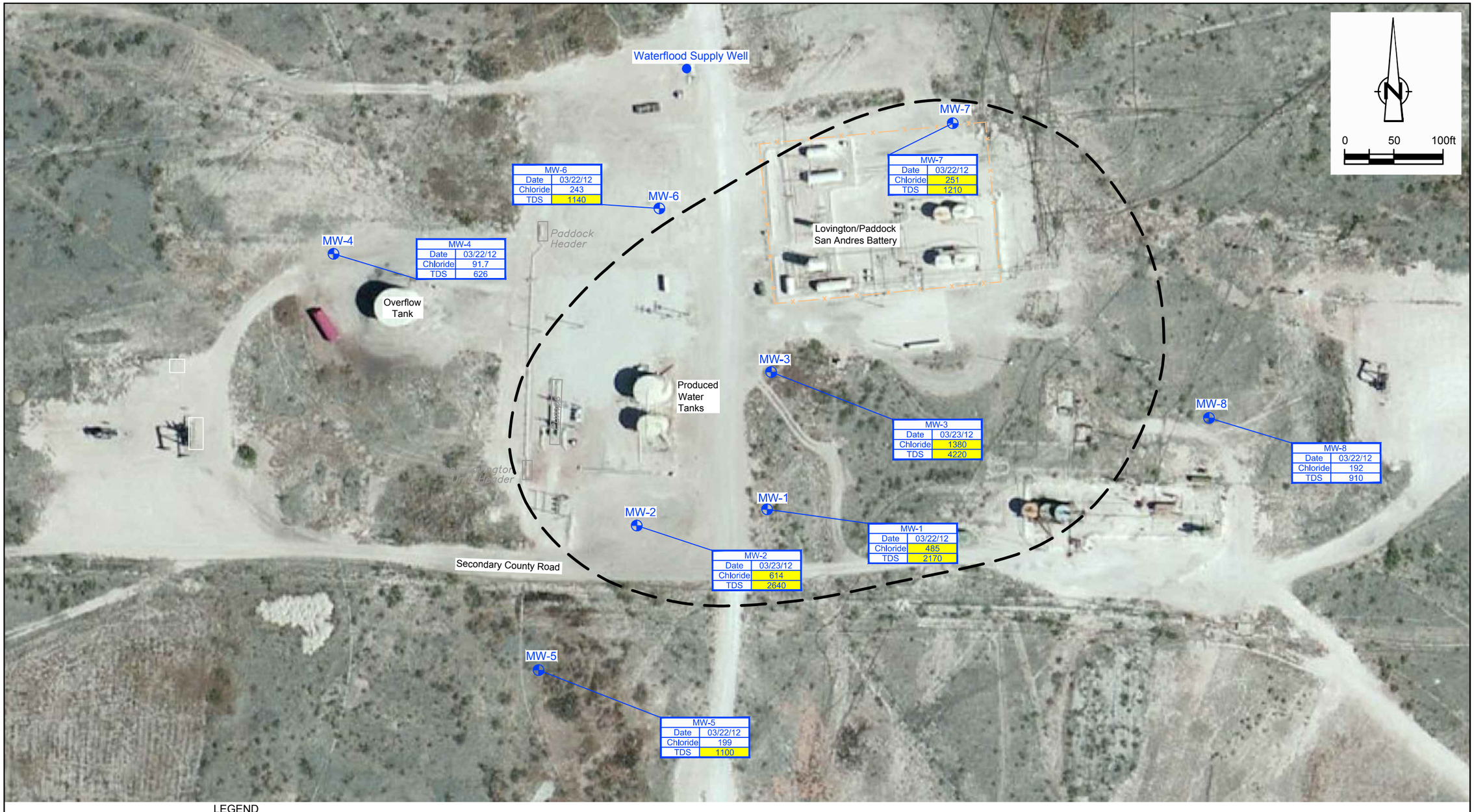
WATERFLOOD SUPPLY WELL

NOTE:

GROUNDWATER GRADIENT = 0.0031

Figure 6

MAP OF THE POTENTIOMETRIC SURFACE - DECEMBER 19, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*



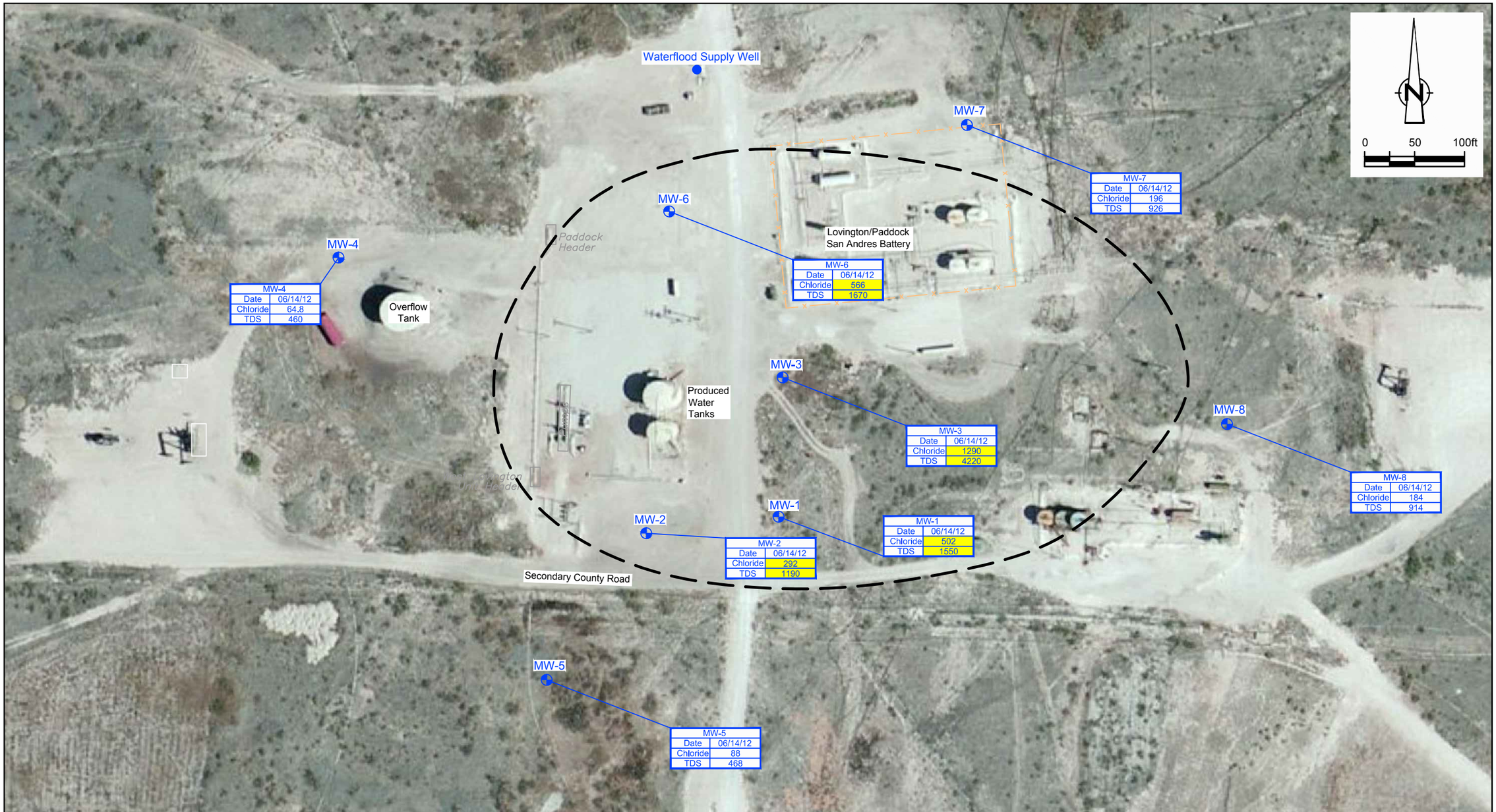

LEGEND

- MONITORING WELL LOCATION
- WATERFLOOD SUPPLY WELL
- CHLORIDE — CONCENTRATION OF DISSOLVED CHLORIDE (mg/L)
- TDS — CONCENTRATION OF TOTAL DISSOLVED SOLIDS (mg/L)
- APPROXIMATE MARGIN OF DISSOLVED CHLORIDE PLUME EXCEEDING NMWQCC STANDARD

NOTE: CONCENTRATIONS SHADED IN YELLOW EXCEED CORRESPONDING STANDARD OR GUIDELINE.

Figure 7

DISTRIBUTION OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS - MARCH 22-23, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*




LEGEND

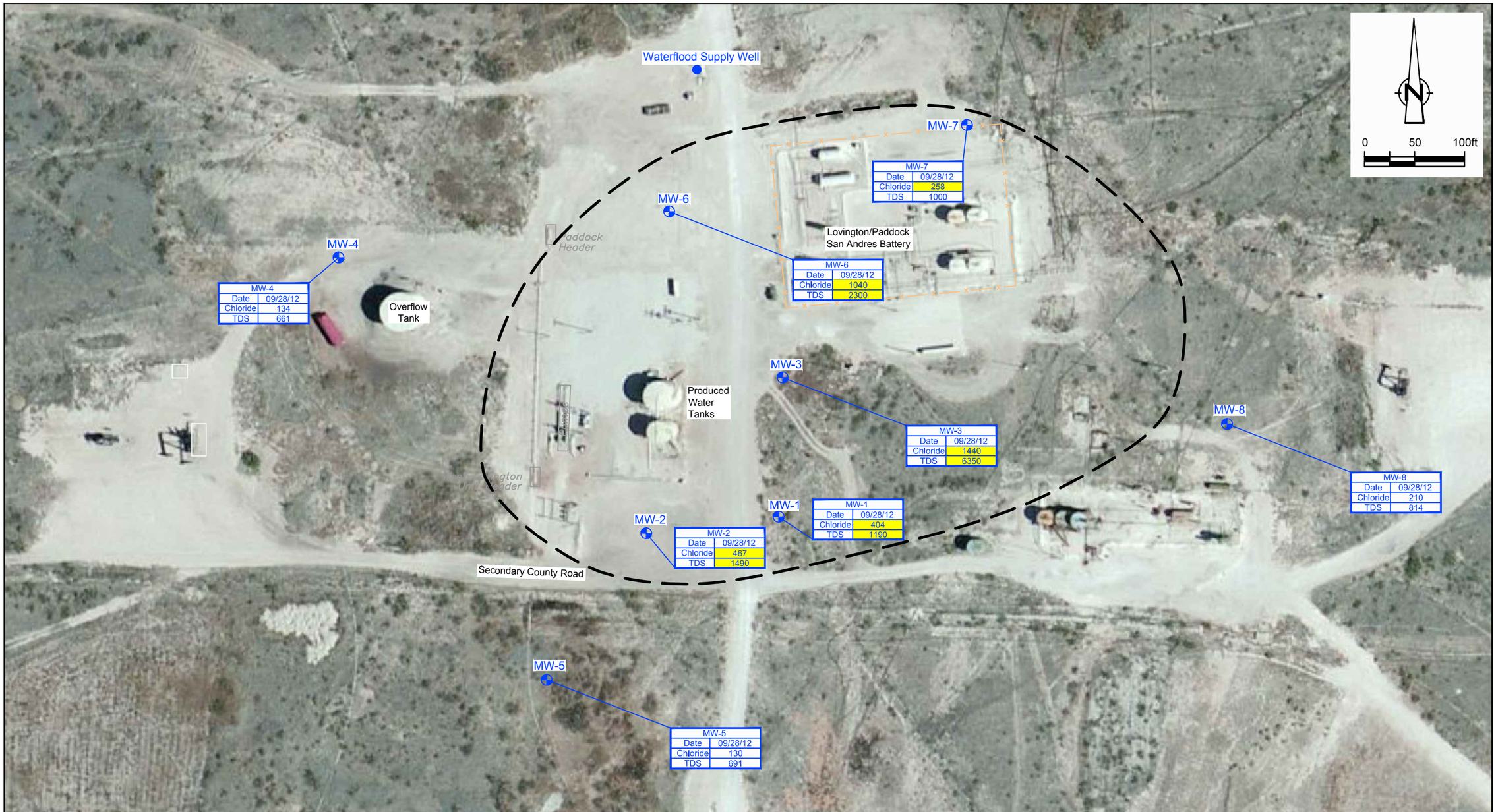
- MONITORING WELL LOCATION
- WATERFLOOD SUPPLY WELL
- CHLORIDE — CONCENTRATION OF DISSOLVED CHLORIDE (mg/L)
- TDS — CONCENTRATION OF TOTAL DISSOLVED SOLIDS (mg/L)
- APPROXIMATE MARGIN OF DISSOLVED CHLORIDE PLUME EXCEEDING NMWQCC STANDARD

NOTE: CONCENTRATIONS SHADED IN YELLOW EXCEED CORRESPONDING STANDARD OR GUIDELINE.

Figure 8

DISTRIBUTION OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS - JUNE 14, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*

073016-2013(003)GN-BR008 JUN 11/2013




LEGEND

- MONITORING WELL LOCATION
- WATERFLOOD SUPPLY WELL
- CHLORIDE — CONCENTRATION OF DISSOLVED CHLORIDE (mg/L)
- TDS — CONCENTRATION OF TOTAL DISSOLVED SOLIDS (mg/L)
- APPROXIMATE MARGIN OF DISSOLVED CHLORIDE PLUME EXCEEDING NMWQCC STANDARD

NOTE: CONCENTRATIONS SHADED IN YELLOW EXCEED CORRESPONDING STANDARD OR GUIDELINE.

Figure 9

DISTRIBUTION OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS - SEPTEMBER 28, 2012
LOVINGTON UNIT WATER PLANT
SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*


LEGEND

- MONITORING WELL LOCATION
- WATERFLOOD SUPPLY WELL
- CHLORIDE — CONCENTRATION OF DISSOLVED CHLORIDE (mg/L)
- TDS — CONCENTRATION OF TOTAL DISSOLVED SOLIDS (mg/L)
- APPROXIMATE MARGIN OF DISSOLVED CHLORIDE PLUME EXCEEDING NMWQCC STANDARD

NOTE: CONCENTRATIONS SHADED IN YELLOW EXCEED CORRESPONDING STANDARD OR GUIDELINE.

Figure 10

# DISTRIBUTION OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS - DECEMBER 19-20, 2012
## LOVINGTON UNIT WATER PLANT
## SECTION 1-T17S-R36E, LEA COUNTY, NEW MEXICO
*Chevron Environmental Management Company, Houston, Texas*

# TABLES

**TABLE 1**

**CUMULATIVE SUMMARY OF FLUID LEVEL MEASUREMENTS**
**LOVINGTON UNIT WATER PLANT**
**SECTION 1-T17S-R36E, LEA COUNTY, NM**

| *Well ID* | *Date of Measurement* | *Elevation of TOC* | *Depth to Water (fbtoc)* | *Elevation of Potentiometric Surface (famsl)* | *Total Depth (fbtoc)* |
|---|---|---|---|---|---|
| MW-1 | 1/19/2010 | 3832.74 | 100.31 | 3732.43 | |
| MW-1 | 2/25/2010 | 3832.74 | 100.41 | 3732.33 | |
| MW-1 | 3/1/2011 | 3832.74 | 102.20 | 3730.54 | 114.8 |
| MW-1 | 4/13/2011 | 3832.74 | 102.40 | 3730.34 | 114.8 |
| MW-1 | 7/15/2011 | 3832.74 | 102.58 | 3730.16 | |
| MW-1 | 12/22/2011 | 3832.74 | 102.63 | 3730.11 | |
| MW-1 | 3/22/2012 | 3832.74 | 103.87 | 3728.87 | |
| MW-1 | 6/13/2012 | 3832.74 | 103.89 | 3728.85 | |
| MW-1 | 9/27/2012 | 3832.74 | 104.25 | 3728.49 | |
| MW-1 | 12/19/2012 | 3832.74 | 104.97 | 3727.77 | |
| MW-2 | 1/19/2010 | 3830.96 | 98.10 | 3732.86 | |
| MW-2 | 2/25/2010 | 3830.96 | 98.17 | 3732.79 | |
| MW-2 | 3/1/2011 | 3830.96 | 99.89 | 3731.07 | 114.42 |
| MW-2 | 4/13/2011 | 3830.96 | 100.03 | 3730.93 | 114.42 |
| MW-2 | 7/15/2011 | 3830.96 | 100.41 | 3730.55 | |
| MW-2 | 12/22/2011 | 3830.96 | 100.53 | 3730.43 | |
| MW-2 | 3/22/2012 | 3830.96 | 101.60 | 3729.36 | |
| MW-2 | 6/13/2012 | 3830.96 | 101.60 | 3729.36 | |
| MW-2 | 9/27/2012 | 3830.96 | 102.02 | 3728.94 | |
| MW-2 | 12/19/2012 | 3830.96 | 102.68 | 3728.28 | |
| MW-3 | 1/19/2010 | 3834.31 | 101.96 | 3732.35 | |
| MW-3 | 2/25/2010 | 3834.31 | 102.10 | 3732.21 | |
| MW-3 | 3/1/2011 | 3834.31 | 103.94 | 3730.37 | 115.2 |
| MW-3 | 4/13/2011 | 3834.31 | 104.30 | 3730.01 | 114.9 |
| MW-3 | 7/15/2011 | 3834.31 | 104.76 | 3729.55 | |
| MW-3 | 12/22/2011 | 3834.31 | 104.98 | 3729.33 | |
| MW-3 | 3/22/2012 | 3834.31 | 105.60 | 3728.71 | |
| MW-3 | 6/13/2012 | 3834.31 | 105.50 | 3728.81 | |
| MW-3 | 9/27/2012 | 3834.31 | 105.83 | 3728.48 | |
| MW-3 | 12/19/2012 | 3834.31 | 106.69 | 3727.62 | |
| MW-4 | 1/19/2010 | 3831.95 | 98.23 | 3733.72 | |
| MW-4 | 2/25/2010 | 3831.95 | 98.28 | 3733.67 | |
| MW-4 | 3/1/2011 | 3831.95 | 99.94 | 3732.01 | 114.52 |
| MW-4 | 4/13/2011 | 3831.95 | 100.18 | 3731.77 | 114.6 |
| MW-4 | 7/15/2011 | 3831.95 | 100.45 | 3731.50 | |
| MW-4 | 12/22/2011 | 3831.95 | 100.48 | 3731.47 | |
| MW-4 | 3/22/2012 | 3831.95 | 101.50 | 3730.45 | |
| MW-4 | 6/13/2012 | 3831.95 | 101.55 | 3730.40 | |
| MW-4 | 9/27/2012 | 3831.95 | 102.07 | 3729.88 | |
| MW-4 | 12/19/2012 | 3831.95 | 102.84 | 3729.11 | |

**TABLE 1**

**CUMULATIVE SUMMARY OF FLUID LEVEL MEASUREMENTS**
**LOVINGTON UNIT WATER PLANT**
**SECTION 1-T17S-R36E, LEA COUNTY, NM**

| *Well ID* | *Date of Measurement* | *Elevation of TOC* | *Depth to Water (fbtoc)* | *Elevation of Potentiometric Surface (famsl)* | *Total Depth (fbtoc)* |
|---|---|---|---|---|---|
| MW-5 | 3/22/2012 | 3830.07 | 100.15 | 3729.92 | |
| MW-5 | 6/13/2012 | 3830.07 | 100.23 | 3729.84 | |
| MW-5 | 9/27/2012 | 3830.07 | 100.72 | 3729.35 | |
| MW-5 | 12/19/2012 | 3830.07 | 101.28 | 3728.79 | |
| MW-6 | 3/22/2012 | 3835.60 | 106.73 | 3728.87 | |
| MW-6 | 6/13/2012 | 3835.60 | 106.56 | 3729.04 | |
| MW-6 | 9/27/2012 | 3835.60 | 107.00 | 3728.60 | |
| MW-6 | 12/19/2012 | 3835.60 | 108.28 | 3727.32 | |
| MW-7 | 3/22/2012 | 3834.46 | 105.97 | 3728.49 | |
| MW-7 | 6/13/2012 | 3834.46 | 106.23 | 3728.23 | |
| MW-7 | 9/27/2012 | 3834.46 | 106.44 | 3728.02 | |
| MW-7 | 12/19/2012 | 3834.46 | 107.31 | 3727.15 | |
| MW-8 | 3/22/2012 | 3832.40 | 104.71 | 3727.69 | |
| MW-8 | 6/13/2012 | 3832.40 | 104.84 | 3727.56 | |
| MW-8 | 9/27/2012 | 3832.40 | 105.21 | 3727.19 | |
| MW-8 | 12/19/2012 | 3832.40 | 105.82 | 3726.58 | |

Notes:
1. TOC - top of casing
2. famsl - feet above mean sea level
3. fbtoc - feet below top of casing

**TABLE 2**

**CUMULATIVE SUMMARY OF ANALYTICAL RESULTS OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS IN GROUNDWATER**
**LOVINGTON UNIT WATER PLANT**
**SECTION 1-T17S-R36E, LEA COUNTY, NM**

| *Monitor Well ID* | *Date of Sample* | *Depth of Sample (fbtoc)* | *Chloride (mg/L by USEPA 300.0)* | *Total Dissolved Solids (mg/L by 2450C)* |
|---|---|---|---|---|
| | | | *NMWQCC Standard for Drinking Water Supply* | |
| | | | ***250*** | ***1,000*** |
| MW-1 | 01/19/10 | | 336 | 1080 |
| MW-1 | 02/25/10 | | 357 | 1100 |
| MW-1 | 03/01/11 | | 264 | 870 |
| MW-1 | 04/13/11 | 114.8 | 348 | 1070 |
| MW-1 | 07/15/11 | 114.8 | 271 | 740 |
| MW-1 | 12/22/11 | 114 | 332 | 1120 |
| MW-1 | 03/22/12 | | 485 | 2170 |
| MW-1 | 06/14/12 | | 502 | 1550 |
| MW-1 | 09/28/12 | | 404 | 1190 |
| MW-1 | 12/19/12 | | 401 | 1000 |
| MW-2 | 01/19/10 | | 857 | 2180 |
| MW-2 | 02/25/10 | | 901 | 2440 |
| MW-2 | 03/01/11 | | 649 | 2390 |
| MW-2 | 04/13/11 | 114.42 | 775 | 2690 |
| MW-2 | 07/15/11 | 114.41 | 384 | 3220 |
| MW-2 | 12/22/11 | 114 | 456 | 1420 |
| MW-2 | 03/23/12 | | 614 | 2640 |
| MW-2 | 06/14/12 | | 292 | 1190 |
| MW-2 | 09/28/12 | | 467 | 1490 |
| MW-2 | 12/20/12 | | 670 | 1560 |
| MW-3 | 01/19/10 | | 734 | 1920 |
| MW-3 | 02/25/10 | | 763 | 2130 |
| MW-3 | 03/01/11 | | 944 | 2670 |
| MW-3 | 04/13/11 | 113 | 1050 | 4180 |
| MW-3 | 07/15/11 | 112.76 | 1130 | 3330 |
| MW-3 | 12/22/11 | 110 | 1200 | 2850 |
| MW-3 | 03/23/12 | | 1380 | 4220 |
| MW-3 | 06/14/12 | | 1290 | 4220 |
| MW-3 | 09/28/12 | | 1440 | 6350 |
| MW-3 | 12/20/12 | | 1190 | 2860 |
| MW-4 | 01/19/10 | | 212 | 622 |
| MW-4 | 02/25/10 | | 110 | 586 |
| MW-4 | 03/01/11 | | 72.6 | 452 |
| MW-4 | 04/13/11 | 105 | 69.8 | 446 |
| MW-4 | 07/15/11 | 110.45 | 65.6 | 366 |
| MW-4 | 12/22/11 | 110 | 66.9 | 526 |
| MW-4 | 03/22/12 | | 91.7 | 626 |
| MW-4 | 06/14/12 | | 64.8 | 460 |
| MW-4 | 09/28/12 | | 134 | 661 |

**TABLE 2**

**CUMULATIVE SUMMARY OF ANALYTICAL RESULTS OF DISSOLVED CHLORIDE AND TOTAL DISSOLVED SOLIDS IN GROUNDWATER**
**LOVINGTON UNIT WATER PLANT**
**SECTION 1-T17S-R36E, LEA COUNTY, NM**

| *Monitor Well ID* | *Date of Sample* | *Depth of Sample (fbtoc)* | *Chloride (mg/L by USEPA 300.0)* | *Total Dissolved Solids (mg/L by 2450C)* |
|---|---|---|---|---|
| | | | *NMWQCC Standard for Drinking Water Supply* | |
| | | | ***250*** | ***1,000*** |
| MW-4 | 12/19/12 | | 125 | 501 |
| MW-5 | 03/22/12 | | 199 | 1100 |
| MW-5 | 06/14/12 | | 88 | 468 |
| MW-5 | 09/28/12 | | 130 | 691 |
| MW-5 | 12/19/12 | | 126 | 489 |
| MW-6 | 03/22/12 | | 243 | 1140 |
| MW-6 | 06/14/12 | | 566 | 1670 |
| MW-6 | 09/28/12 | | 1040 | 2300 |
| MW-6 | 12/20/12 | | 961 | 2210 |
| MW-7 | 03/22/12 | | 251 | 1210 |
| MW-7 | 06/14/12 | | 196 | 926 |
| MW-7 | 09/28/12 | | 258 | 1000 |
| MW-7 | 12/19/12 | | 192 | 683 |
| MW-8 | 03/22/12 | | 192 | 910 |
| MW-8 | 06/14/12 | | 184 | 914 |
| MW-8 | 09/28/12 | | 210 | 814 |
| MW-8 | 12/19/12 | | 192 | 702 |
| Dup #1 (MW-2) | 01/19/10 | | 912 | 2150 |
| Dup-1 | 03/01/11 | | 627 | 2400 |
| Dup-1 (MW-3) | 04/13/11 | | 1070 | 3650 |
| Dup-1 (MW-3) | 07/15/11 | | 1120 | 3480 |
| Dup-1 (MW-1) | 12/22/11 | | 339 | 1010 |
| Dup-1 | 03/23/12 | | 1390 | 3100 |
| Dup-1 | 06/14/12 | | 66.4 | 436 |
| Dup-1 (MW-3) | 09/28/12 | | 1430 | 5650 |
| Dup1 | 12/19/12 | | 243 | 669 |

