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# REPORTS

# DATE:

4/2003

Larson & Associates, Inc.
Environmental Consultants



April 18, 2003

Mr. William C. Olson, Hydrologist
Environmental Bureau
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

**Re: Annual Groundwater Monitoring and Plume Delineation Report, Texaco Exploration and Production Inc., Cooper-Jal Unit Injection Station, NW/4, NW/4, SE/4, Section 24, Township 24 South, Range 36 East, Lea County, New Mexico**

Dear Mr. Olson:

Please find enclosed a copy of the above-referenced report. The report is submitted on behalf of ChevronTexaco Exploration and Production, and presents the results of plume delineation and annual groundwater monitoring conducted by Larson and Associates, Inc. Please call Scott Toner at (915) 687-7318 or myself at (915) 687-0901 if you have questions.

Sincerely,
***Larson and Associates, Inc.***

Cindy K. Crain
Geologist

cc: Scott Toner - Texaco
Chris Williams – NMOCD District I

# ANNUAL GROUNDWATER MONITORING and PLUME DELINEATION REPORT COOPER-JAL UNIT SOUTH INJECTION STATION LEA COUNTY, NEW MEXICO

**Prepared for:**

**ChevronTexaco Exploration and Production**
**15 Smith Road**
**Midland, Texas**

**Prepared by:**

**Larson and Associates, Inc.**
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**Midland, Texas 79701**
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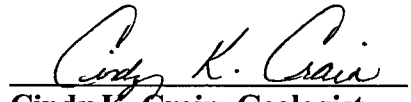
**April 18, 2003**



**Cindy K. Crain, Geologist**

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**Lea County, New Mexico**

## 1.0 INTRODUCTION

ChevronTexaco Exploration and Production (ChevronTexaco), as successor to Texaco Exploration and Production Inc. (Texaco), has retained Larson and Associates, Inc. (LA) to conduct chloride plume delineation, groundwater remediation and monitoring activities at its former Cooper-Jal Unit South Injection Station (Site). In September of 2001, ChevronTexaco sold its interest in the Cooper-Jal Unit to SDG Resources. However, it retained responsibility to remediate the chloride impact to groundwater. The Site is located approximately 5.5 miles northwest of Jal, New Mexico, and is situated in Unit Letter J (NW/4, NW/4, SE/4), Section 24, Township 24 South, Range 36 East, Lea County, New Mexico. Figure 1 presents a Site location and topographic map.

## 2.0 BACKGROUND

From September 10, 1997 to May 14, 1998 fourteen (14) monitoring wells were installed at the Site, in order to investigate soil and groundwater impacts. An electromagnetic (EM-34) terrain conductivity survey was initially conducted on January 13-14, 1998 and May 7, 1998, to determine areas of elevated terrain conductivity prior to monitoring well drilling. Details of the investigations were submitted to the New Mexico Oil Conservation Division (NMOCD) in a Subsurface Environmental Assessment Report dated June 1998.

In that report, Texaco proposed to implement a groundwater recovery program to reduce the levels of chloride, total dissolved solids (TDS) and sulfate in the groundwater, by installing approximately three (3) groundwater recovery wells in the area of highest chloride, TDS and sulfate impact. The actual number and location of recovery wells would be determined by a pumping test, to be performed following installation of the initial recovery well. Recovered fluid from the recovery well would be conveyed to the Cooper-Jal Unit South Injection Station for placement into the injection stream. Groundwater monitoring, on a semi-annual basis, was also proposed, with an annual report to be prepared and submitted yearly to the NMOCD.

The proposed activities were approved by the NMOCD in a letter dated September 17, 1998. In that letter, the NMOCD requested submittal of a work plan to delineate the extent of the chloride, TDS and sulfate impact. On November 18, 1998, a "Work Plan for Plume Delineation and Modification to Proposed Groundwater Monitoring Schedule" was submitted to the NMOCD. In addition to the previously proposed Recovery Wells, the work plan included installation of additional down gradient monitoring wells, in order to delineate the chloride, TDS and sulfate plume at the Site. The groundwater-monitoring schedule was modified to include semi-annual monitoring of down gradient monitoring wells (MW-8, MW-9, MW-9A, MW-10 and MW-11) and annual monitoring of the remaining wells. All monitoring wells will be sampled and analyzed for major anions and cations, and TDS. The proposed activities were approved by the NMOCD in a letter dated February 2, 1999, and included detailed directives for monitoring well installations and reporting requirements. A copy of the September 17, 1998, and February 2, 1999 letters are included in Appendix A.

## 3.0 CURRENT ACTIVITIES

### 3.1 Monitoring and Recovery Wells

On January 18, 1999, monitoring well MW-11 was installed southeast (downgradient) of the Site. Recovery well (RW-1) was installed on May 4 and 5, 1999, and recovery well (RW-2) on November 9 and 10, 1999. Highlander Environmental Corp. conducted initial activities at the Site. On September 17, 2001, two additional monitoring wells (MW-12 and MW-13) were installed under direction of Larson and Associates, Inc. (LA) to satisfy concerns by individuals that protested applications for water allocations submitted to the New Mexico State Engineer (NMSE). Scarborough Drilling, Inc., located in Lamesa, Texas, drilled all the wells from 165 to 174 feet below ground surface (bgs) using an air rotary drilling rig. Monitoring well (MW-11) was constructed with 4-inch diameter schedule 40 PVC casing and screen. The screen extends the entire thickness of the aquifer. Recovery wells RW-1 and RW-2 were constructed with 5-inch diameter schedule 40 PVC

casing and screen. The well screens fully penetrate the aquifer. Monitoring wells MW-12 and MW-13 were constructed with 2-inch diameter schedule 40 PVC casing and screen. The well screen, approximately 15 feet in length in MW-12 and MW-13, was placed in the borings to encounter the bottom of the aquifer. Monitoring well MW-11 was constructed with approximately 40 feet of screen, and recovery wells RW-1 and RW-2 were constructed with approximately 45 feet of screen. In each well, graded silica sand was placed in the annular space between the boring and screen to approximately two (2) feet above the screen. A layer of bentonite chips, approximately three (3) feet thick, was placed above the sand, and hydrated with potable water. The remainder of the annulus was filled with cement and bentonite grout to approximately 1-foot bgs. The monitoring wells were secured with locking above-grade covers that were anchored in concrete pads measuring approximately 3' x 3' x 1'. The surface completion of the recovery wells (RW-1 and RW-2) will be performed after approval by the NMSE to initiate remediation. Table 1 presents a summary of well drilling and installation details. Appendix B presents the well logs and well construction diagrams. Figure 2 presents the well locations.

### 3.2 Groundwater Monitoring

#### 3.2.1 Groundwater Assessment

LA completed monitoring at the Site for the period of May 2002 through October 2002. Depth to groundwater measurements were collected from all deep monitoring wells (MW-1 through MW-13), shallow monitoring wells (MW-2A, MW-4A, MW-5A and MW-9A), and recovery wells (RW-1 and RW-2) on May 10, 2002 and October 22, 2002. On the May 10 groundwater monitoring event, depth to groundwater in the deep wells ranged from 132.40 feet (MW-3) to 144.45 feet (MW-13) below top of casing (TOC), and in the shallow wells, from 134.50 feet (MW-2A) to 137.20 feet (MW-9A) below TOC. On the October 22 event, depth to groundwater ranged from 130.76 feet

(MW-11) to 144.49 feet (MW-13) below TOC in the deep monitoring wells, and from 132.35 feet (MW-9A) to 137.17 feet (MW-5A) below TOC in the shallow monitoring wells. The groundwater gradient was approximately 0.008 feet per foot in the deep wells during the May event, and 0.004 feet per foot in the shallow wells. During the October event, the groundwater gradient in both the upper and lower wells was approximately 0.004 feet per foot. Groundwater flow at the Site has remained consistent, and is from the northwest to the southeast in both the upper and lower portions of the aquifer. Table 2 provides a summary of depth to groundwater measurements. Figure 3 shows the groundwater gradient of the shallow zone on May 10, 2002. Figure 4 shows the groundwater gradient of the deep zone on May 10, 2002. Figure 7 shows the groundwater gradient of the shallow zone on October 22, 2002. Figure 8 shows the groundwater gradient of the deep zone on October 22, 2002.

Groundwater samples were collected on May 13, 15, 16 and 17, 2002, from deep monitoring wells MW-1 through MW-13, and shallow monitoring wells MW-2A, MW-4A, MW-5A and MW-9A. The groundwater samples were submitted under chain-of-custody control to TraceAnalysis, Inc., and analyzed for anions, cations and TDS. Prior to sample collection, the wells were purged of a minimum of three (3) casing volumes of groundwater. The groundwater samples were collected using dedicated disposable PVC bailers. Table 3 presents a summary of the general chemistry analysis. Appendix C presents the laboratory report.

Referring to Table 3, chloride was above the WQCC standard of 250 milligrams per liter (mg/L) in groundwater from MW-2 (3,200 mg/L), MW-4 (11,300 mg/L), MW-4A (577 mg/L), MW-5 (4,040 mg/L) and MW-13 (517 mg/L). Fluoride was above the WQCC standard of 1.6 mg/L in groundwater from MW-1 (5.83 mg/L), MW-2 (1.72 mg/L), MW-4 (2.01 mg/L), MW-6 (1.62 mg/L), MW-9 (2.22 mg/L), MW-10 (1.93 mg/L) and MW-11 (2.13 mg/L). Nitrate was below the WQCC standard of 10 mg/L in all samples.

Sulfate was below the WQCC standard of 600 mg/L in all samples except MW-4 (1,380 mg/L). TDS exceeded the WQCC standard to 1,000 mg/L in samples from MW-2 (6,040 mg/L), MW-4 (22,600 mg/L), MW-4A (1,610 mg/L), MW-5 (8,340 mg/L) and MW-13 (1,596 mg/L). Figure 5 presents a chloride isopleth map of the shallow zone on May 13 – 17, 2002. Figure 6 presents a chloride isopleth map of the deep zone on May 13 – 17, 2002.

On October 22 and 23, 2002, groundwater samples were collected from all deep monitoring wells (MW-1 through MW-13) and all shallow monitoring wells (MW-2A, MW-4A, MW-5A and MW-9A). The groundwater samples were submitted under chain-of-custody control to Environmental Lab of Texas I, Ltd., and analyzed for chloride, sulfate and TDS. Prior to sample collection, the wells were purged a minimum of three (3) casing volumes of groundwater. The groundwater samples were collected using dedicated disposable PVC bailers. Table 3 presents a summary of the general chemistry analysis. Appendix C presents the laboratory report.

Referring to Table 3, chloride concentrations exceeded the WQCC standard of 250 mg/L in samples from monitoring wells MW-2 (2,920 mg/L), MW-4 (11,300 mg/L), MW-4A (478 mg/L), MW-5A (3,900 mg/L) and MW-13 (549 mg/L). Sulfate exceeded the WQCC standard of 600 mg/L in samples from MW-4 (1,320 mg/L) and MW-5A (616 mg/L). TDS exceeded the WQCC standard of 1,000 mg/L in samples from MW-2 (6,770 mg/L), MW-4 (23,200 mg/L), MW-4A (1,430 mg/L), MW-5A (8,670 mg/L) and MW-13 (1,740 mg/L). Figure 9 presents an isopleth map of chloride concentrations in the shallow zone during the October 2002 sampling event. Figure 10 presents an isopleth map of chloride concentrations in the deep zone during the October 2002 sampling event.

With the installation of monitoring well MW-11, the chloride plume has been delineated to the southeast in both the shallow and deep portions of the aquifer. With the installation of MW-12 and MW-13, a second chloride plume was detected northwest (upgradient) of the Site. Chloride

concentrations in the upgradient plume (MW-12 and MW-13) exhibited a slight increase during the monitoring period (May 2002 to October 2002). Chloride concentrations in all monitoring wells (MW-1 through MW-10) during the monitoring period decreased in comparison to chloride concentrations reported in the June 1998 Subsurface Environmental Assessment Report. The chloride concentrations reported in MW-1 and MW-4A, during the monitoring period, were considerably less than previously reported concentrations. General chemistry results of groundwater from MW-5 and MW-5A on October 23, 2002 indicate that the samples for these two wells were labeled incorrectly when submitted to the laboratory (i.e., MW-5 results should be for MW-5A, and MW-5A results should be for MW-5). The chloride concentrations in monitoring wells MW-1, MW-4A, MW-5 and MW-5A will be verified during the groundwater sampling event scheduled for April of 2003. Results will be included in the next Annual Groundwater Monitoring Report.

### 3.2.2 Waste Management and Disposition

Purged groundwater from the sampling activities was disposed at an NMOCD permitted salt water disposal (SWD) facility operated by Chapparel Services, Inc., located in Eunice, New Mexico. Approximately 250 gallons of purged groundwater was disposed following each sampling event, for a total of approximately 500 gallons.

## 3.3 Remediation System Installation and Start-up

Texaco submitted applications to pump water from wells RW-1 and RW-2 to the State of New Mexico, Office of the State Engineer (NMSE) for remediation of the chlorides, subject to conditions. Upon approval of the applications, ChevronTexaco will initiate chloride remediation in accordance with the conditions stipulated by the NMSE.

## 4.0 CONCLUSIONS

1. Depth to groundwater ranged from 132.40 feet (MW-3) to 144.45 feet (MW-13) below top of casing (TOC) in the deep monitoring wells on the May 10 event.
2. Depth to groundwater ranged from 134.50 feet (MW-2A) to 137.20 feet (MW-9A) below TOC in the shallow monitoring wells on the May 10 event.
3. Depth to groundwater ranged from 130.76 feet (MW-11) to 144.49 feet (MW-13) below TOC in the deep monitoring wells on the October 22 event.
4. Depth to groundwater ranged from 132.35 feet (MW-9A) to 137.17 feet (MW-5A) below TOC in the shallow monitoring wells on the October 22 event.
5. The groundwater gradient was approximately 0.008 feet per foot in the deeper zone during the May event, and 0.004 feet per foot in the shallower zone.
6. The groundwater gradient was approximately 0.004 feet per foot in both the shallow and deep zones during the October event.
7. Groundwater flow at the Site has remained consistent, and is from northwest to southeast in both the shallow and deep portions of the aquifer.
8. From the May 2002 sampling event, chloride was above the WQCC standard of 250 milligrams per liter (mg/L) in groundwater from MW-2 (3,200 mg/L), MW-4 (11,300 mg/L), MW-4A (577 mg/L), MW-5 (4,040 mg/L) and MW-13 (517 mg/L).
9. From the May 2002 sampling event, fluoride was above the WQCC standard of 1.6 mg/L in groundwater from MW-1 (5.83 mg/L), MW-2 (1.72 mg/L), MW-4 (2.01 mg/L), MW-6 (1.62 mg/L), MW-9 (2.22 mg/L), MW-10 (1.93 mg/L) and MW-11 (2.13 mg/L).
10. From the May 2002 sampling event, nitrate was below the WQCC standard of 10 mg/L in all monitoring wells.
11. From the May 2002 sampling event, sulfate was below the WQCC standard of 600 mg/L in all monitoring wells except MW-4 (1,380 mg/L).

12. From the May 2002 sampling event, TDS exceeded the WQCC standard to 1,000 mg/L in MW-2 (6,040 mg/L), MW-4 (22,600 mg/L), MW-4A (1,610 mg/L), MW-5 (8,340 mg/L) and MW-13 (1,596 mg/L).
13. From the October 2002 sampling event, chloride concentrations exceeded the WQCC standard of 250 mg/L in monitoring wells MW-2 (2,920 mg/L), MW-4 (11,300 mg/L), MW-4A (478 mg/L), MW-5A (3,900 mg/L) and MW-13 (549 mg/L).
14. From the October 2002 sampling event, sulfate exceeded the WQCC standard of 600 mg/L in MW-4 (1,320 mg/L) and MW-5A (616 mg/L).
15. From the October 2002 sampling event, TDS exceeded the WQCC standard of 1,000 mg/L in MW-2 (6,770 mg/L), MW-4 (23,200 mg/L), MW-4A (1,430 mg/L), MW-5A (8,670 mg/L) and MW-13 (1,740 mg/L).
16. The chloride plume has been delineated to the southeast in both the shallow and deep portions of the aquifer.
17. With the installation of MW-12 and MW-13, a second chloride plume was detected northwest (upgradient) of the Site.
18. Chloride concentrations in the upgradient plume (MW-12 and MW-13) exhibited a slight increase during the monitoring period (May 2002 to October 2002).
19. Chloride concentrations in all monitoring wells (MW-1 through MW-10) during the monitoring period decreased in comparison to concentrations reported in the June 1998 Subsurface Environmental Assessment Report.

# TABLES

**Table 1:** **Summary of Monitoring and Recovery Well Drilling and Completion Details**
**Texaco Exploration and Production Inc., Cooper-Jal Unit South Water Station**
**NW/4, SE/4, Section 24, Township 24 South, Range 36 East**
**Lea County, New Mexico**



| Well Number | Date Drilled | Depth Drilled (Feet BGS) | Well Diameter (Inches) | Ground Elevation (Feet AMSL) | Top-of-Casing Elevation (Feet AMSL) | Screen Interval (Feet BGS) |
|---|---|---|---|---|---|---|
| MW-1 | 10-Sept-97 | 173 | 2 | 3320.17 | 3320.00 | 153 - 173 |
| MW-2 | 12-Feb-98 | 173 | 2 | 3319.86 | 3319.40 | 163 - 173 |
| *MW-2A | 13-Feb-98 | 145 | 2 | 3319.86 | 3319.39 | 130 - 145 |
| MW-3 | 09-Feb-98 | 171 | 2 | 3316.22 | 3318.21 | 161 - 171 |
| MW-4 | 10-Feb-98 | 171 | 2 | 3317.64 | 3319.74 | 161 - 171 |
| *MW-4A | 11-Feb-98 | 143 | 2 | 3317.47 | 3319.58 | 128 - 143 |
| MW-5 | 11-Feb-98 | 171 | 2 | 3318.95 | 3321.10 | 161 - 171 |
| *MW-5A | 12-Feb-98 | 141 | 2 | 3318.96 | 3321.07 | 126 - 141 |
| MW-6 | 13-Feb-98 | 170 | 2 | 3319.13 | 3321.15 | 120 - 170 |
| MW-7 | 14-May-98 | 166 | 2 | 3316.35 | 3318.39 | 151 - 166 |
| MW-8 | 12-May-98 | 170 | 2 | 3314.95 | 3317.14 | 155 - 170 |
| MW-9 | 12-May-98 | 164 | 2 | 3310.79 | 3312.79 | 149 - 164 |
| *MW-9A | 14-May-98 | 142 | 2 | 3310.44 | 3312.56 | 127 - 142 |
| MW-10 | 13-May-98 | 166 | 2 | 3317.26 | 3319.30 | 151 - 166 |
| MW-11 | 18-Jan-99 | 165 | 4 | 3307.30 | 3309.69 | 125 - 165 |
| MW-12 | 17-Sep-99 | 174 | 2 | 3325.51 | 3328.43 | 156.68 - 171.65 |
| MW-13 | 17-Sep-99 | 174 | 2 | 3335.72 | 3338.49 | 156.68 - 171.65 |
| RW-1 | 05-May-99 | 174 | 5 | 3317.40 | 3318.50 | 130.41 - 174.37 |
| RW-2 | 10-Nov-99 | 174 | 5 | 3316.72 | 3318.62 | 134.22 - 172.73 |

Notes: All wells of PVC construction, and installed by Scarborough Drilling Inc., Lamesa, Texas.

1. *: Shallow monitoring well
2. BGS: Depth in feet below ground surface
3. AMSL: Elevation in feet above mean sea level

**Table 2: Summary of Depth-to-Groundwater Measurements from Monitoring and Recovery Wells**
**Texaco Exploration and Production Inc., Cooper-Jal Unit South Water Station**
**NE/4, NE/4, Section 25, Township 24 South, Range 36 East**
**Lea County, New Mexico**

| Date | MW-1 | MW-2 | MW-2A | MW-3 | MW-4 | MW-4A | MW-5 | MW-5A | MW-6 | MW-7 | MW-8 | MW-9 | MW-9A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 05/18/98 | 135.05 | 135.00 | 134.80 | 132.65 | 136.01 | 135.68 | 137.42 | 137.20 | 136.73 | 136.19 | 134.36 | 132.89 | 132.65 |
| 03/23/99 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 05/21/99 | -- | -- | -- | -- | -- | 135.65 | -- | -- | -- | -- | -- | -- | -- |
| 05/25/99 | 134.93 | 134.79 | 134.73 | 132.52 | 135.57 | 135.90 | 137.28 | 137.11 | 136.61 | 135.98 | 134.21 | 132.68 | 132.43 |
| 02/08/01 | 134.80 | 134.63 | 134.58 | 132.40 | 135.87 | 135.34 | 137.18 | 136.99 | 136.50 | 135.87 | 134.08 | 132.52 | 132.37 |
| 05/10/02 | 134.77 | 134.65 | 134.50 | 132.40 | 135.67 | 135.30 | 137.10 | 136.90 | 136.40 | 135.67 | 133.95 | 137.20 | 137.20 |
| 10/22/02 | 134.89 | 134.72 | 134.66 | 132.49 | 135.90 | 135.51 | 137.04 | 137.17 | 136.57 | 135.89 | 134.18 | 132.56 | 132.35 |

| Date | MW-10 | MW-11 | MW-12 | MW-13 | RW-1 | RW-2 |
|---|---|---|---|---|---|---|
| 05/18/98 | 137.18 | -- | -- | -- | -- | -- |
| 03/23/99 | -- | 131.12 | -- | -- | -- | -- |
| 05/21/99 | -- | -- | -- | -- | 134.32 | -- |
| 05/25/99 | 137.04 | 130.91 | -- | -- | 134.24 | -- |
| 02/08/01 | 136.88 | 130.11 | -- | -- | 134.15 | 135.58 |
| 05/10/02 | 136.80 | 135.60 | 139.57 | 144.45 | 134.00 | 135.55 |
| 10/22/02 | 136.91 | 130.76 | 139.73 | 144.49 | 134.17 | 135.55 |

Notes: All measurements recorded in feet below top of well casing
1. *: Indicates shallow monitoring well

**Table 3: Summary of General Chemistry Analysis of Groundwater Samples from Monitoring Wells**
**Texaco Exploration and Production Inc., Cooper-Jal Unit South Water Station**
**NW/4, SE/4, Section 24, Township 24 South, Range 36 East**
**Lea County, New Mexico**



| Well Number | Sample Date | pH s.u. | Carbonate Alkalinity (mg/L) | Bicarbonate Alkalinity (mg/L) | Total Alkalinity (mg/L) | Specific Conductance (umhos/cm) | Chloride (mg/L) | Fluoride (mg/L) | Nitrate - N (mg/L) | Sulfate (mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | TDS (mg/L) | Hardness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **NMWQCC Standard** | | | | | | **250** | **1.60** | **10** | **600** | | | | | **1000** | |
| MW-1 | 09/16/97 | 7.1 | -- | -- | 280 | -- | 8,500 | -- | -- | 1,100 | 520.0 | 630.0 | 50.00 | 4,300 | 15,000 | 3,900 |
| | 02/25/98 | 7.4 | -- | -- | 280 | -- | 5,600 | -- | -- | 570 | 285.0 | 520.0 | 116.00 | 2,900 | 9,300 | 2,850 |
| | 02/14/01 | -- | <1.0 | 306 | 306 | 28000 | 11,000 | 4.4 | 7.7 | 1,000 | 374.0 | 780.0 | 236.00 | 5,236 | 20,000 | -- |
| | 05/17/02 | -- | <1.0 | 208 | 208 | -- | 237 | 5.83 | 3.28 | 86.9 | 45.7 | 20.1 | 11.90 | 184.0 | 784 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 168 | -- | -- | 96.8 | -- | -- | -- | -- | 696 | -- |
| MW-2 | 02/25/98 | 7.4 | -- | -- | 210 | -- | 5,900 | -- | -- | 760 | 840.0 | 380.0 | 30.00 | 2,650 | 9,400 | 3,660 |
| | 04/09/98 | 7.0 | -- | -- | 290 | -- | 8,200 | -- | -- | 990 | 1100 | 490.0 | 29.00 | 3,430 | 15,000 | 4,800 |
| | 02/14/01 | -- | <1.0 | 184 | 184 | 20,000 | 7,400 | 2.30 | 4.10 | 870 | 1025 | 488.0 | 48.50 | 3,189 | 15,000 | -- |
| | 05/17/02 | -- | <1.0 | 160 | 160 | -- | 3,200 | 1.72 | 3.18 | 483 | 587.0 | 239.0 | 35.60 | 1,160 | 6,040 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 2,920 | -- | -- | 451 | -- | -- | -- | -- | 6,770 | -- |
| MW-2A | 02/26/98 | 7.9 | -- | -- | 190 | -- | 280 | -- | -- | 330 | 144.0 | 36.0 | 5.70 | 215.0 | 1,200 | 508 |
| | 02/14/01 | -- | <1.0 | 162 | 162 | 630 | 44 | 1.30 | 2.30 | 76 | 64.4 | 16.7 | 7.02 | 45.5 | 390 | -- |
| | 05/15/02 | -- | <1.0 | 176 | 176 | -- | 36.6 | <1.0 | 2.34 | 79.1 | 57.6 | 13.9 | 4.35 | 43.8 | 435 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 44.3 | -- | -- | 97 | -- | -- | -- | -- | 425 | -- |
| MW-3 | 02/27/98 | 7.9 | -- | -- | 190 | -- | 452 | -- | -- | 406 | 200.0 | 50.0 | 11.00 | 237.0 | 1,500 | 705 |
| | 02/14/01 | -- | <1.0 | 158 | 158 | 640 | 34 | 1.60 | 2.40 | 100 | 54.5 | 19.0 | 7.61 | 48.6 | 440 | -- |
| | 05/17/02 | -- | <1.0 | 158 | 158 | -- | 30.6 | 1.56 | 2.35 | 102 | 55.6 | 18.4 | 5.04 | 50.0 | 433 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 35.4 | -- | -- | 104 | -- | -- | -- | -- | 419 | -- |
| MW-4 | 02/27/98 | 7.1 | -- | -- | 230 | -- | 12,000 | -- | -- | 1,300 | 1,700 | 880.0 | 48.00 | 5,300 | 22,000 | 7,870 |
| | 04/09/98 | 6.7 | -- | -- | 240 | -- | 13,000 | -- | -- | 1,500 | 1,740 | 840.0 | 42.00 | 5,400 | 23,000 | 7,800 |
| | 02/14/01 | -- | <1.0 | 232 | 232 | 38000 | 15,000 | 1.8 | 6.8 | 1,500 | -- | -- | -- | -- | 29,000 | -- |
| | 05/17/02 | -- | <1.0 | 232 | 232 | -- | 11,300 | 2.01 | 6.09 | 1,380 | 1,610 | 814.0 | 60.90 | 4,310 | 22,600 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 11,300 | -- | -- | 1,320 | -- | -- | -- | -- | 23,200 | -- |
| MW-4A | 02/27/98 | 7.6 | -- | -- | 180 | -- | 1,600 | -- | -- | 410 | 470.0 | 130.0 | 11.00 | 620.0 | 3,300 | 1,710 |
| | 02/14/01 | -- | <1.0 | 154 | 154 | 5200 | 1,600 | 1.4 | 2.8 | 210 | -- | -- | -- | -- | 4,000 | -- |
| | 05/15/02 | -- | <1.0 | 156 | 156 | -- | 577 | <1.0 | 2.23 | 121 | 200.0 | 49.5 | 10.30 | 125.0 | 1,610 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 478 | -- | -- | 114 | -- | -- | -- | -- | 1,430 | -- |
| MW-5 | 02/26/98 | 7.2 | -- | -- | 180 | -- | 6,600 | -- | -- | 910 | 1,400 | 470.0 | 31.00 | 2,400 | 12,000 | 5,430 |
| | 02/14/01 | -- | <1.0 | 166 | 166 | 21,000 | 7,700 | 1.8 | 4.1 | 910 | -- | -- | -- | -- | 18,000 | -- |
| | 05/17/02 | -- | <1.0 | 156 | 156 | -- | 4,040 | 1.53 | 4.56 | 586 | 757.0 | 319.0 | 60.90 | 1,260 | 8,340 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 50 | -- | -- | 94.8 | -- | -- | -- | -- | 422 | -- |
| MW-5A | 02/26/98 | 7.9 | -- | -- | 170 | -- | 190 | -- | -- | 180 | 107.0 | 23.0 | 3.50 | 117.0 | 740 | 362 |
| | 02/15/01 | -- | <1.0 | 164 | 164 | 1000 | 140 | 1.20 | 2.10 | 130 | 90.2 | 27.9 | 8.70 | 74.6 | 670 | -- |
| | 05/15/02 | -- | <1.0 | 182 | 182 | -- | 53.5 | <1.0 | 2.23 | 84.4 | 63.2 | 16.1 | 4.69 | 43.6 | 475 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 3,900 | -- | -- | 616 | -- | -- | -- | -- | 8,670 | -- |
| MW-6 | 02/26/98 | 7.7 | -- | -- | 200 | -- | 260 | -- | -- | 400 | 180.0 | 44.0 | 6.20 | 205.0 | 1,200 | 631 |
| | 02/14/01 | -- | <1.0 | 158 | 158 | 730 | 59 | 1.70 | 2.20 | 99 | 67.5 | 22.1 | 7.67 | 52.3 | 470 | -- |
| | 05/17/02 | -- | <1.0 | 162 | 162 | -- | 37.8 | 1.62 | 2.14 | 99.3 | 63.1 | 19.6 | 5.12 | 48.6 | 427 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 46.1 | -- | -- | 109 | -- | -- | -- | -- | 331 | -- |
| MW-7 | 05/14/98 | 7.5 | -- | -- | 230 | -- | 430 | -- | -- | 340 | 214.0 | 66.0 | 13.00 | 165.0 | 1,200 | 810 |
| | 02/14/01 | -- | <1.0 | 150 | 150 | 2,200 | 510 | 1.70 | 2.40 | 150 | -- | -- | -- | -- | 1,500 | -- |
| | 05/16/02 | -- | <1.0 | 150 | 150 | -- | 75.7 | 1.59 | 2.27 | 97.4 | 68.6 | 23.2 | 6.63 | 54.3 | 501 | -- |
| | 10/22/02 | -- | -- | -- | -- | -- | 88.6 | -- | -- | 109 | -- | -- | -- | -- | 490 | -- |

**Table 3: Summary of General Chemistry Analysis of Groundwater Samples from Monitoring Wells**
**Texaco Exploration and Production Inc., Cooper-Jal Unit South Water Station**
**NW/4, SE/4, Section 24, Township 24 South, Range 36 East**
**Lea County, New Mexico**



| Well Number | Sample Date | pH s.u. | Carbonate Alkalinity (mg/L) | Bicarbonate Alkalinity (mg/L) | Total Alkalinity (mg/L) | Specific Conductance (umhos/cm) | Chloride (mg/L) | Fluoride (mg/L) | Nitrate - N (mg/L) | Sulfate (mg/L) | Calcium (mg/L) | Magnesium (mg/L) | Potassium (mg/L) | Sodium (mg/L) | TDS (mg/L) | Hardness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NMWQCC Standard | | | | | | | 250 | 1.60 | 10 | 600 | | | | | 1000 | |
| MW-8 | 05/13/98 | 7.4 | -- | -- | 200 | -- | 270 | -- | -- | 390 | 190.0 | 60.0 | 12.00 | 170.0 | 1,200 | 720 |
| | 02/14/01 | -- | <1.0 | 156 | 156 | 690 | 49 | 1.8 | 2.5 | 100 | 59.9 | 21.5 | 7.84 | 52.9 | 400 | -- |
| | 05/16/02 | -- | <1.0 | 158 | 158 | -- | 32.9 | 1.57 | 2.33 | 101 | 56.6 | 19.2 | 5.20 | 49.5 | 432 | -- |
| | 10/22/02 | -- | -- | -- | -- | -- | 40.8 | -- | -- | 104 | -- | -- | -- | -- | 392 | -- |
| MW-9 | 05/14/98 | 7.6 | -- | -- | 190 | -- | 350 | -- | -- | 470 | 207.0 | 61.0 | 12.00 | 200.0 | 1,300 | 770 |
| | 02/15/01 | -- | <1.0 | 156 | 156 | 660 | 35 | 2.60 | 2.40 | 110 | 60.4 | 19.8 | 7.47 | 47.0 | 430 | -- |
| | 05/16/02 | -- | <1.0 | 160 | 160 | -- | 31.7 | 2.22 | 2.28 | 99.4 | 60.8 | 17.6 | 5.32 | 50.1 | 440 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 39 | -- | -- | 102 | -- | -- | -- | -- | 436 | -- |
| MW-9A | 05/14/98 | 7.3 | -- | -- | 280 | -- | 600 | -- | -- | 770 | 338.0 | 96.0 | 12.00 | 334.0 | 2,200 | 1,240 |
| | 02/15/01 | -- | <1.0 | 142 | 142 | 710 | 85 | 1.40 | 2.20 | 71 | 71.6 | 19.2 | 6.94 | 46.0 | 400 | -- |
| | 05/15/02 | -- | <1.0 | 136 | 136 | -- | 148 | <1.0 | 2.18 | 65.3 | 62.9 | 16.1 | 4.62 | 46.8 | 445 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 168 | -- | -- | 75.5 | -- | -- | -- | -- | 651 | -- |
| MW-10 | 05/14/98 | 7.3 | -- | -- | 240 | -- | 360 | -- | -- | 450 | 211.0 | 62.0 | 11.00 | 190.0 | 1,400 | 780 |
| | 02/15/01 | -- | <1.0 | 140 | 140 | 1100 | 190 | 2.0 | 2.30 | 97 | 108.0 | 32.3 | 8.20 | 61.0 | 660 | -- |
| | 05/17/02 | -- | <1.0 | 152 | 152 | -- | 204 | 1.93 | 2.19 | 99.1 | 109.0 | 31.7 | 7.60 | 62.4 | 713 | -- |
| | 10/22/02 | -- | -- | -- | -- | -- | 213 | -- | -- | 108 | -- | -- | -- | -- | 758 | -- |
| MW-11 | 01/22/99 | 10.6 | 30 | <1.0 | 30 | -- | 46 | 2.3 | 4.2 | 94 | 33.0 | 7.0 | 9.1 | 58.0 | 370 | 110 |
| | 02/15/01 | -- | <1.0 | 156 | 156 | 670 | 37 | 2.40 | 2.40 | 120 | 64.0 | 19.1 | 7.83 | 50.1 | 360 | -- |
| | 05/16/02 | -- | <1.0 | 160 | 160 | -- | 31.9 | 2.13 | 2.33 | 98.8 | 63.5 | 17.2 | 4.83 | 47.0 | 444 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 37.2 | -- | -- | 102 | -- | -- | -- | -- | 447 | -- |
| MW-12 | 05/15/02 | -- | <1.0 | 160 | 160 | -- | 58.3 | 1.09 | 2.44 | 91.3 | 53.5 | 15.9 | 5.52 | 50.3 | 462 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 65 | -- | -- | 102 | -- | -- | -- | -- | 477 | -- |
| MW-13 | 05/13/02 | -- | <1.0 | 100 | 100 | -- | 517 | <1 | 1.61 | 437 | 116.0 | 76.0 | 19.40 | 269.0 | 1,596 | -- |
| | 10/23/02 | -- | -- | -- | -- | -- | 549 | -- | -- | 370 | -- | -- | -- | -- | 1,740 | -- |
| RW-1 | 05/27/99 | 6.9 | 0 | 224 | 224 | -- | 8,700 | 2.70 | 7.0 | 840 | 679.0 | 521.0 | 34.00 | 3290 | 14,000 | 2,145 |
| Duplicate | 02/14/01 | -- | <1.0 | 160 | 160 | 640 | 33 | 1.5 | 2.5 | 100 | 55.9 | 19.0 | 7.74 | 49.2 | 490 | -- |
| (MW-3) | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Duplicate | 02/15/01 | -- | <1.0 | 150 | 150 | 680 | 37 | 2.40 | 2.40 | 120 | 64.1 | 19.3 | 7.75 | 49.1 | 460 | -- |
| (MW-11) | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Duplicate | 10/22/02 | -- | -- | -- | -- | -- | 222 | -- | -- | 107 | -- | -- | -- | -- | 802 | -- |
| ( ) | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Duplicate | 10/23/02 | -- | -- | -- | -- | -- | 62 | -- | -- | 99.2 | -- | -- | -- | -- | 439 | -- |
| (MW-12) | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

Notes:

1. s.u.: Standard Units
2. mg/L: milligrams per liter
3. umhos/cm: millimhos per centimeter
4. New Mexico Water Quality Control Standards

# FIGURES

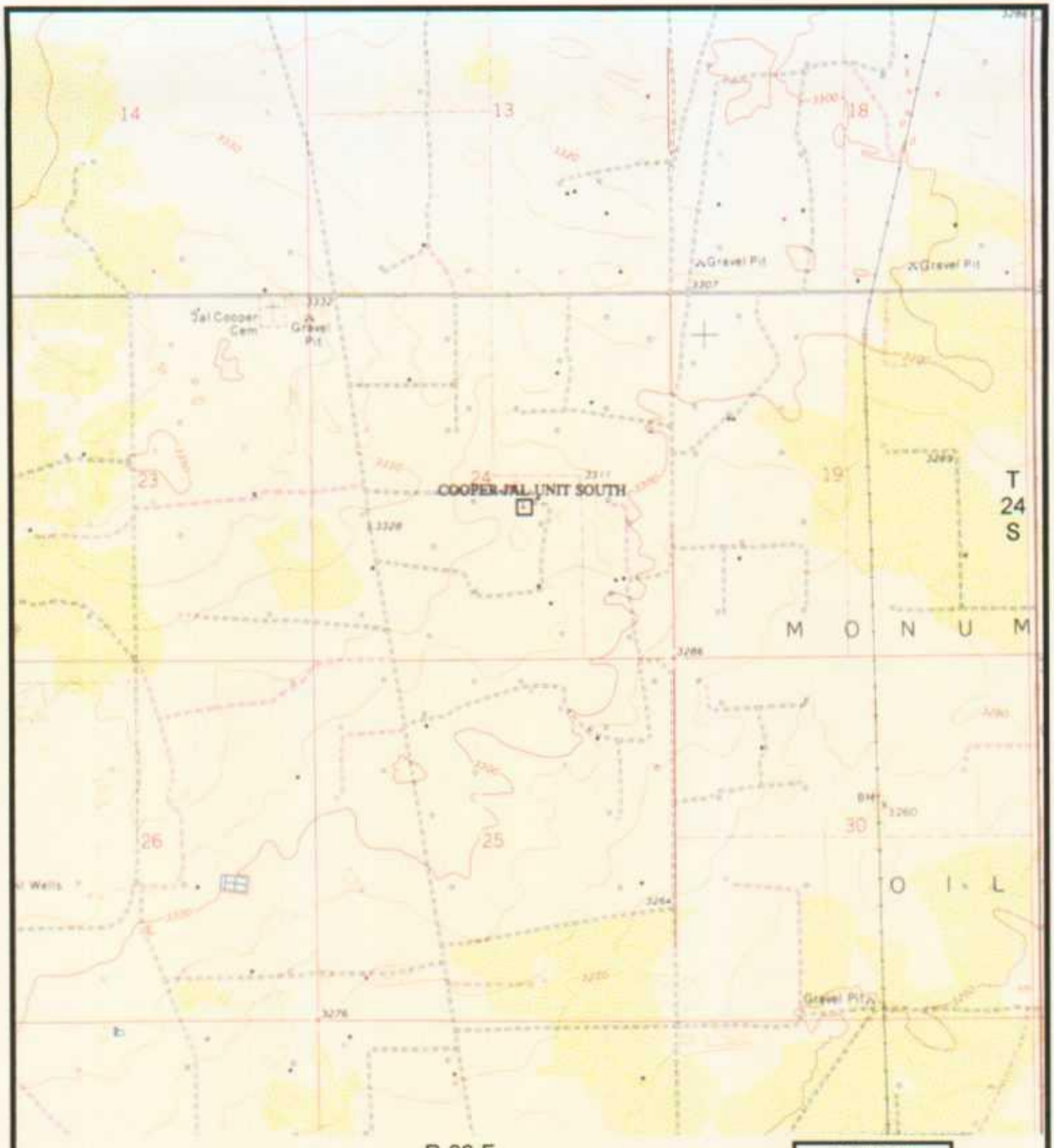



FIGURE #1

LEA COUNTY, NEW MEXICO

# TEXACO EXPLORATION and PRODUCTION, INC.

**COOPER-JAL SOUTH WATER STATION and TANK BATTERY**

NW/4, SE/4, SECTION 24, T24S, R36E

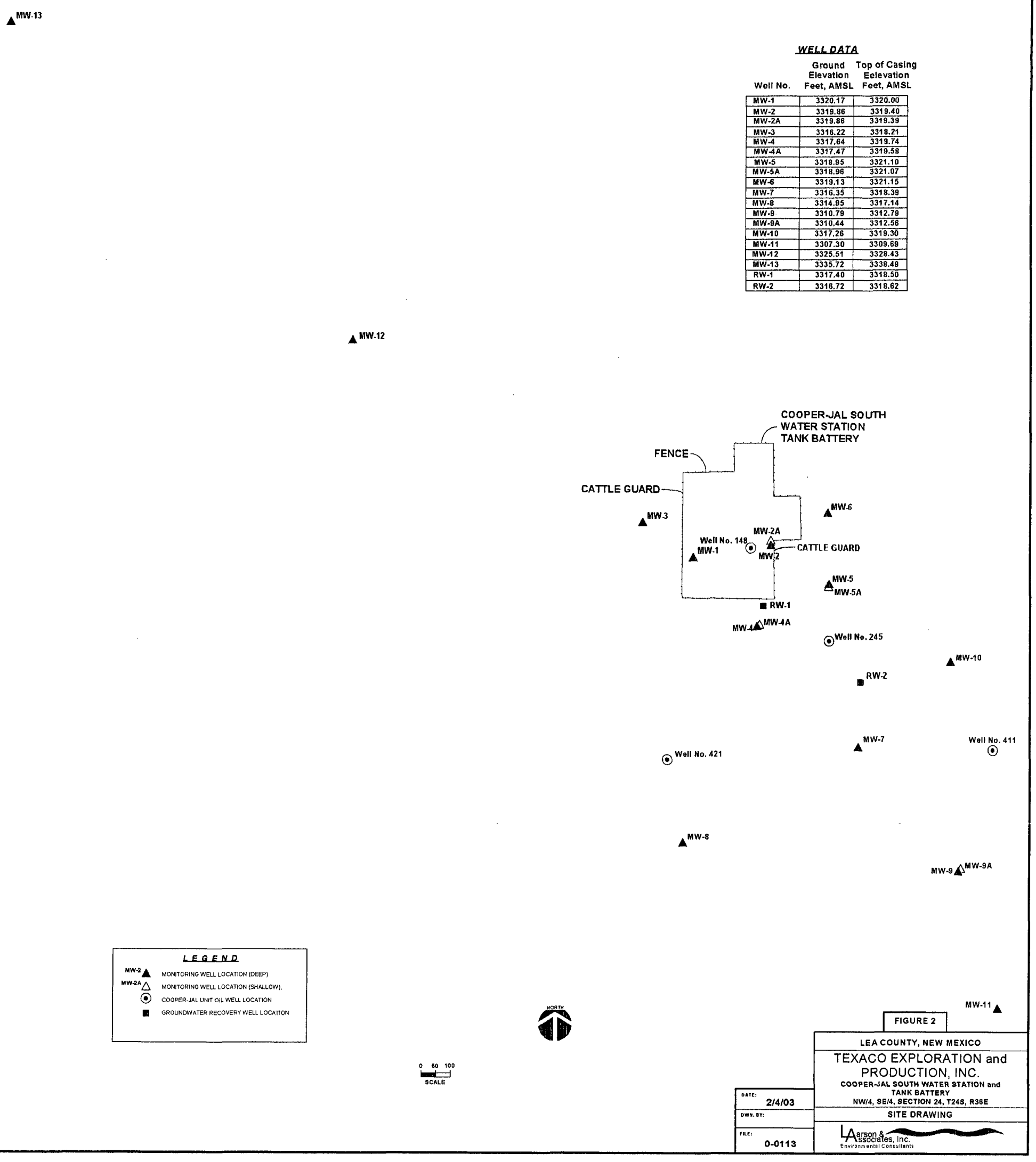
TOPOGRAPHIC MAP

DATE: 2/04/03

NAME:

FILE: 0-0113

Larson & Associates, Inc.
Environmental Consultants




***WELL DATA***

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

***LEGEND***

- MW-2 ▲ MONITORING WELL LOCATION (DEEP)
- MW-2A △ MONITORING WELL LOCATION (SHALLOW),
- ⊙ COOPER-JAL UNIT OIL WELL LOCATION
- ■ GROUNDWATER RECOVERY WELL LOCATION

**FIGURE 2**

**LEA COUNTY, NEW MEXICO**

TEXACO EXPLORATION and PRODUCTION, INC.

**COOPER-JAL SOUTH WATER STATION and TANK BATTERY**

**NW/4, SE/4, SECTION 24, T24S, R36E**

**SITE DRAWING**

DATE: 2/4/03

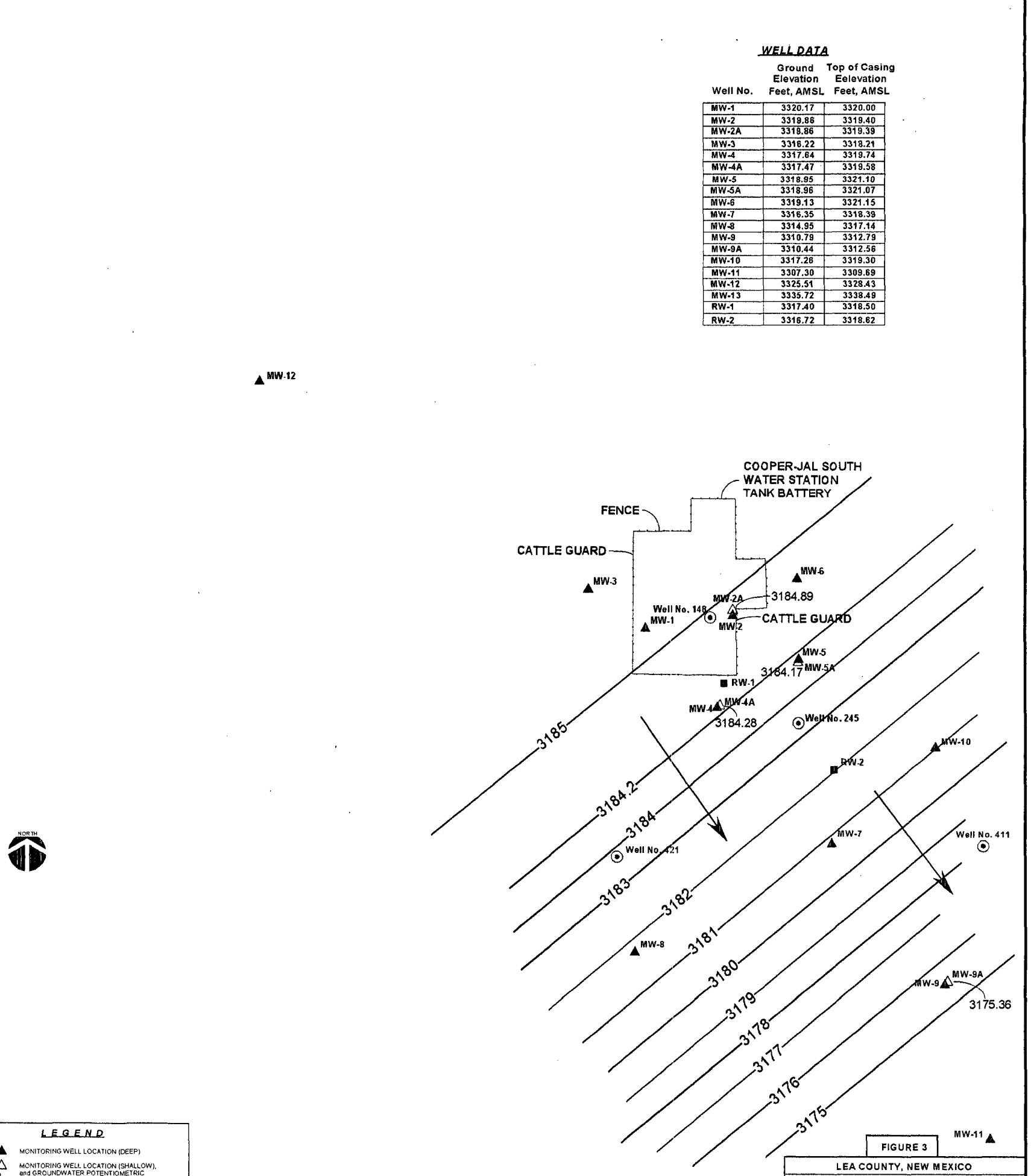
DWN. BY:

FILE: 0-0113

Larson & Associates, Inc.
Environmental Consultants

## WELL DATA

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |




### LEGEND

- MW-2 ▲ MONITORING WELL LOCATION (DEEP)
- MW-2A △ 3184.89 MONITORING WELL LOCATION (SHALLOW), and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 5/10/02
- ⊙ COOPER-JAL UNIT OIL WELL LOCATION
- ■ GROUNDWATER RECOVERY WELL LOCATION
- ~3184~ CONTOUR of GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION FEET AMSL, 5/10/02
- → GROUNDWATER FLOW DIRECTION

0 50 100
SCALE

FIGURE 3

LEA COUNTY, NEW MEXICO

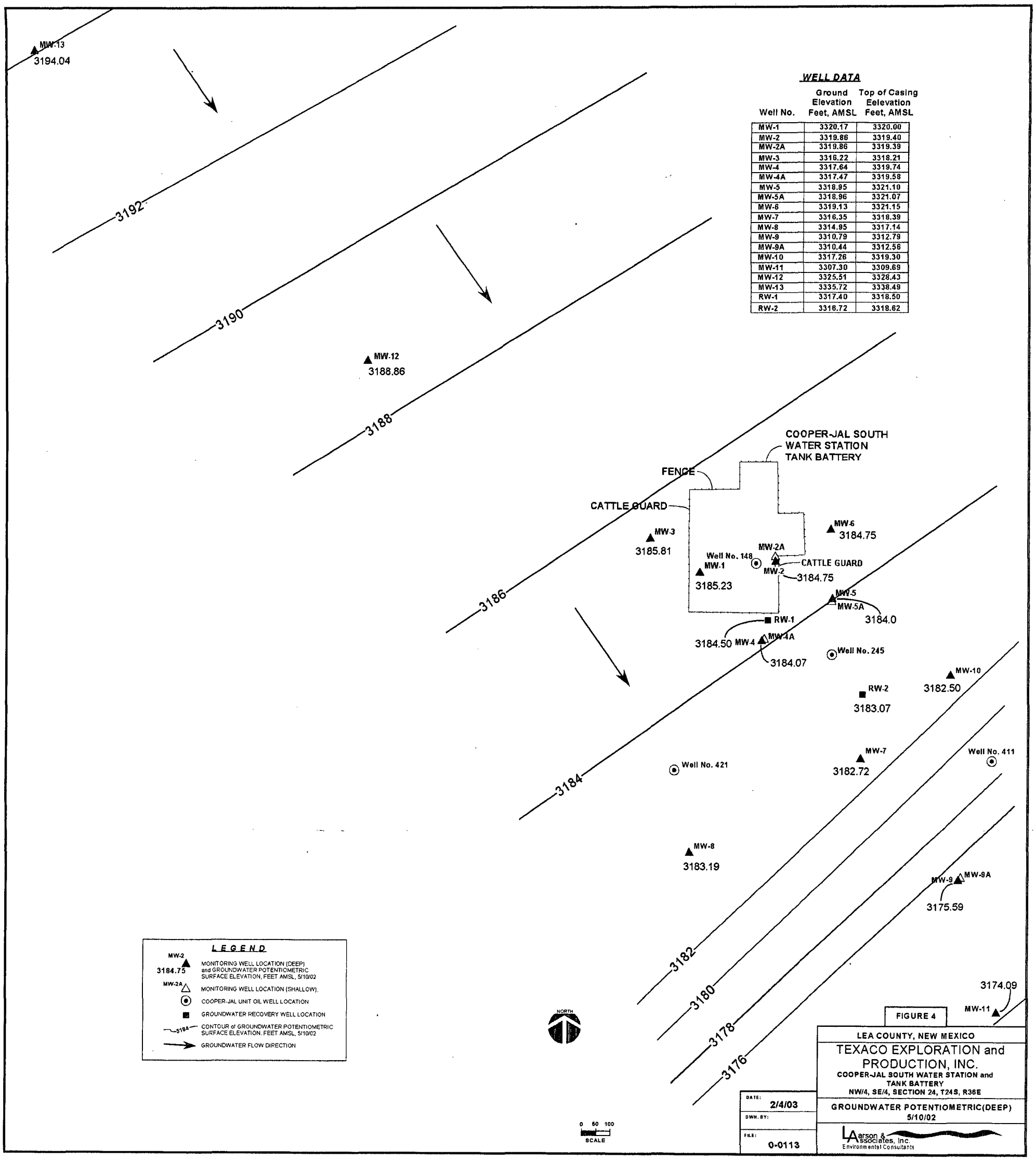
# TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY
NW/4, SE/4, SECTION 24, T24S, R36E

GROUNDWATER POTENTIOMETRIC (SHALLOW)
5/10/02

DATE: 2/4/03
DWN. BY:
FILE: 0-0113

LAarson & Associates, Inc.
Environmental Consultants




***WELL DATA***

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

***LEGEND***

MW-2 3184.75 — MONITORING WELL LOCATION (DEEP) and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 5/10/02

MW-2A — MONITORING WELL LOCATION (SHALLOW).

COOPER-JAL UNIT OIL WELL LOCATION

GROUNDWATER RECOVERY WELL LOCATION

3184 — CONTOUR of GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 5/10/02

GROUNDWATER FLOW DIRECTION

**FIGURE 4**

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY

NW/4, SE/4, SECTION 24, T24S, R36E

GROUNDWATER POTENTIOMETRIC(DEEP) 5/10/02

DATE: 2/4/03

DWN. BY:

FILE: 0-0113

Larson & Associates, Inc. Environmental Consultants

**WELL DATA**

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

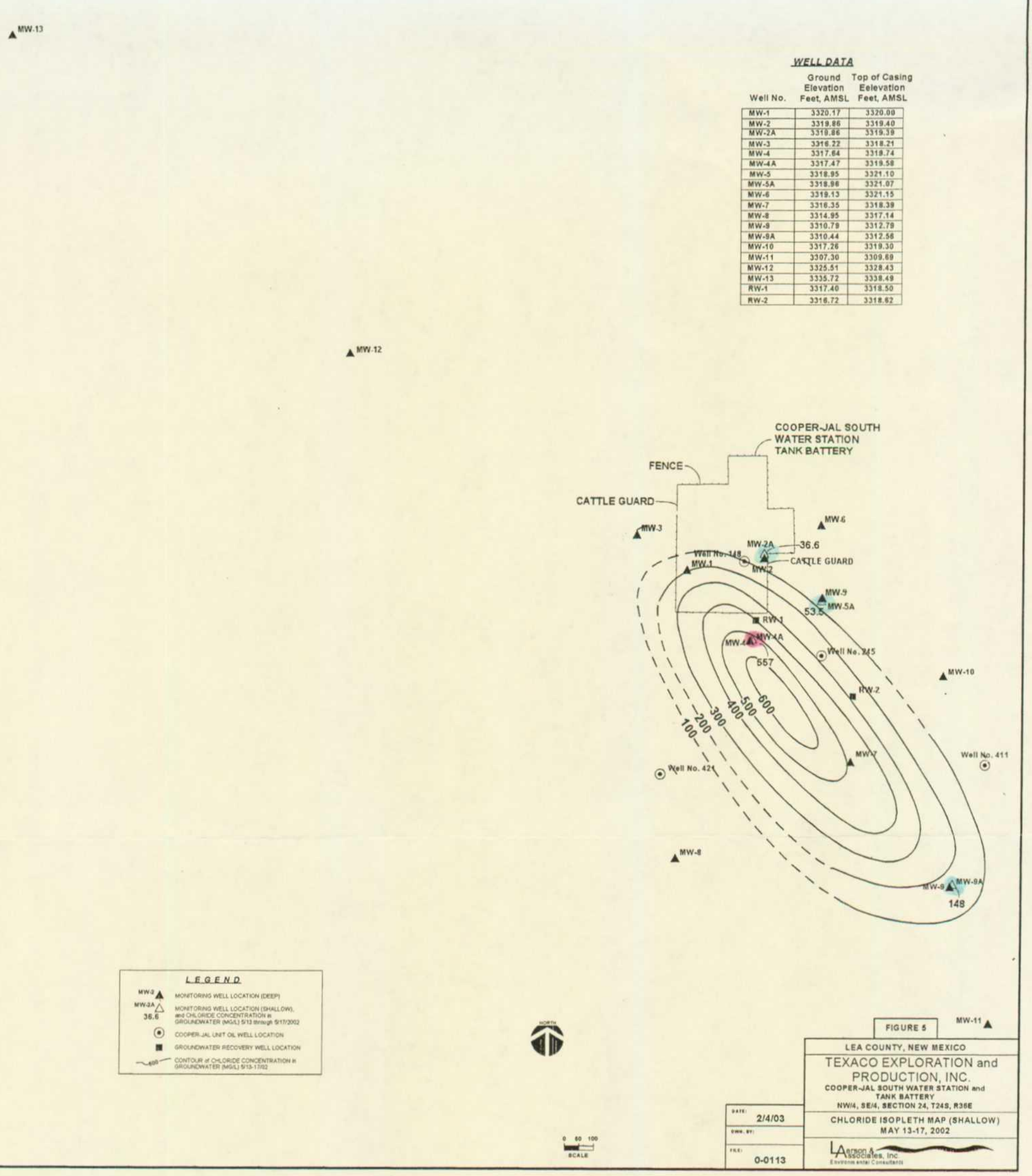



FIGURE 5

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY

NW/4, SE/4, SECTION 24, T24S, R36E

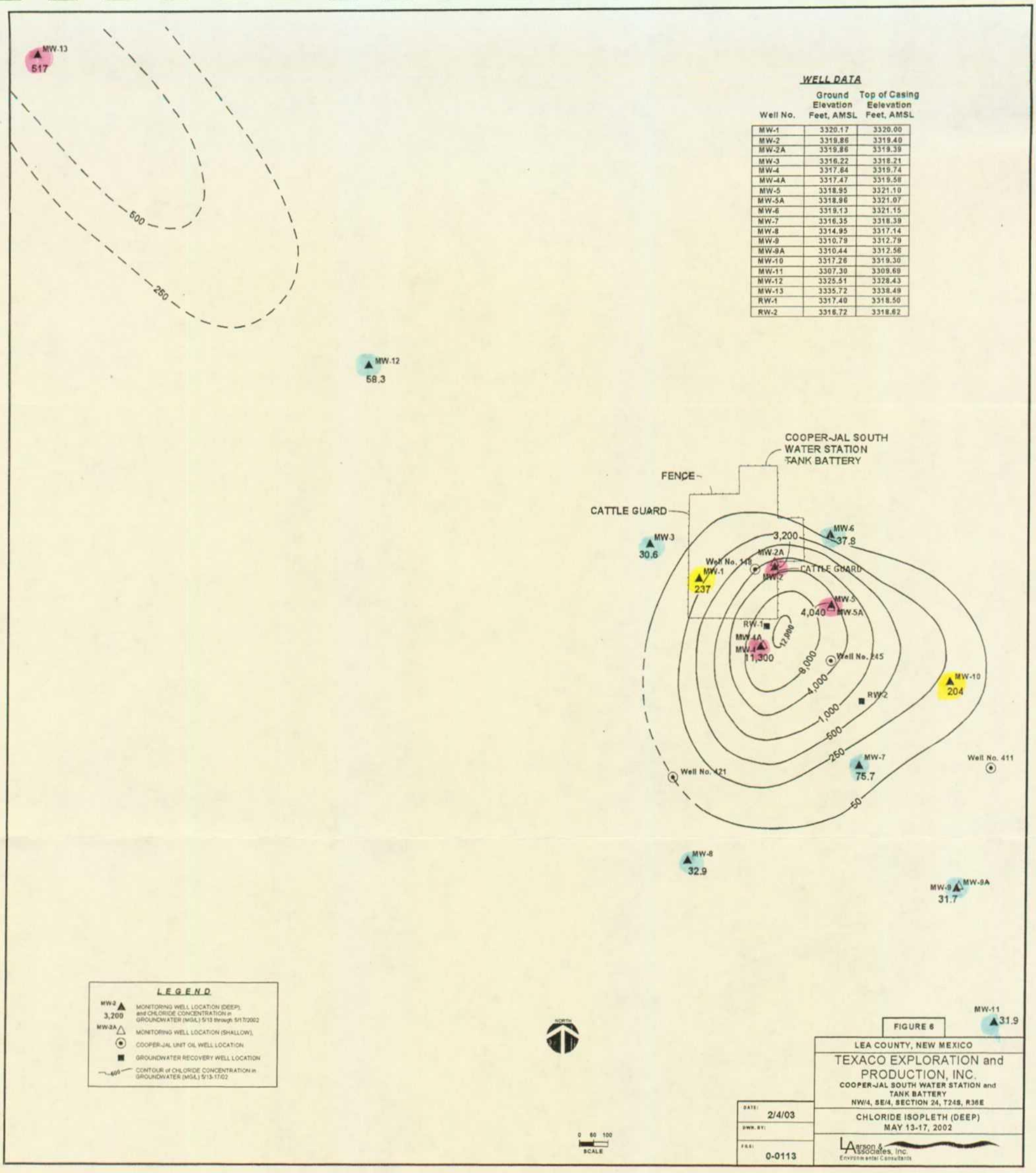
CHLORIDE ISOPLETH MAP (SHALLOW)
MAY 13-17, 2002

DATE: 2/4/03

DWN. BY:

FILE: 0-0113

Larson & Associates, Inc.
Environmental Consultants




**WELL DATA**

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

**LEGEND**

- MW-2 ▲ 3,200 — MONITORING WELL LOCATION (DEEP), and CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 5/13 through 5/17/2002
- MW-3A △ — MONITORING WELL LOCATION (SHALLOW),
- ⊙ — COOPER-JAL UNIT OIL WELL LOCATION
- ■ — GROUNDWATER RECOVERY WELL LOCATION
- 400 — CONTOUR of CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 5/13-17/02

FIGURE 6

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY

NW/4, SE/4, SECTION 24, T24S, R36E

CHLORIDE ISOPLETH (DEEP)
MAY 13-17, 2002

DATE: 2/4/03
DWN. BY:
FILE: 0-0113

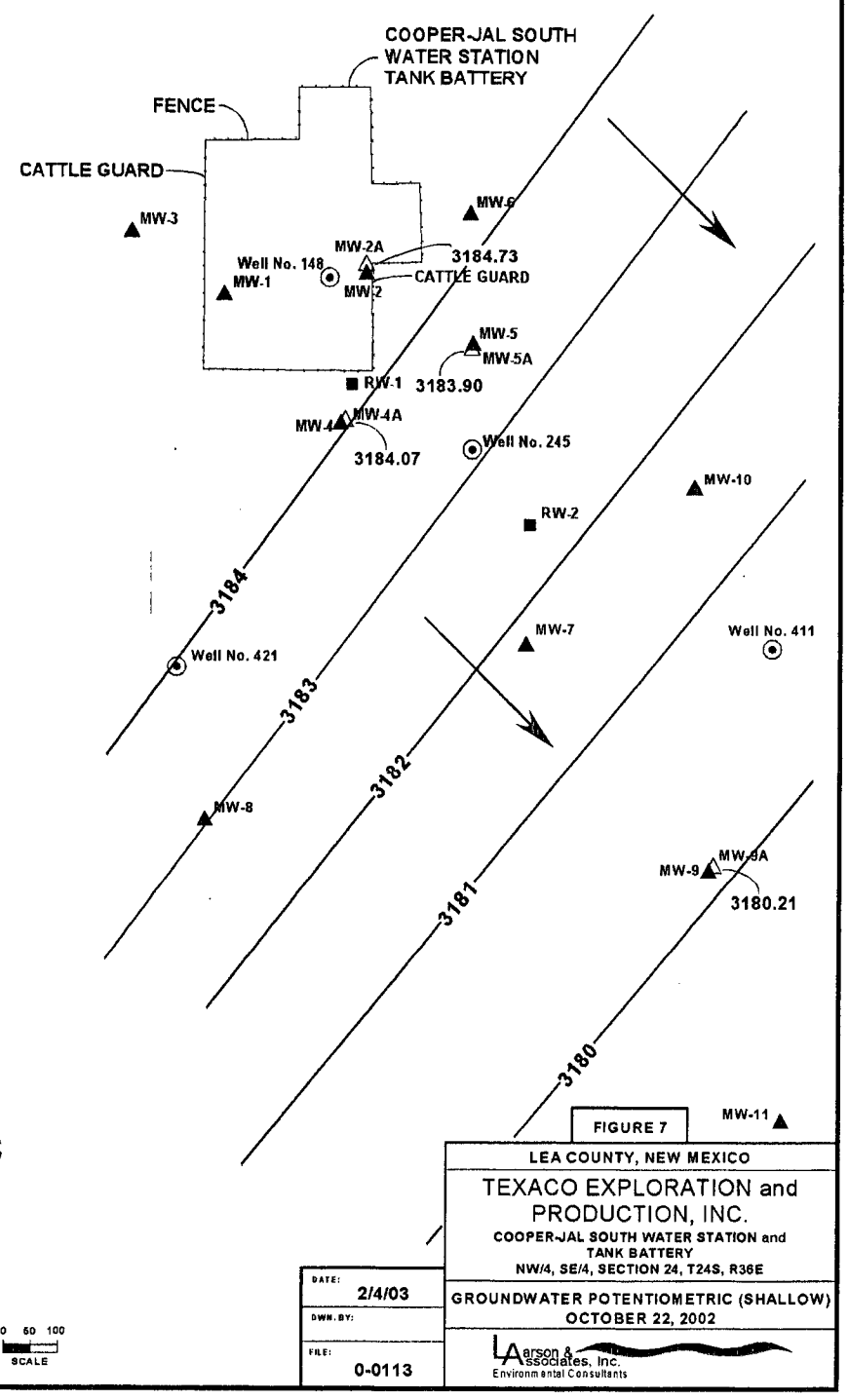
Larson & Associates, Inc.
Environmental Consultants

MW-13

MW-12

***WELL DATA***

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |




***LEGEND***

- MW-2 ▲ MONITORING WELL LOCATION (DEEP)
- MW-2A △ MONITORING WELL LOCATION (SHALLOW), and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 10/22/02 — 3184.89
- ⊙ COOPER-JAL UNIT OIL WELL LOCATION
- ■ GROUNDWATER RECOVERY WELL LOCATION
- 3184 CONTOUR of GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 10/22/02
- → GROUNDWATER FLOW DIRECTION

**FIGURE 7**

LEA COUNTY, NEW MEXICO

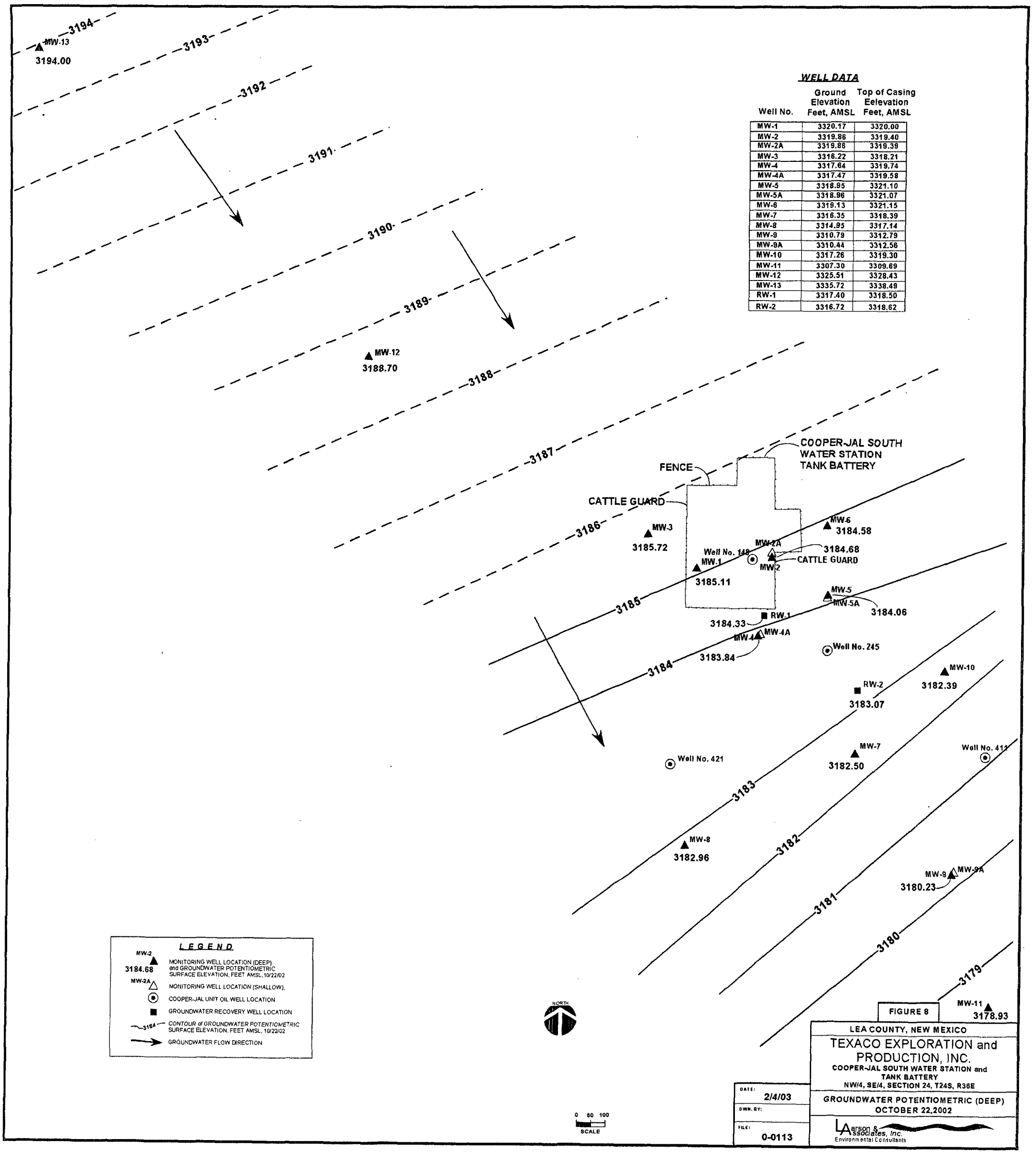
# TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY
NW/4, SE/4, SECTION 24, T24S, R36E

GROUNDWATER POTENTIOMETRIC (SHALLOW)
OCTOBER 22, 2002

DATE: 2/4/03
DWN. BY:
FILE: 0-0113

LA Larson & Associates, Inc.
Environmental Consultants




***WELL DATA***

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.88 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.39 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.30 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

***LEGEND***

MW-2 3184.68 — MONITORING WELL LOCATION (DEEP) and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 10/22/02

MW-2A — MONITORING WELL LOCATION (SHALLOW).