Notes:
1. fbtoc - feet below top of casing
2. NMWQCC - New Mexico Water Quality Control
3. mg/L - milligrams per liter
4. USEPA - United States Environmnetal Protection Agency
5. Cells shaded yellow indicate concentrations exceeding NMWQCC Standard for Drinking Water Supply

# APPENDICES

# APPENDIX A

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEMI
LOCATION Lovington, NM NE/4-Sec1-T17S-R36E

DRILLING CONTRACTOR White Drilling
DRILLER Ed Atkins
SURFACE ELEVATION
WEATHER (A.M.) 3-1-12 Clear, breezy
(P.M.) 2-29-12 Clear, breezy

HOLE DESIGNATION MW-5
DATE/TIME STARTED 2-29-12 15:52
DATE/TIME COMPLETED 3-1-12 10:06
DRILLING METHOD Air rotary w/mud
CRA SUPERVISOR John Schmaltz

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).) | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 3" | Hand clear | | | | | | | | | | | | | | |
| 3" | | 5' | Limestone - lt tan, yellowish, sandy, hard drilling 16:10 | | cut | | | | | | | | | | | | |
| 5 | | 10 | Sand - lt tan, yellowish, fine, poorly cemented 3-1-12 08:14 | | cut | | | | | | | | | | | | |
| 10 | | 15 | Sand - lt tan yellowish, fine, poorly cemented 08:16 | | cut | | | | | | | | | | | | |
| 15 | | 20 | Sand - lt tan, yellowish, fine, poorly cemented 08:18 | | cut | | | | | | | | | | | | |
| 20 | | 25 | Sand - lt tan, reddish, fine, poorly cemented 08:22 | | cut | | | | | | | | | | | | |
| 25 | | 30 | Sand - lt tan, reddish, fine, poorly cemented 08:23 | | cut | | | | | | | | | | | | |
| 30 | | 35 | Sand - lt. tan, reddish, poorly cem but hd stks@31' 08:26 | | cut | | | | | | | | | | | | |
| 35 | | 40 | Sand - lt tan, reddish, vfn-fn, poorly cemented 08:30 | | cut | | | | | | | | | | | | |
| 40 | | 45 | Sand - lt tan, reddish, vfn-fn, poorly cemented, hard stks@45 08:34 | | cut | | | | | | | | | | | | |

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTES AND COMMENTS

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Northwater Plant
PROJECT NUMBER 07216
CLIENT Cone
LOCATION Lovington, NM
NE/4 - Sec 1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Ed Atkins
SURFACE ELEVATION
WEATHER (A.M.) 3-1-12 clear, breezy
(P.M.) 2-29-12 clear, breezy

HOLE DESIGNATION MW-5
DATE/TIME STARTED 2-27-12 15:52
DATE/TIME COMPLETED 3-1-12 10:06
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | | 50 | Sandstone - lt tan, reddish, vfn fine, well cemented (calc) hard drilling 08:38 | | cut | | | | | | | | | | |
| 50 | | 55 | Sandstone - lt tan, reddish fine, very tightly cemented (calc) very hard drilling 08:49 | | cut | | | | | | | | | | |
| 55 | | 60 | Sand - lt/ tan, reddish, fine, stringers mod cemented 08:50 | | cut | | | | | | | | | | |
| 60 | | 65 | Sand - lt tan, reddish vfn with silt poorly cemented 08:53 | | cut | | | | | | | | | | |
| 65 | | 70 | Sand - lt tan, reddish, vfn, silty, poorly cemented 08:58 | | cut | | | | | | | | | | |
| 70 | | 75 | Sand - lt tan, reddish, vfn - fine silty, poorly cem 09:02 | | cut | | | | | | | | | | |
| 75 | | 80 | Sand - lt tan, reddish, vfn silty, poorly cemented 09:06 | | cut | | | | | | | | | | |
| 80 | | 85 | Sand - lt tan, reddish, vfn - fine silty, poorly cem 09:11 | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 273216
CLIENT SEMC
LOCATION Lovington, NM NE/4 - Sec 1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER DO Atkins
SURFACE ELEVATION
WEATHER (A.M.) 3-1-12 clear, breezy
(P.M.) 2-29-12 clear, breezy

HOLE DESIGNATION MW-5
DATE/TIME STARTED 2-29-12 15:52
DATE/TIME COMPLETED 3-1-12 10:06
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85 | | 90 | Silt - lt tan, reddish, with vfn sd, poorly cem 09:15 | | cut | | | | | | | | | | |
| 90 | | 95 | Silt - lt tan, reddish, with vfn sd, poorly cem 09:19 | | cut | | | | | | | | | | |
| 95 | | 100 | Silt - lt tan, reddish, with vfn sd, poorly cem 09:22 | | cut | | | | | | | | | | |
| 100 | | 105 | Silt - lt tan, reddish, with vfn sd, poorly cem | | cut | | | | | | | | | | |
| 105 | | 110 | Silt - lt tan, reddish, with vfn sd, poorly cem 09:29 | | cut | | | | | | | | | | |
| 110 | | 115 | Silt - lt tan, reddish, with vfn sd, poorly cem | | cut | | | | | | | | | | |
| 115 | | 120 | Silt - lt tan, reddish, with vfn sd - poorly cemented | | cut | | | | | | | | | | |
| 120 | | 125 | Silt - lt tan, reddish, with vfn sd, poorly cemented | | cut | | | | | | | | | | |
| 125 | | 130 | Silt - lt tan, reddish, with vfn sd, poorly cemented 10:02 | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEPK
LOCATION Lovington, NM
NE¼ Sec-T17S-R36E

DRILLING CONTRACTOR White Drilling
DRILLER BA Hinds
SURFACE ELEVATION
WEATHER (A.M.) 3-1-12 clear, breezy
(P.M.) 2-29-12 clear, breezy

HOLE DESIGNATION MW-5
DATE/TIME STARTED 2-29-12 15:52
DATE/TIME COMPLETED 3-1-12 10:06
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 130 | | 133 | Silt - lt tan, reddish, with fine sd, poorly cemented, TD 133 10:06 | | cut | | | | | | | | | | | | |

NOTES AND COMMENTS

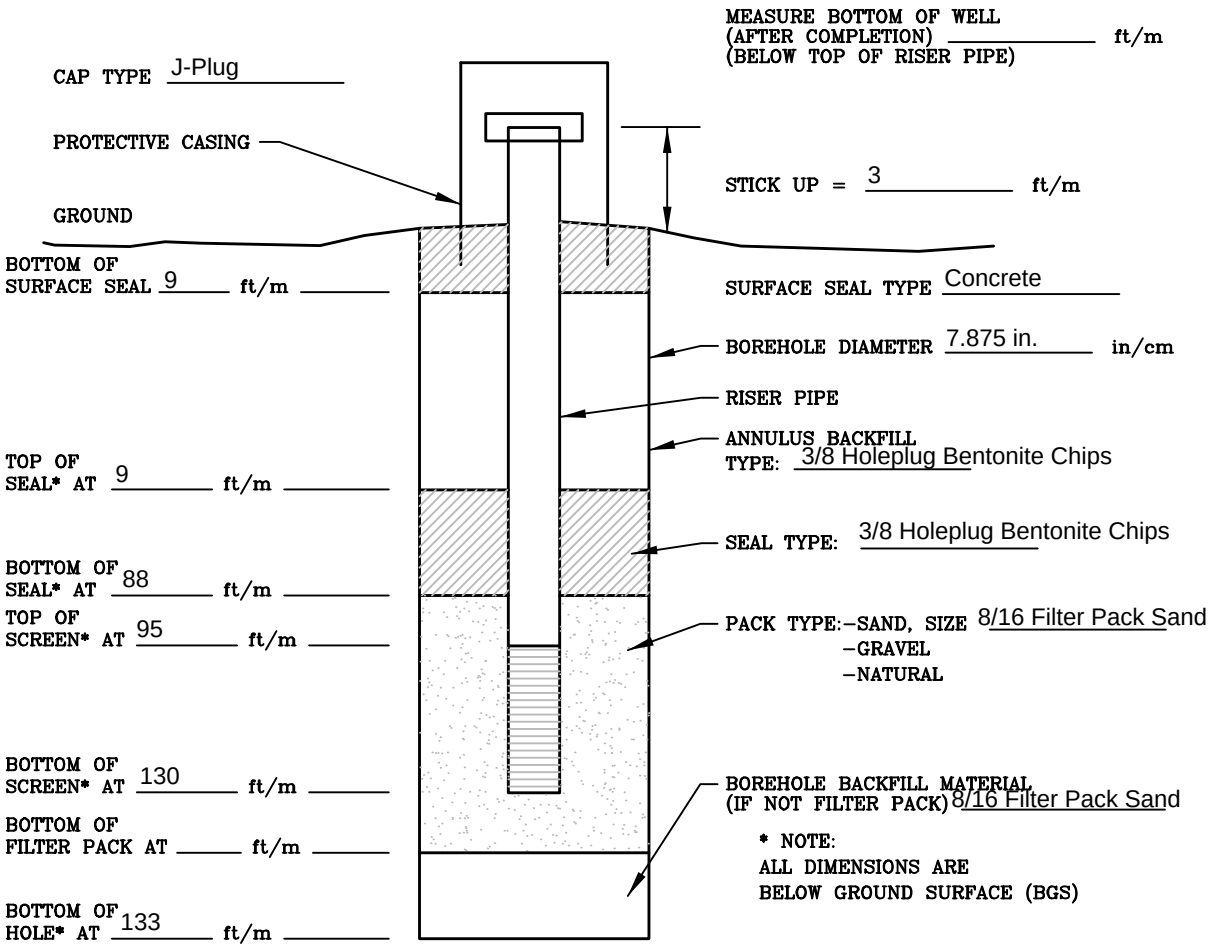
DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# WELL INSTRUMENTATION LOG

PROJECT NAME: Lovington Unit Water Plant
PROJECT NUMBER: 073016
CLIENT: Chevron Environmental Management Company
LOCATION: NE/4-Section 1-T17S-R36E

WELL DESIGNATION: MW-5
DATE COMPLETED: 3/5/12
DRILLING METHOD: Air Rotary
CRA SUPERVISOR: John Schnable




SCREEN TYPE: ☑ continuous slot ☐ wire wrapped ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☐ stainless steel ☑ pvc ☐ other: _____
Schedule 40

SCREEN LENGTH: 35 ft. ft/m SCREEN DIAMETER: 4 in. in/cm SCREEN SLOT SIZE: 0.020 in.

RISER PIPE MATERIAL: Schedule 40 PVC RISER PIPE DIAMETER: 4 in. in/cm

SURFACE CASING (Y/N) No MATERIAL _____ DEPTH _____ ft/m

DIAMETER _____ in/cm SEALANT _____

DEVELOPMENT: METHOD: Bailer and submersible pump DURATION: _____

DESCRIPTION OF PURGED WATER: Development water very cloudy to nearly clear at end. Bailed 75 gallons. Pumped 105 gallons.

073016 - Field Data

# WELL RECORD & LOG

## OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

### 1. GENERAL AND WELL LOCATION

| POD NUMBER (WELL NUMBER) | OSE FILE NUMBER(S) |
|---|---|
| MW-5 | |
| **WELL OWNER NAME(S)** | **PHONE (OPTIONAL)** |
| City of Lovington/Attn: City Manager | |
| **WELL OWNER MAILING ADDRESS** | **CITY** / **STATE** / **ZIP** |
| 214 S. Love St. | Lovington / NM / 88260 |

| WELL LOCATION (FROM GPS) | DEGREES | MINUTES | SECONDS | |
|---|---|---|---|---|
| LATITUDE | 32 | 52 | 2.00 | N |
| LONGITUDE | 103 | 18 | 22.50 | W |

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS

Lovington Water Plant

### 2. OPTIONAL

| (2.5 ACRE) | (10 ACRE) | (40 ACRE) | (160 ACRE) | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|---|---|---|
| ¼ | ¼ | ¼ | ¼ | 1 | 17 ☐ NORTH ☑ SOUTH | 36 ☑ EAST ☐ WEST |

| SUBDIVISION NAME | LOT NUMBER | BLOCK NUMBER | UNIT/TRACT |
|---|---|---|---|
| | | | G |

| HYDROGRAPHIC SURVEY | MAP NUMBER | TRACT NUMBER |
|---|---|---|
| | | |

### 3. DRILLING INFORMATION

| LICENSE NUMBER | NAME OF LICENSED DRILLER | NAME OF WELL DRILLING COMPANY |
|---|---|---|
| WD-1456 | John W. White | White Drilling Company, Inc. |

| DRILLING STARTED | DRILLING ENDED | DEPTH OF COMPLETED WELL (FT) | BORE HOLE DEPTH (FT) | DEPTH WATER FIRST ENCOUNTERED (FT) |
|---|---|---|---|---|
| 2/29/2012 | 3/05/2012 | 130.0 | | 100.19 |

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 100.19

DRILLING FLUID: ☐ AIR ☑ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

| DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | CASING MATERIAL | CONNECTION TYPE (CASING) | INSIDE DIA. CASING (IN) | CASING WALL THICKNESS (IN) | SLOT SIZE (IN) |
|---|---|---|---|---|---|---|---|
| 0.0 | 95.0 | 7 7/8 | PVC Riser | 4 tpi | 4.0 | Sch. 40 | |
| 95.0 | 130.0 | 7 7/8 | PVC Screen | 4 tpi | 4.0 | Sch. 40 | .020 |
| | | | | | | | |
| | | | | | | | |

### 4. WATER BEARING STRATA

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | YIELD (GPM) |
|---|---|---|---|---|
| 100.0 | 130.0 | 30.0 | Brown & light tan silty clayey sand. | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA | TOTAL ESTIMATED WELL YIELD (GPM) |
|---|---|
| | |

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 1 OF 2 |

**5. SEAL AND PUMP**

TYPE OF PUMP: ☐ SUBMERSIBLE ☐ JET ☐ NO PUMP – WELL NOT EQUIPPED ☐ TURBINE ☐ CYLINDER ☐ OTHER – SPECIFY:

| ANNULAR SEAL AND GRAVEL PACK | DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | MATERIAL TYPE AND SIZE | AMOUNT (CUBIC FT) | METHOD OF PLACEMENT |
|---|---|---|---|---|---|---|
| | 130.0 | 88.0 | 7 7/8" | Brady 8/16 Sand | 15 sacks | Hand Mix |
| | 88.0 | 10.0 | 7 7/8" | Bentonite Pellets | 17 sacks | Hand Mix |
| | 10.0 | 0.0 | 7 7/8" | Cement | 2.278 | Hand Mix |

**6. GEOLOGIC LOG OF WELL**

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | WATER BEARING? |
|---|---|---|---|---|
| 0.0 | 1.5 | 1.5 | Brown clayey sand. | ☐ YES ☑ NO |
| 1.5 | 18.0 | 16.5 | Caliche w/limestone. | ☐ YES ☑ NO |
| 18.0 | 31.0 | 13.0 | Light brown silty sand w/calliche. | ☐ YES ☑ NO |
| 31.0 | 50.5 | 19.5 | Tan & light brown sand/sandstone. | ☐ YES ☑ NO |
| 50.5 | 53.5 | 3.0 | Brown silty sandstone/sand. | ☐ YES ☑ NO |
| 53.5 | 98.0 | 44.5 | Brown silty sandstone/sand. | ☐ YES ☑ NO |
| 98.0 | 130.0 | 32.0 | Brown & light tan silty clayey sand. | ☑ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

**7. TEST & ADDITIONAL INFO**

WELL TEST — METHOD: ☐ BAILER ☐ PUMP ☐ AIR LIFT ☐ OTHER – SPECIFY:

TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

**8. SIGNATURE**

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

SIGNATURE OF DRILLER — DATE: 3/22/2012

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 2 OF 2 |

432-230-4310

# STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF 4

PROJECT NAME Lovington Landfill Expansion
PROJECT NUMBER 27311016
CLIENT CEMC
LOCATION S. of Lovington, NM
DRILLING CONTRACTOR White
DRILLER Bo Adams
SURFACE ELEVATION
WEATHER (A.M.) clear, light NW winds
(P.M.) 65°
HOLE DESIGNATION MW-6
DATE/TIME STARTED 2-29-12 10:56
DATE/TIME COMPLETED 2-29-12 12:08
DRILLING METHOD Rotary - Water
CRA SUPERVISOR John Schnabl

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 4" | Clean by hand w/ post digger | | cut | | | | | | | | | | |
| 4" | | 5' | Limestone - lt tan, yellowish, hard drilling, micritic, sandstone, very well cemented (calc) | | cut | | | | | | | | | | |
| 5 | | 10 | Sandstone - lt tan, yellowish, fine-med, very well cemented (calc) | | cut | | | | | | | | | | |
| 10 | | 15 | Sandstone - lt tan, reddish, fine-med, well cemented (calc) | | cut | | | | | | | | | | |
| 15 | | 20 | Sandstone - lt tan, reddish, fn-med gr, well cemented (calc) | | cut | | | | | | | | | | |
| 20 | | 25 | Sandstone - lt tan, reddish, fn-med gr, poorly cemented | | cut | | | | | | | | | | |
| 25 | | 30 | Sandstone - lt tan, reddish, fn-med gr, poorly cemented | | cut | | | | | | | | | | |
| 30 | | 35 | Sand/sandstone - lt tan reddish fn-med gr, streaks well cemented, hard drilling | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEMC
LOCATION Lovington NM
NE/4 Sec 1 T17S R36E

DRILLING CONTRACTOR White Drilling
DRILLER Co Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-6
DATE/TIME STARTED 2-29-12 10:56
DATE/TIME COMPLETED 2-29-12 12:08
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schraable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | | 40 | Sand/Sandstone - lt tan, reddish, fine-med gr, streaks well cemented (calc) | | cut | | | | | | | | | | | | |
| 40 | | 45 | Sand/sandstone - lt tan, reddish fine-med gr, streaks well cemented | | cut | | | | | | | | | | | | |
| 45 | | 50 | Sand - lt tan, reddish, fine gr, poorly cemented | | cut | | | | | | | | | | | | |
| 50 | | 55 | Sand - lt tan, reddish, fine gr, poorly cemented 11:20 | | cut | | | | | | | | | | | | |
| 55 | | 60 | Sand - lt tan, reddish, fine gr poorly cemented 11:22 | | cut | | | | | | | | | | | | |
| 60 | | 65 | Sand - lt tan, reddish, fine gr, poorly cemented 11:26 | | cut | | | | | | | | | | | | |
| 65 | | 70 | Sand - lt. tan, reddish, fine gr. poorly cem 11:29 | | cut | | | | | | | | | | | | |
| 70 | | 75 | Sand - lt tan reddish, fine gr, poorly cemented 11:31 | | cut | | | | | | | | | | | | |
| 75 | | 80 | Sand - lt tan, reddish, v fine-fine gr. poorly cemented 11:33 | | cut | | | | | | | | | | | | |

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____ AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTES AND COMMENTS

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Water Plant
PROJECT NUMBER 073816
CLIENT CEMC
LOCATION Lovington, NM NE/4 - Sec 1 - T16S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-6
DATE/TIME STARTED 2-29-12 10:56
DATE/TIME COMPLETED 2-29-12 12:08
DRILLING METHOD Air rotary w/mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | | 85 | Sand - lt tan, reddish, vfn-fn gr, poorly cemented 11:37 | | cut | | | | | | | | | | | | |
| 85 | | 90 | Sandy sandstone - lt tan, reddish, poorly cemented, vfn-fn gr 11:39 | | cut | | | | | | | | | | | | |
| 90 | | 95 | Silt - lt tan, reddish, w/vfn sd poorly cemented 11:42 | | cut | | | | | | | | | | | | |
| 95 | | 100 | Silt - lt tan, reddish, w/vfn sd, poorly cemented, some hd stks 11:47 | | cut | | | | | | | | | | | | |
| 100 | | 105 | Silt - lite tan, reddish, vfn sd, poorly cemented, some streaks well cem (calc) 11:52 | | cut | | | | | | | | | | | | |
| 105 | | 110 | Silt - tan, reddish, w/vfn sd, poorly cemented | | cut | | | | | | | | | | | | |
| 110 | | 115 | Silt - lt tan, reddish, w/vfn sd, poorly cemented 11:55 | | cut | | | | | | | | | | | | |
| 115 | | 120 | Silt - lt tan, reddish, w/vfn sd, poorly cemented 11:57 | | cut | | | | | | | | | | | | |
| 120 | | 125 | Silt - lt tan, reddish, w/vfn sd poorly cemented 12:01 | | cut | | | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073616
CLIENT CEMC
LOCATION Lovington NM NE/4 - Sec 1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-6
DATE/TIME STARTED 2-29-12 10:56
DATE/TIME COMPLETED 2-29-12 12:08
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 125 | | 130 | Silt - lt tan, reddish, w/ vfg sd poorly cemented 12:04 | | cut | | | | | | | | | | | | |
| 130 | | 135 | Silt - lt tan, reddish, w/ vfg sd poorly cemented TD 135 / 12:08 | | cut | | | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# WELL INSTRUMENTATION LOG

PROJECT NAME Lovington Unit Water Plant

PROJECT NUMBER 073016

CLIENT Chevron Environmental Management Company

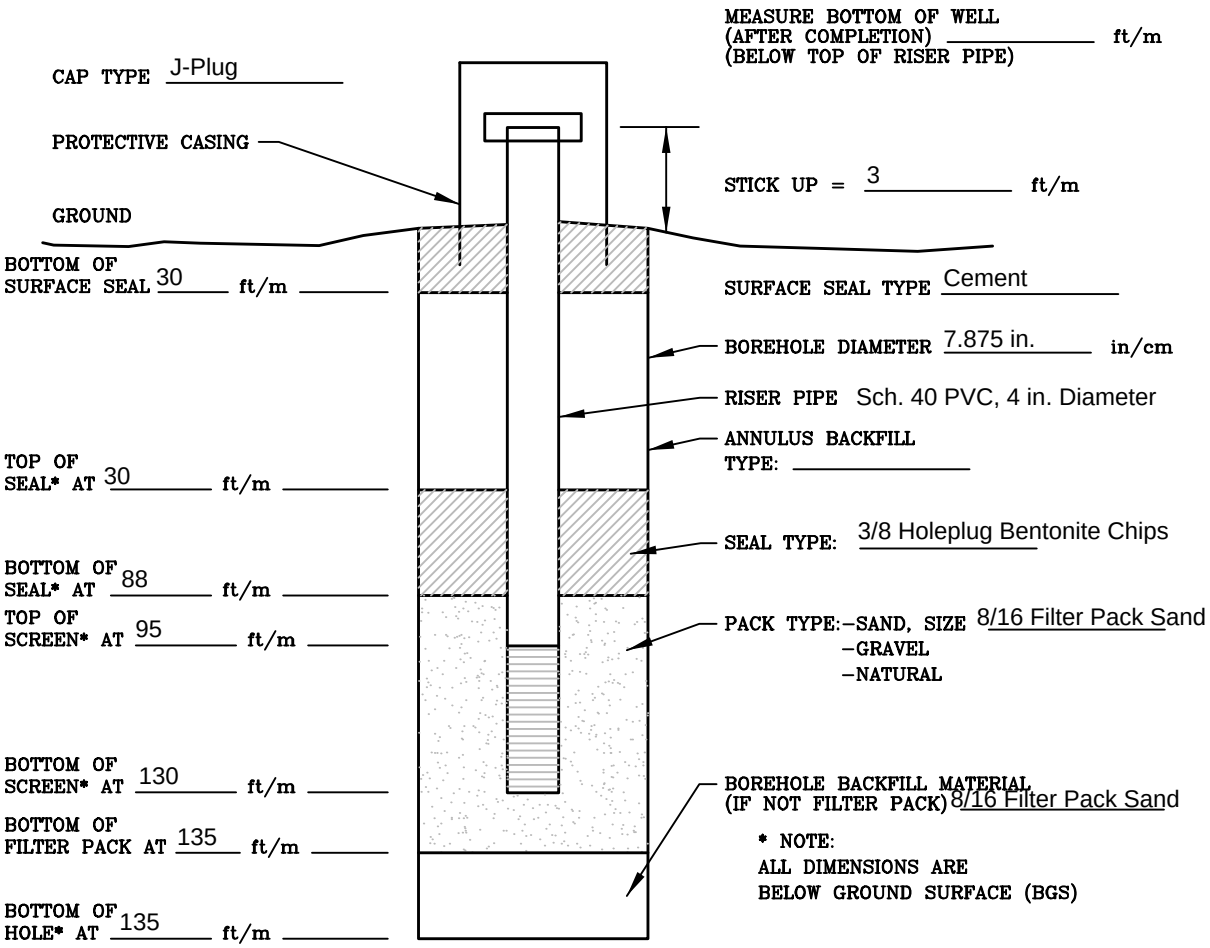
LOCATION NE/4-Section 1-T17S-R36E

WELL DESIGNATION MW-6

DATE COMPLETED 3/5/12

DRILLING METHOD Air Rotary

CRA SUPERVISOR John Schnable




SCREEN TYPE: ☑ continuous slot ☐ wire wrapped ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☐ stainless steel ☑ pvc ☐ other: _____

SCREEN LENGTH: 35 ft. ft/m SCREEN DIAMETER: 4 in. in/cm SCREEN SLOT SIZE: 0.020 in.
lowest 5 ft. 0.010 in. slot

RISER PIPE MATERIAL: Schedule 40 PVC RISER PIPE DIAMETER: 4 in. in/cm

SURFACE CASING (Y/N) No MATERIAL _____ DEPTH _____ ft/m

DIAMETER _____ in/cm SEALANT _____

DEVELOPMENT: METHOD: Bailer and submersible pump DURATION: _____

DESCRIPTION OF PURGED WATER: Development water very cloudy to moderately cloudy at end of development. Bailed gallons. Pumped 65 gallons.