COOPER-JAL UNIT OIL WELL LOCATION

GROUNDWATER RECOVERY WELL LOCATION

3184 — CONTOUR of GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION. FEET AMSL, 10/22/02

GROUNDWATER FLOW DIRECTION

**FIGURE 8**

LEA COUNTY, NEW MEXICO

# TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY

NW/4, SE/4, SECTION 24, T24S, R36E

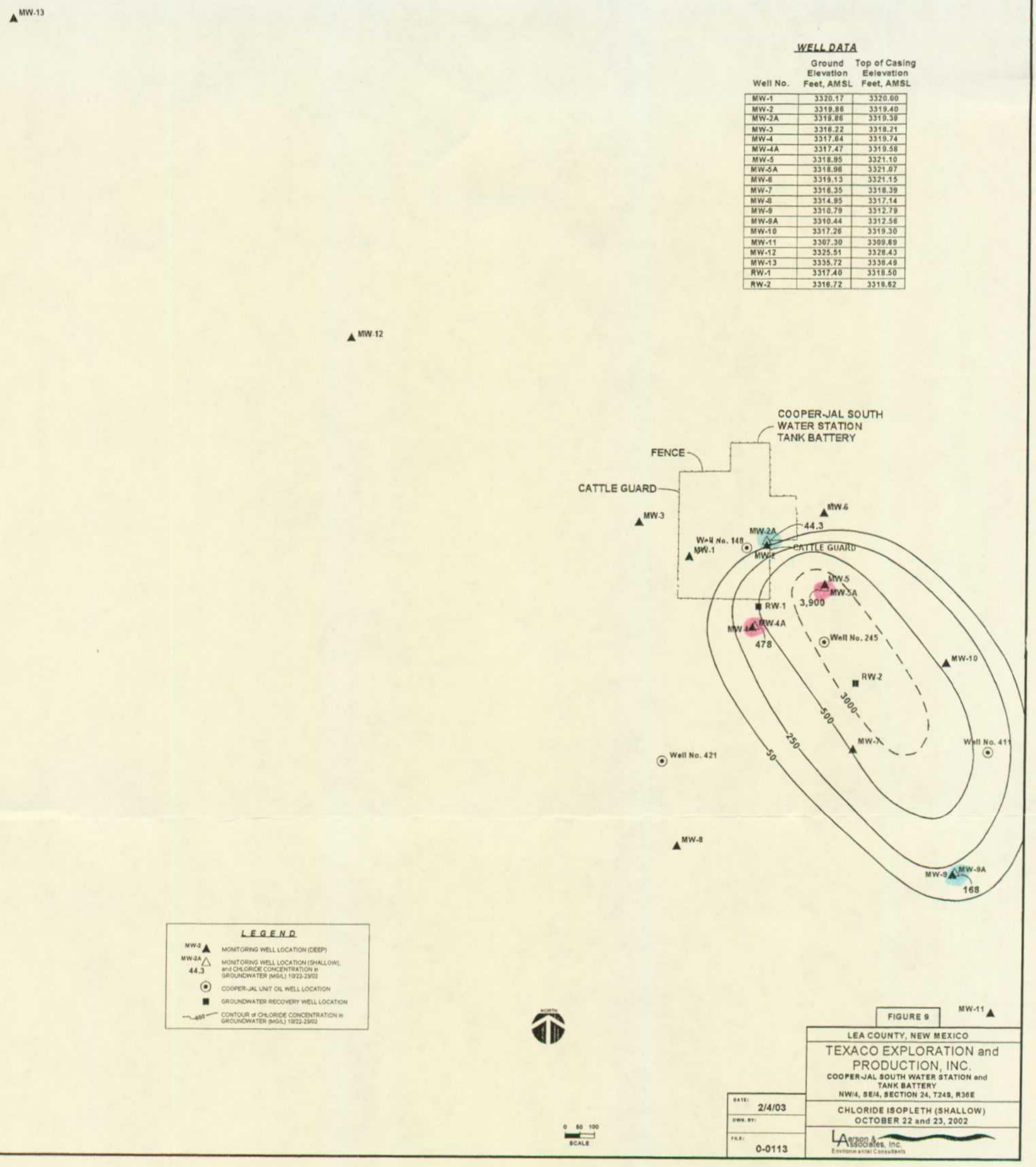
GROUNDWATER POTENTIOMETRIC (DEEP)
OCTOBER 22,2002

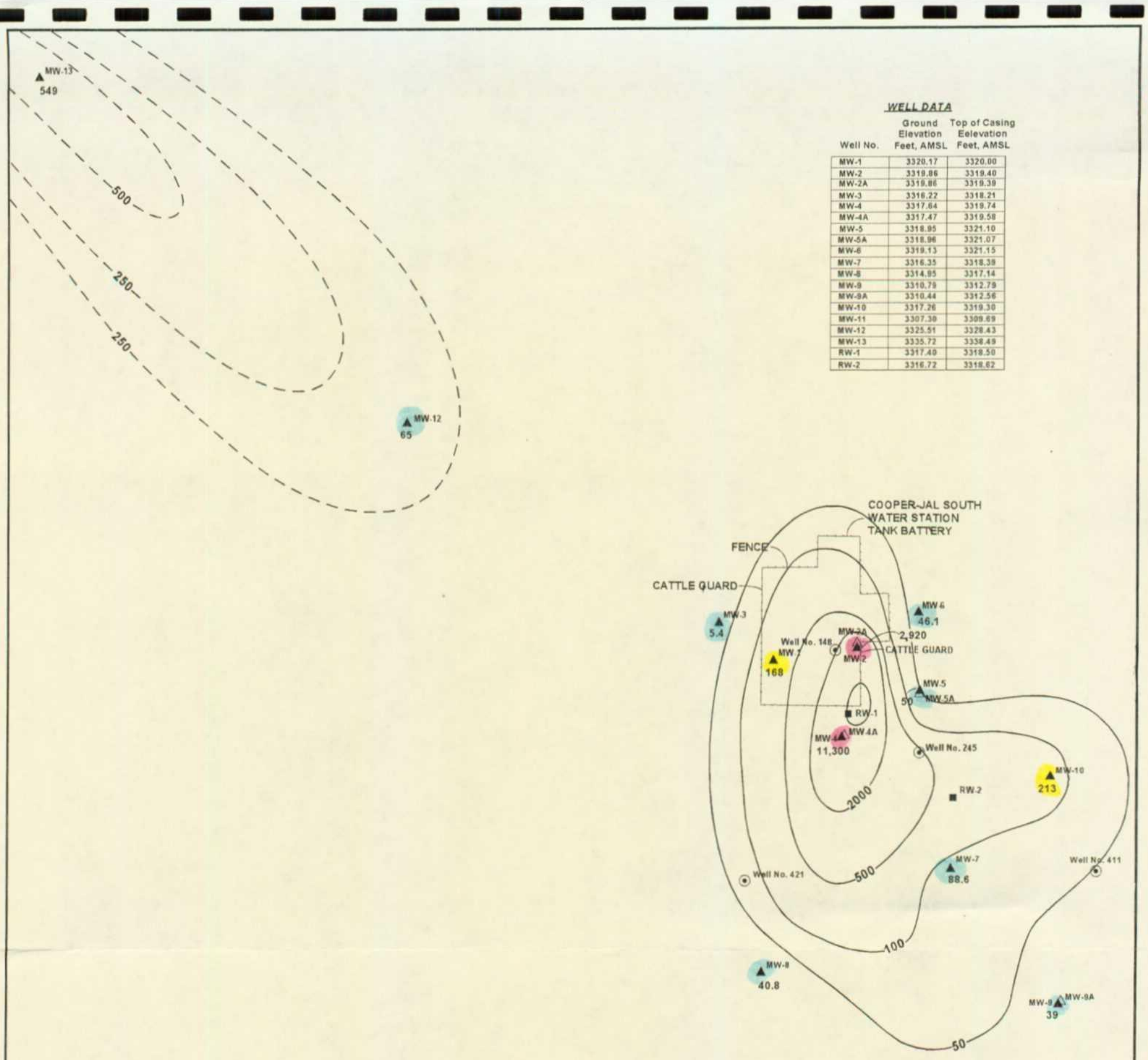
DATE: 2/4/03

DWN. BY:

FILE: 0-0113

Larson & Associates, Inc.
Environmental Consultants


MW-13
MW-12
MW-11
WELL DATA
Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL
MW-1 | 3320.17 | 3320.00
MW-2 | 3319.86 | 3319.40
MW-2A | 3319.86 | 3319.39
MW-3 | 3316.22 | 3318.21
MW-4 | 3317.64 | 3319.74
MW-4A | 3317.47 | 3319.58
MW-5 | 3318.95 | 3321.10
MW-5A | 3318.96 | 3321.07
MW-6 | 3319.13 | 3321.15
MW-7 | 3316.35 | 3318.39
MW-8 | 3314.95 | 3317.14
MW-9 | 3310.79 | 3312.79
MW-9A | 3310.44 | 3312.56
MW-10 | 3317.26 | 3319.30
MW-11 | 3307.30 | 3309.69
MW-12 | 3325.51 | 3328.43
MW-13 | 3335.72 | 3338.49
RW-1 | 3317.40 | 3318.50
RW-2 | 3316.72 | 3318.62
COOPER-JAL SOUTH WATER STATION TANK BATTERY
FENCE
CATTLE GUARD
CATTLE GUARD
Well No. 148
Well No. 245
Well No. 421
Well No. 411
44.3
3,900
478
168
3000
500
250
50
RW-1
RW-2
LEGEND
MONITORING WELL LOCATION (DEEP)
MONITORING WELL LOCATION (SHALLOW), and CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 10/22-23/02
COOPER-JAL UNIT OIL WELL LOCATION
GROUNDWATER RECOVERY WELL LOCATION
CONTOUR of CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 10/22-23/02
NORTH
0 50 100
SCALE
FIGURE 9
LEA COUNTY, NEW MEXICO
TEXACO EXPLORATION and PRODUCTION, INC.
COOPER-JAL SOUTH WATER STATION and TANK BATTERY
NW/4, SE/4, SECTION 24, T24S, R36E
CHLORIDE ISOPLETH (SHALLOW)
OCTOBER 22 and 23, 2002
DATE: 2/4/03
DWN. BY:
FILE: 0-0113
Larson & Associates, Inc.
Environmental Consultants




## WELL DATA

| Well No. | Ground Elevation Feet, AMSL | Top of Casing Eelevation Feet, AMSL |
|---|---|---|
| MW-1 | 3320.17 | 3320.00 |
| MW-2 | 3319.86 | 3319.40 |
| MW-2A | 3319.86 | 3319.39 |
| MW-3 | 3316.22 | 3318.21 |
| MW-4 | 3317.64 | 3319.74 |
| MW-4A | 3317.47 | 3319.58 |
| MW-5 | 3318.95 | 3321.10 |
| MW-5A | 3318.96 | 3321.07 |
| MW-6 | 3319.13 | 3321.15 |
| MW-7 | 3316.35 | 3318.38 |
| MW-8 | 3314.95 | 3317.14 |
| MW-9 | 3310.79 | 3312.79 |
| MW-9A | 3310.44 | 3312.56 |
| MW-10 | 3317.26 | 3319.30 |
| MW-11 | 3307.38 | 3309.69 |
| MW-12 | 3325.51 | 3328.43 |
| MW-13 | 3335.72 | 3338.49 |
| RW-1 | 3317.40 | 3318.50 |
| RW-2 | 3316.72 | 3318.62 |

## LEGEND

- MW-2 / 2,920 — MONITORING WELL LOCATION (DEEP) and CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 10/22-23/02
- MW-2A — MONITORING WELL LOCATION (SHALLOW)
- COOPER-JAL UNIT OIL WELL LOCATION
- GROUNDWATER RECOVERY WELL LOCATION
- 600 — CONTOUR of CHLORIDE CONCENTRATION in GROUNDWATER (MG/L) 10/22-23/02

NORTH

0 50 100
SCALE

FIGURE 10

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION, INC.

COOPER-JAL SOUTH WATER STATION and TANK BATTERY

NW/4, SE/4, SECTION 24, T24S, R36E

CHLORIDE ISOPLETH (DEEP)

OCTOBER 22 and 23, 2002

DATE: 2/4/03

DWG. #:

F&S: 0-0113

Larson & Associates, Inc.
Environmental Consultants

# APPENDIX A

# NMOCD Correspondence

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

September 17, 1998

**CERTIFIED MAIL**
**RETURN RECEIPT NO. Z-274-520-559**

Mr. Rodney Bailey
Texaco E&P Inc.
205 E. Bender
Hobbs, New Mexico 88240

**RE: COOPER-JAL UNIT**
**LEA COUNTY, NEW MEXICO**

Dear Mr. Bailey:

The New Mexico Oil Conservation Division (OCD) has reviewed Texaco Exploration & Development's (Texaco) June 12, 1998 "SUBSURFACE ENVIRONMENTAL ASSESSMENT REPORT, TEXACO EXPLORATION AND PRODUCTION, INC., COOPER-JAL UNIT SOUTH INJECTION STATION, LEA COUNTY, NEW MEXICO". This document which was submitted on behalf of Texaco by their consultant Highlander Environmental Corp. contains the results of Texaco's investigation of the extent of ground water contamination related to an unlined emergency pit at the Cooper-Jal Unit South Injection Station located in Unit J, Section 24, T24S, R36E NMPM, Lea County, New Mexico. The document also contains Texaco's recommended ground water remediation plan.

The investigation work conducted to date is satisfactory and the remediation recommendations are approved with the following conditions:

1. Texaco will submit a work plan to complete the definition of the extent of ground water contamination which is in excess of New Mexico Water Quality Control Commission standards.

2. Texaco will notify the OCD at least 1 week in advance of all scheduled activities such that the OCD has the opportunity to witness the events and split samples.

Please be advised that OCD approval does not relieve Texaco of liability should the investigation actions fail to adequately define the extent of contamination related to Texaco's activities, or if contamination exists which is outside the scope of the work plan. In addition, OCD approval does not relieve Texaco of responsibility for compliance with any other federal, state or local laws and regulations.

Apt.-5 B

If you have any questions, please contact me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Wayne Price, OCD Hobbs Office
Mark J. Larson, Highlander Environmental Corp.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

February 2, 1999

**CERTIFIED MAIL**
**RETURN RECEIPT NO. Z-274-520-612**

Mr. Rodney Bailey
Texaco E&P Inc.
205 E. Bender
Hobbs, New Mexico 88240

**RE: COOPER-JAL UNIT**
**LEA COUNTY, NEW MEXICO**

Dear Mr. Bailey:

The New Mexico Oil Conservation Division (OCD) has reviewed Texaco Exploration & Development's (Texaco) November 18, 1998 "WORK PLAN FOR PLUME DELINEATION AND MODIFICATION TO PROPOSED GROUNDWATER MONITORING SCHEDULE, TEXACO EXPLORATION AND PRODUCTION, INC., COOPER-JAL UNIT SOUTH INJECTION STATION, LEA COUNTY, NEW MEXICO". This document which was submitted on behalf of Texaco by their consultant Highlander Environmental Corp. contains the Texaco's proposed work plan for additional investigation of the extent of ground water contamination related to an unlined emergency pit at the Cooper-Jal Unit South Injection Station located in Unit J, Section 24, T24S, R36E NMPM, Lea County, New Mexico. The document also contains Texaco's proposed modifications to the site ground water monitoring plan.

The above referenced investigation work plan and proposed ground water monitoring plan modifications are **approved** with the following conditions:

1. Texaco will complete the new monitor wells as follows:

    a. An appropriately sized gravel pack will be set in the annulus around the well screen from the bottom of the hole to 2-3 feet above the top of the well screen.

b. A 2-3 foot bentonite plug will be placed above the gravel pack.

c. The remainder of the hole will be grouted to the surface with cement containing 3-5% bentonite.

d. A concrete pad and locking well cover will be placed at the surface.

e. The well will be developed after construction using EPA approved procedures.

2. No less than 48 hours after the wells are developed, ground water from all monitor wells at each site will be purged, sampled and analyzed for concentrations of major cations and anions, total dissolved solids (TDS) EPA approved methods and quality assurance/quality control (QA/QC).

3 All wastes generated during the investigation will be disposed of at an OCD approved facility.

4. Texaco will submit the results of the additional investigations to the OCD in the annual report. The report will include the following investigative information:

a. A description of the investigation activities which occurred including conclusions and recommendations.

b. A geologic/lithologic log and well completion diagram for each monitor well.

c. A water table map showing the location of the pit, monitor wells, recovery wells and any other pertinent site features as well as the direction and magnitude of the hydraulic gradient created using the water table elevation from each monitor well.

d. Summary tables of all past and present ground water quality sampling results and copies of all recent laboratory analytical data sheets and associated QA/QC data.

e. The disposition of all wastes generated.

Please be advised that OCD approval does not relieve Texaco of liability should the investigation actions fail to adequately define the extent of contamination related to Texaco's activities, or if contamination exists which is outside the scope of the work plan. In addition, OCD approval does not relieve Texaco of responsibility for compliance with any other federal, state or local laws and regulations.

If you have any questions, please contact me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Office
Mark J. Larson, Highlander Environmental Corp.

# APPENDIX B

## Boring Logs and Well Construction Records

***Client:*** Texaco Exploration and Production, Inc.

***Project:*** Cooper-Jal Unit Injection Station

***Project No:*** 0-0113

***Location:*** Lea County, New Mexico

# *Log: MW-11*

***Geologist:*** Mark J. Larson



| SUBSURFACE PROFILE | | | | SAMPLE | | | PID Measurement (PPM) 10 30 50 | Well Detail | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Symbol | Description | Elev. | Number | Type | Recovery | | | Well Secured with Locking Above-Grade Cover |
| 5 | | ***Silty Sand*** 7.5 YR 4/6 to 5/6, strong brown, very fine grained quartz sand, poorly sorted. | 3305 | | | | | | |
| 10 | | | 3297 | | | | | | |
| 15 | | ***Caliche*** 10 YR 7/3 to 7/4, very pale brown, sandy, very fine grained quartz sand, moderately hard. | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |
| 45 | | ***Sand*** 5 YR 6/6 to 7/4, reddish yellow to pink, very fine to fine grained quartz sand, moderately sorted, round. Interbedded with thin units of weakly cemented sandstone from 20 to 30'. Sandstone below 30' is weakly cemented. | | | | | | | |
| 50 | | | | | | | | | |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |
| 80 | | | | | | | | | |
| 85 | | | | | | | | | |
| 90 | | | | | | | | | |
| 95 | | | | | | | | | |
| 100 | | | | | | | | | |
| 105 | | | | | | | | | |
| 110 | | | | | | | | | |
| 115 | | | | | | | | | |
| 120 | | | | | | | | | |
| 125 | | | | | | | | | |
| 130 | | | | | | | | | |
| 135 | | | | | | | | | |
| 140 | | | | | | | | | |
| 145 | | | | | | | | | |
| 150 | | | | | | | | | |
| 155 | | | | | | | | | |
| 160 | | | | | | | | | |
| 165 | | ***TD: 165'*** | 3145 | | | | | | |
| 170 | | | | | | | | | |
| 175 | | | | | | | | | |
| 180 | | | | | | | | | |
| 185 | | | | | | | | | |
| 190 | | | | | | | | | |
| 195 | | | | | | | | | |
| 200 | | | | | | | | | |

1 to 116' bgs: cement-bentonite grout

0 - 125' bgs: 4" Sch. 40 PVC Riser (Threaded)

116 to 120': bentonite chips

W. L. 131.12' btoc (3/23/99)

125 to 140' bgs: 4" Sch. 40 PVC Screen, 0.020 slot

120 to 140' bgs: 8/16 graded silica sand

4" Sch. 40 PVC Cap (Threaded)

Drilling Method: Air Rotary

Date Drilled: Jan. 18 and 19, 1999

Well Size: 4"

TOC Elevation: 3309.69

Checked by: CKC

Drilled by: Scarborough Drilling

**Project No:** 996

## *Well ID: RW-1*

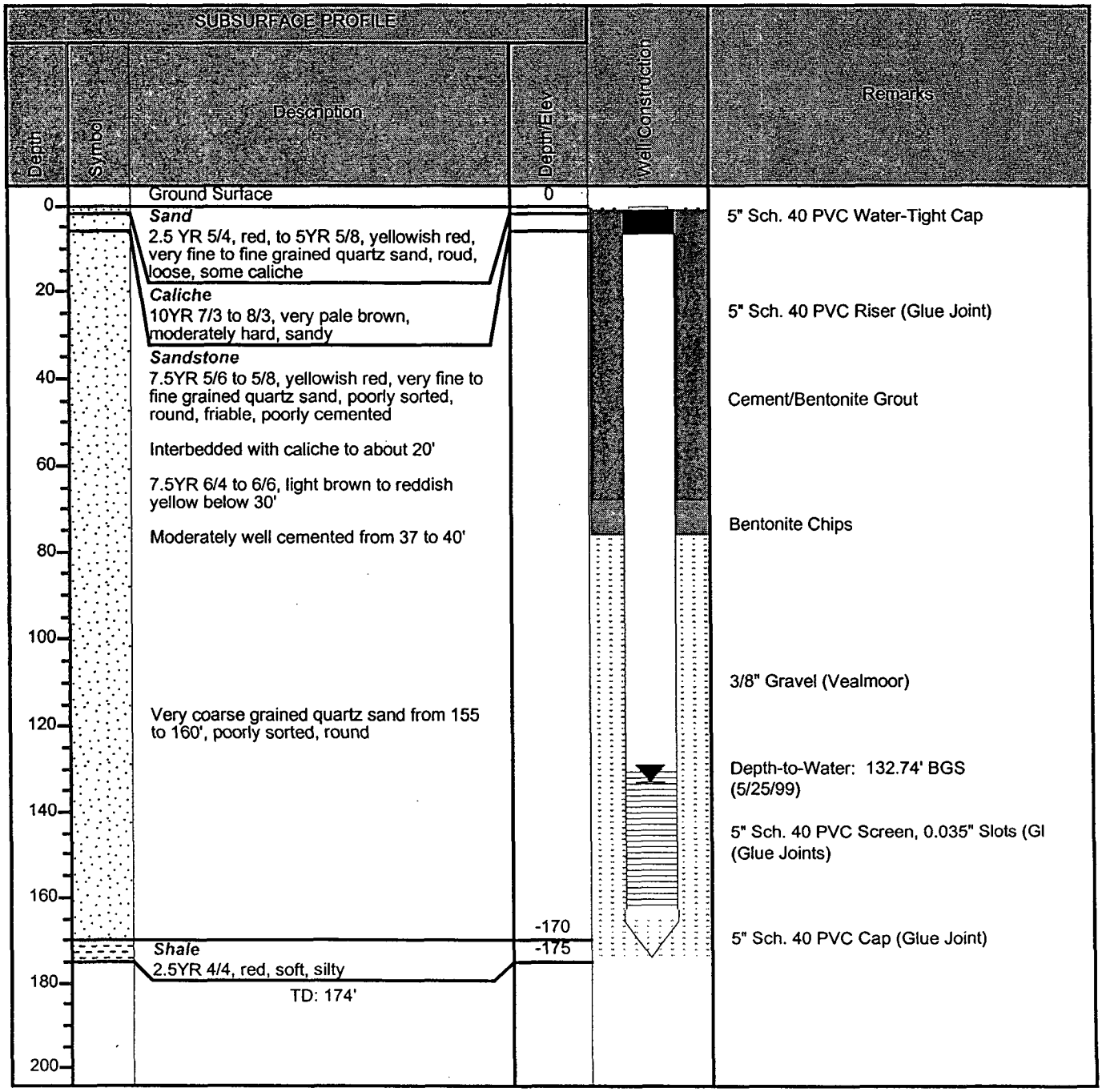
**Project:** Cooper-Jal South Water Station

**Client:** Texaco Exploration and Production Inc.

**Enclosure:** 1 of 1

**Location:** Lea County, New Mexico

**Engineer:** MJL




Drilled By: Scarborough Drilling, Inc.

Drill Method: Rotary (Water)

Drill Date: 4-5-May-99

Highlander Environmental
1910 N. Big Spring
Midland, Texas 79705
(915) 682-4559

Hole Size: 8 3/4"

Datum: Ground Surface

Sheet: 1 of 1

**Project No:** 996

## *Well ID: RW-2*

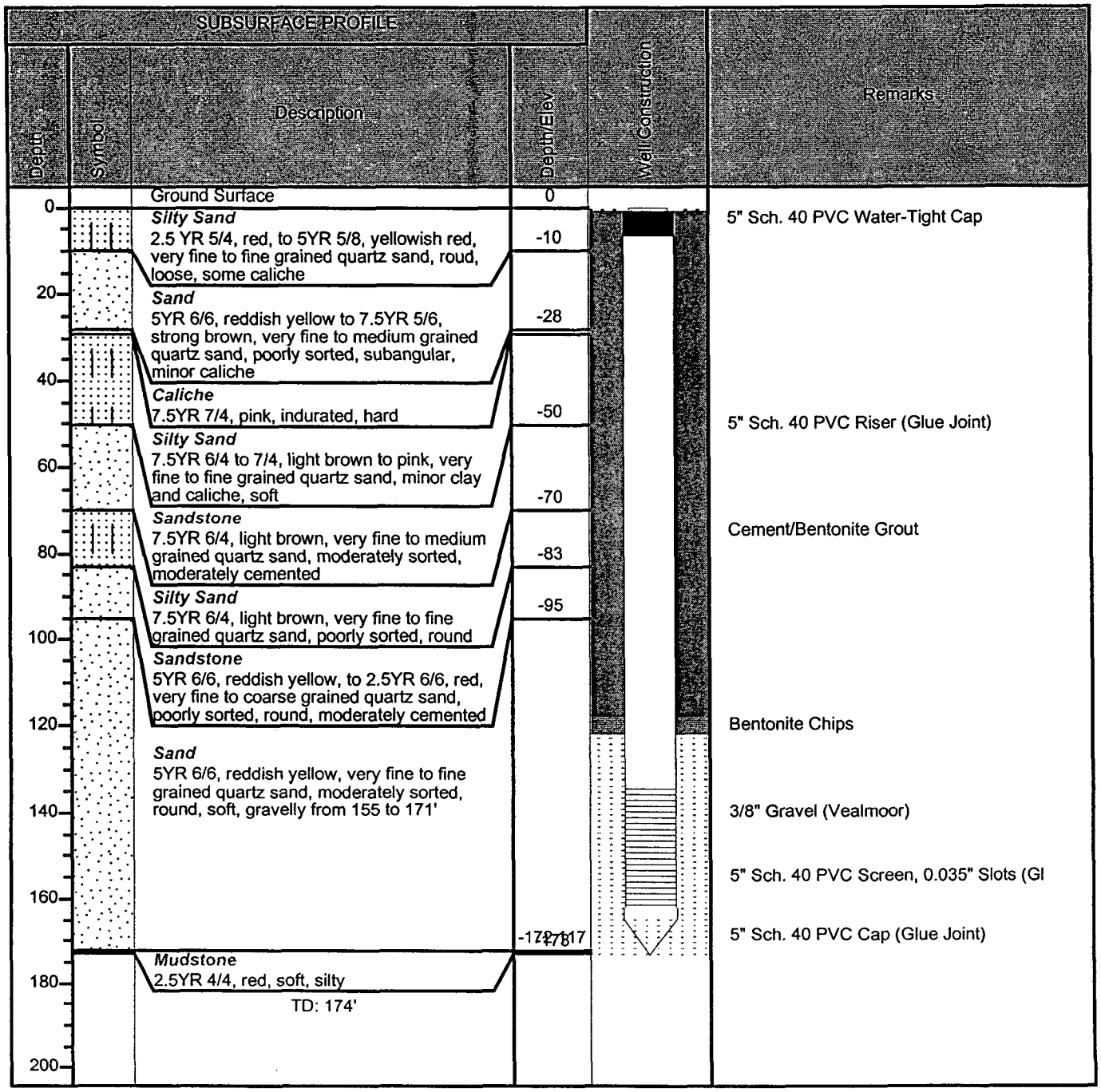
**Project:** Cooper-Jal South Water Station

**Client:** Texaco Exploration and Production Inc.

**Enclosure:** 1 of 1

**Location:** Lea County, New Mexico

**Engineer:** MJL




Drilled By: Scarborough Drilling, Inc.