# WELL RECORD & LOG

## OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

### 1. GENERAL AND WELL LOCATION

| POD NUMBER (WELL NUMBER) | OSE FILE NUMBER(S) |
|---|---|
| MW-6 | |
| **WELL OWNER NAME(S)** | **PHONE (OPTIONAL)** |
| City of Lovington/Attn: City Manager | |
| **WELL OWNER MAILING ADDRESS** | **CITY / STATE / ZIP** |
| 214 S. Love St. | Lovington / NM / 88260 |

| WELL LOCATION (FROM GPS) | DEGREES | MINUTES | SECONDS | |
|---|---|---|---|---|
| LATITUDE | 32 | 52 | 6.60 | N |
| LONGITUDE | 103 | 18 | 21.00 | W |

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS: Lovington Water Plant

### 2. OPTIONAL

| (2.5 ACRE) | (10 ACRE) | (40 ACRE) | (160 ACRE) | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|---|---|---|
| ¼ | ¼ | ¼ | ¼ | 1 | 17 ☐ NORTH ☑ SOUTH | 36 ☑ EAST ☐ WEST |

| SUBDIVISION NAME | LOT NUMBER | BLOCK NUMBER | UNIT/TRACT |
|---|---|---|---|
| | | | G |

| HYDROGRAPHIC SURVEY | MAP NUMBER | TRACT NUMBER |
|---|---|---|
| | | |

### 3. DRILLING INFORMATION

| LICENSE NUMBER | NAME OF LICENSED DRILLER | NAME OF WELL DRILLING COMPANY |
|---|---|---|
| WD-1456 | John W. White | White Drilling Company, Inc. |

| DRILLING STARTED | DRILLING ENDED | DEPTH OF COMPLETED WELL (FT) | BORE HOLE DEPTH (FT) | DEPTH WATER FIRST ENCOUNTERED (FT) |
|---|---|---|---|---|
| 2/28/2012 | 3/05/2012 | 130.0 | | 106.67 |

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 106.67

DRILLING FLUID: ☐ AIR ☑ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

| DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | CASING MATERIAL | CONNECTION TYPE (CASING) | INSIDE DIA. CASING (IN) | CASING WALL THICKNESS (IN) | SLOT SIZE (IN) |
|---|---|---|---|---|---|---|---|
| 0.0 | 95.0 | 7 7/8 | PVC Riser | 4 tpi | 4.0 | Sch. 40 | |
| 95.0 | 130.0 | 7 7/8 | PVC Screen | 4 tpi | 4.0 | Sch. 40 | .020 |
| | | | | | | | |
| | | | | | | | |

### 4. WATER BEARING STRATA

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | YIELD (GPM) |
|---|---|---|---|---|
| 105.0 | 122.0 | 17.0 | Light brown sand. | |
| 122.0 | 125.0 | 3.0 | Hard sandstone light tan. | |
| 125.0 | 135.0 | 5.0 | Light tan sand/sandstone. | |
| | | | | |
| | | | | |

| METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA | TOTAL ESTIMATED WELL YIELD (GPM) |
|---|---|
| | |

FOR OSE INTERNAL USE

WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 1 OF 2 |

**5. SEAL AND PUMP**

TYPE OF PUMP: ☐ SUBMERSIBLE ☐ JET ☐ NO PUMP – WELL NOT EQUIPPED
☐ TURBINE ☐ CYLINDER ☐ OTHER – SPECIFY:

| ANNULAR SEAL AND GRAVEL PACK | DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | MATERIAL TYPE AND SIZE | AMOUNT (CUBIC FT) | METHOD OF PLACEMENT |
|---|---|---|---|---|---|---|
| | 135.0 | 88.0 | 7 7/8" | Brady 8/16 Sand | 19 sacks | Hand Mix |
| | 88.0 | 30.0 | 7 7/8" | Bentonite Pellets | 14 sacks | Hand Mix |
| | 30.0 | 0.0 | 7 7/8" | Cement | 6.834 | Hand Mix |

**6. GEOLOGIC LOG OF WELL**

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | WATER BEARING? |
|---|---|---|---|---|
| 0.0 | 1.0 | 1.0 | Base caliche. | ☐ YES ☑ NO |
| 1.0 | 2.0 | 1.0 | Brown sand. | ☐ YES ☑ NO |
| 2.0 | 5.0 | 3.0 | Limestone. | ☐ YES ☑ NO |
| 5.0 | 55.0 | 50.0 | Tan sand w/caliche.. | ☐ YES ☑ NO |
| 55.0 | 122.0 | 67.0 | Light brown sand. | ☑ YES ☐ NO |
| 122.0 | 125.0 | 3.0 | Hard sandstone light tan. | ☑ YES ☐ NO |
| 125.0 | 135.0 | 10.0 | Light tan sand/sandstone. | ☑ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

**7. TEST & ADDITIONAL INFO**

WELL TEST — METHOD: ☐ BAILER ☐ PUMP ☐ AIR LIFT ☐ OTHER – SPECIFY:

TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

**8. SIGNATURE**

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

SIGNATURE OF DRILLER — DATE: 3/22/2012

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 2 OF 2 |

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit water Plnt
PROJECT NUMBER 073016
CLIENT CEMC
LOCATION Lovington, NM
NE/4-Sec1-T17S-R36E

DRILLING CONTRACTOR White
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-7
DATE/TIME STARTED 3-2-12 09:22
DATE/TIME COMPLETED 3-2-12 11:32
DRILLING METHOD Air rotary w/mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL. (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 3" | Clear to 3" bgs w/ post digger | | cut | | | | | | | | | | |
| 3" | | 5' | Sandstone – lt tan, yellowish, fn-med gr, v well cemented (cals) 09:27 | | cut | | | | | | | | | | |
| 5 | | 10 | Sandstone – lt tan, yellowish, fn-med gr, well cemented, hard drilling 09:48 | | cut | | | | | | | | | | |
| 10 | | 15 | Sand – lt tan, yellowish, fn-med gr, ~~reddish~~, poorly cemented 09:50 | | cut | | | | | | | | | | |
| 15 | | 20 | Sand – lt tan, reddish, fn-med gr, poorly cemented 09:52 | | cut | | | | | | | | | | |
| 20 | | 25 | Sand – lt tan, reddish, fn-med gr, most poorly cem, some hard drilling stretches 10:02 | | cut | | | | | | | | | | |
| 25 | | 30 | Sand – lt tan, reddish, fn-med gr, poorly cemented 10:04 | | cut | | | | | | | | | | |
| 30 | | 35 | Sand – lt tan reddish, fn-med gr poorly cemented 10:05 | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Water Plant
PROJECT NUMBER 073016
CLIENT CEMC
LOCATION Lovington, NM NE/4 - Sec1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Ed Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-7
DATE/TIME STARTED 3-2-12 09:22
DATE/TIME COMPLETED 3-2-12 11:32
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).) | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N–VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | | 40 | Sand - lt tan, reddish, fine gr, poorly cemented 10:07 | | cut | | | | | | | | | | |
| 40 | | 45 | Sand - lt tan, reddish, 10:25 fine gr, poorly cemented | | cut | | | | | | | | | | |
| 45 | | 50 | Sand - lt tan, reddish, fine-med gr, poorly cemented 10:39 | | cut | | | | | | | | | | |
| 50 | | 55 | Sand - lt tan, reddish, fine gr, poorly cemented 10:32 | | cut | | | | | | | | | | |
| 55 | | 60 | Sand - lt tan, reddish, fine gr, poorly cemented 10:55 | | cut | | | | | | | | | | |
| 60 | | 65 | Sand - lt tan, reddish, fine gr, poorly cemented. 10:42 | | cut | | | | | | | | | | |
| 65 | | 70 | Sand lt tan, reddish, fine gr poorly cem 10: | | cut | | | | | | | | | | |
| 70 | | 75 | Sand - lt tan, reddish, fine gr poorly cemented 10:47 | | cut | | | | | | | | | | |
| 75 | | 80 | Sand - lt tan, reddish, fine gr, poorly cemented, hard stringer well cemented 10:52 | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT–SPOON SAMPLE, RECORD BLOW COUNTS, N–VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEMC
LOCATION Lovington, NM NE/4-Sec1-T17S-R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-7
DATE/TIME STARTED 3-2-12 09:22
DATE/TIME COMPLETED 3-2-12 11:32
DRILLING METHOD Air rotary w/mud
CRA SUPERVISOR John Schmidt

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | | 85 | Sand – lt tan, reddish, fine gr, poorly cemented 10:57 | | cut | | | | | | | | | | | | |
| 85 | | 90 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |
| 90 | | 95 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |
| 95 | | 100 | Silt – lt tan, reddish, w/ vfgr sd poorly cemented | | cut | | | | | | | | | | | | |
| 100 | | ~~105~~ 110 | Silt – lt tan, reddish, w/ vfgr sd poorly cemented | | cut | | | | | | | | | | | | |
| 105 | | 110 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |
| 110 | | 115 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |
| 115 | | 120 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |
| 120 | | 125 | Silt – lt tan, reddish, w/ vfgr sd, poorly cemented | | cut | | | | | | | | | | | | |

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTES AND COMMENTS

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CRM
LOCATION Lovington, NM
NE/4 - Sec 1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.) Clear, breezy
(P.M.)

HOLE DESIGNATION MW-9
DATE/TIME STARTED 3-1-12 09:22
DATE/TIME COMPLETED 3-2-12 11:32
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnabb

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.5 | | 138 | Silt - lt tan, reddish, w/ vfn sd, poorly cemented | | cut | | | | | | | | | | | |
| 17.0 | | 133 | Silt - lt tan reddish, w/ vfn sd, poorly cemented TD 133 | | cut | | | | | | | | | | | |

NOTES AND COMMENTS

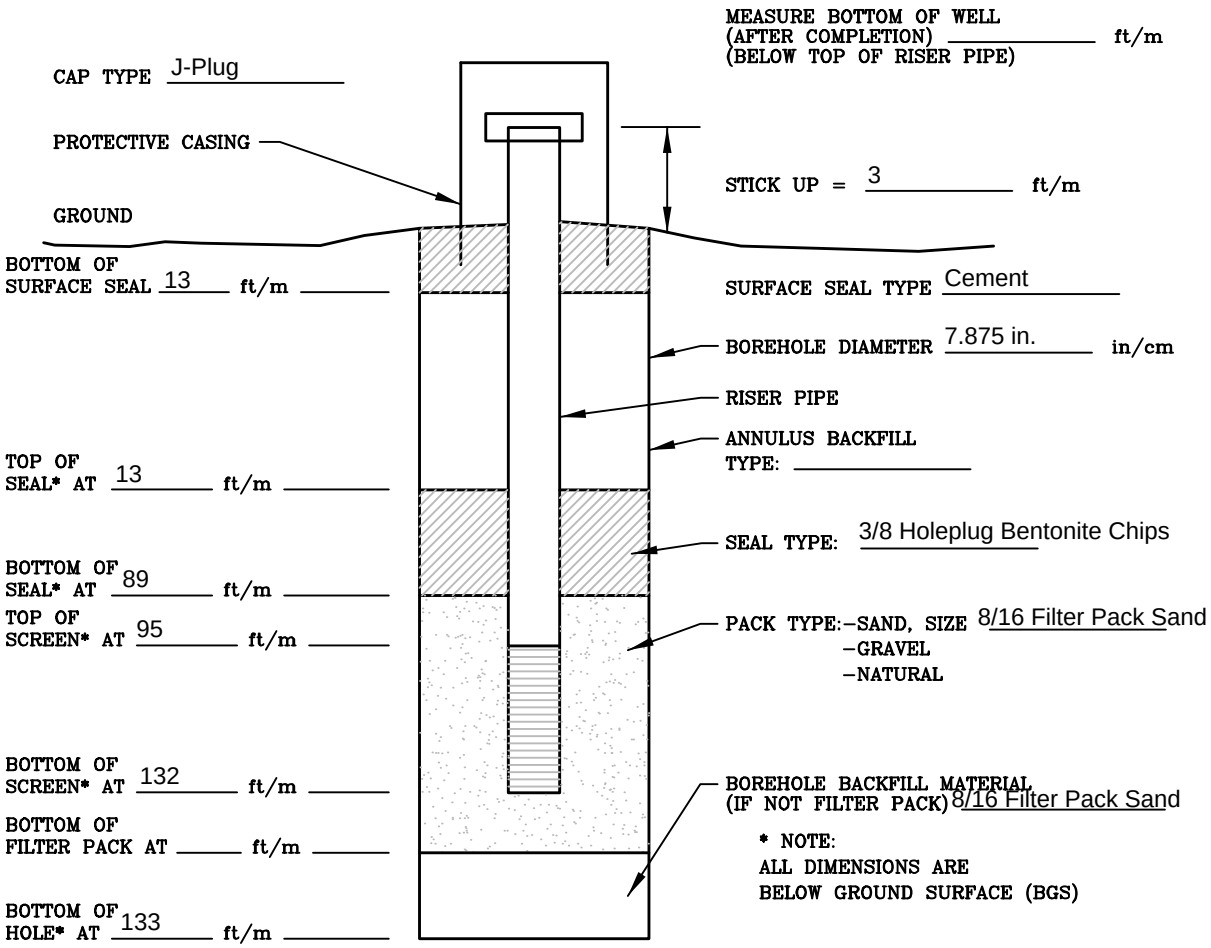
DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER _____ HOURS _____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# WELL INSTRUMENTATION LOG

PROJECT NAME: Lovington Unit Water Plant
PROJECT NUMBER: 073016
CLIENT: Chevron Environmental Management Company
LOCATION: NE/4-Section 1-T17S-R36E

WELL DESIGNATION: MW-7
DATE COMPLETED: 3/5/12
DRILLING METHOD: Air Rotary
CRA SUPERVISOR: John Schnable




SCREEN TYPE: ☑ continuous slot ☐ wire wrapped ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☐ stainless steel ☑ pvc ☐ other: _____

SCREEN LENGTH: 35 ft. ft/m SCREEN DIAMETER: 4 in. in/cm SCREEN SLOT SIZE: 0.020 in.

RISER PIPE MATERIAL: Schedule 40PVC RISER PIPE DIAMETER: 4 in. in/cm

SURFACE CASING (Y/N) No MATERIAL _____ DEPTH _____ ft/m

DIAMETER _____ in/cm SEALANT _____

DEVELOPMENT: METHOD: Bailer and submersible pump DURATION: _____

DESCRIPTION OF PURGED WATER: Development water clear at end. Bailed 75 gallons. Pumped 60 gallons.

# WELL RECORD & LOG

## OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

### 1. GENERAL AND WELL LOCATION

| POD NUMBER (WELL NUMBER) | OSE FILE NUMBER(S) |
|---|---|
| MW-7 | |
| **WELL OWNER NAME(S)** | **PHONE (OPTIONAL)** |
| City of Lovington/Attn: City Manager | |
| **WELL OWNER MAILING ADDRESS** | **CITY / STATE / ZIP** |
| 214 S. Love St. | Lovington / NM / 88260 |

| WELL LOCATION (FROM GPS) | | DEGREES | MINUTES | SECONDS | |
|---|---|---|---|---|---|
| | LATITUDE | 32 | 52 | 7.50 | N |
| | LONGITUDE | 103 | 18 | 17.50 | W |

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS: Lovington Water Plant

### 2. OPTIONAL

| (2.5 ACRE) | (10 ACRE) | (40 ACRE) | (160 ACRE) | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|---|---|---|
| ¼ | ¼ | ¼ | ¼ | 1 | 17 ☐ NORTH ☑ SOUTH | 36 ☑ EAST ☐ WEST |

| SUBDIVISION NAME | LOT NUMBER | BLOCK NUMBER | UNIT/TRACT |
|---|---|---|---|
| | | | G |

| HYDROGRAPHIC SURVEY | MAP NUMBER | TRACT NUMBER |
|---|---|---|
| | | |

### 3. DRILLING INFORMATION

| LICENSE NUMBER | NAME OF LICENSED DRILLER | NAME OF WELL DRILLING COMPANY |
|---|---|---|
| WD-1456 | John W. White | White Drilling Company, Inc. |

| DRILLING STARTED | DRILLING ENDED | DEPTH OF COMPLETED WELL (FT) | BORE HOLE DEPTH (FT) | DEPTH WATER FIRST ENCOUNTERED (FT) |
|---|---|---|---|---|
| 3/01/2012 | 3/05/2012 | 132.0 | | 106.05 |

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 106.05

DRILLING FLUID: ☐ AIR ☑ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

| DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | CASING MATERIAL | CONNECTION TYPE (CASING) | INSIDE DIA. CASING (IN) | CASING WALL THICKNESS (IN) | SLOT SIZE (IN) |
|---|---|---|---|---|---|---|---|
| 0.0 | 97.0 | 7 7/8 | PVC Riser | 4 tpi | 4.0 | Sch. 40 | |
| 97.0 | 132.0 | 7 7/8 | PVC Screen | 4 tpi | 4.0 | Sch. 40 | .020 |
| | | | | | | | |
| | | | | | | | |

### 4. WATER BEARING STRATA

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | YIELD (GPM) |
|---|---|---|---|---|
| 105.0 | 120.0 | 15.0 | Brown sand. | |
| 120.0 | 135.0 | 15.0 | Brown sand/sandstone w/light tan silty sand. | |
| | | | | |
| | | | | |
| | | | | |

| METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA | TOTAL ESTIMATED WELL YIELD (GPM) |
|---|---|
| | |

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 1 OF 2 |

## 5. SEAL AND PUMP

TYPE OF PUMP: ☐ SUBMERSIBLE ☐ JET ☐ NO PUMP – WELL NOT EQUIPPED
☐ TURBINE ☐ CYLINDER ☐ OTHER – SPECIFY:

| ANNULAR SEAL AND GRAVEL PACK | DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | MATERIAL TYPE AND SIZE | AMOUNT (CUBIC FT) | METHOD OF PLACEMENT |
|---|---|---|---|---|---|---|
| | 132.0 | 90.0 | 7 7/8" | Brady 8/16 Sand | 17 sacks | Hand Mix |
| | 90.0 | 10.0 | 7 7/8" | Bentonite Pellets | 17 sacks | Hand Mix |
| | 10.0 | 0.0 | 7 7/8" | Cement | 2.278 | Hand Mix |

## 6. GEOLOGIC LOG OF WELL

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | WATER BEARING? |
|---|---|---|---|---|
| 0.0 | 15.0 | 15.0 | Caliche. | ☐ YES ☑ NO |
| 15.0 | 30.0 | 15.0 | Brown sand w/limestone & caliche. | ☐ YES ☑ NO |
| 30.0 | 54.0 | 24.0 | Tan & brown sandstone. | ☐ YES ☑ NO |
| 54.0 | 120.0 | 66.0 | Brown sand. | ☑ YES ☐ NO |
| 120.0 | 132.0 | 12.0 | Brown sand/sandstone w/light tan silty sand. | ☑ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

## 7. TEST & ADDITIONAL INFO

WELL TEST

METHOD: ☐ BAILER ☐ PUMP ☐ AIR LIFT ☐ OTHER – SPECIFY:

TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

## 8. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

SIGNATURE OF DRILLER

3/22/2012
DATE

FOR OSE INTERNAL USE

WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 2 OF 2 |

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Water Plant
PROJECT NUMBER 077016
CLIENT CEMC
LOCATION Lovington, NM
NE/4 Sec 1 - T17S - R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.) Clear, breezy 80

HOLE DESIGNATION MW-8
DATE/TIME STARTED 15:02 3/1/12
DATE/TIME COMPLETED 16:37 3/1/12
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 5 | LS - lt tan, hard, micritic | | cut | | | | | | | | | | |
| | | | frost | | | | | | | | | | | | |
| 5 | | 10 | Sand - lt tan, reddish, fine - med | | cut | | | | | | | | | | |
| | | | friable 15:05 | | | | | | | | | | | | |
| 10 | | 15 | Sand - lt tan, reddish, fine-med | | cut | | | | | | | | | | |
| | | | friable 15:07 | | | | | | | | | | | | |
| 15 | | 20 | Sand - lt tan, reddish v/fn-fine | | cut | | | | | | | | | | |
| | | | friable 15:08 | | | | | | | | | | | | |
| 20 | | 25 | Sand - lt tan, reddish v/fn-med | | cut | | | | | | | | | | |
| | | | friable | | | | | | | | | | | | |
| 25 | | 30 | Sand - lt tan reddish, v/fn-fine | | cut | | | | | | | | | | |
| | | | moderately cemented 15:18 | | | | | | | | | | | | |
| 30 | | 35 | Sand - lt tan reddish, v/fn-fine | | cut | | | | | | | | | | |
| | | | 15:20 | | | | | | | | | | | | |
| 35 | | 40 | Sand - lt tan, reddish, v/fn-fine | | cut | | | | | | | | | | |
| | | | mod calc cem 15:23 | | | | | | | | | | | | |
| 40 | | 45 | Sand - lt tan, reddish, v/fn-fine | | cut | | | | | | | | | | |
| | | | mod calc cement | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____

WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____

COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.

NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEMI
LOCATION Lovington NM NE/4-Sec1-T17S-R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.) Clear, breezy

HOLE DESIGNATION MW-8
DATE/TIME STARTED 15:02 3-1-12
DATE/TIME COMPLETED 16:57 3-1-12
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION<br>ORDER OF DESCRIPTORS:<br>SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS<br>NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT). | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | | 50 | Sandstone - lt tan, reddish, vfn-fn well cem (calc), hard 15:32 | | cut | | | | | | | | | | |
| 50 | | 55 | Sandstone - lt gray, vfn-fn well cemented (calc), hard 15:35 | | cut | | | | | | | | | | |
| 55 | | 60 | Sand - lt tan, reddish vf-fn poorly cem 15:40 | | cut | | | | | | | | | | |
| 60 | | 65 | Sand - lt tan, reddish, vfn-fine poorly cem 15:44 | | cut | | | | | | | | | | |
| 65 | | 70 | Sand - lt tan, reddish silt-fn poorly cemented 15:46 | | cut | | | | | | | | | | |
| 70 | | 75 | Sand - lt tan reddish, vfn, silty, poorly cemented 15:50 | | cut | | | | | | | | | | |
| 75 | | 80 | Sand - lt tan, reddish, vfn, silty, poorly cemented 15:53 | | cut | | | | | | | | | | |
| 80 | | 85 | Sand - lt tan, reddish, vfn-fine silty, poorly cemented | | cut | | | | | | | | | | |
| 85 | | 90 | Sand - lt tan reddish vfn, silty, poorly cemented | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Plant
PROJECT NUMBER 073016
CLIENT CEMI
LOCATION Lovington, NM
NE/4-Sec1-T17S-R36E

DRILLING CONTRACTOR White Drilling
DRILLER Bo Atkins
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.) Clear, breezy

HOLE DESIGNATION MW-8
DATE/TIME STARTED 3-1-12 15:02
DATE/TIME COMPLETED 3-1-12 16:57
DRILLING METHOD Air rotary w/ mud
CRA SUPERVISOR John Schnable

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS. NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).) | SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 | | 95 | Silt - lt tan, reddish, with vfn sd, poorly cem | | cut | | | | | | | | | | |
| 95 | | 100 | Silt - lt tan, reddish with vfn sand, poorly cemented 16:04 | | cut | | | | | | | | | | |
| 100 | | 105 | Silt - lt tan, reddish with vfn sd, poorly cemented 16:12 | | cut | | | | | | | | | | |
| 105 | | 110 | Siltstone - lt tan, reddish, with vfn sd, well cem (calc), hard 16:14 | | cut | | | | | | | | | | |
| ~~110~~ | | ~~115~~ | | | | | | | | | | | | | |
| 110 | | 115 | Silt - lt tan, reddish with vfn sd, poorly cemented 16:17 | | cut | | | | | | | | | | |
| 115 | | 120 | Silt - lt tan, reddish, with trace vfn sd, poorly cemented 16:19 | | cut | | | | | | | | | | |
| 120 | | 125 | Silt - lt tan, reddish, with vfn sd, poorly cemented 16:22 | | cut | | | | | | | | | | |
| 125 | | 130 | Silt - lt tan, reddish, with vfn sd, poorly cemented 16:27 | | cut | | | | | | | | | | |

NOTES AND COMMENTS

DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# STRATIGRAPHY LOG (OVERBURDEN)



PROJECT NAME Lovington Unit Water Mon. | DRILLING CONTRACTOR White Drilling | HOLE DESIGNATION MW-8
PROJECT NUMBER 073816 | DRILLER Bo Atkins | DATE/TIME STARTED 3-1-12 15:02
CLIENT CEMC | SURFACE ELEVATION | DATE/TIME COMPLETED 3-1-12 16:59
LOCATION Lovington, NM NE/4 Sec 1-T17S-R36E | WEATHER (A.M.) | DRILLING METHOD Air rotary w/ mud
(P.M.) Clear, breezy | CRA SUPERVISOR John Schaadt

| STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM | AT | TO | SAMPLE DESCRIPTION | SAMPLE DETAILS: SAMPLE # | SAMPLING METHOD | PENETRATION RECORD SPLIT SPOON BLOWS (RECORD N-VALUES & RECOVERIES) 6" | 6" | 6" | 6" | N | R | SAMPLE INTERVAL | PID / FID (ppm) | CHEMICAL ANALYSIS | GRAIN SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 130 | | 135 | SILT - lt tan, reddish w/ occ sd, poorly cemented TD 135 / 16:32 | | cut | | | | | | | | | | |

ORDER OF DESCRIPTORS:
SOIL TYPE SYMBOL(S) – PRIMARY COMPONENT(S), (NATURE OF DEPOSIT), SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS
NOTE: PLASTICITY DETERMINATION REQUIRES THE ADDITION OF MOISTURE IF THE SAMPLE IS TOO DRY TO ROLL (INDICATE IF MOISTURE WAS ADDED OR NOT).

NOTES AND COMMENTS

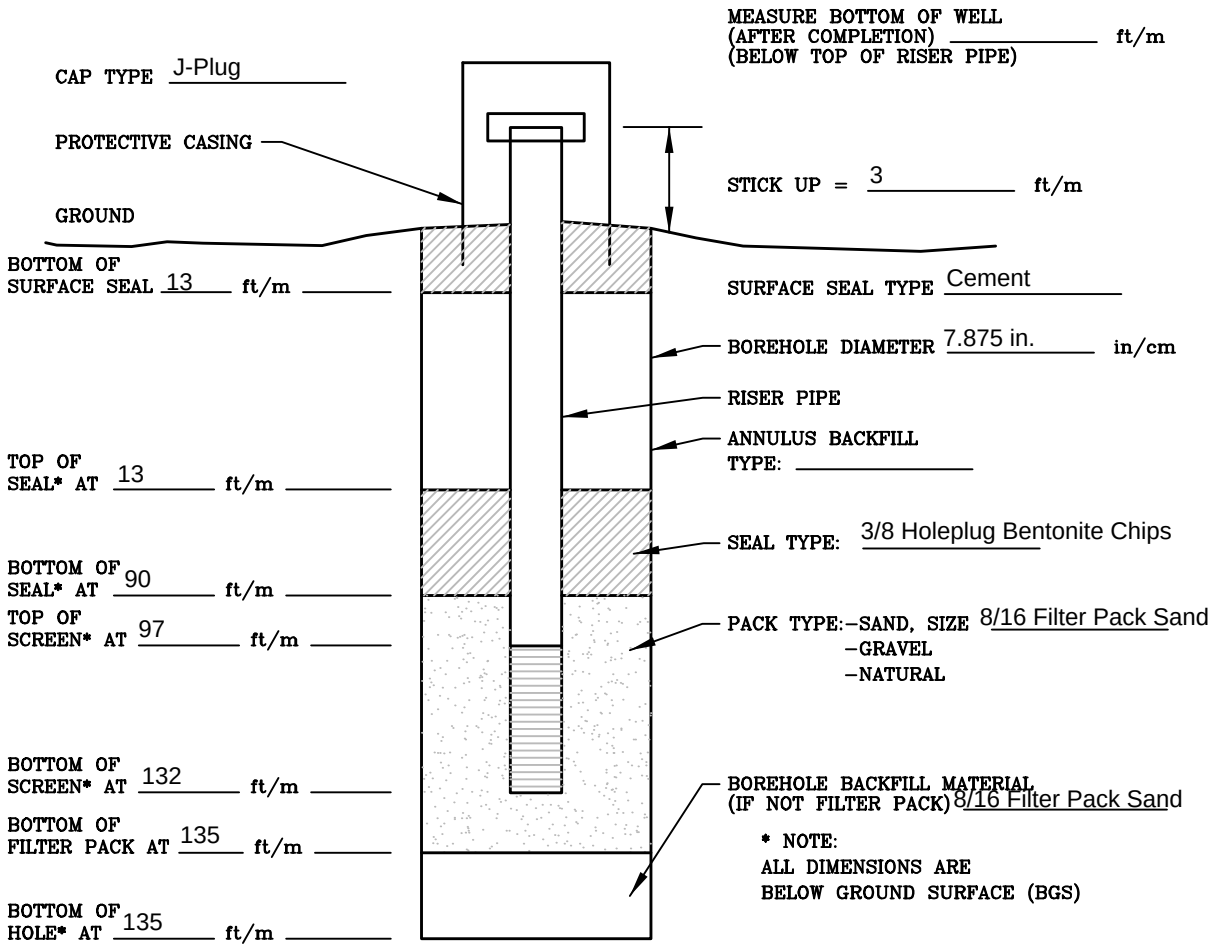
DEPTH OF BOREHOLE CAVING _____ DEPTH OF FIRST GROUNDWATER ENCOUNTER _____ TOPSOIL THICKNESS _____
WATER LEVEL IN OPEN BOREHOLE ON COMPLETION _____, AFTER ____ HOURS ____
COMPLETION DETAILS: _____

NOTE: FOR EACH SPLIT-SPOON SAMPLE, RECORD BLOW COUNTS, N-VALUE, SAMPLE RECOVERY LENGTH, AND SAMPLE INTERVAL.
NOTES:

# WELL INSTRUMENTATION LOG

PROJECT NAME: Lovington Unit Water Plant
PROJECT NUMBER: 073016
CLIENT: Chevron Environmental Management Company
LOCATION: NE/4-Section 1-T17S-R36E

WELL DESIGNATION: MW-8
DATE COMPLETED: 3/5/12
DRILLING METHOD: Air Rotary
CRA SUPERVISOR: John Schnable




SCREEN TYPE: ☑ continuous slot ☐ wire wrapped ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☐ stainless steel ☑ pvc ☐ other: _____

SCREEN LENGTH: 35 ft. ft/m SCREEN DIAMETER: 4 in. in/cm SCREEN SLOT SIZE: 0.020 in.

RISER PIPE MATERIAL: PVC RISER PIPE DIAMETER: PVC in/cm

SURFACE CASING (Y/N) No MATERIAL _____ DEPTH _____ ft/m

DIAMETER _____ in/cm SEALANT _____

DEVELOPMENT: METHOD: Bailer and submersible pump DURATION: _____

DESCRIPTION OF PURGED WATER: Bailed 110 gallons. Pumped 105 gallons.

# WELL RECORD & LOG

## OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

**1. GENERAL AND WELL LOCATION**

| POD NUMBER (WELL NUMBER) | OSE FILE NUMBER(S) |
|---|---|
| MW-8 | |
| WELL OWNER NAME(S) | PHONE (OPTIONAL) |
| City of Lovington/Attn: City Manager | |
| WELL OWNER MAILING ADDRESS | CITY / STATE / ZIP |
| 214 S. Love St. | Lovington / NM / 88260 |

| WELL LOCATION (FROM GPS) | | DEGREES | MINUTES | SECONDS | |
|---|---|---|---|---|---|
| | LATITUDE | 32 | 52 | 4.50 | N |
| | LONGITUDE | 103 | 18 | 14.50 | W |

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS: Lovington Water Plant

**2. OPTIONAL**

| (2.5 ACRE) | (10 ACRE) | (40 ACRE) | (160 ACRE) | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|---|---|---|
| ¼ | ¼ | ¼ | ¼ | 1 | 17 ☐ NORTH ☑ SOUTH | 36 ☑ EAST ☐ WEST |

| SUBDIVISION NAME | LOT NUMBER | BLOCK NUMBER | UNIT/TRACT |
|---|---|---|---|
| | | | G |

| HYDROGRAPHIC SURVEY | MAP NUMBER | TRACT NUMBER |
|---|---|---|
| | | |

**3. DRILLING INFORMATION**

| LICENSE NUMBER | NAME OF LICENSED DRILLER | NAME OF WELL DRILLING COMPANY |
|---|---|---|
| WD-1456 | John W. White | White Drilling Company, Inc. |

| DRILLING STARTED | DRILLING ENDED | DEPTH OF COMPLETED WELL (FT) | BORE HOLE DEPTH (FT) | DEPTH WATER FIRST ENCOUNTERED (FT) |
|---|---|---|---|---|
| 3/02/2012 | 3/05/2012 | 132.0 | | 104.75 |

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 104.75

DRILLING FLUID: ☐ AIR ☑ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

| DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | CASING MATERIAL | CONNECTION TYPE (CASING) | INSIDE DIA. CASING (IN) | CASING WALL THICKNESS (IN) | SLOT SIZE (IN) |
|---|---|---|---|---|---|---|---|
| 0.0 | 97.0 | 7 7/8 | PVC Riser | 4 tpi | 4.0 | Sch. 40 | |
| 97.0 | 132.0 | 7 7/8 | PVC Screen | 4 tpi | 4.0 | Sch. 40 | .020 |
| | | | | | | | |
| | | | | | | | |

**4. WATER BEARING STRATA**

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | YIELD (GPM) |
|---|---|---|---|---|
| 100.0 | 120.0 | 20.0 | Brown silty sand. | |
| 120.0 | 135.0 | 15.0 | Brown silty sand w/caliche & sandstone. | |
| | | | | |
| | | | | |
| | | | | |

| METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA | TOTAL ESTIMATED WELL YIELD (GPM) |
|---|---|
| | |

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 1 OF 2 |

## 5. SEAL AND PUMP

TYPE OF PUMP: ☐ SUBMERSIBLE ☐ JET ☐ NO PUMP – WELL NOT EQUIPPED
☐ TURBINE ☐ CYLINDER ☐ OTHER – SPECIFY:

| ANNULAR SEAL AND GRAVEL PACK | DEPTH (FT) FROM | DEPTH (FT) TO | BORE HOLE DIA. (IN) | MATERIAL TYPE AND SIZE | AMOUNT (CUBIC FT) | METHOD OF PLACEMENT |
|---|---|---|---|---|---|---|
| | 135.0 | 89.0 | 7 7/8" | Brady 8/16 Sand | 17 sacks | Hand Mix |
| | 89.0 | 10.0 | 7 7/8" | Bentonite Pellets | 17 sacks | Hand Mix |
| | 10.0 | 0.0 | 7 7/8" | Cement | 2.2780 | Hand Mix |

## 6. GEOLOGIC LOG OF WELL

| DEPTH (FT) FROM | DEPTH (FT) TO | THICKNESS (FT) | COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES) | WATER BEARING? |
|---|---|---|---|---|
| 0.0 | 15.0 | 15.0 | Caliche. | ☐ YES ☑ NO |
| 15.0 | 35.0 | 20.0 | Brown sand w/caliche.. | ☐ YES ☑ NO |
| 35.0 | 55.0 | 20.0 | Caliche & limestone. | ☐ YES ☑ NO |
| 55.0 | 120.0 | 65.0 | Brown silty sand. | ☑ YES ☐ NO |
| 120.0 | 135.0 | 15.0 | Brown silty sand w/caliche & sandstone. | ☑ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |
| | | | | ☐ YES ☐ NO |

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

## 7. TEST & ADDITIONAL INFO

WELL TEST
METHOD: ☐ BAILER ☐ PUMP ☐ AIR LIFT ☐ OTHER – SPECIFY:
TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

## 8. SIGNATURE

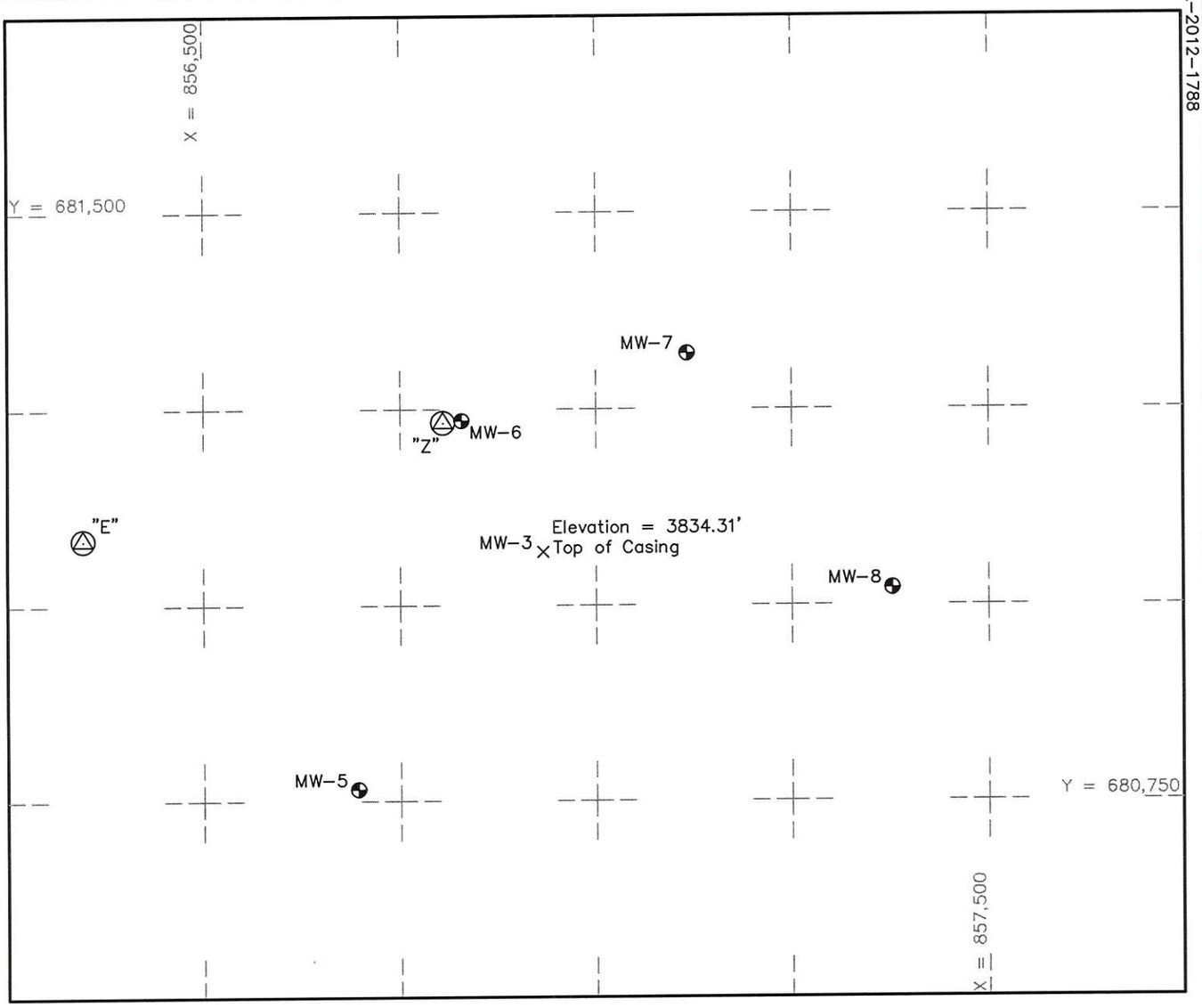
THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

SIGNATURE OF DRILLER — DATE: 3/22/2012

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

| FILE NUMBER | POD NUMBER | TRN NUMBER |
|---|---|---|
| LOCATION | | PAGE 2 OF 2 |

L-2012-1788




THIS IS NOT A BOUNDARY SURVEY
Apparent property corners and property lines, if shown, are for information only.

| DESCRIPTION | GEODETIC POSITIONS | | | | STATE PLANE COORDINATES | | ELEVATION | | |
|---|---|---|---|---|---|---|---|---|---|
| | NORTH AMERICAN DATUM OF 1983 | | | | NAD '83 - New Mexico East Zone (US Ft.) | | | | |
| | Latitude (D.M.S.) | Longitude (D.M.S.) | Latitude (D.D.) | Longitude (D.D.) | Northing (Y) | Easting (X) | Top of Casing | Concrete Pad | Natural Ground |
| MW-3 | 32°52'04.99" N | 103°18'19.68" W | 32.86805 | -103.30547 | 681,068.06 | 856,932.44 | 3,834.31 | | |
| MW-5 | 32°52'02.02" N | 103°18'22.49" W | 32.86723 | -103.30625 | 680,765.21 | 856,696.09 | 3,830.07 | 3,827.28 | 3,826.8 |
| MW-6 | 32°52'06.65" N | 103°18'20.99" W | 32.86851 | -103.30583 | 681,234.07 | 856,818.68 | 3,835.60 | 3,833.08 | 3,832.6 |
| MW-7 | 32°52'07.48" N | 103°18'17.49" W | 32.86874 | -103.30486 | 681,320.73 | 857,116.82 | 3,834.46 | 3,831.80 | 3,831.5 |
| MW-8 | 32°52'04.49" N | 103°18'14.47" W | 32.86791 | -103.30402 | 681,021.26 | 857,377.12 | 3,832.40 | 3,830.08 | 3,829.6 |
| "Z" | 32°52'06.64" N | 103°18'21.05" W | 32.86851 | -103.30585 | 681,233.43 | 856,813.91 | | | 3,832.7 |
| "E" | 32°52'05.20" N | 103°18'26.55" W | 32.86811 | -103.30738 | 681,083.30 | 856,346.12 | | | 3,830.4 |

Date Surveyed: November 6, 2012
Weather: Warm & Breezy

NOTE:

1) Plane Coordinates shown hereon are Transverse Mercator Grid and Conform to the "New Mexico Coordinate System", New Mexico East Zone, North American Datum of 1983.

2) Elevations shown hereon are relative to the Top of Casing of MW-3. Elevation = 3834.31 feet as per information provided by representatives of Conestoga-Rovers & Associates.

3) Geodetic Coordinates shown hereon references the North American Datum of 1983, (GRS '80). Reference Stations – "ODESSA" – CORS (DL2764), "PORTALES AP" – NM2005 CORS ARP (DH3849) and "ROSWELL"– CORS (DG6517).

LEGEND

- ⊕ – Denotes Monitor Well
- △ – Denotes Static GPS Control Station
- × – Denotes Project Benchmark

200 0 200 400
Graphic Scale in Feet

I HEREBY CERTIFY THAT THIS PLAT WAS MADE FROM NOTES TAKEN IN THE FIELD IN A BONA FIDE SURVEY MADE UNDER MY SUPERVISION.

MACON McDONALD NEW MEXICO P.L.S. No. 12185

MACON McDONALD NEW MEXICO 12185 REGISTERED PROFESSIONAL SURVEYOR

**WEST COMPANY**
**of Midland, Inc.**
110 W. LOUISIANA, STE. 110
MIDLAND TEXAS, 79701
(432) 687-0865 – (432) 687-0868 FAX

## CONESTOGA-ROVERS & ASSOCIATES

**Topographic Survey of**

# FOUR MONITOR WELLS

**Located in and around the Lovington Water Plant**
**Section 1, T-17S, R-36-E, N.M.P.M.**
**Lea, New Mexico**

| | |
|---|---|
| Drawn By: SJA | Date: November 13, 2012 |
| Scale: 1" = 200' | Field Book: 566 / 30-32 |
| Revision Date: | Quadrangle: Humble City |
| W.O. No: 2012-1788 | Dwg. No.: L-2012-1788 |

# APPENDIX B

# NABORS WELL SERVICES LTD.

1590409

PLEASE REMIT TO: P.O. BOX 973510, DALLAS, TX 75397-3510

## TRUCK FIELD REPORT

WAYBILL
WORK TICKET

Production Services: Vacuum Trucks • Pump Trucks • Transport Trucks • Winch Trucks • Mud Tanks • Frac Tanks • Fluid Sales

W.H.P. 630 • LPSC 7171 Regulated ☐ Non-Regulated ☐

| | | | |
|---|---|---|---|
| Truck No. 94-0400 | Tank No. 93-0654 | Day of Week: Thur. | Date: 3-22-12 |
| Customer [redacted] - CRA | Address | | |
| Order No. | RRC# John Schnable | | Field |
| From Lease/Well # Lovington Water Plant | Miles N S E W of | Town Lovington | , County Lea |
| To Lease/Well # | Miles N S E W of | Town | , County |

| TARIFF # | ITEM # | COL | TRUCK # | TIME: START: | END: | HRS. | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|---|---|
| Starting Time 1:30 | AM PM | | | TRUCK | | 2.5 | 92.00 | 230.00 |
| Arrived Pt. Of Origin | AM PM | | | TRUCK | BBLS. | | | |
| Load & Left | AM PM | | | TRUCK | BBLS. | | | |
| Arrived Destination | AM PM | | | | | | | |
| Started Unloading | AM PM | | | EXTRA MAN | | | | |
| Released | AM PM | | | 50 LB. | 100 LB. SACKS KCL | | | |
| Quitting Time 4 | AM PM | | | FRESH WATER | BBLS. | | | |
| Mileage Out 10727 In 10769 | | | | WEIGHTED FLUIDS | BBLS. | | | |
| Miles Hauled | TH= 42 | | | WASTE DISPOSAL Nabors 40 | BBLS. | .85 | 34.00 | |
| Rate Per 100 # | E= 20 | | | WASTE DISPOSAL | HRS. | | | |
| Weight | L= 20 | | | SALT WATER DISPOSAL | BBLS. | | | |
| Chgble. Waiting Hrs. | O= 2 | | | MUD | BBLS. | | | |
| Surcharges | | | | FRAC TANKS NO. | BBLS. | | | |
| TOTAL HOURS | 2.5 | | | SET CHARGE MIN. | DAYS | | | |
| TANK MEASUREMENT | | | | TRANSPORTATION CHARGE | HRS. MILES | | | |
| Begin End | | | | EXTRA DAYS | | | | |
| Inches Of Oil | | | | | | | | |
| SWD Loc. | | | | | | | | |
| SWD Ticket # RRC # | | | | | | | | |
| Top Gauge / Bottom Gauge | | | | | | | | |

| | | | |
|---|---|---|---|
| Date Set: | Date Picked Up: | Subtotal | 264.00 |
| Well Description: ☐ Oil ☐ Gas ☐ Misc | | Tax | 17.99 |
| | | Total | 281.99 |

Remarks: Skimmed water out of pit with 20 bbl vac + 10 bbl

**WITH MY INITIALS, I CONFIRM THAT THE TIME SHOWN IN THE "HOURS" COLUMN, ACCURATELY REFLECTS MY COMPENSABLE TIME.**

| | Hours | Initials |
|---|---|---|
| Employee Name (Print) William Bradley | | |
| Driver | 2.5 | [redacted] |
| Swamper | | |

*ACCIDENT REPORT MUST BE ATTACHED WHEN NOT SIGNED

CUSTOMER AGREES to pay Nabors Well Services Ltd. (the "Company") on a net 30 day basis from date of invoice. If Customer disputes any item invoiced, Customer shall, within 20 days after receipt of invoice, notify the Company of the item(s) disputed, specifying the reason(s) therefor; payment of the disputed item(s) may be withheld until settlement of dispute, but payment of undisputed portion of invoice shall be made without delay. All payments shall be made at the address shown on the reverse side of this document. In the absence of a separate written contract, CUSTOMER REPRESENTATIVE REPRESENTS AND WARRANTS THAT HE/SHE IS AUTHORIZED TO ENTER INTO THIS AGREEMENT ON BEHALF OF CUSTOMER AND ACCEPTS ALL TERMS AND CONDITIONS AS PRINTED ON THE REVERSE SIDE OF THIS DOCUMENT (WHICH INCLUDES INDEMNITY LANGUAGE THAT ALLOCATES RISKS RELATED TO THE ABOVE DESCRIBED SERVICES). Pricing and extensions, if shown above, are subject to verification and correction at time of invoicing.

X _____ NABORS WELL SERVICES LTD. REPRESENTATIVE

X John Schnable CUSTOMER REPRESENTATIVE

ORIGINAL

**NON-HAZARDOUS WASTE MANIFEST**

| 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|
| NA | 1 | 432 940 2184 | 0012038 |

**GENERATOR**

5. Generator's Name and Mailing Address
Chevron Environmental Management Company
1400 Smith St
Houston TX 77002
Generator's Phone: 713 372 9209 Attn Mark Hudson

Generator's Site Address (if different than mailing address)
Lovington Unit water Plant
5 miles south of Lovington,
Lovington, NM 88260

6. Transporter 1 Company Name
Gandy Corp (TRUCK 362)
U.S. EPA ID Number

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Controled Recovery Inc
6601 W Carlsbad Highway
Hobbs, NM 88260
Facility's Phone: 575-887-6504
U.S. EPA ID Number
RN-166

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. |
|---|---|---|---|---|---|
| 1 | Non dot regulated material (drill cuttings) | 1 | cm | 2 yards | |
| 2 | | | | | |
| 3. | | | | | |
| 4. | | | | | |

13. Special Handling Instructions and Additional Information

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Desiree Crenshaw for CEMC
Signature:
Month: 3 Day: 22 Year: 12

**INT'L**

15 International Shipments ☐ Import to U.S ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: David Delore
Signature:
Month: 3 Day: 23 Year: 12

Transporter 2 Printed/Typed Name
Signature
Month Day Year

**DESIGNATED FACILITY**

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year

Gandy ticket # 10754 + 10268
Gandy Marley Ticket # 11449

| NON-HAZARDOUS WASTE MANIFEST | 1. Generator ID Number | 2 Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|---|
| | NA | 1 | 432 940 2184 | 0012039 |

5 Generator's Name and Mailing Address: Chevron Environmental Management Co
1400 Smith St Houston TX 77002
Generator's Phone: 713 372 9200 Attn Matt Hudson

Generator's Site Address (if different than mailing address): Lovington Unit Water Plant
5 miles south of Lovington, NM
Lovington, NM 88260

6. Transporter 1 Company Name: Gandy Corp. (TRUCK # 362) — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Control Recovery Inc
6601 West Catlsbad Highway
Hobbs, NM 88260
Facility's Phone: 575-887-6504
U.S. EPA ID Number: NM 166

| | 9 Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12 Unit Wt./Vol. |
|---|---|---|---|---|---|
| 1 | Non DOT Regulated Waste (drill cuttings) | 1 | CM | 30 yds | |
| 2. | | | | | |
| 3 | | | | | |
| 4. | | | | | |

13 Special Handling Instructions and Additional Information

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations

Generator's/Offeror's Printed/Typed Name: Desiree Crenshaw for CEMC — Signature: [signature] — Month 3 Day 22 Year 12

15 International Shipments ☐ Import to U.S ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only) Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: David Decker — Signature: [signature] — Month 3 Day 23 Year 12

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone

17c Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in item 17a

Printed/Typed Name — Signature — Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

Halfway Facility
4507 W. Carlsbad Hwy
Hobbs, New Mexico 88240

R360 ENVIRONMENTAL SOLUTIONS

Phone: (575) 393-1079
Fax: (575) 393-3615
WWW.R360ES.COM

**PERMIAN BASIN REGION**

**TICKET # 56960**

| | | | |
|---|---|---|---|
| Bill To: | Chevron | Lease: | LOVINGTON WEST UNIT |
| Company/Generator: | CHEVRON | Well: | WATER PLANT |
| Company Man: | DESIREE CHRENSHAW | Rig: | |
| Trucking: | GANDY CORPORATION | PO: | |
| Date: | 3/23/2012 | Driver: | DAVID |
| 3rd Party Ticket: | 0012038 | Vehicle: | 362 |

**Comments**

**Type of Materials**

| Product | Quantity | | Area | Description |
|---|---|---|---|---|
| DRILL CUTTING | 20.00 | yards | 50/51 | |
| Wash Out | 1.00 | each | 16 | |

**Generator Certification Statement of Waste Status**

I hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is:

X RCRA Exempt: Oil Field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste.

_ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24 or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items):

_ MSDS Information _ RCRA Hazardous Waste Analysis _ Process Knowledge _ Other (Provide description above)

**Driver/Agent (Signature)** **R360 Representative (Signature)**

**Tank Bottoms**

| | Feet | Inches | | | |
|---|---|---|---|---|---|
| 1st Guage | | | BS &W/BBLS Received | | BS & W |
| 2nd Guage | | | Free Water | | |
| Received | | | Total Received | | |

waste tracking manifest # 0012039 \ see rolloff disposal ticket

# GANDY-MARLEY, INC.

P.O. Box 1658
Roswell, NM 88202
(575) 347-0434
Fax (575) 347-0435

No. 11449

**LEASE OPERATOR/SHIPPER/COMPANY:** Wilcox Drilling

**LEASE NAME:** Chevron Environmental / Lovington Unit Water Plant

**TRANSPORTER COMPANY:** Gandy Co **TIME:** AM/PM

**DATE:** 3-22-12 **VEHICLE NO.:** 361 **DRIVER NO.:**

**CHARGE TO:**

## TYPE OF MATERIAL

### OCD

[ ] Other Material: [ ] Contaminated soil [ ] C-117 No.: 10269

[ ] BS&W content:

Description: Drilling mud

Box 3861

**VOLUME OF MATERIAL [ ]: YARDS** 20 **: CELL#** : [ ]

AS A CONDITION TO GANDY-MARLEY, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, OPERATOR/SHIPPER REPRESENTS AND WARRANTS THAT THE WASTE MATERIAL SHIPPED HEREWITH IS MATERIAL EXEMPT FROM THE RESOURCE, CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED FROM TIME TO TIME, 40 U.S.C. §6901, et seq., THE NM HEALTH AND SAF. CODE, §361.001, et seq. AND REGULATIONS RELATED THERETO, BY VIRTUE OF THE EXEMPTION AFFORDED CONTAMINATED SOILS AND OTHER WASTE ASSOCIATED WITH THE EXPLORATION, DEVELOPMENT OR PRODUCTION OF CRUDE OIL OR NATURAL GAS OR GEOTHERMAL ENERGY.

ALSO AS A CONDITION TO GANDY-MARLEY, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, TRANSPORTER REPRESENTS AND WARRANTS THAT ONLY THE MATERIAL DELIVERED BY OPERATOR/SHIPPER TO TRANSPORTER IS NOW DELIVERED BY TRANSPORTER TO GANDY-MARLEY, INC.'S FACILITY FOR DISPOSAL.

*THIS WILL CERTIFY that the above Transporter loaded the material represented by this Transporter Statement at the above described location, and that it was tendered by the above described shipper. This will certify that no additional materials were added to this load, and that the material was delivered without incident.*

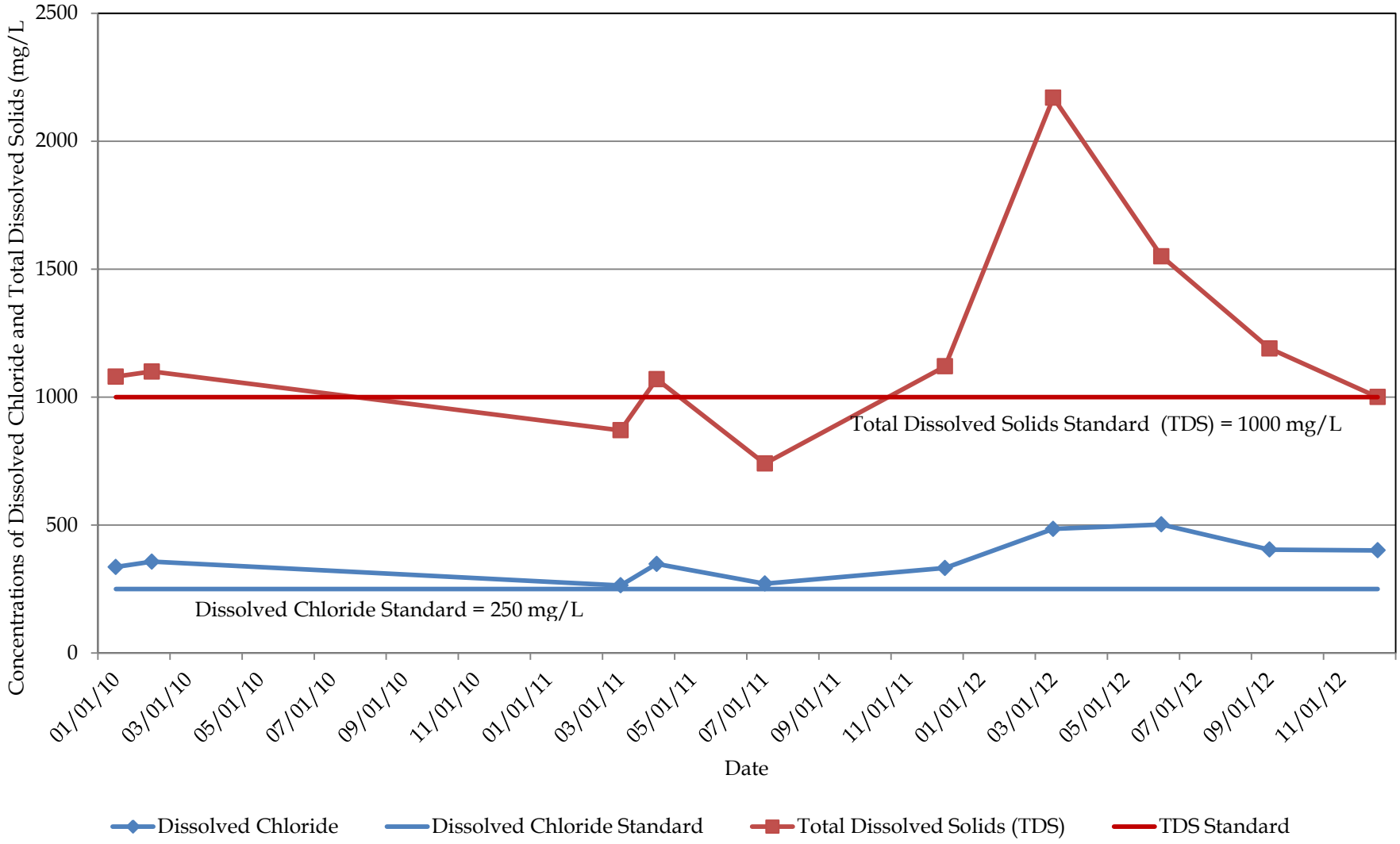
**DRIVER:** Mac Mac

**FACILITY REPRESENTATIVE:**

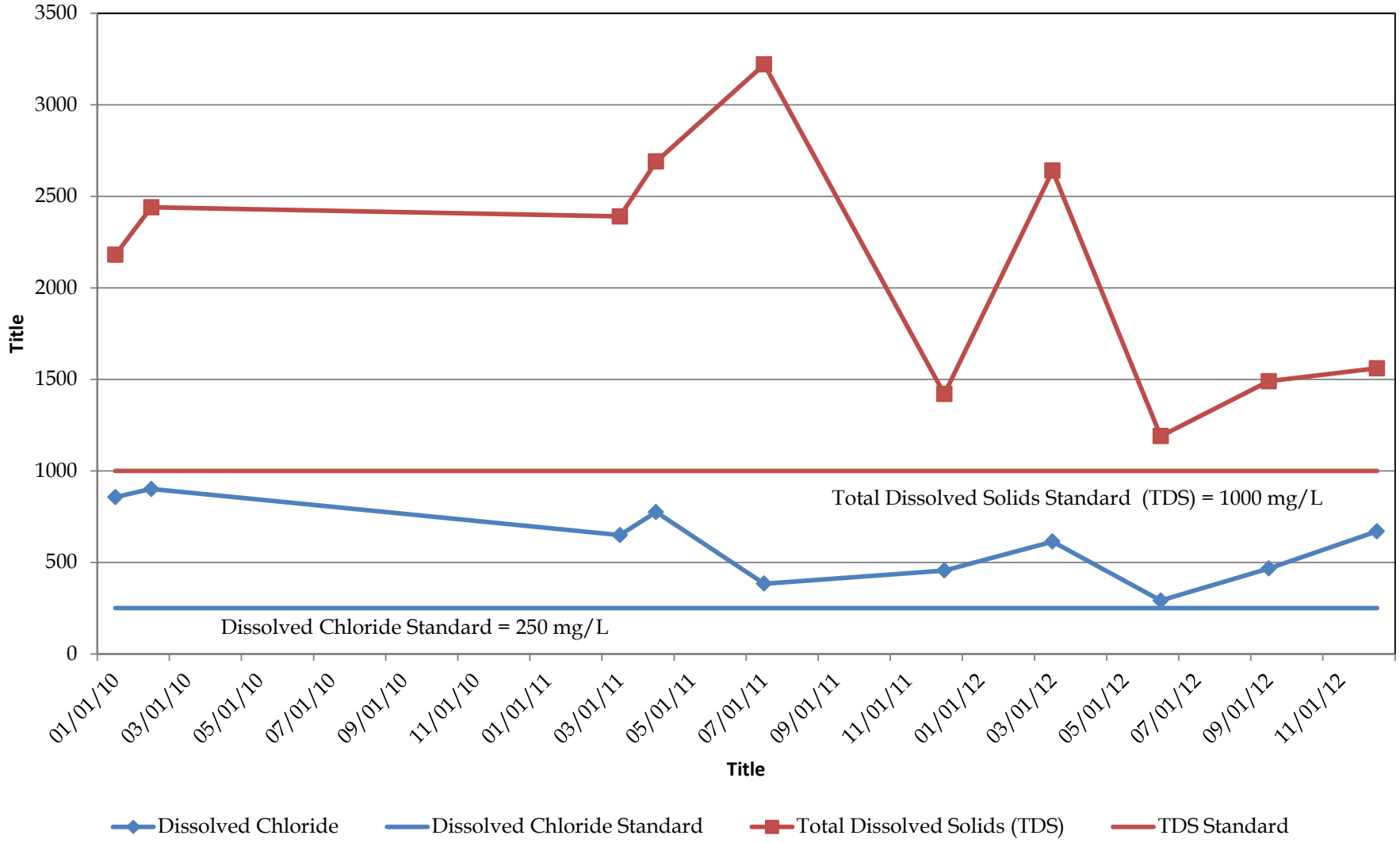
White - GMI Canary - Shipper Pink - GMI Gold - Transporter

# APPENDIX C

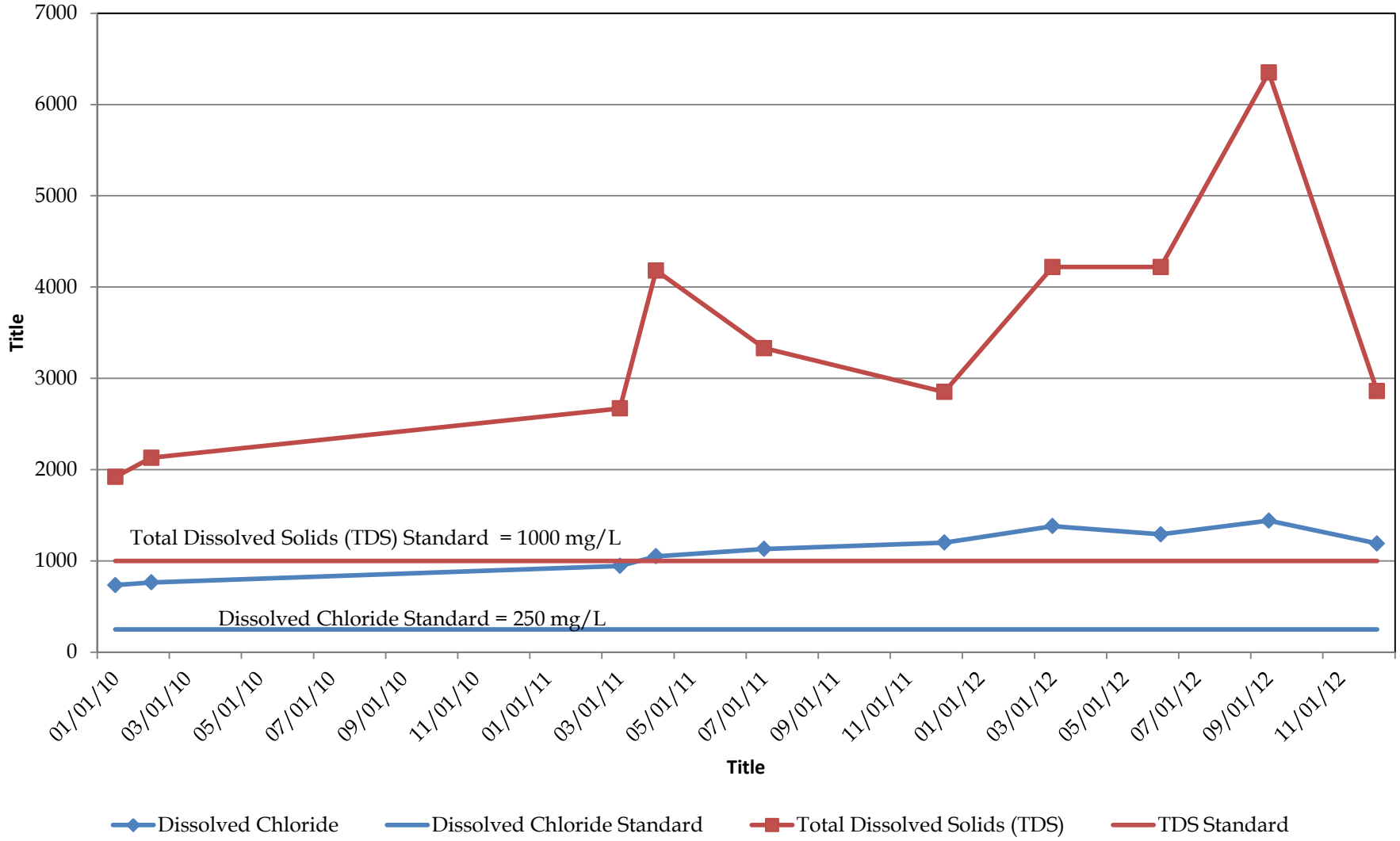
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-1



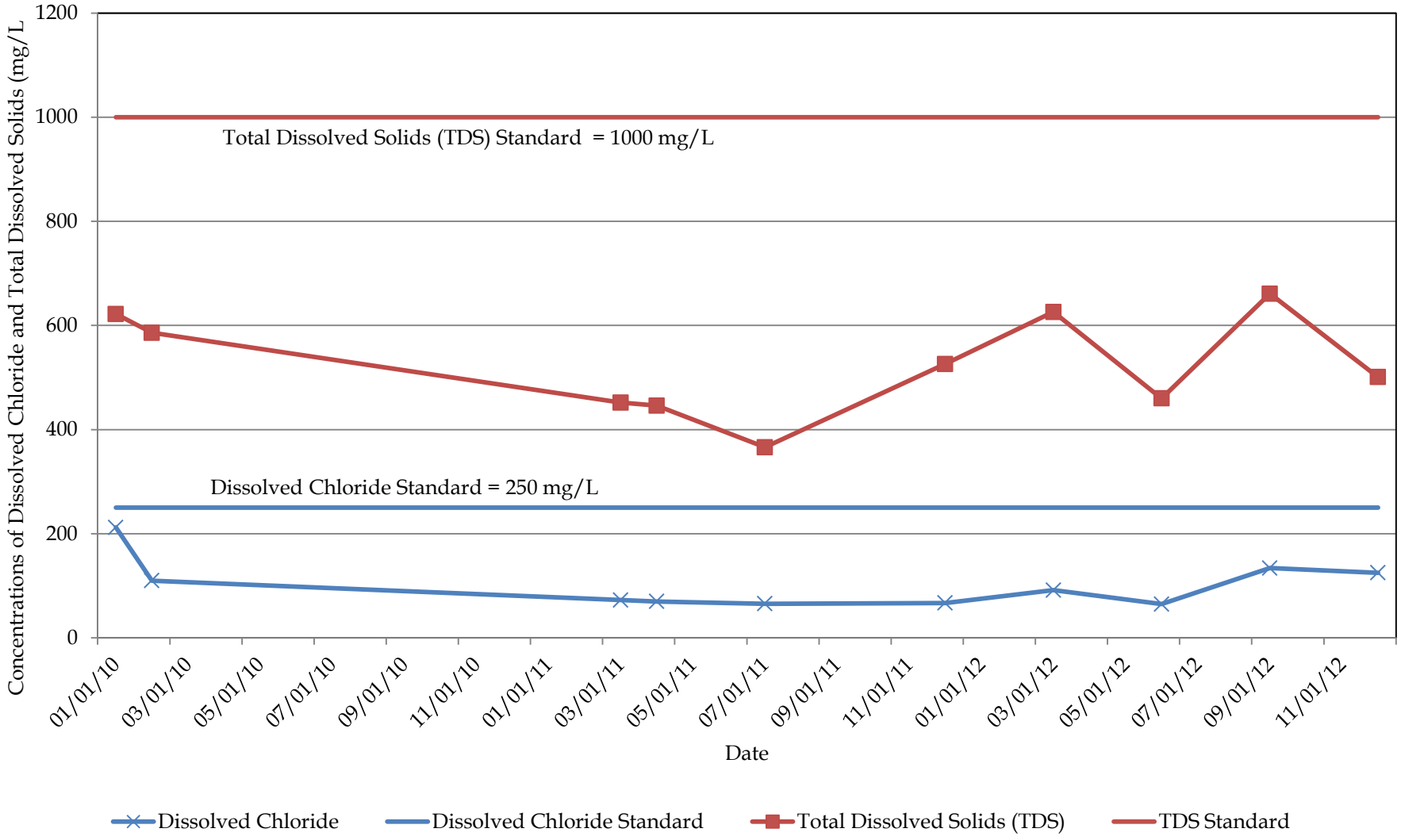
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-2



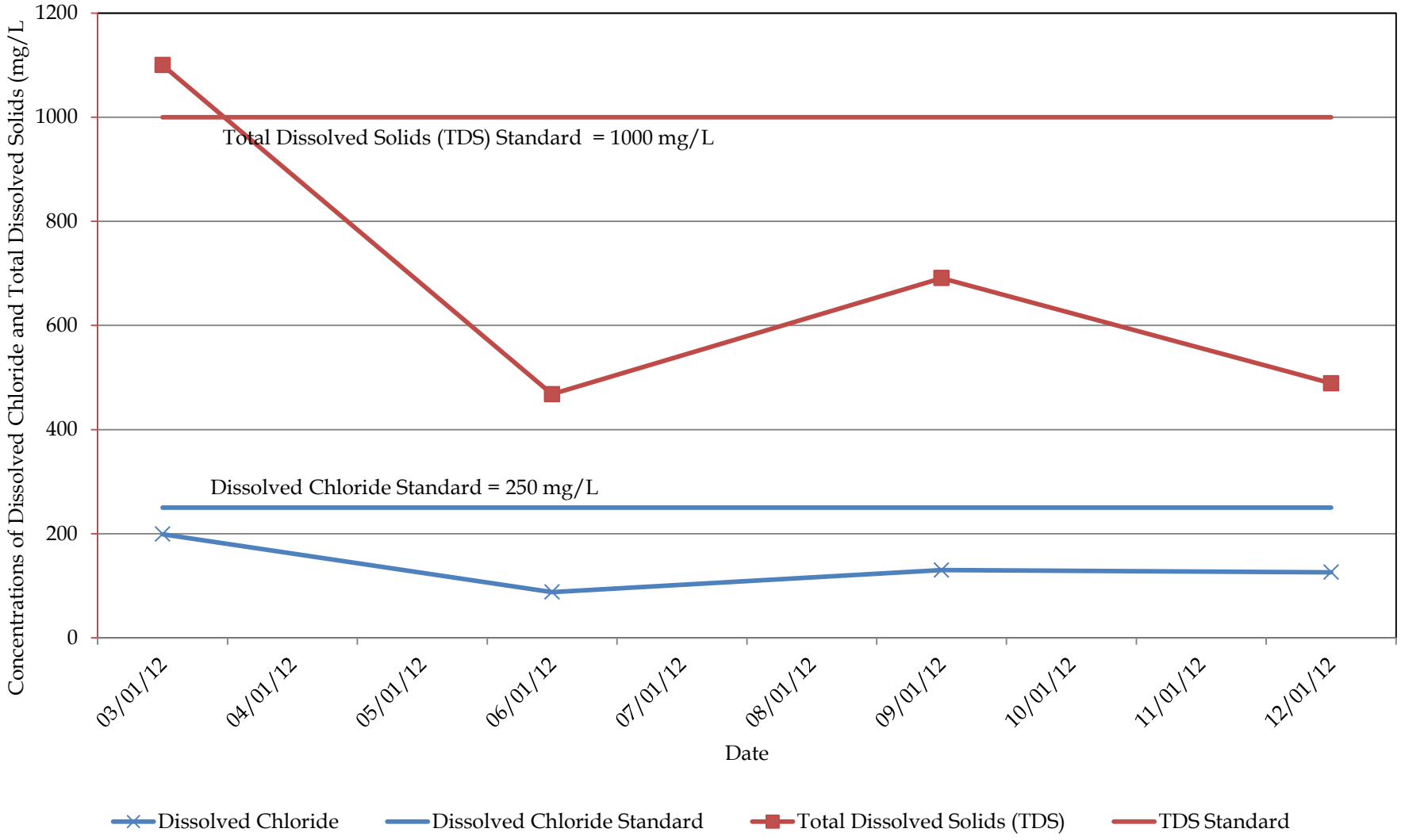
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-3



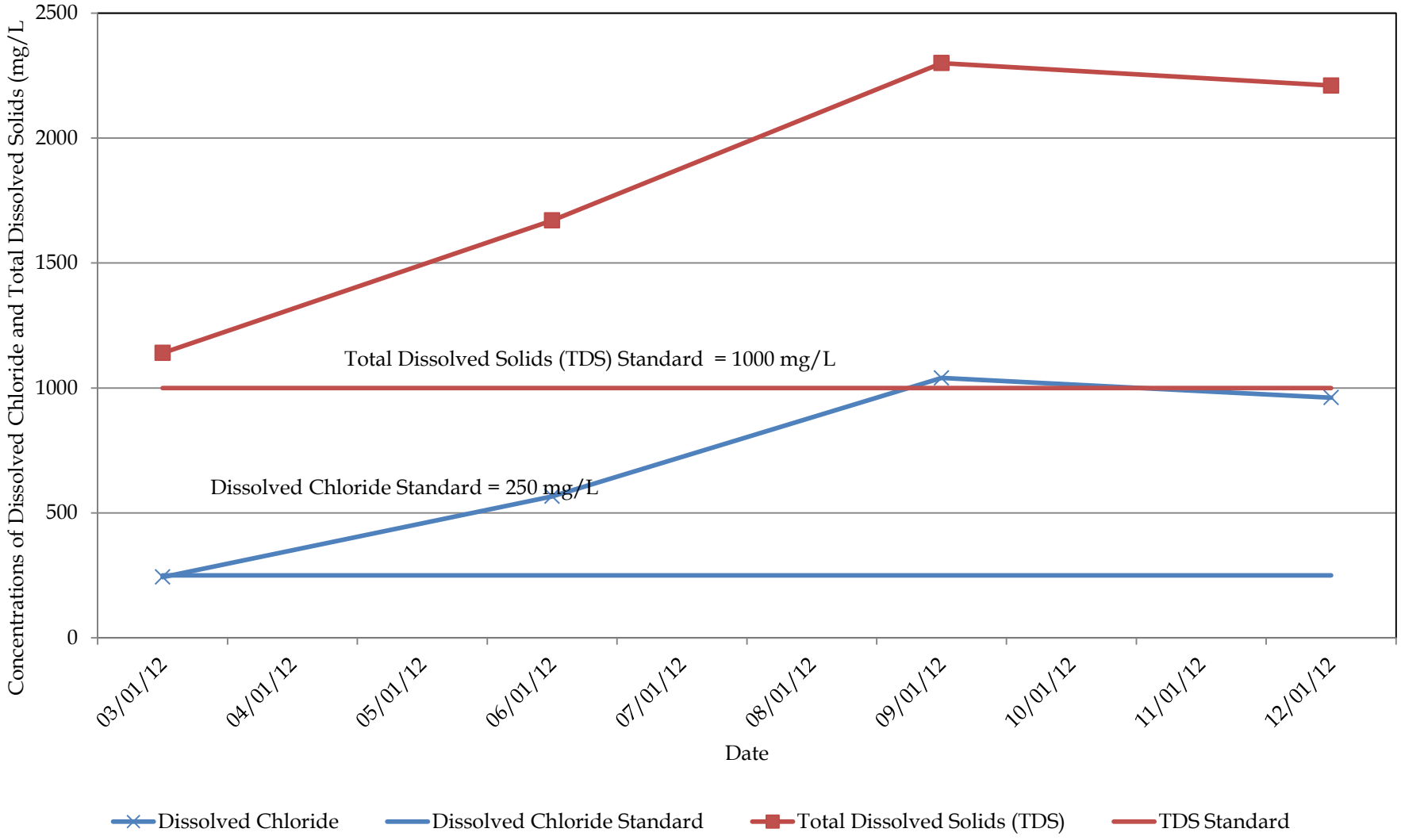
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-4