Drill Method: Rotary (Air)

Drill Date: 9-10-Nov-99

Highlander Environmental
1910 N. Big Spring
Midland, Texas 79705
(915) 682-4559

Hole Size: 8 3/4"

Datum:

Sheet: 1 of 1

***Client:*** Texaco Exploration and Production, Inc.

***Project:*** Cooper-Jal Unit Injection Station

***Project No:*** 0-0113

***Location:*** Lea County, New Mexico

# *Log: MW-12*

***Geologist:*** Mark J. Larson



| SUBSURFACE PROFILE | | | | SAMPLE | | | PID Measurement (PPM) 10 30 50 | Well Detail | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Symbol | Description | Elev. | Number | Type | Recovery | | | Well Secured with Locking Above-Grade Cover |
| 5 | | ***Silty Sand*** 7.5 YR 4/6 to 5/6, strong brown, very fine grained quartz sand, poorly sorted. | 3323 | | | | | | |
| 10 | | | 3315 | | | | | | |
| 15 | | ***Caliche*** 10 YR 7/3 to 7/4, very pale brown, sandy, very fine grained quartz sand, moderately hard. | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |
| 45 | | | | | | | | | |
| 50 | | ***Sand*** 5 YR 6/6 to 7/4, reddish yellow to pink, very fine to fine grained quartz sand, moderately sorted, round. Interbedded with thin units of weakly cemented sandstone from 20 to 30'. Sandstone below 30' is weakly cemented. | | | | | | | 1 to 147' bgs: cement-bentonite grout |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |
| 80 | | | | | | | | | 0 - 156.68' bgs: 4" Sch. 40 PVC Riser (Threaded) |
| 85 | | | | | | | | | |
| 90 | | | | | | | | | |
| 95 | | | | | | | | | |
| 100 | | | | | | | | | |
| 105 | | | | | | | | | |
| 110 | | | | | | | | | |
| 115 | | | | | | | | | |
| 120 | | | | | | | | | |
| 125 | | | | | | | | | |
| 130 | | | | | | | | | |
| 135 | | | | | | | | | |
| 140 | | | | | | | | | W. L. 139.57' btoc (5/10/02) |
| 145 | | | | | | | | | 147 to 151': bentonite chips |
| 150 | | | | | | | | | 151 to 171.65' bgs: 8/16 graded silica sand |
| 155 | | | | | | | | | 156.68 to 171.65' bgs: 5" Sch. 40 PVC Screen, 0.020 slot |
| 160 | | | | | | | | | 4" Sch. 40 PVC Cap (Threaded) |
| 165 | | | 3160 | | | | | | |
| 170 | | ***Shale*** 2.5 YR 4/6, red, silty, fine grained. | 3154 | | | | | | |
| 175 | | ***TD: 174'*** | | | | | | | |
| 180 | | | | | | | | | |
| 185 | | | | | | | | | |
| 190 | | | | | | | | | |
| 195 | | | | | | | | | |
| 200 | | | | | | | | | |

Drilling Method: Air Rotary

Date Drilled: Sept. 17, 2001

Well Size: 2"

**Larson and Associates, Inc.**
**507 North Marienfeld St., Ste. 202**
**Midland, Texas 79701**
**(915) 687-0901**

TOC Elevation: 3328.43

Checked by: CKC

Drilled by: Scarborough Drilling

***Client:*** Texaco Exploration and Production, Inc.

***Project:*** Cooper-Jal Unit Injection Station

***Project No:*** 0-0113

***Location:*** Lea County, New Mexico

# *Log: MW-13*

***Geologist:*** Mark J. Larson



| SUBSURFACE PROFILE | | | | SAMPLE | | | PID Measurement (PPM) 10 30 50 | Well Detail | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Depth | Symbol | Description | Elev. | Number | Type | Recovery | | | Well Secured with Locking Above-Grade Cover |
| 5 | | ***Silty Sand*** 10 YR 5/3, brown, very fine grained quartz sand, loose, moist from rain, poorly sorted. | 3333 | | | | | | |
| 10 | | | 3327 | | | | | | |
| 15 | | ***Caliche*** 10 YR 7/3 to 7/4, pale brown, sandy, very fine grained quartz sand, moderately hard. | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |
| 45 | | | | | | | | | |
| 50 | | | | | | | | | 1 to 147' bgs: cement-bentonite grout |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |
| 80 | | | | | | | | | |
| 85 | | | | | | | | | 0 - 156.68' bgs: 4" Sch. 40 PVC Riser (Threaded) |
| 90 | | | | | | | | | |
| 95 | | | | | | | | | |
| 100 | | | | | | | | | |
| 105 | | | | | | | | | |
| 110 | | | | | | | | | |
| 115 | | | | | | | | | |
| 120 | | | | | | | | | |
| 125 | | | | | | | | | |
| 130 | | | | | | | | | |
| 135 | | | | | | | | | |
| 140 | | | | | | | | | |
| 145 | | | | | | | | | |
| 150 | | | | | | | | | |
| 155 | | | | | | | | | |
| 160 | | | | | | | | | |
| 165 | | | 3169 | | | | | | |
| 170 | | ***Shale*** 2.5 YR 4/6, red, silty, fine grained. | 3164 | | | | | | W. L. 144.45' btoc (5/10/02) |
| 175 | | | | | | | | | 147 to 151': bentonite chips |
| 180 | | | | | | | | | 151 to 171.65' bgs: 8/16 graded silica sand |
| 185 | | | | | | | | | 156.68 to 171.65' bgs: 5" Sch. 40 PVC Screen, 0.020 slot |
| 190 | | ***TD: 174'*** | | | | | | | 4" Sch. 40 PVC Cap (Threaded) |
| 195 | | | | | | | | | |
| 200 | | | | | | | | | |

Drilling Method: Air Rotary

Date Drilled: Sept. 17, 2001

Well Size: 2"

**Larson and Associates, Inc.**
**507 North Marienfeld St., Ste. 202**
**Midland, Texas 79701**
**(915) 687-0901**

TOC Elevation: 3338.49

Checked by: CKC

Drilled by: Scarborough Drilling

# APPENDIX C

## Laboratory Analyses and Chain of Custody Documentation

# Summary Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: May 23, 2002

Order ID Number: A02051507

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197052 | MW-13 | Water | 5/13/02 | 14:45 | 5/15/02 |

0 This report consists of a total of 1 page(s) and is intended only as a summary of results for the sample(s) listed above.

## Sample: 197052 - MW-13

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 100 | mg/L as CaCo3 |
| Total Alkalinity | | 100 | mg/L as CaCo3 |
| Chloride | | 517 | mg/L |
| Fluoride | | < 1 | mg/L |
| Nitrate-N | | 1.61 | mg/L |
| Sulfate | | 437 | mg/L |
| Dissolved Calcium | | 116 | mg/L |
| Dissolved Magnesium | | 76.0 | mg/L |
| Dissolved Potassium | | 19.4 | mg/L |
| Dissolved Sodium | | 269 | mg/L |
| Total Dissolved Solids | | 1596 | mg/L |

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

# Analytical and Quality Control Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: May 23, 2002

Order ID Number: A02051507

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197052 | MW-13 | Water | 5/13/02 | 14:45 | 5/15/02 |

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.



Dr. Blair Leftwich, Director

# Analytical Report

## Sample: 197052 - MW-13

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20520 | Date Analyzed: 5/21/02
Analyst: RS | Preparation Method: N/A | Prep Batch: PB19589 | Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 100 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 100 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197052 - MW-13

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC20467 | Date Analyzed: 5/15/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19545 | Date Prepared: 5/15/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 517 | mg/L | 50 | 1 |
| Fluoride | | < 1 | mg/L | 5 | 0.20 |
| Nitrate-N | | 1.61 | mg/L | 5 | 0.20 |
| Sulfate | | 437 | mg/L | 10 | 1 |

## Sample: 197052 - MW-13

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20504 | Date Analyzed: 5/20/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19459 | Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 116 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 76.0 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 19.4 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 269 | mg/L | 1 | 0.50 |

## Sample: 197052 - MW-13

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20394 | Date Analyzed: 5/17/02
Analyst: RS | Preparation Method: N/A | Prep Batch: PB19489 | Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 1596 | mg/L | 2 | 10 |

# Quality Control Report
# Method Blank

## Method Blank

QCBatch: QC20394

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Total Dissolved Solids | | <10 | mg/L | 10 |

## Method Blank

QCBatch: QC20467

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

## Method Blank

QCBatch: QC20504

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Dissolved Calcium | | <0.5 | mg/L | 0.50 |
| Dissolved Magnesium | | <0.5 | mg/L | 0.50 |
| Dissolved Potassium | | <0.5 | mg/L | 0.50 |
| Dissolved Sodium | | <0.5 | mg/L | 0.50 |

## Method Blank

QCBatch: QC20520

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Bicarbonate Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |
| Total Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |

# Quality Control Report
# Duplicate Samples

## Duplicate

QCBatch: QC20394

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | 1602 | 1596 | mg/L | 1 | 0 | 9.7 |

## Duplicate

QCBatch: QC20520

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Carbonate Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Bicarbonate Alkalinity | | 48 | 46 | mg/L as CaCo3 | 1 | 4 | 9.2 |
| Total Alkalinity | | 48 | 46 | mg/L as CaCo3 | 1 | 4 | 9.2 |

# Quality Control Report
# Lab Control Spikes and Duplicate Spikes

## Laboratory Control Spikes

QCBatch: QC20467

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 11.68 | 11.8 | mg/L | 1 | 12.50 | <1.0 | 93 | 1 | 90 - 110 | 20 |
| Fluoride | 2.35 | 2.39 | mg/L | 1 | 2.50 | <0.2 | 94 | 1 | 90 - 110 | 20 |
| Nitrate-N | 2.34 | 2.36 | mg/L | 1 | 2.50 | <0.2 | 93 | 0 | 90 - 110 | 20 |
| Sulfate | 11.98 | 11.98 | mg/L | 1 | 12.50 | <1.0 | 95 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Matrix Spikes and Duplicate Spikes

## Matrix Spikes

QCBatch: QC20467

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 1102.77 | 1098.18 | mg/L | 1 | 625 | 517 | 93 | 0 | 48 - 127 | 20 |
| Fluoride | [1] 115.54 | 115.41 | mg/L | 1 | 125 | 0.75 | 91 | 0 | 82 - 101 | 20 |
| Nitrate-N | [2] 123.2 | 123.45 | mg/L | 1 | 125 | 1.61 | 97 | 0 | 87 - 100 | 20 |
| Sulfate | [3] 1002.29 | 992.06 | mg/L | 1 | 625 | 437 | 90 | 1 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Continuing Calibration Verification Standards

## CCV (1)

QCBatch: QC20394

[1] 197052*50 was spiked, but *5 was reported. RPD = 0; %EA = 92
[2] 197052*50 was spiked, but *5 was reported. RPD = 0; %EA = 91.
[3] 197052*50 was spiked, but *10 was reported for sulfate. RPD = 1; %EA = 94.

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 995 | 99 | 90 - 110 | 5/17/02 |

## ICV (1) QCBatch: QC20394

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 981 | 98 | 90 - 110 | 5/17/02 |

## CCV (1) QCBatch: QC20467

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 12.05 | 96 | 90 - 110 | 5/15/02 |
| Fluoride | | mg/L | 2.50 | 2.5 | 100 | 90 - 110 | 5/15/02 |
| Nitrate-N | | mg/L | 2.50 | 2.33 | 93 | 90 - 110 | 5/15/02 |
| Sulfate | | mg/L | 12.50 | 12.03 | 96 | 90 - 110 | 5/15/02 |

## ICV (1) QCBatch: QC20467

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.42 | 91 | 90 - 110 | 5/15/02 |
| Fluoride | | mg/L | 2.50 | 2.37 | 94 | 90 - 110 | 5/15/02 |
| Nitrate-N | | mg/L | 2.50 | 2.37 | 94 | 90 - 110 | 5/15/02 |
| Sulfate | | mg/L | 12.50 | 12.02 | 96 | 90 - 110 | 5/15/02 |

## CCV (1) QCBatch: QC20504

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 25.9 | 103 | 90 - 110 | 5/20/02 |
| Dissolved Magnesium | | mg/L | 25 | 25.5 | 102 | 90 - 110 | 5/20/02 |
| Dissolved Potassium | | mg/L | 25 | 25.2 | 100 | 90 - 110 | 5/20/02 |
| Dissolved Sodium | | mg/L | 25 | 25.4 | 101 | 90 - 110 | 5/20/02 |

## ICV (1) QCBatch: QC20504

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 25.4 | 101 | 95 - 105 | 5/20/02 |
| Dissolved Magnesium | | mg/L | 25 | 25.4 | 101 | 95 - 105 | 5/20/02 |
| Dissolved Potassium | | mg/L | 25 | 24.1 | 96 | 95 - 105 | 5/20/02 |
| Dissolved Sodium | | mg/L | 25 | 25.1 | 100 | 95 - 105 | 5/20/02 |

## CCV (1)

QCBatch: QC20520

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/21/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 220 | 0 | 90 - 110 | 5/21/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 24 | 0 | 90 - 110 | 5/21/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 244 | 97 | 90 - 110 | 5/21/02 |

## ICV (1)

QCBatch: QC20520

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/21/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 220 | 0 | 90 - 110 | 5/21/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 16 | 0 | 90 - 110 | 5/21/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 236 | 94 | 90 - 110 | 5/21/02 |

197052

AD2051507

# CHAIN—OF—CUSTODY RECORD


LA Larson & Associates, Inc.
Environmental Consultants
Fax: 915-687-0456
915-687-0901
507 N. Marienfeld, Ste. 202 • Midland, TX 79701


CLIENT NAME: Texaco - Cooper - Jal

SITE MANAGER: Mark Larson

PROJECT NO.: 0-0113

PROJECT NAME: Cooper - Jal

PAGE 1 OF 1

LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: anions, cations | PARAMETERS/METHOD NUMBER: TDS | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-13-02 | 2:45 | X | | | MW-13 197052 | 2 | X | X | | Preserved - O |

SAMPLED BY: (Signature) Ryan Rees
DATE: 5-14-02
TIME: 3:45

RELINQUISHED BY: (Signature)
DATE: 5/14/02
TIME: 1605

RECEIVED BY: (Signature) Helen Shelton
DATE: 5/14/02
TIME: 1605

RELINQUISHED BY: (Signature) Helen Shelton
DATE: 5/14/02
TIME: 1830

RECEIVED BY: (Signature)
DATE:
TIME:

SAMPLE SHIPPED BY: (Circle) Greyhound
FEDEX (BUS) UPS
AIRBILL #:
HAND DELIVERED
OTHER:

COMMENTS:

TURNAROUND TIME NEEDED: As quick as possible without Rush charges

**WHITE** – RECEIVING LAB
**YELLOW** – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
**PINK** – PROJECT MANAGER
**GOLD** – QA/QC COORDINATOR

RECEIVING LABORATORY: Trace Analysis
ADDRESS: 6701 Aberdeen Ave suite 9
CITY: Lubbock STATE: TX ZIP: 79424
CONTACT: Helen PHONE: (806) 794-1296

RECEIVED BY: (Signature)
DATE: 5-15-02 TIME: 10:00

SAMPLE CONDITION WHEN RECEIVED:
40
UPS. 1113-5444-7169-3

LA CONTACT PERSON: Mark Larson

SAMPLE TYPE:

5/24 F/P

# Summary Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 5, 2002

Order ID Number: A02051620

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197162 | MW-12 | Water | 5/15/02 | 10:50 | 5/16/02 |
| 197163 | MW-9A | Water | 5/15/02 | 11:36 | 5/16/02 |
| 197164 | MW-5A | Water | 5/15/02 | 12:30 | 5/16/02 |
| 197165 | MW4A | Water | 5/15/02 | 13:40 | 5/16/02 |
| 197166 | MW-2A | Water | 5/15/02 | 14:42 | 5/16/02 |

0 This report consists of a total of 3 page(s) and is intended only as a summary of results for the sample(s) listed above.

## Sample: 197162 - MW-12

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 |
| Total Alkalinity | | 160 | mg/L as CaCo3 |
| Chloride | | 58.3 | mg/L |
| Fluoride | | 1.09 | mg/L |
| Nitrate-N | | 2.44 | mg/L |
| Sulfate | | 91.3 | mg/L |
| Dissolved Calcium | | 53.5 | mg/L |
| Dissolved Magnesium | | 15.9 | mg/L |
| Dissolved Potassium | | 5.52 | mg/L |
| Dissolved Sodium | | 50.3 | mg/L |
| Total Dissolved Solids | | 462 | mg/L |

## Sample: 197163 - MW-9A

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 136 | mg/L as CaCo3 |
| Total Alkalinity | | 136 | mg/L as CaCo3 |
| Chloride | | 148 | mg/L |
| Fluoride | | <1.0 | mg/L |

*Continued on next page ...*

*Sample 197163 continued ...*

| Param | Flag | Result | Units |
|---|---|---|---|
| Nitrate-N | | 2.18 | mg/L |
| Sulfate | | 65.3 | mg/L |
| Dissolved Calcium | | 62.9 | mg/L |
| Dissolved Magnesium | | 16.1 | mg/L |
| Dissolved Potassium | | 4.62 | mg/L |
| Dissolved Sodium | | 46.8 | mg/L |
| Total Dissolved Solids | | 445 | mg/L |

## Sample: 197164 - MW-5A

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 182 | mg/L as CaCo3 |
| Total Alkalinity | | 182 | mg/L as CaCo3 |
| Chloride | | 53.5 | mg/L |
| Fluoride | | <1.0 | mg/L |
| Nitrate-N | | 2.23 | mg/L |
| Sulfate | | 84.4 | mg/L |
| Dissolved Calcium | | 63.2 | mg/L |
| Dissolved Magnesium | | 16.1 | mg/L |
| Dissolved Potassium | | 4.69 | mg/L |
| Dissolved Sodium | | 43.6 | mg/L |
| Total Dissolved Solids | | 475 | mg/L |

## Sample: 197165 - MW4A

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 156 | mg/L as CaCo3 |
| Total Alkalinity | | 156 | mg/L as CaCo3 |
| Chloride | | 577 | mg/L |
| Fluoride | | <1.0 | mg/L |
| Nitrate-N | | 2.23 | mg/L |
| Sulfate | | 121 | mg/L |
| Dissolved Calcium | | 200 | mg/L |
| Dissolved Magnesium | | 49.5 | mg/L |
| Dissolved Potassium | | 10.3 | mg/L |
| Dissolved Sodium | | 125 | mg/L |
| Total Dissolved Solids | | 1610 | mg/L |

## Sample: 197166 - MW-2A

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 176 | mg/L as CaCo3 |
| Total Alkalinity | | 176 | mg/L as CaCo3 |
| Chloride | | 36.6 | mg/L |
| Fluoride | | <1.0 | mg/L |
| Nitrate-N | | 2.34 | mg/L |
| Sulfate | | 79.1 | mg/L |
| Dissolved Calcium | | 57.6 | mg/L |
| Dissolved Magnesium | | 13.9 | mg/L |
| Dissolved Potassium | | 4.35 | mg/L |
| Dissolved Sodium | | 43.8 | mg/L |
| Total Dissolved Solids | | 435 | mg/L |

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

# Analytical and Quality Control Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 5, 2002

Order ID Number: A02051620

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197162 | MW-12 | Water | 5/15/02 | 10:50 | 5/16/02 |
| 197163 | MW-9A | Water | 5/15/02 | 11:36 | 5/16/02 |
| 197164 | MW-5A | Water | 5/15/02 | 12:30 | 5/16/02 |
| 197165 | MW4A | Water | 5/15/02 | 13:40 | 5/16/02 |
| 197166 | MW-2A | Water | 5/15/02 | 14:42 | 5/16/02 |

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.