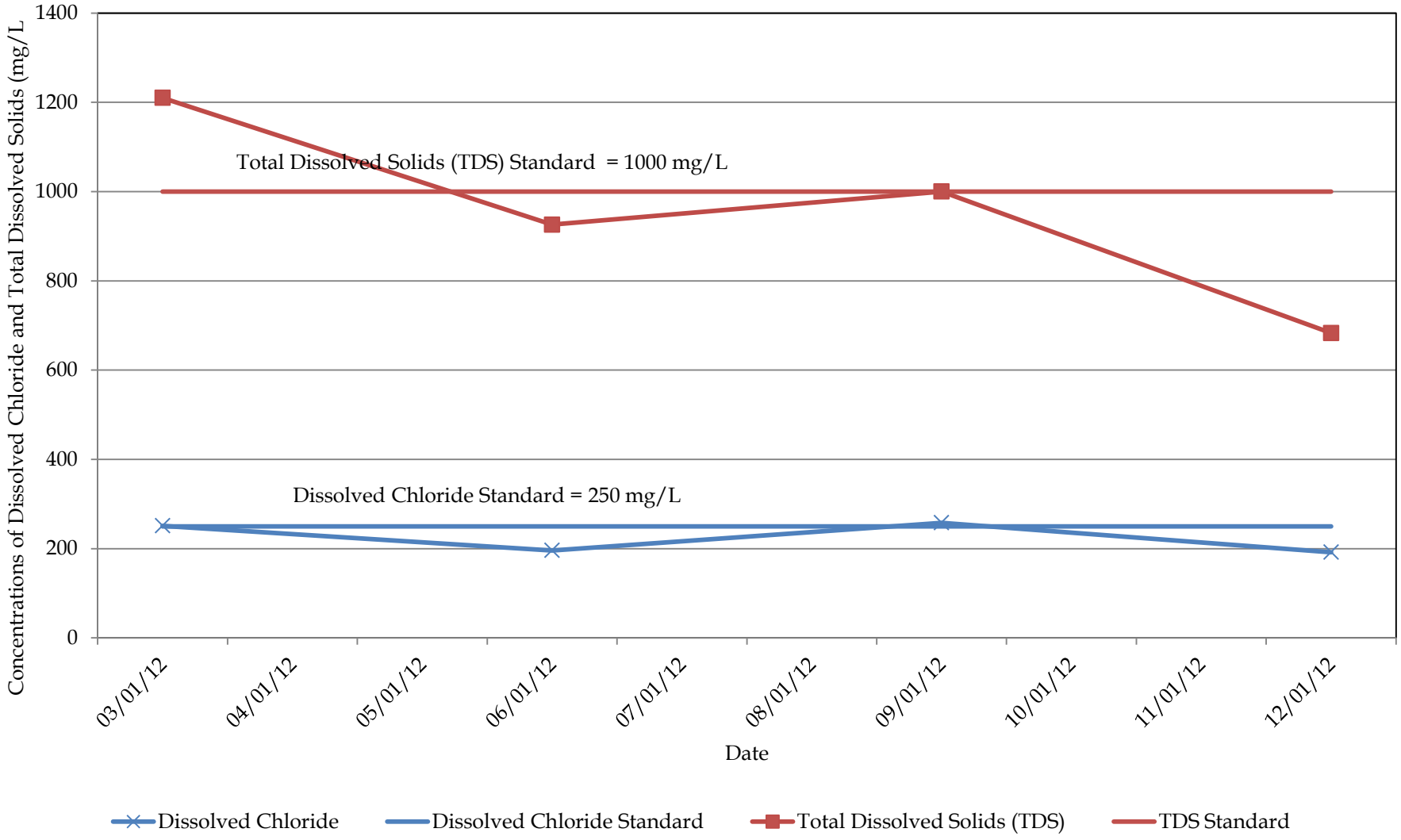
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-5



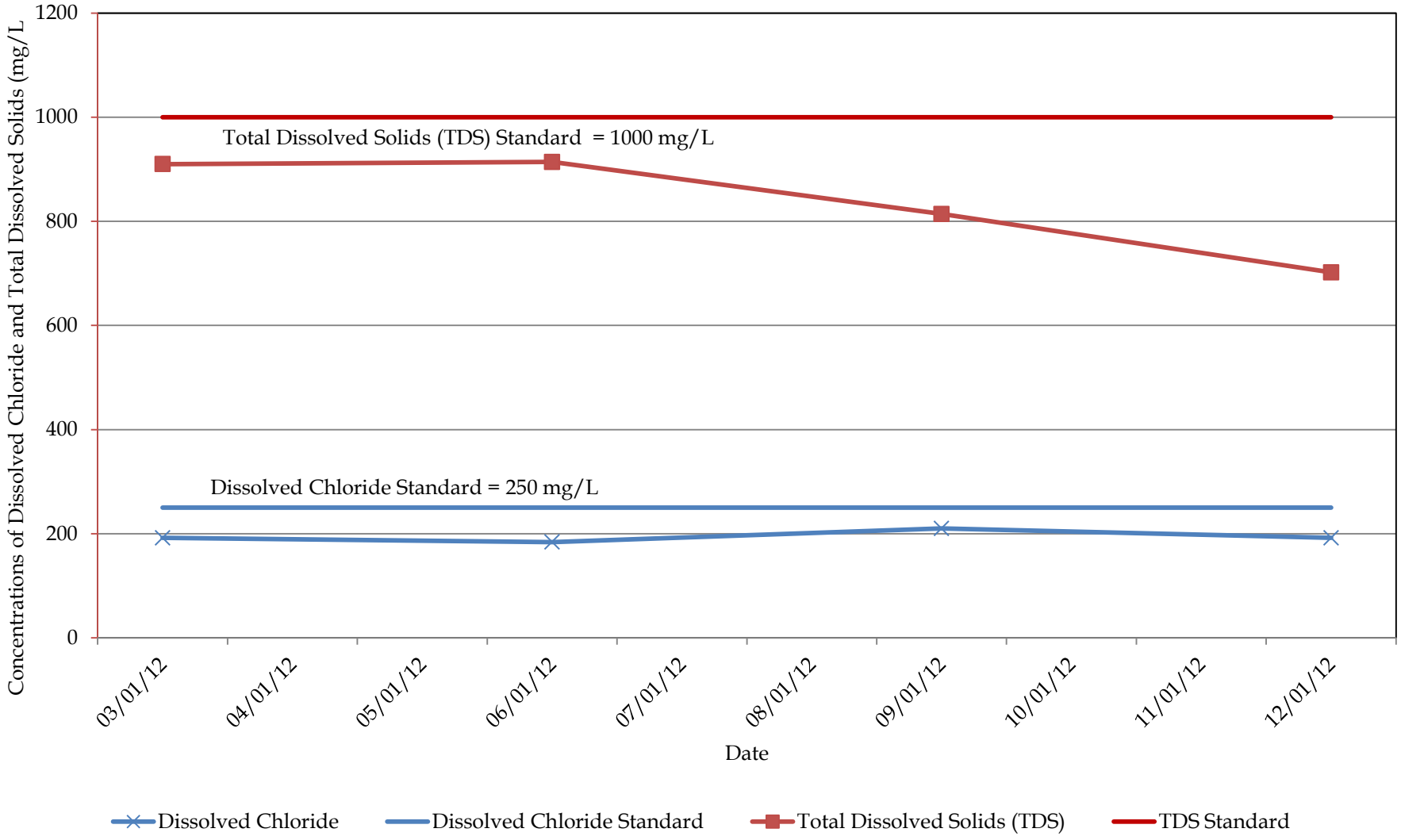
Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-6



Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-7



Chevron Environmental Management Company
Lovington Unit Water Plant
Section 1-T17S-R36E, Lea County, NM
Dissolved Chloride and Total Dissolved Solids in Groundwater
MW-8



# APPENDIX D

# Analytical Report 439430

## for

## Conestoga Rovers & Associates

**Project Manager: John Schnable**

**Lovington Water Unit**

**073016**

**02-APR-12**

Collected By: Client

**Celebrating 20 Years of commitment to excellence in Environmental Testing Services**

**12600 West I-20 East Odessa, Texas 79765**

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Utah (AALI1), West Virginia (362), Kentucky (85)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Miami (EPA Lab code: FL01152): Florida (E86678), Maryland (330)
Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

02-APR-12

Project Manager: **John Schnable**
**Conestoga Rovers & Associates**
2135 S Loop 250 W
Midland, TX 79703

Reference: XENCO Report No: **439430**
**Lovington Water Unit**
Project Address:

**John Schnable**:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 439430. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 439430 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

**Brent Barron II**
Odessa Laboratory Manager

# Sample Cross Reference 439430

## Conestoga Rovers & Associates, Midland, TX

Lovington Water Unit

| Sample Id | Matrix | Date Collected | Sample Depth | Lab Sample Id |
|---|---|---|---|---|
| MW-6 | W | 03-22-12 13:35 | | 439430-001 |
| MW-8 | W | 03-22-12 14:30 | | 439430-002 |
| MW-3 | W | 03-23-12 10:45 | | 439430-003 |
| MW-2 | W | 03-23-12 10:19 | | 439430-004 |
| MW-4 | W | 03-22-12 14:57 | | 439430-005 |
| MW-7 | W | 03-22-12 14:10 | | 439430-006 |
| MW-1 | W | 03-22-12 15:55 | | 439430-007 |
| MW-5 | W | 03-22-12 12:10 | | 439430-008 |
| Dup-1 | W | 03-23-12 00:00 | | 439430-009 |

# CASE NARRATIVE

***Client Name: Conestoga Rovers & Associates***

***Project Name: Lovington Water Unit***

| | | | |
|---|---|---|---|
| *Project ID:* | *073016* | *Report Date:* | *02-APR-12* |
| *Work Order Number:* | *439430* | *Date Received:* | *03/26/2012* |

***Sample receipt non conformances and comments:***

*None*

***Sample receipt non conformances and comments per sample:***

*None*

***Analytical non nonformances and comments:***

*Batch: LBA-884570 Inorganic Anions by EPA 300/300.1*
*E300*

*Batch 884570, Chloride recovered below QC limits in the Matrix Spike.*
*Samples affected are: 439430-008, -009, -002, -007, -004, -005, -001, -003, -006.*
*The Laboratory Control Sample for Chloride is within laboratory Control Limits*

# Certificate of Analysis Summary 439430

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Water Unit

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:**

**Date Received in Lab:** Mon Mar-26-12 04:21 pm
**Report Date:** 02-APR-12
**Project Manager:** Brent Barron II

| *Analysis Requested* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 439430-001 | | 439430-002 | | 439430-003 | | 439430-004 | | 439430-005 | | 439430-006 | |
| | ***Field Id:*** | MW-6 | | MW-8 | | MW-3 | | MW-2 | | MW-4 | | MW-7 | |
| | ***Depth:*** | | | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | WATER | | WATER | | WATER | |
| | ***Sampled:*** | Mar-22-12 13:35 | | Mar-22-12 14:30 | | Mar-23-12 10:45 | | Mar-23-12 10:19 | | Mar-22-12 14:57 | | Mar-22-12 14:10 | |
| **Inorganic Anions by EPA 300/300.1 SUB: TX104704215** | ***Extracted:*** | Mar-28-12 15:00 | | Mar-28-12 15:00 | | Mar-28-12 15:00 | | Mar-28-12 15:00 | | Mar-28-12 15:00 | | Mar-28-12 15:00 | |
| | ***Analyzed:*** | Mar-28-12 16:54 | | Mar-28-12 17:10 | | Mar-28-12 17:26 | | Mar-28-12 17:42 | | Mar-28-12 18:30 | | Mar-28-12 18:46 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Chloride | | 243 | 0.500 | 192 | 0.500 | 1380 | 2.50 | 614 | 1.00 | 91.7 | 0.500 | 251 | 0.500 |
| **TDS by SM2540C SUB: TX104704215** | ***Extracted:*** | | | | | | | | | | | | |
| | ***Analyzed:*** | Mar-29-12 16:00 | | Mar-29-12 16:00 | | Mar-29-12 16:00 | | Mar-29-12 16:00 | | Mar-29-12 16:00 | | Mar-29-12 16:00 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Total dissolved solids | | 1140 | 5.00 | 910 | 5.00 | 4220 | 5.00 | 2640 | 5.00 | 626 | 5.00 | 1210 | 5.00 |





Brent Barron II
Odessa Laboratory Manager

# Certificate of Analysis Summary 439430

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Water Unit

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:**

**Date Received in Lab:** Mon Mar-26-12 04:21 pm
**Report Date:** 02-APR-12
**Project Manager:** Brent Barron II

| *Analysis Requested* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 439430-007 | | 439430-008 | | 439430-009 | | | | | |
| | ***Field Id:*** | MW-1 | | MW-5 | | Dup-1 | | | | | |
| | ***Depth:*** | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | | | | |
| | ***Sampled:*** | Mar-22-12 15:55 | | Mar-22-12 12:10 | | Mar-23-12 00:00 | | | | | |
| **Inorganic Anions by EPA 300/300.1** | ***Extracted:*** | Mar-28-12 15:00 | | Mar-28-12 15:00 | | Mar-28-12 15:00 | | | | | |
| **SUB: TX104704215** | ***Analyzed:*** | Mar-28-12 19:02 | | Mar-28-12 19:19 | | Mar-28-12 19:51 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Chloride | | 485 | 0.500 | 199 | 0.500 | 1390 | 2.50 | | | | |
| **TDS by SM2540C** | ***Extracted:*** | | | | | | | | | | |
| **SUB: TX104704215** | ***Analyzed:*** | Mar-29-12 16:00 | | Mar-29-12 16:00 | | Mar-30-12 10:05 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Total dissolved solids | | 2170 | 5.00 | 1100 | 5.00 | 3100 | 5.00 | | | | |





Brent Barron II
Odessa Laboratory Manager

# Flagging Criteria

**X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

**B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

**D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

**E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

**F** RPD exceeded lab control limits.

**J** The target analyte was positively identified below the quantiation limit and above the detection limit.

**U** Analyte was not detected.

**L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

**H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

**K** Sample analyzed outside of recommended hold time.

**JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

* Surrogate recovered outside laboratory control limit.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

**MDL** Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

**PQL** Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

**DL** Method Detection Limit

**NC** Non-Calculable

\+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation


***Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.***

*Certified and approved by numerous States and Agencies.*

*A Small Business and Minority Status Company that delivers SERVICE and QUALITY*

Houston - Dallas - San Antonio - Atlanta - Midland/Odessa - Tampa/Lakeland - Phoenix - Latin America

| | Phone | Fax |
|---|---|---|
| 4143 Greenbriar Dr, Stafford, TX 77477 | (281) 240-4200 | (281) 240-4280 |
| 9701 Harry Hines Blvd , Dallas, TX 75220 | (214) 902 0300 | (214) 351-9139 |
| 5332 Blackberry Drive, San Antonio TX 78238 | (210) 509-3334 | (210) 509-3335 |
| 2505 North Falkenburg Rd, Tampa, FL 33619 | (813) 620-2000 | (813) 620-2033 |
| 12600 West I-20 East, Odessa, TX 79765 | (432) 563-1800 | (432) 563-1713 |
| 6017 Financial Drive, Norcross, GA 30071 | (770) 449-8800 | (770) 449-5477 |
| 3725 E. Atlanta Ave, Phoenix, AZ 85040 | (602) 437-0330 | |

# BS / BSD Recoveries

## Project Name: Lovington Water Unit

**Work Order #:** 439430 **Project ID:** 073016

**Analyst:** AMB **Date Prepared:** 03/28/2012 **Date Analyzed:** 03/28/2012

**Lab Batch ID:** 884570 **Sample:** 619824-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| Inorganic Anions by EPA 300/300.1<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | <0.500 | 50.0 | 48.4 | 97 | 50.0 | 48.1 | 96 | 1 | 90-110 | 20 | |

**Analyst:** LBA **Date Prepared:** 03/29/2012 **Date Analyzed:** 03/29/2012

**Lab Batch ID:** 884694 **Sample:** 884694-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| TDS by SM2540C<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total dissolved solids | <5.00 | 100 | 104 | 104 | 100 | 103 | 103 | 1 | 80-120 | 30 | |

**Analyst:** LBA **Date Prepared:** 03/30/2012 **Date Analyzed:** 03/30/2012

**Lab Batch ID:** 884764 **Sample:** 884764-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| TDS by SM2540C<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total dissolved solids | <5.00 | 1000 | 988 | 99 | 1000 | 996 | 100 | 1 | 80-120 | 30 | |

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

# Form 3 - MS Recoveries

## Project Name: Lovington Water Unit

**Work Order #:** 439430
**Lab Batch #:** 884570
**Project ID:** 073016
**Date Analyzed:** 03/28/2012
**Date Prepared:** 03/28/2012
**Analyst:** AMB
**QC- Sample ID:** 439430-008 S
**Batch #:** 1
**Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 199 | 50.0 | 209 | 20 | 80-120 | X |

**Lab Batch #:** 884570
**Date Analyzed:** 03/28/2012
**Date Prepared:** 03/28/2012
**Analyst:** AMB
**QC- Sample ID:** 439504-001 S
**Batch #:** 1
**Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 31.7 | 50.0 | 76.0 | 89 | 80-120 | |

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

# Sample Duplicate Recovery

## Project Name: Lovington Water Unit

**Work Order #:** 439430

**Lab Batch #:** 884694 **Project ID:** 073016
**Date Analyzed:** 03/29/2012 16:00 **Date Prepared:** 03/29/2012 **Analyst:** LBA
**QC- Sample ID:** 439343-003 D **Batch #:** 1 **Matrix:** Water
**Reporting Units:** mg/L

| TDS by SM2540C<br>Analyte | SAMPLE / SAMPLE DUPLICATE RECOVERY<br>Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
|---|---|---|---|---|---|
| Total dissolved solids | 956 | 950 | 1 | 30 | |

**Lab Batch #:** 884694
**Date Analyzed:** 03/29/2012 16:00 **Date Prepared:** 03/29/2012 **Analyst:** LBA
**QC- Sample ID:** 439430-001 D **Batch #:** 1 **Matrix:** Water
**Reporting Units:** mg/L

| TDS by SM2540C<br>Analyte | SAMPLE / SAMPLE DUPLICATE RECOVERY<br>Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
|---|---|---|---|---|---|
| Total dissolved solids | 1140 | 1180 | 3 | 30 | |

**Lab Batch #:** 884764
**Date Analyzed:** 03/30/2012 10:05 **Date Prepared:** 03/30/2012 **Analyst:** LBA
**QC- Sample ID:** 439430-009 D **Batch #:** 1 **Matrix:** Water
**Reporting Units:** mg/L

| TDS by SM2540C<br>Analyte | SAMPLE / SAMPLE DUPLICATE RECOVERY<br>Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
|---|---|---|---|---|---|
| Total dissolved solids | 3100 | 3110 | 0 | 30 | |

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

# Analysis Request/ Environmental Services Chain of Custody

Lancaster Laboratories

For Lancaster Laboratories use only

Acct. # 439430 Group# _____ Sample # _____

**COC #** 217935

Please print. Instructions on reverse side correspond with circled numbers.

For Lab Use Only
FSC: _____
SCR#: _____

3.5°C
Soonlpoly

(1) Client: CRA Acct. #: _____

Project Name/#: Lovington Waterunit PWSID #: _____

Project Manager: J. Schnable P.O.#: 073016

Sampler: JP/JN Quote #: _____

Name of state where samples were collected: NM

| (2) Sample Identification | Date Collected | Time Collected | (3) Grab | Composite | (4) Matrix: Soil | Water (Potable ☐ NPDES ☒) | Other | Total # of Containers | (5) Analyses Requested / Preservation Codes: Cl 300.0 | TDS SM2540 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 mw-6 032212 | 3-22-12 | 1335 | X | | | X | | 1 | X | X | |
| 2 mw-8 032212 | 3-22-12 | 1430 | X | | | X | | 1 | X | X | |
| 3 mw-3 03-2312 | 3-23-12 | 1045 | X | | | X | | 1 | X | X | |
| 4 mw-2 032312 | 3-23-12 | 1019 | X | | | X | | 1 | X | X | |
| 5 mw-4 032212 | 3-22-12 | 1457 | X | | | X | | 1 | X | X | |
| 6 mw-7 032212 | 3-22-12 | 1410 | X | | | X | | 1 | X | X | |
| 7 mw-1 032212 | 3-22-12 | 1555 | X | | | X | | 1 | X | X | |
| 8 mw-5 032212 | 3-22-12 | 1210 | X | | | X | | 1 | X | X | |
| 9 Dup-1 032312 | 3-23-12 | — | X | | | X | | 1 | X | X | |

Preservation Codes
H=HCl T=Thiosulfate
N=$HNO_3$ B=NaOH
S=$H_2SO_4$ O=Other

Temperature of samples upon receipt (if requested)

(7) **Turnaround Time Requested** (TAT) (please circle): Normal Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharge.)
Date results are needed: _____
Rush results requested by (please circle): Phone Fax E-mail
Phone #: _____ Fax #: _____
E-mail address: _____

(8) **Data Package Options** (please circle if required)
Type I (validation/NJ Reg)
Type II (Tier II)
Type III (Reduced NJ)
Type IV (CLP SOW)
Type VI (Raw Data Only)
TX TRRP-13
MA MCP CT RCP
SDG Complete? Yes No
Site-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate volume.)
Internal COC Required? Yes / No

| Relinquished by: | Date | Time | Received by: | (9) Date | Time |
|---|---|---|---|---|---|
| [signature] | 3-26-12 | 1621 | Andrea Elam | 3-26-12 | 16:21 |
| Relinquished by: | Date | Time | Received by: | Date | Time |
| Relinquished by: | Date | Time | Received by: | Date | Time |
| Relinquished by: | Date | Time | Received by: | Date | Time |
| Relinquished by: | Date | Time | Received by: | Date | Time |

Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-6766
Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

2102.03

| XENCO Laboratories | XENCO Laboratories<br>Atlanta, Boca Raton, Corpus Christi, Dallas<br>Houston, Miami, Odessa, Philadelphia<br>Phoenix, San Antonio, Tampa | Document Title: Sample Receipt Checklist<br>Document No.: SYS-SRC<br>Revision/Date: No. 01, 5/27/2010<br>Effective Date: 6/1/2010 Page 1 of 1 |
|---|---|---|

# Prelogin / Nonconformance Report - Sample Log-In

**Client:** CRA

**Date/Time:** 3.26.12 16:21

**Lab ID # :** 439430

**Initials:** AE

## Sample Receipt Checklist

| | | | | |
|---|---|---|---|---|
| 1. Samples on ice? | Blue | (Water) | No | |
| 2. Shipping container in good condition? | (Yes) | No | None | |
| 3. Custody seals intact on shipping container (cooler) and bottles? | Yes | No | (N/A) | |
| 4. Chain of Custody present? | (Yes) | No | | |
| 5. Sample instructions complete on chain of custody? | (Yes) | No | | |
| 6. Any missing / extra samples? | Yes | (No) | | |
| 7. Chain of custody signed when relinquished / received? | (Yes) | No | | |
| 8. Chain of custody agrees with sample label(s)? | (Yes) | No | | |
| 9. Container labels legible and intact? | (Yes) | No | | |
| 10. Sample matrix / properties agree with chain of custody? | (Yes) | No | | |
| 11. Samples in proper container / bottle? | (Yes) | No | | |
| 12. Samples properly preserved? | (Yes) | No | N/A | |
| 13. Sample container intact? | (Yes) | No | | |
| 14. Sufficient sample amount for indicated test(s)? | (Yes) | No | | |
| 15. All samples received within sufficient hold time? | (Yes) | No | | |
| 16. Subcontract of sample(s)? | Yes | No | N/A | |
| 17. VOC sample have zero head space? | Yes | No | (N/A) | |

| 18. Cooler 1 No. | | Cooler 2 No. | | Cooler 3 No. | | Cooler 4 No. | | Cooler 5 No. | |
|---|---|---|---|---|---|---|---|---|---|
| lbs | 3.5 °C | lbs | °C | lbs | °C | lbs | °C | lbs | °C |

## Nonconformance Documentation

**Contact:** _____ **Contacted by:** _____ **Date/Time:** _____

**Regarding:** _____

**Corrective Action Taken:** _____

**Check all that apply:**
- ☐ Cooling process has begun shortly after sampling event and out of temperature condition acceptable by NELAC 5.5.8.3.1.a.1.
- ☐ Initial and Backup Temperature confirm out of temperature conditions
- ☐ Client understands and would like to proceed with analysis

# Analytical Report 444089

## for

## Conestoga Rovers & Associates

**Project Manager: John Schnable**

**Lovington Unit Water Plant**

**073016-2012.2-02**

**20-JUN-12**

Collected By: Client

**Celebrating 20 Years of commitment to excellence in Environmental Testing Services**

**12600 West I-20 East Odessa, Texas 79765**

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102), DoD (L11-54)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD ( L10-135)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Lakeland: Florida (E84098)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

20-JUN-12

Project Manager: **John Schnable**
**Conestoga Rovers & Associates**
2135 S Loop 250 W
Midland, TX 79703

Reference: XENCO Report No: **444089**
**Lovington Unit Water Plant**
Project Address: Lovington, NM

**John Schnable**:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 444089. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. Estimation of data uncertainty for this report is found in the quality control section of this report unless otherwise noted. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 444089 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

**Nicholas Straccione**
Project Manager

# Sample Cross Reference 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| Sample Id | Matrix | Date Collected | Sample Depth | Lab Sample Id |
|---|---|---|---|---|
| MW-6 | W | 06-14-12 08:45 | | 444089-001 |
| MW-3 | W | 06-14-12 09:05 | | 444089-002 |
| MW-1 | W | 06-14-12 09:25 | | 444089-003 |
| Dup-1 | W | 06-14-12 00:00 | | 444089-004 |
| MW-5 | W | 06-14-12 10:00 | | 444089-005 |
| MW-4 | W | 06-14-12 10:25 | | 444089-006 |
| MW-8 | W | 06-14-12 10:40 | | 444089-007 |
| MW-7 | W | 06-14-12 11:05 | | 444089-008 |
| MW-2 | W | 06-14-12 09:40 | | 444089-009 |

# CASE NARRATIVE

***Client Name: Conestoga Rovers & Associates***

***Project Name: Lovington Unit Water Plant***

| | | | |
|---|---|---|---|
| *Project ID:* | *073016-2012.2-02* | *Report Date:* | *20-JUN-12* |
| *Work Order Number:* | *444089* | *Date Received:* | *06/15/2012* |

***Sample receipt non conformances and comments:***

*None*

***Sample receipt non conformances and comments per sample:***

*None*

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-6** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-001** | Date Collected: **Jun-14-12 08:45** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 13:21

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 566 | mg/L | 06/18/12 13:21 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 1670 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-3** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-002** | Date Collected: **Jun-14-12 09:05** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 13:56

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 1290 | mg/L | 06/18/12 13:56 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 4220 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-1** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-003** | Date Collected: **Jun-14-12 09:25** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 14:13

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 502 | mg/L | 06/18/12 14:13 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 1550 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **Dup-1** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-004** | Date Collected: **Jun-14-12 00:00** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 14:31

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 66.4 | mg/L | 06/18/12 14:31 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 436 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-5** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-005** | Date Collected: **Jun-14-12 10:00** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 14:48

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 88.0 | mg/L | 06/18/12 14:48 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 468 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-4** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-006** | Date Collected: **Jun-14-12 10:25** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 15:05

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 64.8 | mg/L | 06/18/12 15:05 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 460 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-8** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-007** | Date Collected: **Jun-14-12 10:40** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 15:58

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 184 | mg/L | 06/18/12 15:58 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 914 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-7** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-008** | Date Collected: **Jun-14-12 11:05** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 16:15

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 196 | mg/L | 06/18/12 16:15 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 926 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Hits Summary 444089

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| | | |
|---|---|---|
| Sample Id: **MW-2** | Matrix: **Water** | % Moisture: |
| Lab Sample Id: **444089-009** | Date Collected: **Jun-14-12 09:40** | |
| | Date Received: **Jun-15-12 11:50** | |

**Analytical Method: Inorganic Anions by EPA 300/300.1** Prep Method: E300P

Seq Number: 890398 Date Prep: Jun-18-12 16:32

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Chloride | 16887-00-6 | 292 | mg/L | 06/18/12 16:32 | | 10 |

**Analytical Method: TDS by SM2540C**

Seq Number: 890494

| Parameter | Cas Number | Result | Units | Analysis Date | Flag | Dil |
|---|---|---|---|---|---|---|
| Total dissolved solids | TDS | 1190 | mg/L | 06/19/12 08:00 | | 1 |

Project: Midland Odessa Standard List of prices

# Certificate of Analysis Summary 444089

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Unit Water Plant

**Project Id:** 073016-2012.2-02
**Contact:** John Schnable
**Project Location:** Lovington, NM

**Date Received in Lab:** Fri Jun-15-12 11:50 am
**Report Date:** 20-JUN-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 444089-001 | | 444089-002 | | 444089-003 | | 444089-004 | | 444089-005 | | 444089-006 | |
| | ***Field Id:*** | MW-6 | | MW-3 | | MW-1 | | Dup-1 | | MW-5 | | MW-4 | |
| | ***Depth:*** | | | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | WATER | | WATER | | WATER | |
| | ***Sampled:*** | Jun-14-12 08:45 | | Jun-14-12 09:05 | | Jun-14-12 09:25 | | Jun-14-12 00:00 | | Jun-14-12 10:00 | | Jun-14-12 10:25 | |
| **Inorganic Anions by EPA 300/300.1 SUB: TX104704215** | ***Extracted:*** | Jun-18-12 13:21 | | Jun-18-12 13:56 | | Jun-18-12 14:13 | | Jun-18-12 14:31 | | Jun-18-12 14:48 | | Jun-18-12 15:05 | |
| | ***Analyzed:*** | Jun-18-12 13:21 | | Jun-18-12 13:56 | | Jun-18-12 14:13 | | Jun-18-12 14:31 | | Jun-18-12 14:48 | | Jun-18-12 15:05 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Chloride | | 566 | 5.00 | 1290 | 5.00 | 502 | 5.00 | 66.4 | 5.00 | 88.0 | 5.00 | 64.8 | 5.00 |
| **TDS by SM2540C SUB: TX104704215** | ***Extracted:*** | | | | | | | | | | | | |
| | ***Analyzed:*** | Jun-19-12 08:00 | | Jun-19-12 08:00 | | Jun-19-12 08:00 | | Jun-19-12 08:00 | | Jun-19-12 08:00 | | Jun-19-12 08:00 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Total dissolved solids | | 1670 | 5.00 | 4220 | 5.00 | 1550 | 5.00 | 436 | 5.00 | 468 | 5.00 | 460 | 5.00 |





Nicholas Straccione
Project Manager

# Certificate of Analysis Summary 444089

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Unit Water Plant

**Project Id:** 073016-2012.2-02
**Contact:** John Schnable
**Project Location:** Lovington, NM

**Date Received in Lab:** Fri Jun-15-12 11:50 am
**Report Date:** 20-JUN-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 444089-007 | | 444089-008 | | 444089-009 | | | | | |
| | ***Field Id:*** | MW-8 | | MW-7 | | MW-2 | | | | | |
| | ***Depth:*** | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | | | | |
| | ***Sampled:*** | Jun-14-12 10:40 | | Jun-14-12 11:05 | | Jun-14-12 09:40 | | | | | |
| **Inorganic Anions by EPA 300/300.1** | ***Extracted:*** | Jun-18-12 15:58 | | Jun-18-12 16:15 | | Jun-18-12 16:32 | | | | | |
| **SUB: TX104704215** | ***Analyzed:*** | Jun-18-12 15:58 | | Jun-18-12 16:15 | | Jun-18-12 16:32 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Chloride | | 184 | 5.00 | 196 | 5.00 | 292 | 5.00 | | | | |
| **TDS by SM2540C** | ***Extracted:*** | | | | | | | | | | |
| **SUB: TX104704215** | ***Analyzed:*** | Jun-19-12 08:00 | | Jun-19-12 08:00 | | Jun-19-12 08:00 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Total dissolved solids | | 914 | 5.00 | 926 | 5.00 | 1190 | 5.00 | | | | |





Nicholas Straccione
Project Manager

# Flagging Criteria

**X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

**B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

**D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

**E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

**F** RPD exceeded lab control limits.

**J** The target analyte was positively identified below the quantiation limit and above the detection limit.

**U** Analyte was not detected.

**L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

**H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

**K** Sample analyzed outside of recommended hold time.

**JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

* Surrogate recovered outside laboratory control limit.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

**MDL** Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

**PQL** Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

**DL** Method Detection Limit

**NC** Non-Calculable

+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation


***Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.***

*Certified and approved by numerous States and Agencies.*

*A Small Business and Minority Status Company that delivers SERVICE and QUALITY*

Houston - Dallas - San Antonio - Atlanta - Midland/Odessa - Tampa/Lakeland - Phoenix - Latin America

| | Phone | Fax |
|---|---|---|
| 4143 Greenbriar Dr, Stafford, TX 77477 | (281) 240-4200 | (281) 240-4280 |
| 9701 Harry Hines Blvd , Dallas, TX 75220 | (214) 902 0300 | (214) 351-9139 |
| 5332 Blackberry Drive, San Antonio TX 78238 | (210) 509-3334 | (210) 509-3335 |
| 2505 North Falkenburg Rd, Tampa, FL 33619 | (813) 620-2000 | (813) 620-2033 |
| 12600 West I-20 East, Odessa, TX 79765 | (432) 563-1800 | (432) 563-1713 |
| 6017 Financial Drive, Norcross, GA 30071 | (770) 449-8800 | (770) 449-5477 |
| 3725 E. Atlanta Ave, Phoenix, AZ 85040 | (602) 437-0330 | |

# BS / BSD Recoveries

## Project Name: Lovington Unit Water Plant

**Work Order #:** 444089 **Project ID:** 073016-2012.2-02

**Analyst:** TTE **Date Prepared:** 06/18/2012 **Date Analyzed:** 06/18/2012

**Lab Batch ID:** 890398 **Sample:** 623410-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| Inorganic Anions by EPA 300/300.1<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | <0.500 | 50.0 | 51.9 | 104 | 50.0 | 52.2 | 104 | 1 | 80-120 | 20 | |

**Analyst:** RKO **Date Prepared:** 06/19/2012 **Date Analyzed:** 06/19/2012

**Lab Batch ID:** 890494 **Sample:** 890494-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| TDS by SM2540C<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total dissolved solids | <5.00 | 1000 | 1020 | 102 | 1000 | 1020 | 102 | 0 | 80-120 | 30 | |

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

# Form 3 - MS Recoveries

## Project Name: Lovington Unit Water Plant

**Work Order #:** 444089
**Lab Batch #:** 890398
**Project ID:** 073016-2012.2-02
**Date Analyzed:** 06/18/2012
**Date Prepared:** 06/18/2012
**Analyst:** TTE
**QC- Sample ID:** 444089-001 S
**Batch #:** 1
**Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 566 | 500 | 1060 | 99 | 80-120 | |

**Lab Batch #:** 890398
**Date Analyzed:** 06/18/2012
**Date Prepared:** 06/18/2012
**Analyst:** TTE
**QC- Sample ID:** 444091-011 S
**Batch #:** 1
**Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 1430 | 500 | 1870 | 88 | 80-120 | |

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

# Sample Duplicate Recovery

## Project Name: Lovington Unit Water Plant

**Work Order #:** 444089

**Lab Batch #:** 890494 **Project ID:** 073016-2012.2-02

**Date Analyzed:** 06/19/2012 08:00 **Date Prepared:** 06/19/2012 **Analyst:** RKO

**QC- Sample ID:** 444086-001 D **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

| TDS by SM2540C<br>Analyte | SAMPLE / SAMPLE DUPLICATE RECOVERY<br>Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
|---|---|---|---|---|---|
| Total dissolved solids | 4360 | 4340 | 0 | 30 | |

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

# Xenco Laboratories

The Environmental Lab of Texas

**CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST**

12600 West I-20 East
Odessa, Texas 79765

Phone: 432-563-1800
Fax: 432-563-1713

Project Manager: John Schnable
Company Name: CRA
Company Address: 2135 S. Loop 250 W.
City/State/Zip: Midland, Tx. 79701
Telephone No: 432-686-0086 Fax No: 686-0186
Sampler Signature: [signature] for Brice Haynes e-mail: jschnable@craworld.com

Project Name: Lovington Unit Water Plant
Project #: 073016-2012.2-02
Project Loc: Lovington, NM
PO #: 40-4046852
Report Format: ☐ Standard ☐ TRRP ☐ NPDES

(lab use only)
ORDER #: 444089

| LAB # (lab use only) | FIELD CODE | Beginning Depth | Ending Depth | Date Sampled | Time Sampled | Field Filtered | Total #. of Containers | Preservation & # of Containers: Ice | HNO3 | HCl | H2SO4 | NaOH | Na2S2O3 | None | Other (Specify) | Matrix: DW=Drinking Water SL=Sludge | GW=Groundwater S=Soil/Solid | NP=Non-Potable Specify Other | Analyze For: TCLP: TPH: 418.1 | 8015M | 8015B | TPH: TX 1005 | TX 1006 | Cations (Ca, Mg, Na, K) | Anions (Cl, SO4, Alkalinity) | SAR / ESP / CEC | Metals: As Ag Ba Cd Cr Pb Hg Se | Volatiles | Semivolatiles | BTEX 8021B/5030 or BTEX 8260 | RCI | N.O.R.M. | chlorides 300.0 | TDS SM2540 | RUSH TAT (Pre-Schedule) 24, 48, 72 hrs | Standard TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | MW-6 061412 | | | 6-14-12 | 845 | | 1 | X | | | | | | | | | W | | | | | | | | | | | | | | | X | X | | |
| 02 | MW-3 061412 | | | 6-14-12 | 905 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 03 | MW-1 061412 | | | 6-14-12 | 925 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 04 | DUP-1 061412 | | | 6-14-12 | | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 05 | MW-5 061412 | | | 6-14-12 | 1000 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 06 | MW-4 061412 | | | 6-14-12 | 1025 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 07 | MW-8 061412 | | | 6-14-12 | 1040 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 08 | MW-7 061412 | | | 6-14-12 | 1105 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 09 | MW-2 061412 | | | 6-14-12 | 940 | | 1 | X | | | | | | | | | | | | | | | | | | | | | | | | X | X | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Special Instructions:**

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| [signature] | 6-15-12 | 1150 | | | |
| Relinquished by: | Date | Time | Received by: | Date | Time |
| Relinquished by: | Date | Time | Received by ELOT: Andrea Elam | 6-15-12 | 11:50 |

**Laboratory Comments:**
Sample Containers Intact? Y
VOCs Free of Headspace? Y
Labels on container(s) Y
Custody seals on container(s) N
Custody seals on cooler(s) N
Sample Hand Delivered by Sampler/Client Rep. ? N
by Courier? UPS DHL FedEx Lone Star

Temperature Upon Receipt: 20/0.5 °C

Page 20 of 21

Final 1.000

| XENCO Laboratories | XENCO Laboratories<br>Atlanta, Boca Raton, Corpus Christi, Dallas<br>Houston, Miami, Odessa, Philadelphia<br>Phoenix, San Antonio, Tampa | Document Title: Sample Receipt Checklist<br>Document No.: SYS-SRC<br>Revision/Date: No. 01, 5/27/2010<br>Effective Date: 6/1/2010 Page 1 of 1 |
|---|---|---|

# Prelogin / Nonconformance Report - Sample Log-In

Client: CRA

Date/Time: 6.15.12 11.50

Lab ID # : 444089

Initials: AE

## Sample Receipt Checklist

| | | | | |
|---|---|---|---|---|
| 1. Samples on ice? | Blue | ~~Water~~ | No | |
| 2. Shipping container in good condition? | Yes | No | None | |
| 3. Custody seals intact on shipping container (cooler) and bottles? | Yes | No | N/A | |
| 4. Chain of Custody present? | ~~Yes~~ | No | | |
| 5. Sample instructions complete on chain of custody? | ~~Yes~~ | No | | |
| 6. Any missing / extra samples? | Yes | ~~No~~ | | |
| 7. Chain of custody signed when relinquished / received? | ~~Yes~~ | No | | |
| 8. Chain of custody agrees with sample label(s)? | ~~Yes~~ | No | | |
| 9. Container labels legible and intact? | ~~Yes~~ | No | | |
| 10. Sample matrix / properties agree with chain of custody? | ~~Yes~~ | No | | |
| 11. Samples in proper container / bottle? | ~~Yes~~ | No | | |
| 12. Samples properly preserved? | ~~Yes~~ | No | N/A | |
| 13. Sample container intact? | ~~Yes~~ | No | | |
| 14. Sufficient sample amount for indicated test(s)? | ~~Yes~~ | No | | |
| 15. All samples received within sufficient hold time? | ~~Yes~~ | No | | |
| 16. Subcontract of sample(s)? | ~~Yes~~ | No | N/A | |
| 17. VOC sample have zero head space? | Yes | No | ~~N/A~~ | |

| 18. Cooler 1 No. | Cooler 2 No. | Cooler 3 No. | Cooler 4 No. | Cooler 5 No. |
|---|---|---|---|---|
| lbs 0.5 °C | lbs °C | lbs °C | lbs °C | lbs °C |

## Nonconformance Documentation

Contact:_____ Contacted by:_____ Date/Time:_____

Regarding: _____

_____

Corrective Action Taken: _____

_____

_____

_____

Check all that apply:
- ☐ Cooling process has begun shortly after sampling event and out of temperature condition acceptable by NELAC 5.5.8.3.1.a.1.
- ☐ Initial and Backup Temperature confirm out of temperature conditions
- ☐ Client understands and would like to proceed with analysis

# Analytical Report 449943

## for

## Conestoga Rovers & Associates

**Project Manager: John Schnable**

**Lovington Unit Water Plant**

**073016**

**05-OCT-12**

Collected By: Client

**12600 West I-20 East Odessa, Texas 79765**

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102), DoD (L11-54)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD ( L10-135)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Lakeland: Florida (E84098)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

05-OCT-12

Project Manager: **John Schnable**
**Conestoga Rovers & Associates**
2135 S Loop 250 W
Midland, TX 79703

Reference: XENCO Report No: **449943**
**Lovington Unit Water Plant**
Project Address: New Mexico

**John Schnable**:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number 449943. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 449943 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

**Nicholas Straccione**
Project Manager

# Sample Cross Reference 449943

## Conestoga Rovers & Associates, Midland, TX

Lovington Unit Water Plant

| Sample Id | Matrix | Date Collected | Sample Depth | Lab Sample Id |
|---|---|---|---|---|
| MW-4-092812 | W | 09-28-12 09:00 | | 449943-001 |
| MW-5-092812 | W | 09-28-12 09:25 | | 449943-002 |
| MW-8-092812 | W | 09-28-12 10:00 | | 449943-003 |
| MW-7-092812 | W | 09-28-12 10:40 | | 449943-004 |
| MW-2-092812 | W | 09-28-12 11:20 | | 449943-005 |
| MW-1-092812 | W | 09-28-12 11:50 | | 449943-006 |
| MW-6-092812 | W | 09-28-12 12:15 | | 449943-007 |
| MW-3-092812 | W | 09-29-12 12:50 | | 449943-008 |
| Dup-092812 | W | 09-28-12 00:00 | | 449943-009 |

# CASE NARRATIVE

***Client Name: Conestoga Rovers & Associates***

***Project Name: Lovington Unit Water Plant***

| | | | |
|---|---|---|---|
| *Project ID:* | *073016* | *Report Date:* | *05-OCT-12* |
| *Work Order Number:* | *449943* | *Date Received:* | *10/01/2012* |

***Sample receipt non conformances and comments:***

*None*

***Sample receipt non conformances and comments per sample:***

*None*

# Certificate of Analysis Summary 449943

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Unit Water Plant

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:** New Mexico

**Date Received in Lab:** Mon Oct-01-12 08:38 am
**Report Date:** 05-OCT-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 449943-001 | | 449943-002 | | 449943-003 | | 449943-004 | | 449943-005 | | 449943-006 | |
| | ***Field Id:*** | MW-4-092812 | | MW-5-092812 | | MW-8-092812 | | MW-7-092812 | | MW-2-092812 | | MW-1-092812 | |
| | ***Depth:*** | | | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | WATER | | WATER | | WATER | |
| | ***Sampled:*** | Sep-28-12 09:00 | | Sep-28-12 09:25 | | Sep-28-12 10:00 | | Sep-28-12 10:40 | | Sep-28-12 11:20 | | Sep-28-12 11:50 | |
| **Inorganic Anions by EPA 300/300.1 SUB: E871002** | ***Extracted:*** | Oct-02-12 20:37 | | Oct-02-12 20:53 | | Oct-02-12 21:09 | | Oct-02-12 21:25 | | Oct-02-12 22:13 | | Oct-02-12 22:29 | |
| | ***Analyzed:*** | Oct-02-12 20:37 | | Oct-02-12 20:53 | | Oct-02-12 21:09 | | Oct-02-12 21:25 | | Oct-02-12 22:13 | | Oct-02-12 22:29 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Chloride | | 134 | 5.00 | 130 | 5.00 | 210 | 5.00 | 258 | 5.00 | 467 | 5.00 | 404 | 5.00 |
| **TDS by SM2540C SUB: E871002** | ***Extracted:*** | | | | | | | | | | | | |
| | ***Analyzed:*** | Oct-03-12 11:00 | | Oct-03-12 11:00 | | Oct-03-12 11:00 | | Oct-03-12 11:00 | | Oct-03-12 11:00 | | Oct-03-12 11:00 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Total dissolved solids | | 661 | 5.00 | 691 | 5.00 | 814 | 5.00 | 1000 | 5.00 | 1490 | 5.00 | 1190 | 5.00 |





Nicholas Straccione
Project Manager

# Certificate of Analysis Summary 449943

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Unit Water Plant

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:** New Mexico

**Date Received in Lab:** Mon Oct-01-12 08:38 am
**Report Date:** 05-OCT-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 449943-007 | | 449943-008 | | 449943-009 | | | | | |
| | ***Field Id:*** | MW-6-092812 | | MW-3-092812 | | Dup-092812 | | | | | |
| | ***Depth:*** | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | | | | |
| | ***Sampled:*** | Sep-28-12 12:15 | | Sep-29-12 12:50 | | Sep-28-12 00:00 | | | | | |
| **Inorganic Anions by EPA 300/300.1** | ***Extracted:*** | Oct-02-12 22:46 | | Oct-02-12 23:02 | | Oct-02-12 23:18 | | | | | |
| **SUB: E871002** | ***Analyzed:*** | Oct-02-12 22:46 | | Oct-02-12 23:02 | | Oct-02-12 23:18 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Chloride | | 1040 | 5.00 | 1440 | 5.00 | 1430 | 5.00 | | | | |
| **TDS by SM2540C** | ***Extracted:*** | | | | | | | | | | |
| **SUB: E871002** | ***Analyzed:*** | Oct-03-12 11:00 | | Oct-03-12 11:00 | | Oct-03-12 11:00 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Total dissolved solids | | 2300 | 5.00 | 6350 | 5.00 | 5650 | 5.00 | | | | |





Nicholas Straccione
Project Manager

# Flagging Criteria

**X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

**B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

**D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

**E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

**F** RPD exceeded lab control limits.

**J** The target analyte was positively identified below the quantiation limit and above the detection limit.

**U** Analyte was not detected.

**L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

**H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

**K** Sample analyzed outside of recommended hold time.

**JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

* Surrogate recovered outside laboratory control limit.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

**MDL** Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

**PQL** Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

**DL** Method Detection Limit

**NC** Non-Calculable

\+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation


***Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.***

*Certified and approved by numerous States and Agencies.*

*A Small Business and Minority Status Company that delivers SERVICE and QUALITY*

Houston - Dallas - San Antonio - Atlanta - Midland/Odessa - Tampa/Lakeland - Phoenix - Latin America

| | Phone | Fax |
|---|---|---|
| 4143 Greenbriar Dr, Stafford, TX 77477 | (281) 240-4200 | (281) 240-4280 |
| 9701 Harry Hines Blvd , Dallas, TX 75220 | (214) 902 0300 | (214) 351-9139 |
| 5332 Blackberry Drive, San Antonio TX 78238 | (210) 509-3334 | (210) 509-3335 |
| 2505 North Falkenburg Rd, Tampa, FL 33619 | (813) 620-2000 | (813) 620-2033 |
| 12600 West I-20 East, Odessa, TX 79765 | (432) 563-1800 | (432) 563-1713 |
| 6017 Financial Drive, Norcross, GA 30071 | (770) 449-8800 | (770) 449-5477 |
| 3725 E. Atlanta Ave, Phoenix, AZ 85040 | (602) 437-0330 | |

# BS / BSD Recoveries

## Project Name: Lovington Unit Water Plant

**Work Order #:** 449943 **Project ID:** 073016

**Analyst:** TTE **Date Prepared:** 10/02/2012 **Date Analyzed:** 10/02/2012

**Lab Batch ID:** 897862 **Sample:** 628012-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| Inorganic Anions by EPA 300/300.1<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | <0.500 | 50.0 | 50.6 | 101 | 50.0 | 52.2 | 104 | 3 | 80-120 | 20 | |

**Analyst:** KUG **Date Prepared:** 10/03/2012 **Date Analyzed:** 10/03/2012

**Lab Batch ID:** 898022 **Sample:** 898022-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| TDS by SM2540C<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total dissolved solids | <5.00 | 1000 | 1000 | 100 | 1000 | 1000 | 100 | 0 | 80-120 | 30 | |

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

# Form 3 - MS Recoveries

## Project Name: Lovington Unit Water Plant

**Work Order #:** 449943
**Lab Batch #:** 897862 **Project ID:** 073016
**Date Analyzed:** 10/02/2012 **Date Prepared:** 10/02/2012 **Analyst:** TTE
**QC- Sample ID:** 449943-009 S **Batch #:** 1 **Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 1430 | 500 | 1910 | 96 | 80-120 | |

**Lab Batch #:** 897862
**Date Analyzed:** 10/02/2012 **Date Prepared:** 10/02/2012 **Analyst:** TTE
**QC- Sample ID:** 449988-001 S **Batch #:** 1 **Matrix:** Water
**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 203 | 500 | 718 | 103 | 80-120 | |

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

# Sample Duplicate Recovery

## Project Name: Lovington Unit Water Plant

**Work Order #:** 449943

**Lab Batch #:** 898022 **Project ID:** 073016

**Date Analyzed:** 10/03/2012 11:00 **Date Prepared:** 10/03/2012 **Analyst:** KUG

**QC- Sample ID:** 449943-007 D **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

| TDS by SM2540C | SAMPLE / SAMPLE DUPLICATE RECOVERY | | | | |
|---|---|---|---|---|---|
| Analyte | Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
| Total dissolved solids | 2300 | 2300 | 0 | 30 | |

**Lab Batch #:** 898022

**Date Analyzed:** 10/03/2012 11:00 **Date Prepared:** 10/03/2012 **Analyst:** KUG

**QC- Sample ID:** 450081-003 D **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

| TDS by SM2540C | SAMPLE / SAMPLE DUPLICATE RECOVERY | | | | |
|---|---|---|---|---|---|
| Analyte | Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
| Total dissolved solids | 876 | 874 | 0 | 30 | |

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

XENCO Laboratories

☐ 4143 Greenbriar Drive, Stafford, Tx 77477 281-240-4200
☐ 5332 Blackberry Drive, San Antonio, Tx 78238 210-509-3334
☐ 9701 Harry Hines Blvd., Dallas, Tx 75220 214-902-0300
☒ 12600 West I-20 East, Odessa, Tx 79765 432-563-1800
☐ 842 Cantwell, Corpus Christi, Tx 78408 361-884-0371

# ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

**Serial #:** 251232 Page 1 of 1

**Company-City:** CLA **Phone:** 432-686-0086 **Lab Only:** 449943

**Proj Name-Location:** ☒ Previously done at XENCO — Lovington Unit Water Plant / NM **Project ID:** 073016

**TAT:** ASAP 5h 12h 24h 48h 3d 5d 7d 10d 21d Standard TAT is project specific. It is typically 5-7 Working Days for level II and 10+ Working days for level III and IV data.