Dr. Blair Leftwich, Director

# Analytical Report

## Sample: 197162 - MW-12

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20585 | Date Analyzed: 5/21/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19638 | Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197162 - MW-12

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC20679 | Date Analyzed: 5/16/02
Analyst: MS | Preparation Method: N/A | Prep Batch: PB19724 | Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 58.3 | mg/L | 5 | 1 |
| Fluoride | | 1.09 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.44 | mg/L | 5 | 0.20 |
| Sulfate | | 91.3 | mg/L | 5 | 1 |

## Sample: 197162 - MW-12

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20711 | Date Analyzed: 5/28/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19747 | Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 53.5 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 15.9 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 5.52 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 50.3 | mg/L | 1 | 0.50 |

## Sample: 197162 - MW-12

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20525 | Date Analyzed: 5/21/02
Analyst: RS | Preparation Method: N/A | Prep Batch: PB19596 | Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 462 | mg/L | 1 | 10 |

## Sample: 197163 - MW-9A

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20585 | Date Analyzed: 5/21/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19638 | Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |

*Continued ...*

... *Continued* Sample: 197163 Analysis: Alkalinity

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 136 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 136 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197163 - MW-9A

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20679 Date Analyzed: 5/16/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19724 Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 148 | mg/L | 5 | 1 |
| Fluoride | | <1.0 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.18 | mg/L | 5 | 0.20 |
| Sulfate | | 65.3 | mg/L | 5 | 1 |

## Sample: 197163 - MW-9A

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20711 Date Analyzed: 5/28/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19747 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 62.9 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 16.1 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 4.62 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 46.8 | mg/L | 1 | 0.50 |

## Sample: 197163 - MW-9A

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20525 Date Analyzed: 5/21/02
Analyst: RS Preparation Method: N/A Prep Batch: PB19596 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 445 | mg/L | 1 | 10 |

## Sample: 197164 - MW-5A

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20585 Date Analyzed: 5/21/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19638 Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 182 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 182 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197164 - MW-5A

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20679 Date Analyzed: 5/16/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19724 Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 53.5 | mg/L | 5 | 1 |
| Fluoride | | <1.0 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.23 | mg/L | 5 | 0.20 |
| Sulfate | | 84.4 | mg/L | 5 | 1 |

## Sample: 197164 - MW-5A

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20711 Date Analyzed: 5/28/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19747 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 63.2 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 16.1 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 4.69 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 43.6 | mg/L | 1 | 0.50 |

## Sample: 197164 - MW-5A

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20525 Date Analyzed: 5/21/02
Analyst: RS Preparation Method: N/A Prep Batch: PB19596 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 475 | mg/L | 1 | 10 |

## Sample: 197165 - MW4A

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20585 Date Analyzed: 5/21/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19638 Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 156 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 156 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197165 - MW4A

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20679 Date Analyzed: 5/16/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19724 Date Prepared: 5/16/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 577 | mg/L | 50 | 1 |
| Fluoride | | <1.0 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.23 | mg/L | 5 | 0.20 |
| Sulfate | | 121 | mg/L | 5 | 1 |

## Sample: 197165 - MW4A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Salts | Analytical Method: | E 200.7 | QC Batch: | QC20711 | Date Analyzed: | 5/28/02 |
| Analyst: | BC | Preparation Method: | S 3005A | Prep Batch: | PB19747 | Date Prepared: | 5/20/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 200 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 49.5 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 10.3 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 125 | mg/L | 1 | 0.50 |

## Sample: 197165 - MW4A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | TDS | Analytical Method: | E 160.1 | QC Batch: | QC20525 | Date Analyzed: | 5/21/02 |
| Analyst: | RS | Preparation Method: | N/A | Prep Batch: | PB19596 | Date Prepared: | 5/20/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 1610 | mg/L | 1 | 10 |

## Sample: 197166 - MW-2A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Alkalinity | Analytical Method: | E 310.1 | QC Batch: | QC20585 | Date Analyzed: | 5/21/02 |
| Analyst: | JSW | Preparation Method: | N/A | Prep Batch: | PB19638 | Date Prepared: | 5/21/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 176 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 176 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197166 - MW-2A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Ion Chromatography (IC) | Analytical Method: | E 300.0 | QC Batch: | QC20679 | Date Analyzed: | 5/16/02 |
| Analyst: | MS | Preparation Method: | N/A | Prep Batch: | PB19724 | Date Prepared: | 5/16/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 36.6 | mg/L | 5 | 1 |
| Fluoride | | <1.0 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.34 | mg/L | 5 | 0.20 |
| Sulfate | | 79.1 | mg/L | 5 | 1 |

## Sample: 197166 - MW-2A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Salts | Analytical Method: | E 200.7 | QC Batch: | QC20711 | Date Analyzed: | 5/28/02 |
| Analyst: | BC | Preparation Method: | S 3005A | Prep Batch: | PB19747 | Date Prepared: | 5/20/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 57.6 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 13.9 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 4.35 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 43.8 | mg/L | 1 | 0.50 |

## Sample: 197166 - MW-2A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | TDS | Analytical Method: | E 160.1 | QC Batch: | QC20525 | Date Analyzed: | 5/21/02 |
| Analyst: | RS | Preparation Method: | N/A | Prep Batch: | PB19596 | Date Prepared: | 5/20/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 435 | mg/L | 1 | 10 |

# Quality Control Report
# Method Blank

## Method Blank

QCBatch: QC20525

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Total Dissolved Solids | | <10 | mg/L | 10 |

## Method Blank

QCBatch: QC20585

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Bicarbonate Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |
| Total Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |

## Method Blank

QCBatch: QC20679

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

## Method Blank

QCBatch: QC20711

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Dissolved Calcium | | 0.941 | mg/L | 0.50 |
| Dissolved Magnesium | | 0.719 | mg/L | 0.50 |
| Dissolved Potassium | | <0.5 | mg/L | 0.50 |
| Dissolved Sodium | | <0.5 | mg/L | 0.50 |

# Quality Control Report
# Duplicate Samples

## Duplicate

QCBatch: QC20525

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | 15050 | 15800 | mg/L | 1 | 4 | 9.7 |

## Duplicate

QCBatch: QC20585

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Carbonate Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Bicarbonate Alkalinity | | 174 | 176 | mg/L as CaCo3 | 1 | 1 | 9.2 |
| Total Alkalinity | | 174 | 176 | mg/L as CaCo3 | 1 | 1 | 9.2 |

# Quality Control Report
# Lab Control Spikes and Duplicate Spikes

## Laboratory Control Spikes

QCBatch: QC20679

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 12.67 | 12.67 | mg/L | 1 | 12.50 | <1.0 | 101 | 0 | 90 - 110 | 20 |
| Fluoride | 2.43 | 2.43 | mg/L | 1 | 2.50 | <0.2 | 97 | 0 | 90 - 110 | 20 |
| Nitrate-N | 2.36 | 2.39 | mg/L | 1 | 2.50 | <0.2 | 94 | 1 | 90 - 110 | 20 |
| Sulfate | 12.67 | 12.70 | mg/L | 1 | 12.50 | <1.0 | 101 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Matrix Spikes and Duplicate Spikes

## Matrix Spikes

QCBatch: QC20679

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 1210 | 1210 | mg/L | 1 | 625 | 577 | 101 | 0 | 48 - 127 | 20 |
| Fluoride | 116 | 109 | mg/L | 1 | 125 | <1.0 | 92 | 6 | 82 - 101 | 20 |
| Nitrate-N | 126 | 125 | mg/L | 1 | 125 | 2.23 | 99 | 0 | 87 - 100 | 20 |
| Sulfate | 765 | 771 | mg/L | 1 | 625 | 121 | 103 | 0 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Continuing Calibration Verification Standards

## CCV (1)

QCBatch: QC20525

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 920 | 92 | 90 - 110 | 5/21/02 |

## ICV (1) QCBatch: QC20525

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 984 | 98 | 90 - 110 | 5/21/02 |

## CCV (1) QCBatch: QC20585

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/21/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 224 | 0 | 90 - 110 | 5/21/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 14 | 0 | 90 - 110 | 5/21/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 238 | 95 | 90 - 110 | 5/21/02 |

## ICV (1) QCBatch: QC20585

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/21/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 220 | 0 | 90 - 110 | 5/21/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 24 | 0 | 90 - 110 | 5/21/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 244 | 97 | 90 - 110 | 5/21/02 |

## CCV (1) QCBatch: QC20679

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 12.68 | 101 | 90 - 110 | 5/16/02 |
| Fluoride | | mg/L | 2.50 | 2.42 | 96 | 90 - 110 | 5/16/02 |
| Nitrate-N | | mg/L | 2.50 | 2.37 | 94 | 90 - 110 | 5/16/02 |
| Sulfate | | mg/L | 12.50 | 12.80 | 102 | 90 - 110 | 5/16/02 |

## ICV (1) QCBatch: QC20679

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 12.66 | 101 | 90 - 110 | 5/16/02 |
| Fluoride | | mg/L | 2.50 | 2.36 | 94 | 90 - 110 | 5/16/02 |
| Nitrate-N | | mg/L | 2.50 | 2.36 | 94 | 90 - 110 | 5/16/02 |
| Sulfate | | mg/L | 12.50 | 12.70 | 101 | 90 - 110 | 5/16/02 |

## CCV (1)

QCBatch: QC20711

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 23.6 | 94 | 90 - 110 | 5/28/02 |
| Dissolved Magnesium | | mg/L | 25 | 23.7 | 94 | 90 - 110 | 5/28/02 |
| Dissolved Potassium | | mg/L | 25 | 26.8 | 107 | 90 - 110 | 5/28/02 |
| Dissolved Sodium | | mg/L | 25 | 26.7 | 106 | 90 - 110 | 5/28/02 |

## ICV (1)

QCBatch: QC20711

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 24.3 | 97 | 95 - 105 | 5/28/02 |
| Dissolved Magnesium | | mg/L | 25 | 25.1 | 100 | 95 - 105 | 5/28/02 |
| Dissolved Potassium | | mg/L | 25 | 24.1 | 96 | 95 - 105 | 5/28/02 |
| Dissolved Sodium | | mg/L | 25 | 24.8 | 99 | 95 - 105 | 5/28/02 |

197162-66

A020516 20

# CHAIN—OF—CUSTODY RECORD

Larson & Associates, Inc.
Environmental Consultants
Fax: 915-687-0456
915-687-0901
507 N. Marienfeld, Ste. 202 • Midland, TX 79701

CLIENT NAME: Texco

SITE MANAGER: Mark Larson

PROJECT NO.: 0-0113

PROJECT NAME: Cooper-Jal

PAGE 1 OF 1

LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: X Anions, Cations | PARAMETERS/METHOD NUMBER: X TDS | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-15-02 | 10:50 | X | | | MW-12 197162 | 2 | X | X | | no preserv. |
| ↓ | 11:36 | ↓ | | | MW-9A 197163 | ↓ | ↓ | ↓ | | ↓ |
| | 12:30 | | | | MW-5A 164 | | | | | |
| | 1:40 | | | | MW-4A 165 | | | | | |
| ↓ | 2:42 | ↓ | | | MW-2A 166 | ↓ | ↓ | ↓ | | |

SAMPLED BY: (Signature) [signature] DATE: 5-15-02 TIME: 4:50

RELINQUISHED BY: (Signature) [signature] DATE: 5/15/02 TIME: 4:50

RECEIVED BY: (Signature) DATE: TIME:

RELINQUISHED BY: (Signature) Helen Shelton DATE: 5/15/02 TIME: 1830

RECEIVED BY: (Signature) DATE: TIME:

SAMPLE SHIPPED BY: (Circle) greyhound

FEDEX BUS UPS HAND DELIVERED AIRBILL #: OTHER:

COMMENTS:

TURNAROUND TIME NEEDED

**WHITE** – RECEIVING LAB
**YELLOW** – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
**PINK** – PROJECT MANAGER
**GOLD** – QA/QC COORDINATOR

RECEIVING LABORATORY: Trace Analysis
ADDRESS: 6701 Aberdeen Ave, St. 9
CITY: Lubbock STATE: Tx ZIP: 79424
CONTACT: Helen PHONE: (806) 794-1296

RECEIVED BY: (Signature) [signature]
DATE: 5-16-02 TIME: 10:00

SAMPLE CONDITION WHEN RECEIVED:

LA CONTACT PERSON: (915)687-0901 Mark Larson

SAMPLE TYPE: Ice Blue 77-5

10 samples - HS

4154-19

# Summary Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 6, 2002

Order ID Number: A02052008

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197394 | MW-7 | Water | 5/16/02 | 14:00 | 5/16/02 |
| 197395 | MW-8 | Water | 5/16/02 | 12:27 | 5/16/02 |
| 197396 | MW-9 | Water | 5/16/02 | 11:30 | 5/16/02 |
| 197397 | MW-11 | Water | 5/16/02 | 10:36 | 5/16/02 |

0 This report consists of a total of 2 page(s) and is intended only as a summary of results for the sample(s) listed above.

## Sample: 197394 - MW-7

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 150 | mg/L as CaCo3 |
| Total Alkalinity | | 150 | mg/L as CaCo3 |
| Chloride | | 75.7 | mg/L |
| Fluoride | | 1.59 | mg/L |
| Nitrate-N | | 2.27 | mg/L |
| Sulfate | | 97.4 | mg/L |
| Dissolved Calcium | | 68.6 | mg/L |
| Dissolved Magnesium | | 23.2 | mg/L |
| Dissolved Potassium | | 6.63 | mg/L |
| Dissolved Sodium | | 54.3 | mg/L |
| Total Dissolved Solids | | 501 | mg/L |

## Sample: 197395 - MW-8

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 158 | mg/L as CaCo3 |
| Total Alkalinity | | 158 | mg/L as CaCo3 |
| Chloride | | 32.9 | mg/L |
| Fluoride | | 1.57 | mg/L |
| Nitrate-N | | 2.33 | mg/L |

*Continued on next page ...*

*Sample 197395 continued ...*

| Param | Flag | Result | Units |
|---|---|---|---|
| Sulfate | | 101 | mg/L |
| Dissolved Calcium | | 56.6 | mg/L |
| Dissolved Magnesium | | 19.2 | mg/L |
| Dissolved Potassium | | 5.20 | mg/L |
| Dissolved Sodium | | 49.5 | mg/L |
| Total Dissolved Solids | | 432 | mg/L |

## Sample: 197396 - MW-9

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 |
| Total Alkalinity | | 160 | mg/L as CaCo3 |
| Chloride | | 31.7 | mg/L |
| Fluoride | | 2.22 | mg/L |
| Nitrate-N | | 2.28 | mg/L |
| Sulfate | | 99.4 | mg/L |
| Dissolved Calcium | | 60.8 | mg/L |
| Dissolved Magnesium | | 17.6 | mg/L |
| Dissolved Potassium | | 5.32 | mg/L |
| Dissolved Sodium | | 50.1 | mg/L |
| Total Dissolved Solids | | 440 | mg/L |

## Sample: 197397 - MW-11

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 |
| Total Alkalinity | | 160 | mg/L as CaCo3 |
| Chloride | | 31.9 | mg/L |
| Fluoride | | 2.13 | mg/L |
| Nitrate-N | | 2.33 | mg/L |
| Sulfate | | 98.8 | mg/L |
| Dissolved Calcium | | 63.5 | mg/L |
| Dissolved Magnesium | | 17.2 | mg/L |
| Dissolved Potassium | | 4.83 | mg/L |
| Dissolved Sodium | | 47.0 | mg/L |
| Total Dissolved Solids | | 444 | mg/L |

# Cation-Anion Balance Sheet

DATE: 6/10/02 MS

| Sample # | Calcium ppm | Magnesium ppm | Sodium ppm | Potassium ppm | Alkalinity ppm | Sulfate ppm | Chloride ppm | Nitrate ppm | Fluoride ppm | Bromide ppm | TDS ppm | EC µMHOs/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197394 | 68.6 | 23.2 | 54.3 | 6.63 | 150 | 97.4 | 75.7 | 2.27 | 1.59 | | 501 | |
| 197395 | 56.6 | 19.2 | 49.5 | 5.2 | 158 | 101 | 32.9 | 2.33 | 1.57 | | 432 | |
| 197396 | 60.8 | 17.6 | 50.1 | 5.32 | 160 | 99.4 | 31.7 | 2.28 | 2.22 | | 440 | |
| 197397 | 63.5 | 17.2 | 47 | 4.83 | 160 | 98.8 | 31.9 | 2.33 | 2.13 | | 444 | |

| Sample # | Calcium in meq/L | Magnesium in meq/L | Sodium in meq/L | Potassium in meq/L | Alkalinity in meq/L | Sulfate in meq/L | Chloride in meq/L | Nitrate in meq/L | Fluoride in meq/L | Bromide in meq/L | **Cations in meq/L** | **Anions in meq/L** | **Percentage Error** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197394 | 3.42 | 1.91 | 2.36 | 0.17 | 3.00 | 2.03 | 2.14 | 0.1620553 | 0.0836976 | 0 | 7.86 | 7.41 | 5.955536803 |
| 197395 | 2.82 | 1.58 | 2.15 | 0.13 | 3.16 | 2.10 | 0.93 | 0.1663387 | 0.0826448 | 0 | 6.69 | 6.44 | 3.81800781 |
| 197396 | 3.03 | 1.45 | 2.18 | 0.14 | 3.20 | 2.07 | 0.89 | 0.1627692 | 0.1168608 | 0 | 6.80 | 6.44 | 5.351002782 |
| 197397 | 3.17 | 1.42 | 2.04 | 0.12 | 3.20 | 2.06 | 0.90 | 0.1663387 | 0.1121232 | 0 | 6.75 | 6.44 | 4.803235023 |

| | EC/Cation | EC/Anion | | | | |
|---|---|---|---|---|---|---|
| 197394 | 786.39134 | 740.91179 | range | 0 | to | 0 |
| 197395 | 669.0574 | 643.99125 | range | 0 | to | 0 |
| 197396 | 679.76596 | 644.3395 | range | 0 | to | 0 |
| 197397 | 675.20894 | 643.53769 | range | 0 | to | 0 |

| TDS/EC | TDS/Cat | TDS/Anion | |
|---|---|---|---|
| #DIV/0! | 0.64 | 0.68 | needs to be 0.55-0.77 |
| #DIV/0! | 0.65 | 0.67 | needs to be 0.55-0.77 |
| #DIV/0! | 0.65 | 0.68 | needs to be 0.55-0.77 |
| #DIV/0! | 0.66 | 0.69 | needs to be 0.55-0.77 |

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

# Analytical and Quality Control Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 6, 2002

Order ID Number: A02052008

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197394 | MW-7 | Water | 5/16/02 | 14:00 | 5/16/02 |
| 197395 | MW-8 | Water | 5/16/02 | 12:27 | 5/16/02 |
| 197396 | MW-9 | Water | 5/16/02 | 11:30 | 5/16/02 |
| 197397 | MW-11 | Water | 5/16/02 | 10:36 | 5/16/02 |

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety including the chain of custody (COC), without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director

# Analytical Report

## Sample: 197394 - MW-7

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20645 | Date Analyzed: 5/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19691 | Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 150 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 150 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197394 - MW-7

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC20673 | Date Analyzed: 5/20/02
Analyst: MS | Preparation Method: N/A | Prep Batch: PB19717 | Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 75.7 | mg/L | 5 | 1 |
| Fluoride | | 1.59 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.27 | mg/L | 5 | 0.20 |
| Sulfate | | 97.4 | mg/L | 5 | 1 |

## Sample: 197394 - MW-7

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20801 | Date Analyzed: 6/3/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19808 | Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 68.6 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 23.2 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 6.63 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 54.3 | mg/L | 1 | 0.50 |

## Sample: 197394 - MW-7

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20600 | Date Analyzed: 5/24/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19657 | Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 501 | mg/L | 1 | 10 |

## Sample: 197395 - MW-8

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20645 | Date Analyzed: 5/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19691 | Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |

*Continued ...*

... *Continued* Sample: 197395 Analysis: Alkalinity

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 158 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 158 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197395 - MW-8

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20673 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19717 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 32.9 | mg/L | 5 | 1 |
| Fluoride | | 1.57 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.33 | mg/L | 5 | 0.20 |
| Sulfate | | 101 | mg/L | 5 | 1 |

## Sample: 197395 - MW-8

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20801 Date Analyzed: 6/3/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19808 Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 56.6 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 19.2 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 5.20 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 49.5 | mg/L | 1 | 0.50 |

## Sample: 197395 - MW-8

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20600 Date Analyzed: 5/24/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19657 Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 432 | mg/L | 1 | 10 |

## Sample: 197396 - MW-9

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20645 Date Analyzed: 5/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19691 Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197396 - MW-9

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20673 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19717 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 31.7 | mg/L | 5 | 1 |
| Fluoride | | 2.22 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.28 | mg/L | 5 | 0.20 |
| Sulfate | | 99.4 | mg/L | 5 | 1 |

## Sample: 197396 - MW-9

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20801 Date Analyzed: 6/3/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19808 Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 60.8 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 17.6 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 5.32 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 50.1 | mg/L | 1 | 0.50 |

## Sample: 197396 - MW-9

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20600 Date Analyzed: 5/24/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19657 Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 440 | mg/L | 1 | 10 |

## Sample: 197397 - MW-11

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20645 Date Analyzed: 5/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19691 Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197397 - MW-11

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20673 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19717 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 31.9 | mg/L | 5 | 1 |
| Fluoride | | 2.13 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.33 | mg/L | 5 | 0.20 |
| Sulfate | | 98.8 | mg/L | 5 | 1 |

## Sample: 197397 - MW-11

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Salts | Analytical Method: | E 200.7 | QC Batch: | QC20801 | Date Analyzed: | 6/3/02 |
| Analyst: | BC | Preparation Method: | S 3005A | Prep Batch: | PB19808 | Date Prepared: | 5/22/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 63.5 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 17.2 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 4.83 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 47.0 | mg/L | 1 | 0.50 |

## Sample: 197397 - MW-11

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | TDS | Analytical Method: | E 160.1 | QC Batch: | QC20600 | Date Analyzed: | 5/24/02 |
| Analyst: | JSW | Preparation Method: | N/A | Prep Batch: | PB19657 | Date Prepared: | 5/23/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 444 | mg/L | 1 | 10 |

# Quality Control Report
# Method Blank

## Method Blank

QCBatch: QC20600

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Total Dissolved Solids | | <10 | mg/L | 10 |

## Method Blank

QCBatch: QC20645

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Bicarbonate Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |
| Total Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |

## Method Blank

QCBatch: QC20673

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

## Method Blank

QCBatch: QC20801

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Dissolved Calcium | | <0.5 | mg/L | 0.50 |
| Dissolved Magnesium | | <0.5 | mg/L | 0.50 |
| Dissolved Potassium | | <0.6 | mg/L | 0.50 |
| Dissolved Sodium | | <0.5 | mg/L | 0.50 |

# Quality Control Report
# Duplicate Samples

## Duplicate

QCBatch: QC20600

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | 6115 | 6040 | mg/L | 1 | 1 | 9.7 |

## Duplicate

QCBatch: QC20645

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Carbonate Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Bicarbonate Alkalinity | | 166 | 162 | mg/L as CaCo3 | 1 | 2 | 9.2 |
| Total Alkalinity | | 166 | 162 | mg/L as CaCo3 | 1 | 2 | 9.2 |

# Quality Control Report
# Lab Control Spikes and Duplicate Spikes

## Laboratory Control Spikes

QCBatch: QC20673

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 11.34 | 11.34 | mg/L | 1 | 12.50 | <1.0 | 90 | 0 | 90 - 110 | 20 |
| Fluoride | 2.39 | 2.43 | mg/L | 1 | 2.50 | <0.2 | 95 | 1 | 90 - 110 | 20 |
| Nitrate-N | 2.40 | 2.39 | mg/L | 1 | 2.50 | <0.2 | 96 | 0 | 90 - 110 | 20 |
| Sulfate | 11.59 | 11.69 | mg/L | 1 | 12.50 | <1.0 | 92 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Matrix Spikes and Duplicate Spikes

## Matrix Spikes

QCBatch: QC20673

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 319.86 | 319.28 | mg/L | 1 | 125 | 204 | 92 | 0 | 48 - 127 | 20 |
| Fluoride | 25.73 | 24.07 | mg/L | 1 | 25 | 1.93 | 95 | 7 | 82 - 101 | 20 |
| Nitrate-N | 26.22 | 26.41 | mg/L | 1 | 25 | 2.19 | 96 | 0 | 87 - 100 | 20 |
| Sulfate | 224.84 | 224.41 | mg/L | 1 | 125 | 99.1 | 100 | 0 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Continuing Calibration Verification Standards

## CCV (1)

QCBatch: QC20600

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 1006 | 100 | 90 - 110 | 5/24/02 |

## ICV (1) QCBatch: QC20600

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 994 | 99 | 90 - 110 | 5/24/02 |

## CCV (1) QCBatch: QC20645

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 224 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 16 | 0 | 90 - 110 | 5/30/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 240 | 96 | 90 - 110 | 5/30/02 |

## ICV (1) QCBatch: QC20645

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 228 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 12 | 0 | 90 - 110 | 5/30/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 240 | 96 | 90 - 110 | 5/30/02 |

## CCV (1) QCBatch: QC20673

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.30 | 90 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.44 | 97 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.39 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.62 | 92 | 90 - 110 | 5/20/02 |

## ICV (1) QCBatch: QC20673

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.70 | 93 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.50 | 100 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.40 | 96 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.75 | 94 | 90 - 110 | 5/20/02 |

## CCV (1) QCBatch: QC20801

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 26.2 | 104 | 90 - 110 | 6/3/02 |
| Dissolved Magnesium | | mg/L | 25 | 25.8 | 103 | 90 - 110 | 6/3/02 |
| Dissolved Potassium | | mg/L | 25 | 25.3 | 101 | 90 - 110 | 6/3/02 |
| Dissolved Sodium | | mg/L | 25 | 25.7 | 102 | 90 - 110 | 6/3/02 |

## ICV (1) QCBatch: QC20801

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 25.0 | 100 | 95 - 105 | 6/3/02 |
| Dissolved Magnesium | | mg/L | 25 | 24.7 | 98 | 95 - 105 | 6/3/02 |
| Dissolved Potassium | | mg/L | 25 | 24.9 | 99 | 95 - 105 | 6/3/02 |
| Dissolved Sodium | | mg/L | 25 | 25.4 | 101 | 95 - 105 | 6/3/02 |

197394-97

AQ2052008

# CHAIN—OF—CUSTODY RECORD


LA Larson & Associates, Inc.
Environmental Consultants
507 N. Marienfeld, Ste. 202 • Midland, TX 79701
Fax: 915-687-0456
915-687-0901


CLIENT NAME: Texaco

SITE MANAGER: Mark Larson

PROJECT NO.: 0-0113

PROJECT NAME: Cooper - Jal

PAGE 1 OF 1

LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: Anions, Cations | PARAMETERS/METHOD NUMBER: TDS | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-16-02 | 2:00 | X | | | MW-7 197394 | 2 | X | X | | unpreserved, unfiltered |
| ↓ | 12:27 | ↓ | | | MW-8 395 | ↓ | ↓ | ↓ | | ↓ |
| | 11:30 | | | | MW-9 396 | | | | | |
| | 10:36 | | | | MW-11 397 | | | | | |

SAMPLED BY: (Signature) — DATE: 5-16-02 TIME: 5:00

RELINQUISHED BY: (Signature) — DATE: 5-17-02 TIME: 7:00 A

RECEIVED BY: (Signature) Helen Shelton — DATE: 5/17/02 TIME: 7:00

RELINQUISHED BY: (Signature) Helen Shelton — DATE: 5/17/02 TIME: 1830

RECEIVED BY: (Signature) — DATE: _____ TIME: _____

SAMPLE SHIPPED BY: (Circle) Greyhound

FEDEX (BUS) UPS HAND DELIVERED AIRBILL #: _____ OTHER: _____

COMMENTS:

TURNAROUND TIME NEEDED

WHITE – RECEIVING LAB
YELLOW – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
PINK – PROJECT MANAGER
GOLD – QA/QC COORDINATOR

RECEIVING LABORATORY: Trace Analysis
ADDRESS: 6701 Aberdeen Ave. Ste 9
CITY: Lubbock STATE: Tx. ZIP: 79424
CONTACT: Helen PHONE: (806) 794-1296

RECEIVED BY: (Signature)
DATE: 5/17/02 TIME: 9:20 AM

SAMPLE CONDITION WHEN RECEIVED:
Temp 4°C

LA CONTACT PERSON: (915) 687-0901
Mark Larson

SAMPLE TYPE:

GREYHOUND GLI 163-506-773-7

My 8 samples - HS

# Summary Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 11, 2002

Order ID Number: A02052015

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197420 | MW-1 | Water | 5/17/02 | 14:25 | 5/18/02 |
| 197421 | MW-2 | Water | 5/17/02 | 13:55 | 5/18/02 |
| 197422 | MW-3 | Water | 5/17/02 | 15:00 | 5/18/02 |
| 197423 | MW-4 | Water | 5/17/02 | 13:10 | 5/18/02 |
| 197424 | MW-5 | Water | 5/17/02 | 12:16 | 5/18/02 |
| 197425 | MW-6 | Water | 5/17/02 | 11:07 | 5/18/02 |
| 197426 | MW-10 | Water | 5/17/02 | 10:20 | 5/18/02 |

0 This report consists of a total of 4 page(s) and is intended only as a summary of results for the sample(s) listed above.

## Sample: 197420 - MW-1

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 208 | mg/L as CaCo3 |
| Total Alkalinity | | 208 | mg/L as CaCo3 |
| Chloride | | 237 | mg/L |
| Fluoride | | 5.83 | mg/L |
| Nitrate-N | | 3.28 | mg/L |
| Sulfate | | 86.9 | mg/L |
| Dissolved Calcium | | 45.7 | mg/L |
| Dissolved Magnesium | | 20.1 | mg/L |
| Dissolved Potassium | | 11.9 | mg/L |
| Dissolved Sodium | | 184 | mg/L |
| Total Dissolved Solids | | 784 | mg/L |

## Sample: 197421 - MW-2

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 |
| Total Alkalinity | | 160 | mg/L as CaCo3 |

*Continued on next page ...*

*Sample 197421 continued ...*

| Param | Flag | Result | Units |
|---|---|---|---|
| Chloride | [1] | 3200 | mg/L |
| Fluoride | [2] | 1.72 | mg/L |
| Nitrate-N | [3] | 3.18 | mg/L |
| Sulfate | | 483 | mg/L |
| Dissolved Calcium | | 587 | mg/L |
| Dissolved Magnesium | | 239 | mg/L |
| Dissolved Potassium | | 35.6 | mg/L |
| Dissolved Sodium | | 1160 | mg/L |
| Total Dissolved Solids | | 6040 | mg/L |

## Sample: 197422 - MW-3

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 158 | mg/L as CaCo3 |
| Total Alkalinity | | 158 | mg/L as CaCo3 |
| Chloride | | 30.6 | mg/L |
| Fluoride | | 1.56 | mg/L |
| Nitrate-N | | 2.35 | mg/L |
| Sulfate | | 102 | mg/L |
| Dissolved Calcium | | 55.6 | mg/L |
| Dissolved Magnesium | | 18.4 | mg/L |
| Dissolved Potassium | | 5.04 | mg/L |
| Dissolved Sodium | | 50.0 | mg/L |
| Total Dissolved Solids | | 433 | mg/L |

## Sample: 197423 - MW-4

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 232 | mg/L as CaCo3 |
| Total Alkalinity | | 232 | mg/L as CaCo3 |
| Chloride | | 11300 | mg/L |
| Fluoride | [4] | 2.01 | mg/L |
| Nitrate-N | [5] | 6.09 | mg/L |
| Sulfate | [6] | 1380 | mg/L |
| Dissolved Calcium | | 1610 | mg/L |

*Continued on next page ...*

[1]Chloride analysis for sample 197421 was performed on 05/20/02. ICV %IA = 90, CCV %IA = 90, Matrix Spikes RPD = 0, Matrix Spikes %EA = 89, LCS Spikes RPD = 1, LCS Spikes %EA = 90.

[2]Fluoride analysis for sample 197421 was performed on 05/20/02. ICV %IA = 98, CCV %IA = 96, Matrix Spikes RPD = 0, Matrix Spikes %EA = 93, LCS Spikes RPD = 0, LCS Spikes %EA = 96.

[3]Nitrate analysis for sample 197421 was performed on 05/20/02. ICV %IA = 96, CCV %IA = 95, Matrix Spikes RPD = 0, Matrix Spikes %EA = 98, LCS Spikes RPD = 1, LCS Spikes %EA = 96.

[4]CCV2 %IA = 96; CCV 3 %IA = 96; Matris Spikes RPD = 2; Matrix Spikes %EA = 92; LCS Spikes RPD = 0; LCS Spikes %EA = 96.

[5]CCV2 %IA = 95; CCV 3 %IA = 95; Matris Spikes RPD = 1; Matrix Spikes %EA = 92; LCS Spikes RPD = 0; LCS Spikes %EA = 96.

[6]CCV2 %IA = 92; CCV 3 %IA = 93; Matris Spikes RPD = 1; Matrix Spikes %EA = 91; LCS Spikes RPD = 0; LCS Spikes %EA = 94.

*Sample 197423 continued ...*

| Param | Flag | Result | Units |
|---|---|---|---|
| Dissolved Magnesium | | 814 | mg/L |
| Dissolved Potassium | | 60.9 | mg/L |
| Dissolved Sodium | | 4310 | mg/L |
| Total Dissolved Solids | | 22600 | mg/L |

## Sample: 197424 - MW-5

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 156 | mg/L as CaCo3 |
| Total Alkalinity | | 156 | mg/L as CaCo3 |
| Chloride | | 4040 | mg/L |
| Fluoride | | 1.53 | mg/L |
| Nitrate-N | | 4.56 | mg/L |
| Sulfate | [7] | 586 | mg/L |
| Dissolved Calcium | | 757 | mg/L |
| Dissolved Magnesium | | 319 | mg/L |
| Dissolved Potassium | | 60.9 | mg/L |
| Dissolved Sodium | | 1260 | mg/L |
| Total Dissolved Solids | | 8340 | mg/L |

## Sample: 197425 - MW-6

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 162 | mg/L as CaCo3 |
| Total Alkalinity | | 162 | mg/L as CaCo3 |
| Chloride | | 37.8 | mg/L |
| Fluoride | | 1.62 | mg/L |
| Nitrate-N | | 2.14 | mg/L |
| Sulfate | | 99.3 | mg/L |
| Dissolved Calcium | | 63.1 | mg/L |
| Dissolved Magnesium | | 19.6 | mg/L |
| Dissolved Potassium | | 5.12 | mg/L |
| Dissolved Sodium | | 48.6 | mg/L |
| Total Dissolved Solids | | 427 | mg/L |

## Sample: 197426 - MW-10

| Param | Flag | Result | Units |
|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 |

*Continued on next page ...*

[7] Sulfate analysis for sample 197424 was performed on 05/20/02. ICV %IA = 93, CCV %IA = 92, Matrix Spikes RPD = 1, Matrix Spikes %EA = 91, LCS Spikes RPD = 1, LCS Spikes %EA = 94.

*Sample 197426 continued ...*

| Param | Flag | Result | Units |
|---|---|---|---|
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 |
| Bicarbonate Alkalinity | | 152 | mg/L as CaCo3 |
| Total Alkalinity | | 152 | mg/L as CaCo3 |
| Chloride | | 204 | mg/L |
| Fluoride | | 1.93 | mg/L |
| Nitrate-N | | 2.19 | mg/L |
| Sulfate | | 99.1 | mg/L |
| Dissolved Calcium | | 109 | mg/L |
| Dissolved Magnesium | | 31.7 | mg/L |
| Dissolved Potassium | | 7.6 | mg/L |
| Dissolved Sodium | | 62.4 | mg/L |
| Total Dissolved Solids | | 713 | mg/L |

# Cation-Anion Balance Sheet

DATE: 6/10/02 MS

| Sample # | Calcium ppm | Magnesium ppm | Sodium ppm | Potassium ppm | Alkalinity ppm | Sulfate ppm | Chloride ppm | Nitrate ppm | Fluoride ppm | Bromide ppm | TDS ppm | EC µMHOs/cm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197420 | 45.7 | 20.1 | 184 | 11.9 | 208 | 86.9 | 237 | 3.28 | 5.83 | | 784 | |
| 197421 | 587 | 239 | 1160 | 35.6 | 160 | 483 | 3200 | 3.18 | 1.72 | | 6040 | |
| 197422 | 55.6 | 18.4 | 50 | 5.04 | 158 | 102 | 30.6 | 2.35 | 1.56 | | 433 | |
| 197423 | 1610 | 814 | 4310 | 60.9 | 232 | 1380 | 11300 | 6.09 | 2.01 | | 22600 | |
| 197424 | 757 | 319 | 1260 | 60.9 | 156 | 586 | 4040 | 4.56 | 1.53 | | 8340 | |
| 197425 | 63.1 | 19.6 | 48.6 | 5.12 | 162 | 99.3 | 37.8 | 2.14 | 1.62 | | 427 | |
| 197426 | 109 | 31.7 | 62.4 | 7.6 | 152 | 99.1 | 204 | 2.19 | 1.93 | | 713 | |

| Sample # | Calcium in meq/L | Magnesium in meq/L | Sodium in meq/L | Potassium in meq/L | Alkalinity in meq/L | Sulfate in meq/L | Chloride in meq/L | Nitrate in meq/L | Fluoride in meq/L | Bromide in meq/L | **Cations in meq/L** | **Anions in meq/L** | **Percentage Error** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197420 | 2.28 | 1.65 | 8.00 | 0.30 | 4.16 | 1.81 | 6.69 | 0.2341592 | 0.3068912 | 0 | 12.24 | 13.20 | 7.494159918 |
| 197421 | 29.29 | 19.67 | 50.46 | 0.91 | 3.20 | 10.06 | 90.27 | 0.2270202 | 0.0905408 | 0 | 100.33 | 103.85 | 3.444461941 |
| 197422 | 2.77 | 1.51 | 2.18 | 0.13 | 3.16 | 2.12 | 0.86 | 0.1677665 | 0.0821184 | 0 | 6.59 | 6.40 | 3.014004634 |
| 197423 | 80.34 | 66.98 | 187.49 | 1.56 | 4.64 | 28.73 | 318.77 | 0.4347651 | 0.1058064 | 0 | 336.37 | 352.69 | 4.736743211 |
| 197424 | 37.77 | 26.25 | 54.81 | 1.56 | 3.12 | 12.20 | 113.97 | 0.3255384 | 0.0805392 | 0 | 120.39 | 129.69 | 7.439284874 |
| 197425 | 3.15 | 1.61 | 2.11 | 0.13 | 3.24 | 2.07 | 1.07 | 0.1527746 | 0.0852768 | 0 | 7.01 | 6.61 | 5.798426973 |
| 197426 | 5.44 | 2.61 | 2.71 | 0.19 | 3.04 | 2.06 | 5.75 | 0.1563441 | 0.1015952 | 0 | 10.96 | 11.12 | 1.445599676 |

| | EC/Cation | EC/Anion | | | | |
|---|---|---|---|---|---|---|
| 197420 | 1224.2861 | 1319.60784 | range | 0 | to | 0 |
| 197421 | 10032.9258 | 10384.5621 | range | 0 | to | 0 |
| 197422 | 659.24992 | 639.67509 | range | 0 | to | 0 |
| 197423 | 33636.5882 | 35268.51715 | range | 0 | to | 0 |
| 197424 | 12039.2632 | 12969.49976 | range | 0 | to | 0 |
| 197425 | 700.66436 | 661.18154 | range | 0 | to | 0 |
| 197426 | 1095.6501 | 1111.60413 | range | 0 | to | 0 |

| TDS/EC | TDS/Cat | TDS/Anion | |
|---|---|---|---|
| #DIV/0! | 0.64 | 0.59 | needs to be 0.55-0.77 |
| #DIV/0! | 0.60 | 0.58 | needs to be 0.55-0.77 |
| #DIV/0! | 0.66 | 0.68 | needs to be 0.55-0.77 |
| #DIV/0! | 0.67 | 0.64 | needs to be 0.55-0.77 |
| #DIV/0! | 0.69 | 0.64 | needs to be 0.55-0.77 |
| #DIV/0! | 0.61 | 0.65 | needs to be 0.55-0.77 |
| #DIV/0! | 0.65 | 0.64 | needs to be 0.55-0.77 |

TRACEANALYSIS, INC.

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# Analytical and Quality Control Report

Mark Larson
Larson & Associates, Inc.
P.O. Box 50685
Midland, Tx. 79710

Report Date: June 11, 2002

Order ID Number: A02052015

Project Number: 00-0113
Project Name: Cooper-Jal
Project Location: Lea County, NM

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

| Sample | Description | Matrix | Date Taken | Time Taken | Date Received |
|---|---|---|---|---|---|
| 197420 | MW-1 | Water | 5/17/02 | 14:25 | 5/18/02 |
| 197421 | MW-2 | Water | 5/17/02 | 13:55 | 5/18/02 |
| 197422 | MW-3 | Water | 5/17/02 | 15:00 | 5/18/02 |
| 197423 | MW-4 | Water | 5/17/02 | 13:10 | 5/18/02 |
| 197424 | MW-5 | Water | 5/17/02 | 12:16 | 5/18/02 |
| 197425 | MW-6 | Water | 5/17/02 | 11:07 | 5/18/02 |
| 197426 | MW-10 | Water | 5/17/02 | 10:20 | 5/18/02 |

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.



Dr. Blair Leftwich, Director

# Analytical Report

## Sample: 197420 - MW-1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Alkalinity | Analytical Method: | E 310.1 | QC Batch: | QC20645 | Date Analyzed: | 5/30/02 |
| Analyst: | JSW | Preparation Method: | N/A | Prep Batch: | PB19691 | Date Prepared: | 5/30/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 208 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 208 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197420 - MW-1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Ion Chromatography (IC) | Analytical Method: | E 300.0 | QC Batch: | QC20673 | Date Analyzed: | 5/20/02 |
| Analyst: | MS | Preparation Method: | N/A | Prep Batch: | PB19717 | Date Prepared: | 5/20/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 237 | mg/L | 5 | 1 |
| Fluoride | | 5.83 | mg/L | 5 | 0.20 |
| Nitrate-N | | 3.28 | mg/L | 5 | 0.20 |
| Sulfate | | 86.9 | mg/L | 5 | 1 |

## Sample: 197420 - MW-1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Salts | Analytical Method: | E 200.7 | QC Batch: | QC20802 | Date Analyzed: | 6/3/02 |
| Analyst: | BC | Preparation Method: | S 3005A | Prep Batch: | PB19808 | Date Prepared: | 5/22/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 45.7 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 20.1 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 11.9 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 184 | mg/L | 1 | 0.50 |

## Sample: 197420 - MW-1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | TDS | Analytical Method: | E 160.1 | QC Batch: | QC20600 | Date Analyzed: | 5/24/02 |
| Analyst: | JSW | Preparation Method: | N/A | Prep Batch: | PB19657 | Date Prepared: | 5/23/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 784 | mg/L | 1 | 10 |

## Sample: 197421 - MW-2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis: | Alkalinity | Analytical Method: | E 310.1 | QC Batch: | QC20645 | Date Analyzed: | 5/30/02 |
| Analyst: | JSW | Preparation Method: | N/A | Prep Batch: | PB19691 | Date Prepared: | 5/30/02 |

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |

*Continued ...*

... *Continued* Sample: 197421 Analysis: Alkalinity

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 160 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197421 - MW-2

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20602 Date Analyzed: 5/20/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19659 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | [1] | 3200 | mg/L | 100 | 1 |
| Fluoride | [2] | 1.72 | mg/L | 5 | 0.20 |
| Nitrate-N | [3] | 3.18 | mg/L | 5 | 0.20 |
| Sulfate | | 483 | mg/L | 10 | 1 |

## Sample: 197421 - MW-2

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20802 Date Analyzed: 6/3/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19808 Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 587 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 239 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 35.6 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 1160 | mg/L | 1 | 0.50 |

## Sample: 197421 - MW-2

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20600 Date Analyzed: 5/24/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19657 Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 6040 | mg/L | 1 | 10 |

## Sample: 197422 - MW-3

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20645 Date Analyzed: 5/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19691 Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 158 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 158 | mg/L as CaCo3 | 1 | 1 |

[1]Chloride analysis for sample 197421 was performed on 05/20/02. ICV %IA = 90, CCV %IA = 90, Matrix Spikes RPD = 0, Matrix Spikes %EA = 89, LCS Spikes RPD = 1, LCS Spikes %EA = 90.

[2]Fluoride analysis for sample 197421 was performed on 05/20/02. ICV %IA = 98, CCV %IA = 96, Matrix Spikes RPD = 0, Matrix Spikes %EA = 93, LCS Spikes RPD = 0, LCS Spikes %EA = 96.

[3]Nitrate analysis for sample 197421 was performed on 05/20/02. ICV %IA = 96, CCV %IA = 95, Matrix Spikes RPD = 0, Matrix Spikes %EA = 98, LCS Spikes RPD = 1, LCS Spikes %EA = 96.

## Sample: 197422 - MW-3

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20673 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19717 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 30.6 | mg/L | 5 | 1 |
| Fluoride | | 1.56 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.35 | mg/L | 5 | 0.20 |
| Sulfate | | 102 | mg/L | 5 | 1 |

## Sample: 197422 - MW-3

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20802 Date Analyzed: 6/3/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19808 Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 55.6 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 18.4 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 5.04 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 50.0 | mg/L | 1 | 0.50 |

## Sample: 197422 - MW-3

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20600 Date Analyzed: 5/24/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19657 Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 433 | mg/L | 1 | 10 |

## Sample: 197423 - MW-4

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20645 Date Analyzed: 5/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19691 Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 232 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 232 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197423 - MW-4

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20675 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19718 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 11300 | mg/L | 500 | 1 |
| Fluoride | [4] | 2.01 | mg/L | 5 | 0.20 |
| Nitrate-N | [5] | 6.09 | mg/L | 5 | 0.20 |

*Continued ...*

[4]CCV2 %IA = 96; CCV 3 %IA = 96; Matris Spikes RPD = 2; Matrix Spikes %EA = 92; LCS Spikes RPD = 0; LCS Spikes %EA = 96.
[5]CCV2 %IA = 95; CCV 3 %IA = 95; Matris Spikes RPD = 1; Matrix Spikes %EA = 92; LCS Spikes RPD = 0; LCS Spikes %EA = 96.

... *Continued* Sample: 197423 Analysis: Ion Chromatography (IC)

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Sulfate | [6] | 1380 | mg/L | 50 | 1 |

## Sample: 197423 - MW-4

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC20802 Date Analyzed: 6/3/02
Analyst: BC Preparation Method: S 3005A Prep Batch: PB19808 Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 1610 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 814 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 60.9 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 4310 | mg/L | 1 | 0.50 |

## Sample: 197423 - MW-4

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC20600 Date Analyzed: 5/24/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19657 Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 22600 | mg/L | 50 | 10 |

## Sample: 197424 - MW-5

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC20645 Date Analyzed: 5/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB19691 Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 156 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 156 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197424 - MW-5

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC20675 Date Analyzed: 5/20/02
Analyst: MS Preparation Method: N/A Prep Batch: PB19718 Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 4040 | mg/L | 100 | 1 |
| Fluoride | | 1.53 | mg/L | 5 | 0.20 |
| Nitrate-N | | 4.56 | mg/L | 5 | 0.20 |
| Sulfate | [7] | 586 | mg/L | 50 | 1 |

[6]CCV2 %IA = 92; CCV 3 %IA = 93; Matris Spikes RPD = 1; Matrix Spikes %EA = 91; LCS Spikes RPD = 0; LCS Spikes %EA = 94.
[7]Sulfate analysis for sample 197424 was performed on 05/20/02. ICV %IA = 93, CCV %IA = 92, Matrix Spikes RPD = 1, Matrix Spikes %EA = 91, LCS Spikes RPD = 1, LCS Spikes %EA = 94.

## Sample: 197424 - MW-5

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20802 | Date Analyzed: 6/3/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19919 | Date Prepared: 6/10/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 757 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 319 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 60.9 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 1260 | mg/L | 1 | 0.50 |

## Sample: 197424 - MW-5

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20600 | Date Analyzed: 5/24/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19657 | Date Prepared: 5/23/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 8340 | mg/L | 10 | 10 |

## Sample: 197425 - MW-6

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20645 | Date Analyzed: 5/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19691 | Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 162 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 162 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197425 - MW-6

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC20673 | Date Analyzed: 5/20/02
Analyst: MS | Preparation Method: N/A | Prep Batch: PB19717 | Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 37.8 | mg/L | 5 | 1 |
| Fluoride | | 1.62 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.14 | mg/L | 5 | 0.20 |
| Sulfate | | 99.3 | mg/L | 5 | 1 |

## Sample: 197425 - MW-6

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20802 | Date Analyzed: 6/3/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19808 | Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 63.1 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 19.6 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 5.12 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 48.6 | mg/L | 1 | 0.50 |

## Sample: 197425 - MW-6

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20510 | Date Analyzed: 5/23/02
Analyst: RS | Preparation Method: N/A | Prep Batch: PB19580 | Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 427 | mg/L | 1 | 10 |

## Sample: 197426 - MW-10

Analysis: Alkalinity | Analytical Method: E 310.1 | QC Batch: QC20646 | Date Analyzed: 5/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB19692 | Date Prepared: 5/30/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 | 1 |
| Bicarbonate Alkalinity | | 152 | mg/L as CaCo3 | 1 | 1 |
| Total Alkalinity | | 152 | mg/L as CaCo3 | 1 | 1 |

## Sample: 197426 - MW-10

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC20673 | Date Analyzed: 5/20/02
Analyst: MS | Preparation Method: N/A | Prep Batch: PB19717 | Date Prepared: 5/20/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Chloride | | 204 | mg/L | 5 | 1 |
| Fluoride | | 1.93 | mg/L | 5 | 0.20 |
| Nitrate-N | | 2.19 | mg/L | 5 | 0.20 |
| Sulfate | | 99.1 | mg/L | 5 | 1 |

## Sample: 197426 - MW-10

Analysis: Salts | Analytical Method: E 200.7 | QC Batch: QC20802 | Date Analyzed: 6/3/02
Analyst: BC | Preparation Method: S 3005A | Prep Batch: PB19808 | Date Prepared: 5/22/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Dissolved Calcium | | 109 | mg/L | 1 | 0.50 |
| Dissolved Magnesium | | 31.7 | mg/L | 1 | 0.50 |
| Dissolved Potassium | | 7.6 | mg/L | 1 | 0.50 |
| Dissolved Sodium | | 62.4 | mg/L | 1 | 0.50 |

## Sample: 197426 - MW-10

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC20510 | Date Analyzed: 5/23/02
Analyst: RS | Preparation Method: N/A | Prep Batch: PB19580 | Date Prepared: 5/21/02

| Param | Flag | Result | Units | Dilution | RDL |
|---|---|---|---|---|---|
| Total Dissolved Solids | | 713 | mg/L | 1 | 10 |

# Quality Control Report
# Method Blank

## Method Blank

QCBatch: QC20510

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Total Dissolved Solids | | <10 | mg/L | 10 |

## Method Blank

QCBatch: QC20600

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Total Dissolved Solids | | <10 | mg/L | 10 |

## Method Blank

QCBatch: QC20602

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

## Method Blank

QCBatch: QC20645

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Bicarbonate Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |
| Total Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |

## Method Blank

QCBatch: QC20646

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Carbonate Alkalinity | | <1.0 | mg/L as CaCo3 | 1 |
| Bicarbonate Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |
| Total Alkalinity | | <4.0 | mg/L as CaCo3 | 1 |

## Method Blank

QCBatch: QC20673

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

**Method Blank** QCBatch: QC20675

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Chloride | | <1.0 | mg/L | 1 |
| Fluoride | | <0.2 | mg/L | 0.20 |
| Nitrate-N | | <0.2 | mg/L | 0.20 |
| Sulfate | | <1.0 | mg/L | 1 |

**Method Blank** QCBatch: QC20802

| Param | Flag | Results | Units | Reporting Limit |
|---|---|---|---|---|
| Dissolved Calcium | | <0.5 | mg/L | 0.50 |
| Dissolved Magnesium | | <0.5 | mg/L | 0.50 |
| Dissolved Potassium | | <0.6 | mg/L | 0.50 |
| Dissolved Sodium | | <0.5 | mg/L | 0.50 |

## Quality Control Report
## Duplicate Samples

**Duplicate** QCBatch: QC20510

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | 1730 | 1720 | mg/L | 1 | 0 | 9.7 |

**Duplicate** QCBatch: QC20600

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | 6115 | 6040 | mg/L | 1 | 1 | 9.7 |