**Proj State:** TX, AL, FL, GA, LA, MS, NC, NJ, PA, SC, TN, UT (Other) NM **Proj. Manager (PM):** John Schnable

e-Mail Results to ☒ PM and JSchnable@CLAWorld.com **Fax No:** 686-0086

**Invoice to** ☐ Accounting ☐ Inc. Invoice with Final Report ☐ Invoice must have a P.O Bill to: Check 5506

**Quote/Pricing:** **P.O No:** ☐ Call for P.O.

**Reg Program:** UST DRY-CLEAN Land-Fill Waste-Disp NPDES DW TRRP

QAPP Per-Contract CLP AFCEE NAVY DOE DOD USACE OTHER:

**Special DLs** ( GW DW QAPP MDLs RLs See Lab PM Included Call PM )

Sampler Name: Joe Morales Signature: Joe Morales

| | Sample ID | Sampling Date | Time | Depth ft/in/m | Matrix | Composite | Grab | # Containers | Container Size | Container Type | Preservatives | VOCs: Full-List BTEX-MTBE EtOH Oxyg VOHs VOAs | VOC's PP TCL DW Appdx-1 Appdx-2 CALL Other: | PAHs | TX-1005 DRO GRO MA EPH MA VPH | SVOCs: Full-List DW BN&AE TCL PP Appdx-2 CALL | OC Pesticides PCBs Herbicides OP Pesticides | Metals: RCRA-8 RCRA-4 Pb 13PP 23TAL Appdx 1 Appdx 2 | SPLP - TCLP (Metals VOCs SVOCs Pest. Herb. PCBs) | EDB / DBCP | Chlorides EPA 300.0 TDS SM 2540 | TAT ASAP 5h 12h 24h 48h 3d (5d) 7d 10d 21d | Addn: PAH above mg/L W, mg/Kg S Highest Hit | Hold Samples (Surcharges will apply and are pre-approved) | Remarks: Sample Clean-ups are pre-approved as needed | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MW-4-092812 | 9-28-12 | 0900 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 1 |
| 2 | MW-5-092812 | 9-28-12 | 0925 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 2 |
| 3 | MW-8-092812 | 9-28-12 | 1000 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 3 |
| 4 | MW-7-092812 | 9-28-12 | 1040 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 4 |
| 5 | MW-2-092812 | 9-28-12 | 1120 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 5 |
| 6 | MW-1-092812 | 9-28-12 | 1150 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 6 |
| 7 | MW-6-092812 | 9-28-12 | 1215 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 7 |
| 8 | MW-3-092812 | 9-28-12 | 1250 | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 8 |
| 9 | DUP-092812 | 9-28-12 | — | | W | | X | 1 | 1 | P | C | | | | | | | | | | X X | X | | | | 9 |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |

| Relinquished by ( Initials and Sign) | Date & Time | Relinquished to ( Initials and Sign) | Date & Time |
|---|---|---|---|
| 1) JM Joe Morales | 10-1-12 1430 | 2) | |
| 3) | | 4) | |
| 5) | | 6) Thomas Thomas | 10-1-12 8:38 |

Total Containers per COC: Cooler Temp: -1.0 C

otherwise agreed on writing. Reports are the Intellectual Property of XENCO until paid. Samples will be held 30 days after final report is e-mailed unless hereby requested. Rush Charges and Collection Fees are pre-approved if needed.

**Preservatives:** Various (**V**), HCl pH<2 (**H**), H2SO4 pH<2 (**S**), HNO3 pH<2 (**N**), Asbc Acid&NaOH (**A**), ZnAc&NaOH (**Z**), (Cool,<4C) (**C**), None (**NA**), See Label (**L**), Other (**O**) _____

**Cont. Size:** 4oz (**4**), 8oz (**8**), 32oz (**32**), 40ml VOA (**40**), 1L (**1**), 500ml (**5**), Tedlar Bag (**B**), Various (V), Other _____ **Cont. Type:** Glass Amb (**A**), Glass Clear (**C**), Plastic (**P**), Various (**V**)

**Matrix:** Air (**A**), Product (**P**), Solid(**S**), Water (**W**), Liquid (**L**)

*Committed to Excellence in Service and Quality* *www.xenco.com*

Notice: Signature of this document and relinquishment of these samples constitutes a valid purchase order from client company to Xenco Laboratories and its affiliates, subcontractors and assigns under Xenco's standard terms and conditions of service unless previoiusly negotiated under a fully executed client contract.

# XENCO Laboratories

## Prelogin/Nonconformance Report- Sample Log-In

**Client:** Conestoga Rovers & Associates

**Date/ Time Received:** 10/01/2012 08:38:00 AM

**Work Order #:** 449943

**Acceptable Temperature Range: 0 - 6 degC**
**Air and Metal samples Acceptable Range: Ambient**

**Temperature Measuring device used :**

| Sample Receipt Checklist | Comments |
|---|---|
| #1 *Temperature of cooler(s)? | 4.5 |
| #2 *Shipping container in good condition? | **Yes** |
| #3 *Samples received on ice? | **Yes** |
| #4 *Custody Seals intact on shipping container/ cooler? | **Yes** |
| #5 Custody Seals intact on sample bottles? | **Yes** |
| #6 *Custody Seals Signed and dated? | **Yes** |
| #7 *Chain of Custody present? | **Yes** |
| #8 Sample instructions complete on Chain of Custody? | **Yes** |
| #9 Any missing/extra samples? | **No** |
| #10 Chain of Custody signed when relinquished/ received? | **Yes** |
| #11 Chain of Custody agrees with sample label(s)? | **Yes** |
| #12 Container label(s) legible and intact? | **Yes** |
| #13 Sample matrix/ properties agree with Chain of Custody? | **Yes** |
| #14 Samples in proper container/ bottle? | **Yes** |
| #15 Samples properly preserved? | **Yes** |
| #16 Sample container(s) intact? | **Yes** |
| #17 Sufficient sample amount for indicated test(s)? | **Yes** |
| #18 All samples received within hold time? | **Yes** |
| #19 Subcontract of sample(s)? | **Yes** |
| #20 VOC samples have zero headspace (less than 1/4 inch bubble)? | **Yes** |
| #21 <2 for all samples preserved with HNO3,HCL, H2SO4? | **Yes** |
| #22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH? | **Yes** |

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

| Analyst: | PH Device/Lot#: |
|---|---|

**Checklist completed by:** _____ Date: _____

**Checklist reviewed by:** _____ Date: _____

# Analytical Report 454599

## for

## Conestoga Rovers & Associates

**Project Manager: John Schnable**

**Lovington Water Plant**

**073016**

**27-DEC-12**

Collected By: Client

**12600 West I-20 East Odessa, Texas 79765**

Xenco-Houston (EPA Lab code: TX00122):
Texas (T104704215-10-6-TX), Arizona (AZ0765), Arkansas (08-039-0), Connecticut (PH-0102), Florida (E871002)
Illinois (002082), Indiana (C-TX-02), Iowa (392), Kansas (E-10380), Kentucky (45), Louisiana (03054)
New Hampshire (297408), New Jersey (TX007), New York (11763), Oklahoma (9218), Pennsylvania (68-03610)
Rhode Island (LAO00312), USDA (S-44102), DoD (L11-54)

Xenco-Atlanta (EPA Lab Code: GA00046):
Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD ( L10-135)
Louisiana (04176), USDA (P330-07-00105)

Xenco-Tampa Mobile (EPA Lab code: FL01212): Florida (E84900)
Xenco-Lakeland: Florida (E84098)
Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX)
Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX)
Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757)
Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)
Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)

27-DEC-12

Project Manager: **John Schnable**
**Conestoga Rovers & Associates**
2135 S Loop 250 W
Midland, TX 79703

Reference: XENCO Report No(s): **454599**
**Lovington Water Plant**
Project Address: NM

**John Schnable**:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 454599. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 454599 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

**Nicholas Straccione**
Project Manager

# Sample Cross Reference 454599

## Conestoga Rovers & Associates, Midland, TX

Lovington Water Plant

| Sample Id | Matrix | Date Collected | Sample Depth | Lab Sample Id |
|---|---|---|---|---|
| MW4 121912 | W | 12-19-12 10:25 | | 454599-001 |
| MW5 121912 | W | 12-19-12 11:00 | | 454599-002 |
| MW8 121912 | W | 12-19-12 11:30 | | 454599-003 |
| MW7 121912 | W | 12-19-12 12:10 | | 454599-004 |
| MW1 121912 | W | 12-19-12 12:45 | | 454599-005 |
| Dup1 121912 | W | 12-19-12 00:00 | | 454599-006 |
| MW2 122012 | W | 12-20-12 10:15 | | 454599-007 |
| MW6 122012 | W | 12-20-12 11:00 | | 454599-008 |
| MW3 122012 | W | 12-20-12 12:00 | | 454599-009 |

# CASE NARRATIVE

***Client Name: Conestoga Rovers & Associates***
***Project Name: Lovington Water Plant***

| | | | |
|---|---|---|---|
| *Project ID:* | *073016* | *Report Date:* | *27-DEC-12* |
| *Work Order Number(s):* | *454599* | *Date Received:* | *12/20/2012* |

***Sample receipt non conformances and comments:***
*None*

***Sample receipt non conformances and comments per sample:***

*None*

***Analytical non conformances and comments:***
*Batch: LBA-903523 Inorganic Anions by EPA 300/300.1*
*E300*

*Batch 903523, Chloride recovered below QC limits*
*Samples affected are: 454599-001, -003, -006, -002, -004, -005.*
*The Laboratory Control Sample for Chloride is within laboratory Control Limits*

# Certificate of Analysis Summary 454599

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Water Plant

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:** NM

**Date Received in Lab:** Thu Dec-20-12 04:52 pm
**Report Date:** 27-DEC-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 454599-001 | | 454599-002 | | 454599-003 | | 454599-004 | | 454599-005 | | 454599-006 | |
| | ***Field Id:*** | MW4 121912 | | MW5 121912 | | MW8 121912 | | MW7 121912 | | MW1 121912 | | Dup1 121912 | |
| | ***Depth:*** | | | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | WATER | | WATER | | WATER | |
| | ***Sampled:*** | Dec-19-12 10:25 | | Dec-19-12 11:00 | | Dec-19-12 11:30 | | Dec-19-12 12:10 | | Dec-19-12 12:45 | | Dec-19-12 00:00 | |
| **Inorganic Anions by EPA 300/300.1 SUB: E871002** | ***Extracted:*** | Dec-21-12 20:09 | | Dec-21-12 20:43 | | Dec-21-12 21:00 | | Dec-21-12 21:17 | | Dec-21-12 21:34 | | Dec-21-12 21:51 | |
| | ***Analyzed:*** | Dec-21-12 20:09 | | Dec-21-12 20:43 | | Dec-21-12 21:00 | | Dec-21-12 21:17 | | Dec-21-12 21:34 | | Dec-21-12 21:51 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Chloride | | 125 | 2.00 | 126 | 2.00 | 192 | 2.00 | 192 | 2.00 | 401 | 2.00 | 243 | 2.00 |
| **TDS by SM2540C SUB: E871002** | ***Extracted:*** | | | | | | | | | | | | |
| | ***Analyzed:*** | Dec-24-12 16:00 | | Dec-24-12 16:00 | | Dec-24-12 16:00 | | Dec-24-12 16:00 | | Dec-24-12 16:00 | | Dec-24-12 16:00 | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL | mg/L | RL |
| Total dissolved solids | | 501 | 5.00 | 489 | 5.00 | 702 | 5.00 | 683 | 5.00 | 1000 | 5.00 | 669 | 5.00 |





Nicholas Straccione
Project Manager

# Certificate of Analysis Summary 454599

## Conestoga Rovers & Associates, Midland, TX

## Project Name: Lovington Water Plant

**Project Id:** 073016
**Contact:** John Schnable
**Project Location:** NM

**Date Received in Lab:** Thu Dec-20-12 04:52 pm
**Report Date:** 27-DEC-12
**Project Manager:** Nicholas Straccione

| *Analysis Requested* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***Lab Id:*** | 454599-007 | | 454599-008 | | 454599-009 | | | | | |
| | ***Field Id:*** | MW2 122012 | | MW6 122012 | | MW3 122012 | | | | | |
| | ***Depth:*** | | | | | | | | | | |
| | ***Matrix:*** | WATER | | WATER | | WATER | | | | | |
| | ***Sampled:*** | Dec-20-12 10:15 | | Dec-20-12 11:00 | | Dec-20-12 12:00 | | | | | |
| **Inorganic Anions by EPA 300/300.1 SUB: E871002** | ***Extracted:*** | Dec-22-12 15:46 | | Dec-22-12 16:03 | | Dec-22-12 16:20 | | | | | |
| | ***Analyzed:*** | Dec-22-12 15:46 | | Dec-22-12 16:03 | | Dec-22-12 16:20 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Chloride | | 670 | 10.0 | 961 | 10.0 | 1190 | 10.0 | | | | |
| **TDS by SM2540C SUB: E871002** | ***Extracted:*** | | | | | | | | | | |
| | ***Analyzed:*** | Dec-24-12 16:00 | | Dec-24-12 16:00 | | Dec-24-12 16:00 | | | | | |
| | ***Units/RL:*** | mg/L | RL | mg/L | RL | mg/L | RL | | | | |
| Total dissolved solids | | 1560 | 5.00 | 2210 | 5.00 | 2860 | 5.00 | | | | |





Nicholas Straccione
Project Manager

# Flagging Criteria

**X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.

**B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.

**D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.

**E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.

**F** RPD exceeded lab control limits.

**J** The target analyte was positively identified below the quantiation limit and above the detection limit.

**U** Analyte was not detected.

**L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.

**H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.

**K** Sample analyzed outside of recommended hold time.

**JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

* Surrogate recovered outside laboratory control limit.

**BRL** Below Reporting Limit.

**RL** Reporting Limit

**MDL** Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

**PQL** Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

**DL** Method Detection Limit

**NC** Non-Calculable

\+ NELAC certification not offered for this compound.

***** (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation


***Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.***

*Certified and approved by numerous States and Agencies.*

*A Small Business and Minority Status Company that delivers SERVICE and QUALITY*

Houston - Dallas - San Antonio - Atlanta - Midland/Odessa - Tampa/Lakeland - Phoenix - Latin America

| | Phone | Fax |
|---|---|---|
| 4143 Greenbriar Dr, Stafford, TX 77477 | (281) 240-4200 | (281) 240-4280 |
| 9701 Harry Hines Blvd , Dallas, TX 75220 | (214) 902 0300 | (214) 351-9139 |
| 5332 Blackberry Drive, San Antonio TX 78238 | (210) 509-3334 | (210) 509-3335 |
| 2505 North Falkenburg Rd, Tampa, FL 33619 | (813) 620-2000 | (813) 620-2033 |
| 12600 West I-20 East, Odessa, TX 79765 | (432) 563-1800 | (432) 563-1713 |
| 6017 Financial Drive, Norcross, GA 30071 | (770) 449-8800 | (770) 449-5477 |
| 3725 E. Atlanta Ave, Phoenix, AZ 85040 | (602) 437-0330 | |

# BS / BSD Recoveries

## Project Name: Lovington Water Plant

**Work Order #:** 454599 **Project ID:** 073016

**Analyst:** JOL **Date Prepared:** 12/21/2012 **Date Analyzed:** 12/21/2012

**Lab Batch ID:** 903523 **Sample:** 631646-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| Inorganic Anions by EPA 300/300.1<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | <2.00 | 50.0 | 53.8 | 108 | 50.0 | 53.6 | 107 | 0 | 80-120 | 20 | |

**Analyst:** JOL **Date Prepared:** 12/22/2012 **Date Analyzed:** 12/22/2012

**Lab Batch ID:** 903583 **Sample:** 631677-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| Inorganic Anions by EPA 300/300.1<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | <2.00 | 50.0 | 52.0 | 104 | 50.0 | 52.2 | 104 | 0 | 80-120 | 20 | |

**Analyst:** KUG **Date Prepared:** 12/24/2012 **Date Analyzed:** 12/24/2012

**Lab Batch ID:** 903644 **Sample:** 903644-1-BKS **Batch #:** 1 **Matrix:** Water

**Units:** mg/L

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

| TDS by SM2540C<br>Analytes | Blank Sample Result [A] | Spike Added [B] | Blank Spike Result [C] | Blank Spike %R [D] | Spike Added [E] | Blank Spike Duplicate Result [F] | Blk. Spk Dup. %R [G] | RPD % | Control Limits %R | Control Limits %RPD | Flag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total dissolved solids | <5.00 | 1000 | 991 | 99 | 1000 | 992 | 99 | 0 | 80-120 | 30 | |

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|
Blank Spike Recovery [D] = 100*(C)/[B]
Blank Spike Duplicate Recovery [G] = 100*(F)/[E]
All results are based on MDL and Validated for QC Purposes

# Form 3 - MS Recoveries

## Project Name: Lovington Water Plant

**Work Order #:** 454599

**Lab Batch #:** 903523 **Project ID:** 073016

**Date Analyzed:** 12/22/2012 **Date Prepared:** 12/22/2012 **Analyst:** JOL

**QC- Sample ID:** 454159-006 S **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 245 | 50.0 | 251 | 12 | 80-120 | X |

**Lab Batch #:** 903523

**Date Analyzed:** 12/21/2012 **Date Prepared:** 12/21/2012 **Analyst:** JOL

**QC- Sample ID:** 454599-001 S **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 125 | 50.0 | 153 | 56 | 80-120 | X |

**Lab Batch #:** 903583

**Date Analyzed:** 12/22/2012 **Date Prepared:** 12/22/2012 **Analyst:** JOL

**QC- Sample ID:** 454159-001 S **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 630 | 250 | 865 | 94 | 80-120 | |

**Lab Batch #:** 903583

**Date Analyzed:** 12/22/2012 **Date Prepared:** 12/22/2012 **Analyst:** JOL

**QC- Sample ID:** 454669-002 S **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

**MATRIX / MATRIX SPIKE RECOVERY STUDY**

| Inorganic Anions by EPA 300<br>Analytes | Parent Sample Result [A] | Spike Added [B] | Spiked Sample Result [C] | %R [D] | Control Limits %R | Flag |
|---|---|---|---|---|---|---|
| Chloride | 507 | 500 | 991 | 97 | 80-120 | |

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference [E] = 200*(C-A)/(C+B)
All Results are based on MDL and Validated for QC Purposes

BRL - Below Reporting Limit

# Sample Duplicate Recovery

## Project Name: Lovington Water Plant

**Work Order #:** 454599

**Lab Batch #:** 903644 **Project ID:** 073016

**Date Analyzed:** 12/24/2012 16:00 **Date Prepared:** 12/24/2012 **Analyst:** KUG

**QC- Sample ID:** 454578-003 D **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

| TDS by SM2540C | SAMPLE / SAMPLE DUPLICATE RECOVERY | | | | |
|---|---|---|---|---|---|
| Analyte | Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
| Total dissolved solids | 1130 | 1140 | 1 | 30 | |

**Lab Batch #:** 903644

**Date Analyzed:** 12/24/2012 16:00 **Date Prepared:** 12/24/2012 **Analyst:** KUG

**QC- Sample ID:** 454599-006 D **Batch #:** 1 **Matrix:** Water

**Reporting Units:** mg/L

| TDS by SM2540C | SAMPLE / SAMPLE DUPLICATE RECOVERY | | | | |
|---|---|---|---|---|---|
| Analyte | Parent Sample Result [A] | Sample Duplicate Result [B] | RPD | Control Limits %RPD | Flag |
| Total dissolved solids | 669 | 668 | 0 | 30 | |

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |
All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

# ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

**XENCO Laboratories**

☐ 4143 Greenbriar Drive, Stafford, TX 77477 **281-240-4200**
☐ 5332, Blackberry Drive, San Antonio, TX 78238 **210-509-3334**
☐ 9701 Harry Hines Blvd., Dallas, TX 75220 **214-902-0300**
☐ 12600 West I-20 East, Odessa, TX 79765 **432-563-1800**
☐ 842 Cantwell, Corpus Christi, TX 78408 **361-8840371**

**Serial #:** 307722 Page 1 of 1

**Company-City** CRA Midland, TX **Phone** (432) 686-0086

**Lab Only:** 454599

**Project Name-Location** Lovington Water Plant – NM ☐ Previously done at XENCO **Project ID** 073016

**TAT:** ASAP 5h 12h 24h 48h 3d (5d) 7d 10d 21d Standard TAT is project specific.
It is typically 5-7 Working Days for level II and 10+ Working days for level III and IV data.

**Proj. State:** TX, AL, FL, GA, LA, MS, NC, NJ, PA, SC, TN, UT Other **Proj. Manager (PM)** John Schnable

E-mail Results to ☐ PM and JSchnable@Cramworld.com **Fax No:** (432) 413-6706

**Invoice to** ☐ Accounting ☐ Inc. Invoice with Final Report ☐ Invoice must have a P.O.
Bill to:

**Quote/Pricing:** **P.O. No:** ☐ Call for P.O.

**Reg Program:** UST DRY-CLEAN Land-Fill Waste-Disp NPDES DW **TRRP**
QAPP Per-Contract CLP AGCEE NAVY DOE DOD USACE OTHER:

**Special DLs** (GW DW QAPP MDLs RLs See Lab PM Included Call PM)

**Sampler Name** Justin Nixon **Signature**

| | Sample ID | Sampling Date | Time | Depth ft' In" m | Matrix | Composite | Grab | # Containers | Container Size | Container Type | Preservatives | VCOs: Full-List BTEX-MTBE EtOH Oxyg VOHs VOAs | VCO's PP TCL DW Appdx-1 Appdx-2 CALL Other: | PAHs SIM | TX-1005 DRO GRO MA EPH MA VPH | SVOCs: Full-List DW BN&AE TCL PP Appdx-2 CALL | OC Pesticides PCBs Herbicides OP Pesticides | Metals: RCRA-8 RCRA-4 Pb 13PP 23TAL Appdx 1 Appdx2 | SPLP - TCLP (Metals VOCs SVOCs Pest. Herb. PCBs) | EDB / DBCP | Chlorides EPA 300.0 | TDS SM 2540 | TATASAP 5h 12h 24h 48h 3d (5d) 7d 10d 21d | Addn: PAH above mg/L W, mg/Kg S Highest Hit | Hold Samples (Surcharges will apply and are pre-approved) | Sample Clean-ups are pre-approved as needed | Addn: Date Rcv. by: From: | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MW4 12 19 12 | 12-19-12 | 1025 | | W | | X | 2 | | | Ice | | | | | | | | | | X | X | | | | | | 1 |
| 2 | MW5 12 19 12 | | 1100 | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| 3 | MW8 12 19 12 | | 1130 | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| 4 | MW7 12 19 12 | | 1210 | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| 5 | MW1 12 19 12 | | 1245 | | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| 6 | Dup 12 19 12 | ↓ | — | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| 7 | MW2 12 20 12 | 12-20-12 | 1015 | | | | | | | | | | | | | | | | | | | | | | | | | 7 |
| 8 | MW6 12 20 12 | 12-20-12 | 1100 | | | | | | | | | | | | | | | | | | | | | | | | | 8 |
| 9 | MW3 12 20 12 | 12-20-12 | 1200 | | | | | | | | | | | | | | | | | | | | | | | | | 9 |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |

| Relinquished by (Initials and Sign) | Date & Time | Relinquished to (Initials and Sign) | Date & Time |
|---|---|---|---|
| 1) | 12-20-12 1630 | 2) Shawn Smith | 12/20/12 16:52 |
| 3) | | 4) | |
| 5) | | 6) | |

Total Containers per COC: 18 Cooler Temp: 1.5 °C

Otherwise agreed on writing. Reports are the Intellectual Property of XENCO until paid. Samples will be held 30 days after final report is e-mailed unless hereby requested. Rush Charges and Collection Fees are pre-approved if needed.

**Preservatives:** Various (**V**), HCl pH<2 (**H**), H2SO4 pH<2 (**S**), HNO3 pH<2 (**N**), Asbc Acid&NaOH (**A**), ZnAc&NaOH (**Z**), (Cool, <4C) (**C**), None (**NA**),See Label (**L**), Other (**O**) _____
**Cont. Size:** 4oz (**4**), 8oz (**8**), 32oz (**32**), 40ml VOA (**40**), 1L (**1**), 500ml (**5**), Tedlar Bag (**B**), Various (**V**), Other _____ **Cont. Type:** Glass Amb (**A**), Glass Clear (**C**), Plastic (**P**), Various (**V**)

**Matrix:** Air (**A**), Product (**P**), Solid (**S**), Water (**W**), Liquid (**L**)

*Committed to Excellence in Service and Quality* *www.xenco.com*

# XENCO Laboratories

## Prelogin/Nonconformance Report- Sample Log-In

**Client:** Conestoga Rovers & Associates

**Date/ Time Received:** 12/20/2012 04:52:00 PM

**Work Order #:** 454599

**Acceptable Temperature Range: 0 - 6 degC**
**Air and Metal samples Acceptable Range: Ambient**

**Temperature Measuring device used :**

| Sample Receipt Checklist | Comments |
|---|---|
| #1 *Temperature of cooler(s)? | 1.5 |
| #2 *Shipping container in good condition? | **Yes** |
| #3 *Samples received on ice? | **Yes** |
| #4 *Custody Seals intact on shipping container/ cooler? | **Yes** |
| #5 Custody Seals intact on sample bottles? | **Yes** |
| #6 *Custody Seals Signed and dated? | **Yes** |
| #7 *Chain of Custody present? | **Yes** |
| #8 Sample instructions complete on Chain of Custody? | **Yes** |
| #9 Any missing/extra samples? | **No** |
| #10 Chain of Custody signed when relinquished/ received? | **Yes** |
| #11 Chain of Custody agrees with sample label(s)? | **Yes** |
| #12 Container label(s) legible and intact? | **Yes** |
| #13 Sample matrix/ properties agree with Chain of Custody? | **Yes** |
| #14 Samples in proper container/ bottle? | **Yes** |
| #15 Samples properly preserved? | **Yes** |
| #16 Sample container(s) intact? | **Yes** |
| #17 Sufficient sample amount for indicated test(s)? | **Yes** |
| #18 All samples received within hold time? | **Yes** |
| #19 Subcontract of sample(s)? | **Yes** |
| #20 VOC samples have zero headspace (less than 1/4 inch bubble)? | **Yes** |
| #21 <2 for all samples preserved with HNO3,HCL, H2SO4? | **Yes** |
| #22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH? | **Yes** |

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

| Analyst: | PH Device/Lot#: |
|---|---|

**Checklist completed by:** _____ Date: _____

**Checklist reviewed by:** _____ Date: _____