**Duplicate** QCBatch: QC20645

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Carbonate Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Bicarbonate Alkalinity | | 166 | 162 | mg/L as CaCo3 | 1 | 2 | 9.2 |
| Total Alkalinity | | 166 | 162 | mg/L as CaCo3 | 1 | 2 | 9.2 |

## Duplicate

QCBatch: QC20646

| Param | Flag | Duplicate Result | Sample Result | Units | Dilution | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Carbonate Alkalinity | | <1.0 | <1.0 | mg/L as CaCo3 | 1 | 0 | 9.2 |
| Bicarbonate Alkalinity | | 106 | 104 | mg/L as CaCo3 | 1 | 1 | 9.2 |
| Total Alkalinity | | 106 | 104 | mg/L as CaCo3 | 1 | 1 | 9.2 |

# Quality Control Report
# Lab Control Spikes and Duplicate Spikes

## Laboratory Control Spikes

QCBatch: QC20602

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 11.42 | 11.39 | mg/L | 1 | 12.50 | <1.0 | 91 | 0 | 90 - 110 | 20 |
| Fluoride | 2.40 | 2.39 | mg/L | 1 | 2.50 | <0.2 | 96 | 0 | 90 - 110 | 20 |
| Nitrate-N | 2.39 | 2.38 | mg/L | 1 | 2.50 | <0.2 | 95 | 0 | 90 - 110 | 20 |
| Sulfate | 11.69 | 11.67 | mg/L | 1 | 12.50 | <1.0 | 93 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spikes

QCBatch: QC20673

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 11.34 | 11.34 | mg/L | 1 | 12.50 | <1.0 | 90 | 0 | 90 - 110 | 20 |
| Fluoride | 2.39 | 2.43 | mg/L | 1 | 2.50 | <0.2 | 95 | 1 | 90 - 110 | 20 |
| Nitrate-N | 2.40 | 2.39 | mg/L | 1 | 2.50 | <0.2 | 96 | 0 | 90 - 110 | 20 |
| Sulfate | 11.59 | 11.69 | mg/L | 1 | 12.50 | <1.0 | 92 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Laboratory Control Spikes

QCBatch: QC20675

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 11.26 | 11.15 | mg/L | 1 | 12.50 | <1.0 | 90 | 0 | 90 - 110 | 20 |
| Fluoride | 2.41 | 2.42 | mg/L | 1 | 2.50 | <0.2 | 96 | 0 | 90 - 110 | 20 |

*Continued ...*

... *Continued*

| Param | LCS Result | LCSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrate-N | 2.39 | 2.37 | mg/L | 1 | 2.50 | <0.2 | 95 | 0 | 90 - 110 | 20 |
| Sulfate | 11.74 | 11.68 | mg/L | 1 | 12.50 | <1.0 | 93 | 0 | 90 - 110 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Matrix Spikes and Duplicate Spikes

## Matrix Spikes

QCBatch: QC20602

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 1400 | 1410 | mg/L | 1 | 625 | 841 | 89 | 1 | 48 - 127 | 20 |
| Fluoride | 122 | 125 | mg/L | 1 | 125 | 3.16 | 95 | 2 | 82 - 101 | 20 |
| Nitrate-N | 125 | 126 | mg/L | 1 | 125 | 2.95 | 97 | 0 | 87 - 100 | 20 |
| Sulfate | 679 | 683 | mg/L | 1 | 625 | 100 | 92 | 0 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Matrix Spikes

QCBatch: QC20673

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 319.86 | 319.28 | mg/L | 1 | 125 | 204 | 92 | 0 | 48 - 127 | 20 |
| Fluoride | 25.73 | 24.07 | mg/L | 1 | 25 | 1.93 | 95 | 7 | 82 - 101 | 20 |
| Nitrate-N | 26.22 | 26.41 | mg/L | 1 | 25 | 2.19 | 96 | 0 | 87 - 100 | 20 |
| Sulfate | 224.84 | 224.41 | mg/L | 1 | 125 | 99.1 | 100 | 0 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

## Matrix Spikes

QCBatch: QC20675

| Param | MS Result | MSD Result | Units | Dil. | Spike Amount Added | Matrix Result | % Rec | RPD | % Rec Limit | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 22213 | 22210 | mg/L | 1 | 12500 | 11300 | 87 | 0 | 48 - 127 | 20 |
| Fluoride | 2463 | 2454 | mg/L | 1 | 2500 | 2.01 | 98 | 0 | 82 - 101 | 20 |
| Nitrate-N | 2454 | 2465 | mg/L | 1 | 2500 | 6.09 | 97 | 0 | 87 - 100 | 20 |
| Sulfate | 13462 | 13578 | mg/L | 1 | 12500 | 1380 | 96 | 0 | 59 - 121 | 20 |

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Quality Control Report
# Continuing Calibration Verification Standards

## CCV (1) QCBatch: QC20510

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 1008 | 100 | 90 - 110 | 5/23/02 |

## ICV (1) QCBatch: QC20510

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 967 | 96 | 90 - 110 | 5/23/02 |

## CCV (1) QCBatch: QC20600

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 1006 | 100 | 90 - 110 | 5/24/02 |

## ICV (1) QCBatch: QC20600

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | mg/L | 1000 | 994 | 99 | 90 - 110 | 5/24/02 |

## CCV (1) QCBatch: QC20602

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.33 | 90 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.41 | 96 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.38 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.63 | 93 | 90 - 110 | 5/20/02 |

## ICV (1) QCBatch: QC20602

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.21 | 89 | 90 - 110 | 5/20/02 |

*Continued ...*

*... Continued*

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Fluoride | | mg/L | 2.50 | 2.40 | 96 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.38 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.53 | 92 | 90 - 110 | 5/20/02 |

## CCV (1) QCBatch: QC20645

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 224 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 16 | 0 | 90 - 110 | 5/30/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 240 | 96 | 90 - 110 | 5/30/02 |

## ICV (1) QCBatch: QC20645

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 228 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 12 | 0 | 90 - 110 | 5/30/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 240 | 96 | 90 - 110 | 5/30/02 |

## CCV (1) QCBatch: QC20646

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 228 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 16 | 0 | 90 - 110 | 5/30/02 |
| Total Alkalinity | | mg/L as CaCo3 | 250 | 244 | 97 | 90 - 110 | 5/30/02 |

## ICV (1) QCBatch: QC20646

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Hydroxide Alkalinity | | mg/L as CaCo3 | 0 | <1.0 | 0 | 90 - 110 | 5/30/02 |
| Carbonate Alkalinity | | mg/L as CaCo3 | 0 | 224 | 0 | 90 - 110 | 5/30/02 |
| Bicarbonate Alkalinity | | mg/L as CaCo3 | 0 | 16 | 0 | 90 - 110 | 5/30/02 |

*Continued ...*

*... Continued*

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Alkalinity | | mg/L as CaCo3 | 250 | 240 | 96 | 90 - 110 | 5/30/02 |

## CCV (1) QCBatch: QC20673

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.30 | 90 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.44 | 97 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.39 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.62 | 92 | 90 - 110 | 5/20/02 |

## ICV (1) QCBatch: QC20673

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.70 | 93 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.50 | 100 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.40 | 96 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.75 | 94 | 90 - 110 | 5/20/02 |

## CCV (1) QCBatch: QC20675

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.21 | 89 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.40 | 96 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.38 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.53 | 92 | 90 - 110 | 5/20/02 |

## ICV (1) QCBatch: QC20675

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | mg/L | 12.50 | 11.30 | 90 | 90 - 110 | 5/20/02 |
| Fluoride | | mg/L | 2.50 | 2.44 | 97 | 90 - 110 | 5/20/02 |
| Nitrate-N | | mg/L | 2.50 | 2.39 | 95 | 90 - 110 | 5/20/02 |
| Sulfate | | mg/L | 12.50 | 11.62 | 92 | 90 - 110 | 5/20/02 |

## CCV (1) QCBatch: QC20802

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 26.3 | 105 | 90 - 110 | 6/3/02 |
| Dissolved Magnesium | | mg/L | 25 | 25.8 | 103 | 90 - 110 | 6/3/02 |
| Dissolved Potassium | | mg/L | 25 | 25.3 | 101 | 90 - 110 | 6/3/02 |
| Dissolved Sodium | | mg/L | 25 | 25.7 | 102 | 90 - 110 | 6/3/02 |

## ICV (1) QCBatch: QC20802

| Param | Flag | Units | CCVs True Conc. | CCVs Found Conc. | CCVs Percent Recovery | Percent Recovery Limits | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Dissolved Calcium | | mg/L | 25 | 25.0 | 100 | 95 - 105 | 6/3/02 |
| Dissolved Magnesium | | mg/L | 25 | 24.7 | 98 | 95 - 105 | 6/3/02 |
| Dissolved Potassium | | mg/L | 25 | 24.9 | 99 | 95 - 105 | 6/3/02 |
| Dissolved Sodium | | mg/L | 25 | 25.4 | 101 | 95 - 105 | 6/3/02 |

AQ2052015

# CHAIN—OF—CUSTODY RECORD

LA Larson & Associates, Inc. Environmental Consultants
507 N. Marienfeld, Ste. 202 • Midland, TX 79701
Fax: 915-687-0456
915-687-0901

CLIENT NAME: Texaco
SITE MANAGER: Mark Larson
PROJECT NO.: 0-0113
PROJECT NAME: Cooper - Jal
PAGE 1 OF 1
LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: Anions, Cations | PARAMETERS/METHOD NUMBER: TDS | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5-17-02 | 2:25 | X | | | MW-1 197420 | 2 | X | X | | unfiltered, unpreserved |
| | 1:55 | | | | MW-2 421 | | | | | |
| | 3:00 | | | | MW-3 422 | | | | | |
| | 1:10 | | | | MW-4 423 | | | | | |
| | 12:16 | | | | MW-5 424 | | | | | |
| | 11:07 | | | | MW-6 425 | | | | | |
| | 10:20 | | | | MW-10 426 | | | | | |

SAMPLED BY: (Signature) Ryan Rose DATE: 5-17-02 TIME: 1645
RELINQUISHED BY: (Signature) DATE: 5-17-02 TIME: 1645
RECEIVED BY: (Signature) Helen Shelton DATE: 5/17/02 TIME: 1645
RELINQUISHED BY: (Signature) Helen Shelton DATE: 5/17/02 TIME: 1830
RECEIVED BY: (Signature) DATE: 5/18/02 TIME: 9:20 AM
SAMPLE SHIPPED BY: (Circle) Greyhound GLI 1635772
FEDEX BUS AIRBILL #:
HAND DELIVERED UPS OTHER:

COMMENTS:

TURNAROUND TIME NEEDED

WHITE – RECEIVING LAB
YELLOW – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
PINK – PROJECT MANAGER
GOLD – QA/QC COORDINATOR

RECEIVING LABORATORY: Trace Analysis
ADDRESS: 6701 Aberdeen Ave St. 9
CITY: Lubbock STATE: Tx ZIP: 79424
CONTACT: Helen PHONE: 806 794 1296
RECEIVED BY: (Signature)
DATE: TIME:

SAMPLE CONDITION WHEN RECEIVED:

LA CONTACT PERSON: (915)687-0901 Mark Larson

SAMPLE TYPE:

14 samples - HS 6/12 F/P

# ANALYTICAL REPORT

## Prepared for:

**Cindy Crain**
**LARSON AND ASSOCIATES, INC.**
**P.O. BOX 50685**
**MIDLAND, TX 79710**

| | |
|---|---|
| **Project:** | Texaco/ Cooper-Jal |
| **PO#:** | |
| **Order#:** | G0204832 |
| **Report Date:** | 10/29/2002 |

**Certificates**
**US EPA Laboratory Code TX00158**

# ENVIRONMENTAL LAB OF TEXAS

## SAMPLE WORK LIST

LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710
915-687-0456

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

| Lab ID: | Sample : | Matrix: | Date / Time Collected | Date / Time Received | Container | Preservative |
|---|---|---|---|---|---|---|
| 0204832-01 | MW-10 | WATER | 10/22/02 15:38 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| 0204832-02 | Duplicate | WATER | 10/22/02 15:38 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| 0204832-03 | MW-7 | WATER | 10/22/02 16:42 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| 0204832-04 | MW-8 | WATER | 10/22/02 17:48 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| 0204832-05 | MW-13 | WATER | 10/23/02 7:27 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| 0204832-06 | MW-12 | WATER | 10/23/02 8:10 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |

# ENVIRONMENTAL LAB OF TEXAS

## SAMPLE WORK LIST

LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710
915-687-0456

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

| Lab ID: | Sample : | Matrix: | Date / Time Collected | Date / Time Received | Container | Preservative |
|---|---|---|---|---|---|---|
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-07** | Duplicate | WATER | 10/23/02 8:10 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-08** | MW-3 | WATER | 10/23/02 8:50 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-09** | MW-6 | WATER | 10/23/02 9:15 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-10** | MW-5 | WATER | 10/23/02 9:45 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-11** | MW-5A | WATER | 10/23/02 10:10 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |

# ENVIRONMENTAL LAB OF TEXAS

## SAMPLE WORK LIST

LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710
915-687-0456

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

| Lab ID: | Sample : | Matrix: | Date / Time Collected | Date / Time Received | Container | Preservative |
|---|---|---|---|---|---|---|
| 0204832-12 | MW-4 | WATER | 10/23/02 10:40 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride, Sulfate, Total Dissolved Solids (TDS) | **Rejected:** No | | **Temp:** 1.5 C | | |
| 0204832-13 | MW-4A | WATER | 10/23/02 11:05 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride, Sulfate, Total Dissolved Solids (TDS) | **Rejected:** No | | **Temp:** 1.5 C | | |
| 0204832-14 | MW-9 | WATER | 10/23/02 11:40 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride, Sulfate, Total Dissolved Solids (TDS) | **Rejected:** No | | **Temp:** 1.5 C | | |
| 0204832-15 | MW-9A | WATER | 10/23/02 11:55 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride, Sulfate, Total Dissolved Solids (TDS) | **Rejected:** No | | **Temp:** 1.5 C | | |
| 0204832-16 | MW-11 | WATER | 10/23/02 12:20 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride, Sulfate, Total Dissolved Solids (TDS) | **Rejected:** No | | **Temp:** 1.5 C | | |
| 0204832-17 | MW-2 | WATER | 10/23/02 13:50 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** Chloride | **Rejected:** No | | **Temp:** 1.5 C | | |

# ENVIRONMENTAL LAB OF TEXAS

## SAMPLE WORK LIST

LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710
915-687-0456

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

| Lab ID: | Sample : | Matrix: | Date / Time Collected | Date / Time Received | Container | Preservative |
|---|---|---|---|---|---|---|
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-18** | MW-2A | WATER | 10/23/02 14:20 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |
| **0204832-19** | MW-1 | WATER | 10/23/02 15:00 | 10/23/02 15:00 | 4 oz Glass | Ice |
| | ***Lab Testing:*** | **Rejected:** No | | **Temp:** 1.5 C | | |
| | Chloride | | | | | |
| | Sulfate | | | | | |
| | Total Dissolved Solids (TDS) | | | | | |

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Cindy Crain
LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

**Lab ID:** 0204832-01
**Sample ID:** MW-10

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 213 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 108 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 758 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-02
**Sample ID:** Duplicate

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 222 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 107 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 802 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-03
**Sample ID:** MW-7

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 88.6 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 109 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 490 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-04
**Sample ID:** MW-8

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 40.8 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 104 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 392 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-05
**Sample ID:** MW-13

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 549 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 370 | mg/L | 5 | 2.5 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 1740 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

RL = Reporting Limit N/A = Not Applicable

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Cindy Crain
LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

**Lab ID:** 0204832-05
**Sample ID:** MW-13

**Lab ID:** 0204832-06
**Sample ID:** MW-12

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 65.0 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 102 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 477 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-07
**Sample ID:** Duplicate

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 62.0 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 99.2 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 439 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-08
**Sample ID:** MW-3

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 35.4 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 104 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 419 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-09
**Sample ID:** MW-6

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 46.1 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 109 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 331 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

RL = Reporting Limit N/A = Not Applicable

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Cindy Crain
LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

**Lab ID:** 0204832-10
**Sample ID:** MW-5

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 49.6 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 94.8 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 422 | mg/L | 1 | 5.0 | 160.1 | 10/25/02 | TAL |

**Lab ID:** 0204832-11
**Sample ID:** MW-5A

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 3900 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 616 | mg/L | 12.5 | 6.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 8670 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-12
**Sample ID:** MW-4

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 11300 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 1320 | mg/L | 25 | 12.5 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 23200 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-13
**Sample ID:** MW-4A

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 478 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 114 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 1430 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-14
**Sample ID:** MW-9

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 39.0 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 102 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 436 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

RL = Reporting Limit N/A = Not Applicable

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Cindy Crain
LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

**Lab ID:** 0204832-14
**Sample ID:** MW-9

**Lab ID:** 0204832-15
**Sample ID:** MW-9A

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 168 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 75.5 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 651 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-16
**Sample ID:** MW-11

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 37.2 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 102 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 447 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-17
**Sample ID:** MW-2

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 2920 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 451 | mg/L | 10 | 5.0 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 6770 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

**Lab ID:** 0204832-18
**Sample ID:** MW-2A

*Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 44.3 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 97.0 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 425 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

RL = Reporting Limit N/A = Not Applicable

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Cindy Crain
LARSON AND ASSOCIATES, INC.
P.O. BOX 50685
MIDLAND, TX 79710

Order#: G0204832
Project: 0-0113
Project Name: Texaco/ Cooper-Jal
Location: None Given

**Lab ID:** 0204832-19
**Sample ID:** MW-1

### *Test Parameters*

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 168 | mg/L | 1 | 5.00 | 9253 | 10/26/02 | SB |
| Sulfate | 96.8 | mg/L | 2.5 | 1.25 | 375.4 | 10/25/02 | SB |
| Total Dissolved Solids (TDS) | 696 | mg/L | 1 | 5.0 | 160.1 | 10/28/02 | TAL |

Approval: Raland K Tuttle 10-28-02
Raland K. Tuttle, Lab Director, QA Officer Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

RL = Reporting Limit N/A = Not Applicable

# ENVIRONMENTAL LAB OF TEXAS

## QUALITY CONTROL REPORT

### Test Parameters

**Order#: G0204832**

| ***BLANK*** WATER | LAB-ID # | Sample Concentr. | Spike Concentr. | QC Test Result | Pct (%) Recovery | RPD |
|---|---|---|---|---|---|---|
| Chloride-mg/L | 0003545-01 | | | <5.00 | | |
| Sulfate-mg/L | 0003543-01 | | | <0.50 | | |
| Total Dissolved Solids (TDS)-mg/L | 0003548-01 | | | <5.0 | | |
| Total Dissolved Solids (TDS)-mg/L | 0003556-01 | | | <5.0 | | |
| ***DUPLICATE*** WATER | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Sulfate-mg/L | 0204832-01 | 108 | | 109 | | 0.9% |
| Total Dissolved Solids (TDS)-mg/L | 0204832-01 | 758 | | 757 | | 0.1% |
| Total Dissolved Solids (TDS)-mg/L | 0204832-11 | 8670 | | 8670 | | 0.% |
| ***MS*** WATER | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/L | 0204832-01 | 213 | 500 | 709 | 99.2% | |
| ***MSD*** WATER | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/L | 0204832-01 | 213 | 500 | 717 | 100.8% | 1.1% |
| ***SRM*** WATER | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/L | 0003545-04 | | 5000 | 4960 | 99.2% | |
| Sulfate-mg/L | 0003543-04 | | 50 | 49.5 | 99.% | |

# CHAIN—OF—CUSTODY RECORD

LA Larson & Associates, Inc.
Environmental Consultants
Fax: 915-687-0456
915-687-0901
507 N. Marienfeld, Ste. 202 • Midland, TX 79701

CLIENT NAME: Texaco

SITE MANAGER: Cindy Crain

PROJECT NO.: 0-0113

PROJECT NAME: Cooper Jal

PAGE 1 OF 2

LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION 0204832 | | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: Chloride | Sulfate | TDS | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/22/02 | 1538 | ✓ | | | mw-10 | 01 | 1 | ✓ | ✓ | ✓ | | Un Preserved |
| " | 1538 | ✓ | | | Duplicate | 02 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1642 | ✓ | | | mw-7 | 03 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1748 | ✓ | | | mw-8 | 04 | 1 | ✓ | ✓ | ✓ | | " " |
| 10/23/02 | 0727 | ✓ | | | mw-13 | 05 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 0810 | ✓ | | | mw-12 | 06 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 0810 | ✓ | | | Duplicate | 07 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 0850 | ✓ | | | mw-3 | 08 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 0915 | ✓ | | | mw-6 | 09 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 0945 | ✓ | | | mw-5 | 10 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1010 | ✓ | | | mw-5A | 11 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1040 | ✓ | | | mw-4 | 12 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1105 | ✓ | | | mw-4A | 13 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1140 | ✓ | | | mw-9 | 14 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1155 | ✓ | | | mw-9A | 15 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1220 | ✓ | | | mw-11 | 16 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1350 | ✓ | | | mw-2 | 17 | 1 | ✓ | ✓ | ✓ | | " " |
| " | 1420 | ✓ | | | mw-2A | 18 | 1 | ✓ | ✓ | ✓ | | " " |

SAMPLED BY: (Signature) Michael Holmes
DATE: 10-23-02
TIME: 0700

RELINQUISHED BY: (Signature)
DATE:
TIME:

RECEIVED BY: (Signature)
DATE:
TIME:

RELINQUISHED BY: (Signature) Michael Holmes
DATE: 10-23-02
TIME:

RECEIVED BY: (Signature)
DATE:
TIME:

SAMPLE SHIPPED BY: (Circle)
FEDEX BUS AIRBILL #:
HAND DELIVERED UPS OTHER:

COMMENTS:

TURNAROUND TIME NEEDED

**WHITE** – RECEIVING LAB
**YELLOW** – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
**PINK** – PROJECT MANAGER
**GOLD** – QA/QC COORDINATOR

RECEIVING LABORATORY: ELOT
ADDRESS: 12600 W. I-20 E.
CITY: Odessa STATE: TX ZIP: 79765
CONTACT: PHONE: 563-1800

RECEIVED BY: (Signature) Sandra Biggs
DATE: 10/23/02 TIME: 1500

SAMPLE CONDITION WHEN RECEIVED: 1.5°C

LA CONTACT PERSON: Cindy Crain

SAMPLE TYPE:

# CHAIN—OF—CUSTODY RECORD

Larson & Associates, Inc.
Environmental Consultants
Fax: 915-687-0456
915-687-0901
507 N. Marienfeld, Ste. 202 • Midland, TX 79701

CLIENT NAME: Texaco

SITE MANAGER: Cindy Crain

PROJECT NO.: 0-0113

PROJECT NAME: Cooper-Jal

PAGE 2 OF 2

LAB. PO #

| DATE | TIME | WATER | SOIL | OTHER | SAMPLE IDENTIFICATION | NUMBER OF CONTAINERS | PARAMETERS/METHOD NUMBER: Chloride | PARAMETERS/METHOD NUMBER: Sulfate 1 | PARAMETERS/METHOD NUMBER: 85 | LAB. I.D. NUMBER (LAB USE ONLY) | REMARKS (I.E., FILTERED, UNFILTERED, PRESERVED, UNPRESERVED, GRAB COMPOSITE) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/23/02 | 1500 | / | | | MW-1 19 | 1 | / | / | / | | Unpreserved |

SAMPLED BY: (Signature) Michael Hall
DATE: 10-23-02
TIME: 0700

RELINQUISHED BY: (Signature)
DATE:
TIME:

RECEIVED BY: (Signature)
DATE:
TIME:

RELINQUISHED BY: (Signature)
DATE: 10-23-02
TIME:

RECEIVED BY: (Signature)
DATE:
TIME:

SAMPLE SHIPPED BY: (Circle)
FEDEX BUS AIRBILL #:
HAND DELIVERED UPS OTHER:

COMMENTS:

TURNAROUND TIME NEEDED

**WHITE** – RECEIVING LAB
**YELLOW** – RECEIVING LAB (TO BE RETURNED TO LA AFTER RECEIPT)
**PINK** – PROJECT MANAGER
**GOLD** – QA/QC COORDINATOR

RECEIVING LABORATORY: ELOT
ADDRESS: 12600 W I 20 E
CITY: Odessa STATE: Texas ZIP: 79765
CONTACT: PHONE: 563-1800

RECEIVED BY: (Signature) Sandra Bizzle
DATE: 10/23/02 TIME: 1500

SAMPLE CONDITION WHEN RECEIVED: 1.5°C

LA CONTACT PERSON: Cindy Crain

SAMPLE TYPE: